Department of Transport

Benefit Management Framework

NOVEMBER 2021

VICTORIA State Government | Department of Transport

Acknowledgement of Country

The Department of Transport proudly acknowledges Victoria's Aboriginal communities and their ongoing strength in practicing the world's oldest living culture. We acknowledge the Traditional Owners of the lands and waters on which we live and work, and pay our respect to their Elders past and present.

We acknowledge the ongoing leadership role of the Aboriginal community in addressing and preventing family violence. As First Peoples, Aboriginal Victorians are best placed to determine a culturally appropriate path to gender equality in their communities and we join with our First Peoples to eliminate family violence from all communities.

Accessible version of the document

Contact us if you need this information in an accessible format such as large print or audio, please telephone(03) 9655 6666 or email community@transport.vic.gov.au

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Department of Transport

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1. Introduction

1.1 Framework purpose

The Department of Transport's Benefit Management Framework (BMF) provides a consistent approach to identifying, monitoring, and evaluating the success of investments across the Victorian transport portfolio.

The BMF provides a 'line of sight' from investment-level indicators to the benefits and outcomes that the Department of Transport (DoT) aims to achieve, enabling an effective methodology for benefit identification and management.

1.2 Framework need

On 1 July 2019, VicRoads and Public Transport Victoria joined DoT with the objective of delivering a world-class, integrated approach to planning, building and operating Victoria's transport system and managing $70 billion of transport infrastructure projects.

The new integrated department aims to deliver simple, connected journeys. It aims to ensure that the transport agencies and operators work towards a common goal of an integrated transport system that contributes to an inclusive, prosperous and environmentally responsible state.

DoT's BMF will enable an integrated and consistent approach to how we plan, prioritise and make investment decisions that deliver on the common goals identified above. It will also address the shortfalls identified in recent audits by Victorian Auditor General's Office (VAGO) and Office of Projects Victoria in how project benefits are identified, attributed and evaluated for some of DoT's key projects.

1.3 Framework application

The BMF can be applied in a range of contexts and is an important resource for many audiences, including:

- **Those with overarching responsibility for the investments (typically Directors, Executive Directors and Deputy Secretary).** DoT invests money or resources into projects, programs, policies, and strategies to deliver benefits that matter to the community. By identifying what benefits are important to the organisation, the BMF will help to clearly articulate how each initiative/program of initiatives contributes to the strategic intent of the organisation.
- **Those seeking approval for investment decisions (typically investment proposal writers and reviewers).** The BMF will assist with structuring critical documents that effectively demonstrate that reasonable benefits for an investment are being claimed and were defined through a rigorous process. The BMF will also assist with identifying all complementary projects that may be required together in order to deliver a desired benefit.
- **Those managing investments (typically project coordinators).** The BMF will help to communicate the expectations of the 'investor' to those who are managing or delivering the investment on behalf of the 'investor'. The BMF will also assist with preparing Client Requirement Documents (CRD) to ensure that the delivery agencies and contractors deliver the benefits promised in the original investment proposal.
- **Those delivering investment proposals (typically project managers, contract managers and delivery agency).** The BMF will help the delivery agencies to ensure that the investments under their management deliver the benefits promised in the original investment proposal and/or CRDs and to understand the expectations of the 'investor'.

1.4 Framework structure

This document includes the following sections:

- Section 2 describes how the BMF was developed, principles underpinning the BMF, and how the BMF aligns with other strategic documents.
- Section 3 contains the details of the BMF, and includes two accompanying Appendices:
  - Appendix A defines and describes commonly used indicators in the BMF
  - Appendix B describes the process for developing an Investment Logic Map (ILM)
- Section 4 describes the data sources that can be used when determining the baseline and evaluating the benefits
- Section 5 guides users in applying the BMF
- Section 6 outlines the benefit governance
- Section 7 discusses internal benefits and is accompanied by Appendix C, which defines the benefits internal to DoT.

1.5 Background

In October 2020, DoT Leadership endorsed the development of a single, holistic, portfolio-wide benefit management framework and an evaluation framework to enable DoT to achieve an integrated, outcome-focused and user-centred way of working and realising its purpose and vision.

This BMF is structured around the approach to investment management promoted by the Department of Treasury and Finance (DTF) across the Victorian Government and detailed in its *Investment Lifecycle and High Value High Risk Guidelines* and through Outcomes Reform in Victoria promoted by the Department of Premier and Cabinet (DPC).

Accordingly, the BMF complements the products developed through the application of the Victorian Government's Investment Management Standard (IMS)[1], Resource Management Framework (RMF) and the Transport Assessment and Planning Framework included in the Australian Transport Assessment and Planning (ATAP) Guidelines, noting that the Transport Assessment and Planning Framework also aligns closely with Infrastructure Australia's (IA) Reform and Investment Framework.

The IMS is a collection of practices supporting the functions that organisations undertake to improve how they operate and manage new investments – where an investment refers to a *commitment of the resources of an organisation with the expectation of receiving a benefit*. In DoT, this includes all activities that require resources (either in funding or staff time) in the development of projects, programs, policies or strategies.

DTF's *Resource Management Framework* sets out a service logic model to help identify Department Performance Statements (DPS) measures[2]. This service logic model demonstrates a clear line of sight from activities, outputs and objectives, where objectives are specific statements of outcomes and benefits that a jurisdiction is aiming to achieve.

Central to the IMS, the RMF, the Victorian Outcome Reform agenda and to this BMF is the hierarchical alignment of investment-specific indicators, organisational benefits and broader Government outcomes.

This hierarchical alignment enables a more effective evaluation and comparison of the contribution that all individual investments make to the organisation (DoT) level benefits and Government (Victoria) level outcomes.

1 https://www.dtf.vic.gov.au/infrastructure-investment/investment-management-standard

2 The DPS measures, targets and results are then reported in the state's budget papers- State Budget Paper No.3: Service Delivery (BP3).

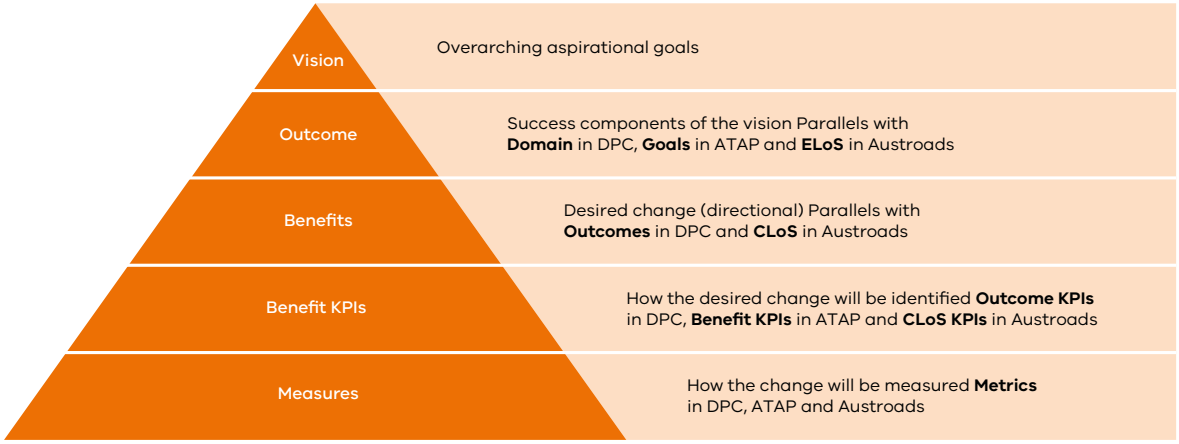
Figure 1-1 shows the structure of the Benefit Framework, which is based on the DTF and DPC benefit frameworks. The Framework includes five components:

- **Vision** is the big picture or aspirational statement that describes what Government wants to achieve for the community.
- **Outcomes** reflect long-term outcomes or impacts that are sought at the State or Enterprise level (e.g. Victoria). As such, outcomes can also be considered as the Enterprise Level of Service (ELoS).
- **Benefits** reflect the contribution that organisations (e.g. DoT) make to broader Government outcomes. They also reflect how the customer experiences the services delivered, and therefore can be considered as the Customer Level of Service (CLoS).
- **Key Performance Indicators** (KPIs or indicators) are the level of change that occurs as a result of an investment and reflect the contribution it makes to the benefits sought by the organisation/s. KPIs are therefore parallel to CLoS indicators.
- **Measures** KPIs are supported by **measures**, which are specific quantifiable units that can be used to assess and/or validate that an indicator has been met.

Note: The benefits and benefit KPIs in the BMF would relate to the objectives and objective KPIs in the service logic model included in the RMF. However, currently the DPS measures include both outcome and output measures. Only outcome-based DPS measures are included in the BMF.

Currently, DTF requires investment business cases to include benefits and benefit KPIs (which are outcome based) in the Investment Case called 'Benefits to be delivered', and DPS measures in the Delivery Case called 'Performance measures'. However, it is expected that DPC's Outcome Reform agenda will influence a greater move to outcome-based DPS measures in the near future. When this change is implemented, the DPS measures will better align with the BMF benefits and benefit indicators.

Figure 1-1 Benefit Framework based on DTF and DPC frameworks



2. Framework development, principles and strategic alignment

2.1 Framework development

The structure and process for development of the BMF has been based on the existing road-based Benefit Management Framework (Roads BMF) given it is trialled, tested and nationally recognised. The Roads BMF was also developed to align with DTF's benefit framework.

The BMF also draws upon all other existing frameworks, guidance, data analysis and research activities available throughout the DoT.

Key aspects of the framework development are listed below:

- **Revising the existing outcome and benefit categories:** The outcome and benefit categories included in the existing frameworks were reviewed and revised following extensive research, to better align with the objectives of the integrated Department.
- **Outcome mapping:** Current and prior public transport investment plans, strategies and business cases were reviewed, and 'line-of-sight' diagrams from each intervention to the outcomes and benefits that would be experienced by the transport user and wider community (at both individual and statewide level) were developed. This allowed for the identification of appropriate public transport benefits, indicators and measures.
- **Reviewing existing indicators:** Relevant indicators and measures from other existing frameworks within DoT were reviewed and incorporated into the BMF, where appropriate. Indicators and measures included in the existing Roads BMF were also reviewed to ensure their appropriateness. Indicators and measures considered outdated or rarely used were updated or removed.
- **Validating indicators and measures:** The indicators and measures identified through the outcome maps and review of existing frameworks were validated using literature review and advice from experts within DoT and Major Transport Infrastructure Authority (MTIA).
- **Incorporating feedback from stakeholders:** Feedback throughout the organisation (via a project working group) was collected and used to finalise the Framework.

2.2 Framework principles

The following seven principles underpin the development of the BMF.

Principle 1: The BMF must be built using common language and concepts, and be simple and easy to understand

The BMF is intended to be used by multiple users and for multiple stakeholders. It therefore must align with concepts that are tangible and familiar to the transport industry and the central agencies, so it can be easily understood by key user groups. The BMF must also be simple, and easy to understand by multiple user groups, and thereby provide a level of clarity between the different service levels.

Principle 2: The BMF must clearly demonstrate how investment in transport interventions contribute to user impacts (benefits and outcomes)

A clear **'line of sight'** from transport interventions to user and community outcomes will enable its effective use in scoping and prioritising investment options, as well as in communicating to Government and the community on what activities will be needed to deliver on those outcomes. Figure 2-1 demonstrates a simplified version of the value chain between transport interventions and user outcomes that underpins the development of the BMF. Note, that a work activity can lead to multiple benefits and a benefit can be realised through multiple activities.

Principle 3: The BMF must be built on best practice

The BMF should build on current best practices, including those available within DoT and its agencies and the broader transport sector (nationally and internationally, where applicable) and tested methodologies to ensure a level of robustness in its application.

Principle 4: The BMF must be relevant for all modes and in all situations

Victoria's transport network caters for multiple uses and user groups, is spread across different geographical and environmental bounds, and has the ability to influence land use changes (city shaping). The network is also exposed to different impacts, including unforeseen or unpredictable events such as extreme weather and traffic incidents.

Figure 2-1 Value chain (transport interventions to community benefit and outcomes)

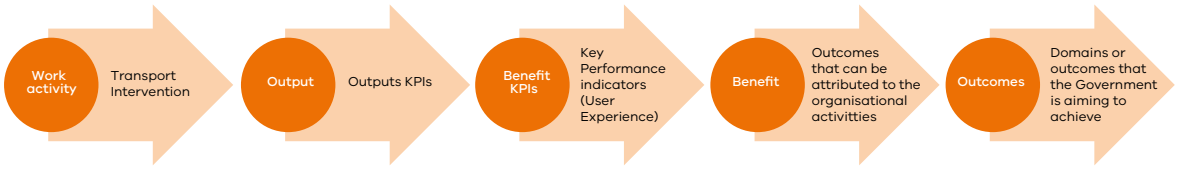
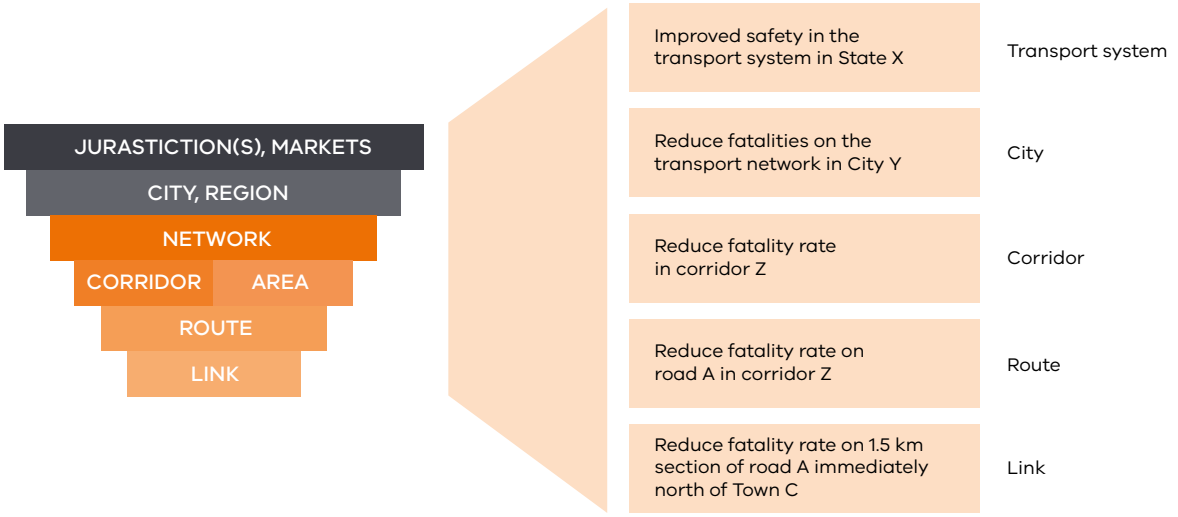


Figure 2-2 Example benefits decomposed to KPIs at different level (Source: ATAP 2016)



The BMF KPIs must include representation and alignment for all transport modes, areas and users (noting that what is considered a mode may evolve over time). In some cases, it may be that KPIs are the same but need to be contextualised during application, as shown in Figure 2-2. In other cases, a change in the benefit or the benefit KPI may be achievable through multiple modal interventions, as shown in Figure 2-3.

Principle 5: The BMF should be applied with context in mind

The BMF can be applied at different planning levels, however, how the BMF is applied should be dependent on the context. It does not substitute the need to do first principles assessment of the issues (problems or opportunities) at hand to understand the benefits relevant to the context.

For example, the accessibility effects of a road improvement may enable more people to reach a destination safer and faster. On the other hand, the accessibility effects of a strategic transport initiative can change a city's development patterns and growth trajectory. This can then influence the decisions people make about where they live or set up businesses (an opportunity), leading to a change in land values and/or moving jobs to new locations (agglomeration economies).

These impacts can be considered as benefits of the investment (if they can be attributed to the investments made) or Value Creation (if there are additional benefits on top of the direct project benefits) as shown in Figure 2-4.

Figure 2-3 Example benefits KPIs achievable through multiple modes

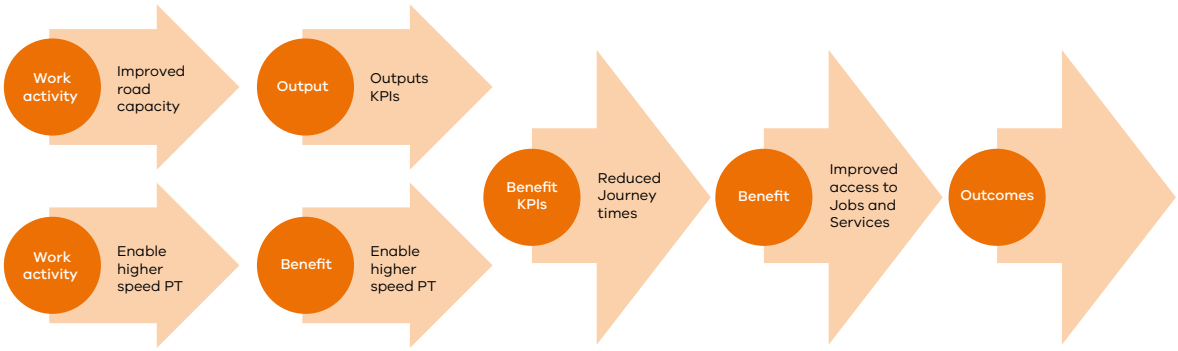
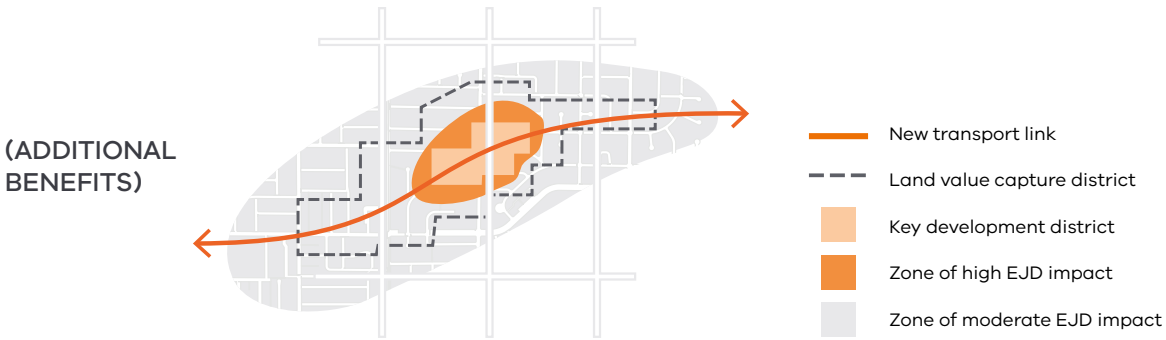


Figure 2-4 Example type of direct and indirect benefits achievable (Sourced: ATAP, 2016)



Principle 6: The BMF should be embedded with continuous improvement

As there is ongoing research to provide evidence for linking transport interventions to user experience, it is important that the BMF is reviewed and improved over time. This would include testing for the accuracy and quality of data, as well as quality of correlation to user outcomes at regular intervals.

The Framework should be reviewed 12 months after its first implementation and subsequently every two years to ensure it is always current and learnings are incorporated in future versions.

Principle 7: The Key Performance Indicators should be relevant, attributable and measurable.

Both qualitative and quantitative indicators will be considered. However, the following principles underpin the selection of individual indicators in the Framework.

- **Indicators must be relevant:** A good indicator will clearly identify how transport interventions contribute to the claimed benefits. If this relationship is tenuous or unclear, the indicator fails the relevance test. In this case, review the outcome that an activity is attempting to achieve and select an alternative measure that can provide better linkage to the benefit.

  In some cases, the project benefits may not be achievable in a short duration of evaluation, because the benefit is subtle or can only be measured qualitatively (for example, perception of safety). In these cases, an indirect measure (a proxy) may be used. The indirect measure or proxy should also be carefully selected and be evidencebased.

- **Indicators must be attributable:** Selected KPIs need to correlate as accurately as possible to user outcomes and have evidence to support those correlations. The chosen activity or intervention should be the most likely reason for a change in the indicator so that it can be **primarily attributed** to the given activity/intervention.

- **Indicators must be measurable:** If it is not possible to collect the required data or its collection would be prohibitively costly, the indicator must be reconsidered, or the additional cost be incorporated into the investment plan. Indicators should also be directional (*positive* – an increase, or *negative* – a decrease) and should be able to measure the incremental change from the baseline to the target value over time.

- **Indicators must be supported by representative datasets:** Recency bias is a concept where an individual responds to feedback based on their most recent experience, hence providing a more skewed response. For example, if a customer was asked about their 'perception of safety' shortly after major safety incidents were reported in media, their response will skew significantly from the mean.

  Where recency bias exists, the use of benefit indicators becomes ineffective. Therefore, where there is potential for recency bias, it is better to ensure that the chosen KPI is tested at a point in time that reflects accurate public perception and is statistically significant.

- **Indicators must be supported by quality and accessible datasets:** If data collection, management and reporting become onerous, commitment to the Framework will diminish.

  Significant datasets are already available in DoT and in Victorian Government (Data Vic) and Australian Government (ABS). These datasets are the best place to start with identifying outcome and benefit indicators to make implementation simpler, faster and more efficient.

2.3 Strategic linkages

Alignment of BMF Outcomes with Transport Strategy Outcomes and the *Transport Integration Act 2010* objectives

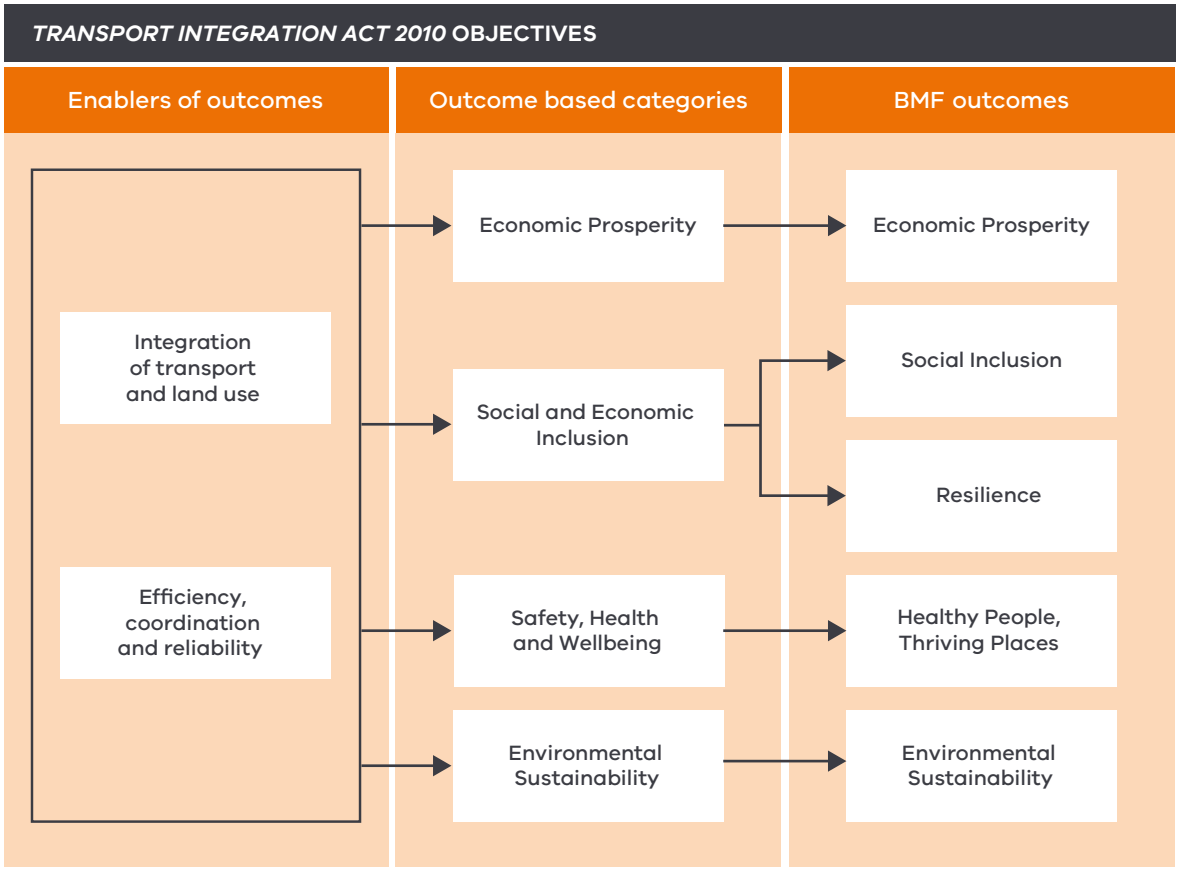
The *Transport Integration Act 2010* (TIA) is Victoria's principal transport Act, bringing together the whole transport portfolio under one statute by informing the Government's vision for *an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible state*[3].

The Act includes six objectives that enables the Government's vision to be realised. Four of these objectives can easily be translated into triple bottom line (TBL) outcomes, while the remaining two objectives are enablers that assist in the delivery of the TBL outcomes, as shown in Figure 2-5.

DoT's Transport Strategy Outcomes were defined using the TIA objectives. As such, the BMF builds on the Transport Strategy Outcomes.

Figure 2-5 also shows how the outcomes in the BMF link to the *Transport Integration Act 2010* objectives. Once this Framework has been applied to categorise benefits from an ILM, and relevant strategic outcomes relating to those benefits have been identified, Figure 2-5 can be used to identify how an investment strategically links to objectives of the Act.

Figure 2-5 *Transport Integration Act 2010* objectives and the BMF Outcomes



3 The Department of Transport's vision is the same as the vision for the Transport Integration Act 2010.

Alignment of the Framework with the Department of Transport's Investment Lifecycle Framework

The Investment Lifecycle (ILC) Framework is DoT's investment management framework that is applied to all DoT projects and programs.

In alignment with DTF's *Investment Lifecycle and High Value High Risk Guidance,* the ILC Framework guides projects through their core project activities, which are categorised into five distinct phases. These phases include conceptualise, prove, procure, implement and realise and are shown in Figure 2-6.

Benefit management is an integral part of each phase of the investment lifecycle:

- **Benefit Gate B1:** During the first phase of the investment lifecycle (i.e. conceptualise), the Framework can be used to identify likely benefits of the investment and how the benefits will be managed.
- **Benefit Gate B2:** As part of the second phase of the investment lifecycle (i.e. prove), the Framework can be used to help reconfirm or revise the initial benefits identified, based on the selected project option. The baseline for that option should also be established at this phase.

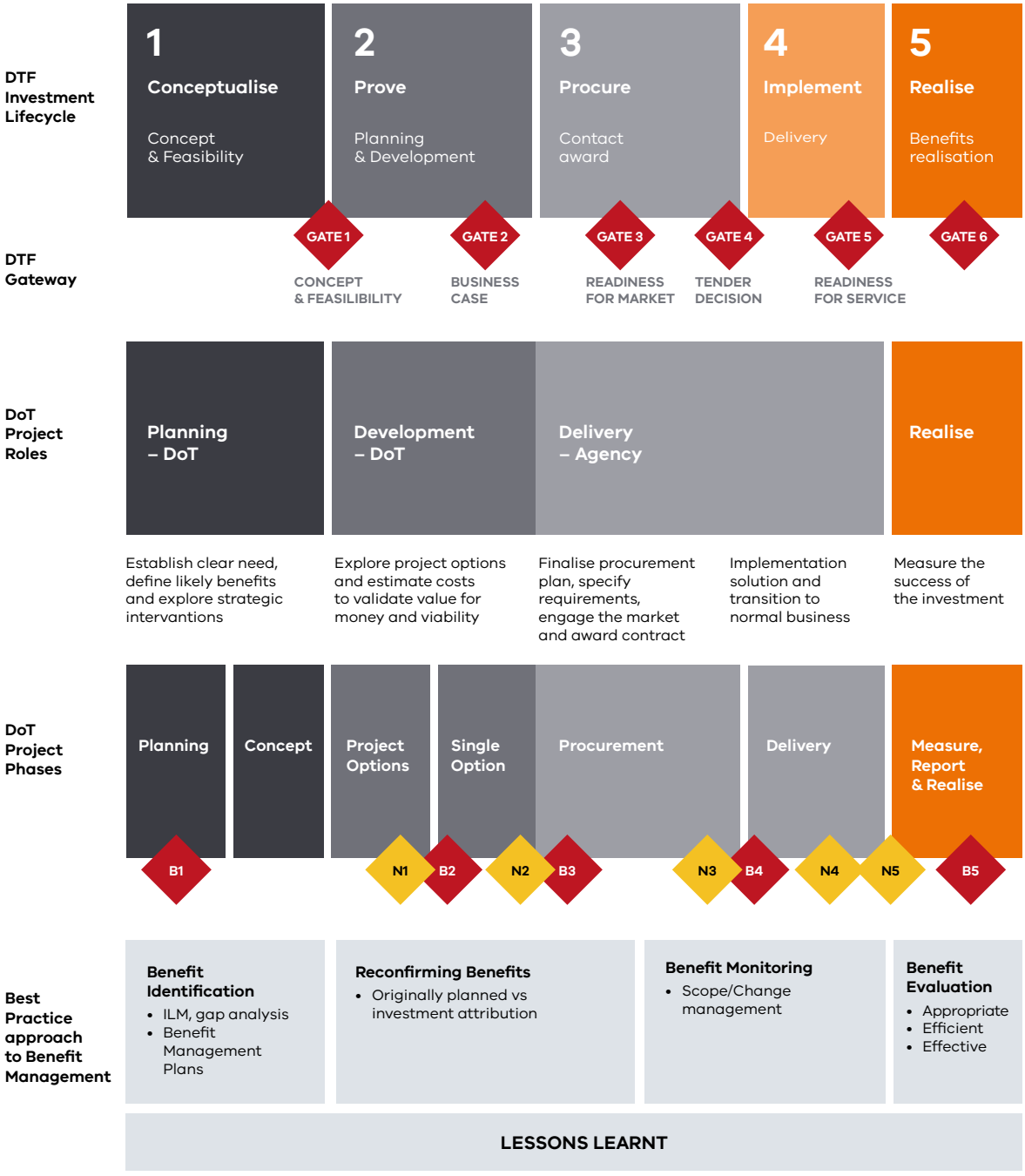
  Under the Network Integration Assurance Management Framework (NIAMF), which is used for heavy passenger rail and light rail projects, the **N1** gate review process (which is aligned to B2) will be a suitable point in time to assess the validity of the initial benefits identified.
- **Benefit Gate B3:** If the recommended investment option includes multiple projects, but enough funding is secured to deliver some of these projects, then this Framework can be used to help reconfirm or revise the initial benefits identified and captured in the Benefit Management Plan to align with the approved scope between the second and third phases of the ILC. Any changes to the initial benefits identified will also require the baseline to be re-established during the third phase.

  Under the NIAMF, the **N2** gate review (which is aligned to B3) will be a suitable point in time to reaffirm the benefits identified.
- **Benefit Gate B4:** If changes occur during the third and fourth phases of the investment lifecycle (i.e. procure and implement), these can also change the benefits. If so, this will trigger a change request to ensure the benefit owner is willing to accept the revised benefits. During this phase, the Framework and BMP can assist in identifying the impact of benefit change. If agreed by the benefit owner, then the baseline will need to be re-established.

  The NIAMF **N3 to N4** gates (which are aligned to B3 and B4) would be a suitable review point for any changes to the benefits as well as making sure the change processes are adhered to.
- **Benefit Gate B5:** At the end of the investment lifecycle (i.e. realise), the Framework and BMP should be used to confirm if and how much of the planned benefits have been achieved, and how efficiently and effectively these benefits were realised. The Framework and BMP should also be used to determine if any unplanned benefits or disbenefits resulted.

  The **N5** gate (which is aligned to B5) of the NIAMF is expected to undertake these assessments.

Figure 2-6 Alignment of BMF with DoT Investment Lifecycle



3. The Benefit Framework

3.1 Overview

An overview of the BMF is provided in Figure 3-1, and is based on DTF's Benefit Framework. The outer circle represents benefits, the middle circle represents the outcomes that DoT is seeking from various investments, and the inner circle implies the focus on DoT's vision as stated in the Strategic Plan 2021-2025, which is central to all outcomes being produced.

Each benefit identified within an investment (project, program or strategy) level ILM will normally sit within the outer circle. Each coloured 'wedge' fans out to depict a series of relevant indicators for each benefit type. These wedges are described separately in the following pages.

3.2 Definition of Government level outcomes

The outcome categories used in this BMF are defined as follows:

Economic Prosperity

Victoria's economy and economic activity grows enabled by efficient local, regional, and international movement of people and product within a fiscally sustainable system.

'Economic prosperity' refers to strengthening the economy through provision of and/or better use of the transport system and connections with land use, to facilitate the efficient movement of people and goods. Transport projects can contribute to economic prosperity through efficiency effects and technology adoption (faster and more reliable systems) and agglomeration (better access), which is considered one of the four types of Wider Economic Benefits (WEBs) that arise from major transport initiatives.

This outcome category also includes the concepts of 'value for money' achieved through delivering an infrastructure or service to the right level, at the right time and at the best cost. It will also include any cost savings as a result of an investment.

Social Inclusion

All Victorians are able to participate in the community, with transport providing universal, safe, secure access to work, social, education, recreation and healthcare opportunities.

'Social inclusion' refers to providing more inclusive experiences for transport users through improved access to the transport system and improved access to opportunities by the transport system; as well as through more predictable, convenient and comfortable journeys. It also refers to the concept of being protected from both real or perceived harm through the control of recognized hazards and potential risks of being harmed.

Healthy People, Thriving Places

Victorians are physically and mentally healthy, enabled by environments where transport, services and land use are integrated to provide safe, vibrant and liveable places.

'Healthy People, Thriving Places' considers the increase in satisfaction of the wider community through improved amenity and quality of place that results from transport projects. Elements of 'liveability', 'placemaking' and 'health' are captured under this outcome, which can be achieved through improved access, amenity and place. Any uplift of land value is also captured here as placemaking can also contribute to value add.

Environmental Sustainability

Victoria's natural environment is protected and conserved for now and the future, with a transport system that is clean, sustainable and environmentally responsible.

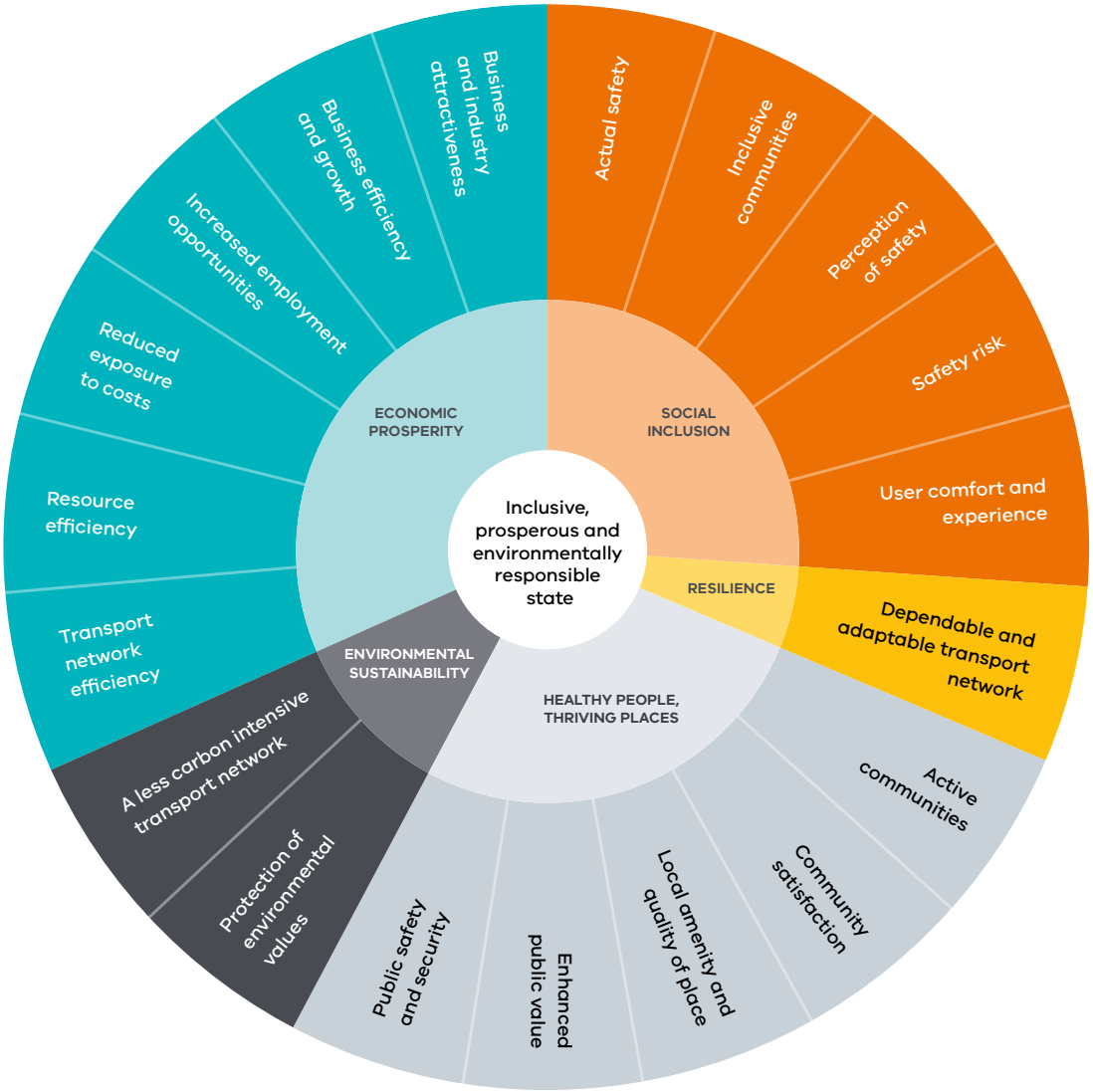
'Environmental sustainability' refers to reducing impacts on our environment and protecting environmental values. Some elements of 'liveability', 'placemaking' and 'health' are also captured under this outcome, which can be achieved through reducing negative environmental impact on people or protecting the environment for future generations.

Resilience

Victoria continues to grow and prosper in the face of the effects of climate change and other emerging threats and hazards, with a resilient transport system that anticipates and adapts quickly to uncertainty and disruption.

'Resilience' considers how well the transport network can respond to changes in demand, events, emergencies, or incidences.

Figure 3-1 Overview of DoT BMF

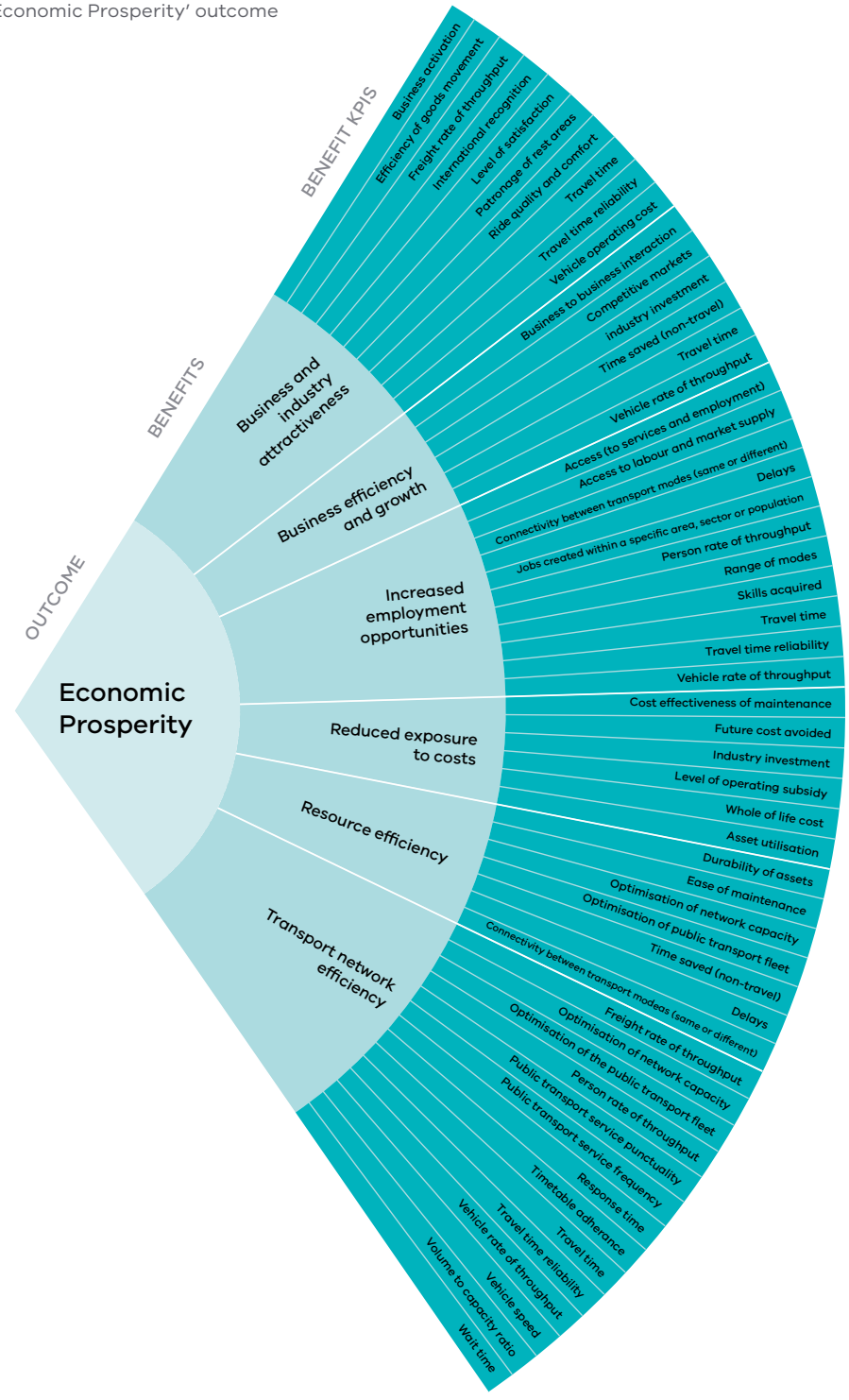


Return to Figure 3-1 Overview of DoT BMF

3.3 Economic Prosperity

Figure 3-2 shows the 'line of sight' for the 'Economic Prosperity' outcome, including the benefits and benefit KPIs. Definition of the benefits are provided thereafter, while the definition of the benefit KPIs are included in **Appendix A**. Table 3-1 outlines the relevant measures for each benefit KPI.

Figure 3-2 Line of sight for 'Economic Prosperity' outcome



Business and industry attractiveness

Increasing the attractiveness of a place to business or industry. This is often achieved by relieving constraints on freight movement or business access and includes all commercial and business activity such as tourism or professional services.

Business efficiency and growth

The reduction in cost to business or an increase in business outputs or services. 'Business efficiency' can be achieved through travel time savings, reduced vehicle operating costs or reduced transactions with DoT (for example, registration and licensing), as well as through better business to business interaction that leads to sharing (e.g. goods and facilities), matching (e.g. suppliers and customers) and learning (e.g. knowledge generation). 'Business growth' can result from an increase in competitive markets or more desirable products or services because of increase in labour supply and business to business interactions, which both occur from the clustering of businesses around new or improved transport infrastructure.

Increased employment opportunities

The increase in employment opportunities available from providing better access in a particular location or enabling individuals to reach jobs not previously easily accessible.

Reduced exposure to costs

The reduction in costs to Government (and therefore to the community). This would be due to investments that reduce future direct costs to Government and can include less maintenance costs, operating costs, administration costs (including legal costs) or future (significantly increased) capital costs.

This benefit is not about cost savings directly to individuals and businesses, such as travel time or vehicle operating costs (these benefits are captured by the 'productivity' outcome).

Resource efficiency

Using existing (non-financial) resources, including assets, more efficiently. Examples of inefficient use of an asset include an Intelligence Transport System (ITS) that is not functioning correctly (or is obsolete) or a road that is not optimally utilised.

Transport network efficiency

The efficiency of the transport network. Network efficiency is increased when people and/or freight can move between destinations faster with fewer delays and/or more reliably.

Definitions of indicators are provided in **Appendix A**.

Table 3-1 Indicators, measures and data contacts for benefits under the 'Economic Prosperity' outcome

Indicator	Measures	Data contacts
Access (to services and employment)	• Percentage or number of population (all or population segment e.g. mobility restricted) within a given number of minutes of service and employment • Average time to access services and employment from different locations • ARRB accessibility metrics (by number of opportunities accessible within a certain time by different modes) • Number of opportunities accessible during a certain time of the day or week	Project specific / transport model
Access to labour market supply	Number of people with specific qualifications in a specific sector or location	ABS
Asset utilisation	• Availability/downtime of assets (e.g. electrical equipment, public transport vehicle) • Number of uses or percentage of time asset or system is used	Project specific
Business activation	Number of Expression of Interest (EOI) for new businesses within a specified area The value of investment within a specified area	Project specific / Council
Business to business interaction	Number of different businesses in a specific area	Project specific
Competitive markets	Number of competing businesses in a specific location	Project specific
Connectivity between transport modes (same or different)	• Average variability in minutes of public transport travel • Frequency of services on a specific public transport corridor or route • Number of interchange connections met • Pedestrian travel time between modes • Proportion of services that are 'on time' or service punctuality	Project specific
Cost effectiveness of maintenance	Maintenance cost ($) per public transport vehicle	Project specific
Delays	Minutes of delay (per kilometre travelled or total)	Information Management Project specific
Durability of assets	• Design life and/or service life in years of an asset/system • Number of bridges with Access Restriction • Time required for an asset/system to reach end of life/replacement	Project specific Technical Services
Ease of maintenance	Average time to identify issue (e.g. with public transport vehicle)	Project specific

Indicator	Measures	Data contacts
Efficiency of goods movement	• $ per tonne per km or average tonnes per km • $ per Twenty-foot Equivalent Uni (TEU) per km • Number of trucks per total tonnage movement • Tonnage per trucks • Twenty-foot Equivalent Unit (TEU) per annum	Information Management
Freight rate of throughput	• Number of trucks per hour on a section of a road during a specified time period • Tonnes per hour	Information Management
Future costs avoided	• Percentage fare compliant • Cost of legal claims/fines • Cost of new infrastructure (e.g. traction power, essential infrastructure) • Maintenance costs (e.g. planned repairs, rehabilitation works) • Operational costs (e.g. incident management costs, electricity costs, costs associated with occupations) • Reactive maintenance costs (e.g. unplanned repairs, emergency works) • Spare fleet costs (e.g. costs associated with maintaining public transport spare fleet)	Project specific
Industry investment	• Number of competitive contracts • Proportion of investment made by industry	Project specific
International recognition	Number of international participants in Victoria's transport manufacturing research facilities	Project specific
Jobs created within a specified area, sector or population	• Square kilometres of retail and commercial floor space • Number of jobs created • Percentage of population segment (e.g. Aboriginal and Torres Strait Islander peoples, female, older people) employed	Project specific / Council
Land value	Land value in $$ in specific location	Project specific / Council
Level of operating subsidy	Cost per passenger	
Level of satisfaction	• Percentage (of users, businesses, community or industry members) satisfied • Number of complaints	
Optimisation of network capacity	• Percentage of capacity used (e.g. of road, path, bus lane, tram lane, rail line) • Number of trains, trams or buses per hour	Information Management
Optimisation of the public transport fleet	Number of trains, trams or buses per service or additional services per specified route	

Indicator	Measures	Data contacts
Patronage of rest areas	Number of spaces at rest areas utilised by heavy vehicles during specified times	Project specific
Person rate of throughput	Persons per hour (e.g. passenger, cyclist or pedestrian)	Information Management
Public transport service frequency	Number of public transport services during a specified time period on specified routes or corridors	
Public transport service punctuality	Percentage of trains, trams or buses considered 'on-time'	
Range of modes	Number of transport options available to a user within a specified distance of their home or work	Project specific
Response time	• Percentage of incidents attended or cleared within specified time • Time (in seconds, minutes, hours, days, etc.) to respond (to incidents, emergency, disruptions, calls, complaints, requests, applications, etc.)	Road Operations Project specific
Ride quality and comfort	• International Roughness Index (IRI) • Heavy Articulated Truck Index (HATI) • Track Quality Index	Project specific
Skills acquired	• Level of skills acquired in a specific industry • Number of people trained in a specific industry	
Time saved (non-travel)	Time in minutes by community/business/industry (e.g. through automation/reduced transactions)	Project specific
Timetable adherence	• Percentage of public transport services cancelled or incomplete (includes 'reliability percentage' reported for bus services, or 'percentage of public transport reliability target met' reported for train or tram services) • Proportion of services that are 'on-time' or service punctuality (includes 'early running performance' and 'on time running performance' reported for bus services, or 'percentage of public transport punctuality target met' reported for train or tram services) • Number of Call-in events, Franchisee Breaches and Termination events	
Travel time	• Travel time in minutes from a specific origin to destination during a specific time period • Travel time between businesses in a specific location	Information Management
Travel time reliability	Average variability in minutes from origin to destination	Information Management
Vehicle operating cost	$ (including fuel, lubricating oils, tyres, vehicle depreciation, repairs and maintenance)	Information Management

Indicator	Measures	Data contacts
Vehicle rate of throughput	Vehicles per hour	Information Management
Vehicle speed	Instantaneous speed or average speed between origin and destination	
Volume to capacity ratio	Number of vehicles per hour through a point (e.g. road segment, intersection or track section) by the maximum number of vehicles per hour capable of travelling through the same point.	Information Management
Waiting time	Average waiting time at beginning of journey or service connection	
Whole of life costs	Cost in dollars	Project specific

Example

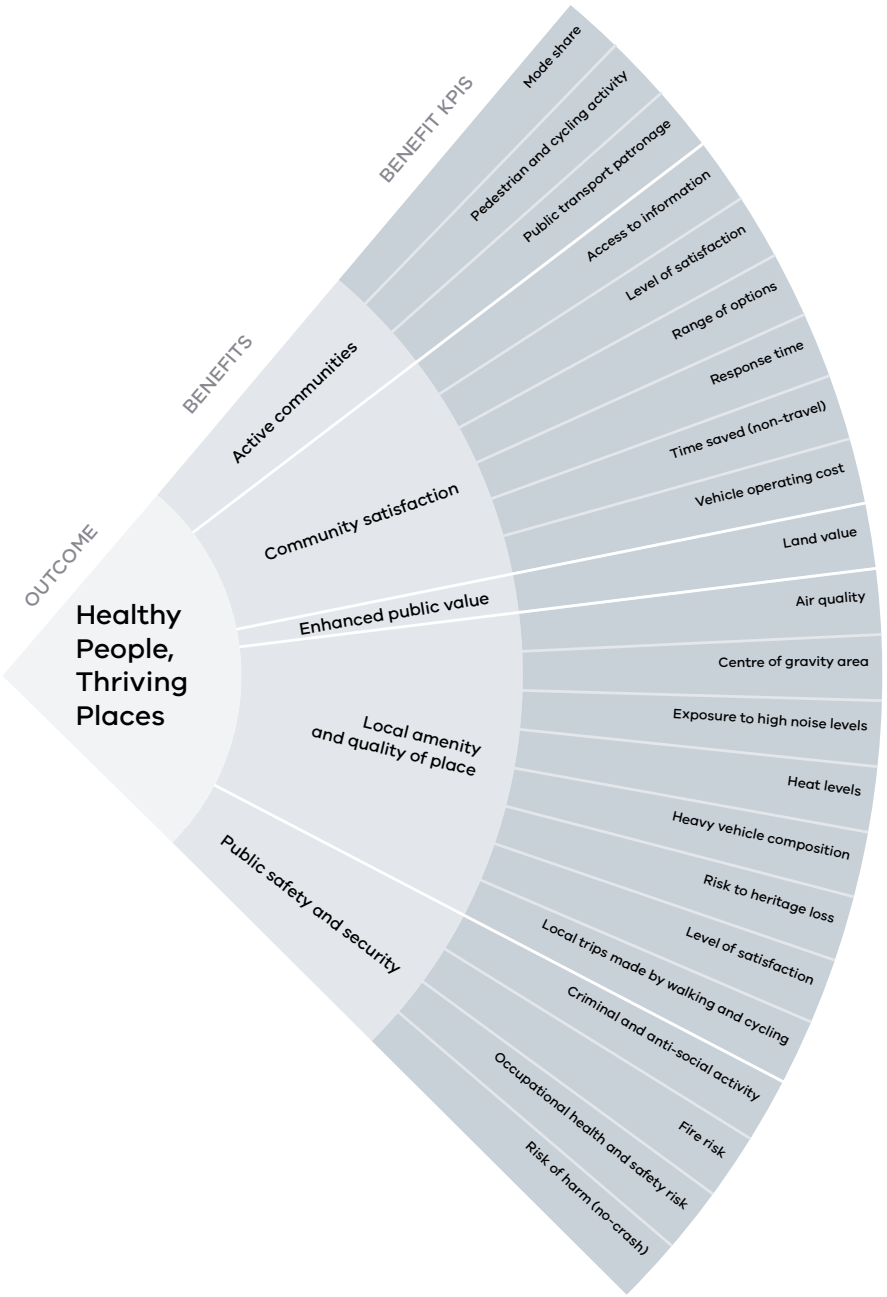
Steps	Example
Take one initial benefit from your ILM	Improving the attractiveness of Ballarat West Employment zone
Match this benefit with the Framework	Business and industry attractiveness
Select an indicator from the Framework and add to the ILM	Travel time
Contextualise the indicator and add to the BMP	Reduction in travel times between Ballarat West Growth area and Ballarat West Employment zone
Select a relevant measure from the Framework	Travel time in minutes from a specific origin to destination during a specified time period
Contextualise a measure to add to the BMP	Travel time in minutes between Ballarat West Growth area to Ballarat West Employment zone during the interpeak period

Return to Figure 3-1 Overview of DoT BMF

3.4 Healthy People, Thriving Places

Figure 3-3 shows the 'line of sight' for the 'Healthy People, Thriving Places' outcome, including the benefits and benefit KPIs. Definition of the benefits are provided thereafter, while the definition of the benefit KPIs are included in **Appendix A**. Table 3-2 outlines the relevant measures for each benefit KPI.

Figure 3-3 Line of sight for 'Healthy People, Thriving Places' outcome



Active communities

The level of physical activity within the community (such as walking and cycling) that leads to positive physical and mental health outcomes.

Community satisfaction

The satisfaction experienced by the community with the level of service of a road (or road network) or a direct customer service, usually measured through direct customer feedback. 'Community satisfaction' may also refer to product or service options available, as well as the choice of location of residence, employment and education as a result of transport improvements.

Enhanced public value

The value that is above and beyond what would ordinarily be achieved as a direct consequence of the relevant Government investment. These would also normally equate to Value Creation.

Local amenity and quality of place

The levels of amenity and quality of place in local areas. It considers features that make for a comfortable and pleasant life, as well as how the surrounding environment impacts people (such as through noise and air pollution).

Public safety and security

The safety and security of the wider community not directly resulting from the transport system. This can include community harm from fires on unmanaged roadsides, a community risk from a lack of street lighting, or the indirect impact of a road incident on the community, such as the impact of a chemical spill from a truck roll over. This can include any broader personal security and health impact that users may be exposed to when using a transport system.

Table 3-2 Indicators, measures and data contacts for benefits under the 'Healthy People, Thriving Places' outcome

Indicator	Measures	Data Contacts
Access to information	• Number and type of information available to community/businesses/industry • Average time information is available after incident identification	
Air quality	Vehicle emissions by gas type	Project specific
Centre of gravity area	Number of (non-transport) services in a specific area	Council
Exposure to high noise levels	Number of residential and/or noise-sensitive community buildings experiencing noise above the acceptable level, over a specified length of time (refer to relevant noise policy)	Project specific
Heat levels	• Temperature in specific location during a specific time • Heat Vulnerability Index	Project specific
Heavy vehicle composition	Percentage of number of heavy vehicles using a certain road or route during a specific time period	
Risk to heritage loss	Number of Historical and Aboriginal sites impacted	Heritage Practice Team / Project Records, Aboriginal Victoria and Heritage Victoria Permit Team
Level of satisfaction	• Percentage (of users, businesses, community or industry members) satisfied • Number of complaints	Project specific
Local trips made by walking and cycling	Percentage of local trips made by walking and cycling	Information Management Project specific
Range of options	• Number of businesses or community services within a specific area • Number of travel options between origin and destination	Project specific
Response time	• Percentage of incidents attended or cleared within specified time • Time (in seconds, minutes, hours, days, etc.) to respond (to incidents, emergency, disruptions, calls, complaints, requests, applications, etc.)	
Time saved (non-travel)	Time (in seconds, minutes) saved by community/business/ industry (e.g. through automation/reduced transactions)	Project specific
Vehicle operating cost	$ (including fuel, lubricating oils, tyres, vehicle depreciation, repairs and maintenance)	

Example

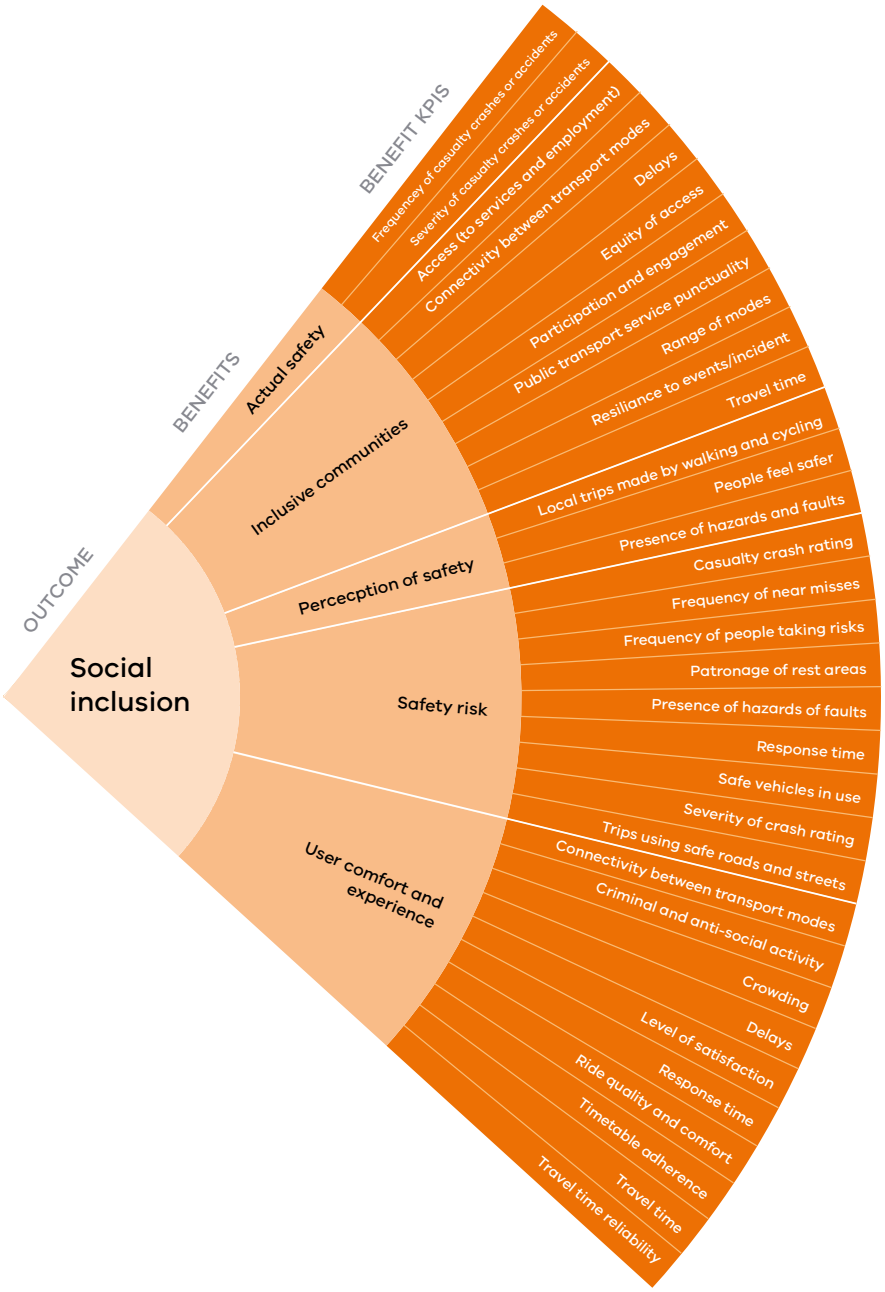
Steps	Example
Take one initial benefit from your ILM	Improved amenity on High Street
Match this benefit with the Framework	Local amenity and quality of place
Select an indicator from the Framework and add to the ILM	Heavy vehicle composition
Contextualise the indicator and add to the BMP	Lower composition of heavy vehicles on High Street
Select a relevant measure from the Framework	Percentage of number of heavy vehicles using a certain road or route during a specific time period
Contextualise a measure to add to the BMP	Average number of heavy vehicles using High Street on weekdays

Return to Figure 3-1 Overview of DoT BMF

3.5 Social Inclusion

Figure 3-4 shows the 'line of sight' for the 'Social Inclusion' outcome, including the benefits and benefit KPIs. Definition of the benefits are provided thereafter, while the definition of the benefit KPIs are included in **Appendix A**. Table 3-3 outlines the relevant measures for each benefit KPI.

Figure 3-4 Line of sight for 'Social Inclusion' outcome



Actual safety

The level of safety achieved by addressing a hazard either related to the transport network (e.g. road, train/tram track, train station, tram/bus stop, shared path) or vehicle (e.g. speed, driver behaviour, vehicle crowding) that has resulted in a known crash or injury. This could be achieved by interventions that lead to a safe transport system.

Inclusive communities

The level of inclusion within the community, taking into consideration non-discrimination, fairness and equity (such as reducing disadvantage and exclusion caused by transport inequity); as well as social participation (such as people participating in community groups, events and activities), which both lead to increased opportunites and positive mental health outcomes.

Perception of safety

The sense of feeling safe or unsafe. This benefit should be used where transport users or community members perceive that a risk to safety exists, but no crash or injury history, or measurable safety risk is present.

Safety risk

The risk imposed on users of the transport system at a given location. This benefit should be used where a known or measurable safety risk exists but there is no crash or injury history. For example, the risk of injury from overhanging branches along the roadside.

User comfort and experience

The extent to which transport users are satisfied with their journey in terms of comfort, delays or travel time and reliability. It also considers the ease and convenience of journeys for passengers through providing certainty or confidence on transport services and information and alternatives when disruptions occur.

Definitions of indicators are provided in **Appendix A**.

Table 3-3 Indicators, measures and data contacts for benefits under the 'Social Inclusion' outcome

Indicator	Measures	Data Contacts
Access (to services and employment)	• Percentage or number of population (all or population segment e.g. mobility restricted) within a given number of minutes of service and employment • Average time to access services and employment from different locations • ARRB accessibility metrics (by number of opportunities accessible within a certain time by different modes) • Number of opportunities accessible during a certain time of the day or week	Information Management Project specific
Connectivity between transport modes (same or different)	• Average variability in minutes of public transport travel • Frequency of services on a specific public transport corridor or route • Number of interchange connections met • Pedestrian travel time between modes • Proportion of services that are 'on time' or service punctuality	Information Management Project specific
Criminal and anti-social activity	Number of crimes reported	
Crowding	• Average number of people in a specific location (e.g. in train, tram or bus, on train platform, in station precinct, at tram or bus stop) over a specified time. • Number of load breach notices issued (for train or tram services)	Information Management
Delays	Minutes of delay (per kilometre travelled or total)	Information Management
Equity of access	• Percentage of or number of DDA or DSAPT compliance (e.g. sites, stations, platforms, stops, trains, trams, buses, facilities) • Percentage of public transport services accessible to people with mobility restrictions • Percentage or number of specific population segment (e.g. mobility restricted, female, children, older people etc.) using a specific aspect of the transport system (e.g. public transport, walking or cycling paths etc.) • New trips made by individuals at risk of social exclusion • Portion of household budgets devoted to transport	Project specific
Fire risk	• Kms of grass mowing for fire management • Kms of other vegetation management work for fire management (planned burns, envelope clearance, dead wood removal etc) • Number of corridors endorsed as high risk by CFA and Municipal Fire Management Planning Committee	Project specific

Indicator	Measures	Data Contacts
Frequency of casualty crashes or incidents	• Number of casualty crashes or incidents (by location, type and/or mode/user) • Number of casualty crashes per vehicle kms travelled (for road sections, per 100 million vehicle kms travelled; for intersections, per 10 million vehicles entering intersection) • Number of casualty crashes or incidents per public transport passenger kms travelled • Number of slips, trips and/or falls (in train, tram or bus, on train platform, in station precinct, at tram or bus stop, at crossing point)	Road Crash Information System (RCIS)
Frequency of near misses	• Number of near misses reported • Number of slips, trips and/or falls not resulting in injury (in train, tram or bus, on train platform, in station precinct, at tram or bus stop, at crossing point)	
Frequency of people taking risks	• Number of people taking risks (visual count) • Percentage of unsafe drivers/riders (e.g. drunk or drugged drivers/riders; riders not wearing protective gear; drivers not wearing seat belts; drivers/riders speeding or not complying with speed limits)	Project specific
Level of satisfaction	• Percentage (of users, businesses, community or industry members) satisfied • Number of complaints	Project specific
Local trips made by walking and cycling	Percentage of local trips made by walking and cycling	Project specific
Mode share	Percentage of mode share	Information Management
Occupational health and safety risk	Level of risk identified in Safe Management System	Project specific
Participation and engagement	Percentage or number of population segment (e.g. Aboriginal and Torres Strait Islander peoples, female etc.) engaged	
Patronage of rest areas	Number of spaces at rest areas utilised by heavy vehicles during specified times (for fatigue management)	Project specific
Pedestrian and cycling activity	• Pedestrians per hour during a specified time period • Cyclists per hour during a specified time period • Frequency of walking or cycling (i.e. times per day or week)	Project specific
People feel safer	• Percentage of people who feel safer • Number of complaints (relating to safety)	Project specific

Indicator	Measures	Data Contacts
Presence of hazards and faults	• Number of defects, faults or hazards identified (e.g. flooded walkways near structures, structural deficiencies, hazardous vegetation, potholes, narrow or unsealed shoulders) • Tonnes of litter removed or disposed • Number of journeys affected by planned events (e.g. road works)	
Public transport patronage	Number of patrons during a specified time period (e.g. hour, day, week, month or year) on public transport vehicles on specified routes or corridors	Information Management
Public transport service punctuality	Percentage of trains, trams or buses considered 'on-time'	Information Management
Range of modes	Number of transport options available to a user within a specified distance of their home or work	Project specific
Resilience to events/ incident	• Percentage or number of road/rail closures during event/incident • Percentage of alternative transport arrangements running at disrupted service frequency (for train or tram services) • Time (hours/days/weeks/months) to return original functionality • Number of journeys impacted by event • Number of instances where road/rail access is lost	Project specific
Response time	• Percentage of incidents/hazard attended or cleared within specified time • Time (in seconds, minutes, hours, days, etc.) to respond (to incidents, emergency, disruptions, calls, complaints, requests, applications, etc.)	Road Operations Project specific
Ride quality and comfort	• International Roughness Index (IRI) • Heavy Articulated Truck Index (HATI) • Number of public transport interchanges required • Track Quality Index	Project specific
Risk of harm (no-crash)	• Number of assets deteriorating that need repair • Number of structural deficiencies identified and repaired • Number of structures deteriorating that need repair (road worker exposure)	Project specific
Safe vehicles in use	• Percentage of safe cars registered (e.g. 5-star cars, vehicles less than 15 years old)	
Serious casualty crash risk rating	ANRAM or Safe System Assessment scores	

Indicator	Measures	Data Contacts
Severity of casualty crashes or incidents	• Number of fatality crashes and serious injury crashes or incidents (by location, type and/or mode/user) • Number of fatality crashes and serious injury crashes per vehicle kms travelled (for road sections, per 100 million vehicle kms travelled; for intersections, per 10 million vehicles entering intersection) • Number of fatality and serious injury crashes or incidents per public transport passenger kms travelled	Road Crash Information System (RCIS)
Timetable adherence	• Percentage of public transport services cancelled or incomplete (includes 'reliability percentage' reported for bus services, or 'percentage of public transport reliability target met' reported for train or tram services) • Proportion of services that are 'on-time' or service punctuality (includes 'early running performance' and 'on time running performance' reported for bus services, or 'percentage of public transport punctuality target met' reported for train or tram services) • Number of Call-in events, Franchisee Breaches and Termination events	Information Management
Travel time	Travel time in minutes from a specific origin to destination during a specific time period	Information Management
Travel time reliability	Average variability in minutes from origin to destination	Information Management
Trips using safe roads and streets	Percentage of Vehicle-Kilometres Travelled (VKT) on safe arterial roads trips, where safe roads and streets are defined as 5-star or 4-star	

Example

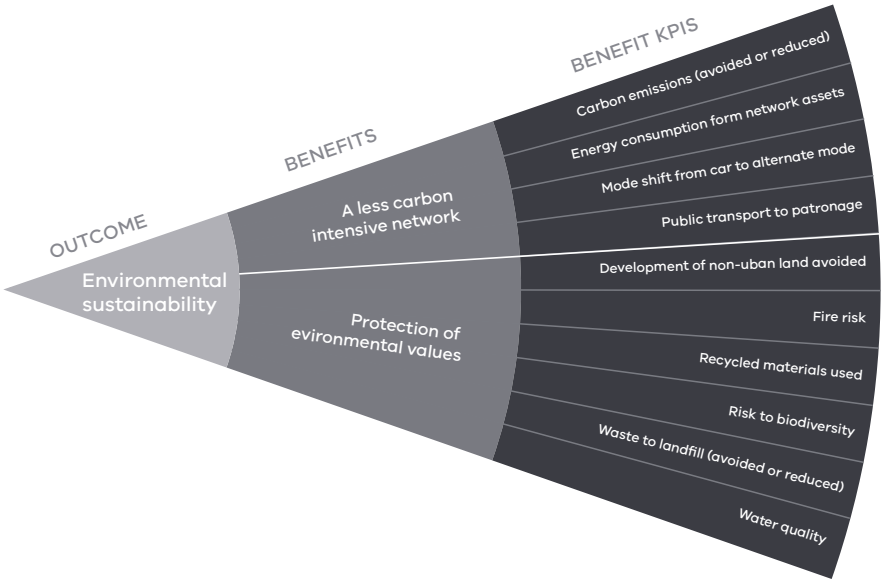
Steps	Example
Take one initial benefit from your ILM	Improved safety
Match this benefit with the Framework	Actual safety
Select an indicator from the Framework and add to the ILM	Frequency of casualty crashes
Contextualise the indicator and add to the BMP	Reduction in the frequency of casualty crashes on the section of Hallam Road to be duplicated
Select a relevant measure from the Framework	Number of casualty crashes per 100 million vehicle kms travelled
Contextualise a measure to add to the BMP	Number of casualty crashes on Hallam Road per 100 million vehicle kilometres travelled

Return to Figure 3-1 Overview of DoT BMF

3.6 Environmental Sustainability

Figure 35 shows the 'line of sight' for the 'Environmental Sustainability' outcome, including the benefits and benefit KPIs. Definition of the benefits are provided thereafter, while the definition of the benefit KPIs are included in **Appendix A**. Table 3-4 then outlines the relevant measures for each benefit KPI.

Figure 3-5 Line of sight for 'Environmental Sustainability' outcome



A less carbon intensive transport network

Reducing the carbon footprint of the transport network (as a whole). Note this does not include air quality (which is captured under 'comfort and connectedness' outcome). This benefit is aligned to both the *Climate Change Act 2017* and DoT's Strategic Plan to reduce carbon emissions.

Protection of environmental values

Biodiversity and other ecological impacts (such as water quality). This is not about mitigating negative environmental impacts of an investment (which are captured as disbenefits).

Definitions of indicators are provided in **Appendix A**.

Table 3-4 Indicators, measures and data contacts for benefits under the 'Environmental Sustainability' outcome

Indicator	Measures	Data contacts
Carbon emissions (avoided or reduced)	Number of tonnes of carbon dioxide or other greenhouse gases (based on electricity used created from non-renewables, or calculated using VKT, carbon content in fuel and fuel efficiencies)	Information Management
Development of non-urban land avoided	Area of non-urban land developed	Project specific
Energy consumption from network assets	MJ/year	Project specific
Fire risk	• Kms of grass mowing for fire management • Kms of other vegetation management work for fire management (planned burns, envelope clearance, dead wood removal etc) • Number of corridors endorsed as high risk by CFA and Municipal Fire Management Planning Committee	Project specific
Mode shift from car to alternate mode	Percentage of or number of trips made by alternative mode (active or public transport) previously made by car	Information Management
Public transport patronage	Number of patrons during a specified time period on public transport vehicles on specified routes or corridors	
Recycled materials used	Tonnes of recycled materials used	
Risk to biodiversity	• Percentage of plants or animals lost • Percentage pest plant and animal priority areas treated • Additional habitat provided in hectares • Number of roadkill discovered via routine maintenance activities • Number of environmental incidences responded to	Project specific
Waste to landfill (avoided or reduced)	Tonnes of waste materials	
Water quality	• Number of environmental incidences responded to • Road runoff compliance to the Urban Stormwater Best Practice Environmental Management Guidelines	Project specific

Example

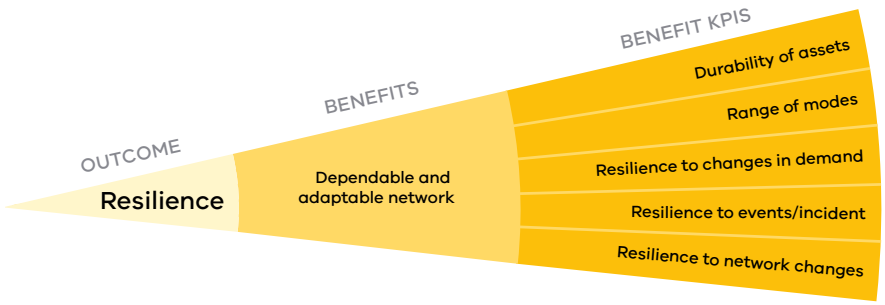
Steps	Example
Take one initial benefit from your ILM	A reduced carbon footprint from buses
Match this benefit with the Framework	A less carbon intensive transport network
Select an indicator from the Framework and add to the ILM	Carbon emissions (avoided or reduced)
Contextualise the indicator and add to the BMP	Carbon emissions avoided by switching from diesel to electric buses
Select a relevant measure from the Framework	Number of tonnes of carbon dioxide or other greenhouse gases (based on electricity used created from non-renewables, or calculated using VKT, carbon content in fuel and fuel efficiencies)
Contextualise a measure to add to the BMP	Number of tonnes of carbon dioxide generated from bus fleet

Return to Figure 3-1 Overview of DoT BMF

3.7 Resilience

Figure 3-6 shows the 'line of sight' for the 'Resilience' outcome, including the benefits and benefit KPIs. Definition of the benefits are provided thereafter, while the definition of the benefit KPIs are included in **Appendix A**. Table 3-5 outlines the relevant measures for each benefit KPI.

Figure 3-6 Line of sight for 'Resilience' outcome



Dependable and adaptable transport network

The ability to depend on the network over time and through changes. This includes changes in transport user demands and constraints, changing technology or through extreme climatic events.

Definitions of indicators are provided in **Appendix A**.

Table 3-5 Indicators, measures and data contacts for benefits under the 'Resilience' outcome

Indicator	Measures	Data Contacts
Durability of assets	• Design life and/or service life in years of an asset/system • Number of bridges with Access Restriction • Time required for an asset/system to reach end of life/ replacement	Project specific Technical Services
Range of options	• Number of businesses or community services within a specific area • Number of travel options between origin and destination	Project specific
Resilience to changes in demand	• Percentage of road network able to accommodate heavier trucks • Amount of additional network capacity • Amount of additional load capacity	Project specific Information Management
Resilience to events/ incident	• Percentage or number of road/rail closures during event/incident • Percentage of alternative transport arrangements running at disrupted service frequency (for train or tram services) • Time (in seconds, minutes, hours, days, weeks, months, etc) to return original functionality • Number of journeys impacted by event • Number of instances where road/rail access is lost	Project specific
Resilience to network changes	• Amount of additional network capacity (with additional lanes, track or route alternatives) • Amount of unused capacity	Project specific

Example

Steps	Example
Take one initial benefit from your ILM	Faster reopening of Princes Highway after a bushfire event
Match this benefit with the Framework	Dependable and adaptable transport network
Select an indicator from the Framework and add to the ILM	Resilience to events/incident
Contextualise the indicator and add to the BMP	Resilience to bushfire events
Select a relevant measure from the Framework	Time (in seconds, minutes, hours, days, weeks, months, etc) to return original functionality
Contextualise a measure to add to the BMP	Time in hours to reopen Princes Highway

4. Data sources

A consistent approach to data collection is critical to ensure that the key performance indicators and measures can be compared between investments.

Existing data sources should be utilised as much as possible to reduce the cost associated with additional data collection. Existing data sources may include:

- **Victorian Government's open data site (data.vic.gov.au):** This portal provides free data from most Government departments, including DoT.
- **Australian Bureau of Statistics (abs.gov.au):** This portal provides free statistical information about economic, population, environmental and social issues.
- **DoT's Enterprise Technology division:** DoT collects routine and project-specific data (e.g. traffic volume, vehicle travel time and speed, and road crash statistics) from within the Melbourne metropolitan area and across rural Victoria. It also maintains summary injury and crash data across Victoria. DoT's Data and Model development team also regularly collects other public transport data.
- **Information collected by DoT Customer Experience division:** This may include customer enquiries, complaints and surveys undertaken to understand customer expectations, priorities, attitudes and behaviours.
- **Information available through Councils:** This may include feedback from residents and information about business activity and housing development. Prior to approaching local councils, the Traffic Operation team can be contacted in respective regional offices to establish the first point of contact.

The current Data Resource Guide, which focuses on road related data,is currently being updated to support the BMF.

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5. How to use the Framework

The BMF provides a framework for identifying, monitoring and evaluating the success of transport investments including projects, programs, policies and strategies. This section outlines a process to identify the benefits relevant to the context and then validate using this Framework.

The approach to monitoring and evaluating these benefits, and how to capture lessons learnt, will be included as part of the *Monitoring and Evaluation Framework* (refer to Section 5.4.2 for further detail). Nevertheless, the BMF provides enough guidance for the preparation of evaluations (keeping the end in mind).

To ensure that the benefits are real and appropriate, it is important that they are based on the needs of the community or the identified problems. This means the benefits are those impacts that are derived by solving a problem or taking on an opportunity. As such, guidance on the following is provided in this section:

- problem identification
- problem prioritisation
- benefit identification
- benefit management.

5.1 Problem identification

The use of the term 'problem' can be interpreted to cover a range of issues, deficiencies and challenges, and not only focus on the negatives. Problems can also be expressed as constraints on opportunities as defined in the *Australian Transport Assessment and Planning Guidelines (2016)*.

Problem identification and assessment is an iterative process that will cycle through:

- identifying the problem as it is currently understood
- identifying and collecting all relevant data and evidence
- analysing the available data and refining the problem statement (validating, rejecting or redefining the problem).

There are various tools available for problem identification including:

- gap analysis
- scenario analysis
- deficiency analysis
- data and modelling including various logic models such as Investment Logic Mapping.

5.1.1 Defining problem statements using Investment Logic Mapping (ILM) process

The ILM process was developed by DTF and provides an international best practice approach to identifying problems and benefits that are relevant to the community. Unlike the other analysis tools, the ILM process then builds on the problems identified and, using four key elements of an investment proposal (problem, benefit, response, and solution), **connects the identified problems and resulting benefits into a stream of logic** as shown in Figure 5-1.

As the ILMs are a key ingredient to developing Victorian budget submissions, DoT strongly recommends using ILMs for problem and benefit definition. Details on how to undertake ILM is included in **Appendix B**.

Step 1 – Issue identification

The first step of problem definition using the ILM process includes identifying relevant issues of a place, the region or the network. A good understanding of the local context, particularly the key factors and influences that may affect broader Government outcomes, is important. This information can be obtained by:

- directly engaging with the community or key stakeholders
- accessing information from Council or Stakeholder plans and publications
- accessing any available market research
- accessing existing DoT knowledge and data on issues previously identified.

Step 2 – Problem definition

Once key issues are identified, the use of the 'root cause analysis' process is required to rationalise and validate problem statements. One of the approaches used for root cause analysis is the development of a 'problem trajectory'. The trajectory aims to identify the fundamental **cause** (what is broken) of a problem and the resultant consequences (**effect**) as a causal interpretation. This simply requires one continuously asking the "why" and "so what" questions to derive a clear cause and consequence picture.

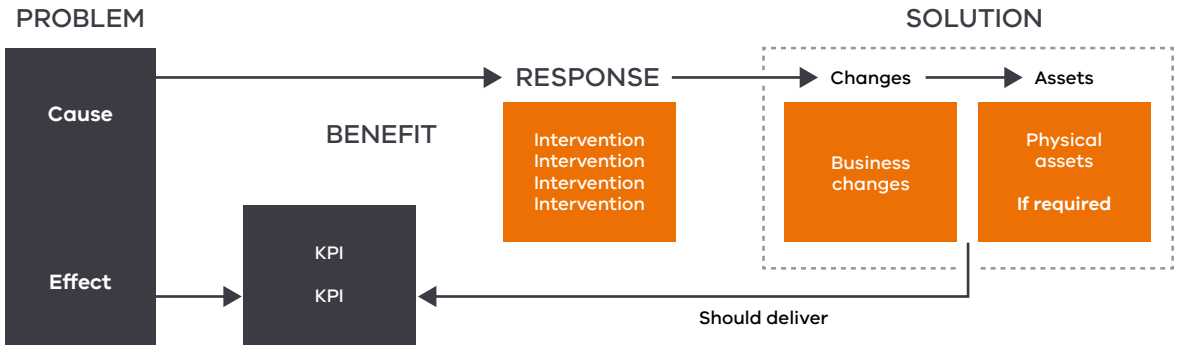
The problem statement is then presented as a statement with a **'cause'** (what's broken) and **'effect'** (consequences) and the **user group.** For example:

"**Non-compliant station amenities** *impede* **access** *for* **vulnerable and mobility impaired users**"

Problem statements should:

- be expressed in plain English and have a clearly defined cause and effect
- be supported by evidence to verify both the cause and effect that these two elements are correlated
- have an end consequence that is measurable
- be compelling and something that the Government, the organisation or community cares about (i.e. if the effect or consequence is of little importance or concern, the problem is not compelling).

Figure 5-1 ILM logic flow - the four elements of an investment story



5.1.2 Defining problem statements for investments derived from a network plan or strategy

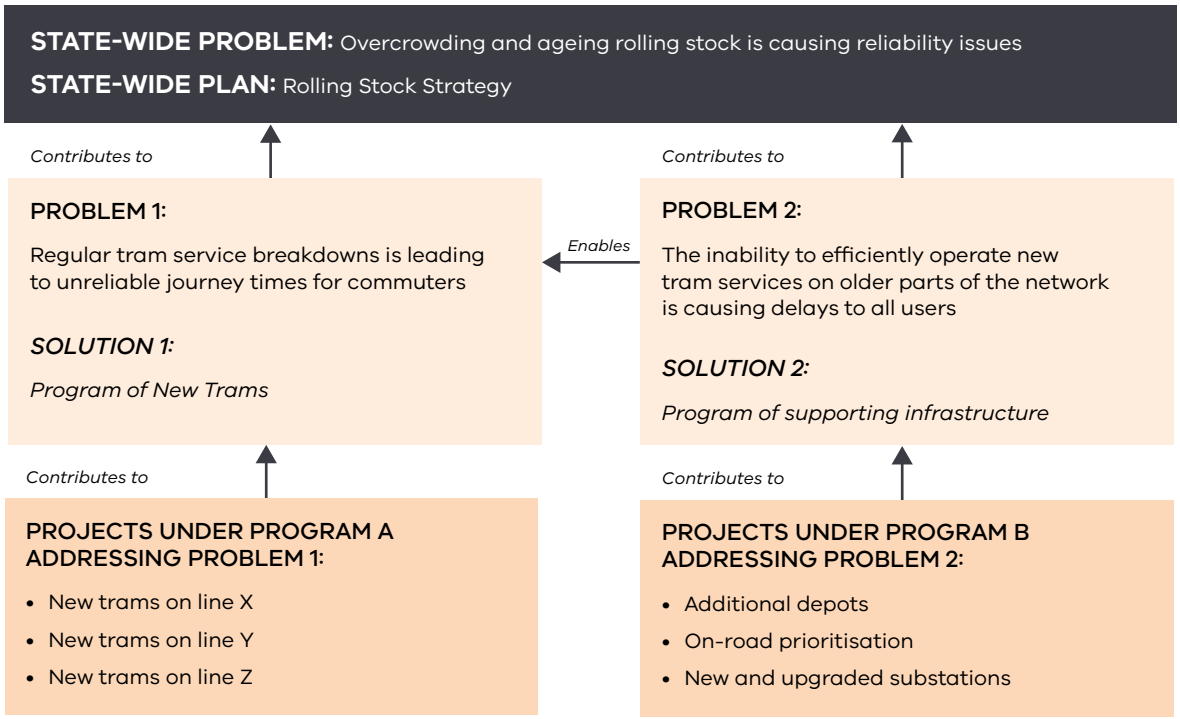
Where an investment 'need' is identified from a network plan/strategy, it is important to determine what level of network problem a particular investment may be addressing. This would first involve identifying the type of plan the problem statements were derived from.

System planning involves developing integrated strategies and plans for a hierarchy of planning levels: jurisdiction(s), markets, city and region, network, corridor and area, route and link. An example of this is shown in Figure 5-2.

An ILM process can also be used for developing plans, strategies and policies. However, in some cases, the problem or challenges identified in strategies and plans would have been identified through other methods such as gap assessments. In either case, all strategies and/or plans will have a set of problems or challenges to address. The next step would be to identify and develop the **cause** and **effect** aspects of the problems/challenges outlined in the strategy/plan.

The problem that an individual investment (project or program) aims to address should align to the strategic problems. However, the quantum of problem that the proposed investment will resolve will differ. For example, if the plan was developed at a corridor level and investment is also sought at corridor level, then the problem statements would be the same as in the plan. However, if the plan was developed at the network or corridor level and the investment is sought at the route or link level, then a project level ILM needs to be undertaken to determine the route or link level problem statements, which will be a subset of the strategic problem. That is, the problem statements for the individual investment will still need to align to the network or corridor level ILMs but will be contextualised to the localised issues.

Figure 5-2 Example of network plan for programs and projects



5.2 Problem prioritisation

Problem statements should be prioritised based on the scale and extent of the impact, estimated cost and urgency of resolving it. The urgency is considered as the risk to the Government or the community of not resolving the problems. The priorities would need to be tested with key stakeholders and community groups, where possible.

A sound evidence base is important in determining why a particular problem should be prioritised ahead of others. A comparison of quantitative and qualitative information gathered during the problem identification stage will help identify the most urgent or most significant problem. However, it is important to appreciate that this may not be an entirely objective process as input from stakeholders will be largely subjective.

As such, several factors may be considered in prioritising problems, including:

- current or forecast levels of demand
- the scale or extent of the problem, and hence the potential benefits of addressing the problem
- Government priorities and policies.

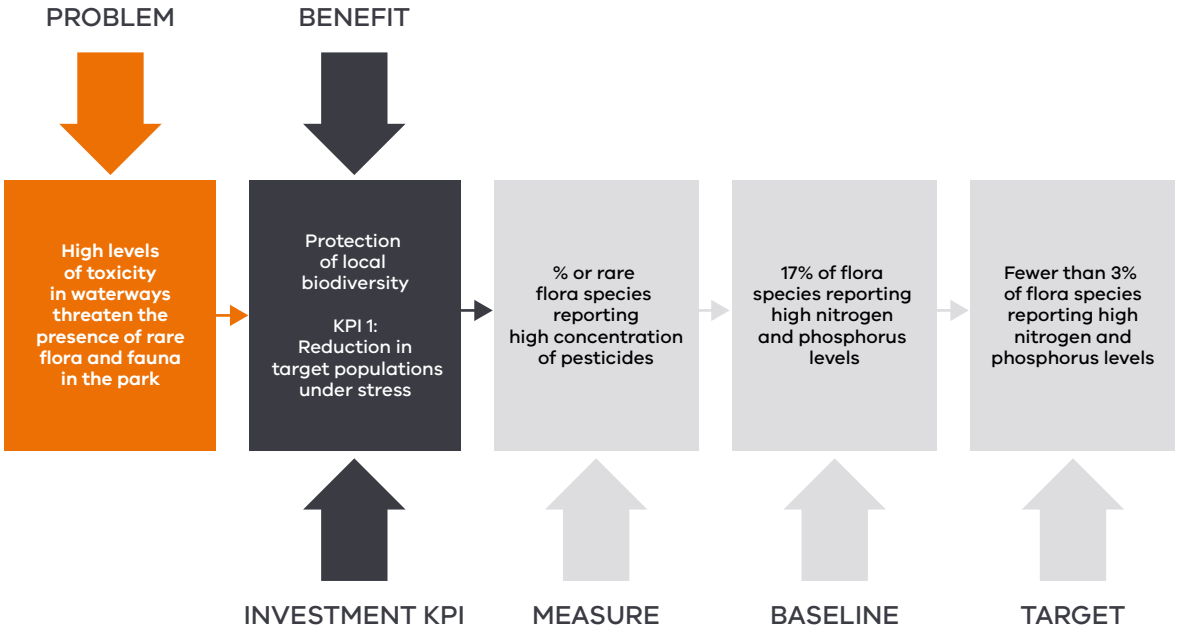
5.2.1 Problem prioritisation as part of ILM process

Problem statements are usually ranked in an ILM process and then weightings are allocated to the problems based on participants' knowledge (and supporting evidence) of how compelling the problems are.

In an ILM, a total of 100 per cent is distributed within each of the problem, benefit and response columns. This distribution indicates the relative importance of the various elements within each column. To ensure clarity and ease of prioritisation, no items should have the same weighting within one column.

If a problem is rated less than 15 per cent, this problem is normally eliminated from the range of problems that would be considered further.

Figure 5-3 Example alignment of problem, benefits, KPIs and measures (Source: DTF, 2017)



5.3 Benefit identification

Benefits are the positive results that will be achieved through successfully addressing the problems. Each benefit is supported by KPIs that will provide the evidence that the benefits are ultimately delivered, and the problem has been adequately addressed.

Various approaches that can be used for benefit identification include:

- Investment Logic Mapping process
- Program Logic
- Theory of Chain
- Result Chain.

The Program Logic, Theory of Chain and Result Chain provide a mapping process to identify the benefits when the investment decision (that is, the amount of funding and resources as well as interventions) is known. On the other hand, the DTF's ILM provides a holistic picture of the investment through a stream of logic connecting the problems to the benefits and then to the responses and solution, as shown in Figure 5-3. Therefore, DoT recommends that the benefit identification process should be based on the ILM mapping technique.

The **estimated** size and complexity of the investment should determine the recommended way the Benefit Management Plan (BMP) is developed. In general:

- only investments under $2 million would normally consider developing BMP outside the workshop environment
- all BMPs developed outside a workshop environment require a review by someone trained in the Investment Management Approach.

Note that even when the problems are defined outside an ILM process, the benefits can still be identified through a benefit definition workshop, as long as the problems are articulated as '**cause** and **effect**' statements and have evidence supporting these.

This Framework should be consulted during the benefit identification workshops as well as during the review process that follows, to select or improve how benefits are expressed and to determine appropriate indicators and measures. Much of the work will revolve around contextualising indicators or determining whether a proxy indicator is appropriate, rather than creating completely new indicators.

5.3.1 Benefit identification using ILM process

Once the problem statements have been adequately defined and substantiated, DTF Investment Management Standards recommends a second workshop (Benefit Definition Workshop) to define the benefits.

This step focuses on determining and articulating the benefits to the organisation, enterprise or community that will be delivered by resolving the problem identified in Section 5.1.

Typically, the 'effect' statement of the problems provides some indication for the types of benefits (the benefit KPI) that could be derived by solving the problem. Understanding the broader context around how the positive change will assist the beneficiaries will also help determine the appropriate benefit.

For example, the problem identified in Section 5.1.1 indicates that **vulnerable and mobility impaired users** (beneficiaries) will achieve better **access** (immediate positive change – which can be translated into a KPI). If these users were to use that access to reach an employment centre, then **'increased job opportunities'** can be claimed as the benefit. Refer to Figure 5-4.

A benefit also needs to pass three tests:

- It has removed or mitigated the defined problem, specifically a cause or effect, and is aligned to the outcomes valued and articulated by the organisation (refer to the Benefit Framework in Section 3)
- It is supported by o KPIs that are meaningful, measurable and attributable to the investment
- It is cost-effective, i.e. the effort required to track the benefit and the KPIs are commensurate with the value and insight that they provide.

Ideally, KPIs should be **outcome** rather than **output** or activity focused. Where there is no practical way to measure an outcome, a proxy or indirect indicator may be used. These are often more output focused and should be used judiciously.

Essentially, this BMF will assist in ensuring the benefits are appropriate and pass the relevance test. The BMF should therefore be used to validate the benefits and complete a Benefit Map and a Benefit Management Plan.

5.3.2 Validating identified benefits using the Benefit Framework

There are two ways in which the benefits and benefit KPIs can be identified and validated once the problem statements have been identified.

Option 1: Develop the plan through a facilitated workshop

If you have completed facilitated workshops to complete an ILM and BMP, you can validate the BMP using this Framework, either during the second workshop (when a BMP is developed) or during the review process once the workshop is completed.

There are four key steps to reviewing the BMP:

1. Take each benefit initially identified in the ILM and match that benefit with the relevant Framework item. There are three possible results: the logic map benefit reflects one of the Framework outcomes; it reflects one of the Framework benefits; or neither of these:
    - **Outcomes –** if the ILM benefit matches a Framework outcome, then the benefit that is most relevant within that outcome must be identified. Look at the problem statements that link to the benefit in the ILM. The problem statements may refer to an issue that closely matches a benefit in the Framework. For example, if an ILM has a benefit identified as **improved road safety** (which matches an outcome), then refer to the problem statement to determine the relevant benefit for the investment. If the problem was 'public behaviour around rail crossing was causing a potential safety hazard', the relevant benefit will be around **safety risk**.

Figure 5-4 Example of benefits and benefit KPI derived from the problem statement

- **Benefits –** if the ILM benefit matches a Framework benefit, this step is complete.
- **Neither –** if the ILM benefit matches neither, either the ILM reflects work not related to the Organisation or the Framework needs to be reviewed as the scope of works undertaken by the Organisation may have changed. In the latter case, investment managers need to contact the Portfolio Management Office (PMO) so the Framework can be updated with the new benefits (if applicable).

2. Review the indicators developed within the workshop. As you review each indicator, make sure that each actual, contextual or proxy indicator meets the principles described earlier for attribution, relevance and measurability. If you believe each indicator developed within the workshop meets these principles, the next question is whether the indicators align with the Framework.
3. Each indicator could be an *actual indicator* (an exact match for the indicator in the relevant coloured wedge), such as **travel times**; a *contextualised indicator* (a match but adjusted to suit the specific issues relating to the investment), such as **travel times along the Hume Freeway**; or a *proxy indicator* (an alternative way of describing the achievement of the indicator), such as **satisfaction with travel times along the Hume Freeway**.
4. If the indicator is neither direct, contextual or a proxy for an indicator provided in the Framework, either the indicator is not appropriate, or the Framework needs to be reviewed and updated. Please do not continue with an indicator in this circumstance. Replace the indicator with a more appropriate indicator or discuss a future review of the Framework with the Portfolio Management Office (PMO). Check that measures and data sources listed in the draft BMP are consistent with the Framework.

Option 2: Develop the BMP outside the workshop environment

If you have already developed an ILM or have identified problem statements outside the ILM process and are developing the BMP outside the workshop environment, you will need to download the templates and guidelines from the DTF website[4].

There are seven key steps to developing the BMP:

1. Take each benefit initially identified in the ILM (or a separate problem definition process) and match that benefit with the relevant Framework item. There are three possible results: the identified benefit reflects one of the Framework outcomes, it reflects one of the Framework benefits, or neither. Follow the instructions under Step 1 of Option 1 to validate this benefit.

4 https://www.dtf.vic.gov.au/investment-management-standard/facilitator-guidance-and-templates

2. Once you have selected the relevant Framework benefits, you will need to identify appropriate indicators and measures from the Framework. You can find relevant indicators from each coloured wedge relating to that benefit. After each coloured wedge, there is an example table showing how to do this.

   Table 5-1 is taken from the section relating to the 'productivity' outcome category.

   Select appropriate indicators for each benefit. Once you have one or two indicators for each benefit, you can start building the BMP.

3. Each indicator could be an *actual indicator* (an exact match for the indicator in the relevant coloured wedge), such as **travel times**; a *contextualised indicator* (a match but adjusted to suit the specific issues relating to the investment), such as **travel times along the Hume Freeway**; or a ***proxy indicator*** (an alternative way of describing the achievement of the indicator), such as **satisfaction with travel times along the Hume Freeway**.

4. If the indicator is neither direct, contextual or a proxy for an indicator provided in the Framework, the indicator is not appropriate, or the Framework needs to be reviewed and updated. Please do not continue with an indicator in this circumstance. Replace with a more appropriate indicator or discuss a review of the Framework with the Portfolio Management Office (PMO).

Table 5-1 Example of how to apply the Framework

Steps	Example
Take one initial benefit from your Investment Logic Map (ILM)	More businesses in the area
Match this benefit with the Framework	Business and industry attractiveness
Select an indicator from the Framework and add to the ILM	Travel time
Contextualise the indicator and add to the Benefit Management Plan (BMP)	Reduction in travel times **from Pakenham Growth Area to Clayton Employment zone**
Select a relevant measure from the Framework	Travel time in minutes from a specific origin to destination
Contextualise a measure to add to the BMP	Travel time in minutes between **Pakenham Growth Area to Clayton Employment zone**

5.3.3 Capturing the benefits and associated KPIs in a Benefit Map and a Benefit Management Plan

To make it easier for future evaluations it is important that standardised templates for Benefit Maps and BMPs are used. As such, the Benefit Map and BMP templates included in DTF's Investment Management Standards should be used across DoT and its agencies. These templates can be downloaded from: download the templates and guidelines.

A Benefit Map, as shown as Figure 5-5, includes the identified benefits and KPIs, measures and targets/interim targets (including dates) that would be used to assess the benefits.

Benefit Management Plan (BMP) (sample included in Figure 5-6) includes clear responsibilities and data sources, baseline, targets and interim targets to be used for reporting.

Figure 5-5 Benefit map template

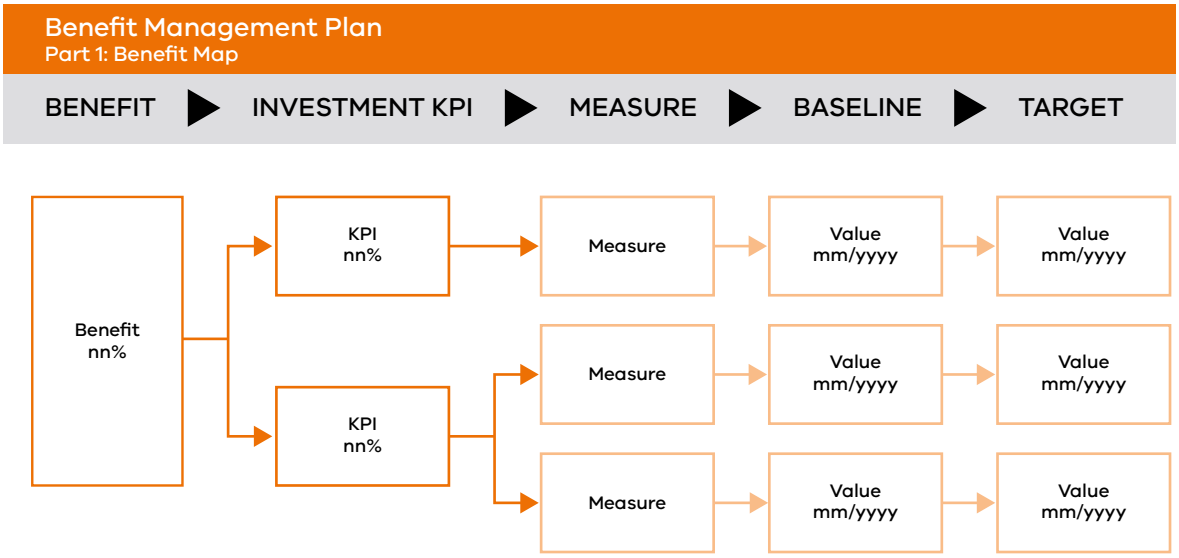


Figure 5-6 Benefit Management Plan template

<INSERT BENEFIT DESCRIPTION HERE>		
KPI:	Insert KPI description here	
Measure	Insert measure description here	
	Baseline	Value (dd/mm/yyyy)
	Target	Value (dd/mm/yyyy)
	Interim Target	Are there interim targets to ensure things are on track (value, date mm/yyyy)
	Source	What is the source of the data to be used to measure this KPI?
Reporting	Forum	Where will this KPI be reported?
	Start date	When will the reporting start (dd/mm/yyyy)?
	Frequency	How frequently will it be reported (monthly, quarterly, annually)?
	End date	When will reporting finish (dd/mm/yyyy)?
Responsibility for reporting	Name	
	Position	
	Organisation	

The following Steps should be used for completing the Benefit Map and the Benefit Management Plan:

5. Once you have identified your benefits using either Option 1 or 2 you are now ready to start building the Benefit Map and the BMP. In the Benefit Map, add the benefits that you validated in Section 5.3.2 above. Then add and link the indicators and measures you have selected. You will also need to add the target values and the date by which you think this target will be achieved.
6. The final step is to complete all the information required in the 'reporting and responsibilities' section of the BMP, including baseline and target values, the data source, any interim targets, the forum that will receive status reports, the dates between which reporting will be undertaken and the person or position responsible for providing the data to the investor/owner.

5.3.4 Understanding levels of benefits attainable at project, program and plan level

The process for benefit identification for different types of investment (project, program or broader network plan) is the same. However, the type and quantum of benefits will differ with the context. For example, the benefits listed in network/corridor plans would be identified at the network/corridor level while the benefits listed for an individual project will be localised.

For this reason, if the benefits are identified at a plan or a strategy level and the project being considered is identified at the route/link level, then a lower level benefit (or localised benefit) that aligns to the benefits outlined in the plan need to be identified. This benefit would be a subset of a broader strategy/plan benefit but should be attributable to that individual project.

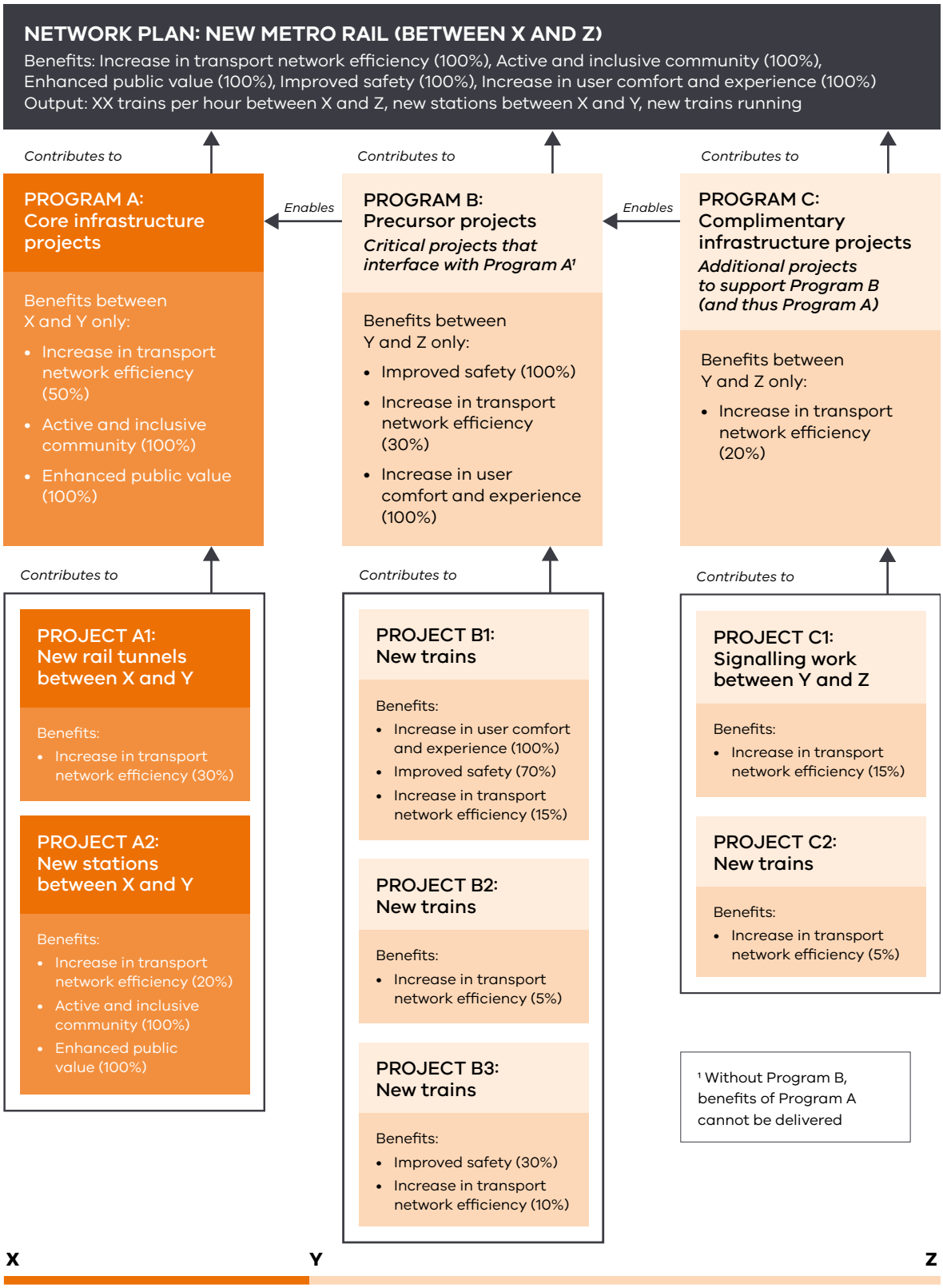
Similarly, the problems to be addressed by a network plan or strategy (and the resulting benefits) are meant to be achieved through delivery of a package of investments. As such, an individual project listed in the plan may only be able to deliver part or none of the benefits outlined in the plan.

Also, some problems cannot be resolved with capital investments alone and may require operational components. Hence, the benefits will only be achievable when combined with complementary investments. This is considered benefit dependency. It is essential that these factors (benefit dependency) are captured and articulated in a Benefit Management Plan and all other supporting documentation.

For example, a plan identifies that 10,000 people are able to move efficiently and safely through a corridor by delivering additional trains plus timetable changes, however, the current project scope only includes additional train purchases. In this case, the reduced scope may be able to deliver 10,000 people movements but it may not be as efficient or safe as originally planned. In fact, it can make the movement less efficient or even unsafe. In this case, it would be important to articulate the difference in efficiency or safety gains achievable from the part scope of the investment.

A further example of benefits attainable at the project, program and plan level is provided in Figure 5-7.

Figure 5-7 Example of network plan for programs and projects



5.4 Management of benefits

5.4.1 Changes to benefits

In some instances, identified benefits may change due to:

- funding not received for the whole program/plan
- project scope changes during delivery due to issues not known during the development of the initiative
- inability to meet project requirements
- changes to assumptions underpinning the benefits.

When this occurs, it is important to revisit and revise the Benefit Map and the Benefit Management Plan so that there is a clear expectation of the level of benefits achievable for a reduced or changed scope.

Any change to the benefits should be clearly articulated in the Change Request template (available from the ePMO) to facilitate an assessment of the appropriateness of the change in terms of the potential trade-off between the benefits and the necessity of the proposed change. This will allow the DoT Project Client to take the necessary measures to address the impact of the proposed change.

The change request should identify, establish and communicate the level of benefits that are achievable due to the change in scope and the impacts of those changes on the community and Government, as well as on the operations, network and DoT's reputation.

Refer to the Change Request template for further detail on the relevant information required for the change.

5.4.2 Benefit monitoring and evaluation

The benefits, Key Performance Indicators (KPIs) and measures established at the planning stage become the basis for how these benefits are managed over time and evaluated to confirm their realisation.

DoT's Monitoring and Evaluation Framework is currently under development. It will build on the existing *Roads Investment Evaluation Framework* and its accompanying *Learnings Dissemination Strategy*, which provides a consistent approach to planning and undertaking post-completion evaluations (including benefit realisation) as well as how learnings can be shared and used.

The Monitoring and Evaluation Framework will:

- define a process and provide guidance for measuring how effectively and efficiently benefits have been realised (benefit realisation)
- define a process to capture any unplanned benefits/disbenefits that would have arisen through the investments
- define a process for capturing any efficiencies that may have been achieved, as well as any learnings through the investment lifecycle.

The Monitoring and Evaluation Framework will also be developed in line with the Gateway Review process and the ATAP Guidelines.

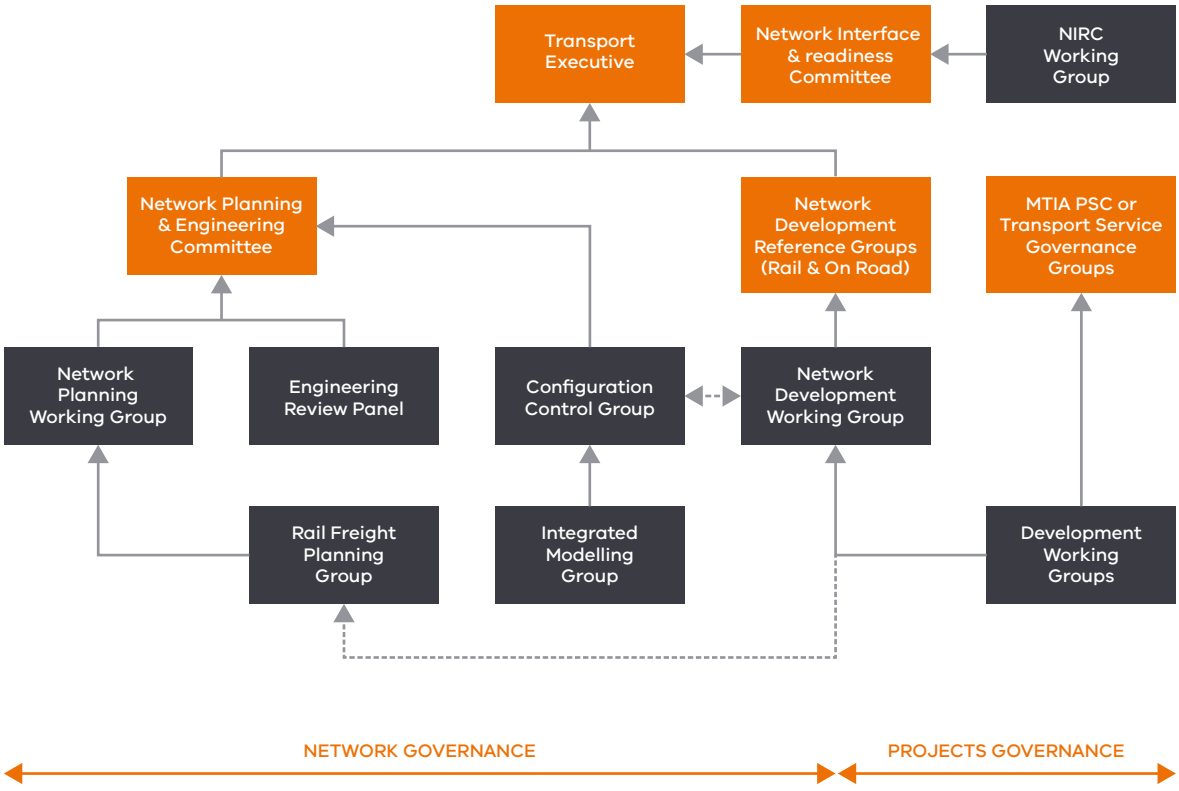
6. Benefit governance

DoT has established a number of project governance structures that look at how the intended delivery of projects is aligned to the strategic direction of the organisation. The Project and Network Governance hierarchy structures are shown in Figure 61.

Under existing governance arrangements, project benefits are required to be endorsed by the Network Development Reference Groups (NDRG) and various Project Steering Committees to ensure that:

- benefits are accurately identified and defined during investment/policy development process
- benefits are maximised during delivery and impact of any scope changes managed
- benefits are evaluated to confirm the delivery of desired benefits
- any lessons learnt during planning and delivery of the investments are captured and make necessary planning or policy changes that would ensure that benefits are delivered more effectively and efficiently.

Figure 6-1 Project and Network Governance Hierarchy structure 2021



Appendix A: Definitions of indicators

The presence of an indicator on this list does not mean that DoT is responsible for its management. In some cases, DoT activities may also be one of several factors that would have contributed to a change in an indicator.

Access (to services and employment): the ease with which services and employment can be reached from a location. This might be used where transport network improvements make it easier to reach jobs and or retail, medical, recreational, social or other community facilities.

Access to information: the ease with which the community, businesses or industries can access the information they need. This may be in relation to traffic information or public transport information.

Access to labour market supply: the ease with which businesses and industries can access suitably qualified people.

Air quality: the degree to which the air in a particular place is clean, clear and free of pollution (i.e. gases, dust, fumes or odour in amounts that could be harmful to the health or comfort of humans). This might be used where an investment reduces vehicle emission pollutants. Air quality can be estimated using parameter values published in Austroads guidelines. Some tools and traffic models report air quality estimates.

Asset utilisation: the degree to which existing assets are utilised. If an asset (such as a Variable Message Sign) is not working, the resource is being wasted. This would only be used where an asset would otherwise not deliver (or deliver less of) the benefit/s it is intended to deliver.

Business activation: the stimulation of new or improved business activity. This might be used when an investment encourages an increase in business activity in a locality.

Business to business interaction: level of activity between businesses in a local area (e.g. activity centre). This indicator reflects agglomeration benefits derived when complementary businesses are near each other. Particular transport investments may encourage or lead to greater business interaction.

Carbon emissions (avoided or reduced): the amount of carbon that is released into the atmosphere from a petrol, gas or diesel vehicle, or from a power station when electricity is generated. Carbon emissions can be estimated using parameter values published in Austroads guidelines. Some tools and traffic models report carbon emission estimates.

Centre of gravity area: indicates the level of community services and amenity surrounding a central location. These would normally be businesses or services moving to key activity nodes or new activity areas that may open up due to better access or connectivity.

Competitive markets: level of competing businesses in a local area (e.g. Activity Centre). More competitive markets lead to consumer benefit via greater choice.

Connectivity between transport modes (same or different modes): the ease of making connections between transport services (e.g. making a change from a bus to a train upon reaching the train station). This might be used when investment improves the quality of a connection facility (e.g. moving the bus stop closer to the train station) or improves the reliability of services (e.g. making sure the bus always arrives on time so the train is not missed).

Cost effectiveness of maintenance: how well money is used to maintain public transport vehicles and assets. This may be used where a project reduces the cost of maintenance, such as building a new stable for trains, to reduce travel costs.

Criminal and anti-social activity: actions that harm or lack consideration for the wellbeing of others, particularly on public transport, at train stations, tram stops or bus stops.

Crowding: number of people, particularly on public transport, at train stations, tram stops or bus stops. Often estimated in public transport models.

Damage to vehicles/properties: damage that occurs to non-DoT property (including vehicles) as a result of the road network (excluding usual vehicle maintenance, which is covered under vehicle operating costs). This might be vehicles damaged by potholes or damage to neighbouring properties caused by falling tree branches.

Delays: additional travel time experienced by transport users to get from an origin to a destination (e.g. from home to the location of services, employment or other activity), with reference to a base travel time (e.g. in comparison with free flow travel time). Delays could be along an entire route or at a specific location (such as an intersection).

Development of non-urban land avoided: the amount of land developed as a result of an investment (e.g. land for housing or commercial purposes) in an urban area that would otherwise have been developed in a greenfield site.

Durability of assets: the ability of an asset to remain functional over time. This might be by withstanding wear and damage (i.e. remaining functional after prolonged exposure to traffic, weather and other external factors) or by remaining up to date (i.e. assets or systems not becoming redundant). This might be used where routine maintenance would allow pavements/structures to have a long usable life in economic terms.

Ease of maintenance: the ease with which issues on public transport vehicles or assets can be identified for repair or maintenance. This may be used where onboard diagnostic tools are installed in vehicles.

Efficiency of goods movement: the ability to move goods from one location to another with the least time, cost and/or resources, usually measured as the money and/or time required to move a given value, weight or volume of freight a given distance (e.g. 1km) or along a specified route (e.g. from a port to a freight hub).

Energy consumption from network assets: the amount of energy (usually electricity) used by a road or rail network asset. This might be used where an electrical asset is upgraded to reduce it's energy use (such as the replacement of incandescent bulbs with LEDs).

Equity of access: level to which all community groups, including those who may need extra support or assistance, can use a given mode. This might be used where a project provides access for community members who are mobility restricted or those of low socioeconomic standing.

Exposure to high noise levels: number of community members exposed to unacceptable noise levels generated from the road or rail network. This might be used when an investment reduces the noise levels experienced by a section of the community (such as through the installation of noise walls). Noise exposure should be in line with relevant noise policies (e.g. DoT's Traffic Noise Reduction Policy).

Fire risk: the probability of fire starting or spreading within land managed by DoT adjacent to the road/roadside or railway track/trackside. This might be used where roadside or trackside maintenance (such as grass slashing) reduces the fuel load on the road shoulder or adjacent to the track.

Freight rate of throughput: the amount of freight that passes a given point in a given time period. This could be all freight or freight of a specific type quantified by weight or value. The number of freight vehicles is often used as a proxy for the amount of freight.

Frequency of casualty crashes or incidents: how often casualties crashes or incidents occur.

Frequency of near misses: how often incidents that could have, but do not result in injury, death or damage, occur. This might be used where near misses are reported, but there is no crash or incident history, and may be captured under complaints made to public transport operators or directly to DoT. An example of this is where the reduction of safety risk due to DSAPT or DDA is to be assessed.

Frequency of people taking risks: the risk-taking behaviour by network users (e.g. pedestrians crossing against signals). This might be used where risk taking behaviour is observable but there is no crash history.

Future costs avoided: known or certain cost savings that will occur in the future. This should only be used where an investment reduces the future total amount spent, such as where routine maintenance would reduce the need for rehabilitation. This would also include where meeting standards/legislative requirements could avoid penalties and/or legal costs.

Heat levels: air temperature.

Heavy vehicle composition: how much of the traffic is made up of heavy vehicles. This might be used where improving a freight route takes freight vehicles off local routes.

Industry investment: level or proportion of specialised investment (e.g. manufacturing new public transport rolling stock) by local industry.

International recognition: level of international interest in local specialised industry (e.g. public transport rolling stock manufacturing). Reflects level of local industry expertise**.**

Jobs created within a specified area, sector or population: the number of jobs created within a given area, sector or population because of an investment. Often the square kilometre of a retail or commercial floor space can be used as a proxy measure for this. However, this indicator would only be used where an investment can be shown to have contributed directly to the creation of new jobs. Consideration should be given to jobs related to both the capital aspect of the investment (such as the number of construction jobs from investment in a new stability facility) and the operational aspect of the investment (such as the number of maintenance jobs associated with the new stability facility).

Land value: how much a plot of land is worth. This may be used where a transport project has a direct impact on land value through better access or amenity.

Level of operating subsidy: the amount paid by Government to public transport operators to supplement operating revenues.

Level of satisfaction: how satisfied transport users, community members, businesses or industry are. This may be used where an investment makes improvements that cannot easily be measured directly. Level of satisfaction can be measured through user experience surveys or through direct user feedback and can consider things such as Net Promoter Scores, App Store Feedback Rating or Social Media Listening Scores.

Local trips made by walking and cycling: the number (or proportion) of trips to local destinations made by walking or cycling. This might be used where an investment encourages the use of walking or cycling for local trips. An increase might occur due to new trips or mode shift.

Mobility restricted users: the number of people who have mobility restrictions using the transport system. Further consideration can be given to the type of mobility restrictions (e.g. age, physical condition, etc).

Mode share: the percentage of travel made by different modes of transport. Mode share is usually reported as a percentage of trips. A proportion of travel distance or travel time could also be used.

Mode shift from car to alternate modes: the amount of travel that changes from being undertaken by car to being undertaken by another mode of transport. This might be used where an investment discourages the use of personal vehicles or encourages the use of alternative modes of transport. Note that it is generally appropriate to consider 'car passenger' as a different mode to 'car driver'.

Occupational Health and Safety (OHS) risk: safety risks to individuals engaged in activities (working) on or around the road or railway track. This might be used where an improvement in asset management procedures or technology reduce the amount of time workers are on the road or railway track.

Optimisation of network capacity: making the best possible use of existing network capacity. This might be used where road or rail space is better used (to move people and freight) as a result of changing its allocation (e.g. providing a contra-flow facility), better managing vehicle flow (e.g. freeway management systems) or redirecting traffic to underutilised parts of the network (e.g. improving driver information). Note that load factor can be used to measure the degree of utilisation of an approach to a signalised intersection or to measure the degree of utilisation of a freight vehicle's capacity, but a network impact needs to be established to be able to use that for the whole network capacity.

Optimisation of the public transport fleet: the ability to make optimum use of the train, tram and bus fleet to move the same number of people and more reliably. This is usually achieved by ensuring the services are spaced running along the same route, instead of running in the same location at the same time due to road congestion (bunching), thus preventing the need to use extra vehicles to cover gaps in service.

Patronage of rest areas: the number of vehicles (or people) visiting rest areas over a given time period. It may be important to consider only specific users (e.g. truck drivers) for some investments. This might be used where a rest area is built or improved.

Pedestrian and cycling activity: the quantity or level of pedestrian movement and cycling.

People feel safer: how safe transport users and wider community members consider a place or situation to be, usually captured under complaints made to public transport operators or directly to DoT; or through customer feedback surveys. This should only be used where transport users or community members perceive that a risk to safety exists but no measurable safety risk (such as a crash history) is present.

Person rate of throughput: the number of people that pass a point in a given time period using any/all modes.

Personal safety risk – the risk regarding safety imposed on active and public transport users, particularly mobility restricted users, from using public transport vehicles, train stations, tram stops or bus stops, and paths.

Presence of hazards and faults:failings or safety issues on the transport system that have the potential to harm. These are usually identified as part of routine maintenance inspections of assets.

Public participation and engagement: interaction with different groups in the community as part of the planning or delivery of a project.

Public transport patronage: the number of passengers carried by public transportation modes.

Public transport punctuality: the percentage of services considered to be 'on-time'.

Public transport service frequency: how often public transport services operate.

Range of modes: the modes (or means) of transport available to transport users. This might be used where one or more modes that were previously not available to a section of the community are made available. This indicator should only be used where a better indicator of accessibility (such as 'Access to activities and services') cannot feasibly be used.

Range of options: the level of choice provided to transport users and the community through transport projects, such as number of travel options and number of businesses or community services to travel to.

Recycled materials used: the amount of waste materials that are converted into new materials for construction.

Resilience to changes in demand: the ability of the road network to continue functioning when changes in transport demand occur (short or long term). This might be used where road or rail capacity or the standard of road has been built to allow for uncertain future changes (in use). For example, upgrading a bridge to be strong enough for Higher Productivity Freight Vehicles despite them not being allowed to use that route yet, or building a new road with extra lanes due to the possibility of future land use change. A reduction in vulnerability can be considered an improvement in resilience.

Resilience to events/incident: the ability for the road or rail network to continue functioning during/after events (e.g. extreme weather, extreme demand or sudden loss of capacity). For example, where an asset is upgraded to enable it to withstand severe storms/flooding (such as by installing uninterruptible power supply at signals) or where sealed shoulders are constructed to carry traffic during an emergency. A reduction in vulnerability can be considered an improvement in resilience.

Resilience to network changes: the ability for the road or rail network to continue functioning when changes to the transport network occur, without adversely affecting the road or rail network. For example, giving trams right of way will reduce the impact of any changes in tram frequency on traffic flow, compared with trams being in the same stream of traffic with other vehicle types. A reduction in vulnerability can be considered an improvement in resilience.

Response time: the time it takes to acknowledge and action an incident, emergency or hazard, or the time taken by public transport operators to respond during planned or unplanned disruptions. This may be measured as the time from when an incident record is created, until the time the incident, emergency, hazard or disruption has been resolved; or the time between when the unplanned disruption occurred, and alternative transport arrangements run (for train or tram services). Response time also considers the time taken for DoT to respond to calls, complaints, requests, applications, etc. made by users or the community.

Ride quality and comfort: the level of discomfort experienced by vehicle occupants on the road network as a result of vibration and noise. This indicator might be used where road pavements or railway tracks are improved. However, it should be noted these are not the only factors that contribute to ride quality and comfort. Many other factors are involved, which require further research and exploration.

Risk of harm (non-crash): the risk of injuries or illness resulting from use of DoT assets not directly caused by crashes. For example, a chemical spill due to truck rollover may pose a risk to local residents, or over-height vehicles may cause damage to bridges or harm to pedestrians or public transport passengers if it hits nearby train lines. This includes risks that can impact public health.

Risk to biodiversity: the risk of reducing the variety of plant and animal life in a particular habitat. This might be used where a new project enhances biodiversity, or roadside maintenance or similar activities protect biodiversity.

Risk to heritage loss: the chance or possibility of losing something of heritage value or significance. This might be used where an investment is made with the purpose of preserving or protecting something of heritage value (e.g. a heritage bridge).

Safe vehicles in use: private or fleet passenger vehicles used on the road that have advanced safety features.

Severity of casualty crashes or incidents: how serious crashes or incidents are, whereby the highest injury sustained by one person is either a 'fatality' or 'serious injury'. 'Serious injury' means a person has been taken and admitted to hospital but has not died within 30 days of the crash or incident. 'Fatality' means a person who has been killed in a crash or incident, or has died within 30 days of the crash or incident.

Serious casualty crash risk rating: an indicator of the level of road safety risks present, but only considers crashes resulting in serious injuries or fatalities. There are several methodologies available for rating safety risk (such as ANRAM, AusRAP or Safe Systems Assessment score). This might be used where there is a known and measurable safety risk but there is no crash history available.

Skills acquired: level of locally acquired expertise relating to a specialised industry (e.g. manufacturing of new rolling stock).

Speed: how fast a vehicle is travelling.

Time saved (non-travel): the amount of time (besides travel time) that is saved by community, businesses, industries or DoT staff as a result of improvements to systems, processes or resource allocation. This might be used where making a registration or licensing service available online makes it faster for customers and/or reduces the amount of staff time needed to provide services.

Timetable adherence: how well public transport services comply with published timetables. This considered the number of public transport services cancelled, as well as the punctuality of the services.

Travel time: the time required to travel between two points. This might be along a length of road/rail or between a specific origin and a specific destination.

Travel time reliability: the consistency/dependability of travel times. This represents the uncertainty experienced by transport users because of the variability in travel time/s. This might be used where network capacity is increased so that travel times become more consistent (despite fluctuations in demand).

Trips using safe roads and streets: trips that are made on safe roads and streets, where safe roads and streets are defined as 5-star or 4-star.

Vehicle operating cost: the cost of operating a vehicle. This includes fuel, lubricating oils, tyres, vehicle depreciation, repairs and maintenance measured using mechanistic algorithm. Austroads and ATAP publishes standard values for vehicle operating costs, which are used in standard economic appraisal calculations.

Vehicle speed: instantaneous speed at which a vehicle is travelling, or the distance travelled by a vehicle divided by the time of travel, which is different from the posted or design speed. This may be used where upgrades to roads or railway tracks allow vehicles to travel faster.

Vehicle rate of throughput: the number of vehicles that pass a point in a given time period.

Volume to capacity ratio: the ratio between the volume of traffic using a road or track and the capacity of that road or track. This can be used as a proxy for travel time and reliability or as an indicator of road or rail capacity utilisation. This might be used where data collection for travel time or reliability are not feasible.

Waiting time: the time spent waiting for a public transport service, either at the start of a journey, or between connecting services.

Waste to landfill (avoided or reduced): waste that is generated from construction.

Water quality: degree to which the waterways are clean, clear and free of pollution. For example, maintaining roadside drainage systems will ensure reduced road debris or traffic spills in the waterways.

Whole of life cost: total cost of owning an asset or a product over its entire life, including capital cost as well as cost of maintaining and operating the asset.

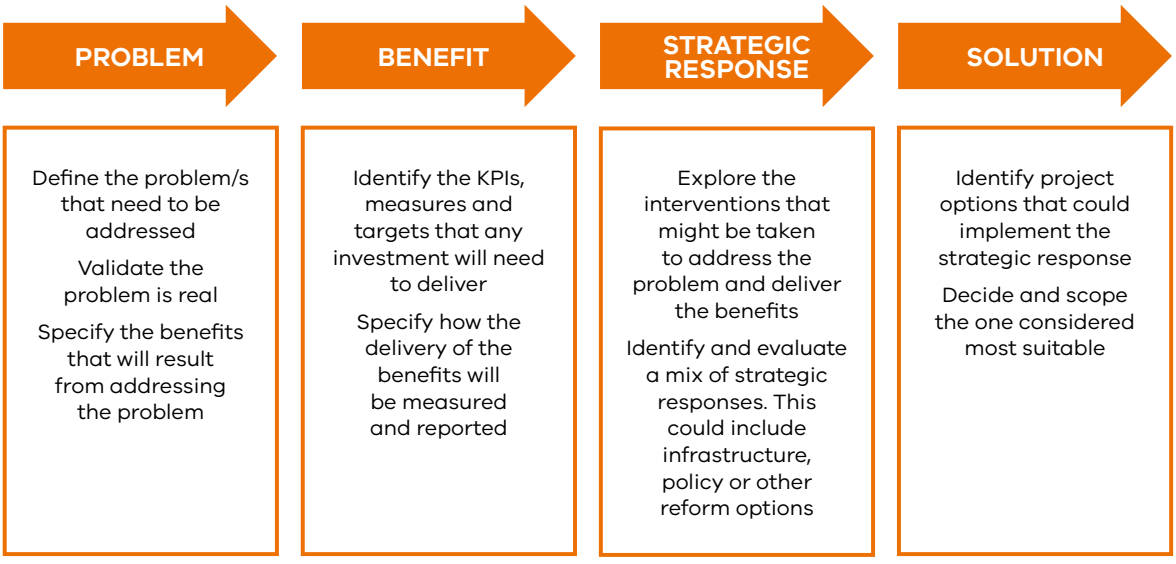
Appendix B: Process for developing Investment Logic Maps

The ILM focuses on the problems or issues that an investment will try to address, the measurable benefits that can be achieved by resolving the problems and the most effective responses or solutions to resolve the problems while maximising the benefits.

Details about how ILMs are developed are included in DTF's Investment Management (IMS) Standard, 2017. In summary, ILMs assist in defining, rationalising and prioritising investment problems, benefits, responses and solutions through a four-step process as shown in Figure B-1.

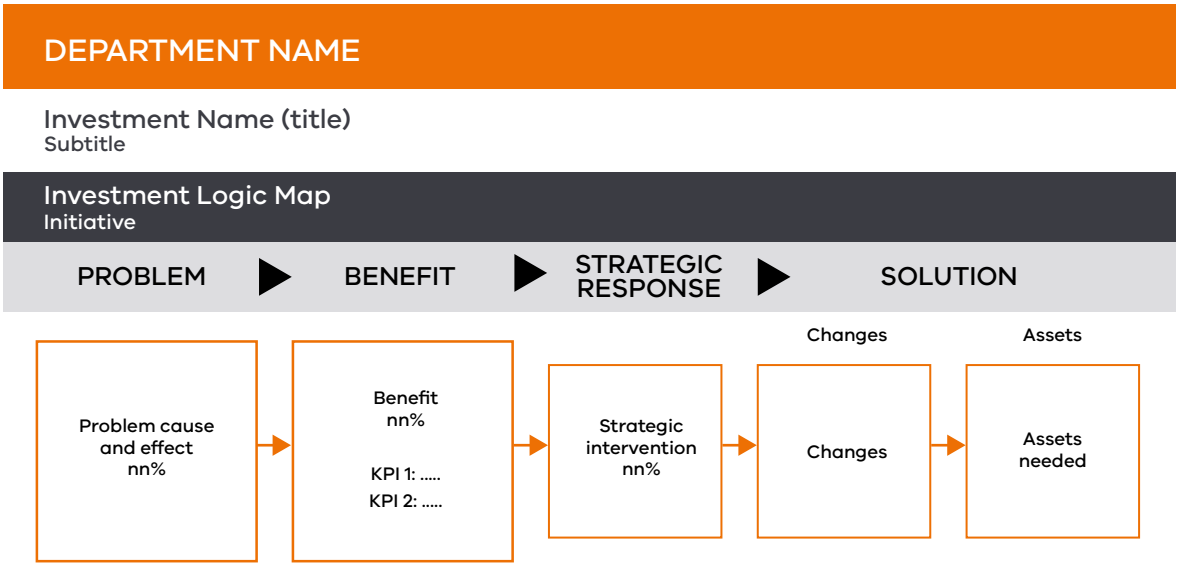
The IMS recommends one workshop for each stage of the ILM (a total of four workshops). However, the size and complexity of the problems would determine if some of these workshops can be combined. For large or complex investments, four workshops are usually recommended to derive enough detail for the initiative. For small investments, it is possible to extract the foundation logic to the level that will be required in a single workshop. However, the first step (problem definition stage) is critical for all investments as it defines whether the initiative should proceed to the next stage.

Figure B-1 ILM process



The ILM is captured diagrammatically in a single page representing the underlying rationale behind an investment. The one-page ILM format is shown in Figure B-2.

Figure B-2 ILM template



The ILM processes use root cause analysis to rationalise the statements and seek to have relevant data and evidence at each stage of the investment. Central to the success of an ILM are the following attributes:

- **Informed discussion:** ILMs require the participation of the investor and those people with the most information on the topic; usually a group of five to 10 people will be involved in an ILM workshop.
- **Decision-making:** ILM practices are structured to address a sequence of decisions that are central to the potential investment.
- **Plain English:** an ILM tells the story of an investment in simple concepts and language so it can be understood by a general audience.
- **Evidence-based:** each statement in an ILM must be supported by evidence.
- **Two-hour limit:** ILM discussions are limited to two hours; short enough to obtain the time commitment of senior stakeholders (e.g. Directors) but long enough to extract an agreed investment story.
- **48 hours review:** the 48 hours following an ILM discussion is used to conclude the ILM. During this time, the first version of the investment story is circulated, and any outstanding matters resolved.
- **Facilitated:** an independent facilitator is recommended, who is responsible for:
  - extracting and telling the investment story in a way that maximises its value to the organisation and expresses it in plain language and concepts
  - obtaining the agreement of all participants to the investment story
  - making sure that each statement is supported by evidence

  The facilitator is usually not an expert on the problem or the solution, but the one who facilitates and captures the information from the experts in the room.

Who should be involved in an ILM process?

To make an ILM workshop effective, it is important that key people who add value to the discussion, provide insight into the issues and have a level of accountability should be involved in its development. As such, it is recommended that the following people participate in the workshop:

- people with sound knowledge of the local issues
- experts with best practice knowledge of strategies and investment planning
- those with access to appropriate datasets to confirm the ability to measure identified problems and related benefits
- people with relevant accountability for the emerging investment (the investor) to ensure critical decisions are made during the workshop
- people with the most knowledge of the intended proposal
- people with a level of seniority (with a level of accountability) who can contribute on behalf of a division or agency
- the effective client in a position of responsibility/accountability for the specific problem (constraint on opportunity).

The person/people who will be responsible for writing the investment proposal should also be responsible for recording the conversation in the ILM workshops to ensure there is a level of consistency throughout the process.

Who should facilitate ILMs

DTF requires the use of accredited ILM facilitators to undertake ILM workshops.

The following approach is recommended to be used in DoT (for all investments except ICT projects) to ensure the level of rigour is commensurate to the **estimated** size and complexity of the investment, where the size and complexity of the investment considers both capital and operational components:

- For investments over $10 million, the requirement is that all workshops be undertaken by an **accredited** ILM facilitator who is independent of the project/program/activity.
- For investments between $2 million and $10 million, an independent **trained** staff member may run the workshops. The staff member should be trained as a facilitator for ILMs and cannot facilitate a project/program/activity they are working on.
- For investments under $2 million, the ILM can be developed outside a workshop by a staff member **trained or untrained** in the Investment Management Approach. Where the ILM has been developed outside a workshop environment or by a staff member untrained in the Investment Management Approach, the investment owner should seek feedback from a trained or accredited facilitator through an independent review for validation and assurance.

The following approach is recommended to be used in DoT for ICT projects:

- For investments over $5 million, all workshops are to be undertaken by an accredited ILM facilitator who is independent to the project/program/activity.
- For investments between $1 million and $5 million, the ILM (and BMP) can be developed by staff trained as a ILM facilitator outside the project team.
- For investments under $1 million, the ILM (and BMP) can be developed by staff trained as a ILM facilitator within the project team.
- All ILMs (and BMPs) for ICT projects should be sent to the ICT Portfolio team in Enterprise Technology for review.

It should be noted that the initial ILM workshop only allows sufficient time to identify benefits at a very high level. These benefits are then further enhanced at the second stage of the process, which includes developing a Benefit Management Plan. Once the benefits are enhanced, the ILM can be updated so the BMP and ILM are consistent.

When should ILMs be developed and when can they be revised?

The first two stages (problem and benefit definition) should be undertaken well in advance of fully developed initiatives (e.g. 12 to 18 months) to allow for evidence to be collected to substantiate the statements before proceeding to later stages. However, the information captured at this early stage will need to be reviewed if the initiative proceeds further in the development stage and as more data or evidence becomes available. This is because the problems and priorities may change over time and/or in light of other developments. For example, the development of a transport initiative on another part of the network or the introduction of road tolls may reduce the extent and scale of a problem. Similarly, unexpected population changes over time or a new housing development may increase the scale of the problem and require problems to be prioritised.

The investor, who is usually the relevant Business Area Manager, is the owner of the ILMs**.** It is recommended (as per the IMS) that:

- the responsibility to review and keep the information updated in the ILMs sit with the investor
- the ILMs should be revised when new evidence substantiating the problems and benefits is uncovered or a cost effective and better practice approach to resolving the problems is identified.

Glossary

- **Activities** are usually the programs, services and initiatives we undertake, and the everyday work we do.
- **Appraisal** is the process of determining impacts and overall merit of a proposed initiative, including the presentation of relevant information for consideration by the decision-maker.
- **Benefits** refers to the value that the investment will provide to the organisation or its customers; typically, a positive consequence of responding to the identified driver.
- **Benefit Evaluation** is a process to confirm that the benefits established and defined in benefits planning are being achieved and that the operational service or asset is running smoothly. It can also be referred to as '**ex-post**' benefits evaluation
- **Benefits Management** is the identification, definition, tracking, optimisation and realisation of benefits.
- **Benefit Management Plan** (BMP) is a short document that specifies the benefits an investment will need to deliver to successfully address an identified problem. It includes the measures to be used as evidence that the benefits have been delivered. These measures are initially used to select the most suitable response to the problem. The plan also defines the dates the benefits are expected to be delivered, who is responsible for their delivery and how they will be reported
- **Disbenefit** is a negative impact that might occur as a direct consequence of implementing a particular solution.
- **Evaluation** is the specific process of reviewing the results and performance of an initiative after it has been delivered.
- **Inputs** are the resources or investments allocated to deliver activities (funding, staffing, capital or infrastructure).
- **Intervention** is a high-level action that is proposed as the response to the identified driver. Interventions can be asset enhancements, non-asset investments, new asset acquisitions or market-based solutions.
- **Investment** is the commitment of the resources of an organisation with the expectation of receiving a benefit.
- **Investor** is the person who owns the business problem and will be responsible for achieving the benefits. The investor may also be known as the senior responsible officer or sponsor.
- **Key Performance Indicators (KPIs or indicators)** are the level of change that occurs as a result of an investment/ intervention and reflect the contribution it makes to the benefits sought by organisation/s.
- **Measures** support KPIs. They are specific quantifiable units (metrics) that can be used to assess and/or validate that an indicator has been met.
- **Objectives** are statements of desired outcomes that have not yet been attained. Objectives are high-level actions (or interventions) that are proposed as the response to the identified driver. The objectives support the high-level goals and can be expressed for each planning level: the whole transport system, city or region, a network, an area or corridor, or a specific route or link. Objectives can also be set for specific initiatives, transport modes and local areas.

- **Outcomes** reflect the long-term outcomes sought at the highest level or by the Victorian Government as described in the DTF Investment Management Standards. For comparison this relates to the term **'Domain'** used in DPC guidelines meaning a logical grouping of related outcomes providing a line of sight from each outcome to the overall vision.
- **Outputs** are the number of activities delivered, products produced, or clients served.
- **Senior Responsible Owner (SRO or project sponsor)** has accountability and responsibility for a project. The SRO is the effective link between the organisation's senior executive body and the management of a project. The sponsor is also a core member of the project steering committee, usually the Chair. The SRO should be an experienced executive well versed in the details of organisational stakeholder and client requirements and relationships.
- **Strategic Intervention** is the high-level strategic action that could be taken as a response to the identified problem. A valid strategic intervention must have the potential to deliver some or all of the identified KPIs and their target measures. To ensure it is sufficiently high level, it's implementation must also allow for more than one possible solution.
- **Strategic response** should consider a broad range of interventions such as demand management, regulation change, repurposing assets, investing in new assets and marketbased solutions.
- **Vision** is the big picture, aspirational statement that describes what Government wants to achieve for the community.

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