



Emergency Egress for Occupants with Disability

Regulation Impact Statement For Decision

March 2015

This Regulation Impact Statement for decision accords with the requirements of *Best Practice Regulation: A Guide for Ministerial Councils and National Standard Setting Bodies* endorsed by the Council of Australian Governments in 2007. Its purpose is to inform interested parties of proposed amendments to the National Construction Code to address emergency egress for persons with disability.

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 mission is to oversee issues relating to health, safety, amenity and sustainability in building. The ABCB promotes efficiency in the design, construction and performance of buildings through the National Construction Code, 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 visit the [ABCB website](#).

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Glossary

Term	Definition
Accessway	A continuous accessible path of travel (as defined in AS 1428.1) to, into or within a building.
Class 1a building	A single dwelling being— (i) a detached house; or (ii) one of a group of two or more attached dwellings, each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit, which are not located above or below another dwelling or another Class of building other than a private garage.
Class 1b building	(i) a boarding house, guest house, hostel or the like— (A) with a total area of all floors not exceeding 300 m ² measured over the enclosing walls of the Class 1b; and (B) in which not more than 12 persons would ordinarily be resident; or (ii) 4 or more single dwellings located on one allotment and used for short-term holiday accommodation, which are not located above or below another dwelling or another Class of building other than a private garage.
Class 2 building	A building containing 2 or more sole-occupancy units each being a separate dwelling.
Class 3 building	A residential building, other than a building of Class 1 or 2, which is a common place of long term or transient living for a number of unrelated persons, including— (a) a boarding house, guest house, hostel, lodging house or backpackers accommodation; or (b) a residential part of a hotel or motel; or (c) a residential part of a school; or (d) accommodation for the aged, children or people with disabilities; or (e) a residential part of a health-care building which accommodates members of staff; or (f) a residential part of a detention centre.
Class 4 building	A dwelling in a building that is Class 5, 6, 7, 8, or 9 if it is the only dwelling in the building.
Class 5 building	An office building used for professional or commercial purposes, excluding buildings of Class 6, 7, 8, or 9.
Class 6 building	A shop or other building for the sale of goods by retail or the supply of services direct to the public, including— (a) an eating room, bar area that is not an assembly building, shop or kiosk part of a hotel or motel; or (b) a dining room, bar area that is not an assembly building, a shop or kiosk part of a hotel or motel; or (c) market or sale room, showroom, or service station.

Class 7a building	A car park.
Class 7b building	A building for storage, or display of goods or produce for sale by wholesale.
Class 8 building	A laboratory, or a building in which a handicraft or process for the production, assembling, altering, repairing, packing, finishing, or cleaning of goods or produce is carried on for trade, sale, or gain.
Class 9a building	A health-care building, including those parts set aside as a laboratory.
Class 9b building	An assembly building, including a trade workshop, laboratory or the like in a primary or secondary school, but excluding any other parts of the building that is of another Class.
Class 9c building	An aged care building.
Class 10 building	A non-habitable building.
Deemed-to-Satisfy	Provisions which are deemed to satisfy the mandatory requirements of the BCA.
Fire-isolated ramp	A ramp within a fire-resisting enclosure which provides egress from a storey.
Fire-isolated stair	A stairway within a fire resisting shaft.
Functional Statement	A statement which describes how a building achieves the Objective.
Performance Requirement	A requirement which states the level of performance which a Building Solution must meet.
Sole-occupancy unit (SOU)	A room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier.

Acronyms

Acronym	Definition
ABCB	Australian Building Codes Board
ABS	Australian Bureau of Statistics
AS	Australian Standard
BS	British Standard
BCA	Building Code of Australia
BAPC	Building Access Policy Committee
BCC	Building Codes Committee
DDA	Disability Discrimination Act
D-t-S	Deemed-to-Satisfy Provisions
HRSC	Commonwealth House of Representatives Standing Committee on Legal and Constitutional Affairs
NCC	National Construction Code
NCIS	National Coronial Information System
PEEP	Personal Emergency Evacuation Plan
RIS	Regulation Impact Statement
SOU	Sole-occupancy unit
TGSI	Tactile Ground Surface Indicators
VoSL	Value of Statistical Life

Introduction

The Egress for All Occupants project has been a project on the Australian Building Codes Board (ABCB) work program since 2011. The project arose from a major initiative of governments, the Access to Premises Standards, which were developed in parallel with a revised Building Code of Australia (BCA) due to concern with the lack of certainty regarding practical compliance obligations under the Disability Discrimination Act (DDA).

In 2000, the ABCB established the Building Access Policy Committee (BAPC), which included representatives from the Human Rights and Equal Opportunity Commission, the Australian government's Attorney General's Department, the disability sector and representatives from the construction industry. The Committee was tasked to recommend changes to the BCA, to consult widely with industry and the community and to provide advice to the ABCB on access-related issues.

During the development of the Premises Standards, it was identified that although there were practical solutions available to assist in providing independent and equitable access to buildings for occupants with disability, there were no readily available solutions for egress in the event of an emergency. The BAPC requested the ABCB continue to research solutions in the area of egress for all occupants.

The Premises Standards continued through a lengthy process of negotiation including a period of review by the House of Representatives Standing Committee on Legal and Constitutional Affairs (HRSC). The HRSC sought submissions to allow it to consider, and report on, the appropriateness and effectiveness of the draft Premises Standard in:

- achieving its objects;
- its interaction with other legislative schemes; and
- whether the standards would have any unjustifiable impact on any particular segment of the industry.

Amongst matters discussed, in the Access All Areas report, the HRSC acknowledged that there were issues that would not be finalised in time for inclusion in the Premises Standards, including emergency egress and Chapter 6 Recommended:

"...the ABCB undertake further research to identify deemed-to-satisfy provisions for emergency egress for people with disability with a view of making changes to the Building Code as soon as possible¹."

As is the case in most countries, current BCA provisions for emergency egress are reliant on the occupants responding to an emergency by recognising warning cues and using appropriate pathways, such as fire-isolated ramps or fire-isolated stairways, to evacuate. However, in the absence of accessible evacuation pathways and warning systems, evacuation of occupants with disability is generally left to administrative evacuation management procedures located outside of the BCA.

¹ Commonwealth of Australia, Access All Areas (2009) 6.1 Recommendation 16 p.130

Disability advocates suggest that the current BCA technical provisions need to be strengthened. Specifically, to cater for those whose impairment prevents them from using features of the built environment and achieving safe, dignified and independent egress without the assistance of alternative warning cues, and/or assistance recognising and using safe egress paths. Significantly the HRSC considered specific matters that included fire stairs, lifts, visual and tactile warnings, wayfinding and places of rescue assistance.

In discussing solutions the HRSC suggested that “in order for access to be truly equitable, facilities must also be put in place to allow people with disability to navigate a building independently and with dignity. Requiring people with disability to be escorted or to rely on there being people in the vicinity to provide directions is not satisfactory”.

To seek opinions on a range of proposals and gauge support for their implementation, the ABCB convened an Emergency Egress Forum in April 2011 with representatives from government, industry and the disability sector. Attendees agreed to a range of proposals and an incremental approach being the most appropriate and consistent with the findings of the recommendations of the HRSC. The ABCB’s peak technical committee, the Building Codes Committee (BCC), at its meeting in July 2011, also supported this staged approach.

As identified by earlier research², lifts were seen to offer obvious accessibility advantages over other options for occupants with disability. In considering research into egress solutions including the use of lifts, the ABCB recognised while there had been some developments internationally, it appeared there was a reluctance to mandate the use of lifts for egress. As awaiting developments was not considered a sustainable approach, in 2011 the ABCB endorsed a strategy which included:

- the development of a non-regulatory Handbook for lifts used during evacuation.
- D-t-S Provisions being considered incrementally, with minor amendments being included and more substantive proposals subject of additional impact assessment (this RIS).

This strategy was progressed in 2013 through the release of the ABCB Directions Report on “Egress for All Occupants” and publication of the ABCB non-mandatory handbook “Lifts Used During Evacuation”. Four minor amendments to improve the accessibility of egress paths were also considered and these proposals progressed to inclusion in the 2013 BCA.

This Regulation Impact Statement (RIS) considers a further five proposals that were developed with the assistance of the Emergency Egress Forum and have the potential to impose large costs on the community.

Scope

Emergency events can occur in all buildings. Despite this, Class 1a buildings (houses) and Class 10 buildings (non-habitable buildings) are considered out of scope due to the coverage of the DDA’s Premises Standards. Proposals for Class 1b buildings (boarding houses) are limited to accessible areas required to have early smoke detection and alarm systems installed. While emergency events

² Warrington Fire Research, *Emergency Evacuation for Occupants with Disabilities, 2004–* Prepared for the Australian Building Codes Board.

occur in these buildings, the small-scale and close relationship occupants have with these building means egress times are reduced and paths of egress are easily recognisable and often familiar to people occupying the building. Areas of focus include those supported through consultation including accessibility of exits and paths of travel to exits, including fire-isolated stairs and early notification.

During Consultation, two stakeholders felt that the scope of the regulatory analysis should consider the impacts of the proposals on existing buildings.

The proposals were developed and assessed from the perspective of new design and construction. As highlighted in the analysis, designs conscious of accessibility have the potential to reduce or ameliorate costs that would, due to the scope of proposals 4 & 5, could not practically be applied in full in existing buildings beyond new construction. Hence the scope of this analysis is limited to new buildings.

Nature and Extent of the Problem

Nature of the Problem

The nature of the problem is twofold. Firstly it relates to life safety and the inability of occupants living with disability being able to evacuate buildings independently in the event of an emergency.

Under the National Construction Code (NCC) buildings are expected to be provided with means of evacuation, which allow occupants time to evacuate safely without being overcome by the effects of an emergency³. Current provisions require emergency egress paths be provided with greater protection, suitable paths of travel and appropriate egress paths to open space. Automatic warning cues are also required in some cases to provide early notification to occupants to achieve this end.

However, the current D-t-S provisions do not prescribe accessible solutions for occupants with disability despite the mandatory Performance Requirements requiring exits and warnings being appropriate to the number, mobility and characteristics of occupants⁴.

Instead, building management practices supplement the needs of occupants with disability through the establishment of evacuation management procedures and Personal Emergency Evacuation Plans (PEEPs), which are designed to address the needs of the person in relation to the specific characteristics of the building. PEEPs are not a requirement of the NCC yet they are recognised as a necessary and effective measure to assist people with disability respond to an emergency by addressing any inadequacies of the built environment. However, reliance on building management practice alone has complexities and although effective in most cases, may not be feasible in all circumstances⁵. Due to the targeted nature of PEEPs, their effectiveness is heavily reliant upon occupants with disability making themselves known to building managers, which may be undesirable or inequitable in day-to-day activities.

³ Functional Statement DF2 & EF2.1 Building Code of Australia 2013

⁴ Extract of Performance Requirement DP4 and EP2.2 Building Code of Australia 2013

⁵ <http://www.fire.nsw.gov.au/news.php?incidents=1187>

Secondly, the nature of the problem involves the obligations under disability discrimination legislation for building owners to ensure, as far as practicable, that dignified and equitable access to and within buildings, including its fire safety features, is provided for people with disability. The problem involves providing adequate facilities for people with disability to ensure that equitable, dignified and independent egress can occur in the event of an emergency.

Under the DDA, it is unlawful to discriminate against a person because of their disability unless actions to avoid discrimination would cause unjustifiable hardship. For the purposes of the DDA, a person discriminates against another person on the ground of a disability if, because of the disability, the discriminator treats, or proposes to treat, the aggrieved person less favourably than the discriminator would treat a person without the disability in circumstances that are not materially different. In considering the issue of egress from buildings, the HRSC commented:

“Every Australian has the right to expect that reasonable provisions will be made to allow them to leave buildings safely in the event of an emergency. Moreover, it is crucial for equitable, dignified, and independent access to buildings that people with disability can be confident that they will also be able to evacuate from a building in a safe, dignified and independent fashion in the event of an emergency.”

Therefore, not providing egress from buildings for people with disability is considered unlawful and discriminatory unless a case of unjustifiable hardship can be demonstrated.

A report commissioned by the ABCB Office in 2009 by Warrington Fire Research⁶ identified that the primary limitation with emergency egress for people with mobility disabilities is the inability to independently manoeuvre stairs. The report also highlights the difficulties people with vision and hearing impairments experience in recognising safe paths of egress and traditional warning cues in the event of an emergency.

The Consultation RIS asked stakeholders whether they agreed with the description of the problem and if there were any other contributing factors.

The majority of stakeholders agreed with the nature of the problem and felt that the primary problem being addressed by the RIS is the indignity currently faced by people with disability and the associated inequity during emergency evacuations.

Five stakeholders felt that the description of the problem was too narrow and that the problem is likely to be exacerbated by a number of occupants becoming disabled during an emergency event.

Disability advocate groups also felt that the nature of the problem impacts all people with disability and not limited to people with sensory and dexterity impairments.

The limited scope of technical solutions is acknowledged in the Final Decision RIS, as informed by the available options and feedback from early consultation.

⁶ Warrington Fire Research Emergency Egress for People with Disabilities 2009

Extent of the Problem

The extent of the problem is influenced by:

- The number of fatalities of people with disability occurring in new buildings.
- The extent of current unavailability or failing of building management practice which is leading to the undignified egress of people with disability.
- The legal obligations of building owners to ensure egress facilities are provided for people with disability.

One stakeholder felt that it was reductionist to attempt to measure the extent of the problem by the number of fatalities in new buildings or the management practices that lead to undignified egress. The stakeholder suggested that this places a large burden on people with disability being an “experiment” while the system learns what it should do.

While it is not possible to accurately determine the future fatality rate in non-residential buildings, using the historical incidence of fatality is an accepted method of deriving benefit from the avoidance of loss of life for the purposes of regulatory impact analysis.

Another stakeholder was critical of the amount of information presented to support the extent of indignity. However, the RIS acknowledged in order for the extent of the problem of undignified egress to be fully appreciated, consultation with the disability sector and the community on their experience of building management practice was essential.

Number of Injuries and Fatalities

There is no available evidence to suggest that the problem is leading to injury or fatality of building occupants living with disability. Although incidences of injury or fatality are known to occur within the built environment, available data suggests private dwellings are where they predominately occur⁷.

In May 2014, the ABCB commissioned the National Coronial Information Systems Database (NCIS) to report on the number of fatalities that have occurred in non-residential buildings over the last five years. The results indicate a total of three fatalities have occurred, of which, none were people living with disability⁸.

The Consultation RIS asked stakeholders whether they were aware of any injuries or fatalities that have occurred in a non-residential building as a result of a person with disability being unable to successfully evacuate.

Stakeholders who commented on the incidence of fatality generally agreed that from a life safety perspective the extent of the problem is small.

The Fire Protection Association of Australia (FPAA) was recognised by a number of stakeholders as a reliable source of data for fatalities that have occurred in non-residential buildings.

⁷ NCIS Fact Sheet: Deaths in the home (Australia 2003-2007)

⁸ NCIS (2014) Fatalities Resulting from Emergency Events in Non-Residential Buildings

During consultation, FPA Australia advised they were unaware of any fatalities involving a person with disability occurring in a non-residential building.

The Metropolitan Fire Brigade also conducted a search of fire fatalities since 2000 involving people with disability in non-residential buildings. MFB were able to identify two incidents of fatality.

1. A fatality occurred in a factory in 2003. MFB understands that the deceased was affected by long term mental health issues and was believed to be living in the factory. While the deceased was identified by responding firefighters and stopped from re-entering the burning building, after the fire was extinguished the deceased was found inside the factory having re-entered the building.
2. A fatality occurred in a shop with a dwelling attached to the rear in 2007. The structure was damaged by fire the previous week and as a result no utilities were connected. MFB understands that the deceased was affected by mental health issues and was sleeping in the building. The deceased identified the fire to authorities but was unable to provide the location and was unable to get out.

In both incidents the occupants were occupying the building for a purpose other than for which it was designed.

Current Management Practice

Obligations for building evacuation management are contained in Work Health and Safety Regulations (2011) and similar instruments apply in each State and Territory. These contain the duty to prepare and maintain an emergency plan in the workplace. This is the legislative basis to establish procedures for an effective response to an emergency, medical treatment and assistance, and communication between the responsible workplace representatives and all persons at the workplace. AS 3745 Planning for Emergencies in Facilities includes guidance on developing evacuation plans for people with disability and assists in addressing the needs of people with disability.

Preparing evacuation plans for people with disability is highly complex and dependent on the needs of the occupant, the building in which the emergency event is occurring, the nature of the emergency event and the capability and availability of trained personnel to assist in evacuation.

Although there could be complications with planning for evacuations for people with disability, the ABCB is unaware of any evidence to suggest people with disability are being evacuated in an unsafe or undignified manner.

The Consultation RIS asked stakeholders whether they were aware of any situations where a person with disability had been evacuated in an unsafe or undignified manner during an emergency event.

The majority of stakeholders felt that current building management practice is not a complete solution to emergency egress for people with disability. One stakeholder suggested that this is likely to be resulting in both unsafe and undignified behaviour during emergency events.

Stakeholders believed that there are two major barriers to the effectiveness of PEEPS:

1. The reluctance by building managers to implement and maintain PEEPs.
2. The reluctance by people with disability identifying themselves as having a disability to building management.

Most stakeholders reported they were not aware of any unsafe or undignified emergency evacuations. However, one individual provided the following response:

“I was working for an organisation a while back, and their policy was that if there was an emergency, any blind employees had to wait until everyone else had left the building, and then someone would come back and collect us. We had several practice evacuations while I was working there, and not even my immediate manager was allowed to escort me out of the building, and a fire warden refused to let me out. If there had been a real fire, I’d be dead now, and that’s no exaggeration. It was very upsetting and stressful working there knowing that I’d be unlikely to get out if a real emergency happened.”

One stakeholder commented on the nature of current management practices and specifically the reliance on others to assist. They suggest this cannot always be guaranteed.

Another stakeholder felt that it was of concern that a higher awareness of the lack of facilities or procedures is only identified during a drill, false alarm, or actual incident. They suggest that the lack of legislative requirements and guidance material on emergency evacuation for people with disability is resulting in inconsistency within the property industry.

One other stakeholder made reference to a gas explosion that occurred in a residential high rise building in 2009. In this case, many of the residents were elderly and either physically unable to use the stairs, or uncertain if they would be able to manage evacuation. The complete evacuation of the 30 storey building required emergency respondents to resort to the use of steel chairs from units with two members per chair, and four members per wheelchair rotating every four floors consuming a large amount of resources of search and rescue for 3 hours⁹. This example serves to highlight the limitations of building management practice alone.

Human Behaviour in Emergency Events

Providing safe means of escape remains fundamental to occupant safety, human behaviour in an emergency is also an important factor. Given the information available, emergency evacuations have shown that most behaviour is both reasonable, rational, and is often heroic and altruistic. Most people will stop and help others in dangerous situations and take cues from others to understand the situation. Familiarity with the exit also contributes to the chosen egress point and studies have found that people tend to egress where they have entered the building¹⁰. The behaviour of occupants to help others and seek the assistance of trained occupants are highly desirable and

⁹ Fire and Rescue, Post Incident Analysis – Residential High Rise Evacuation, Spring 2009

¹⁰ Levin, M. B. 1984 Human Behaviour in Fire: What We Know Society of Fire Protection Engineers

effective, however, assistance is sometimes not available. It is in the scenario where assistance by others is unavailable the problem is most pronounced.

One stakeholder suggested that although people tend to be altruistic and helpful in a life threatening event, it is unrealistic to think that a volunteer might risk their life to stay with a mobility aid user.

Another stakeholder felt that the willingness of others to assist people in an emergency egress situation (whether they have a disability or not) is important and well-attested, however, cannot be taken for granted, and should not be assumed when developing effective and non-discriminatory emergency egress procedures.

Legislative Requirements

Both life safety and the avoidance of discrimination of people with disability are basic human rights that are reflected in Commonwealth and international legislative instruments. The two legislative instruments that are relevant to providing provision for emergency egress for people with disability are the Disability Discrimination Act (1992) and the United Nations (UN) Convention on the Rights of People with Disability. Both instruments are intended to ensure that the basic human rights of people with disability are met.

The Disability Discrimination Act 1992 (DDA)

The Disability Discrimination Act 1992 (Cth) prohibits discrimination against people with disability in the provision of access to premises¹¹. The DDA aims to influence community attitudes and behaviour through its objectives and the setting of a series of standards, including:

- to eliminate as far as possible, discrimination against persons on the basis of their disability in a range of areas including public transport, employment, education, accommodation and premises used by the public;
- to ensure that as far as practicable, persons with disability have the same rights before the law as the rest of the community; and
- to promote recognition and acceptance within the community of the principle that persons with disabilities have the same fundamental rights as the rest of the community.

The DDA recognises that providing access for people with disability does not mean access at any cost. The use of terms such as “as far as possible” and “as far as practicable” makes it clear that there must be a balance between the benefit and costs of providing access¹². In the case of access, prescription was necessary to manage this balance through the development of the Disability (Access to Premises) Standards due to the pervasiveness of the problem and uncertainty arising from the general obligations. However, the Act is generally enforced primarily through a complaints mechanism, which allows individuals who believe that they have experienced unlawful discrimination to seek a conciliated outcome through the Australian Human Rights Commission and,

¹¹ Section 23, Disability Discrimination Act 1992 (Cth). Hereafter ‘Disability Discrimination Act’.

¹² Department of Broadband, Communications and the Digital Economy (2014) Regulation Impact Statement-Media Access Review, page 6

if that is not successful, to bring an action in the Federal Magistrates Court or the Federal Court of Australia¹³.

The ABCB is aware of three cases where complaints relating to the equity of building provisions to enable emergency egress have been the subject of complaint under the DDA. The cases involved hearing impaired occupants being unable to hear aural warning cues. All cases resulted in visual alarms being provided for hearing impaired occupants^{14,15}.

Despite these examples the extent of complaints activity in relation to emergency egress has been low. Although this could be a reflection of the number of emergency events occurring, several other factors may contribute to the number of complaints.

These factors include:

- The degree of compliance with the general duties of the DDA in relation to premises is low¹⁶.
- There is no direct incentive for building owners and designers to ensure they are in compliance.
- The costs involved in resolving complaints are substantial (ranging between \$5,000-\$40,000).
- Limited resources of complainants mean that relatively few complaints will be carried through from the AHRC conciliation process to the court system.
- The risk and burden of losing a compliant once lodged can be enough to discourage action.
- As access to buildings continues to increase as a proportion of building stock, complaints may increase due to the occasional nature of egress.

The extent to which these other factors influence the number of complaints is uncertain. It should be noted however, that in the absence of clarity of compliance obligations – or the existence of current reviews aimed at determining the obligations – the continuation of the existing complaints-based system would probably involve a higher level of complaints activity than has been observed to date.

United Nations Convention on the Rights of People with Disability

Australia has international obligations under the UN Convention on the Rights of People with Disability. Australia ratified the Convention in 2008 in an effort to promote the equal and active participation of all people with disability. In 2009, Australia became a party to the Optional Protocol to the Convention. This sets out with clarity the obligations on countries to promote, protect and

¹³ Human Rights and Equal Opportunity Commission, *Federal Discrimination Law (2008)*, pp. 259–260.

¹⁴ Human Rights Commission, accessed 14 April 2014 > <https://www.humanrights.gov.au/dda-conciliation-goods-services-and-facilities> <

¹⁵ Human Rights Commission, accessed 14 April 2014 > <https://www.humanrights.gov.au/dda-conciliated-cases-access-premises> <

¹⁶ Final Regulation Impact Statement (2009) *Proposal to Formulate Disability (Access to Premises – Buildings) Standards and Amend the Access Provisions of the Building Code of Australia*

ensure the rights of people with disability, and specifically prohibits discrimination against people with disability in all areas of life.

The principles of the present Convention are:

1. Respect for inherent dignity, individual autonomy including the freedom to make one's own choices, and independence of persons;
2. Non-discrimination;
3. Full and effective participation and inclusion in society;
4. Respect for difference and acceptance of persons with disabilities as part of human diversity and humanity;
5. Equality of opportunity;
6. Accessibility;
7. Equality between men and women;
8. Respect for the evolving capacities of children with disabilities and respect for the right of children with disabilities to preserve their identities.

Article 11 of the Convention sets out the obligations of countries to ensure that people with disability can exercise the right to egress in an emergency and States Parties must take "all necessary measures to ensure the protection and safety of persons with disabilities in situations of risk, including humanitarian emergencies and the occurrence of natural disasters."

Australia's obligation under the Optional Protocol to the Convention allows individuals who feel that their rights under the Convention have been breached to make a complaint to the UN Committee.

In September 2013, the Committee responsible for dealing with complaints identified significant short comings relating to all Australians with disability¹⁷. In response to the obligations under Article 11 the Committee noted concern that there were as yet no specific measures in national plans to address emergency intervention strategies for people with disability. Subsequently, the Committee recommended that all levels of government implement emergency management standards that include provision for preparation, early warning and evacuation of people with disability in emergency events¹⁸.

The Consultation RIS asked stakeholders whether they were aware of any complaints being lodged to building owners, local, state or federal government departments in regards to emergency egress facilities.

The Metropolitan Fire Brigade provided two examples of complaints lodged to building managers. In both examples PEEPs were not implemented and upon activation of the emergency warning system people with disability were uncertain of the emergency evacuation procedures.

Another stakeholder suggested that it should not fall on individuals to make formal complaints to implement legislation that addresses the United Nation Committee's findings.

¹⁷ ACB "UN: Australia is not meeting human rights obligations to First People with Disability", accessed 16 August 2014 > <http://www.abc.net.au/rampup/articles/2013/10/14/3868347.htm> <

¹⁸ CRPD: Concluding observations on the initial report of Australia, adopted by the Committee at its tenth session(2-13 September 2013), accessed 16 August 2014 > <http://tbinternet.ohchr.org> <

Requirements of the National Construction Code

People protected from discrimination by anti-discrimination laws may experience difficulties using buildings. Hence, the NCC includes mandatory Performance Requirements that aims to align the objectives of these laws with the requirements of the NCC.

Performance Requirement CP4, DP4 and EP2.2 apply to Class 2 – 9 buildings in relation to the tenability of buildings during occupant evacuations, the number, dimension and distribution of exits and the early notification of occupants in emergency events.

The NCC Guide to Volume One provides explanatory information on what considerations should be taken into account when meeting these Performance Requirements. Matters to be considered include whether the occupants are likely to have limited mobility or capacity to find their way unassisted, and the type and the extent of that limitation.¹⁹

Currently there are no Deemed-to-Satisfy Provisions in the NCC that provides prescriptive solution to meeting these Performance Requirements. Hence compliance with the requirement is reliant on formulating an Alternative Solution which—

- (i) Complies with the Performance Requirement; or
- (ii) Is shown to be at least equivalent to the Deemed-to-Satisfy Provisions.

There is inconsistency with how building professionals are meeting these requirements. One stakeholder believes the requirements are being over looked or justified by a lack of Deemed-to-Satisfy Provisions, while another suggests that the building industry places reliance on implementing emergency egress management plans. Within either of these approaches, it can be assumed that the intention of the DDA and the UN Convention on the Rights of People with Disability are not being satisfied.

Contrary to the above, five stakeholders suggested that responsible design has exceeded the NCC minimum requirements for many years.

Disability Discrimination and Emergency Egress

Every Australian has the right to feel confident that they will be able to evacuate from a building in a safe and independent manner should the need arise as a result of an emergency event. The knowledge that facilities are provided as a means of egress for the able-bodied population means this expectation is met and not necessarily a consideration for the majority of occupants when occupying a building.

The extent to which a lack of emergency egress facilities that enable a dignified and independent means of exiting a building affects people with disability occupying buildings is unknown. It is likely however to contribute to the problem.

¹⁹ National Construction Code Guide to Volume One (2014) Page 199

The Consultation RIS asked stakeholders to what extent did they believe lack of emergency egress facilities affected people with disability occupying buildings.

Three separate individuals provided the following responses to the question:

“After a lifetime of experience I avoid entering premises where I am apprehensive about their accessibility particularly in respect of emergency egress. If I do enter I am reluctant to venture beyond the entry level or to a section where I feel unsafe. I have discussed this with other disabled persons who do the same. In these circumstances it is unlikely that complaints regarding the outcome of a disabled person trying to escape from a building would be very numerous.”

“I need to take my hearing aids out before I go to sleep in case I accidentally roll on them and damage them during the night. Once I’m asleep no alarm will wake me up. When I’m staying at a hotel I just have to accept that if a fire breaks out while I’m asleep the first I’ll know about it is when I’ve been burnt to a crisp. Because of this I always feel a little uneasy when staying in a hotel and am glad to get home again.”

“I have always worked in multi-storey buildings. I am not supposed to be in the building when there is nobody else around to assist me in case of an emergency, such as on weekends, unless there is building security staff on duty. This is not practicable as very often I need to be in the office after hours or on weekends, and some buildings do not have security staff at all or they do not work outside of office hours. Therefore, out of necessity I have to take the risk of using the lift if there is an emergency. My deaf colleagues are not allowed to be in the building alone because the building has no visual emergency warning indicators. This is not only a form of discrimination but a restriction with economic and carer impact on the individuals. My deaf daughters face the same hazards and risks at their workplace.”

National Disability Services (NDS) also provided two examples in response to the question where a young man hid during a drill so he did not have to experience the indignity of being carried by neighbours and of a blind women who felt her life was worth less than others’ after she was told she had to wait for her colleagues evacuate.

Following consultation, there is qualitative evidence, although limited, to suggest that the lack of emergency egress facilities within buildings is impacting on a person with disability perception of safety, dignity and self-worth.

Frequency of Emergency Events

Whilst Australia has experienced a number of major building related emergencies in the past 50 years, emergency events in buildings, especially in non-residential buildings are rare.

Fatalities as a result of emergency events in Australia have primarily been in private residences²⁰ caused by fire events. In many cases, evacuation of commercial buildings occur much earlier when there is greater time to evacuate larger volumes of occupants. Generally, there is no personal

²⁰ AFAC (1998) “ Fire Fatalities: ‘Who’s at risk’” Research Report, p87.

attachment to a commercial building and occupants are more likely to leave early rather than to stay and defend in the situation of a private home.

Five Emergency Egress Scenarios

Where data is difficult to obtain the problem can be described by examining the characteristics of the situation in this case describing how people with disability might egress in the event of an emergency.

In describing the problem the RIS presents five scenarios of emergency egress that match the five proposed solutions. It should be noted that the extent to which the problem associated with each proposal influences the rate of fatality in buildings is unknown.

Each scenario is constructed from the perspective of people with disability and the issues they face in a particular situation, where assistance is not available.

Scenario 1 – Sounding alarms in public spaces

The problem for some hearing impaired occupants, predominantly the profoundly hearing impaired, is that a sounding alarm in the public spaces of buildings (if triggered) will not be heard and these occupants will not be notified of an emergency event.

The BCA, through referenced technical standards includes requirements for alerting occupants to emergency situations. These rely on aural signals produced by sounders or amplified sound systems which, depending on their location, are required to be 10 decibels (dB) higher than ambient noise levels and not less than 65dB in sole-occupancy units²¹, and up to 100dB(A) where building occupant warning is required in public areas²². The use of other warning signals such as visual and tactile signals is not mandatory unless where the specific installation requires background noise greater than 95dBA to be overcome. For occupants with a hearing impairment these aural cues may be insufficient to alert occupants of a hazard, delaying egress time.

According to data from the Australian Bureau of Statistics (ABS), about 2.67 million Australians—one in every eight people—have some form of hearing loss²³. Hearing loss is projected to reach five million Australians by 2020²⁴.

Although hearing loss is prominent in Australia, research suggests some hearing impaired people are likely to recognise audio warning cues. The likelihood that a person recognises an audio warning cue

²¹ Clause 3.22 Australian Standard 1670.1 2004 Fire Detection Warning Control and Intercom Systems: Design, Installation and Commissioning.

²² Spec E2.2a Clause 6, NCC Volume One 2014

²³ Australian Bureau of Statistics, 2007-08 National Health Survey, ABS cat. No.4364.0, ABS, Canberra, 2009, p.15.

²⁴ Access Economics, Listen Hear! The Economic Impact and Cost of Hearing Loss in Australia, Report prepared for the Cooperative Research Centre for Cochlear Implant and Hearing Aid Innovation and the Victorian Deaf Society, Melbourne, 2006, p. 39.

is dependent on the severity of impairment. Hearing impairment is classified across four categories and is shown in Table 1.

Table 1 Hearing impairment by category

Impairment	Hearing Loss (dB)	Proportion (%)
Mild	21 – 40	84%
Moderate	41 – 60	13%
Severe	61 – 90	3%
Profound	91+	

The consequences of impairment in the mild and moderate categories are increasing difficulty in comprehending speech. In the severe and profound categories the consequences also include being unable to hear normal speech.

The World Health Organisation describes²⁵:

- Mild hearing impairment as “able to hear and repeat words spoken in normal voice at one metre”.
- Moderate hearing impairment as “able to hear and repeat words using raised voice at one metre”.
- Severe hearing impairment as “able to hear some words when shouted into the better ear”.
- Profound hearing impairment as “unable to hear or understand even a shouted voice”.

Evidence from the literature is clear that auditory alarms can be effective for people with a hearing loss of up to 70dB while they are awake. This result includes people in the mild and moderate categories.

The frequency of a sounding alarm lies within the audible range of conversation: 3,100Hz compared with the range of conversation of 500 – 4,000Hz. People who can hear a conversation will therefore hear a sounding alarm. Hence people with a mild or moderate hearing loss should be able to hear a sounding alarm; people with a severe or profound impairment will not necessarily hear a sounding alarm.

Two studies have indicated the number of people with a hearing loss of more than 65dB – people with severe and profound impairment – to comprise 80,100 people or 0.3% of the Australian population (or 3% of all people with hearing impairment²⁶). Hence 0.3% of Australians will not hear a sounding alarm in the event of an emergency.

Scenario 2 – Sounding alarms when occupants are asleep

The problem for some hearing impaired occupants, including the profoundly hearing impaired, is that when occupying a publicly accessible room in a Class 1b and Class 3 building (e.g. hotel), and asleep, a sounding alarm will not be suitable to arouse these occupants to respond to an emergency event.

²⁵ World Health Organisation

²⁶ Centre for Population Studies (1998) and Access Economics: The Economic Impact and Cost of Hearing Loss in Australia (2006).

In the event of an emergency, hearing impaired occupants are at greater risk of not being notified of the event due to the inability of the alarm to alert the occupant. There are two known fatalities in Australia that have occurred as a result of hearing impaired occupants not being notified of a signaling alarm^{27,28}. These fatalities occurred in private residences where they were alone and asleep.

The responsiveness of people with disability to a sounding alarm, when asleep, has been tested in a study on 120 people who were asleep.²⁹ Smoke detectors were positioned seven feet from the floor of the room and ten to thirteen feet away from the head of the bed on the opposite wall, sounding at 85dB. The study found that the audible smoke detector signal was 92% effective across all sleep stages for the hearing able population, 57% effective for the hard of hearing and 0% effective for deaf persons.

The study shows that 1,148,100 people or 5% of the Australian population (or 43% of hearing impaired people) would not hear a sounding alarm when asleep.³⁰

In an emergency event 5% of Australians who are asleep in a hotel or other Class 3 building would not hear a sounding alarm.

Scenario 3 – Retracing steps to point of entry

In an emergency, if visually impaired occupants are unable to detect the exit signs in a building, they may respond by retracing their steps via an access way to their point of entry. If the entry point is a lift, and the lift is not designed for use during an emergency event, and there are no fire-isolated stairs close to the lift, then visually impaired people will be unable to evacuate the building.

Occupants with disability are often reliant on routes with accessible features to gain access to buildings. Often the chosen point of access is familiar and suitable for use due to the requirements of AS 1428.1 Design for access and mobility.

As previously discussed, human behavior in emergency events shows that occupants will tend to exit via where they entered the building. This is particularly the case for people with vision impairment. Wayfinding techniques are a common and effective method of independently negotiating the built environment.

A study conducted in 1996 suggests there are three main variables in an occupant's choice of exit when there is an emergency event familiarity with the exit, distance to the exit, and whether the

²⁷ Deaf Australia (2003) How many deaf have to die?

²⁸ ABC News (2008) One dead as blaze destroys house

²⁹ Roby Smoke detector alert for the deaf

³⁰ The proportion of deaf people is unknown but would be too small to affect this calculated percentage; severe and profoundly hearing impaired people comprise 3% of all people with hearing loss.

door is open or closed³¹. The study demonstrates the preference of 17 occupants based on the three variables in deciding which exit to choose in the event of an emergency. The results are shown in Table 2.

Table 2 Occupant preference in exiting buildings

Emergency Exit	Distance to Familiar Exit	Familiar Exit	Emergency Exit
Closed	Short	13	9
Open	Short	9	7
Closed	Long	10	7
Open	Long	1	15

Source: Department of fire safety engineering, Lund University 1996

The findings of the study conclude that most of the occupants preferred to exit via familiar exits even when the distance was double compared to the emergency exit. The only exception is when the emergency exit is open.

Although no empirical data exists, anecdotally, familiarity of the exit would have greater importance to a person with disability.

The problem in this scenario is where the point of access is no longer suitable for use due to a hazard. In this scenario the emergency egress point may be some distance from the original entrance point delaying the time taken to find a suitable means of evacuation.

Vision Australia report there are approximately 357,000 people or 1.6% of the Australian population who are blind or have low vision. Of these 35,000 are blind and 322,000 have low vision. The number of Australians who are blind or have low vision is predicted to be 564,000 by 2030³².

Visual acuity can be described for the mild, moderate, severe, profound categories of disability, and for near blindness; total blindness does not permit any visual acuity. Table 3 describes the categories of visual disability by severity.

³¹ Benthorn L, Frantzich H. 1996. Fire alarm in a public building: How do people evaluate information and choose evacuation exit?

³² Vision Australia (2014): Submission to the Australian Building Codes Board Emergency Egress for Occupants with Disability Consultation Regulation Impact Statement, p. 3.

Table 3: Visual acuity by visual disability category

Category	Reading Ability	Skills for Orientation and Mobility
Mild (near normal)	Normal reading speed, reduced reading distance	Normal performance in orientation and mobility; occasionally surprised by events on the side
Moderate low vision	Near normal with reading aids	Near normal performance; requires scanning for obstacles
Severe low vision	Slower than normal with reading aids	Visual mobility is slower than normal; requires continuous scanning; may use cane as adjunct
Profound low vision	Marginal with aids	Must use long cane for detection of obstacles; may use vision as adjunct for identification
Near blindness	No visual reading	Visual orientation unreliable; must rely on long cane, sound, guide dog

Source: Colenbrander A, *Measuring vision and vision loss*, chapter 51 in Duane's (2001) *Clinical Ophthalmology*

This information indicates that people with mild and moderate low vision would detect exits and exit signs. A person with severe low vision may also detect an exit. If the person uses continuous scanning, this takes time to allow for slower visual acuity. Persons with profound low vision or near blindness would not visually identify an exit.

Data from a Victorian study in 2004³³ shows 10% of people with vision impairment had low vision that was severe or greater. On the basis of this data, 23,000 or 0.10% of Australians would have difficulty detecting an exit in an emergency.

Scenario 4 – Egress paths to and from exits

For persons with mobility impairment, exits not designed as accessways may result in the inability to reach the exit in an emergency. This may cause instances where evacuation of people with disability is undignified.

In buildings with greater floor area and multiple exits, an access-way from the point of entry may not be appropriately separated from the effects of fire in the event of an emergency and people with a mobility disability could be injured or impeded in their ability to reach the exit. In an emergency this could pose a risk to life. This situation – a lack of accessways to exits – would be a problem, and human intervention would be required to assist those people with disability evacuating the building. The extent to which that intervention would cause undignified egress is unknown.

There are 630,000 mobility impaired people or 3% of the Australian population who require the use of aids to carry out day to day activities³⁴.

Not all people with mobility aids will be able to negotiate paths of travel to an exit, particularly where non-fire-isolated stairs are used. People with larger mobility aids, such as wheelchairs or

³³ Hugh R Taylor, Jill E Keeffe, Hien T V Vu, Jie Jin Wang, Elena Rohtchina, Paul Mitchell and M Lynne Pezzullo. 2005. *Vision Loss in Australia*.

³⁴ ABS Category 4446.0 Table 4 Disability Aids

walking frames, will not be able to independently egress. Nonetheless, the ability to reach an exit will facilitate assistance in due course, and assist in the evacuation process.

Scenario 5 – Emergency egress using fire-isolated stairs

For occupants with a visual impairment the lack of accessible features such as tactile indicators at the commencement of a fire-isolated stair ahead, or open risers in stairs creates a risk of injury due to a lack of predictability in the built environment.

For people with mobility impairment, lack of a second handrail could create problems in using fire-isolated stairs.

Current requirements for fire-isolated stairs and ramps do not require full compliance with the requirements of AS 1428.1.

Currently the BCA requires fire-isolated stairs to have one handrail on the inside that is continuous. The stair dimensions must conform to the normal BCA specifications for the risings and goings of stairs. Currently the inside handrail will be helpful for some occupants while evacuating. It could, however, be insufficient for people with a dexterity impairment who are unable to grasp an inside handrail.

Tactile Ground Surface Indicators (TGSIs) are recognized as very effective in identifying hazards for the visually impaired population. Not applying these visual and tactile cues in fire-isolated stairs and ramps may pose a risk in the event of an emergency to visually impaired occupants who, due to the unpredictability or inconsistency of TGSi application, may not be able to identify change in direction or slope when evacuating. Similarly the use of open risers in fire-isolated stairs has the potential to create difficulties for these occupants in negotiating stairs unassisted.

The Consultation RIS asked stakeholders whether they have had personal experience in any of the described scenarios and if the risks faced by people with disability were sufficiently described.

Stakeholders did not provide first-hand experience of being involved in an emergency event.

One stakeholder believed that the scenarios were an accurate description of the risks faced by people with disability. Another individual reported they were aware of a number of people who had not heard a sounding alarm and had failed to evacuate buildings in a dignified manner.

International Comparisons

Two comparative studies^{35,36} of international regulations have been conducted to determine the approaches and methodologies in other jurisdictions in relation to provisions for emergency egress for people with disability. The following findings were reported:

National Fire Code of Canada:

The National Building Code of Canada does not address emergency egress for people with disability, instead it is considered in the National Fire Code via a functional statement which states ‘that the emergency procedures to be used in case of fire shall include provisions for evacuating occupants, including special provisions for persons requiring assistance.

Hong Kong:

The Hong Kong Code of Practice for Fire Safety in Buildings is a performance-based code, and the prescriptive part requires a refuge floor on every 20 storeys or 25 storeys depending on the building use. The refuge floor requirement does not apply to domestic buildings or composite buildings not exceeding 40 storeys in height above the lowest ground storey. The code also requires that such buildings be served by a fireman’s lift to facilitate rescue assistance. These requirements have also been adopted in other areas of China and in some Asian countries.

Sweden Building Regulations BBR:

Sweden does not have specific prescriptive requirements for emergency egress for occupants with disability. Their means of describing obligations for emergency egress for all occupants is through a functional statement.

Norwegian Building Regulations:

Norway does not address emergency evacuations for people with disability on the basis that persons with disability are more aware of their situation and are likely to be assisted by other occupants and rescue services.

Building Standard Law of Japan

Japanese building regulations do not contain prescriptive requirements for emergency egress for people with disability. Provisions for egress of people with disability are presented in emergency evacuation management plans for individual buildings and these plans are submitted to fire service authorities for approval.

United Kingdom Building Regulations

The United Kingdom has a performance-based code that applies in England and Wales and Approved Documents which contain approved building solutions. Approved Document B Volume 2 (2006) deals with Fire Safety in buildings other than dwelling houses. Performance requirement B1 is generic (i.e. it does not differentiate between ambulant people and people with disability). Only a guidance note to the requirement identifies potential issues relating to emergency egress for people with disability.

³⁵ Warrington Fire Research Emergency Egress for People with Disabilities 2009

³⁶ ABCB Handbook 2013- Lifts Used During Evacuation

Approved Document B requires that buildings in excess of 30m high be designed for phased evacuation and that stair capacity be based on one exit stairway being discounted due to use by emergency personnel. Arrangements are to be determined in consultation with the fire service. An additional requirement is that these buildings be equipped with a fire-fighting shaft including a protected lift dedicated to emergency response service.

Approved Document M addresses access and use of facilities in buildings by people with disability; however, it does not specifically address egress by people with disability.

UK legislation requires employers to implement effective arrangements for access and emergency evacuation for employees and visitors. Part of the requirement is the completion of a PEEP for people with disability. The PEEP addresses the safety of a specific individual and records the safety plan, including evacuation routes, corridors, stairs or refuges etc. It also identifies people who will assist the individual and their training or practice needs. It proposes the use of emergency lifts and safe refuges that are protected from fire.

In public places UK workplace legislation proposes that employers, when conducting a fire risk assessment and considering the means of escape from a fire, incorporate the recommendations of the British Standards Institute BS 9999: 2008 – ‘Fire safety code of practice for the design, management, and use of buildings’. This document specifies what is required in relation to building design, lift design and building management responsibilities and procedures including providing information on improving accessibility for people with disability in fire safety design and management plans.

International Building Code (USA)

The International Building Code has specific provisions for ‘accessible means of egress’. The provisions require accessible spaces within a building to be provided with at least one accessible means of egress.

The specific provisions include requirements for accessible means of egress to be continuous to a public way or an exterior assisted rescue area provided. For buildings more than four stories high at least one accessible means of egress must be via a lift and refuge areas directly connected to a stair or lift and provided with communication and evacuation details. Tactile indicators are required at the doorway of a refuge area.

Generally the level of provisions from these countries is comparable with Australia’s existing access provisions and the performance based functional requirements for emergency egress.

Objectives

The Objective in addressing the problem of emergency egress for people with disability relates to the safety of these occupants in new Class 1b, 2, 3, 4, 5, 6, 7, 8 and 9 buildings.

- To ensure an appropriate level of safety in new buildings for occupants with disability.
- To ensure that the National Construction Code reflects the obligations expressed under the Disability Discrimination Act and international obligations with respect to dignity, equality and independence.

Options

There are three options, including the option of retaining the status-quo presented for consideration. These options are as follows:

The Status Quo

The status quo will be regarded as a baseline from which the incremental impacts of the proposals and alternative options will be assessed.

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, the RIS will conclude in favour of retaining the status quo.

Option 1

- To include into the National Construction Code, enhanced emergency egress provisions for people with disability.

This Option involves including five proposals developed in collaboration with the disability sector in the Deemed-to-Satisfy Provisions of the BCA. The proposals are listed below.

Proposal 1 - Visual Alarms

This proposal requires visual alarms to be provided where automatic smoke detection and alarm systems are required in accessible areas of buildings.

The proposed changes are intended to assist those with a hearing impairment to receive adequate warning at the same time as other occupants in areas that require notification and coordination of egress for sound system and intercom systems such as public areas.

Proposal 2 - Tactile Alarms

This proposal requires tactile alarms – pillow shakers to be provided in all bedrooms of Class 1b buildings and all accessible SOUs of Class 3 buildings.

A subset of this Option is providing tactile alarms in all residential areas of Class 1b and Class 3 buildings. This has been costed in the impact analysis on the basis that people with hearing impairment may not have any other physical disability and can occupy any sleeping area.

The proposed changes are intended to provide adequate warning to those occupants with a hearing impairment who are asleep and require notification of an emergency event.

Proposal 3 – Co-location of Fire-isolated Exit with Lifts

This proposal requires one fire-isolated exit to be within 6 metres of a lift or each bank of lifts.

The proposed changes are intended to improve the opportunity for visually impaired occupants who rely on way-finding techniques to locate and use suitable exits in an emergency.

Proposal 4 - Egress Paths to and from an Exit

This proposal requires the paths of travel to a place of safety to be accessible for use by people with disability. The egress paths must be designed as accessways with features which satisfy the requirements of AS 1428.1.

The path from an exit to a 'safe place' (as defined by the NCC) must also comply as an accessway.

The proposed changes are intended to provide suitable pathways to exits for people with disability and allow for dignified and independent egress.

Proposal 5 - Accessibility of Fire-isolated Exits

Fire-isolated exits are required to include accessible features in accordance with AS 1428.1. This includes but is not limited to:

- a) an additional handrail
- b) Tactile Ground Surface Indicators (TGSIs) at the commencement of fire-isolated stairs or ramps.
- c) Limitations on door opening forces
- d) Luminance contrast between doorways and door frames.

External stairways used in lieu of fire-isolated stairways require accessibility features, particularly:

- a) an additional handrail
- b) TGSIs.
- c) closed stair risers

The proposed changes are intended to allow for dignified and independent egress from suitable exits in the event of an emergency.

Option 2

- To develop a non-regulatory handbook

This Option involves the ABCB developing a non-regulatory handbook that would provide suitable guidance for industry to incorporate emergency egress provision for people with disability. The ABCB Office, in collaboration with the jurisdictions, disability sector and industry experts, has developed a set of technical building solutions that address the problem of emergency egress for people with disability. Under this option the proposals outlined in Option 1 would be released as a handbook for reference and use on a case-by-case basis by State, Territory and Local Governments and the building industry.

The Consultation RIS asked stakeholders whether they believed there were any cost-effective measures that could be implemented.

Stakeholders suggested the following alternative options:

- Implementing automatic fire suppression systems in Class 2-9 buildings.
- Implementing refuges for buildings over 12 metres in height or on upper floors of new multi-storey developments.
- Mandating suitable lifts for use during emergency evacuation.
- Mandating the preparation of AS 3959 compliant emergency management plans.
- Narrowing the scope of the proposals to certain buildings based on their size and use.
- Equipping building occupants who are deaf with a vibrating pager connected to the Fire Indicator Panel.
- Requiring occupant warning systems to have the capability to easily incorporate local visual warning devices for hearing impaired persons. Only install the devices as and where needed.
- Eliminating open tread construction in fire isolated stairs and ensuring fire doors are painted in contrasting colours to their frames.

It should be noted that currently, proposals 1, 2 and 5 reflect the intent of the final two points, however, of the remaining alternative options, from observation these would be either unsuitable for inclusion in the NCC, less effective than the current proposals and/or likely to impose greater than immaterial impacts on the community and require a separate RIS.

Impact Analysis

This section provides an assessment of the incremental costs and benefits of the Options 1 and 2, compared with the status quo baseline.

Number of Buildings

The number of building approvals each year is not collected nationally. Victoria previously collected data on the number of approvals issued each year. It is known through ABS comparisons that Victoria accounts for approximately 25% of all building activity occurring annually. This has been verified in the following ways:

- Value of non-residential work completed 2003-2013 account for 24.7% of all activity:
 - Catalogue 8752.0 Tables 71 and 72³⁷.
 - The number of other residential units completed 2003-2013 account for 25.9% of all activity.
 - Catalogue 8752.0 Tables 37 and 39³⁸

The expected number of new buildings approved annually is shown in Table 4.

³⁷ Catalogue 8752.0 Building Activity, Australia Tables 71 & 72 “Value of Non-residential Buildings, Work Completed”

³⁸ Catalogue 8752.0 Building Activity, Australia Tables 37 & 39 “Number of Dwelling Units Completed by Sector”

Table 4: Number of new buildings approved in Australia annually

Building Class	Number
Class 1b	200
Class 2	2,546
Class 3	181
Class 5	2,631
Class 6	1,473
Class 7a	335
Class 7b	2,219
Class 8	1,292
Class 9a	181
Class 9b	1,908

Option 1

The costs associated with this option are categorised by both proposal and building classification. In order to meet the Objective it is assumed all proposals are required to be implemented. It should be noted, however, that if one or more of the proposals identified in the RIS were employed, it would go some way to addressing the problem, including the issue of equity and independence.

The five proposals are intended to apply to areas required to be accessible as described by Table D3.1 of NCC Volume One, and do not apply to all building classes. The proposal to provide supplementary tactile alarms with audial warning cues only apply to accessible dwellings in residential parts of Class 1b and Class 3 buildings. The proposal to supplement audial warning cues with visual alarms applies to public areas of all classes except Class 1b buildings. The other three proposals apply to all building classifications required to be accessible.

Costs

The costs of the proposals are informed by two reports:

- Design and Cost Implications for the Provision of Occupant Warning for Hearing Disabilities ORR Partners May 2014, looking at the typical systems used to alert the hearing impaired and their relative cost of the systems.
 - Informs the visual and tactile alarm proposals.
- Proposed Amendments to Deemed to Satisfy Provisions BCA 2014 Emergency Egress Cost Implications Study RLB June 2014, who used their industry knowledge and experience to provide an analysis of the cost implications of the 5 proposals using typical (generic) examples of the range of representative building classes. A disaggregated cost matrix by building class and proposal is included in Appendix A.
 - Informs all proposals.

Proposals 1 & 2

Visual Alarms

Visual alarms were costed by RLB in two parts using costs and configurations provided in the ORR Partners report. Costs were developed by applying common configurations for visual and tactile alarms that would be given effect through amendments to the current NCC referenced document AS 1670.1 to require –

- visual and tactile alarms be installed in accordance with AS 1603.17 “Automatic fire detection and alarm system, warning equipment for people with hearing impairment”; in accessible sole-occupancy parts of Class 1b and 3 buildings; and
- visual alarm devices supplement audial warnings in AS 1670.1 “Fire detection, warning, control, and intercom systems – System design, installation and commissioning - Fire” in accessible public areas in other classes.

The cost to install VADs to accessible public areas in representative building classes are shown in Table 5.

Table 5: Costs of installing visual alarm devices in accessible common areas per building classification

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 2	\$3,200	2,546	\$8,147,200	\$61,228,100
Class 3	\$2,700	181	\$488,700	\$3,672,694
Class 5	\$94,667	2,631	\$249,068,887	\$1,871,810,532
Class 6	\$34,250	1,473	\$50,450,250	\$379,145,346
Class 7a	\$10,400	335	\$3,484,000	\$26,183,069
Class 7b	\$50,900	2,219	\$112,947,100	\$848,823,688
Class 8	\$2,500	1,292	\$3,230,000	\$24,274,200
Class 9a	\$18,600	181	\$3,366,600	\$25,300,781
Class 9b	\$45,000	1,908	\$85,860,000	\$645,257,841
Total Cost			\$517,042,737	\$3,885,696,251

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with costs of this proposal are:

- Visual alarm devices can be installed as part of the building smoke detection system.
- Approximate coverage of a visual alarm device is 28m² to areas where small coverage is required (e.g. small rooms, and 90m² to larger open areas e.g. warehouses).
- Allowance has been made for additional circuitry for each VAD from all accessible areas to the existing addressable system. An allowance of 10m per VAD has been allowed.

Visual and Tactile Alarms

Under this proposal, visual and tactile alarms will be required to be installed in all accessible SOU parts of Class 1b and Class 3 buildings.

The midpoint cost of installing VADs and tactile alarms in each representative building are shown in Table 6.

Table 6: Cost of installing tactile and visual alarms to the accessible sole-occupancy units in Class 1b & 3 buildings

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 1b	\$3,300	200	\$660,000	\$4,960,053
Class 3	\$3,500	181	\$633,500	\$4,760,900
Total Cost			\$1,293,500	\$9,720,953

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with the costs of this proposal are:

- Visual alarm devices are installed in each SOU as required and can be installed as part of the building smoke detection system in Class 3 buildings.
- Pillow shakers are installed in each bedroom and meet the requirements of AS 1603.17.

This option was developed using the assumption that building occupants with disability have a role in ensuring early notification is provided to them while sleeping in an unfamiliar building. Under this option it is assumed that occupants with disability are identifying themselves to building managers as requiring assistance and occupying accessible SOUs.

As previously discussed, a subset of this option has been costed that extends the proposal to all SOUs of Class 1b and Class 3 buildings. The cost of installing VADs and tactile alarms in each representative building are shown in Table 7.

Table 7: Cost of installing tactile and visual alarms to all sole-occupancy units in Class 1b & 3 buildings

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 1b	\$3,300	200	\$660,000	\$4,960,053
Class 3	\$133,700	181	\$24,199,700	\$181,866,366
Total Cost			\$24,859,700	\$186,826,419

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value

The subset of the option was developed using the assumption that building occupants with disability should not be required to identify themselves as requiring assistance. Under this option it is assumed that occupants with disability are not identifying themselves to building managers as requiring assistance.

The Consultation RIS asked stakeholders whether visual and tactile alarms, if implemented, should be installed in all SOUs in Class 3 buildings or only those required to be accessible.

There was a mixed response from stakeholders who responded to this question, although the majority of stakeholders were supportive of requiring visual and tactile alarms in all SOUs.

The disability sector were generally supportive of visual and tactile alarms in all residential areas while other individuals and an industry group were supportive of tactile and visual alarms to be installed in accessible SOUs of Class 3 buildings only.

Proposal 3

Co-location of Stairways with Lifts

Under this proposal, all accessible lifts would be required to be located within 6 metres of a fire-isolated exit. RLB analysis suggest that the proposal is generally industry practice, except buildings with large floor plates where additional fire-isolated exits may need to be considered and in high rise office buildings where additional banks of lifts are required to carry occupants to the upper storeys.

RLB consider that the additional cost of co-locating lifts with fire-isolated exits may be an issue in Class 5 and Class 6 buildings. The analysis in Table 8 is indicative of costs however, these were considered avoidable in all but the minority of cases. At the time of this Consultation RIS no data was available to determine what percentage of Class 5 and Class 6 buildings were likely to be affected. As such the costs are reported on a per unit basis and have not been included in the total costs of the proposals. These costs are unlikely to significantly impact the Present Value of all proposals.

Table 8: Cost of co-locating lifts with fire-isolated exits

Building Class	Cost
Class 5	\$6,333
Class 6	\$5,850

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with costs of this proposal are:

- The primary costs are the additional hours for design. Design fees have been included at \$200 per hour and an allowance of a period of 16 hours has been assumed.
- In the Class 5 building, 1 lift has been assumed to require relocation to meet the proposal.
- In the Class 6 building, 4 lifts have been assumed to require relocation to meet the proposal.

Proposal 4

Accessible Egress Paths to and from an Exit

Under this proposal, all paths of travel to and from and exit will be required to comply as an accessway in accordance with AS 1428.1. This includes the point of discharge from an exit to open space.

RLB considered the costs in two parts. Firstly they considered the incremental cost of providing accessible paths of travel to an exit within the generic buildings. The costs associated with this part of the proposal are shown in Table 9.

Secondly, RLB considered the incremental cost of providing accessible paths of travel to open space once discharged from an exit. RLB found that while there may be significant costs associated with the installation of an accessway, these could be accounted for through thoughtful design of exits. RLB based their calculations on the assumption that a path provided that did not include a step bollard or similar would not require additional enhancement to facilitate safe egress once discharged from the building.

Table 9: Cost of providing accessible paths to and from exit points

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 2	\$6,450	2,546	\$16,421,700	\$123,412,889
Class 3	\$4,233	181	\$766,172	\$5,757,968
Class 5	\$4,467	2,631	\$11,752,677	\$88,324,097
Class 6	\$16,700	1,473	\$24,599,100	\$184,867,950
Class 7a	\$1,600	335	\$536,000	\$4,028,164
Class 7b	\$24,000	2,219	\$53,256,000	\$400,231,209
Class 8	\$1,600	1,292	\$2,067,200	\$15,535,488
Class 9a	\$2,500	181	\$452,500	\$3,400,643
Class 9b	\$8,680	1,908	\$16,561,440	\$124,463,068
Total Cost			\$126,412,790	\$950,021,476

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with this proposal include:

- Where applicable, inclusion for the installation of threshold and step ramps at each point of egress and at differences in level.
- Where there is a ramp or threshold installation included in a 3 storey accommodation with no lift property type, it is assumed these installations are compliant of the Deemed-to-Satisfy Provisions.

Proposal 5

Accessibility of Fire-isolated Exits

Under this proposal, all fire-isolated exits will be required to include accessible features in accordance with the requirements of AS1428.1. Costs associated with this proposal primarily relate to the additional requirements for landings, handrails and TGSIs. The analysis by RLB also considers the effects of a minimum setback of 900mm from the property boundary, luminance contrast of surfaces and door controls. Costs associated with this proposal are shown in Table 10.

Table 10: Cost of providing accessible fire-isolated exits

Building Class	Cost	Number of Buildings	Total Cost	Present Value Cost
Class 2	\$136,850	2,546	\$336,103,600	\$2,525,896,614
Class 3	\$95,233	181	\$17,237,173	\$129,541,358
Class 5	\$152,133	2,631	\$400,261,923	\$3,008,061,312
Class 6	\$44,450	1,473	\$72,839,850	\$547,408,390
Class 7a	\$48,500	335	\$16,247,500	\$122,103,736
Class 7b	\$8,200	2,219	\$18,195,800	\$136,745,663
Class 9a	\$29,500	181	\$5,339,500	\$40,127,583
Class 9b	\$36,600	1,908	\$69,832,800	\$524,809,711
Total Cost			\$936,058,146	\$7,034,694,266

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

Key assumptions associated with this proposal include:

- A rate of \$200 per metre has been included for the additional handrail to each flight of stairs. This includes the material cost of the component at \$110 per metre and \$90 per metre for additional labour.
- Costs for handrails were revised based on stakeholder feedback that the assumptions for existing handrails were incorrect as changes introduced in NCC 2013 requires that they comply with AS 1428.1.
- The installation of TGSIs has been allowed for in all fire-isolated stairs in accordance with AS 1428.1 where applicable.
- Painting of the surfaces will be sufficient in reaching the required luminance contrast between doors and surrounding surfaces.

A number of stakeholders expressed concern with this proposal and suggested that further research be undertaken to ensure the proposal is practical and effective.

Particular concerns with the proposal were:

- The effectiveness of TGI luminance contrast where large numbers of people are evacuating
- The potential for TGSIs to interfere with the operation of a fire door
- The reduction in maximum allowable opening force from 110N to 20N and the effectiveness of the self-latching device.

In addition to raising these concerns, in their submission to the proposal the ACAA offered an alternative to TGSIs that may have benefits for occupants with visual impairment at a (suggested) lesser cost. This includes substituting TGSIs with Braille and Tactile signs to depict on an exit door if the exit contains a stair (pictogram and words) in conjunction with the installation of raised tactile dome on handrails in fire-isolated stairs to indicate the approaching stair. Removing the need for TGSIs would have a significant bearing on the cost of proposal 5, with the potential to reduce it by up to half.

The door hardware manufacturer ASSA ABLOY also suggest a practical alternative to overcome the issues with adopting the opening forces, is to use those required by BS 8300:2009 which are slightly higher than those of AS 1428.1, yet in their opinion would ensure the fire isolation of a pressurised stair, although, the impact on cost is unclear.

Total Cost of Proposals

The total cost of the proposals is shown in Table 11. The costs of all proposals significantly impact Class 2 and Class 5 buildings where proposals 1 and 5 are the predominate costs (92% of the total costs) incurred across all building classes.

Table 11: Total cost of all proposals by building class

Building Class	Total Cost of Proposals	Present Value Cost
Class 1b	\$660,000	\$4,960,053
Class 2	\$360,672,500	\$2,710,537,603
Class 3	\$19,125,545	\$138,972,020
Class 5	\$661,083,487	\$4,968,195,941
Class 6	\$147,889,200	\$1,111,421,686
Class 7a	\$20,267,500	\$152,314,969
Class 7b	\$184,398,900	\$1,385,800,560
Class 8	\$5,297,200	\$39,809,688
Class 9a	\$9,158,600	\$68,829,007
Class 9b	\$172,254,240	\$1,294,530,620
Total Cost	\$1,580,807,172	\$11,875,372,146

*Where there are multiple representative buildings for a particular building class a midpoint has been taken.

** A discount rate of 7% over 10 years was used to calculate the Present Value.

As reflected in the above table, mandating any of the proposals would result in a significant Present Value cost to industry and society. Appendix A also contains the RLB summary of costs by building and proposal.

A number of stakeholders suggested it would be useful to have information on the percentage increase in building cost for each of the proposals. The percentage increase in building cost is shown in Table 12. The percentages are derived from the representative building cost outlined in the RLB report and the incremental costs of each proposal. Overall the percentage increase in total building cost is small.

Table 12: Incremental percentage increase in total construction cost

Building Classification	Proposal 1	Proposal 2	Proposal 3	Proposal 4	Proposal 5	Total
Class 1b	-	3.829%	-	-	-	3.829%
Class 2	0.036%	0.005%	-	0.019%	0.454%	0.514%
Class 3	0.035%	0.042%	-	0.045%	1.049%	1.171%
Class 5	0.351%	-	0.013%	0.191%	1.928%	2.483%
Class 6	0.137%	-	0.01%	0.117%	0.5%	0.764%
Class 7a	0.086%	-	-	0.013%	0.427%	0.526%
Class 7b	0.293%	-	-	0.171%	0.062%	0.526%
Class 8	0.063%	-	-	0.04%	-	0.103%
Class 9a	0.063%	-	-	0.008%	0.103%	0.174%
Class 9b	0.136%	-	-	0.054%	0.067%	0.258%

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:

- That the distribution of upper building costs and lower building costs is unknown and a midpoint has been used. The sensitivity analysis will test a $\pm 30\%$ variance in construction cost as a result of this uncertainty.
- 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 rate of approvals has been derived from Victorian data that has been extrapolated across Australia. The extrapolation exercise could contain a degree of error. The sensitivity analysis will test a variance of $\pm 20\%$.

The outcomes of the sensitivity analysis are summarised in the table below, in present value terms, with the impact of each on the assessed level of quantitative costs and benefits provided.

Table 13: Net Present Value Sensitivity Analysis

Parameter	Cost	Present Value Costs
Approvals		
Lower bound 20% decrease	\$1,264,645,738	\$9,504,106,434
Upper bound 20% increase	\$1,896,968,606	\$14,256,159,643
Alternative Discount Rates		
Lower bound 3% discount rate	\$1,580,807,172	\$13,889,143,998
Upper bound 11% discount rate	\$1,580,807,172	\$10,333,811,623
Construction Costs		
Lower bound 30% decrease	\$1,106,565,020	\$8,316,093,124
Upper bound 30% increase	\$2,055,049,324	\$15,444,172,953

* A discount rate of 7% over 10 years was used to calculate the Present Value.

As observed above, variation in the major assumptions still results in a large Present Value cost.

Effectiveness of the Proposals

Proposal 1 & 2

Bruck and Thomas³⁹ conducted a research report on the waking effectiveness of tactile and visual alarms on a sample of the hearing impaired population. The report concluded that under normal testing conditions the pillow shaker devices awoke 85% of the hard of hearing participants at the intensity level as purchased (vibrating at intermittent pulses). One stakeholder commented on the effectiveness of current State government subsidy schemes that promote the installation of tactile alarms in private residences for the profoundly hearing impaired population. The technology is considered by the stakeholder as very effective noting that the technology had successfully awoken a Victorian couple to the presence of fire in their private residence.

A report by the Fire Industry Association⁴⁰ in 2012 on the effectiveness of visual alarm devices concluded that VADs were highly effective, ranging from 80%-90% effective, in notifying occupants while awake. It should be noted that the extent and coverage of the test programme was limited and they suggested further tests would be beneficial including using a cross-section of people (e.g. including persons with hearing impairments).

Proposal 3 & 4

From a life safety perspective, the benefits associated with proposal 3 and 4 are unknown. However, these proposals were developed in collaboration with the disability sector and it is likely that implementing the proposals would be of benefit to people with disability in an emergency event particularly in the avoidance of dignitary harm.

Proposal 5

A number of stakeholders expressed concern with this proposal and suggested that further research be undertaken to ensure the proposal is practical and effective.

Particular concerns with the proposal were:

1. The effectiveness of luminance contrast with the TGSi treatment where large numbers of people are evacuating.
2. The potential for TGSIs to interfere with the operation of a fire door.
3. The reduction in maximum allowable opening force from 110N to 20N and the effectiveness of the self-latching device.

The ABCB acknowledges concerns with TGSIs, noting that in the company of others, particularly large numbers of people, the issue of independent egress becomes less relevant. The issue of TGSIs interfering with a fire door was considered in the Directions Report which concluded that while this potential exists, the design and operation of exit doors allows a small clearance over TGSIs, the favourable difference in level due to the absence of a floor finishes generally in fire-isolated stairs would contribute to reduce this potential. However, concerns 2 & 3 are considered to be valid and

³⁹ I. Thomas, D. Bruck (2007) "Strobe Lights, Pillow Shakers and Bed Shakers as Smoke Alarm Signals"

⁴⁰ Fire Industry Association (2012) "Report on tests conducted to demonstrate the effectiveness of visual alarm devices (VAD) installed in different conditions."

have the potential to reduce the overall effectiveness of the proposal by excluding those with an inability to operate a door without the reduction in opening forces required by AS 1428.1.

The practical alternatives received through feedback on the proposals for the ACAA and ASSA ALBOY could be further explored as a means to improve their effectiveness and reduce the overall cost of the proposal. Consultation (and analysis) would be required to confirm that the level of effectiveness was acceptable to the vision impaired community, given current measures have been selected to ensure a level of predictability in the built environment.

Benefits

In 2012, 4.2 million people or 18.5% of Australians reported having a disability⁴¹. As previously identified from earlier research, from a life safety perspective, not all people with disability are likely to benefit from the proposals. Collectively the proposals are estimated to benefit 2,215,200 people or approximately 53% of all people with disability. The beneficiaries of the proposals are outlined in Table 14.

Table 14: Outline of beneficiaries from proposals

	Proposal	Type of disability	Number of people benefited	Percentage of overall impaired population
Notification (Active)	1 & 2 Visual Alarms	Hearing impaired occupants	80,100	1.9%
	2 Tactile Alarms	Hearing impaired occupants	1,148,100	27.3%
Wayfinding (Passive)	3 Co-location of fire-isolated exits with lifts.	Visual impaired occupants	357,000	23.5%
		Mobility impaired occupants	630,000	
			Total: 987,000	
Exit (Passive)	4 Egress paths to and from exits	Visual impaired occupants	357,000	23.5%
		Mobility impaired occupants	630,000	
			Total: 987,000	
Exit (Passive)	5 Accessibility of fire-isolated stairs.	Visual impaired occupants	357,000	21.7%
		Mobility impaired occupants	554,800*	
		Dexterity impaired occupants	Unknown	

* People with larger mobility aids, such as wheelchairs or walking frames, will not be able to independently egress and hence have been excluded from the proportion of people benefited.

⁴¹ Australian Bureau of Statistics Disability, Ageing and Carers, Australia: Summary of Findings 2012.

The primary benefits of the proposals relate to:

- improving the dignity and independence of people with disability in evacuating buildings and:
- reducing the current inequities within the built environment.

These benefits, while accepted as valid, are considered intangible as they primarily relate to creating equal opportunity for people with disability and the avoidance of dignitary harm associated with the reliance of others in emergency events. In this regard, the proposals are likely to benefit all people with sensory and dexterity impairments.

The Consultation RIS asked stakeholders whether there were additional benefits that could be assigned to the proposals and how these could be described or quantified.

Five stakeholders didn't agree that the benefits were intangible, however, acknowledged they are difficult to assess.

These stakeholders suggested that additional benefits should be included in the analysis that included:

- Increase patronage of the building stock and enhanced marketability of the spaces.
- Savings in cost of training of personnel arising from increased independence of occupants and their ability to self-evacuate.
- Possible decrease in cost of insurance premiums.

Following consultation, the ABCB Office considered these potential benefits and provides the following response.

1. There is insufficient evidence to conclude that the proposals would lead to an increase in patronage of buildings. Further consultation with the disability sector is recommended prior to this benefit being included as a primary benefit.
2. Training of all occupants for emergency evacuation procedures is likely to continue as being part of building management practice. It is unlikely that by implementing the proposals it will reduce current training of occupants.
3. The factors that affect the price of insurance premiums are complex. Given the low level of fatalities that have occurred in non-residential buildings, it is unlikely the proposals will influence insurance premiums.

For the above reasons, avoidance of dignitary harm remains the central benefit associated with implementing the proposals.

Quantifying human dignity in Cost Benefit Analysis (CBA) has been attempted by many government agencies both in Australia and internationally. Both supporters and opponents of CBA have expressed the view that dignity in the context of CBA cannot be quantified with any level of accuracy or certainty⁴².

⁴² R, Bayefsky (2014) The Yale Law Journal: "Dignity as a Value in Agency Cost-Benefit Analysis".

Dignitary harm can take multiple forms when associated with the urgency of evacuating buildings. This may include the loss of reputation in the eyes of others; psychological feelings of humiliation; exposure of intimate details; and loss of control over one's surroundings.

The fact that dignity has multiple meanings does not imply that the notion is too subjective to be useful in CBA but that dignity takes on a particular meaning relative to a particular social context. In the context of emergency egress, reliance on others is likely to generate emotional distress for people with disability particularly when the situation is life threatening. The extent to which this dignitary harm impacts a person with disability is an unknown, it is however, expected to be quite high.

Attempting to monetise these benefits in CBA is often misguided and leads to incorrect valuation. Due to this, this RIS does not attempt to monetise these benefits; instead the RIS attempts to determine the scale of benefits associated with the avoidance of dignitary harm through consultation with the community.

An effort to monetise dignity is difficult for three main reasons⁴³:

1. Dignity's complex and malleable nature makes the concept difficult to monetise for principled theoretical reasons.

Dignitary benefits are often associated with other types of benefits. Consequently it is hard to disaggregate people's willingness-to-pay for dignity from their willingness-to-pay for other benefits such as life safety.

2. Attempting to monetise dignity is likely to result in the failure to value dignity in the proper way.

Regulatory agencies have previously used unmonetised benefits as a "finger on the scale" in the determination of regulatory outcomes where the monetised cost and benefits are fairly close. However, dignitary benefits cannot serve the same role between monetised costs and benefits where there is significant difference. In doing so would implicitly value dignitary benefits several times higher than the value of statistical life.

3. Monetised CBA may tend toward various valuations and it is especially important to resist this trend in the case of dignity.

Due to the nature of dignity and the multiple meanings it represents to the community, people value dignity differently based on the social context to which it is used. It is due to this that it is ill-suited to the assignment of a uniform monetary value.

Although dignitary benefits are not quantified in this RIS it is recognised as a basic human right. Often human rights can be enjoyed equally by all without creating conflicts. Delivery of these rights is often through anti-discrimination laws and is generally accepted by all in the community. In some cases however, conflicts arise between meeting the rights of some people and the associated costs imposed on the broader community.

⁴³ R, Bayefsky (2014) The Yale Law Journal: "Dignity as a Value in Agency Cost-Benefit Analysis".

In the case where there are conflicts, decisions must be made about how far they will be pursued. Society has limited resources and many competing demands. Depending on how social welfare is considered by the community, pursuing some rights beyond a certain point might impose unacceptable costs on the community. Under the DDA, the right to freedom from discrimination is not absolute. In many circumstances, discrimination is not unlawful if preventing it would create ‘unjustifiable hardship’.

Willingness to Accept

In cost-benefit analysis, costs and benefits are valued according to the willingness of individuals to pay for them.⁴⁴ Where one side of the equation cannot be calculated accurately the willingness of society to accept a cost for the benefit of others is questioned. Willingness to Accept (WTA) is a concept used to determine if a person or society is willing to accept something at an expense for the benefit of others. In the case of providing emergency egress for people with disability the WTA concept is used to calculate a monetary figure society must be willing to accept. The WTA figures shown in Table 15 are derived from the total annual cost of each proposal divided by the total number of people likely to be benefited.

Table 15: Costs of individual proposals per person benefited

	Proposal	Total Annual Cost	Number of people benefited	Cost per person benefited
Notification (Active)	1 & 2 Visual Alarms	\$517,042,737	80,100	\$6,455
	2 Tactile Alarms	\$1,293,500	1,148,100	\$1.13
Wayfinding (Passive)	3 Co-location of fire-isolated exits with lifts.	-	357,000	0
			630,000	
			Total: 987,000	
Exit (Passive)	4 Egress paths to and from exits	\$126,412,790	357,000	\$128.08
			630,000	
			Total: 987,000	
Exit (Passive)	5 Accessibility of fire-isolated stairs.	\$936,058,146	357,000	\$1,026.60
			554,800*	

⁴⁴ Department of Finance (2006) Handbook of Cost-Benefit Analysis: “The Conceptual Basis of Cost-Benefit Analysis” p21.

The Consultation RIS asked stakeholders whether they felt that the proposals were reasonable adjustments to reduce the current disability discrimination occurring in new buildings.

The question was left unanswered by the majority of stakeholders; however, of those who provided a response, the majority (eight stakeholders) believed that the proposals were reasonable adjustments to the regulations to reduce the current disability discrimination occurring in new buildings.

Option 2

From a life safety perspective, an advantage of this option is that governments and industry could target buildings that may be perceived to be more hazardous for people with disability in an emergency event.

To the extent the problem relates to a lack of practitioner awareness of options to meet the Performance Requirements, a Handbook would go some way to outlining practical methods of compliance, in a similar way to that of the Lifts Used in Evacuation Handbook. The majority of stakeholders agreed the non-regulatory option would not have a significant uptake by industry and will therefore be inefficient in addressing the problem.

This approach would also be an inefficient means to address the extent to which the problem relates to disabled occupants confidence in using buildings and overcoming inequitable outcomes where these occur in building management practice.

Consultation

Consultation is the cornerstone of the ABCB's commitment to create a contemporary and relevant construction code that delivers good societal outcomes for health, safety, amenity and sustainability in the built environment. This must be achieved in the context of good regulatory practice that evaluates the costs and benefits to society, as per the objectives of the ABCB's Inter-Government Agreement. The ABCB recognises the value of engaging constructively with the community and industry in order to achieve this.

The Directions Report on Egress for All Occupants was released by the ABCB for the purposes of public consultation in considering the proposals in October 2013.

The report provided background to the issues associated with disability egress and responses were generally supportive of the proposals to assist occupants with vision and dexterity impairment and were important steps to codifying the obligations under the DDA the Directions Report also discussed use of refuges as a means of affording protection to occupants with mobility impairment. Refuges are protected areas within buildings designed to afford protection for occupants. While construction is technically achievable, they are reliant on trained personnel to effect ultimate evacuation and feedback on the report suggested questions remain over user attitudes and therefore their effectiveness as most respondents expressed a strong preference for lifts, as refuges were considered a less equitable solution.

The Emergency Egress Consultation RIS was released by the ABCB in September 2014 for the purposes of seeking further feedback on the problem and the likely impacts of the options.

Comments were received from twenty three stakeholders in response to the Consultation RIS. These stakeholders were:

1. Australian Door Hardware Association (ADHA)
2. ASSA ABLOY
3. Australian Institute of Architects (AIA)
4. Eric Martin and Associates
5. Association of Consultants in Access Australia (ACAA)
6. Francesca Davenport
7. Fire Protection Association (FPA)
8. Housing Industry Association (HIA)
9. John Deshon
10. Jim Hill
11. John McPherson
12. Kingsley Lunt
13. Lawrence Reddaway
14. Lee Wilson
15. Metropolitan Fire Brigade (MFB)
16. Miles Harrison
17. National Disability Services (NDS)
18. New South Wales Building Administration
19. Property Council of Australia
20. Robert Knott
21. Ross Murphey
22. Richard Smith
23. Vision Australia

Door Hardware Industry

The Australian Door Hardware Association (ADHA) and ASSA ABLOY provided comments in relation to Proposal 5 and specifically the change in stringency for opening forces for doors that form part of a fire-isolated exit. The door hardware industry believes that the proposed reduction in maximum allowable opening force from 110N to 20N will limit the effectiveness of the self-latching device and may increase risk of fire spreading through partly open doorways.

Disability Advocate Groups

Association of Consultants in Access Australia

The Association of Consultants in Access Australia (ACAA) supports the adoption of Option 1 although expresses disappointment in the direction that was taken in framing the RIS.

ACAA are particularly disappointed in the avoidance of analysing mandating the use of lifts for emergency evacuations and believes that the mobility impaired population are the most at risk of harm and the least able to evacuate in an emergency.

ACAA suggests that the use of lifts for people with disability are becoming more noticeable overseas and by leaving the technical measures for lifts as non-regulatory will put Australian developers and building managers behind international trends.

ACAA supports the proposal to require visual alarms where automatic smoke detection and alarm systems are installed, although propose that visual alarms should be installed in any area of the building where a person with hearing impairment could be alone.

ACAA provided further evidence to support the effectiveness of tactile alarms. The Victorian study, conducted in 1991, found that tactile alarms woke 95% of deaf adults and between 77% and 100% of deaf children in different age groups.

ACAA supports Proposal 2 for Class 1b, Class 3 and Class 9c buildings.

ACAA believes Proposal 3 will assist persons with vision impairments, particularly in Class 3 buildings where a person may not be familiar with the building.

ACAA supports the intent of Proposal 4 but urges the clarification of its implementation before mandating.

Particular concerns of ACAA include:

1. The scope of the proposal and whether it includes upper storey waiting spaces or refuge areas.
2. The need for the proposal to extend AS 1428.1 to accessible way finding .

ACAA believes Proposal 5 needs broader debate and consideration, including comparative analysis to lift costing and viability before implementation.

Particular concerns of Proposal 5 are:

4. How do the TGSI's impact landing sizes where a doorway opens into a fire stair. ACAA notes that the gap under the fire door would need to be 7mm and 10mm where the door swings over the TGSI's.
5. The effectiveness of luminance contrast with the TGSI treatment where large numbers of people are evacuating.
6. The practicality of imposing a requirement to achieve door opening forces within a pressurised stairwell without some requirement to improve the fire door assembly. ACAA believes that changing the requirements for fire door assemblies would need further research and extensive testing to determine what door forces can be achieved.

ACAA concludes that the ABCB should continue to research egress strategies and options nationally and internationally and re-issue a position paper in a few years based on the latest trends that include a more comprehensive set of proposals.

National Disability Services (NDS)

The National Disability Services (NDS) supports the stated objectives in the RIS and acknowledges that to achieve these objectives some difficult judgements need to be made about what are reasonable costs and reasonable benefits. NDS believes a nuanced approach to the RIS options is required.

NDS considers that the RIS presents two extreme alternatives and proposes a middle ground option may be more appropriate.

They consider that Option 1 would universally improve egress in new buildings for people with disability and reduce inequity and related indignity. For some people, however, NDS suggest it would not fully eliminate barriers that are better dealt with by access to lifts, while also imposing significant costs.

Alternatively NDS considers that while Option 2 would provide low cost practical advice to the building industry about how to make emergency egress provisions more inclusive of people with disability, compliance would be discretionary and investment would likely be targeted rather than universal.

NDS proposes that the ABCB should consider options in the middle of the continuum, which takes the cost outlay into consideration as well as mandating some improvements to egress to allow more independence for people with disability.

NDS considers the proposal to require co-location of stairways with lifts does not impose significant cost on industry and supports mandating the proposal within the NCC. NDS believes this proposal will result in a universal improvement for people with disability or anyone who may struggle with wayfinding in an emergency.

NDS notes that the proposal to improve accessibility of fire-isolated exits currently makes up the majority of the overall predicted costs. NDS believes that this proposal needs to be considered alongside decisions about improving the use of lifts by people with disability in emergencies.

NDS suggests that costs may be reduced by limiting the types of buildings to which particular regulations apply. For example, the requirement for accessible paths to and from an exit they propose should apply only to buildings that are otherwise accessible.

NDS also proposes that the application of visual and tactile alarms could depend on the building's function. NDS believes it is important to require workplaces and public spaces to have visual alarms. In contrast, the requirement to install visual and tactile alarms in other buildings should depend on the intended use and level of risk.

NDS encourages the ABCB to revise the RIS options to reflect a middle ground that improves the future infrastructure for everyone but does not pose a prohibitive cost.

Vision Australia

Vision Australia supports the adoption of Option 1 and believes that it is important that people who are blind or have low vision are provided with maximum certainty, consistency and predictability in emergency egress situations. They suggest this is only achieved if the proposals become a

mandatory part of building design in Australia, rather than being reliant on a voluntary guideline that may or may not be followed.

Vision Australia feels there is greater potential for risk to personal safety during building egress in view of the current inadequate emergency egress procedures. They believe this level of risk is heightened given that building systems are becoming more complex and security appears to be increasing as the result of terrorist activity. They consider that the implementation of enhanced emergency egress features is therefore timely and necessary.

Vision Australia supports the mandatory installation of pillow shakers and other tactile alarms on the grounds of being an important step forward in providing dignified, independent and safe emergency egress for the visually and hearing impaired population.

Vision Australia suggests that the consistent and predictable application of way finding devices such as TGSIs, handrails and luminance contrast provides people who are blind or who have low vision with a greater sense of dignity, independence and safety when navigating the built environment. They regard the presence of familiar way finding features to not only be important for safety but also important for maintaining the feeling of having some control over the built environment surrounding.

Vision Australia concludes that it is not possible to put a monetary value on the preservation of human dignity, and the promotion and protection of human rights but suggests that the benefits of the proposals would be significant to occupants with disability.

Industry Organisations

Australian Institute of Architects (AIA)

The Australian Institute of Architects Access Working Group (AIA) supports Option 1. The Institute believes there is little evidence to suggest that publication of a non-regulatory handbook would achieve the desired results and maintaining the status quo would not provide a solution to the identified problem.

AIA considers the percentage cost increase per building to be small, noting that the impacts of the proposals have greater impact to smaller buildings. They suggest that inclusion of the percentage increase would allow meaningful discussion of the statement “the proposals have the potential to impose large costs on the community”.

AIA notes that the RLB assumption that currently designed handrails do not include for the handrail to either turn through 180° or return fully to the end post of wall face is incorrect and suggests that the cost estimates should be revised to reflect this requirement as being current industry practice.

Housing Industry Association (HIA)

HIA is generally very negative towards the RIS and suggests that the document lacks objectivity and fails to provide comprehensive information on the potential costs and benefits to allow a comparison across the three options.

HIA considers that the RIS attempts to address a very complex issue by providing a number of practical solutions but in doing so makes no real evaluation of their worth to improve life safety or dignity of egress.

HIA is overall concerned with the approach of the RIS and the questions asked in relation to the evidence of a problem. They consider that there is currently insufficient evidence of a problem that requires additional regulation.

HIA believes that the cost/benefit analysis section fails to satisfy its intended purpose by not quantifying the potential benefits of the proposals. They suggest that the proposals should be individually considered rather than collectively and feel that it is inappropriate to combine the costs.

In relation to Proposal 1 HIA believes it is reasonable to suggest that a person with a hearing impairment in a public space will also be able to gain visual cues from fire wardens and other building occupants in an emergency event.

HIA considers that Proposal 2 should be individually considered due to its limited scope.

In relation to Proposal 3, HIA believes that the costs set out in the RIS do not take account of any potential lost leasable floor area or the alternate additional floor area required to design fire isolated exits within 6 metres of accessible lifts.

In relation to Proposal 4, HIA believes the justification regarding a path of travel in the event of an emergency applies equally to all occupants. They suggest this change does not relate to the exit which may still be a non-isolated stair and therefore still requires a person with disability to receive assistance.

In relation to Proposal 5, HIA notes that this proposal involves the most significant costs to building owners, with a potential \$7.56 billion over 10 years incurred across all building types. HIA considers that the evidence to demonstrate the current risks to egress or dignity from the current design of fire isolated stairs has not been provided. For persons with a significant mobility impairment (i.e. wheelchair bound), these adjustments will make very little if any difference to the manner of egress.

HIA also notes that the RIS does not consider existing buildings and believes it is inappropriate to ignore the costs associated with alternations and additions over the 10 year time period for the cost benefit analysis.

Fire Protection Association (FPA)

The Fire Protection Association Australia (FPA Australia) supports Option 1 in part. FPA Australia notes that Proposal 5 poses some of the most significant costs and considers that the costs outweigh the benefit and therefore suggests rather than making a change to the NCC, to incorporate this information in a handbook.

FPA Australia supports the use of visual and tactile alarms in accessible SOUs of Class 3 buildings and the installation of visual and tactile alarms in all bedrooms of Class 1b buildings. FPA Australia believes to achieve the required goal of providing emergency egress warning to all individuals, this is a necessary cost.

FPA Australia considers Proposals 3 and 4 to be worthwhile changes at minimal costs and supports further consideration of these proposals.

FPA Australia concludes that while the proposals are aimed at assisting people with disability they believe the proposals will assist all people and not solely people with disability. FPA Australia also believes that the installation of automatic fire suppression would greatly assist in providing all occupants with sufficient time to evacuate a building in the event of an emergency and suggest that the ABCB investigate this further.

Government Agencies

New South Wales Building Administration

New South Wales (NSW) building administration supports in principle proposals that reduce discrimination which can enhance the dignity and equitability of persons with a disability. They concur that any proposal must be balanced with a clear understanding of the impacts to the community and industry of implementing those measures from a cost-benefit analysis perspective.

NSW Building Administration believes before a well informed decision can be made, further information is needed in terms of the benefits provided by the proposals from both a qualitative and quantitative perspective.

Victorian Metropolitan Fire Brigade

The Metropolitan Fire Brigade (MFB) responded to all questions asked in the Consultation RIS and their comments have been included throughout the Final RIS.

MFB supports the adoption of Option 1 in the NCC, however, also believes that adoption of Deemed-to-Satisfy building management practices as per AS 37435 should be considered.

MFB supports the inclusion of AS 3745 as it would ensure that such management practices would be maintained and updated on a regular basis and would complement other strategies/requirements for people with disability.

Individuals

Individuals who provided comments on the Consultation RIS consisted of access consultants, people with disability, fire engineers and a building certifier.

Individuals provided a mixed response to the Consultation RIS, however, most were in favour of Option 1. Some individuals were very supportive of the changes and suggested that the proposals did not extend far enough to improve the dignity of people with disability in emergency events, specifically expressing disappointment in lifts not being considered as an alternative option to address the problem.

Other individuals questioned the need for such proposals to be included in regulation and posed philosophical questions about the impacts of the cost on the broader economy and if the costs could be better allocated to other problem areas.

Conclusion

The problem involves a combination of two components: the life safety of occupants with disability and the inability to evacuate buildings independently; and the obligations of building owners and occupiers to ensure as far as practicable, that dignified and equitable access to and within buildings, including its fire safety features, is provided for people with disability.

The extent of the problem is indicated by the historical incidence of emergency events and the extent of discrimination to people with disability that is occurring as a result of providing inadequate emergency egress facilities.

From a life safety perspective, the risk to life is very small. Emergency events are rare in Australia and new buildings are considered generally very safe. In the event of an emergency occurring, either individually or collectively, people respond rationally to the nature of that emergency and assist others where possible. Overall there is a risk to particular occupants in particular situations, but this risk is small. However, for many in the disability community, 'how' things are achieved can be considered as important as 'what' is achieved.

The NCC Performance Requirements require emergency exits and notification systems to be appropriate to the nature and characteristics of occupants including people with disability.

Feedback from consultation suggests that currently, a lack of Deemed-to-Satisfy provisions in the NCC to describe the degree to which this expectation should be met is resulting in:

- industry either formulating on a case by case basis solutions in an attempt to interpret anti-discrimination laws and the level of safety the requirement attempts to satisfy; or
- as justification not to include additional features, leaving the onus for egress as a function of building management practice.

In the view of many stakeholders (including the HRSC), a reliance on management practice alone fails to meet the intent of the DDA with regards to the avoidance of dignitary harm from emergency evacuation situations.

The extent of this problem must then be considered in the context of the practicality and availability of reliable options and their costs. The community is encouraged through disability discrimination legislation to make reasonable adjustments to ensure that discrimination of people with disability is reduced without causing unjustifiable hardship. In recognition of the practical limitations of what can be required through the NCC and the availability of current options prevents other solutions being considered, not all groups within the disability community will be equally benefited.

Five proposals were developed as Deemed-to-Satisfy solutions in collaboration with the disability sector, industry and governments. The purpose of this RIS was to test the cost effectiveness of the proposals and establish if market failure is occurring as a result of absent prescriptive solutions.

The Consultation RIS asked stakeholders whether they believed that the proposals were reasonable adjustments to the regulations to address the current inequity within new buildings. Stakeholders held strong views both in support and opposition of the proposals; however, the majority were in support of the proposals with the exception of Proposal 5.

The Consultation RIS also sought feedback on the benefits associated with the proposals and the majority of respondents agreed the central benefits related to achieving the objects of the DDA otherwise expressed as basic human rights, which have been recognised by previous analysis, as being of significant value despite being intangible.

The costs of the proposals collectively are an annual cost of \$1,580,807,172 with a Present Value cost of \$11,875,372,146. The benefits of the proposals relate to life safety and the avoidance of dignitary harm to people with disability in the event of emergency evacuation, with the latter being the primary benefit. However, the proposals do not accumulate equally from each proposal and cover a range of impairments and as such, some respondents including the NDS argued some proposals be given separate consideration.

In accordance with the COAG Best Practice Regulation requirements, this RIS is required to demonstrate that the preferred option has the greatest net benefit for the community, taking into account all impacts using best practice cost-benefit analysis principles. This RIS considers the primary benefit of the options to be the avoidance of dignitary harm which has been acknowledged as being an intangible benefit. Measuring human dignity in Cost Benefit Analysis (CBA) has been attempted by many government agencies both in Australia and internationally. Both supporters and opponents of CBA have expressed the view that dignity in the context of CBA cannot be quantified with any level of certainty or accuracy.

Best practice cost-benefit analysis principles specify that intangible benefits need to be considered and evaluated against the scale of costs. Where costs are large and the benefits are intangible the status quo must be recommended.

The impact analysis of all options indicates that Option 1 (regulatory adoption of all 5 proposals) has significant impacts both in terms of costs and benefit. The cost of implementing Option 1 is however considered large and the intangible benefits are unlikely to outweigh the costs. Based on COAG best practice regulation requirements this RIS recommends that the status quo remains.