



## *Detailed Business Case*

## *Asset Management Data Standard (AMDS)*

Hannah Farwig

15 October 2021

1.0

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**Authorised signatory**

Approved by	Date	Signature
David Darwin Lead Advisor Investment Planning	18.10.21	
Yogesh Anand Chief Technology Officer	18/10/2021	

Authorised signature indicates that:

- the appropriate personnel have read, understood and agreed to the details of the programme described in this document
- Any changes to the requirements approved for development and delivery by this business case must be subject to formal change control process.

**Endorsement by**

Date of Meeting	Decision	Chair signature

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# DOCUMENT CONTROL

## Document version history

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16 Sept 2021	0.2	Hannah Farwig	Feedback from AMDS programme team incorporated.
27 Sept 2021	0.3	Hannah Farwig	Updated with feedback from Paul Hassell & Mark Owen
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15 Oct 2021	1.0	Hannah Farwig	Approved by Business Owner and Programme Sponsor

## Document review

Role	Name	Review status
Programme Manager – Transport Data	Stephen Carter	Draft v1.0
Programme Sponsor / Governance Group Member	Yogesh Anand	Draft v1.0
Business Owner / Governance Group Member	David Darwin	Draft v1.0
Governance Group Member	Paul Hassall	Draft v1.0
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Workstream Lead – Stakeholder Engagement & Communications	Cath Jacobs	Draft v1.0
Asset Management Data Consultant	Michaela James	Draft v1.0
Senior Outcomes Advisor	Sebastian Reed	Draft v1.0

## Related documents

Document	Version / Date	Location
AMDS Indicative Business Case	Final	<a href="#">InfoHub – AMDS programme</a>
Digital Engineering Programme Business Case	2.0	<a href="#">InfoHub – AMDS programme</a>
AMDS Assurance Plan	1.2	<a href="#">InfoHub - AMDS programme</a>

Document	Version / Date	Location
Government Policy Statement on Land Transport 2021/22-2030/31	Sep 2020	<a href="#">Ministry of Transport website</a>
Waka Kotahi NZ Transport Agency statement of intent 2021–2026	Jun 2021	<a href="#">Waka Kotahi website</a>
The Thirty-Year New Zealand Infrastructure Plan 2015	Aug 2015	<a href="#">Treasury website</a>
Strategy for a Digital Public Service	Mar 2020	<a href="#">Digital.govt.nz</a>

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# PROJECT INFORMATION

## Role identification

<b>Programme Manager</b>	Stephen Carter, Programme Manager - Transport Data
<b>Programme Business Owner</b>	David Darwin, Lead Advisor Investment Planning
<b>Programme Sponsor</b>	Yogesh Anand, Chief Technology Officer

## GLOSSARY OF TERMS

Term	Acronym	Description
Asset class		An asset class is a grouping of physical assets that exhibit similar characteristics.
Asset management		The systematic and coordinated activities and practices of an organisation to optimally and sustainably deliver on its objectives through the cost-effective lifecycle management of assets.
Asset management data standard	AMDS	The Asset Management Data Standard (AMDS) is a collaboration between Waka Kotahi NZ Transport Agency, The Road Efficiency Group (REG) and the transport sector to improve the management of land transport infrastructure asset information that supports best decisions about New Zealand's land transport assets
Benefits cost ratio	BCR	A benefit cost ratio is an indicator, used in cost-benefit analysis, that summarises the overall value for money of a project, programme or proposal.
Building Information Modelling	BIM	Building Information Modelling (BIM) is a set of technologies, processes and policies enabling multiple stakeholders to collaboratively design, construct and operate a Facility in virtual space.
Cost benefit analysis	CBA	Cost benefit analysis is a systematic approach used to evaluate the strengths and weaknesses of options to determine to compare the benefits achieved to the costs of delivery.
Data standard		A data standard is a documented agreement which defines the representation, format and structure of data.
Detailed Business Case	DBC	The detailed business case recommends a preferred option that optimises value for money and seeks approval from decision-makers to finalise the arrangements for successful implementation.
Digital Engineering	DE	Digital Engineering (DE) is a convergence of technologies such as Building Information Modelling (BIM), Geographic Information Systems (GIS) and other related data for driving better businesses, projects and asset management outcomes. DE enables a collaborative way of working using digital processes to enable more productive methods of planning, designing, constructing, operating and maintaining assets through their lifecycle.
Indicative Business Case	IBC	The indicative business case provides decision makers with an early indication of the preferred way forward for high value and/or high risk investment proposals.
Lead Asset Management Advisor	LAMA	The Lead Asset Management Advisor (LAMA) is a role within Waka Kotahi's Transport Services group. They will have a key role embedding and championing AMDS within Waka Kotahi and the sector.



Term	Acronym	Description
Land Transport Management Act	LTMA	The purpose of the Land Transport Management Act (LTMA) is to contribute to an effective, efficient, and safe land transport system in the public interest. Part 4 of the Act establishes the New Zealand Transport Agency and sets out the objective and functions of the Agency, its operating principles, and related provisions.
National Land Transport Programme	NLTP	The National Land Transport Programme (NLTP) is a three-year programme that sets out how Waka Kotahi, working with its partners, plans to invest the National Land Transport Fund (NLTF) to create a safer, more accessible, better connected and more resilient land transport system that keeps New Zealand moving.
National Land Transport Fund	NLTF	The National Land Transport Fund (NLTF) is made up of revenue collected from: fuel excise duty, road user charges, vehicle and driver registration and licensing, state highway property disposal and leasing and road tolling. By law, NLTF money has to be invested in land transport.
Programme Business Case	PBC	The programme business case is used to seek early approval to start a preferred programme of work, to underpin subsequent business cases and to review the ongoing viability of the programme at key points. It provides an early opportunity for the organisation and key stakeholders to influence the direction of the investment proposal and to avoid too much effort being put into developing investment proposals and options that should not proceed.
Road Controlling Authority	RCA	A road authority is the body responsible for the care, control or management of roads within a given jurisdiction. Road authorities are typically local governments.
The Road Efficiency Group	REG	The Road Efficiency Group (REG) programme supports the New Zealand transport sector to deliver a modern integrated system to align with the objectives of local, regional and central government.
Value chain		A value chain is a business model that describes the full range of activities needed to create a product or service

# EXECUTIVE SUMMARY

## Introduction

This Detailed Business Case (DBC) seeks formal approval to invest up to \$65.7 million over six years (2021-2027) to implement an Asset Management Data Standard (AMDS) for the transport sector.

AMDS implementation is included in the NLTP as a probable activity indicating the intent and ability to invest.

## Proposed investment

### What is an asset management data standard (AMDS)?

A data standard is a documented agreement which defines the representation, format and structure of data. AMDS is specifically focused on Aotearoa's land transport assets<sup>1</sup>. It will:

- enable consistent, integrated approach to data structures and asset management
- enable better and cheaper asset data acquisition and analytics
- improve management of land transport asset data and increase opportunities for sharing and collaboration
- improve forward work planning, strategic asset management and improved sector-wide investment decisions through a richer, consistent, spatially enabled evidence base

### Work completed to date

Significant work has been undertaken on the data standard design and the programme is on track to publish the first iteration of AMDS by 30 June 2022. In parallel, prototypes have been established to provide evidence that AMDS can be successfully implemented within an asset management system.

Stakeholder engagement and communication has been a key focus for the programme and there is wide support from the transport sector for the creation of a data standard<sup>2</sup>.

Previously, the AMDS programme has completed a Programme Business Case (PBC)<sup>3</sup> and an Indicative Business Case (IBC)<sup>4</sup>. These business cases established the case for change and the IBC evaluated a range of options to meet the business needs. The IBC identified a preferred way forward with a short-list of implementation options that have been analysed in more detail in this DBC.

### Purpose of this DBC

The purpose of this business case is to:

- confirm the strategic context and how AMDS supports Waka Kotahi's strategic priorities
- confirm the economic case for change and the need for this investment now
- recommend the AMDS implementation approach

## Background

### Strategic context

AMDS is a critical component of the sector's asset management value chain and will enable consistent evidence-based decisions to be made at a local and system level. It provides the foundation for the industry to develop sector wide Digital Engineering (DE) and Building Information Modelling (BIM) which will improve transport outcomes, reduce network maintenance costs, reduce infrastructure costs and enables Waka Kotahi and the Road Controlling Authorities (RCAs) to build a more resilient and connected Aotearoa.

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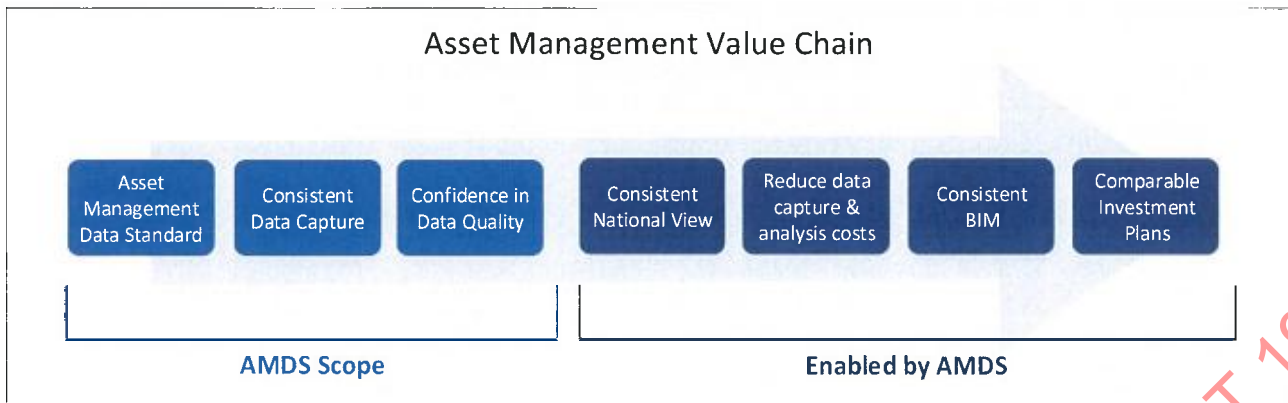
<sup>1</sup> Refer appendix D for a list of asset classes that are included in the first iteration of AMDS

<sup>2</sup> Refer appendix E for stakeholder quotes about what AMDS means for their organisation

<sup>3</sup> Digital Engineering for Transport - Programme Business Case was approved in June 2018

<sup>4</sup> Asset Management Data Standard - Indicative Business Case was approved in November 2019

Figure 1: AMDS value chain



Implementation of AMDS across the sector supports delivery of Waka Kotahi’s statement of intent, the Thirty-Year New Zealand Infrastructure Plan, the Government Policy Statement (GPS) on Land Transport and the Strategy for a Digital Public Service.

It is highly likely that a sector wide data standard for land transport assets will become a requirement in the future, either driven by the Ministry of Transport, the RCAs or the market. There is real benefit to Waka Kotahi and the sector from implementing AMDS now across all RCAs including Waka Kotahi.

Organisations are viewing data as an asset and prioritising investment in digitising their business. Early publication and implementation of AMDS supports this investment, and for the transport sector it will enable the sector to implement and realise benefits from BIM and DE.

Two road maintenance suppliers have adopted a data standard tailored for their business operations. This confirms the commercial advantages that data standards bring to a commodity business. It also highlights a risk that multiple disparate data standards could be introduced across the transport sector, which will increase complexity and cost.

Waka Kotahi is the largest transport network operator in Aotearoa, and it is therefore crucial that any standard is developed in a way that it can be applied by Waka Kotahi and aligned to the approach outlined in the Strategy for a Digital Public Service. Additionally, Waka Kotahi can provide the catalyst, in the form of critical mass, to accelerate adoption of AMDS and deliver productivity benefits earlier than would be possible if left to the market or individual RCAs.

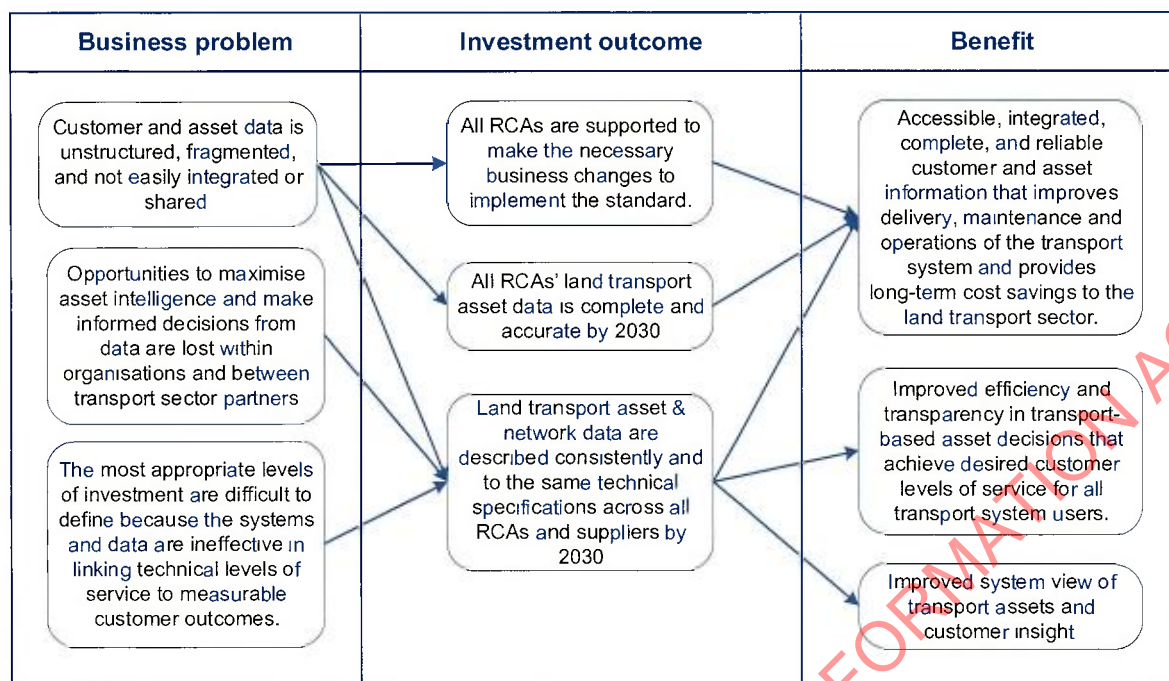
**Problem definition and benefits**

The AMDS programme has undertaken detailed analysis to define the business problems, investment outcomes and benefits. These have been reviewed and reconfirmed through the development of the DBC.

In summary, the preferred option offers total benefits of \$185m over ten years, in net present value terms, with a Benefit Cost Ratio (BCR) of 4.4.

The following diagram shows how the investment outcomes address the business problems and deliver the programme benefits.

Figure 2: relationship between the business problems, investment outcomes and benefits



### DBC option assessment

Significant engagement with the sector and Waka Kotahi stakeholders about the AMDS implementation approach has enhanced the programme's understanding of the RCA's technology landscape and their preferences in terms of approach and timeframes. Based on these insights, the preferred option from the IBC was updated (option 7a) and an additional hybrid option was identified (option 10).

Ernst and Young were engaged to undertake economic analysis of the following four options.

- Option 1: do-minimum**

Completion of the data standard for core inventory asset classes. Waka Kotahi publishes the standard online. No further investment by Waka Kotahi, i.e. documentation, training, guidance, implementation support and ongoing maintenance of the standard is not provided.
- Option 7: full support for the AMDS, NLTF - fully funded (IBC preferred option)**

A full data standard (core inventory asset classes) is implemented for RCAs (excludes the state highway network). Implementation support would be funded by Waka Kotahi and provided locally to enable each RCA to have access to 'on the ground' guidance and technical assistance.
- Option 7a: updated full support for the AMDS, NLTF - fully funded**

This option is based on option 7, applying the same technical solution and associated IT costs. Timeframes, i.e. the anticipated roll-out of the standard across tranches, have been updated to align with DBC assumptions. state highway organisations have also been included.

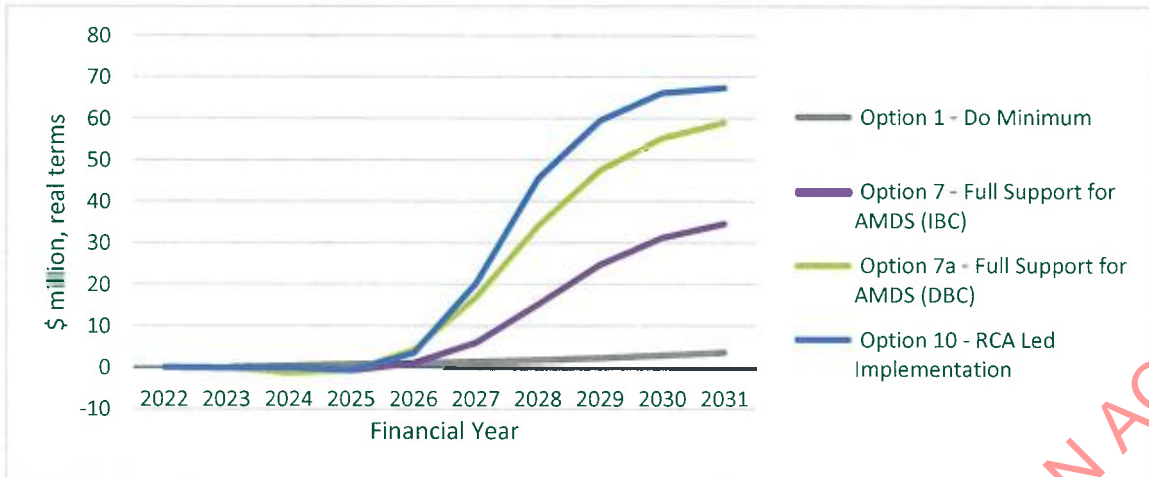
As per Option 7, a full data standard (core inventory asset classes) would be implemented. Implementation support would be procured by Waka Kotahi and provided locally to enable each RCA to have access to 'on the ground' guidance and technical assistance. With the update, Waka Kotahi as an RCA is now included in the analysis.
- Option 10: RCA led implementation NLTF – partially funded**

This option proposes a more devolved model where Waka Kotahi offers RCAs flexibility, without imposing excessive procurement costs, by undertaking a Request for Information (RFI) to identify suppliers in the market who can provide technical and integration services.

A full data standard (core inventory asset classes) would be implemented with Waka Kotahi providing support and quality assurance activities.

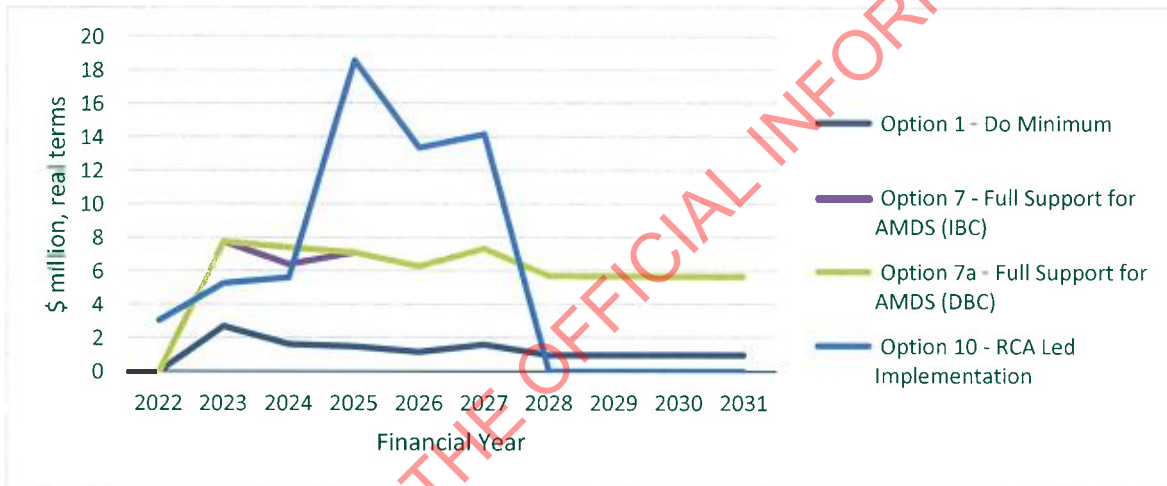
The following graph show the benefits over time.

Figure 3: DBC benefits over time



The cost structure and implementation timeframe for option 10 differs from the other options. It has higher costs earlier due to the establishment of a BAU team to increased availability of support earlier in the programme and condenses the implementation timeframe. This is depicted in the graph below.

Figure 4: DBC costs over time



### The preferred option

Following consultation with sector stakeholders and the results from the economic analysis, Option 10: RCA led implementation has been identified as the preferred option.

The cost benefit analysis determined that Option 10 will deliver the highest net benefits (BCR 4.4). This option requires RCAs to contribute to and manage their implementation of AMDS, which is aligned to Waka Kotahi's investment principles. Additionally, this approach should incentivise a robust implementation of the data standard and increase the likelihood that the full benefit potential of the programme is realised.

The benefits associated with this option have the same drivers as the original IBC options of cost savings in operations and maintenance and supply chains.

### Management approach

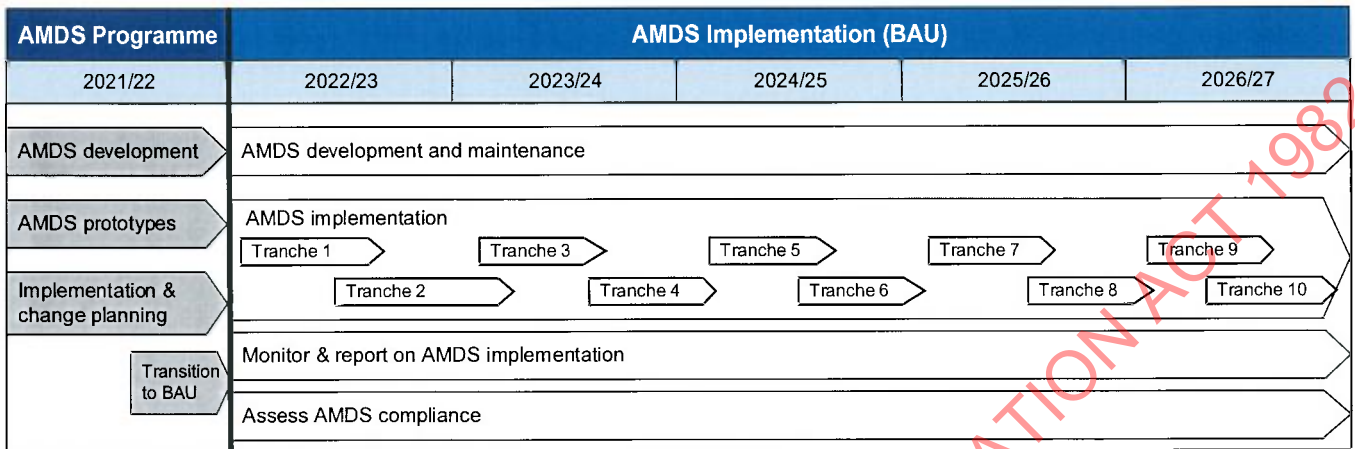
Accountability for the AMDS programme is shared by Transport Services and Te Aukaha - Digital Group. This is reflected in the membership of the AMDS Governance Group.

AMDS delivery is the responsibility of the Programme Manager - Transport Data. The programme has five established workstreams which will be in place until June 2022. From 01 July 2022 the implementation of AMDS will be handed over to the Te Aukaha – Digital Group, Data Management team for business as usual delivery.

The programme is supported by subject matter expertise from Waka Kotahi's finance, communications and engagement, and change management teams.

Stakeholder engagement has been facilitated by forums established for the AMDS programme (Road Efficiency Group (REG) Reference Group, Contractor’s Reference Group and the RCA Data Standard Group). These groups represent the sector; membership includes RCAs, maintenance contractors, consultants and Waka Kotahi.

Figure 5: AMDS timeline



## Recommendation

This business case recommends:

1. Completion of the AMDS for core inventory asset classes and their lifecycles and the continuation of the other workstreams (enabling technology, change, management, implementation planning, and stakeholder engagement and communications) required to prototype, plan and consult on the AMDS implementation approach.
2. Establishment of a new data standards team within Te Aukaha - Digital Group to support the implementation of AMDS, continued development and maintenance of the data standard and assessment of RCAs compliance with AMDS. This team will work in partnership with Transport Service’s Lead Asset Management Advisor (LAMA).
3. Waka Kotahi is confirmed as the steward and custodian of AMDS. This will ensure the standard remains consistent across the transport sector.
4. \$65.7M OpEx is released over six years to implement AMDS across all RCAs, including Waka Kotahi. AMDS implementation is included in the NLTP as a probable activity indicating the intent and ability to invest.

# STRATEGIC CASE

## The strategic context

The land transport sector invests in, maintains, operates, and improves the national and local transport system for customers to use today and tomorrow.

The relationship between Waka Kotahi, RCAs, consultants, and contractors is fundamental to providing an integrated, safe, and connected transport system that enables customers and goods to move throughout Aotearoa.

Land transport services in Aotearoa are required to be effective, efficient, and safe, and must provide efficient infrastructure and public services in a way that is most cost-effective for households and businesses, now and in the future. This is mandated through the Land Transport Management Act (LTMA)<sup>5</sup> and the Local Government Act (LGA).

The Thirty-Year New Zealand Infrastructure Plan and the Government Policy Statement (GPS) on Land Transport both highlighted the need for more mature asset management practices. Additionally, the Road Efficiency Group (REG) independently concluded that a national asset data standard is needed.

Mature asset management practices preserve and extend the service life of long-term infrastructure assets, this directly contributes to a more resilient and connected Aotearoa. Asset management decisions are enhanced through access to high quality standardised asset data.

Transport networks across Aotearoa service a common customer base and use common practices, materials and techniques. Asset management decisions on these networks use similar, but not consistent, data making it difficult to develop economies of scale in data collection and interpretation. The data differences also impede efforts to assess which networks would benefit from improved practices, materials and techniques as it is difficult to assess the scale of opportunity or forecast the benefits.

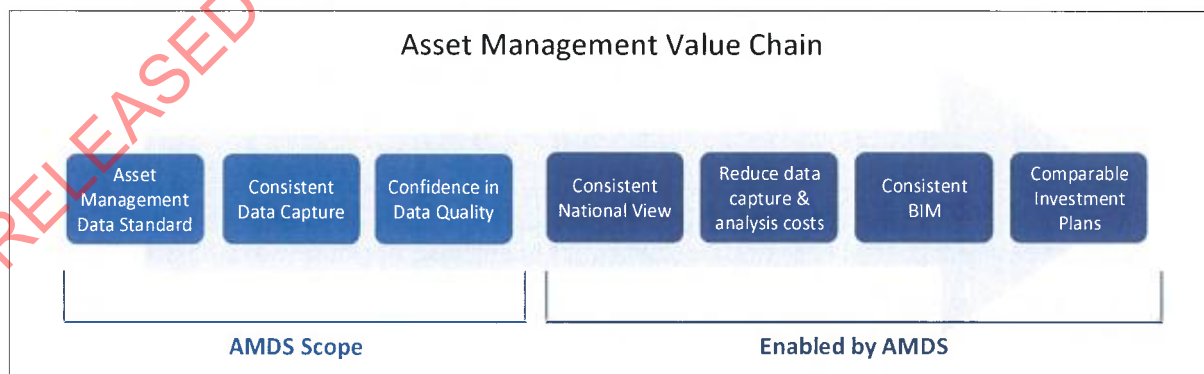
Networks have often used bespoke data and approaches as they perceive that their context is unique. However, there is evidence that asset management decisions operate in a largely common context, e.g. the aggregate benchmark data, provided by the REG insights tool, and the fact that 90% of the variability between network maintenance costs is caused by traffic demand differences between networks. This supports the argument that a common approach to asset management data can improve asset investment value for money.

Additionally, the shared service arrangements in place (e.g. Rata and the Northern Transport Alliance) and the use of common back office data by commercial road maintenance contractors shows the benefits of shared approaches requiring and using common data standards.

The adoption of a data standard for land transport assets by all RCAs will offer a consistent, integrated approach to data structures and asset management. It will enable better and cheaper asset data acquisition and analytics, better management of land transport asset data and greater opportunities for sharing and collaboration. This will improve forward work planning, strategic asset management and improved sector-wide investment decisions through a richer, consistent, spatially enabled evidence base.

The asset management value chain shows the relationship between what is delivered by the implementation of AMDS and what is enabled.

Figure 6: AMDS value chain



<sup>5</sup> The Land Transport Management Act (LTMA) requires Waka Kotahi to contribute to an effective, efficient, and safe land transport system in the public interest.

## The business problem

Through the development of the IBC, workshops were held which identified the following business problems that will be addressed through investment in the implementation of AMDS:

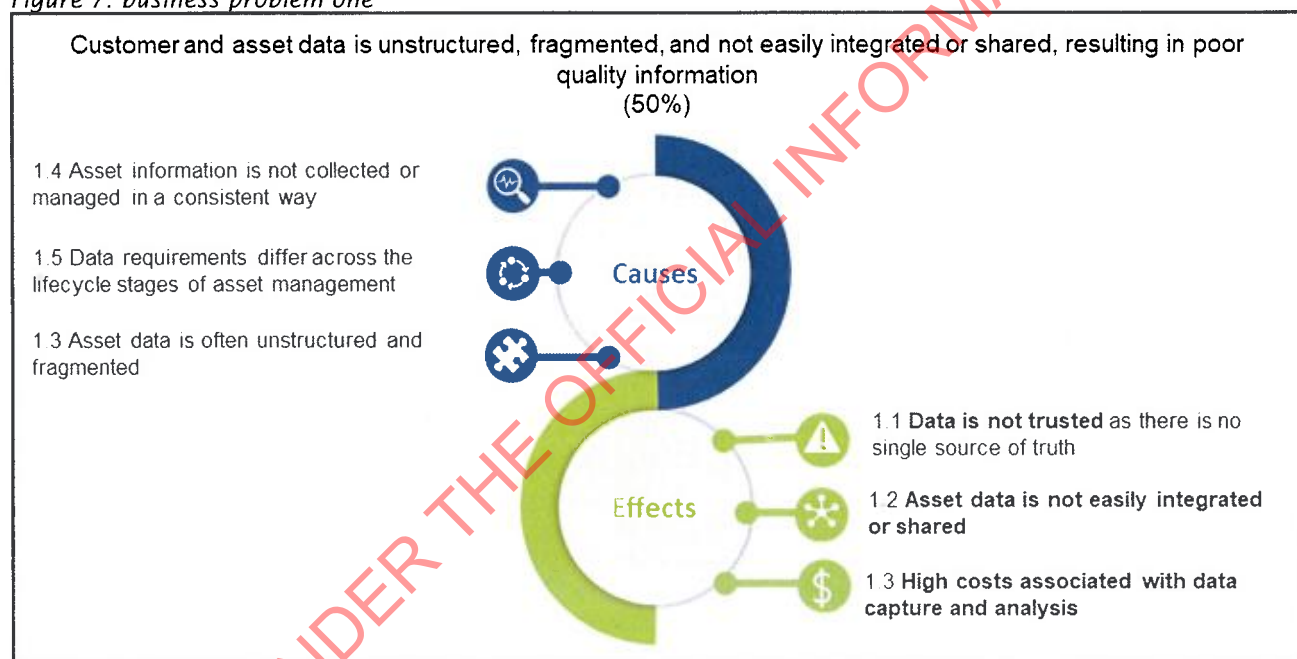
1. Customer and asset data is unstructured, fragmented, and not easily integrated or shared.
2. Opportunities to maximise asset intelligence and make informed decisions from data are lost within organisations and between transport sector partners.
3. The most appropriate levels of investment are difficult to define because the systems and data are ineffective in linking technical levels of service to measurable customer outcomes.

The business problem definition is supported by local and international evidence, for example Highways England have documented millions of pounds in cost associated with miscommunication and misspecification from fragmented asset data. Engagement with public and private asset managers across New Zealand similarly identified huge challenges in integrating and analysing road asset data. Several RCAs highlighted that better data is necessary to prioritise maintenance spending, such that high-value and high-risk assets can be focussed upon.

### Problem one: customer and asset data is unstructured, fragmented, and not easily integrated or shared

Consistent data will improve asset intelligence and allow for data to be shared and integrated within RCAs and across the sector. This is critical for operating an effective, efficient transport system.

Figure 7: business problem one



Example one: there are currently 12 different reference systems and processes for the road centreline; different RCAs have set up independent road centreline management methods. These competing systems are not easily integrated, which makes it complex and time consuming to establish centreline information.

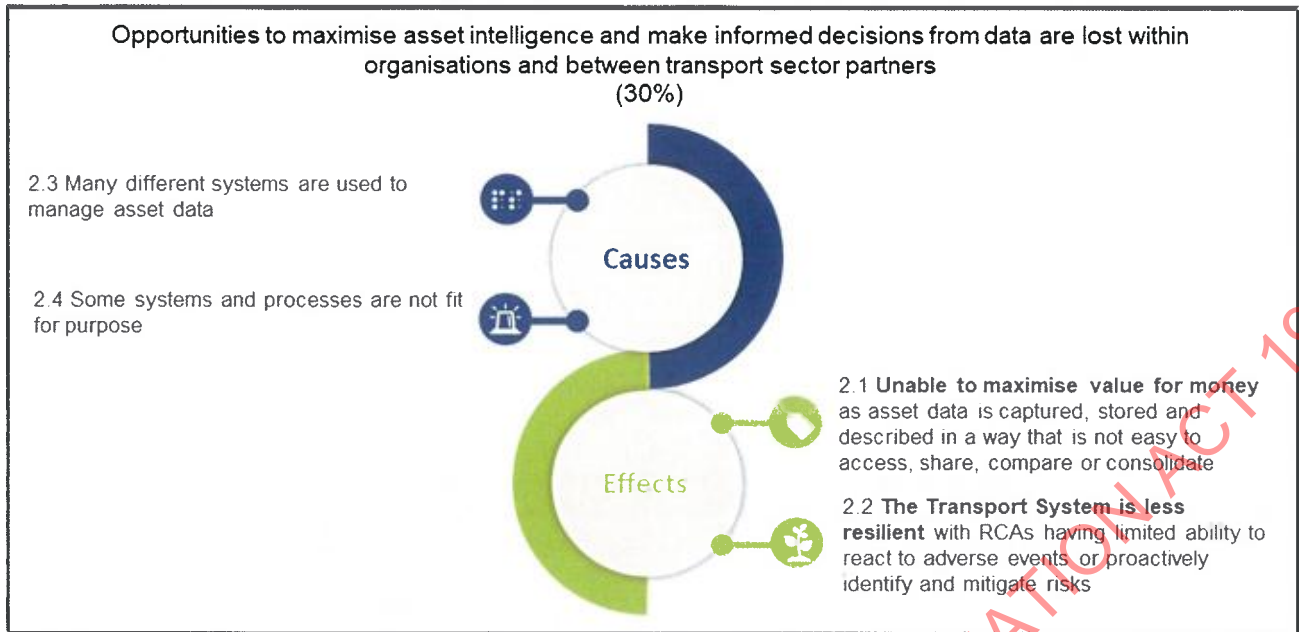
Example two: the Road Maintenance Taskforce work of 2011-2013 was established to address the high degree of decentralisation in both Waka Kotahi and the RCAs. This included significant fragmentation in maintenance and renewals, from both a professional services and physical works perspective. This initiative implemented a level of rationalisation within Waka Kotahi, including the centralisation of procurement activities (e.g. moving from over 250 grass mowing contracts to less than 100) which delivered significant productivity gains and improved value for money. Not all identified business problems were addressed, particularly at the RCA level.

### Problem two: opportunities to maximise asset intelligence and make informed decisions from data are lost within organisations and between transport sector partners.

The ability to make evidence-based decisions reduces the risk of asset failure and allows investment decisions to be needs based and consider the full transport system. Additionally, increased visibility of the nationwide forward view of work will provide opportunities to bulk procure materials.



Figure 8: business problem two

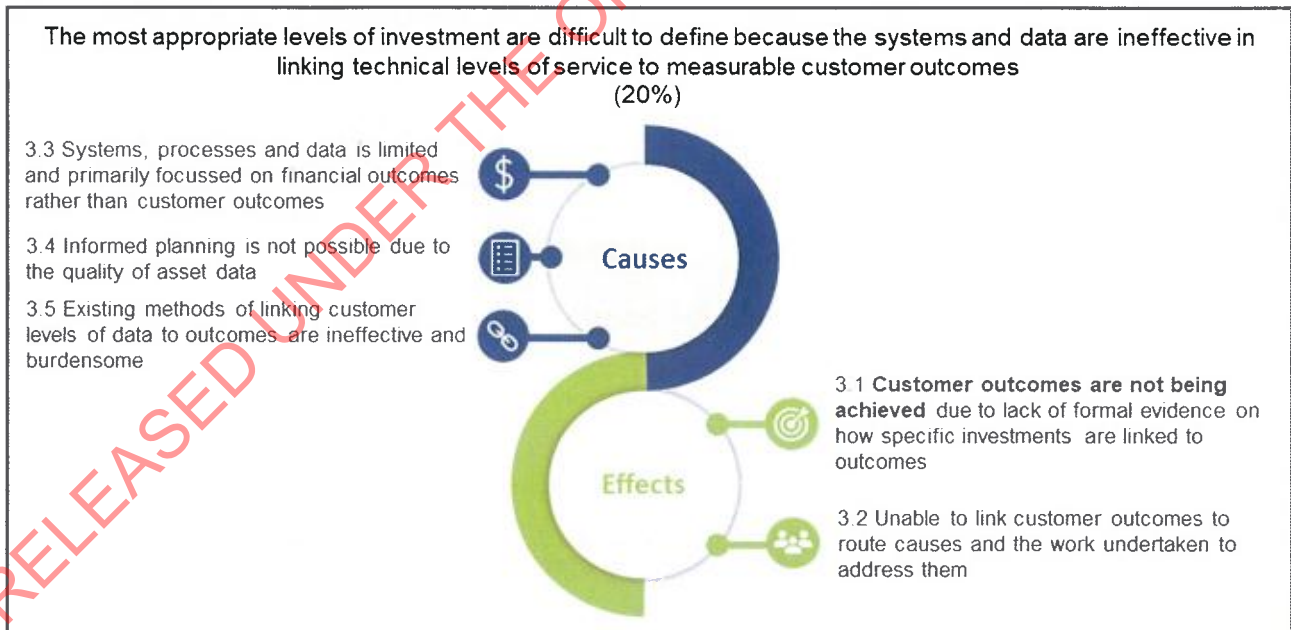


Example three: road safety barriers are procured on a short-term, as-needed basis. Due to the inability to develop a nationwide view of the need for road barriers, it is not possible to realise cost efficiencies through bulk supply agreements.

**Problem three: the most appropriate levels of investment are difficult to define because the systems and data are ineffective in linking technical levels of service to measurable customer outcomes.**

The data standard will improve asset intelligence and enable consistent integrated asset planning across the sector. This will allow the sector to deliver the appropriate interventions at the right location and time which improves customer outcomes and creates a consistent experience across the land transport system.

Figure 9: business problem three



Example four: the safety risk associated with defective road safety barriers is difficult to quantify as records for state highway assets have incomplete information about the number of safety barriers in place, their condition and age.

## Alignment to strategic priorities

### Waka Kotahi NZ Transport Agency statement of intent 2021–2026

Te kāpehu describes Waka Kotahi’s vision as a land transport system connecting people, products and places for a thriving Aotearoa. Four core system outcomes underpin the work undertaken by Waka Kotahi, which are aligned with the Transport Outcomes Framework and reflect the priorities of the GPS on land transport 2021:

- Safe
- Environmentally sustainable
- Effectively and efficiently moving people and freight
- Meeting current and future needs

In addition to the system outcomes, Waka Kotahi’s statement of intent outlines the roles required to achieve its vision. The implementation of the asset management data standard contributes to each of the roles and the realisation of Waka Kotahi’s vision.

Table 1: AMDS contribution to Waka Kotahi statement of intent

Role		AMDS contribution
<b>Kia hoe ngātahi</b> Move together as one	Kia hoe ngātahi is about working with people and in partnerships, in particular, with iwi and local government, to build a more resilient and connected Aotearoa.	<ul style="list-style-type: none"> <li>• Enables Waka Kotahi and the RCAs to build a more resilient and connected Aotearoa through evidence-based decision making and need based asset interventions.</li> <li>• Establishment of a data standard to improved transport outcomes and reduce infrastructure costs.</li> </ul>
<b>Te anamata</b> Leave great legacies	Te anamata is about what we do for Aotearoa. We plan, invest and build for future generations and leave legacies for our children.	<ul style="list-style-type: none"> <li>• Improved ability to curate valuable data, information and insights on behalf of all New Zealanders.</li> <li>• Enables improvements to the delivery of transport solutions and maintenance of the state highway network.</li> <li>• Improved evidence based NLTP funding decisions.</li> </ul>
<b>Kia tika te mahi</b> Deliver the right things	Kia tika te mahi is about our stewardship of the country’s largest asset, our \$60 billion land transport network.	<ul style="list-style-type: none"> <li>• Supports Waka Kotahi to meet its obligations as owner and manager of the land transport network.</li> <li>• Enables evidence-based asset management decisions that are aligned to customer needs.</li> </ul>
<b>Kia marutau</b> Enable a safe system	Kia marutau puts safety and the environment at our heart.	<ul style="list-style-type: none"> <li>• Supports evidence-based asset management decisions that ensure work is prioritised based on need.</li> </ul>

### Government Policy Statement (GPS) on land transport 2021/22-2030/31

This investment enables delivery of the following GPS strategic priorities.

- Better Travel Options
- Improving Freight Connections priority

Table 2: AMDS contribution to GPS

Strategic priority	AMDS contribution
<b>Better Travel Options</b> improve people’s transport choices and to make sure our cities and towns have transport networks that are fit for purpose and fit for the future	<ul style="list-style-type: none"> <li>• Improved access to network data enables enhanced, evidence based, decision making and a local and system level.</li> <li>• Maintenance data collected consistently across the transport network can assist with prioritisation of forwards works plans.</li> <li>• Supports management of transport assets to minimise maintenance disruption and improve travel options for customers.</li> </ul>

Strategic priority	AMDS contribution
<b>Improving Freight Connections</b> Well-designed transport corridors with efficient, reliable and resilient connections will support productive economic activity.	<ul style="list-style-type: none"> <li>• Access to network data will optimise management of transport assets through evidence-based decision making and prioritisation.</li> <li>• This minimises disruption and improve reliability of existing freight connections.</li> </ul>

Additionally, the consistent capture and management of asset data supports Waka Kotahi in the delivery of the following Ministerial expectations:

146: The Minister expects Waka Kotahi will:

- work closely with every region to help them develop robust RLTPs informed by evidence that take account of GPS 2021
- coordinate delivery across the whole land transport system based on service level standards that are consistent with network use and function
- have and maintain a longer-term understanding of the costs of maintaining land transport assets

154: The Minister expects Waka Kotahi will work collaboratively across the sector within the environment created by the Transport Evidence Base Strategy to:

- make necessary, timely and cost-effective enhancements to information, data, analytical and modelling systems to manage and gain insight from the large volumes of data generated by the land transport system
- collect, maintain and publish accurate, reliable and relevant, open (land transport) data

### The Thirty-Year New Zealand Infrastructure Plan 2015

The vision outlined in the Thirty-Year New Zealand Infrastructure Plan is that by 2045 Aotearoa's infrastructure is resilient and coordinated and contributes to a strong economy and high living standards.

This investment will strengthen asset management at Waka Kotahi and the RCAs, and contributes to deliver the following action:

- Develop national metadata standards for roads, water and buildings to ensure a consistent base to build evidence, undertake forecasting and deepen capability.

### Strategy for a Digital Public Service

Table 3: AMDS contribution to the strategy for a digital public service

Focus area	AMDS contribution
<b>Foundations</b> Integrated services are enabled through digital foundations that can be used across the public service, making it possible to reuse data, rules and transactions, as well as government-wide standards and frameworks.	<ul style="list-style-type: none"> <li>• Provides increased opportunities to collaborate and share data between government agencies and local authorities.</li> <li>• AMDS will be publicly available, which will allow other organisations to use and align to the standard.</li> </ul>
<b>Investment</b> Investment in digital, data and ICT take an all-of-government view to ensure future investment is targeted, efficient and creates public value.	<ul style="list-style-type: none"> <li>• Increases the ability for investment decisions to be made at a system level, e.g. increased procurement opportunities</li> <li>• Increased confidence that asset management decisions are evidence based and deliver:               <ul style="list-style-type: none"> <li>- value for money</li> <li>- efficiency through coordination and collaboration</li> <li>- wider environmental and social benefits</li> </ul> </li> </ul>
<b>New ways of working</b> The public service works together, across agencies, being flexible and mobile, and using appropriate practices to deliver better services for all New Zealanders.	<ul style="list-style-type: none"> <li>• Improves collaboration across RCAs to deliver outcomes.</li> <li>• Improved ability to respond rapidly to significant events like natural disasters.</li> </ul>

## Partners and key stakeholders

### Waka Kotahi

Waka Kotahi is responsible for the development of the AMDS, the implementation approach and rollout schedule.

Waka Kotahi is the steward and custodian of the AMDS and will provide ongoing governance and facilitate engagement with the sector. Additionally, they manage the RCA budget allocations, through the NLTP process using conventional Funding Assistance Rates (FAR), provide support to RCAs and assess AMDS compliance.

Waka Kotahi is also an RCA and will plan and manage the implementation of AMDS for the state highway network.

### Road Efficiency Group (REG)

The successful implementation of AMDS across all RCAs is a key component of the REG value chain.

They are a key partner in the establishment of AMDS and will track implementation of AMDS using the REG insights tool. They are an ambassador for AMDS and play a key role in sector communications and engagement.

### Road Controlling Authorities (RCAs)

RCAs are contributing partners to this business case. They are responsible for the implementation of AMDS for their organisation, within the agreed timeframes and to the expected level of data quality.

Once implemented, they will be responsible for ensuring that asset data is collected and maintained in line with the AMDS.

### Maintenance contractors and consultants

Contractors and consultants who provide RCAs with roading design and implementation services<sup>6</sup>, including data management and insights, are stakeholders to this business case.

It is likely that they will work with RCAs to implement AMDS. Once implemented, the asset data that they collect and/or maintain on behalf of RCAs will be aligned to AMDS.

### Te Manatū Waka - Ministry of Transport

This programme supports the delivery of GPS on land transport. AMDS will provide Te Manatū Waka with access to consistent data on land transport assets which will enhance their ability to undertake sector-wide analytics.

As an example, Te Manatū Waka are completing a data access study where the issues around RCAs and the market of mobility providers are very similar to those identified within this business case, e.g. there are 4 different data requirements for e-scooters across councils in Aotearoa which increases business and compliance costs.

### Digital Government Partnership

AMDS is aligned with the Strategy for a Digital Public Service and will enable increased collaboration on land transport asset management between government agencies and partners, for example, local authorities and the private sector.

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<sup>6</sup> Refers to the construction of new assets and maintenance of existing assets.

## Benefits

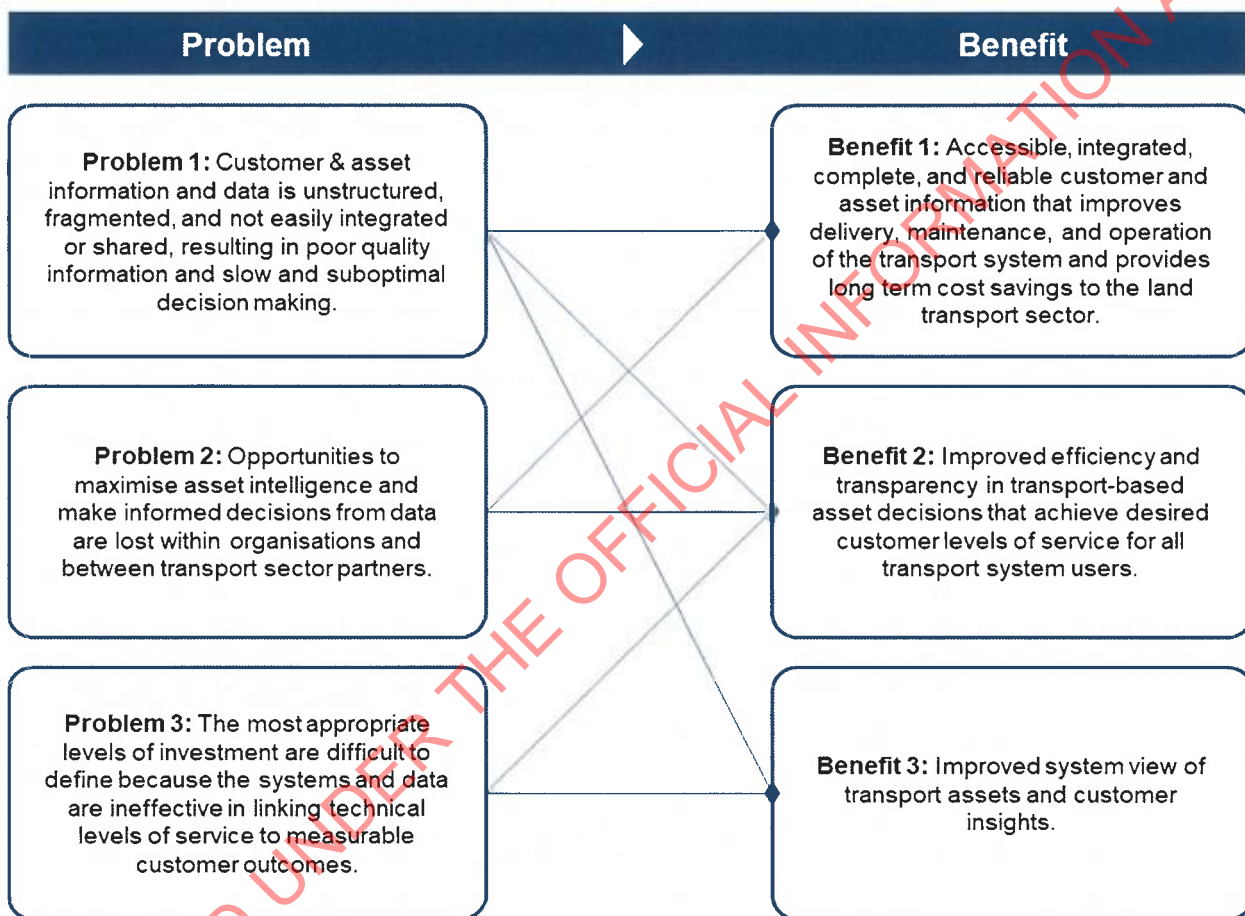
The introduction of an AMDS used nationally by all RCAs will introduce a significant step change for asset management of transport infrastructure.

Benefits analysis was undertaken through the development of the IBC. The following primary benefits have been reviewed and validated<sup>7</sup>.

1. Accessible, integrated, complete, and reliable customer and asset information that improves delivery, maintenance and operations of the transport system and provides long-term cost savings to the land transport sector.
2. Improved efficiency and transparency in transport-based asset decisions that achieve desired customer levels of service for all transport system users.
3. Improved system view of transport assets and customer insight.

The diagram below shows the relationship between the business problem and the benefits.

Figure 10: alignment of benefits to the business problems



Since the IBC, Waka Kotahi have implemented the Land Transport Benefits Framework and Management Approach. The AMDS benefits can be aligned to the following economic prosperity benefits:

- 5.1 impact on system reliability
- 5.2 impact on network productivity and utilisation.

Additionally, this programme of work provides a foundation which will enable future projects to deliver benefits aligned to the five transport outcomes.

<sup>7</sup> Refer appendix F for AMDS benefits analysis

The following mechanisms and measures will provide evidence that AMDS has been successfully implemented and the benefits realised.

Table 4: benefits mechanisms and measures

Mechanism	Measure
New report to track AMDS implementation	The AMDS Implementation Schedule will be baselined by 30 June 2022 and used to measure AMDS progress.
New report to measure compliance with AMDS	Baselines will be established for each RCA as an AMDS implementation activity.
REG Annual Data Quality Report	Baseline will be taken from the previous year's report. Data quality score to improve following implementation of AMDS.

## Investment objectives

Four investment objectives were developed in an IBC stakeholder workshop which was facilitated by Deloitte. They have been reviewed as part of the development of this business case to ensure that the investment will address the underlying business problem and deliver the objective.

Table 5: AMDS investment objective one

Investment objective 1: All RCAs' land transport asset data is complete and accurate by 2030	
<b>Overview</b>	<ul style="list-style-type: none"> <li>It is essential that asset data is reliable and available for asset management and investment decision making.</li> <li>AMDS will improve the current accuracy, completeness, and compliance of asset data.</li> <li>This objective provides the foundation step for digital engineering and BIM.</li> </ul>
<b>Existing arrangements</b>	<ul style="list-style-type: none"> <li>Data quality, completeness, and accuracy varies across RCAs and commonly performs poorly in each of these categories</li> <li>Data is commonly unstructured, often with large amounts of information in free-text fields</li> <li>Bespoke, organisation specific data collection contracts are in place</li> </ul>
<b>Business needs</b>	<ul style="list-style-type: none"> <li>Consistent definitions are used to describe assets.</li> <li>Asset data is complete and captured consistently across all RCAs.</li> <li>Confidence in asset data is high and is actively used to inform asset planning and maintenance decision.</li> </ul>
<b>Critical success factor</b>	<ul style="list-style-type: none"> <li>The data standard is adopted by data suppliers which delivers reduced costs for data collection and analysis.</li> <li>Improved data quality ratings from the annual REG One Network Road Classification (ONRC) Data Quality Report.</li> </ul>

Table 6: AMDS investment objective two

Investment objective 2: Land transport asset and network data are described consistently and to the same technical specifications across all RCAs and suppliers by 2030	
<b>Overview</b>	<ul style="list-style-type: none"> <li>To enable the efficient aggregation of individual RCA asset data, data must be collected, described, and reported consistently.</li> <li>This objective ensures that the workstream delivers solutions that drive consistency in asset data across the sector.</li> </ul>
<b>Existing arrangements</b>	<ul style="list-style-type: none"> <li>There is significant customisation of the data structures within each RCA's asset management system.</li> </ul>
<b>Business needs</b>	<ul style="list-style-type: none"> <li>The same standard, data model and technical specifications are in use by all sector participants.</li> <li>Business processes for data collection, input, and reporting are embedded consistently across all RCAs.</li> <li>Future updates to the standard are centrally managed to maintain consistency as the standard continues to be enhanced.</li> <li>Effective mechanisms are established to engage with impacted teams within RCAs, Contractors and consultants, and Waka Kotahi.</li> </ul>

**Investment objective 2: Land transport asset and network data are described consistently and to the same technical specifications across all RCAs and suppliers by 2030**

<b>Critical success factor</b>	<ul style="list-style-type: none"> <li>An increase in the number of RCAs that describe and report on asset data in a consistent and compliant way through the REG insights tool.</li> <li>A reduction in the number of individual user defined tabled (UDT) used to manage land transport assets (currently 2,300).</li> </ul>
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Table 7: AMDS investment objective three

**Investment objective 3: Technology solutions are available to the market which meet the ongoing data and asset management needs of RCAs and contractors as early as practicable.**

This objective was outlined in the IBC. A market scan was undertaken which confirmed that asset management solutions are available that can be utilised for land transport assets.

The AMDS Governance Group agreed a scope change on 04 March 2021 to prioritise the development of a data standard that is system agnostic and publicly available. This allows RCAs to select asset management software that meets the needs of their business.

To ensure the standard can be implemented from a technology, process and people perspective prototypes are being developed to test AMDS. AMDS will also conform to current and emerging international standards.

Table 8: AMDS investment objective four

**Investment objective 4: All RCAs are supported to make the necessary business changes to implement the standard.**

<b>Overview</b>	<ul style="list-style-type: none"> <li>The implementation of AMDS will require RCAs to collect different data about their assets.</li> <li>This objective ensures that change impacts are defined, and RCAs supported to transition to the AMDS.</li> </ul>
<b>Existing arrangements</b>	<ul style="list-style-type: none"> <li>RCAs have existing maintenance contracts which have between 1-10 years remaining.</li> <li>The majority of data collection is performed by civil contractors during maintenance and build projects.</li> <li>A proportion of councils manage their asset data themselves, with a proportion outsourcing asset management to engineering consultancy firms.</li> <li>In many cases the contractors incur a higher cost for collecting the required data than the contractual penalty for failing to meet data collection obligations.</li> <li>Many RCAs have small asset management teams that are resource constrained.</li> </ul>
<b>Business needs</b>	<ul style="list-style-type: none"> <li>Contractual arrangements are updated to reflect the AMDS requirements.</li> <li>The implementation approach, including training, is developed in consultation with key stakeholders.</li> <li>Lessons learnt from AMDS prototypes are documented and shared.</li> </ul>
<b>Critical success factor</b>	<ul style="list-style-type: none"> <li>RCAs can implement AMDS within the agreed timeframe.</li> <li>Asset managers can meet existing operational requirements throughout the implementation at their RCA.</li> </ul>

## Constraints

The following constraints have been identified for the AMDS implementation.

Table 9: AMDS constraints

#	Constraint	Notes & management strategies
C1	Budget allocations and priorities	<ul style="list-style-type: none"> <li>Local governments operate within defined funding envelopes and allocate their budget based on the high priority investments which results in trade-offs.</li> <li>Competing priorities may mean that RCAs find it difficult to allocate the funds required to implement AMDS.</li> <li>The AMDS implementation schedule has been developed to align with availability of NLTP funding and ensure that RCAs have time to plan for their implementation.</li> </ul>

#	Constraint	Notes & management strategies
C2	Availability of technical & integration capabilities in the market	<ul style="list-style-type: none"> <li>The implementation of AMDS will require RCAs to source skilled data migration and integration resources.</li> <li>The AMDS implementation schedule has been phased over five years to take into account availability of organisations/individuals with the required capabilities.</li> </ul>
C3	RCAs resource availability	<ul style="list-style-type: none"> <li>The development of NLTP's requires a significant resource commitment from RCAs. This may constrain when the RCA can undertake training and adoption of AMDS.</li> <li>RCAs have been consulted throughout the development of the AMDS implementation schedule. The schedule will include RCA specific date constraints.</li> </ul>

## Dependencies and related initiatives

The following implementation dependencies have been identified and will be monitored closely.

Table 10: AMDS dependencies

#	Dependency	Notes & management strategies
D1	AMDS implementation cannot start until the RCA's asset management system has been updated.	<ul style="list-style-type: none"> <li>Proactive engagement with asset management vendors is underway and will continue throughout AMDS implementation.</li> <li>The AMDS is aligned to international standards and will be available to all current and future asset management vendors.</li> <li>Implementation tasks and lessons learnt from the prototype will be developed into a playbook and shared with RCAs.</li> </ul>
D2	Successful AMDS implementation requires RCAs to support and commit to the implementation schedule.	<ul style="list-style-type: none"> <li>RCA engagement channels are established and will be maintained throughout AMDS implementation.</li> <li>The RCAs have been consulted throughout the development of the implementation approach and schedule.</li> <li>A BAU team will be established within Waka Kotahi to support AMDS implementation. Additional support will be provided to early adopters to ensure their implementation is successful and lessons learnt can be captured and shared.</li> </ul>
D3	Sector-wide implementation of BIM and DE is dependent on the successful implementation of AMDS.	<ul style="list-style-type: none"> <li>The implementation of the AMDS is a critical step in the sector wide adoption of digital engineering (DE) and BIM.</li> <li>The Waka Kotahi Lead Asset Management Advisor (LAMA) will ensure that line of sight between AMDS, DE and BIM is maintained.</li> </ul>

The following Waka Kotahi initiatives<sup>8</sup> have been identified as related to the implementation of the AMDS:

- Standards & Specifications (for roadside devices)
- One Network Framework (ONF)
- Transport Asset Management
- Spatial Digital Engineering
- Traffic Monitoring Improvement
- National Speed Register

Additionally, the sector has several asset management improvements underway. These include LINZ Location Standard, LINZ/Australasian Cadaster standard, 3Waters, REG Programme of Work.

The Lead Asset Management Advisor (LAMA) will provide strategic oversight across all Waka Kotahi asset information improvements and lead engagement with the sector. Where appropriate this will include the coordination of timelines and stakeholder engagement.

<sup>8</sup> Refer appendix B for additional information about related initiatives



## Assumptions

Table 11: AMDS assumptions

#	Assumption	Notes & management strategies
A1	RCAs will not have capacity to undertake training and some AMDS implementation activities whilst NLTP planning is underway.	<ul style="list-style-type: none"> <li>AMDS implementation tranches that overlap with NLTP planning are longer and finish two months after NLTP planning has been completed.</li> <li>RCA's could also be offered the opportunity to start their AMDS implementation earlier.</li> </ul>
A2	AMDS training will not occur in December and January	<ul style="list-style-type: none"> <li>The scheduling of the AMDS implementation tranches considers that RCAs are unlikely to deliver training in December and January.</li> </ul>
A3	Waka Kotahi's system architecture will require the state highway NOCs & Alliances to adopt AMDS at the same time.	<ul style="list-style-type: none"> <li>The 23 NOCs/Alliances have been scheduled in a single tranche.</li> <li>It is recommended that Waka Kotahi start to prepare for their AMDS implementation early.</li> </ul>
A4	Asset management software development will be undertaken and paid for by the vendor.	<ul style="list-style-type: none"> <li>The programme has engaged with the incumbent asset management vendors and they are supportive of a consistent data standard and see the benefits to adopt within their product.</li> </ul>

## The case for change

AMDS is a critical component of the sector's asset management value chain. A consistent data standard provides the foundation for sector wide DE and BIM and will deliver sector wide benefits.

It contributes to delivery of Waka Kotahi's statement of intent, the Thirty-Year New Zealand Infrastructure Plan and the GPS on Land Transport through the development of evidence-based plans, at a local and system level. This will improve transport outcomes, reduce infrastructure costs and enables Waka Kotahi and the RCAs to build a more resilient and connected Aotearoa.

It is likely that a sector wide data standard for land transport assets will become a requirement in the future, either driven by the Ministry of Transport, the RCAs or the market. The real question is, what is the benefit to Waka Kotahi and the economy from implementing AMDS now across all RCAs.

Organisations are viewing data as an asset and prioritising investment in digitising their business. Early publication and implementation of AMDS supports this investment and for the transport sector will enable the sector to implement and realise benefits from BIM and DE.

Two road maintenance suppliers have adopted a data standard tailored for their business operations. This confirms the commercial advantages that data standards bring to a commodity business. It also highlights a risk that a delay in implementation of AMDS could result in multiple disparate data standards across the transport sector, which will increase complexity and cost.

Waka Kotahi is the largest network operator in Aotearoa, and it is therefore crucial that any standard is developed in a way that can be applied to Waka Kotahi and is aligned to the approach outlined in the Strategy for a Digital Public Service and the GPS. Waka Kotahi can provide the catalyst, in the form of critical mass, to accelerate adoption of AMDS and deliver productivity benefits earlier that would be possible if left to the market or individual RCAs.

# ECONOMIC CASE

## Do-minimum option

The do-minimum option is defined as the development of the standard for core inventory asset classes and their lifecycle activities and data. The standard will be made available on the Waka Kotahi website for RCAs, contractors, consultants and asset management vendors to utilise. Waka Kotahi would discontinue all future investment in the AMDS and will not provide documentation, training, guidance, implementation support or ongoing maintenance of the standard<sup>9</sup>.

The development of the AMDS is 45% complete as of September 2021. This option includes the minimal amount of funding required to complete the standard for core inventory asset classes and their lifecycles. From an implementation perspective, this option is equivalent to do-nothing. Investment to date represents unrecoverable or 'sunk' cost.

Transport sector stakeholders have consistently stated that asset management data standards are unlikely to be prioritised by RCAs without leadership and implementation support from central government. This has been the experience of other agencies, including Land Information New Zealand (LINZ)<sup>10</sup>.

Based on case study evidence and stakeholder consultation the benefits of the do-minimum option will be modest. It is assumed that a proportion of the capability and efficiency benefits associated with the implementation of AMDS will accrue over time.

## Long list options identification

The 2019 IBC explored the feasibility of eight option dimensions, this ensured that a wide range of alternatives were considered and recognised that a data standard can take a variety of forms and be executed in various ways. This exercise produced a long list of nine options<sup>11</sup>, including a 'do minimum' option.

The nine options were qualitatively assessed based on their performance against the investment objectives, critical success factors and other evaluation criteria, e.g. value for money and ease of implementation. Five options were progressed to the shortlist and modelled as part of the IBC Economic Case.

## Shortlisted options

The IBC shortlist consisted of five implementation options (including do-minimum):

### Option 1: do-minimum

Completion of the data standard for core inventory asset classes. Waka Kotahi publishes the standard online. No further investment by Waka Kotahi, i.e. documentation, training, guidance, implementation support and ongoing maintenance of the standard is not provided.

### Option 5: full support for an MVP standard, NLTF fully funded

The minimum viable product (MVP) standard would only cover a proportion of asset classes. Local implementation support would be funded by Waka Kotahi and provide 'on the ground' guidance and technical assistance for RCAs.

### Option 6: RCA managed AMDS, NLTF fully funded

A full data standard (core inventory asset classes) is implemented. A moderate amount of implementation support would be funded by Waka Kotahi and provided centrally. This would include remote guidance and assistance to RCAs. Where required, technical and integration capability would be sourced by each RCA.

### Option 7: full support for the AMDS, NLTF fully funded

A full data standard (core inventory asset classes) and their lifecycles are implemented for RCAs (excludes state highway network). Implementation support would be procured by Waka Kotahi and offer 'on the ground' guidance and technical assistance to RCAs

<sup>9</sup> Progress on the standard has been socialised with RCAs, suppliers and industry groups. A decision not to publish AMDS would have significant reputational implications.

<sup>10</sup> For example, the Metadata (shared standards) project for housing, released in September 2017.

<sup>11</sup> Refer appendix A for details of the IBC options assessment process and long list options.

### Option 9: full Support for the AMDS, NLTF partially funded (via FAR process)<sup>12</sup>

A full data standard (core inventory asset classes) is implemented. Implementation support would be provided locally and Waka Kotahi would procure 'on the ground' guidance and technical assistance for RCAs. Implementation would be funded through existing FAR, with RCAs allocated additional resources over the implementation period to pay for a proportion of AMDS costs.

The IBC recommended Option 7 and Option 9 as preferred due to the superior value for money offered. A summary of the cost benefit analysis (CBA) results is presented in Table 12.

Table 12 Costs, benefits, and BCR of IBC shortlisted options (November 2019)

Net Present Value Summary, 2020-2029 (inclusive, relative to do minimum option) \$ million, real terms	Total Cost	Total Benefit	Net Benefit	BCR
Option 5 - Full Support for the MVP	21.0	80.9	59.9	3.9
Option 6 - RCA managed AMDS, NLTF fully funded	33.8	39.2	5.4	1.2
Option 7 - Full Support, NLTF fully funded	29.9	144.1	114.2	4.8

Following approval of the IBC there has been significant engagement with the sector about the AMDS and the implementation approach. This has enhanced the programme's understanding of the RCA's technology landscape and their preferences in terms of approach and timeframes. Based on these insights the preferred IBC option has been updated (option 7a) and an additional hybrid option has been identified (option 10).

For consistency the new scenario has been assessed using the IBC options assessment process. It was presented to the AMDS Governance Group in June 2021<sup>13</sup> and added to the shortlist.

### Option 7a: updated full support for the AMDS, NLTF fully funded

This option is based on option 7, applying the same technical solution and associated IT costs. Timeframes, i.e. the anticipated roll-out of the standard across tranches, have been updated to align with DBC assumptions. State highway organisations have also been included.

As per Option 7, a full data standard (core inventory asset classes) would be implemented. Implementation support would be procured by Waka Kotahi and provided locally to enable each RCA to have access to 'on the ground' guidance and technical assistance. With the update, Waka Kotahi as an RCA is now included in the analysis.

### Option 10: RCA led implementation, NLTF, partially funded (via FAR process)

Waka Kotahi provides implementation planning and quality assurance support. This option has been developed at the DBC stage and takes into account stakeholder feedback, specifically:

- Centralised procurement of IT services (as proposed in options 1-7) would be challenging to scope and tender, this could create a risk that capability and resource allocation is not fit for purpose.
- Implementation requirements will differ for each RCA, for example the volume of data migration and system integrations required.
- RCAs are best placed to evaluate supplier offerings. Value for money may be achieved by contracting a supplier who is familiar with local systems and processes.

Option 10 implements a full data standard (core inventory asset classes) for RCAs and the state highway network. It proposes a more devolved model where Waka Kotahi does not procure a specific, pre-determined set of services on behalf of RCAs. In contrast to the other options, RCAs will be responsible for all technical and integration activities and sourcing the required capabilities. This implies a different set of implementation costs, with Waka Kotahi activity focussed on capability and support rather than purchasing specific IT solutions. Waka Kotahi can also offer RCAs flexibility, without imposing excessive procurement costs, by undertaking a Request for Information (RFI) to identify suppliers in the market who can provide technical and integration services.

<sup>12</sup> The IBC notes that for the purposes of the short list assessment, options 7 and 9 are treated as a single choice. All analysis describing the costs and benefits of option 7 applies equally to option 9 and vice-versa. This is because the funding dimension analysis did not identify differences between NZTA-funded and FAR-based options. The impact of this variable has been explored as part of the DBC options assessment.

<sup>13</sup> [link to 14 June 2021 Governance Group paper](#)

## Further analysis of the shortlist

Each of the shortlisted options have been assessed through Cost Benefit Analysis (CBA), estimating economic impacts from a national perspective. The cost and benefits of each option have been assessed across the 10-year period 2021-2030 (inclusive). Value for money is estimated through Benefit Cost Ratios (BCR). Financial requirements for NZTA are explored within the Financial Case.

Standard Treasury assumptions about inflation, discount rates, salary cost growth, and BCRs have been applied.

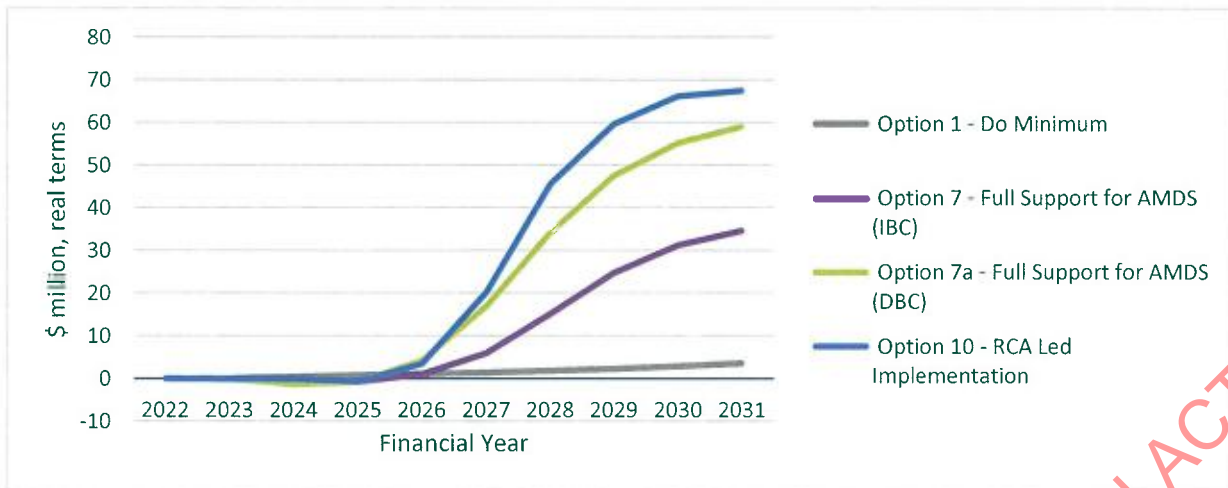
Insights from stakeholder engagement and commercial planning have refined the assumptions for the cost benefits analysis of the options. These refinements have been applied to the IBC preferred option (option 7), the refined option 7a, and the new option (option 10); do minimal (option 1) is used as a baseline comparator for assessing the costs and benefits of these options. The following table shows the changes in costs and benefits from the IBC to the DBC.

Table 13: Key updates to implementation costs and benefits since the IBC

Parameter / Assumption	Indicative Business Case (2019)	Detailed Business Case	Rationale for Change
Data conversion: Implications for benefits realisation	90% of benefits achieved after 4 years	90% of benefits achieved after 5 years	Recognition that data conversion may take more time to implement at RCA level
Roll-out: updated timetable	Three tranches over 8 years, based on contract cycle	Seven tranches and two prototypes over 6 years, based on risk and complexity	Based on feedback from RCAs and detailed implantation planning
Roll-out: Waka Kotahi as an RCA	Impacts on Waka Kotahi not quantified	Standard to be applied to NOC & Alliance contracts over 2022-2024	Discussions with relevant Waka Kotahi teams and implementation planning
Roll-out: staffing requirements	12 central and 6 local FTEs (PA, on average)	Move to providing a core BAU team and providing funding for RCA's to find contractors and staff	Change in costing structure
Training and support requirements	Comms & training equal to 10% of technology costs	Comms & training part of BAU team responsibilities	Change in costing structure
Total technology costs (net of do minimum)	\$8.5m over 10 years	No technology cost	Technology cost estimates refined

These changes effect both the benefit and cost realisation for the programme. Figure 11 shows the benefit curves for the options investigated in this DBC. Only the preferred option (option 7) has been carried across for the analysis of the DBC.

Figure 11: DBC benefits over time



The inclusion of Waka Kotahi as an RCA has a large impact on the benefit realisation of the AMDS programme. Their size and the fact that they are planned to be earlier in the implementation schedule means that both option 7a and option 10 provide greater benefits than the preferred option from the IBC (option 7).

Option 10 incorporates a completely different cost structure which results in a very different cost curve as shown in Figure 12.

Figure 12: DBC costs over time



Option 10 has higher costs earlier in the establishment of a BAU team to increased availability of support earlier in the programme and condenses the implementation timeframe. Once AMDS implementation has completed (June 2027) the resources needed to manage and maintain AMDS will be identified and budgeted for in the data management business plan.

Option 7a keeps the same cost structure as option 7. Combined with the increased benefits this mean that both option 7a and option 10 have higher benefits cost ratios (BCR) than the IBC options. This can be seen in the table below.

Table 14: Costs, benefits and BCR of DBC options

Net Present Value Summary, 2021-2030 (inclusive, relative to do minimum option)				
	Total Cost	Total Benefit	Net Benefit	BCR
\$ million, real terms				
Option 7 - Full Support for AMDS (IBC)	37.4	71.8	34.4	1.9
Option 7a - Full Support for AMDS (DBC)	38.4	149.7	111.3	3.9
Option 10 - RCA Led Implementation	41.2	184.9	142.7	4.4

A critical question with the cost benefit analysis is “why now”?

The cost benefit analysis shows positive net benefits. Additionally, it shows very strong benefits of Waka Kotahi stewardship as opposed to leaving the adoption of a consistent data standard to the RCAs, contractors and consultants.

There are potentially some significant sacrifices to the programme benefits from a delay or deferral in implementing AMDS. Critically the costs of the programme will remain fixed (or potentially increase). The benefit stream will be deferred, and potentially reduced as existing practices adapt to rapid, but unregulated/under-managed enhancement of data, which would require a degree of unwinding once the AMDS was implemented.

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# PREFERRED OPTION

## Selection of preferred option

Following consultation with sector stakeholders and economic analysis, Option 10: RCA led implementation has been identified as the preferred option. This is largely driven through the inclusion of Waka Kotahi as an RCA into the programme scope, but the revised cost structure and implementation schedule also contribute to this decision. This option costs more than those previously considered as it reflects more detailed implementation planning, including realistic costs for a centralised Waka Kotahi support and implementation team.

The benefit gained from inclusion of Waka Kotahi as an RCA is shown through the difference in the BCR of option 7 and 7a (1.9 compared to 3.9). The updated cost and implementation structure that option 10 provides increases the BCR further (3.9 for option 7a to 4.4 for option 10), indicating net benefits, above that provided by the do minimum option, of \$143m. Costs would be recovered within six years of implementation, and benefits would continue to grow after this point.

Option 10 is also a better option when non-monetized benefits are analysed. Option 10 compared to options 7 and 7a requires RCA's to 'have skin in the game' which means that the full implementation cost will be shared. This approach is more in line with Waka Kotahi's goals and values. Requiring RCA's to contribute to the programme should also help incentivise a robust implementation of the data standard and the full benefit potential of the programme is more likely to be realised.

Lastly, option 10 limits the ongoing support that Waka Kotahi needs to provide. Option 7 and 7a relied on upfront and ongoing technology and resource costs that under option 10, are no longer necessary. This means that Waka Kotahi required financial support will be zero after the six years of the programme's implementation is completed. Ongoing maintenance of AMDS will be absorbed into data management team's business as usual functions.

## Description of preferred option Benefits and Costs

Implementation of AMDS is expected to create savings for RCAs and Waka Kotahi through two channels.

1. Operations and Maintenance efficiencies will be possible through improved planning and coordination, as well as the avoidance of variations and unnecessary work.
2. Supply chain costs can be reduced through the application of better-informed procurement.<sup>14</sup>

The calculation of benefits makes use of several data sources, including council Long-Term Plans (LTP) financial forecasts, international research as to potential savings and information as to the status of each RCA's maintenance contract. Consistent across all options, key assumptions for this DBC include:

- AMDS will be implemented by 30 June 2027.
- the benefits of AMDS will be realised over the course of several years, as organisations become more familiar with the technology and its applications for asset management; this is consistent with international experience.

AMDS costs arise from the following sources:

- A Waka Kotahi BAU team that will be available to provide support AMDS implementation.
- AMDS programme costs; the costs incurred in creating AMDS, developing prototypes and designing the implementation approach.
- Licensing of required software and intellectual property for the implementation of AMDS.
- Funding given to RCAs for the implementation and integration of AMDS.
- Contingency to address risks and issues has been incorporated into estimated implementation costs.

Cost estimates for these categories was based on consultation with subject matter experts within Waka Kotahi and RCAs.

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<sup>14</sup> Consistent with NZTA and Treasury guidance, all costs and benefits in the economic case are reported in real terms (adjusted for inflation) unless otherwise specified. Nominal or cash values, as reported in the financial case, will generally be higher.

## Scope of the preferred option

### In scope

#### Data standard design

- Develop asset management data standard (AMDS) for core inventory asset classes and their lifecycles<sup>15</sup>.
- Align data standard to current and emerging international standards
- Establish the base network model as a spatial 3D link-node polyline<sup>16</sup>.

#### Enabling technology

- Establish and manage development environments for each prototype site.
- Create an AMDS compliant version of the AMS tables and apply to each prototype.
- Test AMDS data entry with a minimum of one prototype site and capture lessons learnt.
- Targeted software development, within the prototypes, where core functionality is impacted by the new data structure (e.g. forward works programmes, valuations).
- Develop data quality processes & report to assess compliance with AMDS.

#### Stakeholder engagement and communications

- Management of AMDS internal and external engagement activities.

#### Implementation planning

- Plan the first 12 months of AMDS implementation.
- Develop an indicative AMDS implementation schedule through to 30 June 2027.
- Establish supplier list for integration and technical specialists.
- Facilitate updates to Waka Kotahi procurement and commercial processes/templates to reflect AMDS and align to BIM asset information requirements.
- Work with the Manager, Data Management to establish a data standards team.
- Establish governance structure and release management process for future AMDS updates of AMDS.
- Develop process, tools and reports to support the data standards team.

#### Change management

- Develop change management strategy and collateral to support the implementation of the data standard across the sector.
- Co-design training approach and material with sector partners and validate through AMDS prototype sites.
- Facilitate the development of the Implementation Playbook, for use by Waka Kotahi and sector partners to guide implementation.
- Work with the data standard team to prepare them for their roles and responsibilities from 01 July 2022.

#### AMDS implementation

Waka Kotahi is funded for the following implementation activities:

- Data Standards team resources through to 30 June 2027.
- Continued AMDS development and maintenance.
- Management of AMDS changes.
- Coordinate AMDS sector engagement groups.
- Quality assurance of the RCAs implementation approach and business readiness.
- Assess compliance with AMDS.
- Licence costs for data validation tool set until 30 June 2027.
- Deliver train the trainer for AMDS implementation.
- Develop roadmap to implement AMDS principles and terminology across Waka Kotahi systems and processes.

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<sup>15</sup> Refer appendix D for a list of the AMDS asset types.

<sup>16</sup> Establishing the base network model as a spatial 3D link-node polyline underpins the data standard and is the foundation for pulling the network and associated asset data together.



RCA's (including Waka Kotahi) are funded for the following implementation activities. FAR process used for funding allocation.

- Analysis of asset management system integration requirements<sup>17</sup>.
- Analysis of asset management data<sup>18</sup>.
- Data migration.
- Test and validate data migration.
- Integration activities<sup>19</sup> for one year from date AMDS implemented.

### Out of Scope

Excluded from scope:

- Procurement or management of RCA resources required for AMDS implementation.
- Management or funding required to update or create RCA owned policies, processes, documentation, templates, dashboards or reporting SQLs.
- Management or funding required to update or create reports that utilise asset management data.
- Delivery of AMDS user training for RCA's, contractors and consultants.
- Management or funding to deliver RCA communication and engagement activities for AMDS.

## Economic analysis of the preferred option

The benefits for Option 10 have the same drivers as the original IBC options of cost savings in:

1. operations and maintenance
2. supply chain

With the inclusion of Waka Kotahi as an RCA into the scope of the AMDS programme, these benefits have been magnified (as shown earlier) showing an increase in the benefits that the entire programme generates compared to the options examined in the IBC.

Costs have changed significantly since the creation of the IBC. In the IBC staffing costs were based on Waka Kotahi funding FTE's for the implementation of AMDS across all the RCA's and included upfront and ongoing technology costs for the programme. Option 10 provides a simpler approach to costs with a fixed Waka Kotahi BAU team and a proportion of funding given to RCA's for them to source and fund staff and contractors for the implementation and integration of the data standards.

While the total programme costs do not significantly change between options, the breakdown of costs are different. Options 7 and 7a include 'on the ground' guidance and technical assistance which results in a higher proportion of costs allocated to Waka Kotahi resources and travel allocations. Option 10 is an RCA led implementation, which requires RCA's to provide some funding for the implementation and integration of AMDS. Waka Kotahi will fund RCA's based on the FAR system which aims to incentivise RCA participation through ensuring they have financial incentives to do so.

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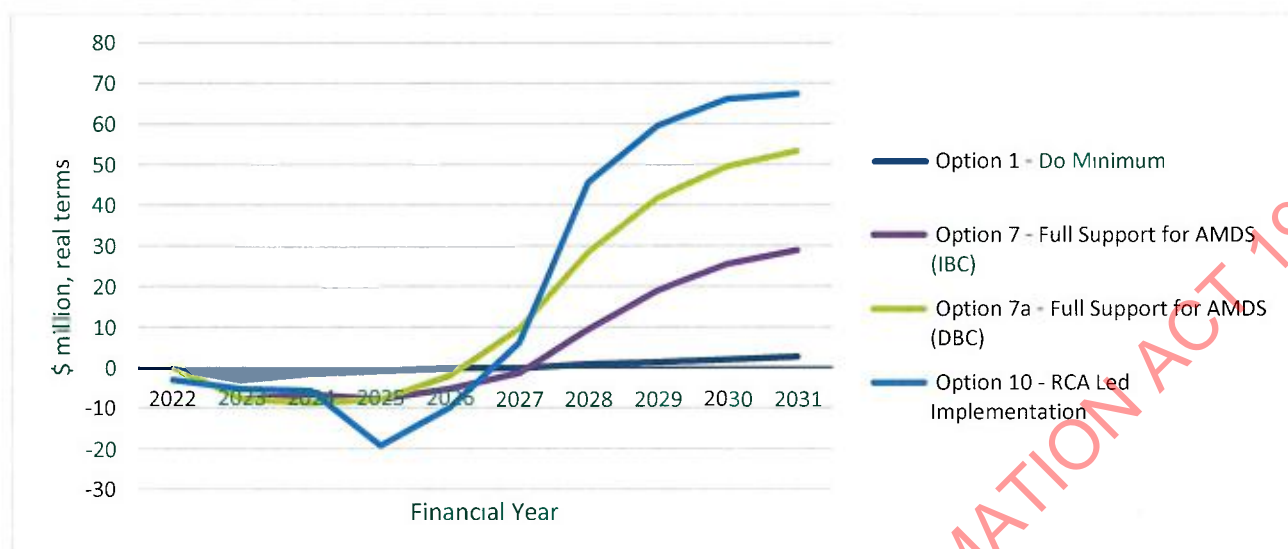
<sup>17</sup> Capped at 120 hours for a complex RCA's and 80 hours for medium/small RCA's.

<sup>18</sup> Capped at 100 hours for each RCA.

<sup>19</sup> Enables the RCA to determine which integrations they use the funding for.

The changing cost structure combined with the increased benefits from the inclusion of Waka Kotahi as an RCA mean that the net benefits of option 10 are higher than both the IBC options and the updated preferred option (option 7a), as shown in the figure below.

Figure 13: DBC net benefits over time



With more of the funding for AMDS provided earlier on under option 10, the net benefits don't become positive for the programme until about 5 years into the programme. By the end a 10-year term, however, option 10 is the best option for AMDS. This clearly shows the effect of the change in the costing structure for this DBC, compared to the previous IBC methodology.

The table below shows more details about the performance of Option 10, in real terms, over a 10-year implementation schedule.

Table 15: Details of Preferred Option performance

Implementation Timing		
Earliest implementation start date	FY23	
Expected duration of implementation	10 Years: FY22-FY31 inclusive	
Economic Efficiency		
Time zero (IBC stage)	1 July 2021	
Base date for costs and benefits	1 July 2021	
Option Comparison	Absolute impacts	Relative to do minimum
Present value of total project cost of do minimum	\$10.6m	\$0.0m
Present value total project cost of preferred option	\$52.9m	\$42.3m
Present value total benefit of preferred option	\$195.8m	\$184.9m
Present value net benefit of preferred option	\$142.9m	\$142.6m
BCR		4.4

## Sensitivity analysis

Sensitivity analysis has been carried out to test how sensitive the assessed benefits and costs are to change. The outputs for each sensitivity test are documented below:

Table 16: sensitivity analysis

Sensitivity scenario	Sensitivity test	BCR
Base case	No change	4.4
Reduced maximum benefit realisation	Reduced the maximum benefit realisation from 100% to 90% to reflect the risk that some RCA's may not fully and properly implement the data standard.	3.9
Reduced benefit uptake rate	Reduced O&M rate from 3% to 2% and Supply chain rate from 2.5% to 1.5% to reflect possibility that true benefits are less than expected	2.7

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# FINANCIAL CASE

## Outlining the financial case

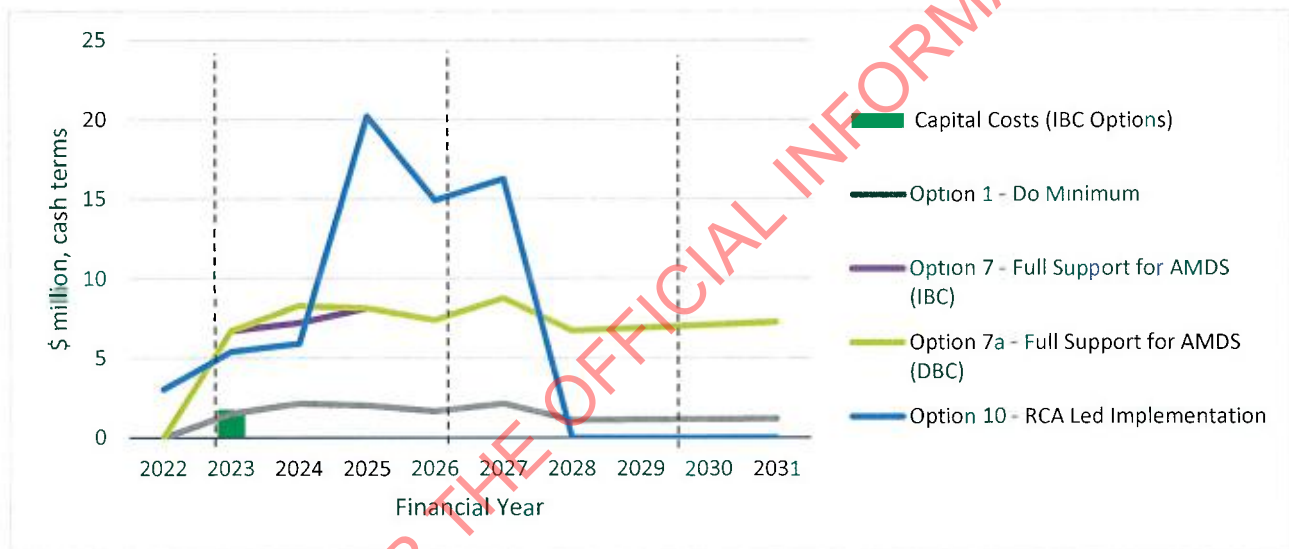
The financial structure of the preferred option in this DBC are different to the IBC, largely due to the lack of capital costs inherent with the updated cost structure of the programme. The technology costs that were present in the IBC are no longer required for this option.

The costs have been reworked since the completion of the IBC. This has led to the change in cost structure, but also means that there is increased certainty around the costs for the programme.

As stated earlier, the economic costs for the preferred option include BAU team costs and, implementation and integration funding provided to RCA's. Because all of this is considered operating expenditure there is no capital contingency of depreciation with this option.

In line with Treasury guidance, financial analysis is performed from a department or agency perspective. RCA expenses and savings are therefore excluded from this analysis, such that financial impacts are limited to Waka Kotahi costs only. These capital and operating requirements by option are summarised in Figure 14. Capital costs are only presented once, as these one-off technology costs are common across all IBC options, but do not relate to option 10.

Figure 14: DBC financial costs



## Option cost

Funding will be required for the period of 2022-2027, but the financial and economic analysis has been built on the assumption that the maximum budget for this programme of work will be \$60m plus inflation in real terms. The breakdown of funding requirements per year, in nominal terms, for this can be seen in Table 17.

Table 17: Preferred option financial cost summary

Summary of estimated financial costs by financial year, Option 10 \$ million, nominal terms	FY22	FY23	FY24	FY25	FY26	FY27	Total
AMDS Programme resources	2.7	-	-	-	-	-	
Waka Kotahi BAU resources	0.2	0.7	0.6	0.6	0.6	0.6	
Licencing (DQ tool set)	0.1	0.1	0.1	0.1	0.1	0.1	
AMDS Implementation	-	1.2	1.6	9.8	4.8	4.3	
AMDS Integration	-	1.4	1.6	6.4	6.2	7.5	
<b>Total OpEx (excluding inflation)</b>	<b>3.0</b>	<b>5.3</b>	<b>5.6</b>	<b>18.6</b>	<b>13.4</b>	<b>14.2</b>	<b>60.0</b>
Inflation	-	0.1	0.3	1.6	1.6	2.1	5.7
<b>Total OpEx (including inflation)</b>	<b>3.0</b>	<b>5.4</b>	<b>5.9</b>	<b>20.2</b>	<b>14.9</b>	<b>16.3</b>	<b>65.7</b>

AMDS implementation and integration includes costs for all RCAs (68 RCAs for local roads and Waka Kotahi as the state highway network RCA) to adopt AMDS<sup>20</sup>.

This includes analysis of asset management data and system integration requirements, data migration, testing and agreed system integration activities.

The following assumptions have been made in determining these initial estimates:

- Software development of the RCA's asset management systems will be undertaken and paid for by the vendor.
- AMDS implementation will be completed within two NLTP periods
- Resources required to support ongoing maintenance of AMDS will continue beyond 2027 and will be included in the Data Management team's budget.

## Funding Risks

As the costs for this programme, under the preferred option, are entirely operating, the risks facing the cost estimation are largely driven from the ability to implement the standards according to the specified implementation schedule. Any move up or down the timetable will cause the funding requirements in each year to change, changing the burden for Waka Kotahi.

This emphasises the importance of accurately estimating which RCA's will fall into which implementation tranche. While much work has been put into this estimation, we note that further changes may occur if RCAs are not ready to implement the standard or strongly favour the ability to adopt the standard early.

## Funding sources

It is proposed that the funding requirement of \$65.7m is sought from the NLTF. The 2021/2024 NLTF includes the following allocations for AMDS implementation:

- SH WC 151, \$10m at a FAR of 100%
- LR WC151, \$20m at a FAR of 50%

## Overall affordability

The proposed whole of life cost of the programme is \$60m in real terms over the six years of the expected lifetime of the programme. Inflation over six years is estimated as \$5.7M.

AMDS implementation is included in the NLTP as a probable activity indicating the intent and ability to invest.

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<sup>20</sup> Refer appendix I for the draft implementation schedule.

# COMMERCIAL CASE

## Outlining the commercial case

The commercial case outlines the procurement arrangements for the preferred implementation approach.

## Procurement plan

To ensure RCAs are set up for success a Request for Information (RFI) will be undertaken to identify suppliers in the market who can provide technical and integration services to implement the AMDS. A questionnaire format will be used to enable information to be captured in a consistent structured way.

Information from the RFI will be used to establish a list of suppliers which RCA's can use to initiate their procurement processes. The list will be open to allow for suppliers to be added.

A review of the list will occur after two years to determine whether it should stay open for the duration of the AMDS implementation.

## Required services

The RFI will request information from suppliers who can provide the following services.

Table 18: required services

Capability	Description of services
Data migration	Prepare, extract and migrate data
Independent data quality assurance	Provides assurance that the data conforms to the asset management data standard.
System integration analysis	System analysis to determine size and complexity of integration requirements. Develop integration approach, time and cost estimates.
System integration implementation	System integration development and testing.
Business analysis	Business process analysis to size the complexity and impact of the change.

## Contract provisions

Appointments will not be made from the RFI. The RCAs, including Waka Kotahi, will follow their own procurement processes to engage suppliers.

# MANAGEMENT CASE

## Outlining the management case

The management case describes the arrangements that are in place, and will be introduced, for the successful delivery of the preferred option and the management of implementation risks.

Since the release of funding in December 2018, five programme workstreams have been established. These workstreams will be progressed through until June 2022 when the implementation of AMDS will be handed over to the Data Management team for business as usual delivery.

Accountability for the AMDS programme is shared by Transport Services and Te Aukaha - Digital Group. This is reflected in the membership of the Governance Group. The programme is supported by subject matter expertise from Waka Kotahi's finance, communications and engagement, and change management teams.

### Business case development

Development of the DBC has been led in-house. Ernst and Young were engaged to develop the economic and financial models and assist with the analysis and quantification of the benefits and risks.

The IBC content was reviewed and validated to ensure that it remained relevant and aligned to the scope of the preferred option. Stakeholder engagement has occurred throughout the development of the DBC, this has included consultation with industry experts and groups, and stress testing with sector leaders has occurred for problem statements, option dimensions, and preferred options.

Additionally, RCAs have been consulted on their priorities, readiness, and the depth of support they require to implement AMDS within their organisation.

Implementation planning, costing, and benefits modelling has been undertaken for the preferred option.

### AMDS programme workstreams

#### Data standard design

This workstream will draft, test, and iterate the standard and technical specifications. Consultation with SMEs from across the industry occurs throughout this process.

- The Asset Management Data Standard is released to the sector quarterly, each release focuses on an agreed set of core asset classes.
- A release cycle has been developed to manage the release of these asset classes in a controlled manner, which allows the sector to provide feedback over a 4-week period. Once the feedback has been received, this is reviewed, and the standard updated to include the request or responded to as to why this has not been considered.
- Since the IBC, the scope of the data standard work includes:
  - core inventory asset classes
  - the components (entities) that are required to support the management of the core inventory assets through their lifecycle (creation, maintenance, renewal/replacement, decommissioning)
  - zones, enabling assets to be grouped/categorised to provide the ability to develop dynamic visual representations of areas using existing technology toolsets.
- Contractor and consultant resources are being used to develop the standard. This is due to availability of asset management resources within Waka Kotahi. Waka Kotahi SMEs are included in the review and feedback process.
- An AMDS RCA Data Working Group has been established to advise and assist the team in the development of the standard.
- The workstream approach and the increased scope have been endorsed by the Governance Group. The workstream is on track to publish AMDS by June 2022.

## Enabling technology

This workstream will develop prototypes to provide evidence that AMDS can be implemented within an existing asset management system and provide insights and lessons learnt which will inform the implementation approach, timeframe and training.

- This workstream utilises specialised technology resources and subject matter experts from Waka Kotahi and the sector.
- RCAs have been surveyed to understand their technology environments, specifically asset management system (AMS) applications, uses and integrations. The following parameters were also assessed and informed the selection of RCA's to prototype:
  - vehicle kilometres travelled
  - network length
  - annual spend
  - number of AMS integrations
  - qualitative and quantitative analysis of the data and capabilities at each site.
- Confirmed prototype sites are Marlborough Roads/security zone 57, Wellington City Council and Masterton District Council. As each asset class is released an AMDS compliant version of the data tables is created within each prototype. Targeted software development will be undertaken where AMS functionality is impacted by these changes.
- For the Marlborough Roads/security zone 57 prototype data capture and training will also be tested by users to provide real world learnings which will inform the implementation approach and schedule.

## Stakeholder engagement and communication

This workstream will identify AMDS internal and external stakeholders and manage how and when they are consulted and/or informed.

- A high-level stakeholder plan has been developed to ensure that all AMDS engagement and communication activities are coordinated and messages are consistent.
- The programme is actively engaging with the sector and Waka Kotahi, through existing engagement channels and targeted programme reference groups.

## Change Management

This workstream will define stakeholder impacts and change management strategies to mitigate impacts and enable the successful implementation of the data standard across the sector. This information will be combined with the learnings from the prototypes to develop an implementation playbook, training approach and train the trainer material.

- The change approach and supporting collateral has been co-designed, tested and refined with the AMDS programme reference groups and a selection of RCAs. Further testing will occur through the prototype(s).
- An implementation playbook is in development for use by Waka Kotahi and the sector to guide their implementation and change management activities. These activities are founded on a robust change management methodology and have been shaped through iterative design with sector partners and will be 'road tested' through the prototype(s).

## Implementation planning

The implementation planning workstream will develop the AMDS implementation plan and design processes and tools that will be used to support Waka Kotahi and the sector through their AMDS implementation.

- A draft implementation schedule has been developed based on initial consultation with Waka Kotahi and the sector. This will be refined through further consultation. The key focus is a confirmed plan for the first 12 months which can be transitioned to the BAU team to manage.
- Following approval of this business case work will be undertaken in partnership with the Manager, Data Management to establish a Data Standards team, and support roles (LAMA, trainer) to support AMDS implementation. This will ensure an effective transition to business as usual.



- A market scan will be undertaken, and a supplier list established which details organisations who can provide technical and integration services to implement the AMDS. This information will be available for RCAs to use as part of their procurement process.
- This workstream will also define the governance structure, the change control process for future releases of AMDS to the sector and develop process/checklists/tools to support the transition to the Data Standards team.

### **AMDS implementation**

From 01 July 2022 support for AMDS implementation will be transitioned to the data standards team. The data standards team is a new team within Te Aukaha – Digital Group’s data management team. The data standards team will be responsible for the continued development and maintenance of the data standard and the assessment/reporting of RCA compliance with AMDS.

To address the potential challenges recruiting people with the required capabilities, work to establish the data standards team will be initiated once this business case has been approved. Recruitment for key positions will commence in February/March 2022.

Following AMDS implementation across all RCAs (planned to complete by June 2027) the resources needed to manage and maintain AMDS will be identified and continue as part of the data management team.

### **Management approach**

The AMDS programme utilises MS Teams for stand ups and backlog boards and is aligned to the following agile principles:

- deliver work in short increments, e.g. 6-week sprints
- significant involvement from SMEs within Waka Kotahi and the sector
- recruit highly experienced programme resources who can work together
- deliverables evolve through iteration and constant refactoring
- document only what is necessary

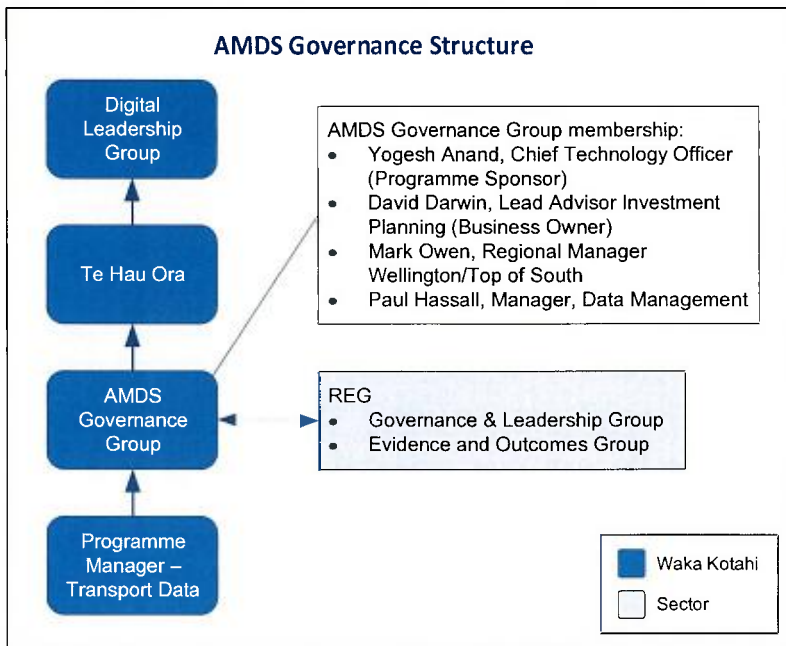
The AMDS implementation has been phased over five years and has ten tranches. The implementation activities for each tranche are repeatable and will be described in the implementation playbook.

### **Governance arrangements**

A designated governance group was established for the AMDS programme in November 2019. This group sits within Waka Kotahi’s wider digital governance structure. It is chaired by the programme sponsor and membership is reflective of AMDS as a collaboration between Transport Services and Te Aukaha - Digital Group. Meetings are monthly to enable responsive decision making and strategic guidance of the programme.

Information sharing occurs between the REG and the AMDS Governance Group on an as required basis.

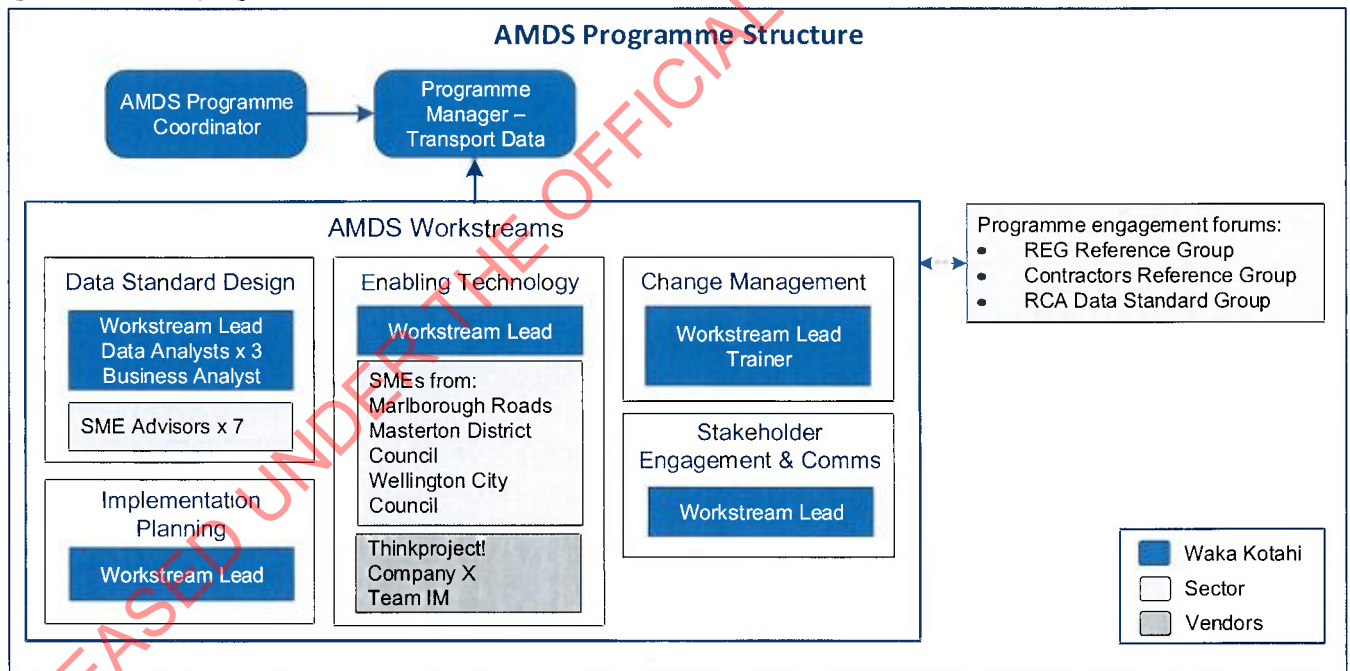
Figure 15: AMDS governance structure



### Management structure

The Programme Manager – Transport Data is responsible for delivery of the five AMDS programme workstreams. This structure will remain in place until 30 June 2022<sup>21</sup>.

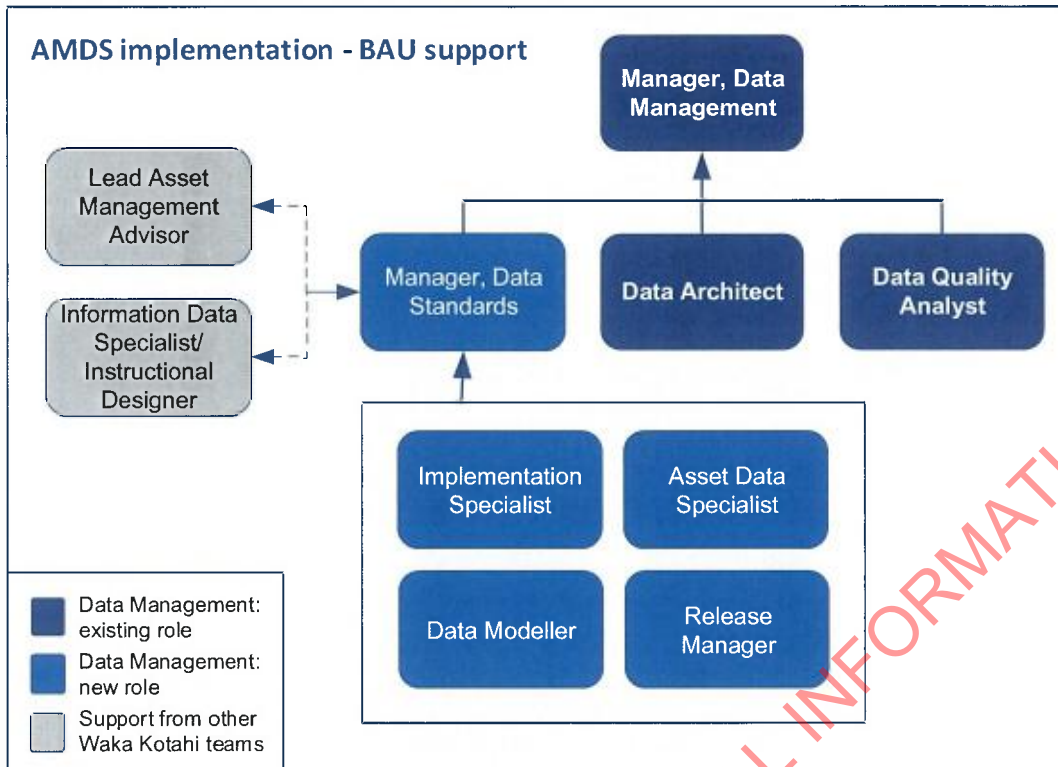
Figure 16: AMDS programme structure



<sup>21</sup> Refer appendix C for details of roles and responsibilities.

Following approval of this business case, work will commence to establish the BAU roles required to support AMDS implementation<sup>22</sup>. Transition to BAU will start early 2022, to enable knowledge and lessons learnt to be shared.

Figure 17: AMDS implementation - BAU support



## Reporting arrangements

Monthly programme status reports are created in Planview<sup>23</sup> and provided to the AMDS Governance Group for endorsement. This will continue until the programme has transitioned to BAU.

Once the programme transitions to BAU, AMDS implementation reporting will occur for progress and quality. This will complement the current REG reporting and where possible utilise the REG insights tool. The reporting frequency and audience will be confirmed as part of the AMDS implementation approach and playbook.

## Stakeholder engagement plan

There are two major stakeholder categories; internal Waka Kotahi teams, and groups external to Waka Kotahi. The latter is comprised of RCAs, construction and maintenance partners, software vendors, and engineering and business consultancies.

### Internal Stakeholders

Strong internal stakeholder engagement and inclusion will continue to be a priority throughout the implementation of this programme. This communication is essential as the project will have significant implications across multiple Waka Kotahi teams, including Transport Services, Research and Insights, Te Aukaha - Digital Group and will create potential changes for Investment and Reporting functions.

The Waka Kotahi Working Group was established to provide input into the implementation planning and approach, influencing timeframes, technology considerations, rollout timing, implementation support options, and funding decisions.

<sup>22</sup> Refer appendix C for details of roles and responsibilities.

<sup>23</sup> Planview is Waka Kotahi's project management tool

## External Stakeholders

Initially the bulk of communication and stakeholder engagement was focused on external audiences. Those efforts focussed on raising widespread awareness and buy-in for the programme among data and asset management experts within RCAs. Subsequently, we have sought their input into the problem statements and implementation options.

Engagement has been facilitated through existing stakeholder forums; REG Governance and Leadership Groups and the REG Evidence and Outcomes Group

The programme's problem statements, progress, and milestones have been endorsed by the REG Governance Group throughout the IBC phase. The IBC and indicative preferred option were also endorsed by the REG Leadership Group on 3 October and the REG Governance Group on 18 October 2019

Engagement has also been facilitated by forums established for the programme; REG Reference Group, Contractor's Reference Group and the RCA Data Standard Group. These groups were established in 2020 and 2021 and represent the sector made up of RCAs, Maintenance Contractors, Consultants and Waka Kotahi representatives.

Monthly reports have been provided to the REG and Contractor's Reference Groups and their feedback has influenced timeframes, technology considerations, rollout timing, implementation support options, and funding decisions.

The RCA Data Standard Working Group was established to test and validate development of the standard. This group is made up of small to large RCAs nationwide.

Waka Kotahi has prepared tailored videos and included regular updates and presentations at Industry Forums and through industry group publications.

The Programme team has also consulted with multiple government agencies with expertise around standards. These include:

- **DIA:** As home of the Government Chief Digital Officer as well as Ministry with responsibility for advising on matters of Local Government).
- **Statistics New Zealand** as the Central Government agency responsible for standards.
- **LINZ, DIA, and Statistics New Zealand** in relation to the development of a common georeferencing/location standard.

From July 2022, it is expected that the Waka Kotahi Working Group will transition into the AMDS Implementation Lead Group. The external AMDS Reference Groups will remain in place and will continue to provide feedback on future AMDS releases. They will also champion AMDS implementation and advocate benefits to the sector. Where appropriate, REG will be utilised as one of the communications and engagement channels. Waka Kotahi will continue to provide regular updates to the sector through all communication channels.

## Change management implementation plan

The change approach and supporting collateral has been co-designed, tested and refined with the programme reference groups, a selection of RCAs and through the prototype(s)<sup>24</sup>. An Implementation Playbook is in development for use by the sector to guide their implementation and change management activities. These activities are founded on a robust change management methodology and have been shaped through iterative design with sector partners and will continue to be refined and 'road tested' through the prototype(s). Below are the phased activities

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<sup>24</sup> Refer appendix G for stakeholder impact assessment

### Pre-implementation (12 months before go-live)

- Programme kick-off session with implementation team.
- Execution of RCA engagement and communications plan to impacted stakeholders. This include discussions on benefits relevant and specific for stakeholder groups, as defined and validated by the programme.
- Training needs confirmed for each RCA and contractors and / or consultants.

### Implementation (6 months before go-live)

- Training approach will be applied across all implementations, with generic training materials updated to reflect data migration findings
- Resources, business processes and templates that reference asset data will be updated by the RCA.
- Waka Kotahi to provide 'train-the-trainer' sessions for the delivery of 'operations' training. This is targeted at roles that collect and enter asset data at source (e.g. contractors). This training involves a mixture of theory and practical exercises.
- Education for 'consumers' of asset data (e.g. roading managers, asset managers, network managers) will be facilitation through on-line briefing sessions, with participants accessing reference material as and when required.
- Change readiness assessments completed throughout the implementation period, to assess stakeholder perception of their readiness to adopt the data standard. Change readiness assessment checklists will be provided to RCAs and overall change readiness will be incorporated as part of final business readiness checks.

### Post implementation

- Establishment of business as usual resources within Waka Kotahi to be 'stewards of the data standard'. A business transition plan will be developed and implemented to support the transition of activities to business as usual.
- Continued sector engagement across the full five-year implementation period, sharing lessons learnt and quick wins achieved.
- AMDS Community of Practice and Champion network to be established, for the duration of the implementation across the sector.

## Outline activity plan

The key AMDS programme milestones are outlined in the table below<sup>25</sup>.

Table 19: AMDS activity plan

AMDS key programme milestones	Estimated timing
Marlborough Roads prototype 'test data capture' completed	November 2021
Masterton prototype 'test data capture' completed	December 2021
Detailed Business Case approved	December 2021
Asset Management Data Standard completed – for core asset classes & their lifecycles	April 2022
Data standards team established	May 2022
Targeted Investment Review	May 2022
AMDS Implementation Playbook completed	June 2022
AMDS launched and transitioned to BAU	June 2022

<sup>25</sup> Refer appendix H for the AMDS programme roadmap and appendix I for the draft implementation schedule.

## Benefits realisation management plan

A benefits realisation management plan will be developed by the AMDS programme in partnership with the Manager, Data Management and the Lead Asset Management Advisor as part of the transition to BAU activities.

The following benefits will be delivered through the implementation of a sector wide AMDS:

1. Accessible, integrated, complete, and reliable customer and asset information that improves delivery, maintenance and operations of the transport system and provides long-term cost savings to the land transport sector.
2. Improved efficiency and transparency in transport-based asset decisions that achieve desired customer levels of service for all transport system users.
3. Improved system view of transport assets and customer insight.

The table below detailed the non-monetised benefit measures that have been identified and the responsibility for sourcing the required data and reporting on the benefits.

Table 20: AMDS benefits measure and responsibility

Non-monetised benefit measure	Responsible
New report established to track AMDS implementation. The AMDS implementation schedule will be baselined by 30 June 2022 and used to measure AMDS progress.	Manager, Data Standards
New report established to measure compliance with AMDS. Baselines will be established for each RCA as an AMDS implementation activity.	Manager, Data Standards
REG Annual Data Quality Report <sup>26</sup> Baseline will be taken from the previous year's report. Data quality score to improve following implementation of AMDS.	Manager, Data Standards

## Risk management

The standard Waka Kotahi risk management framework will be followed for AMDS implementation. Risk workshops have been undertaken at key points during the programme to identify, validate and classify risks and issues.

Risks and issues are reviewed periodically (at least monthly) to identify if there has been any change to the status. Critical and high risks and issues are captured in the programme status report and are discussed at the monthly Governance Group meeting.

A bowtie risk analysis was undertaken to assess in more detail the possible causes and consequences associated with the risk that the AMDS is not successfully implemented across the sector<sup>27</sup>. Controls have been identified which will be managed by the AMDS programme team, as part of the transition to BAU they will be handed over to the data standards team to manage.

## Programme assurance arrangements

An AMDS assurance plan has been developed in conjunction with the Governance Group. It provides guidance for regular assurance activities and the use of health checks and independent quality assessments.

The table below details the key internal and external assurance activities that will be undertaken for the AMDS programme to ensure the quality of the implementation approach before AMDS implementation is transitioned to BAU.

<sup>26</sup> The REG Annual Data Quality Report is an established report which can be accessed via the REG Insights tool.

<sup>27</sup> Refer appendix J for bowtie risk analysis.

Table 21: AMDS assurance

Assurance Activity	Purpose	Audience
Programme Management foundation review	Confirm the programme structure and controls have been established to support the successful delivery of the pre-implementation phase of the programme. In March 2021 a programme review was conducted and there has been a change to the AMDS development approach and a detailed resource plan created to ensure deadlines will be met	Programme Sponsor
Review of the AMDS	Confirm the standard: <ul style="list-style-type: none"> <li>- enables extensibility across the sector</li> <li>- is comprehensive across the scope and all parts fit together</li> <li>- is intuitive to the sector users (e.g. architects and engineers)</li> <li>- has consistent level of detail.</li> </ul>	Business Owner Chief Technology Officer AMDS Programme Governance Group RCA Data Standard Working Group
Review of implementation approach and funding model	Provide assurance the implementation approach and funding model to consider all aspects (within scope) of the AMDS implementation for RCAs and has a suitable resource panel to implement the Asset Management Data Standards across all RCA's.	AMDS Programme Governance Group REG
Internal Review of Business Case	Confirm the Detailed Business Case contains all the necessary information for a funding allocation decision to be made.	AMDS Programme Governance Group Transport Services Business Case Process Team

The table below outlines the scheduled external assurance activities that will be performed and whether procurement is required.

Table 22: AMDS external assurance

Activity	Procurement Required	Undertaken by
IQA - Implementation Approach	No	Aurecon
Targeted Investment Review	No	Treasury

**Activities considered but not included are:**

Assurance of the data modelling and dissemination tool is not deemed necessary as this is an out of the box software as a service solution and a proof of concept was undertaken early in the pre-implementation phase.

## NEXT STEPS

This business case recommends:

1. \$60M OpEx is released over six years to implement AMDS across all RCAs, including Waka Kotahi.
2. Completion of the AMDS for core inventory asset classes and their lifecycles and the continuation of the other workstreams (enabling technology, change and implementation planning and stakeholder engagement and communications) required to prototype, plan and consult on the AMDS implementation approach.
3. Establishment of a new data standards team within Te Aukaha - Digital Group to support the implementation of AMDS, continued development and maintenance of the data standard and assessment of RCAs compliance with AMDS. This team will work in partnership with Transport Service's Lead Asset Management Advisor (LAMA).
4. Waka Kotahi is the steward and custodian of AMDS and will ensure the standard remains consistent across the transport sector.

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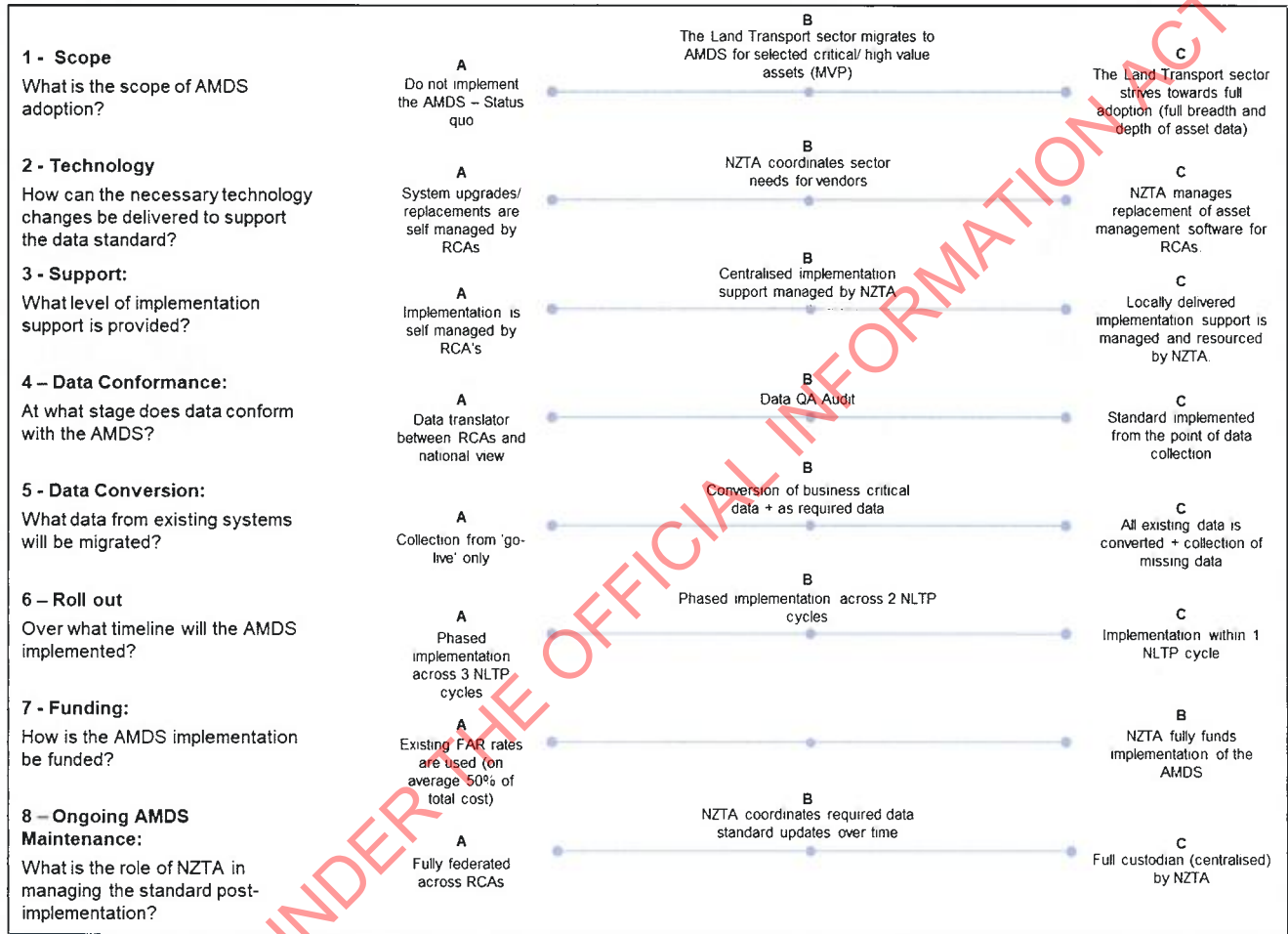
# APPENDICIES

## Appendix A: summary of IBC options analysis

### IBC options analysis

Option dimensions are building blocks that are used in different combinations to understand how this impacts performance, costs, and benefits. The IBC initial analysis determined that from eight option dimensions there are over 4000 potential options. An elimination process identified nine options to be carried through for the long list options assessment.

Figure 18: IBC option dimensions



The IBC identified nine long list options which were qualitatively assessed based on their performance against the investment objectives, critical success factors, and other evaluation criteria. Options 1, 5, 6, 7, and 9 were progressed to the shortlist. The overall process for analysing the long list options is described below.

Figure 19: long list assessment process



For each of the criteria, options were scored a pass, partial, or fail. The performance of the long list options against these criteria is summarised below.

Figure 20: IBC long list assessment results

	1. Do Nothing	2. RCA managed MVP	3. NZTA supported MVP	4. RCA managed MVP, NZTA funded	5. Full support for the MVP	6. RCA managed AMDS, NZTA funded	7. Full support for the AMDS	8. RCA managed AMDS	9. NZTA supported AMDS
<b>Investment Objectives</b>									
Data is complete and accurate	Fail	Partial	Partial	Partial	Partial	Partial	Pass	Partial	Pass
Asset data is described consistently across all RCAs	Fail	Partial	Partial	Partial	Partial	Partial	Pass	Partial	Pass
Technology solutions are available in the market	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
RCAs are supported to make required changes	Fail	Partial	Partial	Partial	Partial	Partial	Pass	Partial	Pass
<b>Critical Success Factors</b>									
Trust in data	Fail	Partial	Partial	Partial	Pass	Partial	Pass	Partial	Partial
Supplier capability and willingness	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
National view foundation	Fail	Partial	Partial	Partial	Partial	Partial	Pass	Partial	Pass
Strategic fit	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Nationally Beneficial Timeline	Fail	Partial	Partial	Partial	Pass	Partial	Pass	Partial	Partial
<b>Other Criteria</b>									
Affordability	Pass	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial
Value for money	Fail	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial
Ease of implementation	Pass	Partial	Partial	Partial	Pass	Partial	Partial	Fail	Partial
Risk management	Pass	Fail	Partial	Partial	Pass	Partial	Pass	Partial	Partial
Adaptable	Fail	Partial	Partial	Partial	Pass	Partial	Pass	Partial	Pass
<b>Verdict</b>	Carried Forward as counterfactual				Carried Forward	Carried Forward	Carried Forward – highly preferred		Carried Forward – highly preferred

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## Appendix B: related initiatives

The following projects have synergies with the implementation of an asset management data standard across the sector. The Lead Asset Management Advisor and Lead Advisor Data Standard will engage with subject matter experts to ensure that these relationships continue to be managed and where appropriate engagement and communications with the sector are coordinated.

Table 23: related initiatives

Initiative	Status/key dates	Project Name
<b>Standards &amp; Specifications (for roadside devices)</b>	In progress Start: Dec 2019 End: Oct 2021	<ul style="list-style-type: none"> <li>This project will deliver an approved set of ITS Asset Standards and Specifications (S&amp;S).</li> <li>ITS assets following an agreed process that will transition to BAU and enable the ongoing management of the new standards and specifications.</li> </ul>
<b>One Network Framework (ONF)</b>	In progress Go live: Feb 2022 End: Jul 2022	<ul style="list-style-type: none"> <li>ONF is a single framework that caters for rural, urban and complex metro environments particularly where competing demands on limited road and street space, using a range of modes are present.</li> <li>It will enable the transport system to be reclassified in advance of the 2021-2024 NLTP period and embedded for the 2024-2027 investment round.</li> </ul>
<b>ITS Asset Management</b>	Not started Start: Dec 2021 End: Jun 2023	<ul style="list-style-type: none"> <li>This project will deliver a modernised application layer providing great efficiency in the management of assets, faults and maintenance.</li> </ul>
<b>Spatial Digital Engineering</b>	Not started - to be reviewed in year 2	<ul style="list-style-type: none"> <li>New data collection mechanism that allows better information base using integrated data, resulting in lower costs because information transactions are electronic, and information created once is used many times.</li> </ul>
<b>Traffic Monitoring Improvement</b>	Not started – planned for year 3	<ul style="list-style-type: none"> <li>Telemetry data is key to many aspects of transport planning. Aotearoa has a reasonably extensive network of devices that collect traffic count and classification data.</li> </ul>
<b>National Speed Register</b>	In progress Go live: Feb 2022	<ul style="list-style-type: none"> <li>Replaces gazetting as a way to record bylaws (legal process to describe bylaws) AMDS provides the data structure aligned to modelling and the same terminology to be used where relevant.</li> </ul>
<b>HSIMS – Phase 2</b>	In progress	<ul style="list-style-type: none"> <li>New assets going into HSIMS e.g. geotechnical assets, will be aligned to the data standard enabling use of the same language and defining things in the same way.</li> </ul>
<b>REG Projects</b>	In progress	<ul style="list-style-type: none"> <li>REG has a 3-year programme of work underway which includes the following projects:                             <ul style="list-style-type: none"> <li>- Condition Assessment Project</li> <li>- NOC Alignment Project</li> <li>- Annual Achievement Return Review</li> <li>- TIO Project (AAR)</li> </ul> </li> </ul>
<b>CSVUE</b>		<ul style="list-style-type: none"> <li>Environmental permit collection data space will align with AMDS environment zones, which enables zones and the permits associated with them to be talked about in the same way.</li> </ul>
<b>RIM Projects</b>		<ul style="list-style-type: none"> <li>AMDS entity models provide the structure to define components clearly when faced with a new problem.</li> </ul>

Initiative	Status/key dates	Project Name
Let's Get Wellington Moving		<ul style="list-style-type: none"> <li>Digital Engineering (DE) roadmap identifying recommended next steps to support the roll-out and adoption of Digital Engineering for the LGWM programme.</li> <li>Building upon the list of defined assets and their classification, this will map between Uniclass to AMDS in its current form to provide a mapping schema.</li> <li>There is an option to also map to RAMM simultaneously</li> </ul>
3Waters Standards		<ul style="list-style-type: none"> <li>Common standard for locating so 3Waters know where our assets are in relation to theirs and what they are.</li> <li>Waka Kotahi are responsible for a lot of run off storm water from roads and we currently do not have our stormwater network connected to the 3Waters network.</li> <li>AMDS will enable a common way of defining these assets to be used in the 3Water standard.</li> </ul>
LINZ Location standard		<ul style="list-style-type: none"> <li>Specifies how we want our assets located within the location standard</li> </ul>
NZUP Programme		<ul style="list-style-type: none"> <li>Share findings with NZ programmes and initiatives to drive a common approach and supercharge capability increase.</li> <li>Leveraging AMDS information requirements to inform the Exchange Information Requirements (EIR)</li> </ul>

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## Appendix C: key roles and responsibilities

### AMDS programme

Table 24: AMDS programme roles and responsibilities

Role	Name	Responsibilities	Commitment
<b>Programme governance</b>			
<b>Programme Sponsor</b>	Yogesh Anand	<ul style="list-style-type: none"> <li>Receive programme progress updates</li> <li>Promote and champion the programme within Waka Kotahi and the sector</li> <li>Ensure programme benefits are achieved</li> </ul>	5 hours per week
<b>Business Owner</b>	David Darwin	<ul style="list-style-type: none"> <li>Provide asset management advice and strategic direction to programme team</li> <li>Consider and make recommendations to the programme sponsor on requests for minor changes</li> <li>Promote and champion the programme within Waka Kotahi and the sector</li> <li>Review programme status reports</li> </ul>	5 hours per week
<b>Governance Group members</b>	Yogesh Anand David Darwin Mark Owen Paul Hassall	<ul style="list-style-type: none"> <li>Review and endorse business cases and recommend for approval by DFA holder</li> <li>Monitor risks and issues and provide mitigation advice for high rated items</li> <li>Assist the programme sponsor in resolution of escalated project issues</li> <li>Formal acceptance and sign off of key programme deliverables</li> </ul>	2-3 hours per month
<b>Programme management</b>			
<b>Programme Manager</b>	Stephen Carter	<ul style="list-style-type: none"> <li>Programme planning, monitoring and reporting</li> <li>Resource planning and management</li> <li>Relationship management of vendors and consultants</li> <li>Achievement of programme deliverables</li> <li>Scope and budget management</li> <li>Delivery of economic, benefits and financial models</li> <li>Management of programme registers</li> <li>Escalation of issues and risks as appropriate</li> <li>Liaison with other projects to ensure dependencies are identified and managed</li> <li>Compliance with Waka Kotahi's standards and programme process controls</li> <li>Programme closure and post implementation review</li> </ul>	100%
<b>Programme Coordinator</b>	Amber De Gregorio	<ul style="list-style-type: none"> <li>Provide support to the programme manager</li> </ul>	50%
<b>EPMO Support</b>	Sharon Esteban	<ul style="list-style-type: none"> <li>Programme monitoring and quality reviews</li> </ul>	5-10 hours per month
<b>Quality Assurance</b>	Aurecon	<ul style="list-style-type: none"> <li>Review of the AMDS change management and implementation approach</li> </ul>	40 hours

Role	Name	Responsibilities	Commitment
<b>Data standard design workstream</b>			
<b>Workstream Lead - Data Standard Design</b>	Leah Watts	<ul style="list-style-type: none"> <li>Workstream planning, monitoring and reporting</li> <li>Provide day to day direction to the workstream</li> <li>Achievement of workstream deliverables</li> <li>Workstream scope and budget management</li> <li>Input into programme registers and reports</li> <li>Escalate issues and risks as appropriate</li> </ul>	100%
<b>Data Analysts x3</b>	Michaela James Michael Ford Nick Borrell	<ul style="list-style-type: none"> <li>Design Asset Management Data Standard, includes:               <ul style="list-style-type: none"> <li>- ontology</li> <li>- entities</li> <li>- attributes</li> <li>- value lists</li> </ul> </li> </ul>	100% 100% 100%
<b>Business Analyst</b>	TBC <sup>28</sup>	<ul style="list-style-type: none"> <li>Business analysis activities that contribute to the development of AMDS</li> </ul>	100%
<b>SME Advisors</b>	WSP Fulton Hogan Higgins Downer Waka Kotahi RCA's	<ul style="list-style-type: none"> <li>Review and advise on the data standard</li> <li>Develop contracted components of the data standard</li> </ul>	5-10 hours per month
<b>Enabling technology workstream</b>			
<b>Workstream lead</b>	Felix Five	<ul style="list-style-type: none"> <li>Workstream planning, monitoring and reporting</li> <li>Provide day to day direction to the workstream</li> <li>Achievement of workstream deliverables</li> <li>Workstream scope and budget management</li> <li>Input into programme registers and reports</li> <li>Escalate issues and risks as appropriate</li> <li>Vendor management in line with their statement of work</li> </ul>	100%
<b>Vendor(s)</b>	Thinkproject! Company X Team IM	<ul style="list-style-type: none"> <li>Delivery of the contracted services.</li> </ul>	Per SOW
<b>Change management workstream</b>			
<b>Workstream lead: Change &amp; Implementation</b>	Carla Hadley	<ul style="list-style-type: none"> <li>Workstream planning, monitoring and reporting</li> <li>Provide day to day direction to the workstream</li> <li>Workstream scope and budget management</li> <li>Input into programme registers and reports</li> <li>Escalate issues and risks as appropriate</li> <li>Achievement of workstream deliverables, including the change management strategy and implementation playbook</li> </ul>	100%
<b>Trainer</b>	Adriaan Strik	<ul style="list-style-type: none"> <li>Develop training plan and training materials</li> <li>Facilitate prototype training</li> <li>Deliver train-the-trainer training</li> </ul>	100%

<sup>28</sup> Recruitment underway to secure additional business analysis resource.

Role	Name	Responsibilities	Commitment
<b>Implementation planning workstream</b>			
<b>Workstream Lead: Implementation Planning</b>	Hannah Farwig	<ul style="list-style-type: none"> <li>Workstream planning, monitoring and reporting</li> <li>Provide day to day direction to the workstream</li> <li>Workstream scope and budget management</li> <li>Input into programme registers and reports</li> <li>Escalate issues and risks as appropriate</li> <li>Achievement of workstream deliverables including the tranche 1 delivery approach and processes/tools to support AMDS implementation</li> </ul>	80%
<b>Stakeholder engagement and communications workstream</b>			
<b>Workstream Lead: Stakeholder Engagement and Communications</b>	Cath Jacobs	<ul style="list-style-type: none"> <li>Delivery of communication &amp; stakeholder engagement strategy and plans.</li> <li>Coordinate AMDS engagement and communication activities.</li> <li>Develop communication and engagement material to support the implementation of AMDS.</li> <li>Coordinate delivery of Governance Group papers and presentations.</li> </ul>	100%

#### AMDS implementation (BAU)

Table 25: AMDS implementation BAU roles and responsibilities

Role	Name	Responsibilities	Commitment
<b>Transport Services</b>			
<b>Lead Asset Management Advisor (LAMA)</b>	Recruitment underway	<ul style="list-style-type: none"> <li>Business owner of AMDS</li> <li>Review and approve changes to AMDS</li> <li>Coordinates AMDS reference groups</li> <li>Champions AMDS within Waka Kotahi and across the sector</li> <li>Actively engages with AMDS stakeholders to proactively gather and collate feedback and prioritise improvements</li> <li>Reviews quality assurance reports that measure compliance with AMDS and work with the RCAs to agree corrective actions and timeframes</li> </ul>	100%
<b>Data standards team</b>			
<b>Manager, Data Standard</b>	New role	<ul style="list-style-type: none"> <li>Manages the Data Standards team</li> <li>Manage AMDS implementation within the agreed timeframe and budget</li> <li>Coordinate engagement and communication activities to ensure consistent messages and alignment with related projects</li> <li>Risk and issue management and escalation</li> </ul>	100%
<b>Implementation Specialist</b>	New role	<ul style="list-style-type: none"> <li>Use implementation playbook to assess RCA's readiness to implement AMDS</li> <li>Manage the implementation of each AMDS tranche</li> <li>Escalate issues and risks to Lead Advisor Data Standard</li> <li>Capture and share lessons learnt</li> </ul>	100%, reduces to 40% from 01 July 2023

Role	Name	Responsibilities	Commitment
<b>Release Manager</b>	New role	<ul style="list-style-type: none"> <li>Contract and vendor management for data modelling tools</li> <li>Maintain a sector wide community of practice</li> <li>Consultation and communications with industry</li> <li>Coordinate contractors reference group</li> <li>Develop and manage documentation to provide visibility and transparency about AMDS updates</li> <li>Environment and release management for development and test</li> <li>Own and facilitate the release management process to implement AMDS updates consistently across the Sector.</li> <li>Document and manage the process for updating the SHDOM and DOMs</li> <li>Manage quality assurance process for AMDS implementation</li> </ul>	100%
<b>Data Modeller</b>	New role	<ul style="list-style-type: none"> <li>AMDS design and updates, including: <ul style="list-style-type: none"> <li>reference data</li> <li>ontology</li> <li>attribute design</li> <li>guidelines and business rules</li> </ul> </li> <li>Working with SMEs and AMDS reference groups</li> </ul>	100%
<b>Asset Data Specialist</b>	New role	<ul style="list-style-type: none"> <li>Support Release Manager and Lead Advisor Data Standard</li> <li>Updates value lists within Waka Kotahi's asset management system, the data standard and documentation</li> <li>Provide training support for AMDS implementation</li> </ul>	100%
<b>Data Management Team</b>			
<b>Data Architect</b>	Existing vacant position – recruitment underway	<ul style="list-style-type: none"> <li>Work with SMEs and reference groups, to gather reporting requirements</li> <li>Work with data warehouse team to implement reporting requirements</li> <li>Report development using Waka Kotahi tools</li> <li>Work with data warehouse architect to implement extract, transform, load (ETL) processes to collect sector data</li> </ul>	70%, reduces to 40% from 01 July 2024
<b>Data Quality Analyst</b>	Existing vacant position	<ul style="list-style-type: none"> <li>Monitor and report on AMDS implementation progress</li> <li>Assess RCA compliance with AMDS</li> </ul>	20%
<b>Learning and Development</b>			
<b>Information Data Specialist / Instructional Designer</b>	L&D resource	<ul style="list-style-type: none"> <li>Update and publish AMDS training resources, e.g. quick reference guides, workshop plans to incorporate AMDS updates</li> <li>Deliver train the trainer training</li> </ul>	20%



## Appendix D: AMDS asset management data classes

The table below details the asset management data classes that are in scope for the first iteration of the AMDS, which will be published by 30 June 2022.

Table 26: AMDS asset types

Entity Type	Asset management data class
Asset	Surface layer
Asset	Pavement layer
Asset	Subgrade
Asset	Structures group (bridges, culverts, underpasses)
Asset	Structures group (tunnels, retaining walls, high mast, gantry)
Asset	Geotech Assets (sea wall, flood protection, groyne, rock fences, erosion control/loose rocks)
Asset	Minor structures/simple barriers
Asset	Luminaire group
Asset	Traffic control devices group
Asset	Drainage system (surface water channels, small culverts, pipes, treatment devices, swales)
Asset	ITS assets
Asset	Mechanical & electrical plant
Asset	Pathways
Asset	Cycleways
Lifecycle will include maintenance activities, observations, faults, priority, severity, condition (assessment, measurement, severity), target performance metrics, treatment (proposed, renewals, types)	
Lifecycle	Pavement surface subgrade
Lifecycle	Barriers
Lifecycle	Other assets
Zone is a not a physical asset, but provides information about a specific location and or network to enable a dynamic view of the constraints and functions of the network	
Zone	Multi modal network model
Zone	Environmental zone (culture and heritage, landscaping, vegetation, sustainability)
Zone	Zone relationships

## Appendix E: sector support for AMDS

The AMDS programme team has been working in collaboration with the sector. The following quotes show the importance of AMDS to the sector.

### **Andy Lyon, Programme Director – Digital Engineering, KiwiRail**

KiwiRail is a strong supporter of Waka Kotahi's implementation of the AMDS, as it sets a solid foundation for the development of digital assets around New Zealand. Without the structured schema that the AMDS brings the industry will struggle to realise the step change that digital engineering can offer, and we will continue to suffer the loss of productivity of people not having the right information at the right time.

### **Sean O'Neill, Group Maintenance Operations Manager, Higgins**

The AMDS will enable us to use a common language nationally, to further advance efficient processes and productive practices so that we are able to maximise operational efficiency and deliver better results with increased certainty around a quality service. AMDS will also standardise training which will make it easier for staff to work across multiple contracts and not having to retrain to understand multiple different asset standards. AMDS will further enable better collaboration of organisations and decision making, ultimately providing a higher-quality service and experience to the asset users.

### **Myles Lind, Head of Asset Management, Auckland Transport**

Auckland Transport strongly supports the implementation and management by Waka Kotahi of the asset management data standard (AMDS).

The AMDS will enable Auckland Transport and Waka Kotahi to identify and address the issues that are undermining Auckland Transport asset management maturity and Waka Kotahi investor confidence through formally resolving the legacy transport sector issues.

### **Shaun Lion-Cachet, Rata Manager**

At RATA we are exposed to asset management systems for ten councils across the Waikato. Whilst we are moving towards more consistent use of data, AMDS will help all of us speak the same data language and start achieving greater benefits across the region by being able to analyse larger data sets for more robust decision making.

### **Danny Fitzgerald, Information Systems Manager, Road Maintenance, Fulton Hogan**

The AMDS will ensure all our operational teams are singing from the same hymn sheet across the country, which is a key contributor to great outcomes for our clients and the communities they care for. The standard also paves the way for open data and a more competitive market amongst asset management software vendors, leading to greater innovation in the industry, and potentially improved licensing costs for RCA's.

### **Andrew McKillop, Manager, REG Partnership Programme**

As a key partner, REG has strong interest in ensuring the success of Asset Management Data Standard (AMDS) as the programme contributes to a unified and effective transport sector. The core outcomes of the AMDS programme are aligned across the REG suite of programmes. REG supports and is engaged in all levels of the AMDS programme from Governance through to delivery.

## Appendix F: benefits analysis

Table 27: AMDS benefits analysis

#	Benefit	AMDS Outcomes		
		Short Term (AMDS implementation complete)	Mid Term (within 5 years)	Long Term (within 10 years)
1.	Accessible, integrated, complete, and reliable customer and asset information that improves delivery, maintenance and operations of the transport system and provides long-term cost savings to the land transport sector.	<ul style="list-style-type: none"> <li>- Consistent definitions are used to describe assets which reduces ambiguity with data collection and monitoring.</li> <li>- Future updates to the standard are centrally managed to maintain consistency as the standard continues to be enhanced.</li> <li>- Asset data users receive consistent, structured, location-based data for each asset class which creates opportunities to invest in more sophisticated repeatable analysis and reporting.</li> <li>- Standardised data structure improves data quality and reduces the number of repeat inspections.</li> <li>- Tenders can clearly articulate data collection requirements which improves the data quality for new assets.</li> <li>- Opportunities to optimise delivery through an integrated works planning approach</li> </ul>	<ul style="list-style-type: none"> <li>- Business processes for data collection, input, and reporting are embedded across all RCAs.</li> <li>- Capital projects and developments submit AMDS compliant data within agreed timeframes.</li> <li>- Assets that receive disproportionate levels of upkeep can be identified.</li> <li>- Information for official updates and briefings can be easily obtained.</li> <li>- Emerging trends can be identified and responded to.</li> </ul>	<ul style="list-style-type: none"> <li>- Asset data is complete and captured consistently across all RCAs.</li> <li>- Complete, consistent, accessible asset data reduces or removes the need to undertake one-off data collections for project planning and business case development.</li> </ul>
2.	Improved efficiency and transparency in transport-based asset decisions that achieve desired customer levels of service for all transport system users.	<ul style="list-style-type: none"> <li>- Evidence based asset management decisions.</li> <li>- Expenditure is targeted to address the greatest need.</li> </ul>	<ul style="list-style-type: none"> <li>- Increased confidence in asset data ensures it is actively used to inform asset planning and maintenance decisions.</li> <li>- Accumulated data about asset condition and interventions improves accuracy of maintenance forecast.</li> </ul>	<ul style="list-style-type: none"> <li>- High confidence in asset data accuracy and completeness and associated decisions at a local and national level.</li> </ul>

#	Benefit	AMDS Outcomes		
		Short Term (AMDS implementation complete)	Mid Term (within 5 years)	Long Term (within 10 years)
3.	Improved system view of transport assets and customer insight.	<ul style="list-style-type: none"> <li>- Consistent standard and data model are used by all sector participants.</li> <li>- Reduced time undertaking data manipulation and aggregation within Waka Kotahi.</li> <li>- Increase the efficiency and accuracy of information sharing between organisations</li> </ul>	<ul style="list-style-type: none"> <li>- Improved ability to compare costs and performance across RCAs and increase confidence in the results of this analysis.</li> <li>- Improved ability to obtain insights into the transport system and track trends over time.</li> <li>- Data trends can be linked to customer satisfaction and feedback.</li> </ul>	<ul style="list-style-type: none"> <li>- Data consistency creates opportunities for RCAs to jointly invest in new technologies.</li> </ul>

## Appendix G: stakeholder impact assessment

The following stakeholder impact assessment was undertaken in August 2021. It considers the impact of change from the people, business and process and technology perspectives.

Table 28: AMDS stakeholder impact assessment

Stakeholder group	People Changes to roles and responsibilities, resourcing or skills required to complete an activity	Business and Process Changes to data and information (inputs) & reports (outputs) and business resources (e.g. reference manuals)	Technology Changes to asset management systems and integrated systems.
<b>Infrastructure Delivery</b>	For Project Managers: AMDS to be integrated with in-flight asset management education (re: handover practices from Capital to Maintenance and Operations)	Capital contracts to be updated to include the collection of data as per AMDS.	Changes required to asset management systems to reflect the data standard. Changes to integrated systems that utilise asset data
<b>System Management</b>	A high-level understanding of the change required by all and a demonstration of active commitment to achieving success outcomes relevant to System Management.  Accountable for delivering training on the data standard, as part of implementation.	Changes to existing names for some assets. Asset data information within reports, dashboards and tracker sheets sourced from RAMM data may be different. Changes to SHDOM. Changes to planned or in-flight data cleansing activities (where implementation activities supersede the need for it) New business process to maintain compliance with future releases of the data standard. New business process to request changes to the data standard.	Changes required to RAMM to reflect the data standard. Changes to integrated systems that utilise asset data e.g. JunoViewer, Data Warehouse, DTIMS etc.
<b>Consumers of asset data within Waka Kotahi</b>	A high-level understanding of the change required by all and a demonstration of active commitment to achieving success outcomes relevant to Transport Services.	Research and Analytics: Changes to RAMM source data for State Highway Performance Reports, Data Quality Reports, Surfacing / ATP / Drainage renewals. Programme and Standards: Changes to existing names for some assets that are used in data manipulation practices. Asset data information within reports consumer (as noted above) may be different.	

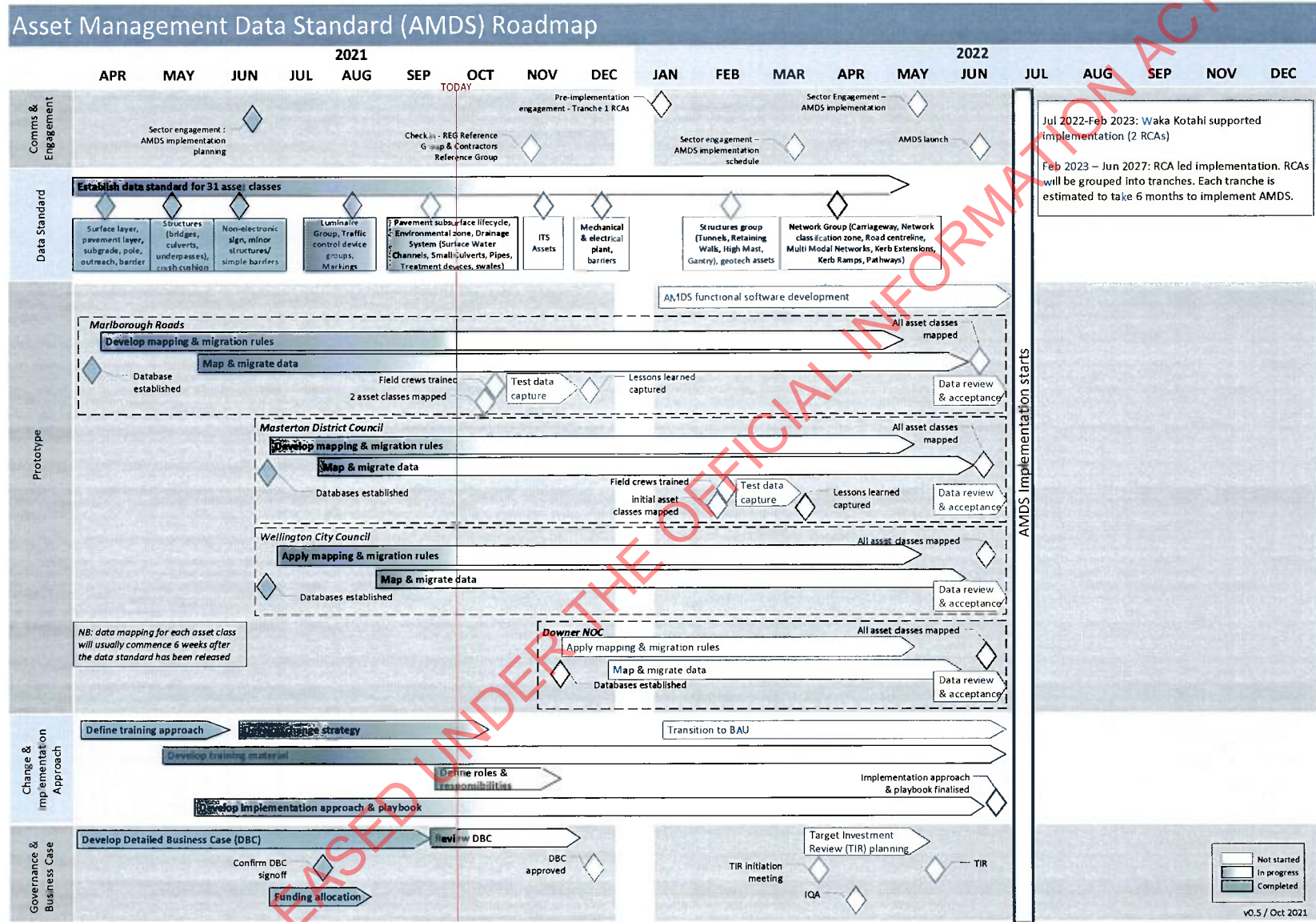
<b>Stakeholder group</b>	<b>People</b> Changes to roles and responsibilities, resourcing or skills required to complete an activity	<b>Business and Process</b> Changes to data and information (inputs) & reports (outputs) and business resources (e.g. reference manuals)	<b>Technology</b> Changes to asset management systems and integrated systems.
<b>Data Management – Digital Group</b>	<p>New roles established to deliver on Waka Kotahi role as 'steward of the data standard', this may include establishment of a Waka Kotahi / Sector Governance Group</p> <p>A high-level understanding of the change required by all and a demonstration of active commitment to achieving success outcomes relevant to Waka Kotahi.</p>	<p>Waka Kotahi to design and execute new processes to support the on-going maintenance of the data standard and assessment of compliance for RCAs.</p>	<p>Changes required to RAMM to reflect the data standard.</p> <p>Changes to integrated systems that utilise asset data e.g. Junoviewer, Data Warehouse, DTIMS etc.</p>
<b>Road Controlling Authorities</b>	<p>A high-level understanding of the change required by all and a demonstration of active commitment to achieving success outcomes relevant to Road Controlling Authorities.</p> <p>Accountable for delivering training on the data standard, as part of implementation.</p>	<p>Changes to existing names for some assets.</p> <p>Mandatory asset data to be collected as per AMDS.</p> <p>Updates to business processes and reference material that reference asset data.</p> <p>Changes to planned or in-flight data cleansing activities (where implementation activities supersede the need for it)</p> <p>New business process to maintain compliance with future releases of the data standard</p> <p>New business process to request changes to the data standard</p>	<p>Changes required to asset management systems to reflect the data standard.</p> <p>Changes to integrated systems that utilise asset data e.g. Junoviewer, Data Warehouse, DTIMS etc.</p>
<b>REG</b>	<p>A high-level understanding of the change required by all and a demonstration of active commitment to achieving success outcomes relevant to Road Controlling Authorities.</p> <p>REG trainers to be accountable for delivering training on the data standard, as part of implementation.</p>	<p>Changes introduced by the data standard will need to be reflected in annual REG reporting, (Insights tool)</p> <p>REG to monitor AMDS implementation and other measures of success and report via Insights tool (TBC)</p>	

Stakeholder group	People Changes to roles and responsibilities, resourcing or skills required to complete an activity	Business and Process Changes to data and information (inputs) & reports (outputs) and business resources (e.g. reference manuals)	Technology Changes to asset management systems and integrated systems.
<b>Contractors &amp; Consultants</b>	<p>A high-level understanding of the change required by all and a demonstration of active commitment to achieving success outcomes for the Sector.</p> <p>In-house trainers accountable for delivering training on the data standard, as part of implementation.</p>	<p>Changes to existing names for some assets.</p> <p>Mandatory asset data to be collected as per AMDS.</p> <p>The identification of new mandatory asset data required will see some contractors collecting more / new asset information (TBC from prototype insights.)</p> <p>Update data collection forms used to manually collect data</p> <p>New business process to maintain compliance with future releases of the data standard.</p>	<p>Changes required to asset management systems to reflect the data standard.</p> <p>Changes to integrated systems that utilise asset data e.g. Data Warehouse, reporting and modelling tools.</p>

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# Appendix H: AMDS programme roadmap

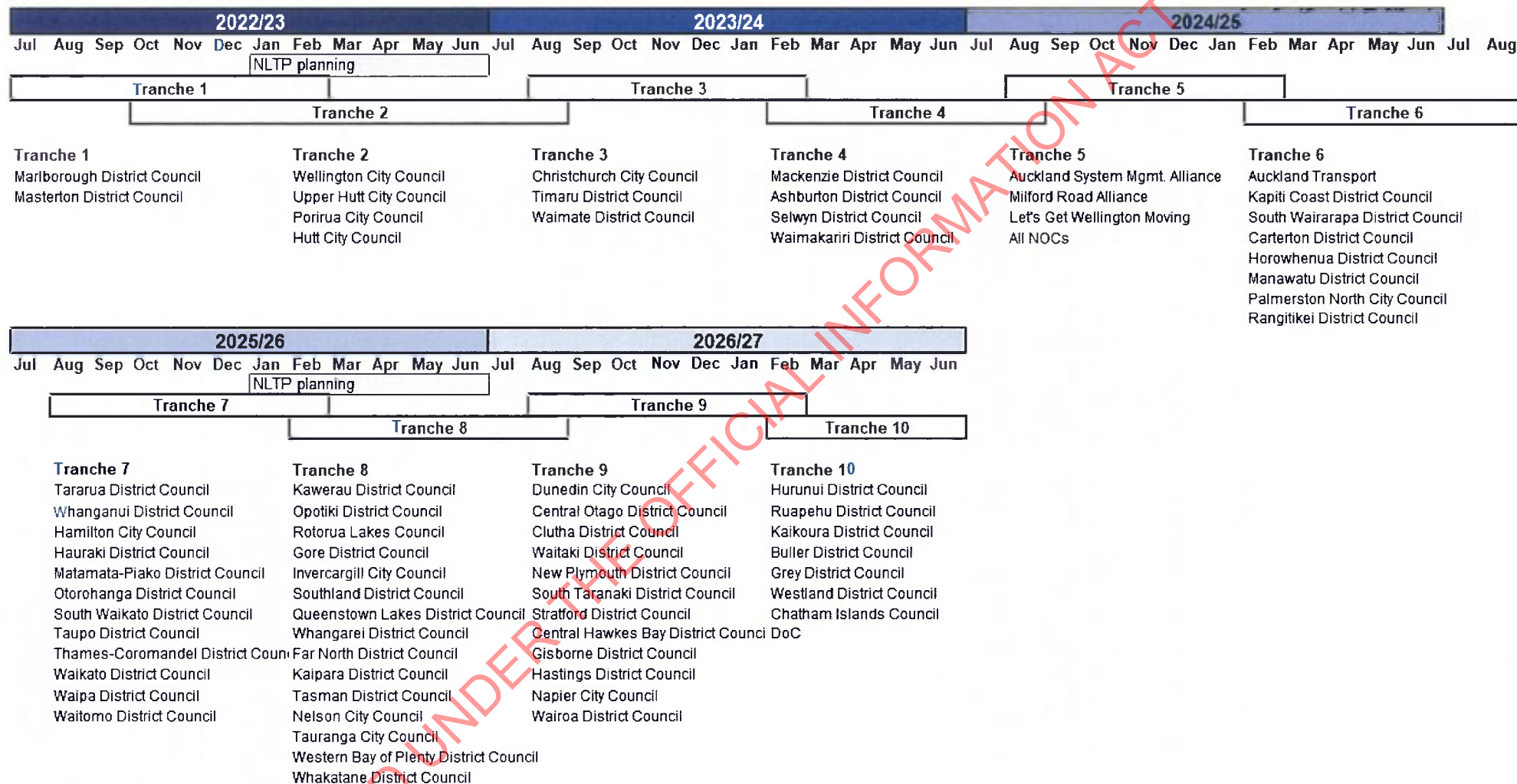
Figure 21: AMDS programme roadmap





# Appendix I: AMDS draft implementation schedule

Figure 22: draft AMDS implementation schedule



# Appendix J: bowtie risk analysis

Figure 23: AMDS implementation risk analysis

