



**National
Construction
Code**

Handbook



Upgrading existing buildings



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Preface

The Inter-Government Agreement (IGA) that governs the Australian Building Codes Board (ABCB) places a strong emphasis on reducing reliance on regulation, including consideration of non-regulatory alternatives such as non-mandatory handbooks and protocols.

This handbook is one of a series produced by the ABCB in response to comments and concerns expressed by government, industry and the community that relate to the built environment. The topics of handbooks expand on areas of existing regulation or relate to topics which have, for a variety of reasons, been deemed inappropriate for regulation. They provide non-mandatory advice and guidance.

The Upgrading Existing Buildings Handbook assists a range of stakeholders in understanding the application of the performance-based National Construction Code (NCC), as well as the relationship between the NCC and respective state and territory legislative systems. Typically, legislative systems require compliance with the NCC for construction of new buildings and new work to be undertaken on existing buildings.

It has been developed in response to government and industry request for guidance on the potential application of the NCC in relation to upgrading existing buildings, specifically buildings classified as Class 2 to 9 (in the building classification provisions of the NCC Governing Requirements).

This document addresses issues in generic terms, it does not provide prescriptive solutions to building specific issues. It is expected that this handbook will be used to guide solutions to specific situations in accordance with the generic principles and criteria contained herein.

It should also be noted that this handbook represents the views of the ABCB and that alternative means of developing proposals for upgrading existing buildings may achieve, at least, an equivalent outcome.

Acknowledgements

The ABCB acknowledges the valuable contribution made by respective state and territory administrations on the scope and content of this handbook.

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REMINDER

This handbook is not mandatory or regulatory in nature and compliance with it will not necessarily discharge a user's legal obligations. The handbook should only be read and used subject to, and in conjunction with, the general disclaimer at page i.

The handbook also needs to be read in conjunction with the relevant legislation of the appropriate state or territory. It is written in generic terms and it is not intended that the content of the handbook counteract or conflict with the legislative requirements, any references in legal documents, any handbooks issued by the Administration or any directives by the appropriate authority.

1 Background

The NCC is a performance-based code containing all Performance Requirements for the construction of buildings. A building, plumbing or drainage solution will comply with the NCC if it satisfies the Performance Requirements, which are the mandatory requirements of the NCC. To comply with the NCC, a solution must achieve compliance with the Governing Requirements and the Performance Requirements. The Governing Requirements contain requirements about how the Performance Requirements must be met.

This document was developed to assist practitioners with the development of a suitable scope of remedial work for upgrading an existing building.

State and territory legislation prescribe various circumstances under which an existing building may be assessed for conformity with the Performance Requirements of the NCC. Circumstances include where the use of the building is to be changed, where building work is proposed to be undertaken on the existing building, or where the building may be unfit for occupation. This handbook does not consider under which of these circumstances the existing building is being assessed.

1.1 Scope

The handbook is structured to first provide the reader with an understanding of important terms and terminology used in NCC Volume One and then an overall introduction to the concept of applying the NCC to upgrading existing buildings.

Further reading on this topic can be found with the references located in the body of this document.

1.2 Design and approval of Performance Solutions

The design and approval processes for the upgrading of existing buildings is likely to be similar to the process for demonstrating compliance of NCC Performance Solutions. The design approval process for Performance Solutions varies between the responsible state and territory governments. Therefore, the requirements and

approval process for upgrading of existing buildings will vary across jurisdictions and should be checked with the relevant jurisdiction.

Notwithstanding the quantified input and acceptance criteria, other qualitative aspects of the upgrading of existing buildings, which are discussed in this document, require assessment and analysis throughout the design and approval process. The advice of an appropriately qualified person should be sought to undertake this assessment and analysis where required, and may be aided by the early and significant involvement from regulatory authorities, peer reviewer(s) and / or a technical panel as appropriate to the state or territory jurisdictions.

1.3 Using this document

General information about complying with the NCC and responsibilities for building and plumbing regulation are provided in Appendix A of this document.

Acronyms used in this document are provided in Appendix B.

A bibliography is also provided.

Different styles are used in this document. Examples of these styles are provided below:

NCC extracts

Examples

Alerts

Reminders

2 Introduction to existing buildings

In 2012, the Australian Bureau of Statistics reported that new buildings comprise approximately 2% of the nation's total building stock in any one year.

With the passage of time, technical requirements for the design and construction of buildings have evolved, producing the potential for existing buildings to become non-compliant with current provisions.

While some technical reforms have resulted in more conservative requirements, others have resulted in less conservative requirements. Therefore, it is reasonable to assert that components of existing buildings may not comply with current Deemed-to-Satisfy (DTS) Provisions, but could equate to, or possibly exceed, current Performance Requirements.

Therefore, non-compliance with contemporary DTS Provisions should not be an indicator that an existing building is not fit for purpose.

To address the risks that may arise from existing buildings not complying with current Performance Requirements, state and territory legislative regimes typically include provisions that can be applied by authorities to initiate a technical evaluation of whether an existing building is fit for purpose.

The method used to conduct such an evaluation will be critical to achieving a cost-effective scope of work that will enable an existing building to perform adequately.

In consideration of the diversity and uniqueness of existing buildings, it would not be feasible to impose a generic technical solution for upgrading that was simply based on characteristics such as building classification, floor area, or similarly broad criteria.

Additionally, to accommodate the variety of design and construction characteristics reflected within individual buildings, a generic technical solution would need to be conservative and therefore, expensive to apply, particularly for buildings that could be justifiably assessed as being of low risk.

Consequently, a balanced approach needs to be taken when assessing an existing building and subsequently, when developing a proposed scope of remedial work.

A process for achieving a balanced scope of work is presented in Section 3.1 of this handbook.

Alert: Legislation governing building work

Under Australia's constitution, governance of the built environment is the responsibility of individual state and territory governments. State and territory specific requirements are addressed in Appendices Appendix C and Appendix D.

3 Scoping proposed work

When developing a proposed scope of work for a new building, designers are able to select the most appropriate means of achieving compliance with the NCC, i.e. via (i) development of Performance Solutions, or (ii) compliance with applicable DTS Provisions, or a combination of (i) and (ii). Similarly, a process for determining whether an existing building is fit for purpose should enable equal flexibility to be applied.

The primary difference between these two processes is that a designer can take an almost unbounded approach to preparing a comprehensive scope of work for a new building and subsequently have the proposal assessed to establish whether it complies with respective Performance Requirements.

However, in the case of developing a required scope of work to ensure an existing building complies with respective Performance Requirements, a designer will initially need to assess the performance of the existing building. This is required to identify potential deficiencies and subsequently prepare a proposed scope of work to alleviate those deficiencies in a manner that maximises the strengths of the building.

A five step process to facilitate such an outcome is outlined below.

Alert:

State and territory specific requirements are addressed in Appendices Appendix C and Appendix D.

3.1 A five step process

The process described below enables due credit to be given to identified strengths of the building and due consideration to be given to identifying the most cost-effective means of alleviating, to the degree necessary, any identified weaknesses.

Figure 3.1 Five step process for scoping proposed new work



Due to the number and complexity of professional judgements involved in applying this process, it is recommended that it be undertaken by suitably qualified and experienced practitioners. This could include those practitioners that state and territory legislation empowers to develop and/or approve Performance Solutions.

If the upgrading of existing buildings is likely to be an ongoing component of a practitioner’s business activity, it may be beneficial to develop a template for recording the outcomes of the respective steps. The structure of documentation used to complete this task should be based on individual preferences. However, a simple structure may be developed by replicating the NCC Performance Requirements within the template, which can then be used to make notes against the applicable Performance Requirements.

Prior to commencing the process, consideration should be given to the extent of stakeholder consultation that will need to be undertaken to produce a successful outcome from each of the five steps. See Section 3.1.4.3.

An outline of the individual steps in the recommended process is provided below.

3.1.1 Step 1 – Locate related documentation

The purpose of Step 1 is to locate any documentation that may provide information relating to the original design, approval and construction of the building, as well as any subsequent additions and alterations.

Relevant documentation includes –

- building approval records
- architectural design plans
- structural design plans
- building services plans
- construction specifications
- building maintenance records
- heritage listings
- planning controls and records.

Potential sources of documentation include the –

- building's owner
- building's designer
- relevant approval authority
- relevant local government authority.

Access to documentation held by local government authorities may be limited.

A successful outcome from this exercise can significantly reduce the amount of work required to complete the on-site inspection described in Step 2. Regardless, it should not be assumed that existing construction will in all instances align with that described in the design documentation.

Prior to commencing Step 2, the template may be populated with initial data derived from Step 1.

3.1.2 Step 2 – Undertake an on-site inspection

The purpose of Step 2 is to identify and document the design and construction characteristics of the building that relate to current Performance Requirements.

When working on an existing building in which the purpose (use) of the building is proposed to be changed, or significant ‘additions or alterations’ are to be undertaken, it will be necessary to document design and construction characteristics relating to Performance Requirements that would apply to the proposed activity.

The text of applicable Performance Requirements will provide guidance on the characteristics of an existing building that need to be recorded during a site inspection, e.g. Performance Requirement CP2, Spread of fire, lists eleven topics that need to be considered when developing a Performance Solution.

If appropriate documentation was not located via Step 1, the scope of investigation required under Step 2 may be substantial.

During the conduct of Step 2, the correctness of documentation obtained via Step 1 should also be evaluated.

Relevant characteristics of an existing building can be determined in various ways, some of which are simple, e.g. an external masonry wall can be readily identified by basic observation. However, the thickness of the wall may not be readily identified. Similarly, the existence of an air-conditioning system may be readily evident. However, the capacity of the system, or its mode of operation in the event of fire in the building, may not be readily identifiable.

In some instances, it may be necessary to undertake a degree of de-construction (with the building owner’s consent) to establish a level of performance of certain building elements.

When identification of a relevant characteristic can be made visually, photography can be an efficient means of documenting building characteristics. This will typically prove to be beneficial as a means of subsequently exchanging information with stakeholders who have not participated in on-site inspections of a building.

The results of Step 2 will be a record of those characteristics of the building that are the subject of respective Performance Requirements.

3.1.3 Step 3 – Compare expected performance

The purpose of Step 3 is to compare the performance of the existing building with the relevant Performance Requirements, using the document prepared via Step 2.

The product of Step 3 will be a documented comparison of the expected performance of the existing building against any relevant Performance Requirements for new buildings and the identification of potential deficiencies.

When performing this task, consideration should be given to the existing building's inherent strengths and inherent weaknesses. This will determine whether its strengths are sufficient to compensate for its perceived weaknesses, or whether there is a need for remedial work to be undertaken to achieve an appropriate balance.

When inherent strengths are deemed to be insufficient to compensate for weaknesses, a compensating scope of work can be established via Step 4 activities.

Based on an assumption that potential upgrade work may comprise one or more Performance Solutions, a comparison of the 'expected performance' of an existing building should be undertaken against the requirements of A2.1 of the NCC Governing Requirements. As described previously, this provision describes the means by which Performance Requirements can be satisfied, i.e. where a relevant Performance Requirement is not met by the existing building solution, the design of any upgrading work will have to include work that will address any gaps in performance; either by a Performance Solution, a DTS Solution or a combination of both.

The Performance Requirements of the NCC address numerous aspects of design and construction, such as structural design, fire safety, access and egress, ventilation, lighting and energy efficiency. Subject to the number of potential deficiencies identified in a building, it may not be feasible for an individual practitioner to determine whether a particular characteristic of an existing building complies with the respective Performance Requirements.

Therefore, depending on the outcomes of Step 2 and the perceived complexity of the project, it may be appropriate for Step 3 to be undertaken via -

- (a) suitably qualified and experienced individuals
- (b) stakeholder consultation, or
- (c) a combination of (a) and (b).

Once a determination is made that a particular characteristic does comply with all relevant Performance Requirements, no further analysis is required.

However, when a determination is made that a particular characteristic does not comply with the relevant Performance Requirements, or where a practitioner is uncertain whether a particular characteristic exists or is relevant, that characteristic should be identified as a 'potential deficiency' for consideration via supplementary processes outlined in Step 4.

3.1.4 Step 4 – Identify actual deficiencies

The purpose of Step 4 is to assess whether a potential deficiency identified in Step 3 is an actual deficiency. Assessment Methods described in A2.2(2) and A2.3(2) of the NCC may assist in determining whether a potential deficiency is an actual deficiency.

At this stage of the process it is necessary to specify the goal(s) of the upgrade work, because this can influence the proposed scope of work. Potential goals may include -

- to comply with an Order issued by a regulatory authority; or
- to voluntarily upgrade a building to comply with the NCC; or
- to ensure the building is safe for the occupants.

Once the goals of the project are established it will be necessary to determine the most appropriate process to develop a scope of work that accommodates these goals.

The optimum method of undertaking Step 4 will be influenced by issues such as the -

- complexity of the project
- importance of actual deficiencies
- any stakeholder consultation process.

3.1.4.1 Complexity of the project

The complexity of a project can be significantly influenced by the number and the type of identified 'deficiencies'. As an example, consider the most efficient means of upgrading a timber portal-framed warehouse in which the following are deemed to be actual deficiencies:

- the structural performance of the existing frame if exposed to fire
- the fire resistance of building elements
- occupant travel distances to an exit.

In consideration of these 'deficiencies' and the assumption that, potentially, each could be adequately addressed by the suppression of fire, it may be reasonable to propose that all could be addressed by a single fire safety measure, such as the installation of an appropriate fire sprinkler system.

However, if three different actual deficiencies had been identified, e.g. a fire safety issue, an energy efficiency issue and an issue relating to access for people with a disability, a more complex scope of upgrading work would be necessary.

Similarly, if actual deficiencies in the warehouse were restricted to the structural adequacy of a limited number of key timber elements, it would be reasonable to propose that a more cost-effective solution may be to simply reinforce each deficient element.

3.1.4.2 Importance of identified deficiencies

The importance of identified deficiencies is an essential matter for consideration when determining a scope of upgrading work, i.e. how important is it that compliance is achieved.

It is equally important to acknowledge that compliance with the NCC means compliance with the mandatory Performance Requirements, rather than compliance with the optional DTS Provisions.

While the NCC enables Performance Solutions to be comparable to either the mandatory Performance Requirements or DTS Provisions, it may be beneficial to consider a Performance Solution against the relevant Performance Requirements.

One reason for this is that the level of importance of an identified deficiency may be more readily revealed, particularly for 'non-life threatening' matters of health and amenity, such as the number of sanitary facilities being deemed a deficiency simply because of non-compliance with DTS Provisions.

Another reason for applying this approach is that not all DTS Provisions have been precisely calibrated against respective Performance Requirements and it is possible that some will deliver a different level of performance than that necessary to achieve compliance with a Performance Requirement.

3.1.4.3 Stakeholder consultation

Consultation is a fundamental component of the process of formulating an appropriate scope of work for upgrading an existing building.

As the development, approval and implementation of proposed work will involve more than one stakeholder, the process will require collaboration and negotiation in order to achieve a mutually acceptable outcome.

Consultation between an independent practitioner and other stakeholders should be initiated as soon as possible. However, the stage at which consultation is commenced is a decision for the independent practitioner and may be influenced by the complexity of the project and the knowledge and experience of the particular practitioner.

For simple projects, involving few potential deficiencies, practitioners should at least commence consultation with stakeholders prior to Step 3 decision making regarding the scope of actual deficiencies in a building. For more complex projects, it would be beneficial to initiate preliminary consultation prior to Step 1.

A primary benefit of early consultation is that stakeholders, who will be required to contribute to decision making processes during the course of the project, have an opportunity to express their needs. This could be regarding preferred processes, preferred technical methodologies and the preferred scope of documentation to support future decision making.

To assist the initiation of consultation activities, an ABCB guide to implementing a collaborative approach to development of Performance Solutions, 'Performance Solutions Process' is available on the ABCB website (abcb.gov.au).

3.1.5 Step 5 – Alleviate actual deficiencies

The purpose of Step 5 is to develop a proposed scope of upgrading work that alleviates actual deficiencies identified via Step 4.

When a decision is made under Step 4 that a particular building characteristic does not comply with the relevant Performance Requirements, it is appropriate that the 'actual deficiency' be addressed in accordance with Part A2 of the Governing Requirements. In particular, A2.2(2) and A2.3(2) specifies the Assessment Methods for how Performance Solutions and DTS Solutions may be assessed. Therefore, from the application of these Assessment Methods, potential deficiencies can be assessed, which should result in actual deficiencies being identified.

When determining a scope of remedial work, it is important to note that the work required to demonstrate compliance with respective Performance Requirements may be less than the sum of work required to demonstrate compliance with various DTS Provisions.

As an example, an existing building may have a lower level of passive fire protection and a higher level of active fire protection than that prescribed in DTS Provisions. However, when considering the levels of performance achieved by the existing fire safety measures, it may be considered that the existing active fire safety measures are sufficient to compensate for the lower level of passive protection and, in doing so, be considered to achieve compliance with the respective Performance Requirements.

Verification of the suitability of the existing fire safety system could then be provided via an Assessment Method listed in in A2.2(2)(b) of the NCC Governing Requirements (e.g. by use of computer modelling of the existing system and certification in accordance with A5.2, Evidence of suitability - Volumes One and Two).

For simple projects involving few potential deficiencies, highly experienced practitioners may prefer to undertake Step 5 independently and develop a proposed scope of remedial work prior to consultation with respective approval authorities. However, this process may not prove effective for projects on which a respective approval authority has not contributed to the selection of methodologies required to verify the efficacy of the proposed works.

Consequently, it is recommended that a holistic, comprehensive consultation process be undertaken on all projects in which a future element of uncertainty may arise.

4 Examples of application

To promote an understanding of the five step process described in Section 3, three examples of its potential application are presented below. Each example relates to a specific component of the NCC.

4.1 Fire safety

4.1.1 Introduction

NCC requirements for fire safety facilitate occupant life safety in the event of a building fire and minimise damage to adjacent buildings. Comprehensive protection of a building is not a requirement.

4.1.2 Fire safety systems

A building fire safety system can comprise one or several fire safety measures, each of which may be described as being either a 'passive' or 'active' fire safety measure. Fire safety systems typically perform one, or a combination, of the following –

- warn people of an emergency
- provide for safe evacuation
- restrict the spread of fire
- suppress fire.

Passive fire safety measures perform without changing their state when initially exposed to fire. These measures include –

- non-combustible building elements
- fire-resisting building elements
- fire protective coverings
- building elements that resist the incipient spread of fire
- fire resisting doors
- fire resisting windows
- fire hazard properties of materials
- smoke proof doors

- unimpeded open-space
- fire brigade access.

Active fire safety measures perform when they are activated by the detection of heat, smoke or specific gases, or they are used manually to actively suppress a fire.

These measures include –

- smoke alarms
- smoke detectors
- sprinkler systems
- fire hose reels
- fire hydrants
- fire extinguishers
- fire retardant coatings.

While existing buildings would be expected to contain a combination of fire safety measures, they may not contain the same scope of measures as would be expected in a contemporary building of the same classification and size. This outcome may well be a product of historic building codes tending to rely on passive fire safety measures to a higher degree than current NCC DTS Provisions.

As an example, under prescriptive building codes in place prior to the Building Code of Australia (BCA), fire sprinkler systems were not required to be installed until a building had an effective height greater than 42 m; whereas the current DTS Provisions requirement applies to buildings with an effective height greater than 25 m.

However, the fact that an existing building with an effective height of 35 m does not have a fire sprinkler system is not an indicator that the building is unsafe; for it may have a higher level of inherent passive fire safety measures than an equivalent contemporary building.

Consequently, the combination of passive and active fire safety measures within this existing building may be sufficient to comply with respective Performance Requirements.

4.1.3 Applying the five step process

When applying the five step process described in Section 3, the following information could be considered with regard to fire safety.

Step 1 - Locate related documentation

Common sources of information are –

- original building approval documents, typically located at the respective local government authority
- ongoing building maintenance documents, typically located at the respective building or at the respective local government authority.

Documentation relating to ongoing maintenance of a building will typically list the installed fire safety measures that are required to be maintained.

For this case study, it is assumed that no documentation relating to the building can be identified. However, it is likely to require an increased scope of work to complete Step 2.

Step 2 - Undertake an on-site inspection

The primary Performance Requirements relating to building fire safety are located in Sections C, D, E and G of NCC Volume One.

The text of applicable Performance Requirements will provide guidance on the scope of fire safety characteristics of the existing building that need to be recorded during the site inspection.

Identification of an existing component of a fire safety system can be established by visual inspection, building records or by some degree of de-construction.

For example, to determine the performance of a plasterboard lining it may be necessary to measure the thickness of the lining and to gain access to the back of the panel in order to identify whether it is a fire-rated lining.

Step 3 - Compare expected performance

On the basis that completion of this step is a generic procedure, see Section 3.1.3.

Step 4 - Identify actual deficiencies

There are various methods to compare the actual performance of fire safety measures in an existing building. Methods of assessing compliance with respective Performance Requirements may be derived from the options available in the Assessments Methods listed in A2.2(2) and A2.3(2) the NCC Governing Requirements.

For complex projects involving a number of potential deficiencies in a fire safety system, a common methodology is to undertake computerised mathematical modelling. This process involves modelling key influences on the predicted outcome of a fire event including the -

- building
- building occupants
- building materials and its contents.

Typically, a fundamental relationship for achieving occupant fire safety occurs when mathematical modelling predicts that 'Available Safe Evacuation Time' (ASET) is greater than 'Required Safe Evacuation Time' (RSET), when ASET is multiplied by an acceptable factor of safety.

ASET commences at the time of fire initiation and ceases at the time at which the earliest untenable condition (described below) is predicted to occur. In essence, ASET describes the period available for all occupants of a building to evacuate to a place of safety.

RSET commences at the time of automatic occupant warning of the detection of fire, or at the time a smoke layer of specified thickness is predicted to be visible to occupants of the space in which fire has initiated. It ceases at the time the last occupant is estimated to have reached a place of safety.

Untenable conditions are conditions under which human life is not sustainable. During a building fire, products of combustion will be generated and prolonged exposure to these products can be life threatening. Typical sources of untenable conditions are -

- heat
- smoke (hot gases plus partially burnt material)

- toxic gases (e.g. carbon monoxide and hydrogen cyanide).

A determination of the relationship between ASET and RSET typically involves subjective input data. Therefore, it is recommended that this process be undertaken in conjunction with stakeholder consultation (see 3.1.4.3).

On the basis that any potential upgrading work is proposed to be undertaken, and that the proposed work is to be treated as a Performance Solution, consideration of A2.4 A combination of solutions, in the NCC Governing Requirements will be required as part of Step 4.

Step 5 - Alleviate actual deficiencies

Following the determination of actual deficiencies under Step 4, a suitable means of identifying measures to counter the deficiencies must be applied.

As discussed in Step 3, the Assessment Methods listed in A2.2(2) and A2.3(2) of the NCC Governing Requirements can be used to assess compliance and the outcomes of the respective processes will guide the development of a fire safety system that will alleviate actual deficiencies.

Regardless, for complex projects, the benefits of undertaking a mathematical modelling exercise should be discussed with stakeholders. In a mathematical modelling exercise where ASET (multiplied by a factor of safety) is estimated to be less than RSET, it will be necessary to engineer an acceptable outcome.

In such instances, an examination of the output of the computerised comparative analysis will reveal the earliest untenable condition to be produced in the building.

When this condition is predicted to exist prior to the time required for completion of safe evacuation, a compensating fire safety measure may need to be added to improve the fire safety of the building system. Alternatively, the performance of an existing fire safety measure can be modified to increase ASET.

For example, the underside of a hot smoke layer may be predicated to fall to an unsafe height prior to complete occupant evacuation, in which case a smoke extraction system could be introduced to maintain the smoke layer at a safe height.

Alternatively, a fire safety measure that decreases RSET can be introduced into the fire safety system. For example, an additional exit could be introduced to decrease the predicted travel time and overall evacuation time. The mathematical modelling exercise can then be re-run until an acceptable ASET is achieved.

4.2 Energy efficiency

4.2.1 Introduction

In NCC Volume One, the Performance Requirement for energy efficiency is JP1, Energy use, which considers a building and its services as a single entity. This means that if the energy efficiency of a building's envelope is considered deficient, the deficiency may be compensated by the energy efficiency of its services.

As the objective of the provisions is to reduce greenhouse gas emissions, JP1 includes both the building envelope and its services. This means that the source of consumed energy may be considered. For example, solar energy collectors can be used to reduce the nett energy load of the building.

4.2.2 Energy efficiency features

As for fire safety systems, energy efficiency features can also be both passive and active. Building envelope elements are predominantly passive, whereas building services elements such as air-conditioning, ventilation, artificial light and power, heated water and swimming pool and spa plant, are active. Active building envelope elements can include adjustable shading devices.

Certain passive building envelope elements can be improved. The most critical envelope element is the glazing. While replacing glazing may be costly, adding shading to high solar exposure window units may be less costly and equally as effective.

Most existing buildings have scope for adding insulation to the ceiling of the upper most storey (inter-storey ceilings do not require insulation). In some climates, under floor insulation can improve the energy efficiency if there is an un-conditioned space below such as a garage or plant room.

When determining a required level of performance, the operating characteristics of a building are most important. As an example, in an auditorium where the higher density of occupants will have a significant influence on the energy efficiency of the auditorium, and it may not need comfort heating even in a cold location. Also important are the hours of operation of the building and any seasonal usage. For example, a Class 3 dormitory, only used to accommodate service personnel during an annual training exercise, has much less scope for reducing energy usage than frequently used Class 3 hotel accommodation.

4.2.3 Applying the five step process

When applying the five step process described in Section 3, the following information could be considered with regard to energy efficiency.

Step 1 - Locate related documentation

Common sources of information are –

- building approval documents, typically located at the respective local government authority
- building maintenance documents, typically located at the respective building or at the respective local government authority
- documentation relating to past sales of a building and consequential disclosures, which may provide energy efficiency data
- for commercial buildings the following websites may also be useful:
 - NABERS website (nabers.gov.au) provides information about buildings previously energy-rated by accredited assessor
 - Commercial Building Disclosure Scheme website (cbd.gov.au) provides information about buildings with over 1000 square meters of lettable floor area.

For this case study, it is assumed that no documentation relating to the building can be identified. This in itself should not present major problems. However, it is likely to require an increased scope of work to complete Step 2.

Step 2 - Undertake an on-site inspection

The Performance Requirement relating to building energy efficiency can be located in Section J of NCC Volume One. The text of the applicable Performance Requirement,

JP1 Energy use, will provide guidance on the energy efficiency characteristics of an existing building that need to be recorded during a site inspection.

Identification of an existing component of a building can be established in various ways by visual inspection or from any building records. In some instances, it may also be necessary to undertake some form of de-construction in order to establish definitive performance, such as the extent of insulation in ceiling spaces, walls and under floors. Inspecting ductwork and piping for its level of insulation and fan or pump power restrictions may need some dismantling depending on what access openings are provided.

The site inspection also needs to investigate:

- the future occupancy density of the building
- the times of use of the building
- the future energy source for any heating or cooling
- what space may be available for external shading or solar collectors
- changes to overshadowing (e.g. through any new adjoining properties or future development (i.e. under construction or recently approved)).

The use of energy monitoring may be beneficial in circumstances where de-construction of building elements is not feasible. Energy monitoring could be undertaken to measure the performance of particular services, for example air-conditioning, artificial lighting, or appliance power. Alternatively, the monitoring may be broadened and compared to building stock of a similar classification and climate zone, to determine a benchmark for the overall performance of the existing building. This data may inform Step 3 when comparing the performance of the existing building with the respective Performance Requirement.

Energy profiles may also be obtained from on-site energy monitoring showing existing building energy consumption patterns can be very useful. These profiles can be used to benchmark the current performance of the building relative to the occupancy, and may inform the proposed occupancy profiles. This too may be beneficial for comparison purposes in Step 3.

Step 3 - Compare expected performance

On the basis that completion of this Step is a generic procedure, see Section 3.1.3.

Step 4 – Identify actual deficiencies

When an assessment of the Step 3 report identifies potential deficiencies in the existing building, methods of assessing whether these are actual deficiencies are available in the Assessment Methods described in A2.2(2) and A2.3(2) of the NCC Governing Requirements.

While it may seem simple to compensate for a deficient building element by applying additional measures, the result can often be counter-productive. For example, applying fixed shading to a large underperforming window may assist in reducing the cooling load in the summer, but may result in more heating being required in the winter.

The intent of NCC Volume One DTS Provisions for building fabric (which includes glazing) are to facilitate the efficient use of energy for buildings that are conditioned or likely to be conditioned. They are not based simply on solar gain or loss, or even solar and conductive energy flow, but rather the impact such energy flow has, in conjunction with other loads, on the air-conditioning system. As a result, the energy the air-conditioning system needs to operate may increase. Another example is that using high efficiency lighting in a night-time-only restaurant in a cold climate may not achieve the benefit expected and actually lead to an increase in the heating needs of the restaurant, which would otherwise have been provided by the inefficient lighting.

Therefore, while expert judgement may sometimes be sufficient for determining compliance for a single deficiency, for most projects computerised mathematical modelling is the most appropriate approach. The modelling takes into account all the active and passive system elements, the energy sources and the building usage to determine the theoretical annual energy consumption of the building.

There are a number of software programs available for modelling the energy efficiency of buildings.

Step 5 - Alleviate actual deficiencies

On the basis that potential upgrade work is to be undertaken as a Performance Solution, consideration should be given to the methods of assessing compliance with respective Performance Requirement contained in A2.2(2) and A2.3(2) of the NCC Governing Requirements.

The recommended approach to alleviating actual deficiencies would be to model the building as if it was constructed in accordance with the DTS Provisions and so determine a maximum permitted annual energy consumption allowance. The intent of this approach is to demonstrate that the existing building is at least equivalent to the DTS Provisions.

The NCC contains a Verification Method based on this approach, i.e. JV3 Verification using a reference building. This Verification Method has been developed for use in conjunction with complying software and sets certain criteria (along with the subject building's characteristics) to model the building as if it was constructed in accordance with the DTS Provisions. This determines the annual energy consumption as a maximum energy allowance for the existing building. Once set up, the software then enables different energy efficiency measures, such as improving the building envelope elements or glazing to be tried and the results compared with the allowance.

The most likely scenario for changes to the energy efficiency features of a building are to the active systems during a “change-of-use” renovation or during a new fit-out of an existing building.

In both of these scenarios, changes to the building's services are likely to provide the best opportunity to install energy efficient equipment. This could include sophisticated control equipment not just for the air-conditioning, lighting and power systems, but also for active shading devices. As an example, with a sophisticated control system, to operate shading devices and to sense when to maximise the use of free outdoor air for cooling, an air-conditioning system may not need to provide refrigerated cooling for much of the time in those locations where the climate is suitable.

4.3 People with disabilities

4.3.1 Introduction

In 2010, the Australian Government finalised the content of the Disability (Access to Premises – Buildings) Standards (Premises Standards) and the ABCB subsequently amended the respective content of the 2011 BCA to reflect the provisions in Schedule 1 (the Access Code) of the Premises Standards. The Premises Standards

commenced on 1 May 2011 and applied to any subsequent application for a building approval for a new building or upgrade of an existing building.

The Australian Human Rights Commission issued Guidelines on the application of the Premises Standards to assist in their implementation. A copy of the Guidelines is available from their website (humanrights.gov.au/guidelines-application-premises-standards).

The purpose of the Premises Standards is to:

- ensure that dignified, equitable, cost-effective and reasonably achievable access to buildings, and facilities and services within buildings, is provided for people with disability
- give certainty to building certifiers, developers and managers that if the Standards are complied with they cannot be subject to a successful complaint under the Disability Discrimination Act in relation to those matters covered by the Premises Standards.

The Premises Standards consist of:

- six initial parts setting out the legal application of the Premises Standards and certain exceptions and concessions
- an Access Code for Buildings at Schedule 1, which contains Performance Requirements for providing access to, and use of, those buildings and areas of buildings to which they apply and technical DTS Provisions for complying with those Performance Requirements.

Therefore, compliance with the 'Premises Standard' is achieved via compliance with respective state and territory administrative provisions, as well as the respective requirements of the BCA.

4.3.2 State and territory regulations

When considering an upgrade of an existing building, practitioners will need to refer to respective state and territory regulations on requirements for access for people with a disability.

There are certain aspects that may require particular consideration, such as:

- exemptions for existing Class 1b and Class 2 buildings and upgrades to existing lifts and accessible unisex toilets

- upgrades to what the Premises Standards refer to as the 'affected part' of a building - see 4.3.3
- arrangements for considering appeals that the full application of the BCA to a specific building may result in an unjustifiable hardship.

4.3.3 Affected part of an existing building

When an upgrade to an existing building is proposed, the Premises Standards require that, in some situations, upgrading what is called the 'affected part' of a building.

The 'affected part' of a building is the path of travel from the principle pedestrian entrance (main entrance) to the area of new work. In a multi-storey building, this could mean an upgrade of the path of travel from the main entrance to the lift, and up the lift to the floor where the new work is taking place.

Another example might be from the main entrance to a restaurant, through the restaurant and into a new dining area being built at the back of the existing space. Such an upgrade may require the elimination of a front entry step, upgrading required handrails or signage.

The reason for the introduction of this requirement is to encourage more extensive upgrades of buildings over time and to ensure that, in appropriate cases, access is available to new areas of buildings that include accessibility; for there is no benefit in level 6 or 10 of a building being fully accessible if people cannot gain access to that area. Regardless, there is a limit to the requirement for the upgrade of the 'affected part'.

If the person making the application for building approval for the new work in an existing building is the owner or a tenant who occupies the whole building, the requirement for an upgrade of the 'affected part' is triggered.

However, if the person making the application for building approval for the new work in an existing building is one of a number of lessees in the building, the requirement for 'affected part' upgrade is not triggered.

As an example, if a building has two tenants and one makes an application to upgrade the area they rent, this does not require an upgrade of the 'affected part'.

Alternatively, if a building owner makes an application to upgrade part of their building, this would trigger a requirement for an upgrade of the 'affected part'.

State and territory regulations are intended to achieve the same outcome as the Premises Standards with respect to 'affected part' upgrades.

4.3.4 Unjustifiable hardship

The Premises Standards also include a general exception for access provisions where the full application of requirements would result in what is called an 'unjustifiable hardship'.

'Unjustifiable hardship' is not defined; however, a list of factors provides guidance as to what is relevant in considering whether compliance with the Premises Standards might impose unjustifiable hardship. The factors include, but are not limited to, costs, loss of value, impact on revenue, capacity to pay and impact on financial viability, technical building factors, the relationship of cost to the value of the building and the benefits of access, whether the building is used for public purposes or has a community function, and the effort expended in trying to comply with the Standards. It demands an inquiry of what is fair and reasonable in the circumstances.

Compliance with the Premises Standards is still required to the maximum extent not involving unjustifiable hardship. For example, enlarging a lift may impose unjustifiable hardship but upgrading the lift control panel to provide Braille and tactile buttons may not.

There is no similar general exception within the BCA.

However, in some States and Territories, Access Panels or similar bodies have been established to deal with questions of unjustifiable hardship. Practitioners should check with respective regulatory authorities to identify local mechanisms.

4.3.5 Upgrading certain existing buildings

The Premises Standards states that if an existing building is developed or upgraded into a 'bed and breakfast' or 'farm-stay' Class 1b building, the access requirements are not triggered unless there are four or more bedrooms made available to the public. While the BCA states that any Class 1b building of this type must have access

to at least one bedroom irrespective of the number of bedrooms available, state and territory regulations are intended to achieve the same outcome as under the Premises Standards.

While the BCA does not make a distinction between new Class 2 buildings, i.e. those for which a building application was made after 1 May 2011 and older Class 2 buildings undergoing upgrade, the Premises Standards do. The Premises Standards do not require Class 2 buildings built before 1 May 2011 (or for which a building application was made before 1 May 2011) to meet the requirements for access if it is subsequently upgraded. State and territory regulations are intended to achieve the same outcome as the Premises Standards.

Earlier editions of the BCA required a lift floor circulation space for lifts travelling more than 12 m to be a minimum of 1100 mm by 1400 mm. However, the new BCA requires a floor space of 1400 mm by 1600 mm for such lifts. The Premises Standards allows for a concession for lifts in existing buildings that travel more than 12 m. As long as an existing lift meets the earlier BCA requirements, it does not need to be upgraded in relation to circulation space requirements. Again, state and territory regulations are intended to achieve the same outcome as the Premises Standards.

The same applies to existing accessible unisex toilets that comply with the earlier BCA requirements for circulation space and fit out.

4.3.6 Applying the five step process

When applying the five step process described in Section 3, the following information could be considered in regard to requirements for people with a disability.

Step 1 - Locate related documentation

Common sources of information are –

- Building approval documents, typically located at the respective local government authority.
- Building maintenance documents, typically located at the respective building or at the respective local government authority. (However, as the majority of building characteristics that facilitate access for people with disabilities are inherently passive, it is unlikely that this source of data will prove to be beneficial.)

For this case study, it is assumed that no documentation relating to the building can be identified. This in itself should not present major problems; however, it is likely to require an increased scope of work to complete Step 2.

Step 2 - Undertake an on-site inspection

Performance Requirements relating to the provision of requirements for people with a disability are -

Part D Access and egress

- DP1 Access for people with a disability
- DP4 Exits
- DP6 Paths of travel to exits
- DP8 Carparking for people with a disability
- DP9 Communication systems for people with hearing impairment

Part E3 Lift Installations

- EP3.4 Lift access for people with a disability

Part F2 Sanitary and other facilities

- FP2.1 Sanitary facilities.

Identification of an existing component of a building can be done in various ways. In some instances it may be possible to readily identify the designed performance, e.g. from documentation identified in Step 1. However, as it has been assumed that no such documentation is available, it will be necessary to visually identify and record the scope of existing components. In some instances, it may also be necessary to undertake some form of de-construction in order to establish definitive performance.

Step 3 - Compare expected performance

On the basis that completion of this Step is a generic procedure, see Section 3.1.3.

Respective DTS Provisions are presented in:

- Part D3 Access for people with a disability – DTS Provisions
- Part E3 Lift installations – DTS Provisions
- Part F2 Sanitary and other facilities – DTS Provisions
- Part H2 Public transport buildings – DTS Provisions.

Step 4 – Identify actual deficiencies

When an assessment of the Step 3 report identifies potential deficiencies in the existing building, methods of assessing whether these are actual deficiencies are available in the Assessment Methods described in A2.2(2) and A2.3(2) of the NCC Governing Requirements.

Step 5 - Alleviate potential deficiencies

On the basis that potential upgrade work is to be undertaken as a Performance Solution, consideration should be given to the methods of assessing compliance with respective NCC Performance Requirements available in the Assessment Methods described in A2.2(2) and A2.3(2) of the NCC Governing Requirements.

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APPENDICES



Appendix A Compliance with the NCC

A.1 Responsibilities for regulation of building and plumbing in Australia

Under the Australian Constitution, state and territory governments are responsible for regulation of building, plumbing and development / planning in their respective state or territory.

The NCC is an initiative of the Council of Australian Governments and is produced and maintained by the ABCB on behalf of the Australian Government and each state and territory government. The NCC provides a uniform set of technical provisions for the design and construction of buildings and other structures, and plumbing and drainage systems throughout Australia. It allows for variations in climate and geological or geographic conditions.

The NCC is given legal effect by building and plumbing 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 give effect to the legislation.

Each state's and territory's legislation adopts the NCC subject to the variation or deletion of some of its provisions, or the addition of extra provisions. These variations, deletions and additions are generally signposted within the relevant section of the NCC, and located within appendices to the NCC. Notwithstanding this, any provision of the NCC may be overridden by, or subject to, state or territory legislation. The NCC must therefore be read in conjunction with that legislation.

A.2 Demonstrating compliance with the NCC

Compliance with the NCC is achieved by complying with the Governing Requirements of the NCC and relevant Performance Requirements.

The Governing Requirements are a set of governing rules outlining how the NCC must be used and the process that must be followed.

The Performance Requirements prescribe the minimum necessary requirements for buildings, building elements, and plumbing and drainage systems. They must be met to demonstrate compliance with the NCC.

Three options are available to demonstrate compliance with the Performance Requirements:

- a Performance Solution
- a DTS Solution
- a combination of a Performance Solution and a DTS Solution.

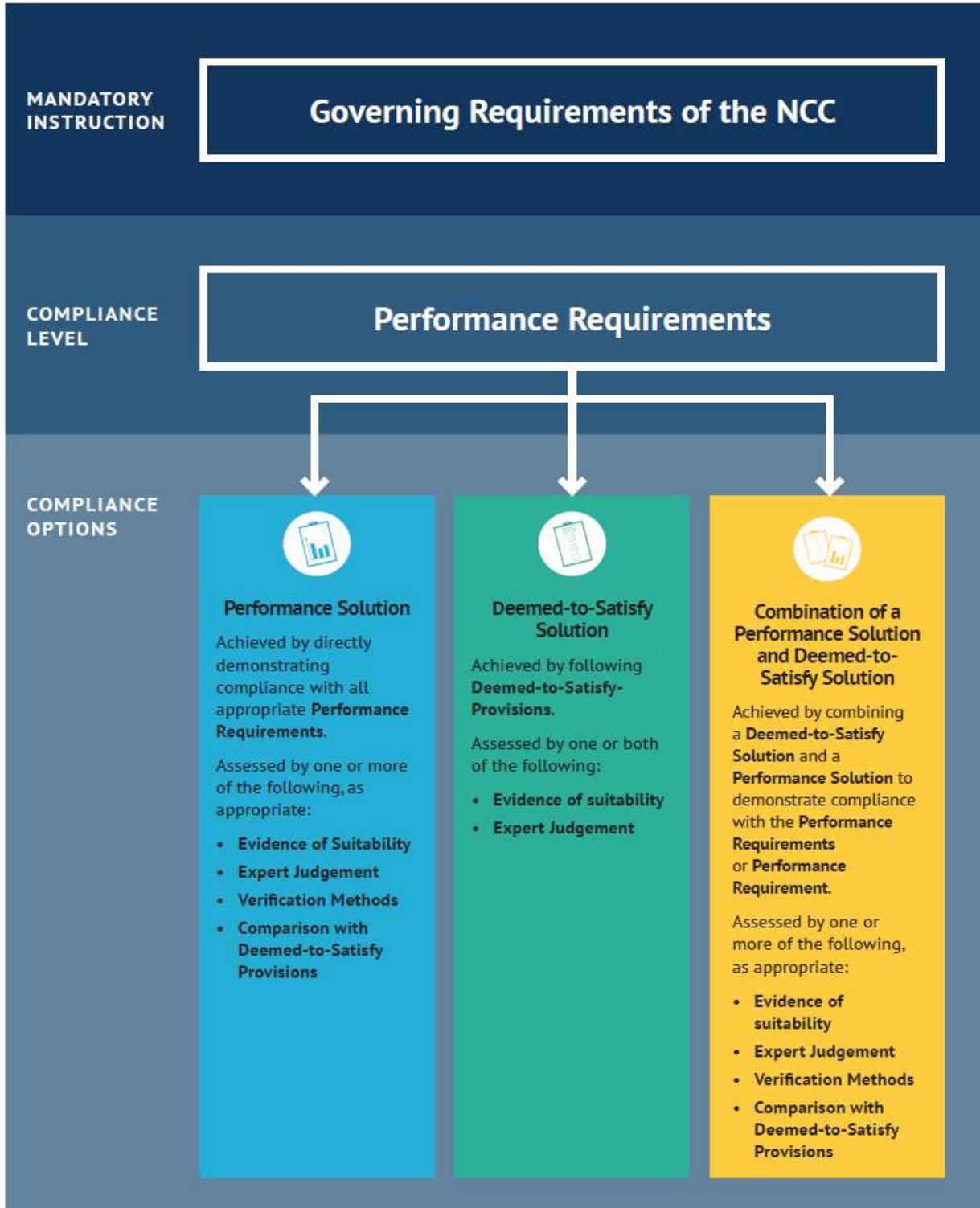
All compliance options must be assessed using one or a combination of the following Assessment Methods, as appropriate:

- Evidence of Suitability.
- Expert Judgement.
- Verification Methods.
- Comparison with DTS Provisions.

A figure showing hierarchy of the NCC and its compliance options is provided in Figure A.1. It should be read in conjunction with the NCC.

To access the NCC or for further general information regarding demonstrating compliance with the NCC visit the ABCB website (abcb.gov.au).

Figure A.1 Demonstrating compliance with the NCC



Appendix B Acronyms

The following table, Table B.1 contains acronyms used in this document.

Table B.1 List of acronyms

Acronym	Meaning
ABCB	Australian Building Codes Board
ASET	Available safe egress time
BCA	Building Code of Australia
DTS	Deemed-to-Satisfy
IGA	Inter-government agreement
NCC	National Construction Code
RSET	Required safe egress time
WHS	Workplace health and safety

Appendix C Acts, Regulations and design responsibilities

C.1 Other Applicable Acts, Regulations and design responsibilities

There is other legislation (both Commonwealth, and state and territory) which may impact on building approval and design.

For instance, the NCC does not regulate matters such as the roles and responsibilities of building and plumbing practitioners. These fall under the jurisdiction of the states and territories.

State and territory building and plumbing legislation is not nationally consistent in relation to these matters with significant variations with respect to:

- registration of practitioners
- mandatory requirements for inspections during construction.

The design and approval of building and plumbing and drainage solutions will need to consider these variations.

In addition to the relevant legislation, Workplace Health and Safety (WHS) legislation is also applicable which requires safe design principles to be applied.

A Code of Practice on the safe design of structures has been published by Safe Work Australia (2018) which provides guidance to persons conducting a business or undertaking work in regard to structures that will be used, or could reasonably be expected to be used, as a workplace. It is prudent to apply these requirements generally to most building classes since they represent a workplace for people undertaking building work, maintenance, inspections at various times during the building life.

The Code of Practice defines safe design as:

“the integration of control measures early in the design process to eliminate or, if this is not reasonably practicable, minimise risks to health and safety throughout the life of the structure being designed”.

It indicates that safe design begins at the start of the design process when making decisions about:

- the design and its intended purpose
- materials to be used
- possible methods of construction, maintenance, operation, demolition or dismantling and disposal
- what legislation, codes of practice and standards need to be considered and complied with.

The Code of Practice also provides clear guidance on who has health and safety duties in relation to the design of structures and lists the following practitioners:

- architects, building designers, engineers, building surveyors, interior designers, landscape architects, town planners and all other design practitioners contributing to, or having overall responsibility for, any part of the design
- building service designers, engineering firms or others designing services that are part of the structure such as ventilation, electrical systems and permanent fire extinguisher installations
- contractors carrying out design work as part of their contribution to a project (for example, an engineering contractor providing design, procurement and construction management services)
- temporary works engineers, including those designing formwork, falsework, scaffolding and sheet piling
- persons who specify how structural alteration, demolition or dismantling work is to be carried out.

In addition, WHS legislation places the primary responsibility for safety during the construction phase on the builder.

From the above it is clear that the design team in conjunction with owners / operators and the builder have a responsibility to document designs, specify and implement procedures that will minimise risks to health and safety throughout the life of the structure being designed.

A key element of safe design is consultation to identify risks, develop practical mitigation measures and to assign responsibilities to individuals / organisations for ensuring the mitigation measures are satisfactorily implemented.

This approach should be undertaken whichever NCC compliance pathway is adopted.

Some matters specific to health and safety are summarised below, but this list is not comprehensive.

- The NCC and associated referenced documents represent nationally recognised minimum standards for health and safety for new building works.
- The NCC's treatment of safety precautions during construction is very limited. Additional precautions are required to address WHS requirements during construction.
- Detailed design of features to optimise reliability and facilitate safe installation, maintenance and inspection where practicable.
- Document procedures and allocate responsibilities for determining evidence of suitability for all health and safety measures.
- Document procedures and allocate responsibilities for the verification and commissioning of all health and safety measures.
- Provide details of health and safety measures within the building, evidence of suitability, commissioning results and requirements for maintenance and inspection to the owner as part of the building manual. (Note: Some state and territory legislation contains minimum requirements for inspection of fire safety measures).
- The building manual should also provide information on how to avoid compromising fire safety through the life of a building (e.g. preventing disconnection of smoke detectors or damage to fire resistant construction).

Some health and safety measures will be impacted by other legislation that may be synergistic with the NCC requirements or potentially in conflict particularly in relation to the content of this handbook, these include:

- planning / development
- conservation
- state emergency risk management policies.

Appendix D State and territory information

The following advice has been provided by the state and territory administrations responsible for building matters and was current at the time of publication. Any queries regarding this advice should be directed to the respective administration.

D.1 Legislation governing building work

Under Australia's constitution, governance of the built environment is the responsibility of individual state and territory governments.

Legislation governing the built environment generally comprises a suite of administrative requirements governing processes and documentation, as well as a suite of technical requirements governing design and construction.

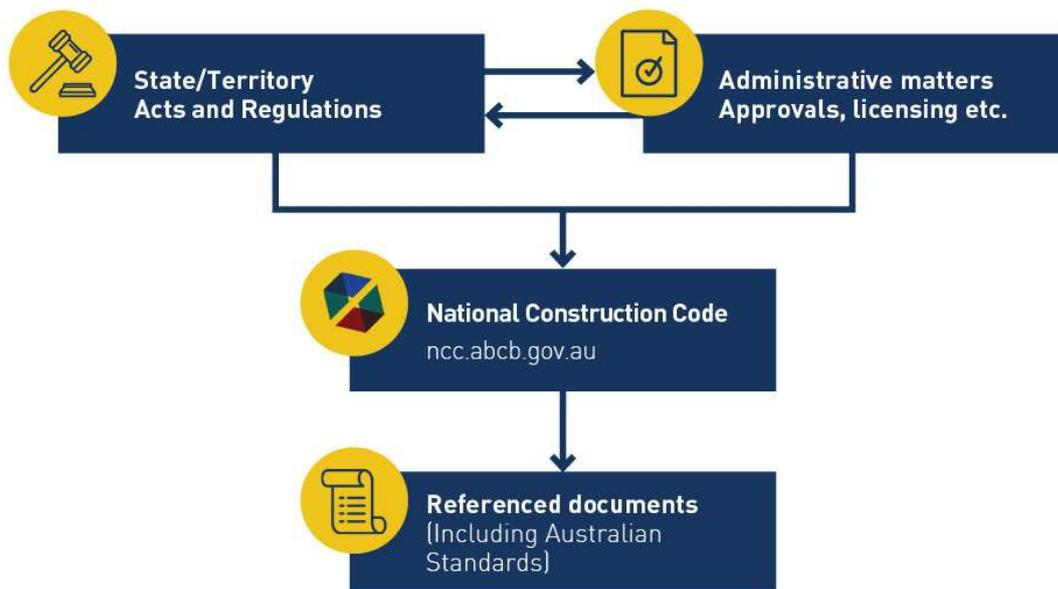
State and territory legislation typically includes a requirement that the design and construction of new buildings, as well as new work on existing buildings, must comply with the NCC. Typically, legislation governing the built environment does not require existing buildings to be upgraded to present day requirements.

A summary of individual state and territory legislative requirements governing existing buildings is presented in the remainder of this appendix. Electronic access to respective legislation is available via the following websites –

- Australian Capital Territory (legislation.act.gov.au);
- New South Wales (legislation.nsw.gov.au);
- Northern Territory (legislation.nt.gov.au);
- Queensland (legislation.qld.gov.au);
- South Australia (legislation.sa.gov.au);
- Tasmania (legislation.tas.gov.au);
- Victoria (legislation.vic.gov.au);
- Western Australia (legislation.wa.gov.au).

The following diagram (Figure D.1) shows the relationship of legislation, administrative matters and the NCC.

Figure D.1 NCC regulatory framework



D.2 Australian Capital Territory

Unless building work carried out in the ACT or Jervis Bay Territory (JBT) is exempt from requiring building approval under the ACT's *Building Act 2004*, Section 42 of that Act requires that the work only be carried out in accordance with the BCA. Section 29 of that Act sets out the approval requirements for plans that must be complied with as part of obtaining a building approval. Section 29 provides that where plans are for the substantial alteration of a building, the building as altered must comply with the BCA.

Section 136 of that Act gives legal force to the BCA in the ACT and JBT. The BCA is therefore a subordinate law under the *Building Act 2004*. Section 7 of that Act defines what the term **building** means in the Act, and provides that the term **building** includes part of a building. It then follows that if the *Building Act 2004* requires a building to comply with the BCA that Act also requires a part of a building to comply with the BCA.

Therefore, where that Act requires a building as altered to comply with the BCA, all of the pre-existing and new parts of the building must comply with the BCA. However, the abovementioned Section 29 also entitles a regulation to declare that an alteration of a building is or is not a substantial alteration; or that a part of a building (the

unaltered part) that has not been altered need not comply with the BCA despite Section 29.

The Act's *Building Regulation 2004* declares that:

An alteration of a building is a substantial alteration if-

- (a) the aggregate volume of the proposed alteration and any other alteration made to the building during the 3 years immediately before the day the application for building approval of the alteration is made is more than 50% of the volume of the original building; and
- (b) the volume of a building is measured by reference to roof and outer walls, but excludes internal alterations made to a Class 1 building, and alterations to Class 10 buildings or structures.

The substantial alteration provisions of the Act and regulation are therefore commonly referred to as the '50% rule'.

Taken together, the abovementioned provisions provide that if the 50% rule is triggered by alterations to, or an extension of, a pre-existing building, the whole building must be brought into compliance with the BCA, unless a regulation declares otherwise. Because it is unreasonable to make some older houses comply with the current edition of the BCA, Section 16A of the *Building Regulation 2004* declares the unaltered parts of a pre-existing building that need not be brought into compliance with the BCA despite the 50% rule otherwise applying. The effect of that section is to provide alternatives to compliance with the full provisions of the BCA, and to prescribe when it is not reasonable to bring aspects of a building into compliance with certain aspects of the NCC. However, it may be the case that those alternatives only cover Class 1 and Class 10 buildings.

Other ACT legislation also regulates aspects of building construction, particularly the *Water and Sewerage Act 2000*, which has provisions aimed at reducing water usage, energy used to heat water, and thereby reducing carbon emissions from energy generated for water heating.

ACT legislation is available through the ACT legislation website (legislation.act.gov.au).

D.3 New South Wales

The Environmental Planning and Assessment (EP&A) Act 1979 and EP&A Regulation 2000 reference the Building Code of Australia (BCA) as the technical standard for the design and construction of new buildings and new building work. The application of the BCA is to building work that requires development consent, including work that is categorised as complying development. Building work that is categorised as exempt development under State Environmental Planning Policy (Exempt and Development Codes) 2008 must also comply with the BCA, as relevant.

The legislation requires that all new buildings and new building work must comply with the requirements of the BCA. This includes new building work to or within an existing building, including a heritage listed building. The BCA applicable to any building work is that which is in force at the time an application for a construction certificate (CC) or complying development certificate (CDC) is made (See EP&A Regulation 2000 clauses 136A and 145).

Existing buildings are not generally required to comply with the BCA retrospectively, however consent authorities must consider the existing building (including any parts which are not subject to the new building works) when alterations and additions are proposed. Under specified circumstances, the consent authority may require the existing part of the building, (i.e. the parts not subject of the new works) to be upgraded (see EP&A Regulation 2000 clauses 94).

For changes of use, compliance with the BCA is required in terms of specified fire safety matters and for any building work deemed necessary for the purposes of the new classification (see EP&A Regulation 2000 clause 93).

Where work involves an alteration or addition to an existing building or a change of use, and that work is categorised as complying development, similar considerations also apply (see EP&A Regulation 2000 clauses 131 and 132).

For the full text of the above mentioned legislation, refer to the NSW legislation website (legislation.nsw.gov.au).

D.4 Northern Territory

The Northern Territory *Building Act* and *Building Regulations* reference the NCC as the technical standard for the design and construction of new buildings and new building work.

For an existing building being altered, extended or subject to change of use, the NCC is applicable to the new building work, i.e. to those parts of the building that are directly affected by the new building work or to those parts of the building being changed.

In regard to energy efficiency, the Northern Territory Part 3.12 is replaced with BCA 2009 Part 3.12.

The ultimate decision regarding the reach of upgrading works to existing buildings with regard to compliance rests with the building certifier.

However, where new works are proposed to be carried to an existing building which was unapproved or did not fulfil the requirements of the building approval at the time of construction, the NT has introduced on 1 May 2016, the *Building Amendment (Occupancy Certification) Act 2016* to establish alternative pathways to achieve occupancy certification.

A Certificate of Existence may be granted by the Director of Building Control on recommendation by a building certifier for building works that were completed before 1 May 2016, when certain conditions are met under specific circumstances.

To be eligible for a Certificate of Existence the building work must meet a reasonable level of safety, health and amenity determined by the building certifier as sufficient for occupancy of the building.

As a minimum, all building works granted with this basic level of occupancy certification, must meet current standards under the NCC in relation to wind loading and fire safety and therefore require upgrade works to take place.

Works to historic buildings

Section 60 of the *Building Act* allows a building certifier to grant a Building Permit for the carrying out of work that does not comply to the *Building Regulations* if the building work is to be carried out on or in connection with a building designated as historic under the *Heritage Act*.

Any such Building Permit may be granted to enable the carrying out of work appropriate to the style, manner of construction and materials of the building and subject to any imposed conditions, restrictions or protections.

D.5 Queensland

Queensland's *Building Act 1975* (the Act) calls up the applicable building codes for all building work including the NCC, and the Queensland Development Code for Queensland specific standards. The Act defines building work to include repairing, altering or adding to a building, as well as management procedures relating to a building that may not directly involve a structural change (for example, changing a management procedure relating to a budget accommodation building where a specific fire safety standard applies).

All building work requires a building approval to be issued by a licenced building certifier unless it is specified under the Act to be 'self-assessable' or 'exempt'. Self-assessable building work is work that does not require a building approval to be issued by a building certifier. However, when the work is carried out it must comply with the prescriptive (*DTS*) elements of applicable building codes such as the current edition of the NCC and any other relevant codes (see s21 of the Act). Generally, self-assessable building work is minor and non-structural in nature (see Schedule 1 of the *Building Regulation 2006*). If a *Performance Solution* (previously known as an Alternative Solution) is intended for such work, the work requires assessment and approval by a licenced building certifier.

Where a building approval is required for alterations or additions to a building, a building certifier has some discretion available when applying the provisions of the NCC or other codes to the existing part of the building. In relation to alterations within an existing building, this may include assessing the works under earlier building assessment provisions (such as those in force at the time the building was originally

built). However, a certifier may not approve alterations to an existing building if the alterations would unduly reduce the building's existing level of fire safety. Even though this discretion exists, certifiers are required to apply the Act in order to achieve its purposes. Generally the Act's purpose is to achieve the health, safety, amenity and sustainability objectives of the NCC and other relevant codes.

The exercise of discretion by a building certifier in relation to the existing part of a building should recognise the extent of work being undertaken to the building and the potential benefits derived from the requirements of the NCC. For example, if more than 50% of a building is being changed, the building certifier may in some instances require all or part of the whole building to be upgraded to comply with the current code requirements. Certifier discretion may allow all or some of the current code requirements of the NCC or other relevant codes to be applied to the existing fabric of buildings being altered, provided that the certifier has a suitable basis for applying the requirement either in relation to compliance of the new work or as a result of the concessional powers under the Building Act.

Other concessional approvals also apply for Class 2-9 buildings constructed before 14 December 1993, where a change of classification is being sought.

The *Building Act 1975* – key provisions:

Section 5	What is <i>building work</i> ?
Section 21	Building work that is self-assessable for the Planning Act
Section 22	Building work that is exempt development for the Planning Act
Section 37	Provision for changes to building assessment provisions
Section 61	Alterations to safe existing work may be approved on basis of earlier building assessment provisions
Section 68	Particular alterations not permissible
Section 80	Alterations to unsafe existing work
Section 81	Building development approval for particular alterations may require existing building or structure to comply with building assessment provisions
Section 112	Concessional approval for particular existing buildings

D.6 South Australia

The *Development Act 1993* and *Regulations 2008* reference the NCC and adopt it as part of the Building Rules for the purposes of obtaining a Building Rules Consent. The Act defines a “building” as including a portion of a building and this includes any fixtures or fittings which are subject to the provisions of the NCC. The Act also defines “building work” as any work or activity relating to construction, demolition or removal of a building. Accordingly, any new building work on an existing building must be compliant with the NCC.

Discretion should be applied in relation to heritage places where it may not be possible to obtain complete compliance with the Building Rules. However, there is still an obligation to ensure so far as is reasonably practical that adequate standards of building soundness, occupant safety and amenity are as good as can reasonably be achieved in the circumstances.

Where a change of use/classification in an existing building is proposed, the relevant authority must be satisfied that the building possesses all of the attributes appropriate to its intended use. Generally this will be compliance with the current NCC to the extent that this is reasonable.

Section 53A of the *Development Act* enables the upgrading of an existing in relation to an application for an alteration to that building. However, it first has to be determined that the building is unsafe, structurally unsound, in an unhealthy condition or has inadequate access for people with disabilities. The upgrading can only be required to the extent reasonably necessary to ensure that the building is safe, conforms to proper structural and health standards, and provides adequate access.

Specific information on the application of NCC to existing buildings in South Australia can be found on the State Government website (sa.gov.au).

D.7 Tasmania

Any new building work carried out on an existing building needs to comply with the current *Building Act 2016*, *Building Regulations 2016* and NCC when the work is undertaken (see section 11 of the *Building Act 2016*).

This new building work may trigger an obligation to upgrade the remainder of the existing building to comply with current standards in certain circumstances. Under Section 53 of the *Building Act 2016*, an existing building has to be upgraded if proposed new building work, together with previous building work approved or carried out on the building in the past three years, comprises more than 50% of the volume of the original building. Repair work following a fire, wind, flood, storm or subsidence of land event does not count towards the 50% upgrade threshold.

If Section 53 is triggered, the entire existing building needs to be upgraded to comply with current standards. However, a building surveyor can consent to partial compliance with the NCC for aspects of the existing building if appropriate. The building surveyor can only give this consent if they are satisfied that partial compliance is appropriate after taking into account:

- the structural adequacy of the existing building
- whether the building is a historic building
- whether requirements have been met to reasonably provide for building amenity and the health and safety of the building's users
- whether appropriate measures have been taken to prevent the spread of fire to and from adjoining buildings.

However, the building surveyor cannot consent to partial compliance for the new building work on the building. Further, they cannot consent to partial compliance if the proposed and/or prior building work that triggered the upgrade threshold comprised addition(s) of more than 1000 m² or 25% of the floor area of the original building.

As stated in the Director's Determination – Exemptions from Obligation to Upgrade Existing Buildings, the requirements of Section 53 of the *Building Act 2016* do not apply to:

- a Class 1a building, except where it has been previously erected on a site and is being relocated and re-erected on a new site, and
- a Class 10a building associated with a Class 1a building, except where it has been previously erected on a site and is being relocated and re-erected on a new site.

Even if the 50% threshold for a full building upgrade is not triggered, if the proposed building work will adversely affect any building exit or path to an exit in an existing

Class 2-9 building then the remainder of the building must be upgraded to comply with Section D of Volume One of the NCC. This is as per Section 54 of the *Building Act 2016*. Again, building surveyors have discretion to consent to partial compliance for the existing building after taking into account the four criteria listed above.

A change of use may also trigger an obligation to upgrade an existing building. Section 55 of the *Building Act 2016* provides that if a building's use is going to change, and this changes its classification under the NCC, then the building needs to be upgraded to comply with the technical specifications that apply to the new classification. If the building's classification stays the same but the new usage gives rise to different NCC requirements within that classification, then the building needs to be upgraded to comply with these requirements. Any necessary upgrade work must be completed before the building is used for its new purpose.

Consumer, Building and Occupational Services have released the Director's Guidelines – Obligation to Upgrade Existing Buildings to provide further guidance on how to apply the above provisions. This document can be accessed from their website (cbos.tas.gov.au).

Practitioners should always seek up-to-date information from Consumer, Building and Occupational Services website (cbos.tas.gov.au).

References:

- *Building Act 2016* (sections 53-55): Tasmanian legislation website (legislation.tas.gov.au)
- Director's Determination – Exemptions from Obligation to Upgrade Existing Buildings: Consumer, Building and Occupational Services website (cbos.tas.gov.au)
- Director's Guidelines – Obligation to Upgrade Existing Buildings: Consumer, Building and Occupational Services website (cbos.tas.gov.au)

D.8 Victoria

In Victoria, all building work must comply with the *Building Act 1993* and the *Building Regulations 2006*. The relevant technical provisions are contained within the National Construction Code (NCC Volumes One and Two) and are adopted by the Regulations.

The Building Act and Regulations do not generally require upgrading of existing buildings to present day requirements except where a change of use is proposed (Regulation 1011), major works are being undertaken (Regulation 608), the building is being subdivided (Regulation 503) or the building is considered to be unfit for occupation or use. In addition all new work in an existing building must comply with the current requirements, irrespective of whether the work triggers the need for the whole building to be assessed for compliance with the current standards.

Heritage considerations

In considering the nature and scope of any proposed work, consideration should also be given to whether the building has heritage value. The *Heritage Act 1995* establishes the Victorian Heritage Register and the Heritage Inventory, administered by Heritage Victoria. Locally significant heritage places may be included in a Heritage Overlay to a local planning scheme administered by the relevant local council. A building may have heritage values but not be formally recognised or protected, an initial check with the relevant local council can assist identify any likely significance.

All works to places on the Victorian Heritage Register, including for example, works to improve access, will require a permit under the Heritage Act 1995. Many alterations will require planning permission where a heritage place is included in the heritage overlay of the local planning scheme.

There are a number of relevant technical and advisory publications involving access and fire issues, published by Heritage Victoria relating to heritage properties including:

- Access for all to heritage places (technical leaflet).
- Heritage Buildings and Energy Efficiency Regulations (technical leaflet).
- Heritage Buildings and Sustainability (technical leaflet).
- Fire and Heritage, published by the NSW Heritage Branch on the NSW Department of Planning, Industry and Environment website (environment.nsw.gov.au/resources/heritagebranch/heritage/maintenance81fireheritage.pdf)

D.9 Western Australia

In Western Australia, the NCC operates prospectively for all proposed building work, which is required to comply with applicable buildings standards that are prescribed by the *Building Act 2011* (the Act) in the *Building Regulations 2012* (the regulations) in the circumstances. In other words, when upgrading an existing building, the new building work in the existing building is required to comply with the NCC. This requirement prevails despite whether the proposed building work is exempted from needing a building permit pursuant to Part 5 of the Act or outlined in Scheduled 4 of the regulations.

The NCC only operates retrospectively for certain matters in relation to existing buildings, where those matters are prescribed in the regulations.

Part 7 of the Act allows for prescribing any requirements for existing buildings, which are set out in Part 8 of the Regulations and are limited to:

- change of classification of certain buildings and incidental structures
- maintenance of buildings
- private swimming pools and associated safety barrier requirements and inspections
- smoke alarms.

There are no immediate plans to prescribe other matters at this stage.

In respect to enforcement, Part 8 allows for issuing orders to effectively deal with a building or incidental structure that is reasonably believed to be in a dangerous state or unfit for human occupation (s112(2)(g)).

Further information can be obtained at the Department of Mines, Industry Regulation and Safety's website (dmirs.wa.gov.au).