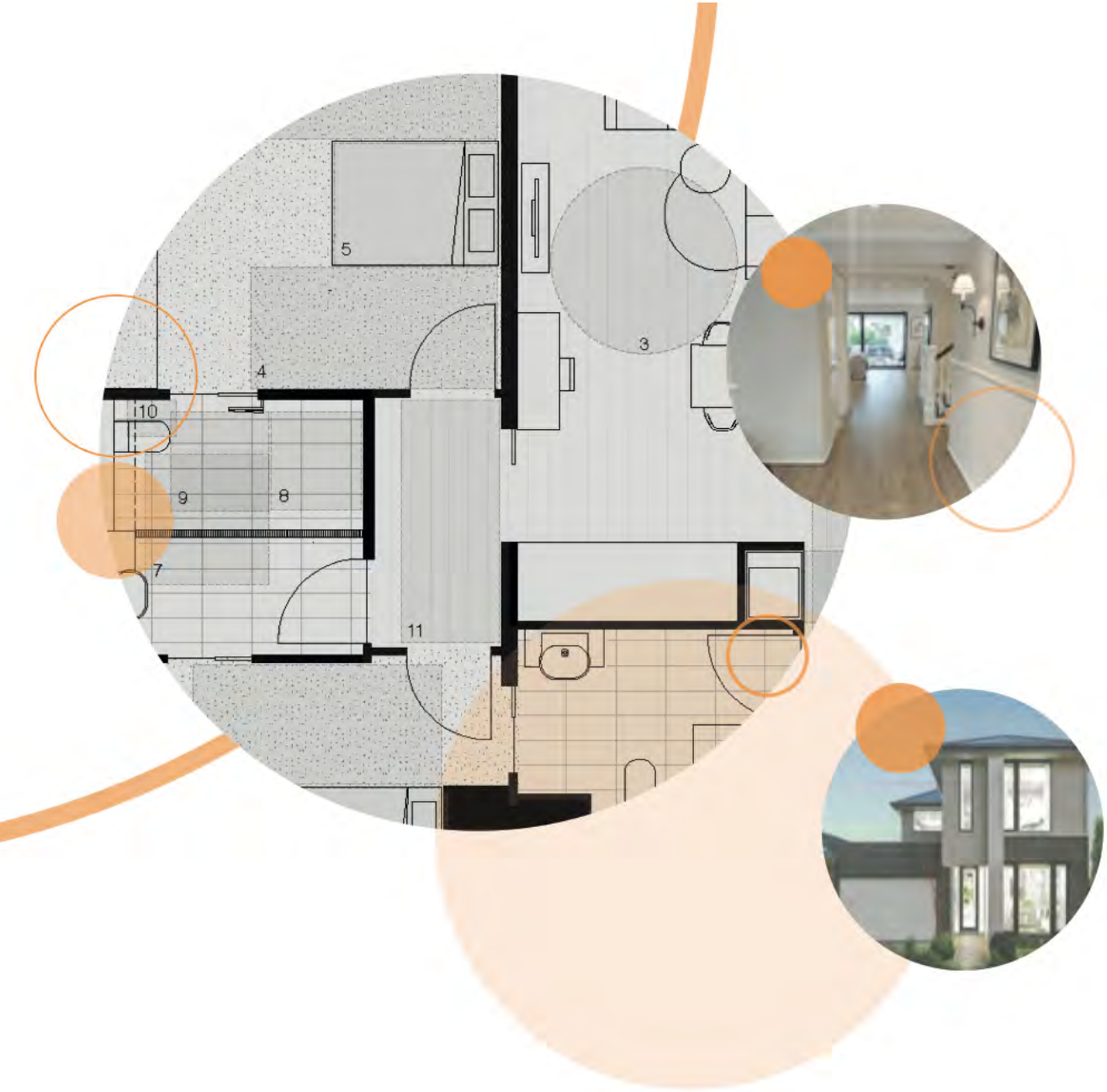


# Audit of accessible features in new build house plans

SUMMER FOUNDATION

THE UNIVERSITY OF MELBOURNE

The Summer Foundation is a not-for-profit organisation, established in 2006, that aims to change human service policy and practice related to young people in nursing homes. Our mission is to create, lead and demonstrate long-term sustainable changes that stop young people from being forced to live in nursing homes because there is nowhere else for them.

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# Contents

# Executive Summary

The Australian Building Codes Board (ABCB) is nearing the end of consultations as part of a nation-wide assessment of options for minimum accessibility standards for housing for potential inclusion in the 2022 National Construction Code (NCC). Housing is social infrastructure that is with us for 30 or 40 years, so it is crucial that it meets the current and future needs of Australia's ageing population. This study audited 20 of the most popular house designs from Australia's most active volume home builders. It found that many features of the Silver, Gold and Platinum levels of Livable Housing Australia's (LHA) Livable Housing Design Guidelines are already incorporated into new dwellings produced by these builders.

This study demonstrates that where these features are incorporated into house designs, some are above the minimum Silver level, and achieve Gold or Platinum levels. Given the high take-up of individual elements, and the consistent exceeding of minimum standards for some elements, this study suggests that some of the cost of accessibility has been factored into current designs to a significant extent already; however, not in a way that guarantees practical accessibility of the dwellings. All 20 of the houses audited included at least 7 of LHA's 15 Design Elements at Silver level, with 6 houses complying with at least 9 of the elements. However, no house in the study featured all of the elements, and none met the full criteria for any of the options proposed in the ABCB Options Paper. Photographs of best practice compliance with individual standards demonstrate that developers were able to maintain a consistent 'look' in the house designs while incorporating accessible features. An initial assessment of the cost implications of meeting the guidelines indicates that if consideration is taken at the design stage, the majority of the standards are deemed to require little or no additional cost, while only one (dwelling access), could possibly involve a substantial extra cost.

This study found that while all new houses completed by volume builders for the general population included at least 7 of the 15 accessible design elements, none of the dwellings featured all of the accessible elements. Accessibility features are not consistently or systematically incorporated into the new homes. Commonly, these features do not all line up in the one dwelling, which does not enable access by people with a mobility limitation. This study demonstrates that consistently incorporating accessible features into the building code for all new dwellings would not be a significant impost on volume builders of residential housing in Australia. Indeed, the country's biggest builders are already incorporating most of these features in some new builds because they are consistent with good design. The findings of this study support the idea that well-designed housing that works for people with mobility impairments does not compromise the design of housing for the general population – rather it enhances the built environment.

# Introduction

In October 2017, the Building Ministers' Forum (BMF) proposed to the Council of Australian Governments (COAG) that a national assessment be undertaken to consider applying a minimum accessibility standard for private dwellings in Australia through the National Construction Code (NCC). This was subsequently agreed by COAG. In September 2018, the Australian Building Code Board (ABCB) released an Options Paper, which set out a preliminary menu of options and sought broader community and industry input (ABCB, 2018). The ABCB is undertaking a Regulation Impact Assessment (RIA) of options for minimum accessibility standards for housing for potential inclusion in the 2022 NCC (ABCB, 2020).

The ABCB consulted with stakeholders, through:

- Consultation forums — ABCB held consultation forums in each capital city during October and November 2018
- Written stakeholder submissions — ABCB received 179 submissions from a wide range of organisations and individuals
- ABCB released a consultation report summarising stakeholder feedback on the Options Paper in April 2019

The consultation process provides a unique opportunity to improve the design of new residential housing for all Australians. The NCC has a three-year amendment cycle and the RIA consultation process is lengthy. The current consultation is in its final phase for potential changes commencing in 2022. Housing is critical social infrastructure that is with us for 30 or 40 years, so it is vital to get it right.

The twin Royal Commissions into aged care and disability demonstrate public and political will to address issues across both sectors and represent an opportunity for lasting change (Aged Care Royal Commission, 2019; Disability Royal Commission, 2019). Institutional housing that segregates people with disability and the frail elderly is not working. The recent challenges experienced by the aged care sector during the COVID-19 pandemic also highlight the importance of helping our ageing population to remain in their own homes for as long as possible. Universal design principles attest that well-designed housing that works for people with mobility impairments does not compromise the design of housing for the general population – rather, it enhances the built environment. Indeed, a 'willingness-to-pay' survey conducted by the Centre for International Economics (CIE) as part of its Consultation Regulation Impact Statement commissioned by the ABCB confirmed that people in households that do not currently contain any persons with limited mobility place considerable monetary value on the accessibility features (CIE, 2020). The current consultation process is an opportunity to consider the functionality of new housing for everyone and the need to future-proof Australian housing for an ageing population.

# Aims of this study

The aims of this study are to:

1. Test the hypothesis that some accessibility features are already incorporated into the most popular house designs being built in Australia, but not in a systematic way that makes all new builds accessible.
2. Demonstrate that accessibility features are basic elements of good house design for the general population.
3. Indicate the likely cost of including accessibility features in new builds.

# Method

An initial desktop search identified the 10 largest residential developers in Australia in 2018-19, based on the total number of dwellings built. This search, complemented by phone calls, then identified each developer's 10 most popular house designs, including which of these designs had a display home in greater Melbourne. An audit of 20 homes (maximum of 3 per developer) was conducted, and a summary of the results is included below. The audit involved photographing, measuring, and assessing the presence of accessible elements in these new builds as outlined in Livable Housing Australia (LHA)'s design guidelines. The 3 levels are Silver, Gold, and Platinum, and are outlined in the LHA's Livable Housing Design Guidelines, and consist of 15 Design Elements (see Table 1), most of which are also included in the CIE report for the ABCB (LHA, 2017; CIE, 2020).

The purpose of the photos is to provide evidence that accessible features do not need to be institutional or unsightly but can be routinely incorporated into contemporary new homes. Photos of features that did not comply were also taken.

*Table 1. Livable Housing Australia's 15 Livable Housing Design Elements*

| | LHA Design Elements | Performance Requirements |
|---|---|---|
| 1 | Dwelling Access | A safe, continuous, step-free pathway from the street entrance and/or parking area to a dwelling entrance that is level |
| 2 | Dwelling Entrance | At least one step-free entrance into the dwelling and the entrance should be connected to the safe and continuous pathway as specified in Element 1 |
| 3 | Internal Doors and Corridors | Widths of the internal doors and corridors facilitates comfortable and unimpeded movement between spaces |
| 4 | Toilets (Accessible ground level) | The ground (or entry) level has a toilet to support easy access for home occupants and visitors with adequate circulation space |
| 5 | Shower (Accessible ground level) | A slip resistant, hobless shower recess should be featured in the corner of a bathroom in the dwelling |
| 6 | Reinforcement of Bathroom and Toilet Walls | The toilet and bathroom walls are reinforced to enable future installation of grabrails |
| 7 | Internal Stairways | Where installed, stairways are designed to reduce the likelihood of injury and enable safety pathway |
| 8 | Kitchen Space | The kitchen space is designed to support ease of movement between fixed benches and to support easy adaptation |
| 9 | Laundry Space | The laundry space is designed to support ease of movement between fixed benches and to support easy adaptation |
| 10 | Ground (or Entry Level) Bedroom Space | There is a space on the ground (or entry) level that can be used as a bedroom |
| 11 | Switches and Powerpoints | Light switches and powerpoints are located at heights that are easy to reach for all home occupants |
| 12 | Door and Tap Hardware | Level or D-Pull handle door hardware and taps located at a height that can be independently operate by all home occupants |
| 13 | Family/Living Room Space | The family/living room features clear space to enable the home occupant to move in and around the room with ease |
| 14 | Window Sills | Windows sills are installed at a height that enables home occupants to view the outdoor space from either a seated or standing position |
| 15 | Flooring | Floor coverings are slip resistant to reduce the likelihood of slips, trips and falls in the home |

# Findings

## Incorporation of accessable features

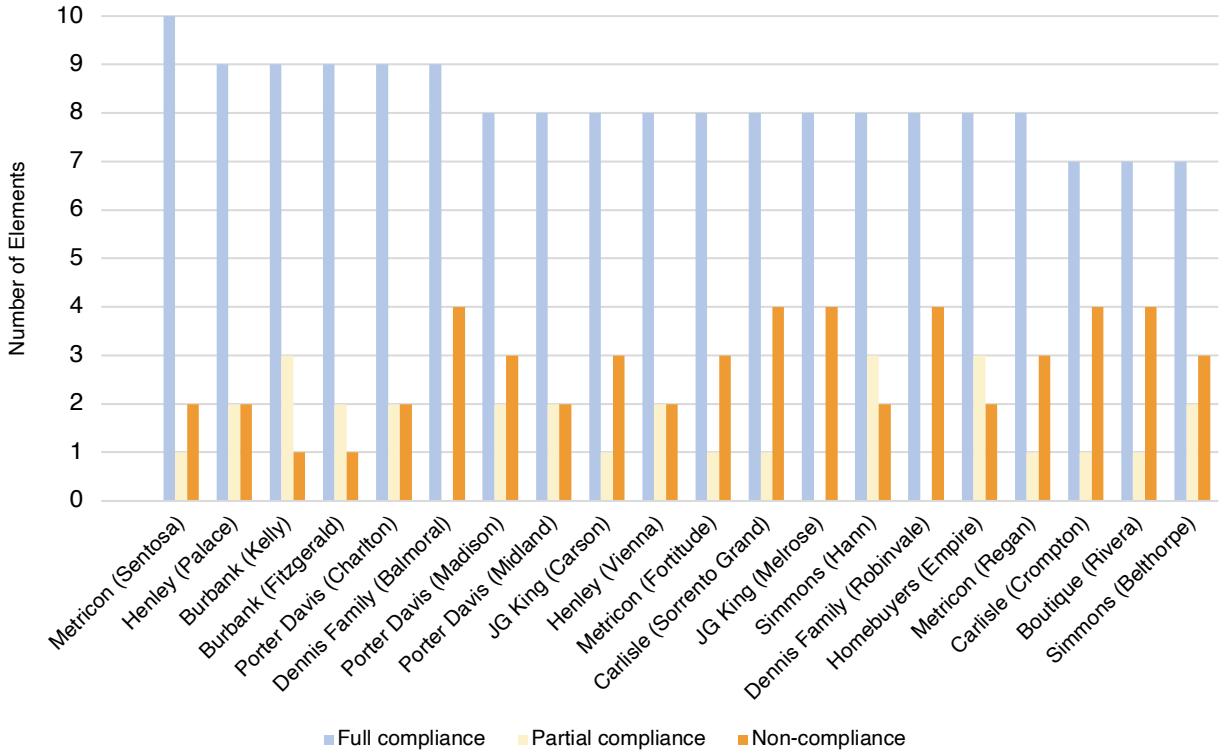
The findings of the audit of the display homes, based on LHA's Design Guidelines, is shown below (see Table 2). Dwellings are listed in order from the most to the least compliant. Three elements (E2, E3 and E4) were broken into two parts for the audit – E2.1 Landings, E2.2 Door openings; E3.1 Doors, E3.2 Corridors; E4.1 Toilet – walls and E4.2 Toilet – front because the two parts of these elements show quite different results. In Table 2, these are listed as partially complying, if for example they complied with E3.1, but not E3.2. For the audit, Element 6 which is the reinforcement of bathroom walls was not possible to assess. Element 15 (slip resistant flooring) was not assessed because it is not required for Silver or Gold accessibility and was difficult to assess using the study methodology. The findings of the audit confirm the hypothesis of this study. While on average eight Design Elements were incorporated into the 20 display homes, none of the dwellings featured all of the elements (see Table 2).

*Table 2: Display homes and their compliance with Livable Housing Design Elements*

| **Dwellings Assessed** | **Design Element** | | | | | | | | | | | | | **Compliance** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Full | Partial | Non- |
| Metricon (Sentosa) | | | | | | | | | | | | | | **10** | 1 | 2 |
| Henley (Palace) | | | | | | | | | | | | | | **9** | 2 | 2 |
| Burbank (Kelly) | | | | | | | | | | | | | | **9** | 3 | 1 |
| Burbank (Fitzgerald) | | | | | | n/a | | | | | | | | **9** | 2 | 2 |
| Porter Davis (Charlton) | | | | | | | | | | | | | | **9** | 2 | 2 |
| Dennis Family (Balmoral) | | | | | | | | | | | | | | **9** | 0 | 4 |
| Porter Davis (Madison) | | | | | | | | | | | | | | **8** | 2 | 3 |
| Porter Davis (Midland) | | | | | | n/a | | | | | | | | **8** | 2 | 2 |
| JG King (Carson) | | | | | | n/a | | | | | | | | **8** | 1 | 3 |
| Henley (Vienna) | | | | | | n/a | | | | | | | | **8** | 2 | 2 |
| Metricon (Fortitude) | | | | | | n/a | | | | | | | | **8** | 1 | 4 |
| Carlisle (Sorrento Grand) | | | | | | | | | | | | | | **8** | 1 | 4 |
| JG King (Melrose) | | | | | | n/a | | | | | | | | **8** | 0 | 5 |
| Simmons (Hann) | | | | | | | | | | | | | | **8** | 3 | 2 |
| Dennis Family (Robinvale) | | | | | | n/a | | | | | | | | **8** | 0 | 4 |
| Homebuyers (Empire) | | | | | | | | | | | | | | **8** | 3 | 2 |
| Metricon (Regan) | | | | | | n/a | | | | | | | | **8** | 1 | 3 |
| Carlisle (Crompton) | | | | | | n/a | | | | | | | | **7** | 1 | 4 |
| Boutique (Rivera) | | | | | | n/a | | | | | | | | **7** | 1 | 4 |
| Simmons (Belthorpe) | | | | | | n/a | | | | | | | | **7** | 2 | 3 |

**Design elements** 1: Dwelling Access, 2: Dwelling Entrance, 3: Internal Doors and Corridors, 4: Toilets (Accessible ground level), 5: Shower (Accessible ground level), 7: Internal Stairways, 8: Kitchen Space, 9: Laundry Space, 10: Entry Level Bedroom Space, 11: Light Switches and Power-points, 12: Door and Tap Hardware, 13: Family Living Room Space, 14: Window Sill Height.
Note: The study methodology did not allow analysis of Elements 6: Reinforcement of Bathroom and Toilet Walls, or 15: Flooring.
N/A: Element 7 (Internal Stairways) was not applicable for single-storey dwellings.
**Legend** Platinum Level Gold Level Silver Level Partial compliance

*Figure 1. Display home compliance with LHA's Design Elements*

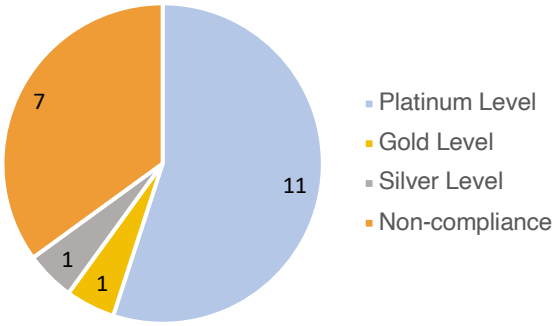


# Individual analysis of elements

### Element 1: Step-free dwelling access from the street entrance

Element 1 requires a safe, continuous, step-free pathway from the street entrance and/or parking area to a dwelling entrance that is level. At a Silver level, the pathway width should be at least 1000mm. The audit found 13 display homes that complied with the minimum accessibility standards. Most (11 dwellings) complied at a Platinum level. The housing designs that meet the standards of Element 1 have step-free accesses from the allotment boundaries. Two covered parking spaces were standard in these dwellings. This would allow a person to open their car doors fully and easily move around the vehicle when the parking space is part of the dwelling access.

*Figure 2. Results for audit of Element 1 (n=20)*



## Element 2: Step-free dwelling entrance

Element 2 requires at least one level (step-free) entrance into the dwelling to enable home occupants to easily enter and exit the dwelling. Element 2 was broken down into two components: 2.1 Level entry landings, and 2.2 Entry door openings. Overall, 50% of the display homes met the requirement for a level landing area in front of the main entrance. While none of the display homes provided true step-free entrances, and therefore are regarded as only partially complying, 50% had thresholds less than 5 mm and these thresholds were due to the door frame hardware not a step. The clear opening of the entry doors in 3 of the display homes were narrower than 800mm, which was below the minimum requirement set by the LHA Design Elements (820mm). Nine dwellings had Platinum level (>900 mm) and 8 had Gold level (>850 mm) clear openings.

*Figure 3a. Results for Element 2: Dwelling entrance (n=20)*

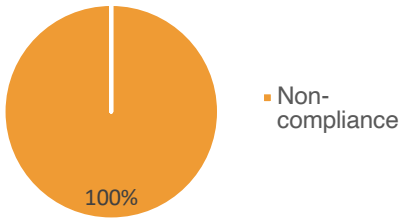



*Figure 3b Results for Element 2.1: Level entry landings (n=20)*

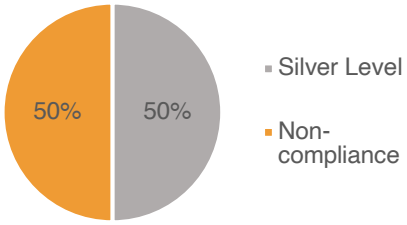
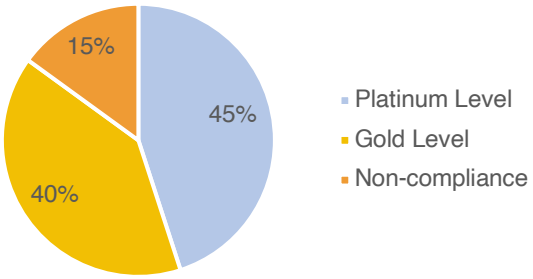



*Figure 3c. Results for Element 2.2: Entry door openings (n=20)*



## Element 3: Internal doors and corridors

Element 3 requires that Internal doors and corridors facilitate comfortable and unimpeded movement between spaces. At the Silver level doors have a minimum clear opening width of 820mm and internal corridors/passageways should provide a minimum clear width of 1000mm. Despite 14 of the 20 display homes providing wider than 1000mm internal corridors throughout (the minimum requirement stated by the LHA), all the display homes' internal doors had a clear opening less than the minimum required width of 820mm. Hence, none of the display homes complied with the accessible internal doors and corridors element.

*Figure 4a. Results for Element 3 internal doors and corridors (n=20)*

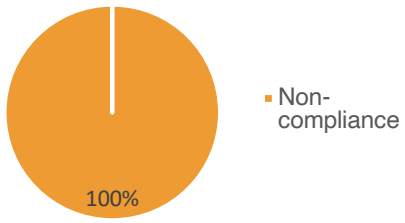



*Figure 4b. Element 3.1: Clear opening width of internal (n=20)*

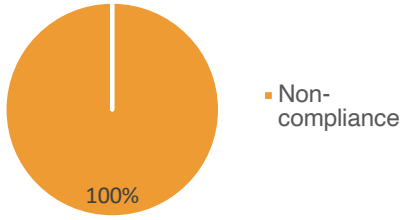
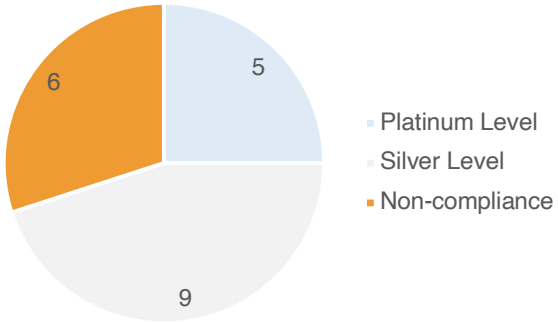



*Figure 4c. Element 3.2: Width of internal corridors (n=20)*



## Element 4: Accessible toilets on the ground level

Element 4 requires that the ground (or entry) level has a toilet to support easy access for home occupants and visitors. Nine of the 20 inspected display homes were double-storey. All the display home designs had a toilet on the ground/entry level. Some dwellings had ground level toilets with at least 900mm clearance between the walls on either side of the toilet (see Figure 5a). Only one of the toilets satisfied the requirement of providing a 1200mm or above circulation space between the front edge of toilet and the arc of the door (see Figure 5b).

Figure 5a. Results for Element 4.2: Wall clearance in toilets (n=20)

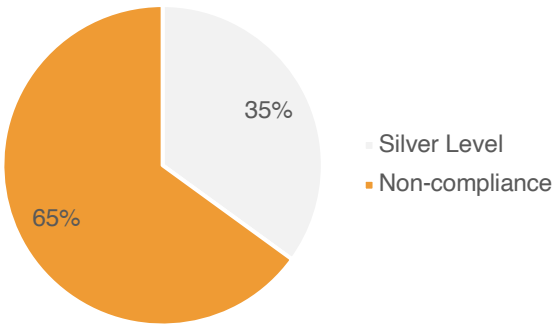
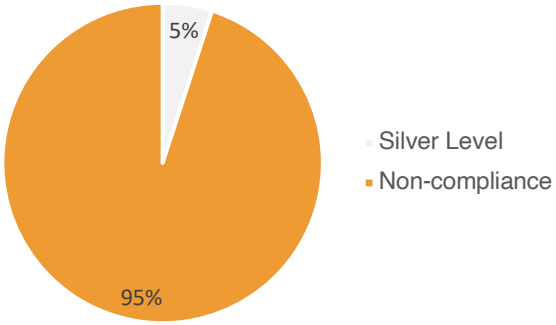



*Figure 5b. Element 4.1: Circulation space in toilets (n=20)*



## Element 5: Accessible bathrooms and shower

Element 5 requires a bathroom and shower designed for easy and independent access for all home occupants. Only one of the shower recesses in the display homes had the built-in hobless design (see Figure 6a) with the shower screen easily removable at a later date. A removable shower screen is installed separately, once floor surfaces are in place. This allows the ready removal of the screen without causing damage to surfaces or waterproofing integrity (see Figure 6b; Ryan, 2017).

*Figure 6a. Results for Element 5 Accessible shower (n=20)*

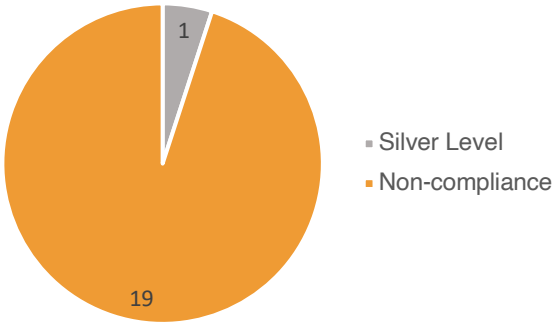
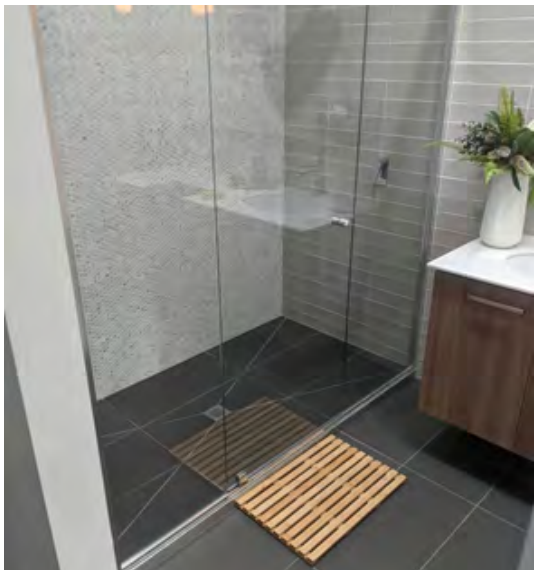



*Figure 6b: Hobless shower with removable shower screen (Ryan, 2017)*

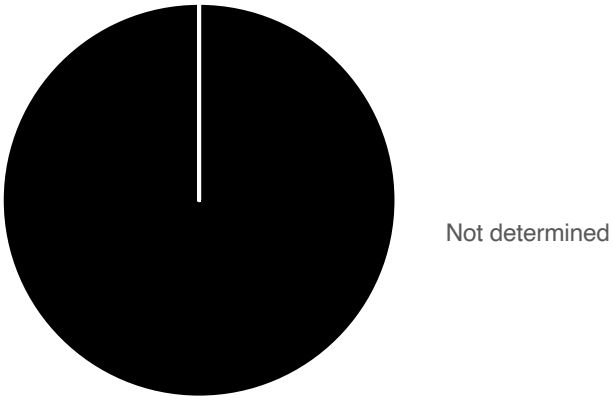
*Figure 6c: Shower recess with hob*



## Element 6: Reinforcement of bathroom and toilet walls

Element 6 requires that the bathroom and toilet walls are built to enable grabrails to be safely and economically installed. No engineering drawings of the display homes were provided to determine the existences of additional reinforcements built into the bathroom and toilet walls to enable future installation of grabrails.

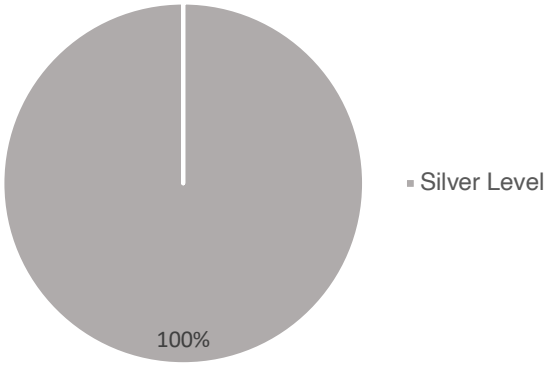
*Figure 7. Results for Element 6 Wall reinforcement (n=0)*




## Element 7: Safe internal stairway designs

Element 7 requires that where installed, stairways are designed to reduce the likelihood of injury and also enable a safe pathway. The Silver Level specifications stated by LHA is a requirement for all new homes under the NCC. Stairways in the 9 double-storey dwellings featured a continuous handrail on one side of the stairway where there was a rise of more than 1m, which satisfies the Silver Level requirement.

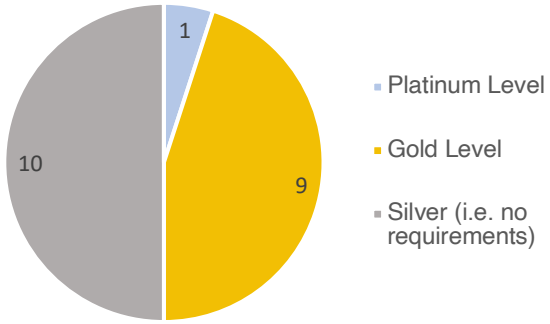
*Figure 8. Results for Element 7 Stairs (n=9)*



## Element 8: Ease of movement in kitchen spaces

Element 8 requires that the kitchen space is designed to support ease of movement between fixed benches and to support easy adaptation. This is not required for Silver Level. The floor finishes of the kitchen spaces in all the inspected display homes were considered slip resistant as this is a requirement for all new homes under the NCC. Nine of the display homes provided no less than 1200mm (but no greater than 1500mm) clearance in front of fixed benches and appliances (excluding handles). One display home provided a 1830mm clearance in the kitchen, which is above the Platinum Level's 1550mm clearance requirement.

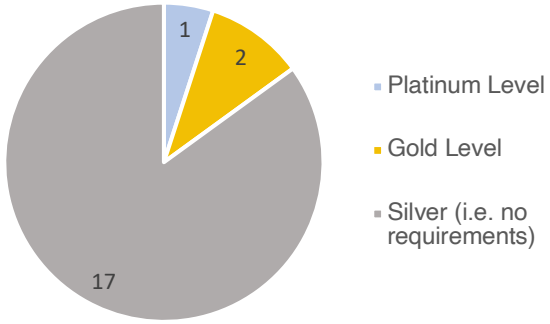
*Figure 9. Results for Element 8 Kitchen (n=20)*




## Element 9: Ease of movement in laundry space

Element 9 requires that the laundry space is designed to support ease of movement between fixed benches and to support easy adaptation. This is not required for Silver Level. The floor finishes of the laundry spaces in all the inspected display homes were considered slip resistant as this is a requirement for all new homes under the NCC. Two of the display homes provided no less than 1200mm (but no greater than 1500mm) clearance in front of fixed benches and appliances (excluding handles). One home offered a 1860mm clearance in the laundry, which was above the Platinum Level's 1550mm clearance requirements

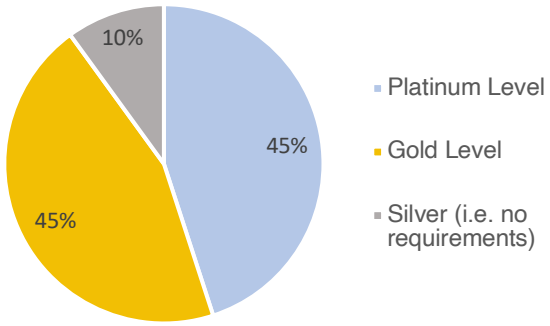
*Figure 10. Results for Element 9 Laundry (n=20)*



## Element 10: Ground level bedroom space

Element 10 requires that there is a space on the ground (or entry) level that can be used as a bedroom. This is not required for Silver Level. Two of the double-storey display homes did not include a bedroom or space on the ground/entry level that could be used as a bedroom. Two of the double-storey display homes included studies without a door on the ground/entry level that could be used as a temporary bedroom with a screen. These studies would need to be enclosed and have a door installed if this space was to be used for a permanent bedroom. All the other display homes had at least 1 bedroom on the ground/entry level. These bedrooms satisfied at least the Gold Level requirements

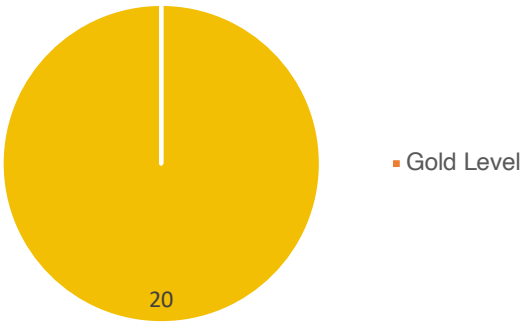
*Figure 11. Results for Element 10 Bedroom (n=20)*




## Element 11: Accessible switches and power-points

Element 11 required that light switches and powerpoints are located at heights that are easy to reach for all home occupants. This is not required for Silver level. The light switches in the 20 display homes were located at 1050mm to 1100mm above the floor levels, which satisfied the requirements of the Gold level. The power-points in the 20 display homes were installed at heights of 300mm to 350mm above the finished floor levels. The Platinum level for Element 11 requires that the light and power-point switches be rocker action, toggle or push pad in design with a recommended width of 35mm. While all the display homes featured toggle or push pad switches, none of them had a width of 35mm or above.

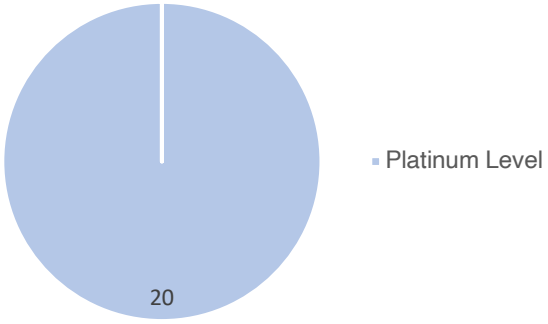
*Figure 12. Results for Element 11 Light and power-point switches (n=20)*



## Element 12: Accessible door and tap hardware

Element 12 requires that home occupants are able to easily and independently open and close doors and safely use tap hardware. Door handles in all of the audited display homes were installed at between 1000mm to 1050mm above the finished floor, which complied the positioning requirements of the Platinum level. The LHA Design Elements and the ABCB Options recommended the door handles to be installed at between 900mm – 1100mm above the finished floor. The doorways also featured lever or D-pull style door hardware, satisfying the LHA Design Elements' door handle designs requirement. Basins, sinks and tubs in all of the display homes featured lever or capstan style tap hardware with a central spout, meeting the Platinum level criteria for tap hardware.

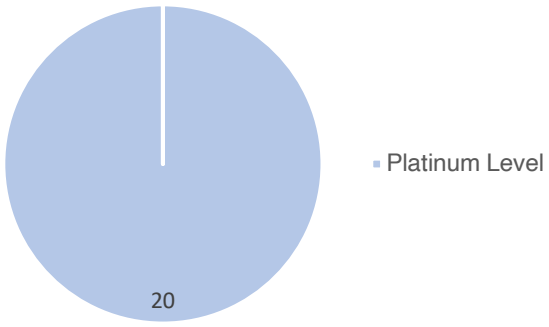
*Figure 13. Results for Element 12 Door and tap hardware (n=20)*




## Element 13: Family living room space with clear space for ease of movement

Element 13 requires that the family/living room features clear space to enable the home occupant to move in and around the room with ease. All 20 display homes featured generous free space in the family living room on the ground floors, with no less than 2250mm in diameter and enabled ease of movement clear of furniture placements.

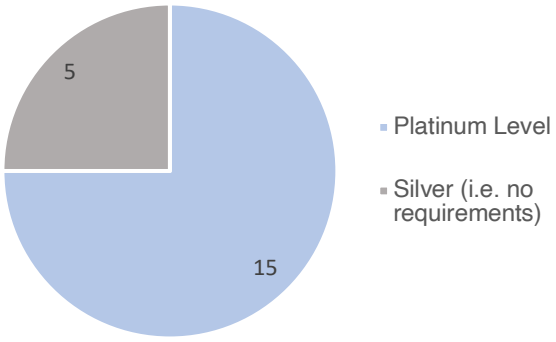
*Figure 14: Results for Element 13 Family living room (n=20)*



## Element 14: Window sill height

Element 14 requires that windows sills are installed at a height that enables home occupants to view the outdoor space from either a seated or standing position. Fifteen display homes had ground/entry level window sills installed no higher than 1000mm above the finished floor level. This enabled home occupants to view the outdoor space from either a seated or standing position. The measurements did not include windows in the bedrooms and toilets or shower rooms.

*Figure 15. Results for Element 14 Window sill height (n=20)*



# Examples of compliance and non-compliance

## Elements 1 & 2: Dwelling access and entrance accessibility

**The 'Fitzgerald' and 'Kelly' designs in Wollert by Burbank Group**

✓ **Platinum Level dwelling access**

✓ **Level dwelling entrance landing and Gold Level clear door width**

Four of the houses provided a safe, continuous, step-free pathway from the street entrance and parking area to the dwelling entrance that is level. However, the designs were not step-free due to the door frames creating a threshold into the dwelling.



**The 'Sorrento Grand' in Wollert by Carlisle Homes**

X **Non-compliant dwelling access**

X **Non-compliant dwelling entrance**

There was a step from the allotment boundary to the dwelling entrance. The doors served as entrances to the dwelling were not step-free and continuous. There was also a step on the path from the car parking space to the dwelling entrance, which meant no continuous step-free pathway could be relied upon when entering the dwelling from the street entrance.

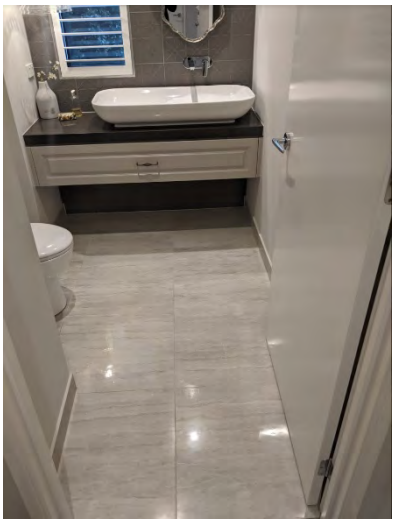

## Element 3: Internal doors and corridors designs

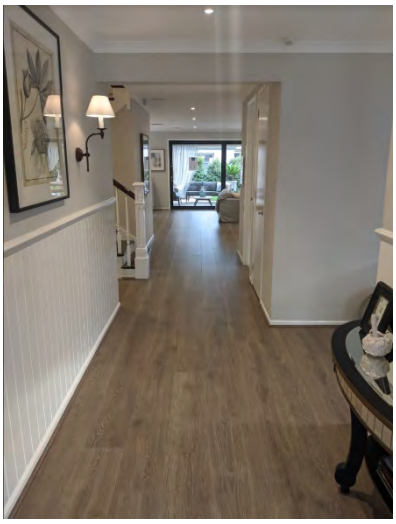
**The 'Charlton' design in Kalkalo by Porter Davis Homes**

**X Non-compliant door opening**

**✓ Platinum-standard corridor width**

The internal doors on the ground floor had a unified opening width of 760mm, which was below the minimum required width of 820mm. However, the width of the internal corridor in the house was 1400mm, wider than the optimal width requirement (1200mm) (LHA, 2017; CIE, 2020).





## Element 4: Toilet accessibility

**The 'Empire' designs in Donnybrook by Homebuyers**

**✓ Sliver Level clear width between a wall and amenities**

**X Non-compliant circulation space**

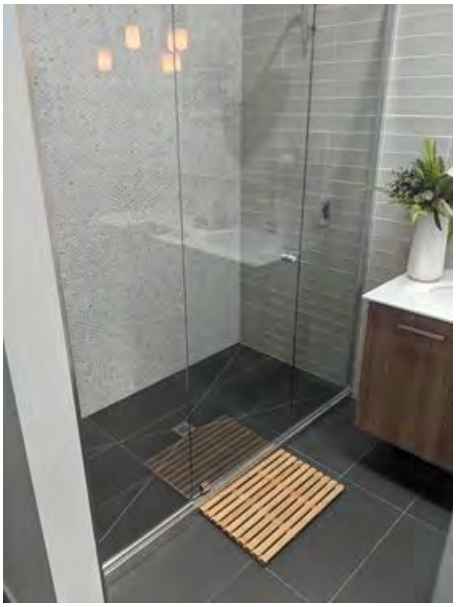
The toilet closet was positioned with a width of 1180mm between the walls of the toilet space. This is above the 900mm clear width Silver Level requirement. However, like all other ground/entry level toilets inspected, the circulation space between front edge of the toilet and arc of the internal door is less than the 1200mm minimum requirement (LHA, 2017).

## Element 5: Accessible shower designs

### The ‘Kelly’ design in Wollert by Burbank Group

### X Non-compliant shower recess design (required by Silver Level)

The shower screen was considered not easily removable, though the recess is located in the corner of the bathroom as required to enable the installation of grabrails at a future date. The shower recess was not regarded as hobless because it did not provide a flat entry. A hobless shower recess should be prepared before the floor finishes are applied. A strip drain is also required (LHA, 2017; CIE, 2020).



### The ‘Sentosa’ design in Point Cook by Metricon

### ✓ Silver Level shower design

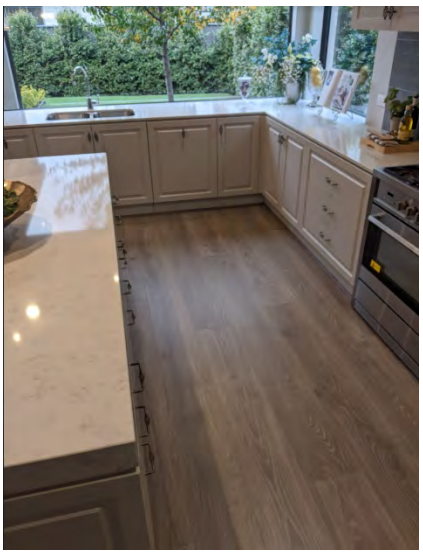
An opening beside the glass shower screen provided a level entry to the shower recess. The shower recess was hobless as there was no dam or curb at the boundary and a strip drain was installed (refer to Figure 6c for comparison). This shower space fell short of Gold Level compliance only because it is narrower than 900mm (870mm in width).

## Element 8: Kitchen space

### The ‘Charlton’ design in Kalkalo by Porter Davis Homes

✓ **Gold Level kitchen space**

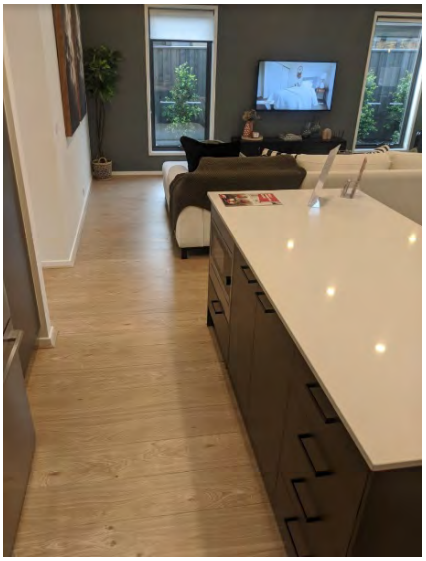
The clearance in front of fixed benches and appliances (excluding handles) in the kitchen space is measured at 1400mm. Gold Level requires at least 1200mm clearance (LHA, 2017). Large clearances support ease of movement between fixed benches and easy adaptations.



### The ‘Empire’ design in Donnybrook by Homebuyers

X **Does not comply with Gold or Platinum Level kitchen space requirements**

The clearance in front of fixed benches and appliances (excluding handles) in this kitchen space is measured at 980 mm. Gold Level requires at least 1200mm clearance in front of fixed benches and appliances (excluding handles) (LHA, 2017).



## Element 9: Laundry space

### The ‘Madison’ design in Michelham by Porter Davis Homes

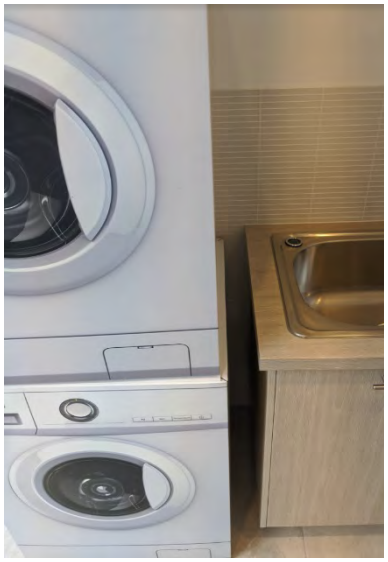
✓ **Platinum Level laundry space**

1860mm clear width was provided in front of the fixed benches and appliances (excluding handles). A 600mm deep recessed area is provided for the installation of a washing machine. Platinum Level requires a minimum 1550mm clearance in front of the fixed bench in a laundry room to support ease of movement and easy adaptations. 600mm minimum deep recessed area is required for laundry room appliances (LHA, 2017).

### The ‘Belthorpe’ design in Wollert by Simmonds Group

X **Does not comply with Gold or Platinum Level laundry space requirements**

900mm clear width was provided in front of the fixed benches and appliances (excluding handles). A 600mm deep recessed area is provided for the installation of a washing machine (though not aligned with the fixed bench). Gold Level requires a minimum 1200mm clearance in front of the fixed bench in a laundry room (LHA, 2017).



## Cost implications of assessable features

This study did not include a detailed quantity survey of the cost of compliance with the individual options or inclusion of particular LHA elements. However, the inclusion of each element was assessed against expected changes in cost for the developer (see Table 3). Where green is no additional upfront cost (e.g. having lower window sills), orange is a small additional upfront cost (e.g. a larger door and stronger hinges), and red is a significant potential upfront cost (e.g. Step-less access on a sloping site – although exemptions are proposed for this).

*Table 3. Anticipated cost burden of incorporating additional Livable Housing Design Elements*

| | **Design Elements** | **Cost** | | |
|---|---|---|---|---|
| | | min | low | high |
| 1 | Dwelling Access | | | |
| 2 | Dwelling Entrance | | | |
| 3 | Internal Doors and Corridors | | | |
| 4 | Toilets | | | |
| 5 | Shower | | | |
| 6 | Reinforcement of Bathroom and Toilet Walls | | | |
| 7 | Internal Stairways | | | |
| 8 | Kitchen Space | | | |
| 9 | Laundry Space | | | |
| 10 | Ground (or Entry Level) Bedroom Space | | | |
| 11 | Switches and Powerpoints | | | |
| 12 | Door and Tap Hardware | | | |
| 13 | Family-Living Room Space | | | |
| 14 | Window Sills | | | |
| 15 | Flooring | | | |

When assessed at the initial design stage, most additional costs of the proposed design element requirements are either negligible (lower window sills) or modest (extra noggins in bathroom walls, additional tiles in larger bathrooms). The element with the largest potential cost increase, Element 1 Dwelling Access, will depend on the slope of the plot of land being developed. This has been recognised in the ABCB's Options paper with a proposal for possible exemptions for houses on sites that slope greater than a set limit – a proposal that should avoid extreme cost imposts for difficult sites.

A key consideration of cost is perception. A small additional cost for an individual item (for example a larger front door that may cost an extra $1000 dollars), will be viewed through the prism of multiple houses built by a volume builder (and so assessed as an additional cost of $100,000 for front doors if they build 100 houses a year). When many small additional costs are tallied then, larger doors, step-less showers, extra tiles in larger bathrooms, larger light switches and power-points, and so on, the costs can seem considerable. However, once wider doors, step-less showers, larger light switches and power-points become standard and are installed at scale the cost of these items will come down. In practice many of these costs are merely delayed and passed on to a new party, as inappropriate housing needs to be modified by the home user, often at a far higher cost than if the features were included in the original build. By embedding the standards in the National Construction Code requirements, the additional costs are both minimised, and shared between the consumer (who pays more but for a better, more appropriate house), and the developer (who must absorb some cost to stay competitive in the market).

# Discussion

The Livable Housing Design Elements focus on features of a dwelling that may or may not be present (e.g. step-less entry, ground level toilets, and frameless showers), or must meet designated space standards such as dimensions of front and internal doors, bathrooms, and bedrooms. Overall, the display homes showed a consistent pattern of exceeding some minimum Silver Level requirements. All 20 of the display homes assessed in this audit had at least 7 of the 15 Livable Housing Design Elements incorporated into their design. Over three-quarters of the homes had 8 or more compliant elements overall, and 15 of the homes had 5 or more Gold or Platinum Level elements.

When considering the space standards of elements that are common to all houses – including bedrooms, kitchens, living rooms, and bathrooms – the 20 audited homes demonstrated that current industry practice is capable of routinely meeting space standards at Gold Levels. Internal stair dimensions in the 9 of 20 dwellings that were double-storey are the only element that is consistently at Silver Level and not higher. However, conspicuous non-compliance is found in internal door dimensions (0%), ground level toilet dimensions (0%), frameless shower (5%), and front door dimensions (50%) which failed to meet Silver Level requirements.

The first 5 accessible features (E1-E5), which constitute the bulk of requirements for compliance with Silver, are less often included in the existing housing plans than some of the features required for Gold level. However, where they are included (E1 and E2) or partially included (e.g. internal corridor dimensions in E3.1), components of current house designs consistently exceed minimum levels.

In part, compliance with some Gold and Platinum Level elements most likely reflects the fact that the dwellings assessed consist of suburban, detached family houses which in Australia are among the largest in the world in spatial terms. While caution should be used in assuming similar levels of compliance in inner city townhouses or apartments, the vast majority of new homes in Australia are built by volume home builders in new and existing suburbs.

While it is realistic for nearly all new homes to incorporate minimum accessibility features, there are going to be geographically complex sites where this will be near impossible or the costs will be prohibitive. There are at least two potential solutions to this dilemma. The first is to require dwellings that do not comply to make provision for the future installment of either a stair climber or lift, the second is to implement a process for granting exemptions. Where sites have limited floor space at entry level, precluding having amenity (e.g. toilet, shower, living area or space for bedroom) on the entry level, provision could be made for future fitout of a stair climber or lift. This may be through the option of stairs suitable for future installation of a stair-climber or alternatively, provision for future fitout with a lift. These would need to be demonstrated on drawings to achieve compliance. A simple, transparent and timely process is needed for obtaining an exemption based on the gradient and/or size of a house block. There is however a significant risk that granting exemptions would create perverse incentives and unintended consequences e.g. developers designing house blocks and dwellings to ensure that they meet the requirements for an exemption.

This study did not explicitly attempt to quantify the additional cost of including the LHA's Design Elements at different space standard levels. However, the consistent exceeding of minimum (Silver Level) requirements across multiple design elements, coupled with the assessment of the likely scale of cost increases when elements are considered at the design stage as noted in Table 3, suggests that the cost of compliance has been factored in to current designs to a significant extent.

# Conclusion

This study suggests that consistently incorporating accessible features into the counstruction code for all new dwellings would not be a significant impost on volume builders of residential housing in Australia. Indeed, the country's biggest builders are already incorporating most of these features in some new builds because they are consistent with good design. Surprisingly, the audit of 20 display homes found that *all* the house designs had at least 4 elements that complied with either the Gold or Platinum Levels. However, notable examples of widespread non-compliance are the width of internal doors, and the provision of threshold free entrances. That being said, changing the standard width of doors is a common-sense change that is effectively cost neutral. Therefore, despite some compliance with the LHA's Livable Housing Design Guidelines in the 20 display homes, threshold free entrances, accessible elements related to the width of doors, the dimensions of the ground level toilet and a frameless shower were the most consistent barriers for people with mobility impairments.

The findings of this study support the idea that well-designed housing that works for people with mobility impairments does not compromise the design of housing for the general population – rather it enhances the built environment. The current ABCB consultation process is a unique opportunity to improve the functionality of new housing for everyone and future-proof Australian housing for our ageing population.

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