



Process for the development of Performance Solutions

Consultation Regulation Impact Statement

2020

The Australian Building Codes Board has developed this Consultation Regulation Impact Statement, which accords with the requirements of *Best Practice Regulation: A Guide for Ministerial Councils and National Standard Setting Bodies*, as endorsed by the Council of Australian Governments in 2007. Its purpose is to inform interested parties and to assist the Australian Building Codes Board in its decision making on proposed amendments to the National Construction Code.

The Australian Building Codes Board

The Australian Building Codes Board (ABCB) is a joint initiative of all levels of government in Australia, together with the building industry. Its objective is to oversee issues relating to safety, health, amenity, accessibility and sustainability in building. The ABCB promotes efficiency in the design, construction, performance and liveability of buildings through the National Construction Code (NCC), and the development of effective regulatory and non-regulatory approaches. The Board aims to establish effective and proportional codes, standards and regulatory systems that are consistent between States and Territories. For more information see the ABCB website (abcb.gov.au).

Consultation

This is a consultation document where interested parties are invited to provide comment on any matter raised in this Consultation Regulation Impact Statement (RIS). A series of consultation questions have been provided throughout the document, and respondents are encouraged to address these items to assist in finalisation of the regulatory impact analysis. All submissions and comments will be published unless they are marked 'commercial-in-confidence'. However, any contact details you provide within your submission will be redacted prior to the submission being published.

Comments on this Consultation RIS are invited by 11.59PM AEDT Sunday 22 March 2020.

The ABCB Office will review all comments received and incorporate stakeholder information and data into the regulatory analysis, as appropriate. The RIS will be revised in the light of stakeholder comments and will be forwarded to the Board as an input into its decision-making.

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Glossary

Term	Meaning
Deemed-to-Satisfy Provisions	Means provisions which are deemed to satisfy the Performance Requirements.
Performance Requirement	Means a requirement which states the level of performance which a Performance Solution or Deemed-to-Satisfy Solution must meet.
Performance Solution	Means a method of complying with the Performance Requirements other than by a Deemed-to-Satisfy Solution.

Acronyms

Abbreviation	Full Name
ABCB	Australian Building Codes Board
AIA	Australian Institute of Architects
AIBS	Australian Institute of Building Surveyors
AIRAH	Australian Institute of Refrigeration, Air-Conditioning and Heating
BCA	Building Code of Australia
BCR	Building Confidence Report
COAG	Council of Australian Governments
DTS	Deemed-to-Satisfy
EA	Engineers Australia
HIA	Housing Industry Association
IFEA	Institute of Fire Engineers Australia
IFEG	International Fire Engineering Guidelines
IRCC	Inter-jurisdictional Regulatory Collaboration Committee
JAS-ANZ	Joint Accreditation System of Australia and New Zealand
MBA	Master Builders Australia
MPA	Master Plumbers Association
NCC	National Construction Code
OBPR	Office of Best Practice Regulation
PBDB	Performance Based Design Brief
PCA	Plumbing Code of Australia
PS	Performance Solution
RICS	Royal Institute of Chartered Surveyors
RIS	Regulation Impact Statement
SFS	Society of Fire Safety
UDA	(National) Urban Development Institute
VM	Verification Method

Introduction

Governments have long supported a focus on outcomes rather than inputs where a case for regulation is established. By communicating the level of desired performance and avoiding prescription, the objective of the regulation can be achieved with the added benefits of freedom and flexibility for innovation and unnecessary restrictions on competition minimised. Such requirements are referred to as 'performance-based' regulations.

Performance-based codes rely on three elements, a code, acceptable solutions and design and evaluation tools. When the performance-based building code was introduced in Australia as the Building Code of Australia (BCA) 1996, the first two elements were already well developed. These informed the expectations that would be set through the Performance Requirements, which at a mandatory level, describe the community expectations a building must meet. Historically, compliance was considered against prescriptive (Deemed-to-Satisfy) provisions. However, with buildings becoming increasingly complex mixes of classifications (uses), and innovative designs and materials becoming more prevalent, rigid building approval systems also needed to evolve through verification frameworks. Initially, no framework for the evaluation of 'alternative solutions' (i.e. Performance Solutions) or the methods for their assessment was mandated. It also meant uptake of Performance, was slow as it required expert judgements to be routinely made. This led to some within industry to question the appropriateness of such regulatory systems.

As part of its efforts to encourage the increased and competent use of Performance, and avoid conflicting with state governments' role in administering the provisions, the ABCB produced a number of guidelines and education materials to support its use. Most recently, an ABCB guidance document has been developed with the assistance of industry and governments.¹

¹ The Guideline was endorsed by IFEA, MPA, UDI, RICS, EA, AIA, HIA, MBA, AIRAH and AIB. See: <https://www.abcb.gov.au/Resources/Publications/Education-Training/Development-of-Performance-Solutions>

Consultation: Process for the Development of Performance Solutions

Following a number of high profile building failures, a review of building regulatory systems found public confidence in industry's ability to deliver safe building outcomes is diminishing.² The approach to Performance Solutions is singled out in two recommendations,³ for their lack of adequate processes and documentation required, resulting in:

- some new buildings not achieving compliance with the NCC's Performance Requirements;
- some building approvals not providing transparency and accountability for decisions associated with Performance Solutions.

While some states have commenced consulting on potential changes to their administrative systems, the ABCB has been tasked with assisting with a national implementation framework.⁴ Within this framework, a proposal to formalise a process for the assessment of Performance Solutions has emerged.

This Consultation Regulation Impact Statement (RIS) will examine a proposal that seeks to mandate the ABCB guideline on the development of Performance Solutions to ensure all building and plumbing Performance Solutions are developed and documented using an appropriate process. Amendments to the NCC's Governing Requirements would require the process be followed as a general obligation when preparing all Performance Solutions.

This is proposed to be:

- developed under a nationally consistent process, where stakeholder involvement, expertise and testing and/or modelling is commensurate with the technical complexity and risk associated with the solution, and;
- clearly documented with respect to the levels of safety and health, amenity and accessibility and sustainability delivered.

² Weir. B Shergold. P (2018) Building Confidence Report.

³ Weir. B Shergold. P (2018) Building Confidence Report. Recommendations 8 and 14. https://www.industry.gov.au/sites/default/files/July%202018/document/pdf/building_ministers_forum_expert_assessment_-_building_confidence.pdf

⁴ Building Ministers' Forum Communique, July 2018. <https://www.industry.gov.au/sites/default/files/2019-07/bmf-communique-18-july-2019.pdf>

Consultation: Process for the Development of Performance Solutions

This Consultation RIS will focus on the marginal impacts of changing current practice for assessment and documentation of Performance Solutions and the administrative regulatory burden. It does not assess the merits or value of performance-based codes, the benefits of which are well established by previous reports.

Background

The introduction of the performance-based BCA in 1996 formalised the outcomes or targets for what were then described as 'alternative solutions', now 'Performance Solutions' for any area of construction regulated by the National Construction Code (NCC).⁵ The NCC is given legal effect by building regulatory legislation in each state and territory. This legislation consists of an Act of Parliament and subordinate legislation (e.g. Building Regulations), which empowers the regulation of certain aspects of buildings and structures and contains the administrative provisions necessary to support and give effect to the legislation.

The NCC is subordinate legislation to a state's building Act and Regulations and enactment is acknowledged as the domain of individual state and territory building or plumbing administrations. Administration covers a range of building-related issues, including roles and responsibilities within the system for design, certification, issuance of permits, inspections, occupancy certificates and accreditation of materials and components, proportionate liability, private certification, dispute resolution and registration. The assessment and approval of a building solution against the NCC is a state function administered by a combination of local authorities (e.g. councils) and private certifiers.

In 2002, key stakeholders (Australasian Fire and Emergency Services Council (AFAC), Australian Institute of Building Surveyors (AIBS) and the Society of Fire Safety (SFS)) expressed concern about the appropriateness of the processes being used for Performance Solutions for fire safety and formally raised the issue with governments. In response, the ABCB in collaboration with industry delivered a seminar series in capital cities promoting the use of appropriate processes. The message focused on a process for defining the solution, analysis, stakeholder engagement and documentation and would go on to be reflected in the International Fire Engineering Guidelines (IFEG)⁶. Performance Solutions developed and documented in accordance with the IFEG are widely accepted as more likely to deliver an outcome that satisfies

⁵ With the expansion of the NCC, areas of construction regulated by the NCC now include fire, health and safety, amenity, accessibility and energy efficiency and plumbing.

⁶ IFEG produced by ABCB with NRC in Canada, ICC in United States of America, DBH New Zealand was published in 2005.

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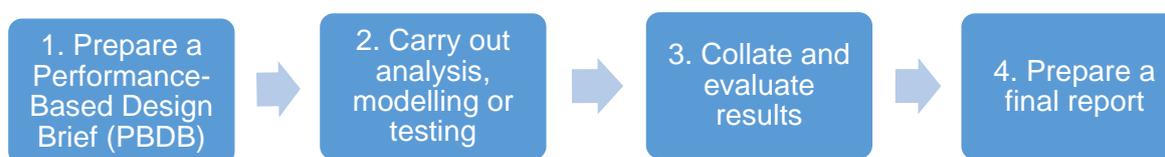
the intent and expectations of the NCC due to the rigour of its process. In 2015, another seminar series would be undertaken to address similar stakeholder concerns. The ABCB also produce non-mandatory guidance documents to assist in the preparation and assessment of Performance Solutions.

Since 2014, the ABCB has been consulting with industry and government on ways to improve the use of the performance-based NCC and the uptake of performance-based design. Predominantly, this has involved research and development of methods to quantify the Performance Requirements. These efforts have resulted in some stated targets for Performance Requirements and often quantified by Verification Methods (VM). Some VM describe processes and documentation in recognition that approval and acceptance is an inherently administrative task that goes beyond technical verification, namely the fire safety verification method (FSVM) and the access verification method DV2 in NCC Volume One.

The ABCB 'Guideline for the Development of Performance Solutions'⁷ was based on the IFEG process and adapted. In recognition that a Performance Solution can be used in any other area of the NCC, it was developed and endorsed by key industry stakeholders, including the ABCB's national technical committees, the Building Codes Committee (BCC) and Plumbing Codes Committee (PCC).

The Guideline consolidated the IFEG process into four steps as follows:

Figure 1 Model Performance Solution Process



Key to the process is the development of a Performance Based Design Brief (PBDB), to define the proposed solution, the NCC Performance Requirements, acceptance criteria and the assessment methods. The emphasis of the IFEG and the Guideline is

⁷ Available from: <https://www.abcb.gov.au/Resources/Publications/Education-Training/Development-of-Performance-Solutions>.

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on stakeholder involvement in the PBDB to define the risks and complexity of the design. The remaining steps are required to be undertaken to an extent proportionate to the proposals' risk and complexity.

State and territory governments have also responded to the absence of a formal verification framework by providing guidance on the development of Performance Solutions. For example, the Victorian Government has a practice note on the development of Performance Solutions that has been in place since 2014.⁸ The Victorian Building Regulations, Regulation 38, provides general direction on the development and documentation of Performance Solutions.⁹ The WA Government has also published guidance on the development of Performance Solutions¹⁰ but is limited in application to housing and fire safety.

Stakeholder involvement is also required to some extent in jurisdictions. In NSW, referral to the fire brigade is a requirement of building approval; in Victoria referral is required for a fire safety system that does not meet the DTS Provisions¹¹; in Queensland referral extends to a Performance Solution or a residential or residential care building¹²; and in Western Australia, in commercial buildings where a Performance Solution is proposed. Additionally, in Western Australia the Building Act requires the Fire and Emergency Services (FES) Commissioner to be provided with detail to enable an assessment of the building against the brigade's operational requirements.¹³

A lack of national consistency and uniformity in the regulation and guidance of Performance Solutions exists where governments attempt to address this issue at a state level. This patchwork approach does little for national firms, product

⁸ Updated in 2018, See: https://www.vba.vic.gov.au/_data/assets/pdf_file/0007/45844/Industry-Guide-Performance-Solutions.pdf

⁹ Victorian Building Regulations (2018) Retrieved: [http://www.legislation.vic.gov.au/domino/Web_Notes/LDMS/LTObject_Store/ltobjst10.nsf/DDE300B846EED9C7CA257616000A3571/2E7A3D35A8D6F9C6CA2582C600815A1B/\\$FILE/18-38sra004%20authorised.pdf](http://www.legislation.vic.gov.au/domino/Web_Notes/LDMS/LTObject_Store/ltobjst10.nsf/DDE300B846EED9C7CA257616000A3571/2E7A3D35A8D6F9C6CA2582C600815A1B/$FILE/18-38sra004%20authorised.pdf)

¹⁰ Performance Solutions for housing projects (2018) See: https://www.commerce.wa.gov.au/sites/default/files/atoms/files/ib_102_performance_solutions_for_housing_projects.pdf

¹¹ Victorian Building Regulations (2018) Schedule 8, Regulation 129.

¹² Queensland Sustainable Planning Regulation (2009), Table 1, Schedule 7.

¹³ Consulting with referral authorities, such as the fire brigade, does not amount to an obligation to adopt their advice or recommendations.

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manufacturers or proactive national industry associations attempting to deliver compliant processes, products, education or training.

Similarly, some states require documentation of decisions for Performance Solutions:

- Notification, under Western Australian Building Regulation 15(c), if the application of a building permit is in respect to a Class 1 or Class 10 building, details of the Performance Solution to a building standard that is proposed to be used must accompany the application.¹⁴
- The Queensland Building Act requires at application the relevant Performance Requirements and how the building work complies, how the building work differs from the DTS Provisions and any test results and reports relied upon for the basis of decision.^{15 16}
- The Victorian Building Authority requires that in issuing a building permit or certificate of compliance, the relevant building surveyor record in writing the Performance Requirement with which the solution complies and details of any assessment methods, expert judgement, details of any test or calculations, standards or other information they rely on in making the decision.¹⁷

¹⁴ Western Australian Building Regulations (2012) Part 3, Clause 18B.

¹⁵ Ibid, Clause 4, Section 68A.

¹⁶ Queensland Building Act (1975) Chapter 3, Section 26.

¹⁷ Victorian Building Regulations (2018) Clause 38 and Clause 124.

Problem

Performance Solutions require careful consideration given the latitude for judgement to be applied, particularly for health and safety risks. In the time since its introduction, no single defined framework for consideration of Performance Solutions has emerged. The veracity of analysis and quality of decisions has repeatedly been brought into question, most recently in the Building Confidence Report¹⁸ (BCR), highlighted the potential for gaps to exist between the intentions of a performance-based code and its enactment.

The nature of the problem therefore consists of two factors: a lack of clarity in expectations in the development of a Performance Solution and decision making process at assessment; and a lack of transparency in the documentation of Performance Solutions. The hypothesis this RIS will consider is whether a change to the Governing Requirements of the NCC to require a consistent process for Performance Solutions will lead to improvements in building outcomes and confidence.

Clarity in expectations in the development of a Performance Solution

Under an agreement between all levels of government, the ABCB develops and maintains the NCC, which is then adopted by states and territories into building regulation under state or territory building Acts. In developing a Performance Solution both the Governing Requirements and the Performance Requirements must be met. The NCC contains Governing Requirements that generally describe the application of the NCC in five parts:

- A1: Concepts and conventions that need to be taken into account;
- A2: Methods of demonstrating compliance and the steps that must be taken under various pathways;
- A3: Applying the NCC with state and territory legislation that can override the NCC;

¹⁸Weir. B Shergold. P (2018) Building Confidence Report.

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- A4: Referenced Documents scope and function; and
- A5: Documentation and evidence required to show compliance with the NCC for a material, product, form of construction and design.

A Performance Solution must be 'shown to comply' with the relevant Performance Requirements.¹⁹ The NCC details a combination of Assessment Methods including, Evidence of Suitability in accordance with A5, a Verification Method and comparison with the Deemed-to-Satisfy Provisions or expert judgement. Evidence used must be appropriate to the use of the material, product, form of construction or design to which it relates, yet documentation is reportedly poor.^{20,21} The NCC's Governing Requirements, nor in general state regulation, do not mandate the process for assessment of a solution and, in concept, a Performance Solution could be developed based on one individual's expert judgement.

Acceptance is the domain of the appropriate authority. However, roles and responsibilities of parties involved in the building process, licencing, and approval and acceptance requirements, are unique to each jurisdiction's administrative system. Some define roles to limit involvement of approval authorities in the development of a solution. Others require disclosure and documentation for certain building classifications or topics such as fire safety or disability access.²²

This arrangement gives rise to the potential for administrative overlap or gaps to exist between the intentions of performance-based codes and their enactment. The potential for confusion of functions and roles under a performance-based framework were conceptually explored in a discussion paper in 1998 by the Inter-jurisdictional Regulatory Collaboration Committee (IRCC). Given the latitude for judgement, Performance Solutions require careful consideration both at design and approval. This was underscored when discussing the subtle differences in design or use that have a major influence over fire safety.²³

¹⁹ National Construction Code Volume One (2019) Section A2.2 (2).

²⁰ National Construction Code Volume One (2019) Section A5.1(1).

²¹ Weir. B Shergold. P (2018) Building Confidence Report. Page 30.

²² Western Australian Consultation RIS - Reforms to the building approval process. (2019) Page 16.

²³ International Fire Engineering Guidelines (2005).

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'The relationship between the acceptance criteria and the relevant Performance Requirements is often a matter of engineering judgement...can vary between practitioners and from project to project'.

Such judgements are complex and in effect require levels of rigour, analysis and competency of those undertaking solutions.

Identification of the risks to a building, the appropriate selection of calculation techniques (where available and required) and scenarios to be tested and agreement between all parties is a fundamental issue. The approval authority alone is unable to address these concerns.²⁴

For the development of fire-life-safety solutions, this concern was proposed to be managed collaboratively under a formalised design review and hazard assessment procedure or Fire Engineering Brief (FEB). Now common practice, concerns have been raised that Performance Solutions may still not be subject to consultation and analysis commensurate with the complexity or risk involved. The BCR suggests fire authorities have expressed clear concerns on behalf of brigades about their lack of involvement in the development of a Performance Solution for fire:

"[if] IFEG was closely followed, the quality of fire engineering designs would improve and fire authorities would be consulted early on all designs involving Performance Solutions as part of the fire engineering design process. This would help fire authorities gain confidence in the capability of fire safety engineers to design acceptable fire safety solutions".

This lack of confidence appears to be with regard to both the process followed and the capability of a practitioner.

Transparency and Documentation

The BCR observes that fundamental to a performance-based approach to building regulation producing benefits is:

²⁴ Inter-jurisdictional Regulatory Collaboration Committee (1998) Performance Based Building Regulations, Discussion Paper. Page 90.

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“... a high level of awareness and understanding across the building and construction industry of how compliance can be achieved by incorporating the Performance Requirements within the design process. Second, there needs to be strong public trust that the Performance Requirements are being met and, in particular, that health and safety is assured.”²⁵

It concludes that neither of these requirements are presently being fully met. Undermining public trust is a lack of transparency in decision making and record keeping. Attempts to audit buildings have revealed ‘as constructed’ documentation may not be available or accurate.²⁶

Two of the recommendations of the BCR single out Performance Solutions for the lack of adequate processes and documentation required. The BCR suggests that this is resulting in buildings not achieving compliance with the NCC’s Performance Requirements, as well as not providing transparency and accountability for decisions.

The BCR suggests confidence in outcomes can clearly only be achieved where there is an effective disclosure regime and scrutiny is central to public accountability:

“It is widely reported that the standard of documentation supporting Performance Solutions is poor. There is a lack of basic information on matters such as the relevant Performance Requirements and the Assessment Methods applied.”

The BCR also states:

“Confidence in the NCC requires an effective disclosure regime... Decisions made during the design and construction of a building need to become an accessible record. Scrutiny is vital to public accountability. Those responsible for making and certifying decisions under the NCC need to be identified so that they can be held accountable for their decisions.”

²⁵ Weir, B Shergold, P (2018) Building Confidence Report. Page 9. Reference to meeting the Performance Requirements in this context is unlikely to be referring to just Performance Solutions, but a general compliance with the NCC of all solutions.

²⁶ Victorian Cladding Taskforce (2019) Report from the Co-Chairs. Page 32. See: https://www.planning.vic.gov.au/data/assets/pdf_file/0019/426034/DELWP0124_Victorian_Cladding_Taskforce_Final_Report_July_2019_v9.pdf

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The BCR was published in 2018 and involved widespread consultation with government and industry. The recommendations have since been supported by all governments and key industry stakeholders.²⁷

A number of state government reviews of regulatory systems have delivered similar findings that support the shortcomings.²⁸ A summary of those that reflect the intent of improved documentation (Recommendation 14) include:

- *‘A minimum standard of design documentation should be established’* (Wallace Review - Recommendation 105).²⁹
- *‘Standardised report requirements be developed for all classes of alternative solutions’* (Lambert Review - Recommendation 6.2.6).³⁰
- *‘There was inadequate information for 96 per cent of the 401 permits reviewed to demonstrate compliance with critical provisions of the Act, the regulations and the BCA.’* (VAGO Report).³¹

Those review recommendations³² that relate to the process (Recommendation 8) of developing fire safety Performance Solutions (alternative solutions) found:

- *‘That properly qualified and experienced people are required in the design, installation and commissioning of fire safety alternative solutions.’*
- *‘The potential impact of the failure to meet critical fire safety provisions can obviously be significant...There was also no evidence of approved alternative solutions needed to mitigate the issue identified in each case.’*

The Building Commission [now the Victorian Building Authority], in consultation with stakeholders should:

²⁷ The recommendations of the BCR report are a result of widespread and targeted consultation with industry and government and are part of a broader package of reform still to be delivered. The Building Ministers’ Forum recently agreed to the establishment of an ABCB implementation team to assist in developing a consistent approach to implementation of the BCR recommendations.

²⁸ Weir. B Shergold. P. (2018) Building Confidence Report. Page 30.

²⁹ Review of the Building Act 1975 and building certification in Queensland, [1311] Page 71.

³⁰ Outcome sought by the proposed reforms. Independent Review of the Building Professionals Act 2005 – Final Report.

³¹ Victorian Auditor-General, Compliance with Building Permits, Victorian Government Printer (2011) Victorian Auditor-General, Victoria’s Consumer Protection Framework for Building Construction, Victorian Government Printer (2015) Melbourne Page 24.

³² The following recommendations though relevant are wider ranging and rely on other recommendations of BCR report: 6.1.15, 6.28, 6.5.8, 7.4.2 of the Lambert review.

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develop standard templates and procedures to require building surveyors to adequately document their assessment approach and basis of their decisions; and, require building surveyors to demonstrate, using these templates and procedures, their consideration and acquittal of mandatory safety and technical requirements.'

Consultation Questions:

- Do you agree with the nature of the problem?
- Are there any other characteristics not described?
- Are you aware of other circumstances when documentation is mandatory?
- Are you aware of any residential buildings which required rectification as a consequence of the Performance Solution process followed?
- Are you aware of commercial buildings which required rectification as a consequence of the Performance Solution process followed?

Extent of the Problem

Currently, a degree of process and documentation to meet the obligations of the NCC Governing Requirements and other state and territory regulations will be expected by the appropriate authority. The extent of the problem is influenced by the number of Performance Solutions undertaken where the process and documentation is either inadequate or not undertaken at all.

Use of Performance

There is uncertainty over the extent of use of Performance Solutions, as data is not consistently captured or reported as part of approval documentation by states and territories. Given a lack of adequate reporting and documentation, the extent of use of Performance Solutions is not known with certainty.

Enquiries with state and territory building authorities suggest that information may be captured by local authorities, although it is generally not coordinated or consistent.

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Anecdotally, the use of Performance Solutions in residential (Class 1) buildings is generally lower due to their lesser comparative size, complexity, variability, cost and margins; as well as in plumbing.^{33,34}

Notwithstanding the lack of reliable data, the estimates in Table 1 have been derived using figures from voluntary reporting of around two thirds of local government areas in one state (WA), which if reflective of other jurisdictions would imply the following:

Table 1: Implied proportion of solutions using performance-based design

Class 1	Sample	State ²	Australia ³	Percentage
Number of buildings	6,0711	20,729	116,548	(100%)
Number of Performance Solutions	1741	594	3,3452	(2.87%)

Class 2 – 9	Sample	State ²	Australia ³	Percentage
Number of buildings	1,156 ⁴	3,240 ⁶	24,000	(100%)
Number of Performance Solutions	62 ⁴	792 ⁵	3,052	(12.72%)

Notes:

1. Jurisdictional data based on totals by class September 2018 to September 2019
2. Extrapolated based the sample's share of state development.
3. Calculated using a five year average of building approvals from 2013 to 2018 for state share of national data.
4. September 2018 to September 2019 (Excluding Class 2 and Class 3 buildings).
5. Number of Performance Solutions assessed by a state fire authority annually.
6. Jurisdictional data including Class 2 buildings.

Adequacy of Process

To better understand current practice, the ABCB undertook a survey targeting practitioners involved with the development or assessment of Performance Solutions from 12 September to 26 September 2019. A total of 297 responses were received (94% building, 6% plumbing). The survey focused on whether current practice would be considered equivalent at achieving the intent of the ABCB Guideline. Responses to the survey found that some steps in the process were either 'not undertaken' or 'inadequately undertaken'. The proportions reporting adequacy were low and suggest

³³ 6% of survey respondents identified plumbing as the sector where they predominantly involved in the development of Performance Solutions.

³⁴ The CIE (2014) Report on the benefits of a Performance Based NCC.

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outcomes achieved in practice may differ to those sought by the NCC (See Table 2). These results suggest the process followed by up to half the industry when judged against the ABCB Guideline would be considered inadequate.

Table 2 Total residential and commercial building responses by adequacy by step in the process

Adequacy	PBDB	Stakeholder involvement	Testing and modelling	Documentation
Adequately undertaken	47%	35%	39%	48%
Inadequately undertaken	39%	44%	41%	42%
Not undertaken	14%	21%	20%	10%
Total	100%	100%	100%	100%

Source: ABCB Survey, 2019

Notes: Excludes unsure responses.

Responses to the ABCB survey suggest that when compared to the ABCB Guideline, a proportion of steps under current processes would be considered 'not adequately undertaken' (Table 3) or 'not undertaken' (Table 4).

Table 3: Percentage not 'adequately' undertaking a component of the process

Component	Percentage residential	Percentage commercial
Percentage not adequately undertaking Performance-Based Design Brief	37%	41%
Percentage not adequately undertaking stakeholder consultation	51%	40%
Percentage not adequately undertaking testing and modelling	37%	43%
Percentage not adequately providing documentation	41%	43%

Source: ABCB Survey Results, 2019.

Table 4: Percentage of ‘not undertaking’ a component of the process

Component	Percentage residential	Percentage commercial
Percentage not undertaking a Performance-Based Design Brief	21%	9%
Percentage not undertaking stakeholder consultation	24%	19%
Percentage not undertaking testing and modelling	30%	14%
Percentage not providing documentation	12%	9%

Source: ABCB Survey, 2019.

Most often, the step identified as ‘not undertaken’ amongst the commercial building sector was ‘stakeholder involvement in determining acceptance criteria’. Likewise, it was ‘stakeholder involvement’ amongst the residential building sector in over half of the responses.

In both sectors, ‘not undertaken’ responses to ‘documentation of results and solution’ was generally low. However, ‘inadequately undertaken’ was highest in the commercial building sector and second only to stakeholder consultation in the residential building sector.

Case studies

There are a number of examples both domestically and internationally where inadequacies in the process for Performance Solutions has resulted in costly rectification work and legal fees. Where inadequate solutions have been found, they have typically been in the area of fire safety, external cladding, energy efficiency and weatherproofing. There is, however, anecdotal information from industry sources and media reports that problems occur in all areas covered by the NCC, largely in commercial buildings and less frequently in the housing sector.

When problems do occur, the cost of rectification work can vary greatly and is often dependent on the size and use of the building in addition to the extent the Performance Solution influences the physical features of the building.

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There is limited information in Australia and internationally on the total cost of inadequate Performance Solutions. One study from New Zealand found that the cost of inadequate Performance Solutions could be in the range of \$12 billion in 2008 dollars. This report included both residential and commercial buildings and found many factors contributing to a systematic failure of performance-based design. The greatest weakness was described as “naive blind faith” that the industry would self-correct deficiencies without any emphasis on accountability. No other studies on the total cost of inadequate solutions are known.

The New Zealand experience shows that the cost of rectifying a single storey dwelling may range between \$50,000 and \$110,000 and for a sole-occupancy unit within an apartment building between \$30,000 and \$36,000. A breakdown of these costs in 2019 Australian dollars is shown in Table 5.

Table 5 Single and Multi-dwelling cost parameters

Type of expense	Single dwelling	Single dwelling	Sole-occupancy unit	Sole-occupancy unit
<i>Intervention</i>	<i>Targeted</i>	<i>Full reclad</i>	<i>Targeted</i>	<i>Partial</i>
Design	\$4,474	\$13,422	\$2,013	\$2,461
Legal	\$26,844	\$67,111	\$12,527	\$14,317
Experts	\$4,474	\$8,948	\$4,027	\$4,921
Consequential	\$8,948	\$8,948	\$8,053	\$10,738
Total	\$44,740	\$98,429	\$26,621	\$32,437

Source: Weather tightness – Estimating the cost (PWC 2009)

To determine whether the costs incurred in New Zealand could be similar to the costs incurred in Australia, several Australian examples were assessed using case law files.^{35, 36,37} In one case, the façade of an office building required full replacement after approval for occupation when it was found that water penetration was not addressed at the time of assessment. The cost of this rectification was not made publicly available, however, is highly likely to be at least consistent with the New Zealand experience. One residential apartment facade was also found to require removal and replacement

³⁵ NSW Land and Environmental Court <http://www.lec.justice.nsw.gov.au/>

³⁶ Victorian Buildings Appeals Board <https://www.buildingappeals.vic.gov.au/decisions-and-statistics>

³⁷ ACT Civil and Administrative Tribunal <http://www8.austlii.edu.au/au/act/>

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of its façade equivalent to \$72,000 per sole-occupancy unit with one other complex incurring a rectification cost of \$60,000 per sole-occupancy unit following deficiencies with the way the buildings were assessed. In these examples, the costs incurred by the Australian market may be at least equal to the reported costs in New Zealand, and could be much higher.

Although Australian examples of complete failure are rare, there are documented examples of whole building failures where design choices in pursuit of increased sustainability have led to fire and increased risks to life safety. A lack of technical knowledge with decision makers and a lack of involvement of specialists at the design stage is cited as among the root causes of impacts to construction schedules and costs.

Consultation Questions:

- Do you have information on the extent of use of Performance Solutions in Class 1 and 10 buildings?
- Do you have information on the extent of use of Performance Solutions in Class 2 to 9 buildings?
- Is stakeholder involvement in determining acceptance criteria likely to lead to higher confidence in Performance Solutions?
- Do you agree with the estimates on the extent Performance Solutions are used in residential and commercial buildings?
- Are you aware of any studies on the costs of rectifying building work as a result of inadequate Performance Solutions?
- Do you agree with the costs associated with rectification work outlined in Table 5?

Objectives

The objectives of the proposal are to ensure that Performance Solutions:

- are developed using an appropriate process using methods commensurate with the complexity and risk posed by the design;
- meet the relevant Performance Requirements of the NCC;
- achieve the required level of health and safety, amenity, accessibility and sustainability; and
- are well documented and transparent.

Options

There are three options presented for decision-makers.

Option 1: Maintain the status quo

The status quo involves the ABCB promoting non-regulatory guidance to provide information on the process to be used for the development and documentation of NCC Performance Solutions. Under this option there would be no change to the content of the current NCC. The non-regulatory document would continue to be used to explain the NCC's intent for the consistent development and documentation of Performance Solutions.

The status quo is the default choice for decision-makers in considering alternatives to achieve the objectives. Where the incremental impacts of other options would result in more costs than benefits, or would be ineffective in addressing the problem or achieving the objectives, this analysis will conclude in favour of the status quo.

The status quo will be regarded as a baseline, as a basis to determine the incremental impacts of the other options.

Option 2: Amend the NCC Governing Requirements to include a mandatory process for the development and documentation of a Performance Solution

This option would require all Performance Solutions regardless of topic, size or complexity, to be subject to the process proposed in Attachment A to an extent commensurate with the complexity and risk of the design.

The intent of Option 2 is to address the need for clear expectations for the development and documentation of all NCC Performance Solutions. The proposal requires the involvement of stakeholders in both the performance-based design brief, setting acceptance criteria and evaluation of results to overcome the potential technological risks and ensure adequate decisions are made.

This will be implemented through an amendment to the NCC's Governing Requirements, formalising the intent of the NCC and content of current guidance material.

Option 3: Restrict the application of the solution to life safety matters (fire and structure)

This option would apply as per Option 2, but only require its application to solutions involving life safety matters. This option has been developed in response to the opinions of the ABCB's Building Codes Committee (BCC) who felt as that inherently higher risk (consequences) and more complex considerations relate to safety issues (fire and structure) when compared with other topics covered by the NCC this was an alternative option. A recent survey of industry practitioners conducted by the ABCB found that Performance Solutions relating to fire and structure represent approximately 80% of all Performance Solutions. Hence, the impacts of this option are assumed to be 80% of that of Option 2.

International Approaches

The following international approaches were reviewed as being either performance-based or similar to the structure of the NCC.

Canada

In most Canadian jurisdictions, the building verification and approval process includes verification at the design stage, during construction and before occupancy. Review and acceptance is generally undertaken at the municipal level by the authority having jurisdiction (AHJ). Canadian Codes are 'Objectives' based. A solution can either be deemed-to-satisfy or an alternative solution. A building applicant must demonstrate compliance is at least equivalent. The final acceptance of an 'alternative solution' is the decision of the AHJ, and may in some cases require prior acceptance by provincial or territorial boards or commissions.

New Zealand

The New Zealand Building Code is similar in structure to the NCC. 'Alternative Solutions' are required where 'Acceptable Solutions' are not used. Solutions are considered by building consent authorities (usually Local Councils) and these authorities need to be satisfied "on reasonable grounds" that the proposed requirements will meet the Code. No specific process is mandated, but general guidance on the burden of proof and the role of evidence is provided.

Development of a Fire Engineering Brief (FEB) is recommended to ensure agreement between stakeholders on assessment methods, acceptance criteria and the process or peer review. Assessment is the responsibility of the consent authority required to be accredited by an independent Building Consent Accreditation Body, established in 2004. Peer review may be sought by the BCA in assessing all or specific aspects of a proposed alternative solution and the qualifications of the practitioners involved. Specific guidance has been issued for the 'fire safety design for tall buildings'. A systematic (verification) approach to the assessment of alternative fire safety solutions is also now required and alternative pathways are reportedly rare.

United States

In the United States, building regulation consists of model codes that are primarily prescriptive. Alternative designs, often termed 'equivalencies', are allowed. However, there is not a consistent and established process for their assessment.

United Kingdom

As of January 2020, a full independent review of the UK building regulations has resulted in more than 50 recommendations, which are at various stages of implementation. These address systematic issues, including a lack of clarity around responsibility and enforcement, but maintain a performance or 'outcomes' based framework. Reforms focus on high risk residential buildings (those greater than 10 storeys) but the UK government's responses suggest their application will be extended further. Reforms of relevance to this RIS include recommendations to improve the limited requirements for documentation and design changes approval, and project documentation and accountability.

Impact Analysis

This section provides an assessment of the incremental costs and benefits associated with Option 2 and Option 3 when compared with the status quo baseline.

Groups Impacted by the Options

This analysis identifies the following impacted stakeholder groups –

- Individuals, e.g. owners and occupiers of new buildings.
- Businesses, e.g. developers, builders, building practitioners, testing bodies and private certifiers.
- Government, e.g. state and territory building authorities and fire authorities.
- Education providers, e.g. universities and Registered Training Organisations (RTO's).

Assumptions and Parameters

The following key parameters and assumptions have been used in preparation of this impact analysis:

- The annual number of new houses constructed each year is 116,000.³⁸
ABS (2019) Building Activity, Catalogue 8752.0. Table 37.
- The annual number of commercial building approvals is not collected nationally. The Western Australian Building Commission has provided the ABCB with data on commercial building activity occurring within its jurisdiction. It is known through ABS comparison that Western Australia accounts for approximately 17% of all commercial building activity occurring annually.
- The annual number of new commercial buildings constructed each year is 24,000.
Unpublished data from Western Australian Building Commission.
Extrapolated using ABS (2019) Building Activity, Catalogue 8752.0. Table 71.

³⁸ A five year average of total completions for new houses between 2014 and 2018 has been taken.

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- The proportion of total completions using at least one Performance Solution is 15% of all new commercial buildings (3,600 commercial buildings) and approximately 3% of all new residential buildings (3,480 new houses).

Unpublished data from the Western Australian Building Commission.

- The estimated proportion of Performance Solutions not following a component of the process currently is shown in Table 6.

Table 6 Percentage not undertaking a component of the process

Component	Percentage residential	Percentage commercial
Not undertaking a Performance Based Design Brief	21%	9%
Not undertaking stakeholder consultation	24%	19%
Not undertaking testing and modelling	30%	14%
Not providing documentation	12%	9%

Source: ABCB Survey, 2019.

- The estimated proportion of Performance Solutions not following a component of the process adequately is shown in Table 7.

Table 7 Percentage not adequately undertaking a component of the process

Component	Percentage residential	Percentage commercial
Not adequately undertaking Performance-Based Design Brief	37%	41%
Not adequately undertaking stakeholder consultation	51%	40%
Not adequately undertaking testing and modelling	37%	43%
Not adequately providing documentation	41%	43%

Source: ABCB Survey Results, 2019.

- An important variable is the complexity of a solution. The need for an adequate process is generally one that reflects the commensurate risk or complexity of a solution. Where a Verification Method exists and is widely used, such as JV3 in NCC Volume One, the parameters of the analysis are largely set through the method itself. However, some Performance Requirements remain unquantified, others may allow significant flexibility and be subject to guidance or common practice (e.g. engineering judgement or comparison to the DTS). For these

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reasons, the cost of developing a solution can vary significantly and cannot be known with certainty. An estimate has been developed based on the broad proportions outlined in Table 8.

Table 8 Estimate of composition of total costs associated with Performance Solutions.

Component	Cost of professional fees	Proportion of total professional fee
Performance Design Brief	\$2,000	20%
Stakeholder Consultation	\$1,500	15%
Testing and Modelling	\$6,000	60%
Documentation	\$500	5%
Average fee commercial building	\$10,000	100%

Notes:

1. A Performance Solution in a residential building has been assumed to be half the cost of a Performance Solution in a commercial building, reflective of lower resources, variability in size and complexity and available cost savings.
 2. Total professional fees exclude the cost of the building or plumbing solution.
- An analysis of the costs from the New Zealand leaky buildings experience suggests the costs of rectification in 2019 Australian dollars could conservatively be estimated as shown in Table 9.

Table 9 Single and Multi-dwelling cost parameters

Type of expense	Single dwelling	Single dwelling	Sole-occupancy unit	Sole-occupancy unit
<i>Intervention</i>	<i>Targeted</i>	<i>Full reclad</i>	<i>Targeted</i>	<i>Partial</i>
Design	\$4,474	\$13,422	\$2,013	\$2,461
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Consequential	\$8,948	\$8,948	\$8,053	\$10,738
Total	\$44,740	\$98,429	\$26,621	\$32,437

Source: Weather tightness – Estimating the cost (PWC 2009)

Assessment of cases of recent rectification work in Australia has shown that the costs incurred in Australia are equal to or higher than those shown in Table 9.

Option 1 – Retain the status quo

The impacts of the status quo are those reflected in the problem section of this RIS:

- Expectations of the process for documentation remains unclear and increases latent risks in the form of buildings constructed that are unlikely to achieve the required levels of safety, health, amenity, accessibility or sustainability.
- Undocumented solutions restrict transparency, accountability and undermine building administration.

Confidence in the building industry's ability to deliver safe buildings will remain stagnant. In the event of more building failures (an extreme case), it may also prompt governments to consider returning to more prescriptive regulation, impacting on an industry where buildings are becoming more complex, innovation is increasing and proprietary systems are often used. Performance-based regulation is more responsive to this type of environment and contributes significantly to national productivity.

Option 2 – Amend the NCC Governing Requirements to include a mandatory process for the development and documentation of a Performance Solution

This option would require all Performance Solutions use the ABCB's process for formulating and approving Performance Solutions. The process would be reflected in the Governing Requirements of all Volumes of the NCC.

The process is aimed at formalising a nationally consistent approach to assessing Performance Solutions, based on the process proposed in Attachment A. This option would require all Performance Solutions regardless of topic, size or complexity, to be subject to the process, but importantly, to an extent commensurate with the complexity and risk of the design (in other words not a one size fits all approach).

Qualitative Costs

It could be argued that formalising the existing guidance material in the NCC, which has been developed and promoted by the ABCB, is the status quo and simply reflects the current intent of the NCC and the expectations of state and territory building control systems. On this basis, changes to the NCC would impose no additional cost on industry. However, in those cases, where the intent of the NCC and guidance documents have not been followed and substandard Performance Solutions developed, industry should expect to incur greater costs.

Arguably changes to the Governing Requirements is just further confirmation of what was always expected (ie Performance Solutions need to be properly documented by those practitioners using them to test and justify their application against the Performance Requirements; enable those approving them to be able to assess their adequacy; and provide a record for future auditing and owners of buildings to reference).

The costs associated with Option 2 will be highly dependent on the extent to which industry has been developing Performance Solutions in line with guidelines and the intent and objectives of the NCC. In a scenario where decisions have been made without adequate analysis, additional costs will be incurred. These costs may include the engagement of experts, time to consult with stakeholders, additional analysis and the preparation of associated documentation. These costs are considered by the quantitative cost section below.

Quantitative Costs

Consistent with the stated problem, irrespective of the qualitative assessment above, the impact analysis adopts the approach that as expectations are not legislative or consistent, incremental costs will be incurred by industry where a step in the current process is either 'inadequately' or 'not undertaken'. In addition to the ABCB survey results, the following key parameters and assumptions have been used in preparation of the quantitative costs:

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- The annual number of new houses constructed each year is 116,000.³⁹
- The annual number of new commercial buildings constructed each year is 24,000.⁴⁰
- The proportion of total completions using at least one Performance Solution is 15% of all new commercial buildings and approximately 3% of all new residential buildings.
- The estimated proportion of Performance Solutions not following a component of the process currently is that shown in Table 6.
- The assumed percentage price increase in total professional fees is estimated to be 8% where the process is currently inadequately undertaken and 108% where components of the process are not undertaken at all.⁴¹

The increases in professional fees is applied using the above assumptions is shown in Tables 10 & 11.

Table 10 Estimates of marginal annual increase in cost for proportion not undertaking a component of the process

Component	Commercial	Residential
Performance-Based Design Brief	\$699,840	\$789,264
Consultation	\$1,108,080	\$902,016
Testing and modelling	\$3,265,920	\$2,818,800
Documentation	\$174,960	\$225,504
Total Annual Cost	\$5,248,800	\$4,735,584
Present Value Cost	\$39,445,951	\$35,589,014

³⁹ A five year average of total completions ABS (2014-2018) Building Activity, Catalogue 8752.0. Table 37.

⁴⁰ The annual number of commercial building approvals is not collected nationally. Estimate based on: https://www.commerce.wa.gov.au/sites/default/files/atoms/files/final_report_security_of_payment_reform_in_the_wa_building_and_construction_industry.pdf Page 341. Extrapolated using ABS (2019) Building Activity, Catalogue 8752.0. Table 71.

⁴¹ ABCB Survey Results (2019) approximately 50% of respondents identified an increase in professional fees. The average increase in professional fees was approximately 8%.

Table 11 Estimate of marginal annual cost for proportion not adequately undertaking a component of the process

Component	Commercial	Residential
Performance-Based Design Brief	\$236,160	\$103,008
Consultation	\$172,800	\$141,984
Testing and modelling	\$743,040	\$257,520
Documentation	\$61,920	\$57,072
Total Annual Cost	\$1,213,920	\$559,584
Present Value Cost	\$9,122,891	\$4,205,404

Note: Present Values have been calculated using a 7% discount rate over a 10 year period.

The total aggregate annual cost is estimated to be \$11,757,888⁴² or \$88,363,259⁴³ in Present Value terms. These impacts will not be distributed equally on all Performance Solutions and reduce depending on the extent of adequacy in current processes.

Qualitative Benefits

The industry will benefit from a nationally consistent process, which should not vary across the country. State and territory governments will benefit from not having to maintain separate legislation and guidance material.

A national process helps ensure variations are minimised in both the process and guidance around the development of Performance Solutions that meet the NCC.

Stakeholders have expressed higher confidence in the Objectives of the NCC being met where the proposed process is followed. The ABCB survey asked respondents to advise the extent that the steps identified in the ABCB Guideline were:

- Adequately undertaken
- Inadequately undertaken
- Not undertaken.

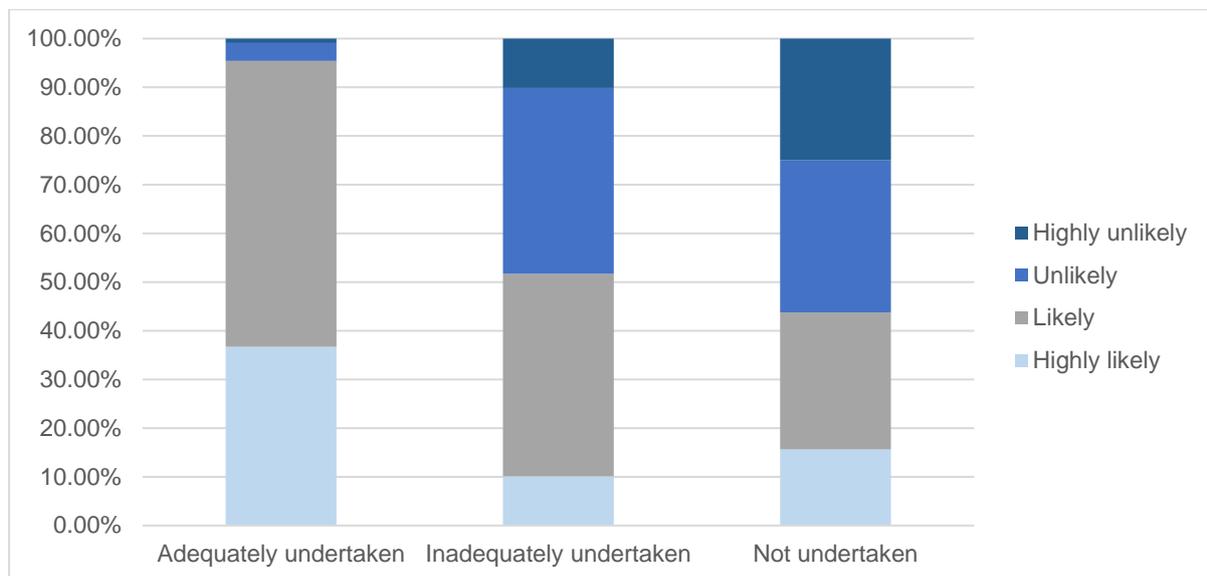
⁴² This is the sum of the total annual costs in Tables 10 and 11.

⁴³ This is the sum of the total Present Value Costs in Tables 10 and 11.

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Hence, the competence of the solution is only assumed if all steps are adequately followed in the process. Amendments to the NCC would ensure expectations are clear about documenting what consultation with stakeholders was undertaken and what acceptance criteria was agreed. Comparing 'likely' or 'highly likely' responses to the question of how likely a process was to meet the NCC Requirements, shows these reduce significantly where 'inadequate' or 'not undertaken' steps were nominated. 'Highly unlikely' responses more than double in proportion. This is shown by Figure 2.

Figure 2 Reported likelihood of a solution meeting the Performance Requirements of the NCC, grouped by response to adequacy of steps



Source: ABCB Survey, 2019

When a Performance Solution is proposed, acceptance criteria must be developed in order to analyse the outcome of the design. The relationship between the acceptance criteria and the relevant Performance Requirements is often a matter of engineering and professional judgement. As a condition of developing a Performance Solution, clearly articulating the steps undertaken will benefit regulatory authorities who rely on the documented process when auditing the adequacy of the solution. State and territory governments will also benefit from not maintaining separate legislation and guidance material.

In the case of widespread system failure, governments are often left as the insurer of last resort.⁴⁴ Therefore, improving the process reduces government's exposure to private risk.

Option 3 Restrict the application of the solution to fire and structure

This option would require that all Performance Solutions relating to fire and structure use the ABCB's Performance Solution process when formulating and approving Performance Solutions. The process would be referenced in the Governing Requirements of all Volumes of the NCC and be specific to Performance Solutions relating to life-safety.

Qualitative Costs

This option would impose similar costs to Option 2. However, there is likely to be a need for separate guidance, education and training material depending on the industry targeted. Inconsistency with the long-stated position of the ABCB and education material produced to date is likely to lead to misinterpretation by NCC practitioners by giving tacit recognition to not needing to properly document Performance Solutions for non-life safety matters.

Transparency in decision making and stakeholder agreement to acceptance criteria is already a component of some VMs outside of fire and structure. It could create some confusion if this were to appear no longer necessary. A key feature of this measure is to contribute to changing industry culture in the use of a performance-based code, made more difficult if it is either implicitly or explicitly acknowledged that some Performance Solutions do not need to be properly developed and documented.

⁴⁴ Australian Financial Review (2019) Federal government must lead on building insurance crisis, PCA says. See: <https://www.afr.com/property/commercial/federal-government-must-lead-on-building-insurance-crisis-pca-says-20190628-p52271>

Quantitative Costs

The costs of this option will be a subset of the costs of Option 2. It is not known with certainty the proportion of fire and structural solutions. As the proposed process has its origins in engineering, the degree of use in this area would be expected to be higher and the most commonly nominated area where Performance Solutions were used by respondents to the survey.

Examining the proportion of 'adequate' responses where fire and structure were nominated by respondents suggests adequacy in this area is not significantly higher. The value of fire Performance Solutions is also on average likely to be higher.

As such, this analysis assumes that 80% of all Performance Solutions relate to fire and structure.

Should this assumption hold, the annual cost of this option would be \$9,406,310 or \$70,690,604 in Present Value terms using a discount rate of 7% over 10 years.

Benefits

The amendment of the Governing Requirements will provide a clearer indication of government expectations as to compliance with the process for practitioners to follow and governments or third parties to enforce. The proposed changes will therefore better reflect government and community expectations when a Performance Solution is developed. Consistent with the survey feedback, by following the process there is a much better chance that Performance Solutions will comply with the NCC's Performance Requirements and that the building meets community expectation in terms of safety.

In the case that a complaint is lodged or where there is an issue with a building limited to fire or structural safety, governments will have access to documentation for the purpose of auditing and determining compliance with the NCC's Performance Requirements.

Over time and combined with other measures, this should result in improved building outcomes, reducing costs of rectification and disputation, lifting confidence in the

industry and potentially assist in lowering professional indemnity insurance for practitioners.

Break-Even Analysis

There is limited evidence to indicate the extent of the problem in monetary terms. With the information that is available, it is limited to problems associated with external cladding. In these circumstances a break-even analysis can be helpful to indicate the reasonableness or otherwise of the possible benefits of the options.

A break-even analysis calculates the benefits needed to equal the costs using a key assumption. In this case the key assumption is the number of buildings that require rectification and the costs associated with that rectification. Benefits are calculated by multiplying the key assumption by a frequency over a forty-year period to determine the Present Value benefit required to offset the Present Value cost.

The number of buildings required to avoid rectification work per year for the calculated benefits to equal or exceed the costs for both options is shown in Table 12 for residential buildings and Table 13 for commercial buildings.

Table 12 Break-even analysis for residential buildings

	Present Value Costs	Annual number of rectification work required to be avoided
Option 2	\$39,794,418	3.8
Option 3	\$31,835,534	3

Notes:

1. Present Value costs calculated using a 7% discount rate over a ten year period.
2. Required Present Value benefits calculated using a 7% discount rate over a forty-year period.
3. Costs of rectification based on full replacement cost of external façade.
4. Option 3 calculated based on the assumption that structure and fire account for 80% of all Performance Solutions.

Table 13 Break-even analysis for commercial buildings

	Present Value Costs	Annual number of rectification work required to be avoided
Option 2	48,568,842	1.2
Option 3	38,855,074	1

Notes:

1. Present Value costs calculated using a 7% discount rate over a ten year period.
2. Required Present Value benefits calculated using a 7% discount rate over a forty-year period.
3. Costs of rectification based on full replacement of sole-occupancy units (SOUs within Class 2 buildings).
4. Option 3 calculated based on the assumption that structure and fire account for 80% of all Performance Solutions.

As can be shown by the above tables, a small number of buildings (less than 0.008% of annual building constructed) are required in order for the costs to equal the benefits. That is, 5 dwellings for Option 2 and 4 dwellings for Option 3.

There is insufficient data to include other commercial building types in the break-even analysis. However, these break-even thresholds would be lower if new commercial buildings (offices, retail buildings etc.) and industrial buildings (warehouses, factories, etc) were taken into account.

Sensitivity Analysis

This section examines the sensitivity of the quantitative analysis to variations in key assumptions underpinning the aggregate gross impact analysis. The sensitivity analysis has been conducted on three areas noting:

- A real discount rate of 7% has been used in the quantitative analysis and sensitivity will be tested from a lower bound of 3% to an upper bound of 11%.
- The cost of rectification could vary depending on size and use of the building. The sensitivity analysis will test a variance of $\pm 30\%$.
- The proportion of building approvals utilising Performance Solutions may also vary. The sensitivity analysis will test a lower and upper bound for residential and commercial buildings.

Table 14 Sensitivity analysis – Residential

Sensitivity	Option 2 - Cost	Option 2 – Break-even	Option 3- Cost	Option 3 – Break-even
Lower bound discount rate (3%)	\$46,523,923	2.3	\$37,219,138	1.8
Upper bound discount rate (11%)	\$34,614,765	5.5	\$27,691,812	4.4
Lower bound rectification costs (-30%)	\$39,794,418	5.4	\$31,835,534	4.3
Upper bound rectification costs (+30%)	\$39,794,418	3.0	\$31,835,534	2.4
Lower bound number of residential Performance Solutions (1%)	\$13,264,806	1.3	\$10,611,845	1.0
Upper bound number of residential Performance Solutions (5%)	\$66,324,030	6.3	\$53,059,224	5.0

The sensitivity analysis for residential buildings shows that between 1 and 6.3 dwellings are required to avoid rectification work (full replacement of cladding and substantial replacement of timber framing) per year for the benefits to equal the costs. These rates of avoidance are small and plausible under the status quo.

Table 15 Sensitivity analysis – Commercial

Sensitivity	Option 2 - Cost	Option 2 – Break-even	Option 3- Cost	Option 3 – Break-even
Lower bound discount rate (3%)	\$56,782,162	0.7	\$45,425,730	0.6
Upper bound discount rate (11%)	\$42,247,108	1.7	\$33,797,686	1.4
Lower bound rectification costs (-30%)	\$48,568,842	1.7	\$38,855,074	1.4
Upper bound rectification costs (+30%)	\$48,568,842	0.9	\$38,855,074	0.7
Lower bound number of Performance Solutions (5%)	\$16,189,614	0.4	\$12,951,691	0.3
Upper bound number of Performance Solutions (25%)	\$80,948,070	2	\$64,758,456	1.6

The sensitivity analysis for commercial buildings shows that between 0.3 and 2 apartment buildings (containing 12 SOUs or more) are required to avoid rectification work per year for the benefits to equal the costs. These rates of avoidance are also small and plausible under the status quo.

Consultation Questions:

- Are there any other qualitative costs and benefits to consider under each option?
- Are there any other quantitative costs and benefits (e.g. reductions in insurance premiums) to consider under each option?
- Do you have any examples of costs associated with rectification work where a Performance Solution was developed inadequately?
- Do you have any examples of costs associated with rectification work where a component of the Performance Solution process was not followed?
- In absence of better information, do you agree with the cost of rectification estimates outlined in Table 9 relating to weatherproofing?
- Do you agree that the benefits will outweigh the costs under each option?

Effectiveness of all Options

The impacts of alternative options have been considered on the basis of full compliance. However, overall effectiveness will be influenced by the extent of behavioural change and other administrative processes (e.g. education, auditing and enforcement).⁴⁵

Enforcement

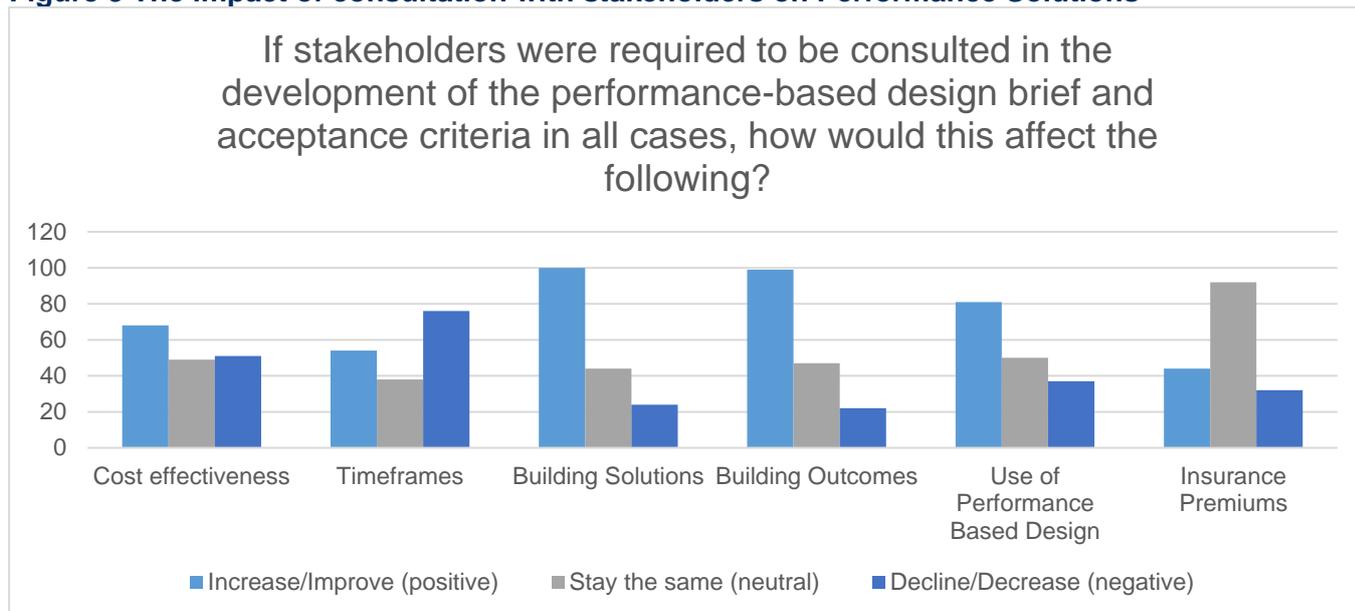
A broadly applied process (Option 2) is expected to be simpler to communicate, educate and enforce. It is also supported by existing guidance and supporting materials. Option 3 would provide clarity around what steps were required and the level of documentation practitioners are expected to produce for fire and structure. As amendments are principle-based, industry is likely to require guidance information, templates and examples to aid interpretation. Yet providing exemptions for other areas (Option 3) could infer no process is required. This would be an unintended consequence.

Changing behaviour

Under all options it is acknowledged that there are degrees of flexibility that reduces the effectiveness of the process. The extent that guidance has been effective under the status quo is reflected in the problem. Both regulatory options could be expected to increase the effectiveness of guidance. Under Option 2, the scaling of the process against a solution is intended to be managed through stakeholder consultation. This is where the majority of survey respondents felt building outcomes would positively change, as shown in Figure 3.

⁴⁵ Enforcement is a function of state and territories and generally delegated to private certifiers.

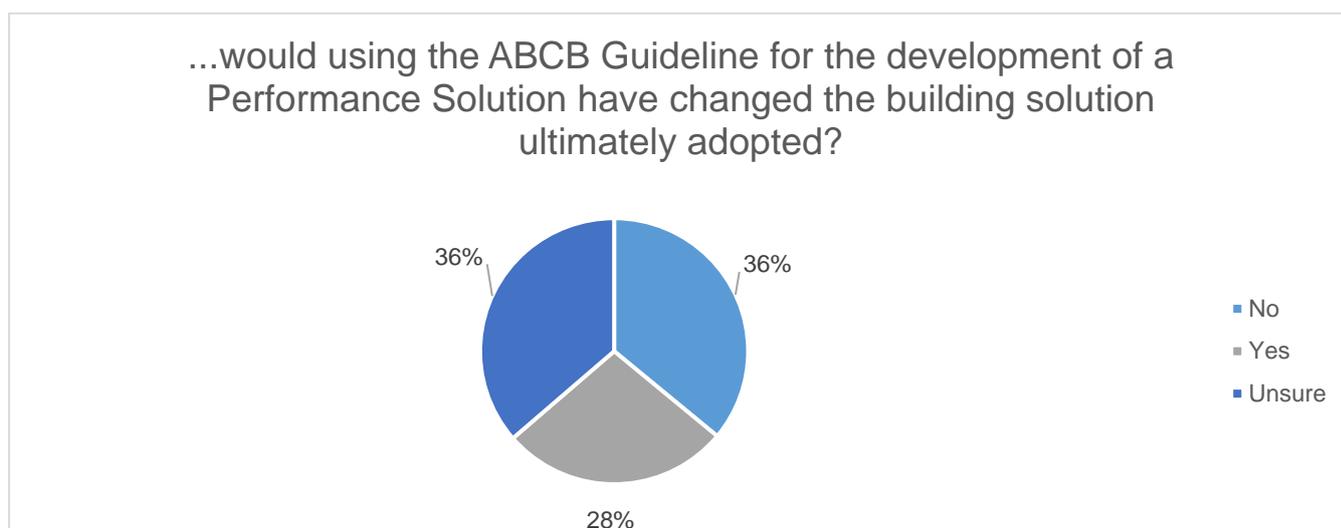
Figure 3 The impact of consultation with stakeholders on Performance Solutions



Source: ABCB Survey, 2019

There was no clear agreement between responses when respondents were asked if using the ABCB Guideline for the development of a Performance Solution would have changed the building solution ultimately adopted. This is shown in Figure 4 below. The only sector where the majority responded that this would be the case was 'Government'.

Figure 4 The impact of the ABCB Guideline



Source: ABCB Survey, 2019.

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Where limited to life safety matters (to the extent Performance Solutions are able to be classified as fire and structural solutions) effectiveness may increase under Option 3. However, it may undermine a degree of voluntary compliance in other areas under the status quo for the reasons outlined above.

Consultation Questions:

- Do you believe that better building outcomes will be achieved by making changes to the Performance Solution process?
 - Why or why not?

Unintended Consequences

The goal of this proposal is to ensure that the right balance between process and flexibility is achieved. This goal is aimed at enhancing the use of Performance Solutions while safeguarding the public against the inherent risks of insufficient process and documentation when they are developed.

In some states and territories the accreditation of certifiers to approve Performance Solutions is limited, which may constrain their wider use. In all cases, the analysis assumes certifiers are operating within their area of expertise. If there is a culture of operating outside their expertise, the proposed changes will contribute to revealing and correcting this culture through greater documentation and auditing ability.

Option 3 proposes to limit the application of the process to 'life safety issues', assumed to be fire and structure. However, Performance Solutions that seek objectives such as access and energy efficiency have also been shown to have the potential to significantly impact life safety. Given the inter-reliance of the Performance Requirements, classifying Performance Solutions as life safety or fire and structure would require further amendments to guidance and could create some confusion, disagreement and delay.

Regulatory Burden

The Australian Government has introduced the 'Guide to Regulation', which discusses the importance of cutting red tape.

A key principle for Australian Government policy makers in the Guide to Regulation is that:

The cost burden of new regulation must be fully offset by reductions in existing regulatory burden.

All regulatory costs, whether arising from new regulations or changes to existing regulation, must be quantified using the Regulatory Burden Measurement framework. The framework must also be used for quantifying regulatory savings, where applicable.

As measured in accordance with the framework, the regulatory cost from implementing Option 2 would be \$8,363,326.⁴⁶ The Commonwealth's share of this would be \$981,814.⁴⁷ Note, no exclusion has been made on government-to-government regulatory costs. That is, excluding the regulatory burden costs associated with local government building certifiers. This decision has been made on the basis that excluding local government certifiers from the RBM framework would not materially impact the calculated costs.

Governments of the states and territories are not required under COAG policy to identify regulatory offsets. Some jurisdictions may have their own mechanisms regarding regulatory offsets, which would be a matter for those jurisdictions to consider.

⁴⁶ This has been calculated by annualising the Present Value of Option 2 in accordance with the RBM framework.

⁴⁷ This has been calculated by dividing the annual burden by nine and reflects the Commonwealth's contribution to the decision.

Consultation

There has been widespread acceptance from the stakeholders consulted of the need for a consistent process to be followed when developing and documenting Performance Solutions.

Over the past 5 years, as part of the ABCB's Increased and Competent Use of Performance project, the ABCB has been directly consulting with industry and governments on ways to improve the use of the performance-based NCC and the uptake of performance-based design. In addition to the quantification of all Performance Requirements, much of the consultation has focused on the appropriate methods of analysis, decision and documentation. The existing guidance document developed as part of this project has received the full support of industry and governments. There is also widespread agreement from the stakeholders consulted that industry needs to do more to demonstrate the processes followed when developing Performance Solutions.

In 2002, some stakeholders were concerned about the processes used for performance-based fire safety solutions. In response, the ABCB in collaboration with the key stakeholders delivered a national seminar series in all capital cities to promote the use of the processes outlined in the International Fire Engineering Guidelines. The central message was that the development, analysis, stakeholder engagement and documentation of Performance Solutions is critical to the process.

In 2015, stakeholders again expressed concern that the appropriate process was still not being used for the development of fire safety Performance Solutions. In response, the ABCB delivered panel sessions in all capital cities on the importance of the process.

Industry has been directly consulted during the development of all performance-based design guidance documents and feedback has been sought on the process of developing Performance Solutions during a number of education seminars.

Both the Board and Building Ministers Forum (BMF) were consulted on the need for further direction on the development of Performance Solutions. The impact that

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guidance material has had on improving the processes applied, as evidenced by its uptake, indicates there is a residual gap in regulation and enforcement. The Board and the BMF subsequently agreed to the BCR National Framework, including changes to the NCC's Governing Requirements, being consulted on as part of the public consultation on the NCC's 2019 out-of-cycle amendment. Consultation occurred between 23 September and 11 October 2019 and feedback on these changes were considered in the development of this RIS.

Information and data was separately sought from state and territory building administrations on the use of Performance Solutions to inform this assessment. To address uncertainties, the ABCB's national technical committees, the Building Codes Committee and Plumbing Code Committee, reviewed this analysis and its assumptions. They were specifically asked to consider the:

- costs of Performance Solutions (total fees);
- extent Performance Solutions are used in the commercial and residential sectors;
- if the value of (qualitative) benefits are likely to exceed the costs;
- the effectiveness of the proposal; and
- any unintended consequences.

Their feedback has been taken into consideration in the preparation of this analysis and its options, particularly the preference of some to restrict the application of the changes to fire and structure Performance Solutions (Option 3). The extent to which Performance Solutions should be applied, particularly in relation to commercial buildings and plumbing applications, was questioned. However, this is an issue of enforcement, not the specific problem that this proposal seeks to address.

This is a consultation document where interested parties are invited to provide comment on any matter raised in this Consultation RIS. Respondents are encouraged to address the Consultation Questions to assist in the development of the Final RIS.

Comments on this Consultation RIS are invited by close of business 22 March using the ABCB consultation platform, Citizen Space.

The ABCB believes meaningful consultation can promote trust between industry, the community and government. Transparency allows stakeholders to see and judge the

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quality of government actions and regulatory decisions. Consultation also provides an opportunity for stakeholders to participate in the development of policy solutions and encourages broad ownership of those solutions. For more information on the ABCB's consultation philosophy and objectives, visit the ABCB Consultation Hub (<https://consultation.abcb.gov.au/>).

Conclusion

Where no action is taken to formalise the principles of an agreed process, the problem described in this RIS will continue. A lack of transparency in documentation has brought into question the ability for a performance-based code to meet community expectations. The continuation of a performance-based regulatory system relies on confidence in its use and clarity in the principles for the development of Performance Solutions.

Currently, processes and documentation are developed to meet a patchwork of state obligations or voluntary adherence with principles of guidance. When measured against the ABCB Guideline, a proportion would be incomplete or inadequate and feedback suggests, for these Performance Solutions, the likelihood of meeting the NCC would be lower.

Both Option 2 and Option 3 will impose costs of \$88,363,259 and \$70,690,607 respectively in Present Value terms. The extent of their impact will be in proportion to the extent current processes are considered inadequate and result in behavioural change. The magnitude of impacts (both costs and benefits) are subject to uncertainty, particularly around the extent of use⁴⁸ and the degree to which the process is currently followed.

If the survey responses are representative of current behaviour, around half of all Performance Solutions in use could be impacted to varying degrees. The costs are considered small in the context of the potential benefits of achieving the objective of adequately demonstrating compliance with the NCC in a nationally consistent manner. This is reaffirmed by the results of the break-even analysis, which shows that given the potential costs of rectification, few avoided failures would be required to offset the costs each year.

Option 3 limits both costs and the ability to fully achieve the objective. There are also likely to be difficulties practically defining 'life safety' issues leading to misattribution,

⁴⁸ The extent Performance Solution process followed is dependent on enforcement.

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debate on its legitimate application or the unintended consequence of a retreat from current (adequate processes) in areas other than fire and structure.

Stakeholder consultation suggests clarity in roles and expectations, building solutions and outcomes improve the closer the proposed process is observed. The conclusion is, therefore, that Option 2 would be most effective at addressing the problem and therefore deliver the highest (qualitative) benefits. As such, Option 2 is the recommended option of this Consultation RIS.

Implementation

If decision makers support changes to the NCC, the provisions outlined in Attachment A will be included in Amendment 1 of NCC 2019. Decision makers will consider the need for transitional arrangements with regard to the responses received to this Consultation RIS. Transitional periods typically occur for 12 months in some States and Territories.

Consultation Questions:

- If proposed changes are adopted, should a 12 month transitional period be included prior to its implementation?

Attachment A

Part A2 Compliance with the NCC

A2.2 Performance Solution

- (1) A *Performance Solution* is achieved by demonstrating—
 - (a) compliance with all relevant *Performance Requirements*; or
 - (b) the solution is at least *equivalent* to the *Deemed-to-Satisfy Provisions*.
- (2) A *Performance Solution* must be shown to comply with the relevant *Performance Requirements* through one or a combination of the following *Assessment Methods*:
 - (a) Evidence of suitability in accordance with *Part A5* that shows the use of a material, product, *plumbing* and *drainage product*, form of construction or design meets the relevant *Performance Requirements*.
 - (b) A *Verification Method* including the following:
 - (i) The *Verification Methods* provided in the NCC.
 - (ii) Other *Verification Methods*, accepted by the *appropriate authority* that show compliance with the relevant *Performance Requirements*.
 - (c) *Expert Judgement*.
 - (d) Comparison with the *Deemed-to-Satisfy Provisions*.
- (3) Where a *Performance Requirement* is satisfied entirely by a *Performance Solution*, in order to comply with (1) the following method must be used to determine the *Performance Requirement* or *Performance Requirements* relevant to the *Performance Solution*:
 - (a) Identify the relevant *Performance Requirements* from the Section or Part to which the *Performance Solution* applies.
 - (b) Identify *Performance Requirements* from other Sections or Parts that are relevant to any aspects of the *Performance Solution* proposed or that are affected by the application of the *Performance Solution*.

Note to pre-publication draft:

Inclusion of A2.2(4), including its accompanying note and explanatory information, in this amendment is subject to consideration of impact analysis that is yet to be completed.

- (4) Where a *Performance Requirement* is proposed to be satisfied by a *Performance Solution*, the following steps must be undertaken:
 - (a) Prepare a *performance-based design brief* in consultation with relevant stakeholders.
 - (b) Carry out analysis, using one or more of the *Assessment Methods* listed in (2), as proposed by the *performance-based design brief*.
 - (c) Evaluate results from (b) against the acceptance criteria in the *performance-based design brief*.

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- (d) Prepare a final report that includes—
- (i) all *Performance Requirements* and/or *Deemed-to-Satisfy Provisions* identified through A2.2(3) or A2.4(3) as applicable; and
 - (ii) identification of all *Assessment Methods* used; and
 - (iii) details of steps (a) to (c); and
 - (iv) confirmation that the *Performance Requirement* has been met; and
 - (v) details of conditions or limitations, if any exist, regarding the *Performance Solution*.

Note:

A2.2(4) does not take effect until 1 June 2021.

Explanatory information:

...

More information on NCC compliance methods is located at www.abcb.gov.au.

A2.4(2)(a) references A2.2. Therefore when using a combination of *Performance Solutions* and *Deemed-to-Satisfy Solutions* it is necessary to comply with A2.2(4) where a *Performance Requirement* is proposed to be satisfied by a *Performance Solution*.