



**Report on the 2017 review of the
Infrastructure Australia Assessment
Framework 2018 Update**

Final Report

5 March 2018

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Glossary

Acronym	Full name
ATAP	Australian Transport Assessment and Planning
BCR	Benefit-Cost Ratio
CBA	Cost-Benefit Analysis
CSIRO	Commonwealth Scientific and Industrial Research Organisation
IA	Infrastructure Australia
IAAF	Infrastructure Australia Assessment Framework
IPL	Infrastructure Priority List
NDRRA	Natural Disaster Relief and Recovery Arrangements
The Act	Infrastructure Australia Act 2008
WEBs	Wider Economic Benefits

Executive Summary

1.1 Introduction

The Infrastructure Priority List (IPL) is a list of potential solutions to address nationally significant infrastructure problems and opportunities. The IPL includes potential infrastructure solutions at two different stages of development, Initiatives and Projects.

In order to be included on the IPL, Initiatives and Projects submissions undergo a rigorous prioritisation process set out by the Infrastructure Australia Assessment Framework (IAAF).

The IAAF sets out what proponents must contain in a submission to Infrastructure Australia (IA). A key component of the submission is the inclusion of a cost-benefit analysis (CBA) of the proposed infrastructure investment.

Under the Infrastructure Australia Act 2008 (the Act), IA is required to have the CBA method reviewed every 24 months. This review must consider whether the CBA takes adequately into account social, environmental and economic costs and benefits of infrastructure proposals.

Figure 1 illustrates the reviews of the IAAF undertaken by IA since 2015 to comply with the requirements of the Act. These reviews are reflected in three publications, including the proposed 2018 IAAF as shown in Figure 1. In 2015, IA undertook a review which led to the publication of the February 2016 IAAF. In 2017, IA undertook a review of the IAAF in two stages. The Stage 1 update was completed in the first half of 2017, which led to the publication of the June 2017 IAAF. The Stage 2 update was undertaken in the second half of 2017 and is reflected in the proposed 2018 IAAF.

Figure 1 IAAF reviews undertaken since 2015

Review period	Outputs	Name of Update
September 2015	February 2016 IAAF	
January-June 2017	June 2017 IAAF	Stage 1 Update
June-December 2017	2018 IAAF	Stage 2 Update

Deloitte has been commissioned to conduct an independent review of Stages 1 and 2 of the 2017 review by IA (refer to Figure 1), with a focus on the CBA framework and three new sections that have been added to the IAAF or have been significantly enhanced, specifically:

- Guidance to capture land use impacts into the CBA in D3 ‘Conducting economic appraisals’, in particular new guidance provided under D3.9 ‘Land use impacts’;
- Guidance to account for climate change risks in the IAAF in D4.6 ‘Considering climate change risks’; and
- Improved guidance to prepare a Post Completion Review in B5 ‘Stage 5: Post Completion Review’, C7 ‘Checklist for Stage 5: Post Completion Review’ and D5 ‘Undertaking Post Completion Reviews’.

In addition, the review has assessed the implementation of changes made to the IAAF as part of the Stage 1 update, which led to the publication of the June 2017 IAAF.

1.2 Key findings of this review

Previous versions of the IAAF and overall document

In relation to the changes that IA has made to the IAAF in the previous revisions (February 2016 and Stage 1 in June 2017) and in response to the recommendations developed in 2015, this review found that the changes have been reflected in these recent updates to the IAAF.

In addition, it is worth noting that the overall 'look and feel' of the IAAF has significantly changed since February 2016. The revised IAAF document is more 'user-friendly' and contains relevant technical appendices and updated business case submission templates in the same document. This makes it easier for proponents to follow the submission process and understand IA's requirements.

Land use impacts

The addition of guidance to measure land use impacts in transport proposals represents a significant change in the conduct of CBAs as currently practised in Australia. The material included in the proposed 2018 IAAF covering land use impacts reflects the issues that would be expected to arise with the measurement of the benefits and costs associated with land use changes.

While conducting this review, a number of specific recommendations were made to improve the section on land use impacts, including:

- Strengthen the additionality and displacement definitions, and outline the resulting uncertainty associated with land use impacts due to these issues;
- Establish a clearer link between additionality and displacement, and measurement issues, such as land values; and
- State the difference between the land use impacts in the economic appraisal and the land value capture mechanisms in the financial case.

IA has adopted these recommendations within the proposed 2018 IAAF, actioning edits in the relevant sections. The review expects the guidance over the measurement of land use impacts to continue to develop as better spatial data is collected and approaches continue to be refined.

Climate change risks

The inclusion of climate change risks into the IAAF is a major step forward for Australia, and sets a global benchmark in the treatment of these types of risks within infrastructure appraisals. The difficulty of including these types of risks within an appraisal framework should not be underestimated, and has been challenging globally. Deloitte has reviewed the new guidance material on climate change within the proposed 2018 IAAF and made the following recommendations:

- Noting that the interrelationship between infrastructure and climate change is complex. It is suggested to embed climate change considerations within other parts of the IAAF;
- Discuss the inclusion of climate change risks, together with other risks and uncertainties, such as development of new technology and economic growth, in the context of general guidance on scenario analysis; and
- Enhance the guidance on designing and planning resilient infrastructure.

In recognition of the complexity of these issues and the need for the development of methods, evidence and refinement of approaches, the recommendations were not specifically made to be addressed within the proposed 2018 IAAF. Instead, the focus of this review was to consider any material or factual issues. Regardless, IA has implemented some of the recommendations within the proposed 2018 IAAF, and also added some definitions and clarifications where necessary. The review expects future updates of the IAAF to further develop the treatment of climate change risks, noting that the above recommendations will likely be supplemented by the development of the broader literature and evidence base on climate change and infrastructure.

Post completion reviews (PCRs)

The enhancement of guidance on PCRs follows from IA's continued commitment to promote their use more widely in Australia. The guidance on PCRs within the proposed 2018 IAAF is well developed. However, the addition of other items, such as land use impacts, provides an opportunity to further update the PCR guidelines in future versions of the IAAF. In this context, this review has made the following recommendations:

- Provide further guidance on PCRs with respect to data collection required to measure actual land use impacts; and
- Provide guidance on the analysis of actual and assumed data (included in the CBA) to identify success factors of the project and/or identify root causes for why specific benefits have not been realised. For example, forecast transport demand might not be realised because of a multitude of factors and isolating these is useful to determine why actual demand diverges from forecast demand.

Other issues

The fact that the IAAF and other government guidance (such as the Australian Transport Assessment and Planning (ATAP) guidelines and those developed by state and territory governments) are going through revisions and updates to incorporate new items (including Wider Economic Benefits (WEBs) and land use impacts) means that the certainty over the estimation of these impacts is likely to vary. Against this background, this review recommends that, in future updates of the IAAF, IA considers ordering benefit and cost items by certainty, particularly as land use impacts are incorporated into appraisals.

2 Background and Objectives

2.1 The Infrastructure Australia Assessment Framework (IAAF)

IA is an independent statutory body, established in July 2008, to provide independent research and advice to all levels of government, as well as investors and owners of infrastructure. Its mandate is to prioritise and progress nationally significant infrastructure, including transport, energy, communications, water and social infrastructure. IA advocates for reforms on key issues which include funding and financing, delivering and operating infrastructure, and how to better plan and utilise Australia's infrastructure networks.

IA's advice to the Australian, state and territory governments is a key input in guiding the governments' major infrastructure investment decisions. Accordingly, and as per the 2017-2019 Statement of Expectations, IA contributes to the efforts of all governments in building a strong and prosperous economy by providing robust, independent and evidence-based advice on Australia's future infrastructure needs.

As prescribed by the Act and as amended in 2014, the key functions of IA include:

- Conducting audits to determine the adequacy, capacity and condition of nationally significant infrastructure;
- Developing IPLs that prioritise Australia's infrastructure needs, based on audits, research and evaluations conducted by IA;
- Evaluating infrastructure proposals for investment in nationally significant infrastructure or other infrastructure determined by the Minister; and
- Developing Infrastructure Plans.

The IPL is a list of potential infrastructure solutions to address nationally significant infrastructure problems and opportunities. The IPL includes potential infrastructure solutions at two different stages of development, Initiatives and Projects. Initiatives are proposals for which a business case has not yet been completed. Projects are proposals for which a full business case has been submitted by the proponent, and which have been positively assessed by the IA Board.

In order to be included on the IPL, Initiative and Project submissions undergo a rigorous prioritisation process set out by the IAAF. The IA Assessment Panel, chaired by the IA Chief Executive, reviews the completed assessments of the submissions and makes recommendations to the IA Board. The Board makes the final decision with regards to the inclusion of the Initiative or Project on the IPL.

The IAAF is a multi-purpose framework, which ensures a structured and objective prioritisation process and facilitates evidence-based development of infrastructure investment proposals. The IAAF sets out a five-stage assessment process including:

- Stage 1: Problem Identification and Prioritisation;
- Stage 2: Initiative Identification and Options Development;
- Stage 3: Business Case Development;
- Stage 4: Business Case Assessment; and
- Stage 5: Post Completion Review.

The IAAF provides clear guidance to proponents on how submissions should be prepared and detailed, including the provision of information during the assessment process and the role of IA and the proponent at each step of the process. The IAAF sets out specific details for proponents when preparing submissions for IA including:

- Level of detail required for development of options and information required for submission;
- The quantitative multi-criteria analysis (MCA) and approved method of CBA, including the key steps and detailed requirements of the CBA; and
- Templates, checklists and technical notes for each stage of the process.

2.2 The process of reviewing the IAAF

The IAAF sets out what proponents must include in their submission to IA and a key component of the submission is the inclusion of a CBA of the proposed infrastructure proposal. The approach must enable a comparison of proposals, and is set out in the IAAF.

Under the *Infrastructure Australia Act 2008*, IA is required to have the CBA method reviewed every 24 months. This review must consider whether the CBA takes adequately into account social, environmental and economic costs and benefits of infrastructure investment proposals. The review is made available on IA's website within 14 days of the report being given to IA.

Reviews of the IAAF respond to the need to incorporate development of best practice in the conduct of infrastructure project appraisals. For transport CBAs, the IAAF seeks to reflect most of the policy positions and advice from the ATAP guidelines. The ATAP guidelines outline best practice for transport planning and assessment in Australia and are updated regularly to maintain a process of continual improvement. In addition, the IAAF revisions incorporate feedback from users of the framework, including assessors and proponents, to improve clarity of the assessment process and the requirements of the submissions to the IPL.

Figure 2 illustrates the reviews of the IAAF undertaken by IA since 2015 to comply with the requirements of the Act. These reviews are reflected in three publications, including the proposed 2018 IAAF as shown in Figure 2. In 2015, IA undertook a review which led to the publication of the February 2016 IAAF. In 2017, IA undertook a review of the IAAF in two stages. The Stage 1 update was completed in the first half of 2017, which led to the publication of the June 2017 IAAF. The Stage 2 update was undertaken in the second half of 2017 and is reflected in the proposed 2018 IAAF.

Figure 2 IAAF reviews undertaken since 2015

Review period	Outputs	Name of Update
September 2015	February 2016 IAAF	
January-June 2017	June 2017 IAAF	Stage 1 Update
June-December 2017	2018 IAAF	Stage 2 Update

2.3 Scope of work for this review

Deloitte has been commissioned to conduct an independent review of Stage 1 and 2 of the 2017 review by IA (refer to Figure 2), with a focus on the CBA framework and three new sections that have been added to the IAAF or have been significantly enhanced. IA provided the new material developed under the Stage 2 Update to Deloitte for review. In particular, IA changed or added new information to the following sections, which were the major focus of the Deloitte review:

- Guidance to capture land use impacts into the CBA in D3 'Conducting economic appraisals', in particular new guidance provided under D3.9 'Land use impacts';
- Guidance to account for climate change risks in the IAAF in D4.6 'Considering climate change risks'; and
- Improved guidance to prepare a Post Completion Review in B5 'Stage 5: Post Completion Review', C7 'Checklist for Stage 5: Post Completion Review' and D5 'Undertaking Post Completion Reviews'.

Upon reviewing the Stage 2 Update material provided on 21 December 2017, Deloitte defined recommendations for IA's immediate consideration to incorporate into the 2018 IAAF as well as recommendations for future editions of the IAAF.

In addition, the review has assessed the implementation of changes made to the IAAF as part of the Stage 1 update, which led to the publication of the June 2017 IAAF.

2.4 Structure of the report

The remainder of this report is structured as follows:

- Chapter 3 details the changes made to the framework since the January 2016 IAAF;
- Chapter 4 presents the key findings of this review; and
- Chapter 5 provides a summary of the recommendations.

3 Changes since the January 2016 IAAF

In September 2015, a review of the IAAF was conducted, leading to a number of recommendations to improve the clarity and robustness of the IAAF. The review found that, while the principles of the framework were sound, a number of issues were apparent. In response to the review, IA improved the IAAF by adopting the recommendations made.

The 2015 review identified the following key issues:

- Proponents submit business cases to IA for review relatively late in the process, and with limited early engagement with IA. This limits IA's advisory function and ability to guide submissions and share best practice;
- Proposals often have insufficient strategic alignment to problems and opportunities of national significance;
- In some cases, the assessment of options can be limited due to insufficient material provided by project proponents and insufficient thought to non-capital project options;
- The IPL classifications operating at the time (Early Stage, Real Potential, Threshold, Ready to Proceed) have been interpreted as a comment on the stage of project development rather than project merit;
- IA has been required to assess business cases for some projects already under construction; and
- The focus has tended to be on a project's benefit-cost ratio (BCR), rather than a rounded evaluation.

To address these issues, IA developed enhancements to the IAAF, which are reflected in subsequent revisions of the IAAF, namely:

- The January 2016 IAAF,
- The 30 June 2017 IAAF (Stage 1 Update); and
- The proposed 2018 IAAF (Stage 2 Update).

Table 3-1 provides an overview of the enhancements developed by IA to address the issues identified during the September 2015 review, and how the enhancements were implemented in subsequent revisions of the IAAF.

Table 3-1 Changes to the IAAF in January 2016, June 2017 and 2018 editions

Objectives	Proposed changes	January 2016 IAAF	June 2017 IAAF	Proposed 2018 IAAF
Simplify the framework's stages of project development and the categories on the IPL.	Improve terminology of types of infrastructure solutions included in the IPL	IPL's former four-stage classification (Early Stage, Real Potential, Threshold and Ready to Proceed) was replaced with a two-stage grouping – Initiatives and Projects.	No change	No change
	Simplify stages of IAAF	The updated IAAF uses a new five-stage model, structured around points of engagement between IA and proponents, driven by information required at each stage. These five stages broadly align with existing state and territory gateway processes.	Stage 2 of the IAAF was renamed to 'Initiative Identification and Options Development'	No change
Allow IA to provide a strategic 'top-down' view of problems and solutions put forward by proponents, using the Audit as an evidence base.	Use the IA Audit as an evidence base to identify problems of national significance	Stage 1 in the IA business case cycle requires IA and jurisdictions to use evidence to inform problems of national significance faced in that jurisdiction. This collaboration draws on the evidence provided by the IA Audit, while using additional relevant jurisdiction data to deliver a clear and evidence-based articulation of the problems.	No change	No change
Allow for a structured approach to prioritising initiatives and projects; improve the overall quality, consistency and strategic alignment of submissions.	Support the structured prioritisation of initiatives and projects	The data on the submissions' impact on nationally significant problems and their economic, social and environmental value (in the case of projects) gathered through the assessment framework will allow IA to prioritise initiatives and projects.	Updated content, including departures from ATAP guidelines.	New content on land use impacts, climate change risk, and Post Completion Reviews.
Support IA's engagement with proponents throughout the project lifecycle; enable IA to act as an instigator and facilitator to support the front-end identification and development of initiatives.	Encourage proponents to engage with IA throughout the process	The updated framework provides a structure in which IA can engage with proponents at any point during the project development process, and vice-versa.	Inclusion of additional stage, Stage 2, solely focused on options development.	No change

Improve the overall quality, consistency and strategic alignment of submissions	Enhance the use of Wider Economic Benefits (WEBs)	Updated IAAF recommends the use of UK Transport Analysis Guidance (WebTAG) approach. These should be used until the publication of ATAP guidelines for estimating WEBs that are currently under consultation. WEBs should be included as a sensitivity test only.	No change	No change
	Encourage proponents to consider 'best practice' policy principles	As part of Stage 3, proponents are requested to describe how they have incorporated IA's best practice policy principles into their submissions to encourage proponents to consider best practice. This will be incorporated by the IA Decision-Making Principles.	No change	No change
Streamline templates and guidance for proponents and IA	Streamline templates and guidance	Some streamlining of sector templates Quantitative data from proponent business cases are captured in an Excel-based template to enable IA high quality assessment and comparison over time.	Update led to a 'one-stop' guide to the Framework that incorporates all templates and guidance. The templates and guidance documents have been refined to be simpler and easier to complete and to incorporate new content.	No change
Incorporate updated economic, cost modelling and 'best practice' guidelines	Retain alignment with the revised National Guidelines for Transport System Management (NGTSM)	Updated IAAF retains alignment with revised NGTSM (note: now, replaced by the ATAP guidelines) and encourages proponents to follow these guidelines in preparing business cases.	Departures from ATAP shown	Improved guidance on land use impacts

In the context of this report, the review has considered the changes that IA has made to the IAAF outlined in Table 3-1. These have been reflected in revised IAAFs, first in the January 2016 edition and then more substantially in the June 2017 publication.

It is worth noting that the overall 'look and feel' of the updated IAAF has significantly changed. The revised IAAF document is more 'user-friendly' and contains the relevant technical appendices and updated business case submission templates in the same document. This makes it easier for proponents to follow the submission process and understand IA's requirements.

4 Findings of the review

4.1 Documents received

Deloitte has reviewed the following documents provided by IA for the purpose of this review:

- Various draft versions of the revised *Infrastructure Australia Assessment Framework* which is intended for publication in 2018;
- *The inclusion of land use change in Infrastructure Australia's Assessment Framework, Independent review (2018)*, carried out by the Centre for International Economics; and
- A summary of the September 2015 review and major changes to the IAAF as a response to this review.

The review involved a desk top review of the documents listed above, as well as meetings conducted between IA and Deloitte in December 2017 and January 2018.

Our findings for each of the three additional or enhanced content areas are detailed in the remainder of this Chapter. These three areas are land use impacts, climate change risks and Post Completion Review.

Upon reviewing the Stage 2 Update material provided in December 2017, Deloitte proposed specific recommendations for IA's immediate consideration to incorporate into the 2018 IAAF as well as recommendations for future editions of the IAAF. As a result, IA has adopted some of these recommendations within the proposed 2018 IAAF.

The remainder of this Chapter provides an overview of the recommendations made on the material provided by IA in December 2017. Table 5-1 in Chapter 5 clearly identifies which recommendations are already addressed within the proposed 2018 IAAF and which recommendations are for future consideration.

4.2 Land use impacts

The addition of guidance to measure land use impacts in Australian transport project proposals represents a significant change in the conduct of CBAs as currently practised in Australia. The fact that transport impacts on land use is widely accepted. The spatial distribution of economic activity is in large part due to the development of transport networks. In many Australian and North American cities, for example, investment in the road network has sometimes led to the urban sprawl and low density development that characterise many cities in these regions, while public transport networks have facilitated denser developments in many European cities as a broad generalisation and comparison.

Major transport projects are planned or underway in Australia. The scale of these projects means that the distribution of economic activity over the coming years is set to change. It is important, therefore, that Australian policymakers develop a better understanding of how these projects will impact on development patterns, how transport and land use are better integrated, and how to get better economic, social and environmental returns from these major capital programs. In this context, the fact that IA has taken a more proactive role in incorporating guidance on land use impacts is laudable in the context of Australian transport appraisals.

The material included in the IAAF to cover land use impacts (Section D3.9) reflects the issues that would be expected with the measurement of the benefits and costs associated with land use change. Currently, there exists a significant body of work that considers the impacts of infrastructure on land use change in other countries and the IAAF has reflected what key considerations are, including: the interactions of demand and supply; dual causality; and additionality and displacement issues.

In addition, the IAAF outlines some of the challenges with quantifying the costs and benefits that are associated with land use change, such as whether this should be measured with land value

changes and how this relates to what is already captured in the conventional transport user effects. The inclusion of a discussion of these factors is very important to further development of the approaches that project developers will utilise whilst business cases for infrastructure proposals are developed. This will become fundamental to ensuring policymakers are comfortable with the way these impacts are measured and that better project funding decisions are made.

Deloitte reviewed the material on land use impacts provided by IA in December 2017 and developed specific recommendations. IA has adopted these recommendations within the proposed 2018 IAAF, actioning edits in the relevant sections as detailed in Table 5-1. This review expects the guidance over the measurement of land use impacts to continue to develop as better spatial data is collected and approaches continue to be refined.

Upon reviewing the material provided in December 2017, Deloitte proposed that the discussion in the IAAF could benefit from better linkages of some of the issues associated with incorporating land use impacts in CBAs. One clear example of this is how the issues associated with measuring the impacts through land values is directly linked with additionality and displacement. The challenge can be articulated through a better definition of additionality and displacement so that the evidence base needed to be developed to support the estimates in the CBA is robust. More specifically:

- **Additionality** refers to the proportion of the estimated benefits that are truly net additional to the national economy. There is a clear issue with attempting to measure net benefits at a national level in Australia given the geographic scale, distance between major urban centres and the inhabited land mass in the country. As a result of this measurement issue, project proponents should attempt to measure net **additionality at a city, region, or in some instances, at a state level**. The concept generally reflects whether a specific land use investment that is dependent on a specific infrastructure project, would have happened in any case elsewhere in the geography regardless of the infrastructure investment. One way to consider this is in the context of **future base case population and employment projections** and whether these are likely to be achieved with the assumed committed projects or land use allocations; and
- **Displacement** refers to a specific land use impact which simply displaces activity elsewhere in the geography. This is a situation that is likely to occur in a situation of full employment, such that employment created on one site simply displaces employment elsewhere. The net impact then depends on whether there is a societal value from the employment being located at the new site. The reality is that this would be difficult to support analytically, but **project developers should articulate a narrative of where there is value to society from the displaced activity**. In addition, due to the difficulty of measuring the net land use impacts at the national level as discussed above, the full extent of displacement can often not be quantified. In this case, the proponent should provide a qualitative discussion or supporting analysis to illustrate the extent of displaced activities.

The key implication for the IAAF is that the discussion on additionality and displacement should be strengthened and project proponents are encouraged to carry out scenarios that detail the conditions through which the estimated impacts are additional. IA has taken this recommendation on board and has already addressed this comment within the proposed 2018 IAAF, so no further action is required.

A dimension for future development of the IAAF is to consider how future estimates of costs and benefits that come through different sources are treated. This means that the level of certainty over certain benefit streams (such as through land use impacts) will differ. Proponents could consider ordering the benefits by the level of certainty and strength of the evidence base that underpins these estimates.

In addition, given that the likely metric that will be used to measure land use impacts is land values, it will be useful to make a distinction between what will be reflected in the financial case and what is included in the economic appraisal. The Commonwealth and state and territory governments are actively pursuing value capture strategies to fund infrastructure investments and these are becoming more prominent. There is a risk that the land use impacts, measured through

land value change in the economic appraisal, are confused with the financial funding streams from value capture mechanisms. The IAAF could make clear distinctions between these items to avoid confusion. Within the proposed 2018 IAAF, IA has already made the distinctions between these items clear, so no further action is required.

4.3 Climate change risks

Climate change presents a significant challenge to Australia as it is projected to lead to an increase in the occurrence of hot days and the intensity of extreme rain events and tropical cyclones, a higher frequency of severe droughts and a rise in sea levels.¹ These changes have potentially severe adverse impacts on humans' health and well-being, as well as on Australia's natural and man-made environment, including economic and social infrastructure.

There is a strong interrelationship between climate change and infrastructure. For example, climate change significantly affects infrastructure's functionality, *whole-of-life* costs and demand. This necessitates the need to develop more resilient infrastructure. Conversely, the construction and use of infrastructure results in greenhouse gas emissions, the major contributor to climate change. For example, the road transport sector alone was responsible for 15 per cent of total greenhouse gas emissions in Australia in 2015.² As a result, the right type of infrastructure development can significantly contribute to the governments' emission reduction efforts at the national and state/territory levels.

For the reasons of the potential severity of the issue of climate change and its strong interrelationship with infrastructure, the incorporation of changes to the IAAF to adequately consider considerations of climate change risks when prioritising Australia's infrastructure needs is appropriate.

Upon Deloitte's review of the new section on climate change risk provided by IA in December 2017, Deloitte proposed a number of recommendations to improve the guidance for practitioners. It was suggested that this can be mainly achieved by clearly distinguishing between climate change risks, risks from natural hazards in general and other risks.

In particular, to improve the section and clarity for practitioners, it was suggested to divide the section into three specific subsections under D4:

- Consideration of significant project uncertainty: Under the heading of 'Considering climate change risks', the current draft includes references to uncertainty in areas other than climate change, for example, population growth and the development of new technology. It is recommended to add a new section that discusses a wide range of uncertain factors, including population growth, climate change and other developments. It is appropriate to include in this new section the material related to scenario development as provided in the current draft.
- Consideration of natural hazards: these are already occurring regularly in Australia, but climate change will increase the likelihood of occurrence and severity of natural hazards.³ It is recommended that the consideration of natural hazards is reflected through the planning of more resilient infrastructure. These considerations can be embedded within other stages of the IAAF, as further outlined below.
- Consideration of specific climate change related issues: This section would focus on remaining issues that are not related to natural hazards, including
 - Demand profile changes;
 - Construction costs/ approach changes; and
 - Direct investment to mitigate climate change.

¹ CSIRO and Bureau of Meteorology (2015)

² Department of the Environment and Energy (2015)

³ A natural disaster is one, or a combination of the following rapid onset events: bushfire, earthquake, flood, storm, cyclone, storm surge, landslide, tsunami, meteorite strike, or tornado (Natural Disaster Relief and Recovery Arrangements (NDRRA)).

The review recommends that IA considers the following advice to enhance the incorporation of climate change issues across all stages of the IAAF into future iterations of the framework. While the proposed 2018 IAAF has already incorporated additions to various stages to consider climate change issues, IA could consider development of the following additions:

- Stage 1: Problem Identification and Prioritisation: Increase focus on environmental sustainability when considering problems and opportunities
 - As per the Act, IA is required to conduct audits to determine the adequacy, capacity and condition of nationally significant infrastructure, taking into account environmental sustainability. The impact of climate change is a key criterion to assess the environmental sustainability of infrastructure, and as such could be incorporated into the identification of problems and opportunities.
- Stage 2: Initiative Identification and Options Development: Promote the development of Options that contribute to climate change mitigation
 - The type and design of the planned infrastructure has a significant impact on greenhouse gas emissions. During the option development phase, proponents should be encouraged to consider opportunities with reduced life-cycle carbon emission of the proposed infrastructure (mitigate climate change).
 - Gradually incorporate resilience considerations into option development: Infrastructure is affected by climate change as it influences significantly the infrastructure's functionality, costs and demand. It is advised that option development should increasingly consider the resilience of the infrastructure with respect to climate change hazards.

Some of these recommendations were followed up by IA and partly incorporated within the proposed 2018 IAAF as detailed in Table 5-1.

4.4 Post Completion Review

Post Completion Reviews (PCRs) are useful to derive lessons from previous project experience to improve project planning, delivery and risk mitigation. It is also a useful tool to assess the extent to which an infrastructure project was successful in addressing a problem or harnessing an opportunity the project was originally designed for.

This has been recognised by IA, promoting the use of PCRs to improve investment decisions and delivery of projects. In its Australian Infrastructure Plan (2016), IA recommends the use of PCRs to "evaluate the delivery and operation of a project with the evidence that was used to support its selection". This led to an initial inclusion of PCR guidance in the June 2017 IAAF.

This review supports IA's continued promotion and moves to establish the use of PCRs. In this regard, the substantial addition to the existing guidance material within the 2018 IAAF is a laudable and requisite step. IA is taking the lead at the national level in fostering a practice of using PCRs, including ex-post evaluation (and not just benefits realisation). The level of guidance material available and the use of PCRs is inconsistent across Australian states and territories and, as a result, it is noteworthy that IA develop clear guidance on how to conduct a PCR for nationally significant projects. Deloitte supports the proposed 2018 IAAF approach in IA's recommendation to encourage the establishment of a 'no blame culture' in undertaking PCRs among delivery agencies and project sponsors.

It is worth highlighting that land use impacts are becoming a prominent part of CBAs and this is further fostered by additional guidance on its estimation methodology provided in the proposed 2018 IAAF. Deloitte recommends IA to expand Box 45 included in the proposed 2018 IAAF to include key variables that can be collected to measure the actual land use impacts realised by a project, including demographic and employment data, land use, population densities and realised land values, as well as changes in zoning.

In future editions of the IAAF, Deloitte recommends that IA provide additional guidance on the analysis of actual and forecast values. For example, forecast transport demand of a new infrastructure might not be realised because of a multitude of factors and isolating these factors is

useful to determine why actual demand diverges from forecast demand. IA has already addressed this comment in the proposed 2018 IAAF so no further action is required.

5 Our recommendations

This review has identified nine recommendations for IA's consideration to enhance the clarity of guidance within the IAAF and to improve the robustness of the CBA framework with respect to land use impacts, to adequately consider climate change risk throughout the IAAF and to enhance the guidance for conducting a Post Completion Review. These are detailed in Table 5-1.

The recommendations were developed based on the material provided by IA in December 2017 (reflecting its work undertaken as part of the Stage 2 Update of the IAAF during the second half of 2017). IA has adopted some of these recommendations within the proposed 2018 IAAF. The following Table 5-1 identifies which recommendations are already incorporated within the proposed 2018 IAAF ('immediate' recommendations) and which one are for future consideration ('future updates').

Table 5-1 Key recommendations

Recommendation	Proposed timing	Action taken and comment
Strengthen the additionality and displacement definition, and outline the resulting uncertainty that arises from land use impacts due to these issues	Immediate	IA has addressed this comment in the proposed 2018 IAAF so no further action required
Make a clearer link between additionality and displacement, and measurement issues, such as land values	Immediate	IA has addressed this comment in the proposed 2018 IAAF so no further action required
Consider ordering benefit and cost items by certainty, particularly as land use impacts are incorporated into appraisals	Future updates	This could be considered for future updates as certain ATAP guidelines – such as Wider Economic Benefits – are currently in consultation phase
State the difference between the land use impacts in the economic appraisal and the land value capture mechanisms in the financial case	Immediate	IA has addressed this comment in the proposed 2018 IAAF so no further action required
Discuss the inclusion of climate change risks, together with other risks, such as development of new technology, in the context of the drafted guidance on scenario analysis	Future updates	The inclusion of climate change risk into the IAAF is already a significant step forward and is global best practice. In this context, further updates of the IAAF can consider how this specific item is advanced and how other risks are incorporated
Enhance the guidance on designing and planning infrastructure, which is resilient in the face of natural disasters and other threats within an additional section in the IAAF. While climate change alters the frequency and intensity of natural disasters, these are still two different aspects that need to be defined adequately	Future updates	See comment above in relation to the inclusion of climate change risk
The interrelationship between infrastructure and climate change is complex. It is suggested to embed climate change considerations within other parts of the IAAF	Immediate and future updates	This would be a complex undertaking and is not necessary for this version of the IAAF, given climate change risk is a recent addition. However, IA has addressed this partly in the proposed 2018 IAAF which is adequate for the purposes of this independent review
Provide further guidance on PCRs with respect to data collection required to measure actual land use impacts	Future updates	The PCR guidance is a new addition to the IAAF which is a step forward. Future refinements can consider adding additional data collection requirements as guidelines on aspects, such as land use are developed further
Provide guidance on the analysis of actual and assumed data (included in the CBA) to identify success factors of the project and/or identify root causes for why specific benefits have not been realised. For example, forecast transport demand might not be realised because of a multitude of factors and isolating these is useful to determine why actual demand is short of forecast demand	Immediate	IA has addressed this comment in the proposed 2018 IAAF so no further action required

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