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Method Article

Measuring the high life: A method for assessing apartment design policy implementation

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A B S T R A C T

This paper introduces a comprehensive method to measure the implementation of residential apartment design policies in Australia. It describes a protocol for extracting and measuring potentially health-enhancing policy-specific design requirements derived from three current residential apartment design policies in Sydney, Melbourne and Perth. These requirements focus on ten key design elements: (1) solar access, (2) natural ventilation, (3) private open space, (4) communal open space, (5) circulation spaces, (6) acoustic privacy, (7) outlook and (8) visual privacy, (9) bicycle and car parking and (10) apartment mix. This paper also describes the computation of scores to quantify the levels of on-ground implementation of the design requirements and compliance with the policies. The method will allow researchers to objectively quantify, benchmark and assess the uptake of apartment policy in apartment design and construction to inform future policy development.

- Measurements were developed to systematically assess apartment buildings for their implementation of specific design requirements stipulated by State Government design policies.
- Policy implementation was defined as the degree to which the apartment buildings adhered to the requirements outlined by the apartment design policies. A scoring system was developed to quantify policy implementation at both the apartment and building levels.
- This method can be replicated to allow researchers to objectively quantify, benchmark and assess the uptake of apartment policy in apartment design and construction to inform future policy development.

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All major Australian cities are currently experiencing a boom in the construction of apartments, reflecting a range of factors including land supply constraints, affordability considerations and a desire to reside close to employment and amenities [1]. However, concerns have been raised about the quality of what is being delivered and the potential negative impacts of poor design on building residents [2,3]. This situation has prompted the introduction of new residential apartment design policies by Australian State Governments to regulate and improve design outcomes conducive to resident amenity, good health and well-being. Since 2002, apartment buildings in NSW have been developed under the State Environmental Planning Policy 65 (SEPP65) [4] and the Apartment Design Guide in New South Wales (NSW) [5] which was the first Australian design policy for apartment building developments to be introduced. More recently, other Australian States have sought to improve the design quality of apartment buildings being developed and have introduced their own respective design guidelines. The Western Australian government introduced the State Planning Policy 7.3 Residential Design Codes Volume 2 - Apartments in Western Australia (WA) in 2019 [6]; and the Victorian state government introduced the Better Apartments Design Standards (BADS) in 2021 [7]. Whilst SPP7.3 and BADS have largely emulated and are based upon SEPP65, there are inconsistencies and differences between the three policies in terms of the number of design requirements listed and the specific standards of those requirements. The WA and VIC policies also acknowledge the role of apartment design can play on promoting health and wellbeing, with both explicitly stating an aim to impact health outcomes.

The relatively recent introduction of these design policies presents opportunities for natural experiments to monitor and evaluate the impact of these policy interventions on planning, design and resident perceptions, experiences and health and well-being outcomes. Indeed, knowledge concerning the implementation of apartment design requirements is vital to help policymakers understand whether policies are being implemented as intended and, if not, identify which design objectives are not being adhered to. This requires detailed assessment and quantification of which policy components were implemented as intended in constructed buildings (i.e., to assess the 'dose' of the policy implementation). Without this information, it is impossible to know whether any positive effects (e.g., desirable design or health outcomes) result from the policy intervention, and difficult to establish whether a lack of observed policy impact is due to incorrect policy principles or inadequate policy implementation, or indeed, a mix of both. The development of policy-specific design measures is thus essential to accurately measure the implementation of compliance against specific policy design requirements and assess how constructed buildings reflect the intended design outcomes of the policy.

The high life project

The High Life project is a cross-sectional, observational study evaluating the implementation of design policy requirements in apartment buildings in three Australian cities and their association

with the health and well-being outcomes of approximately 1000 adult residents of these buildings [8]. It aims to provide empirical evidence on the association between apartment design requirements and resident health and wellbeing outcomes to guide future policy decisions on the design and location of residential apartment buildings, thereby contributing to the creation of healthy, equitable higher-density communities [8]. The study focuses on recently constructed (i.e., in the last 10 years) apartment buildings in Sydney, NSW, Melbourne, VIC and Perth, WA. In Sydney, buildings were developed under the operational SEPP65 policy, whereas in WA and VIC, where state governments have only recently legislated new apartment design policies (SPP7.3 and BADS, respectively) developments in the study sites were developed under former residential design policies. These policies contained few design standards (i.e., State Planning Policy 3.1, Residential Design Codes in Perth [9]) or were entirely discretionary (i.e., Guidelines for Higher Density Residential Development in Melbourne [10]). This presented a unique opportunity to assess the alignment of current apartment design and development practices against the new policy aspirations. A core aim of the High Life project was to assess:

(1) The degree to which constructed apartment developments in Sydney comply with the design aspirations and standards outlined in the NSW state design policy (i.e., SEPP65);
(2) Evaluate and benchmark how aligned current industry practice/apartment development in Perth (WA) and Melbourne (VIC) is with the design aspirations and requirements in the newly introduced state policies (SPP7.3 and BADS respectively).

This *MethodsX* paper outlines the comprehensive process of developing policy-specific measures of the residential design policies, data extraction methods, and computation of scores to quantify the levels of on-ground implementation of the design requirements and compliance with the policies.

Apartment buildings were randomly selected from the greater metropolitan areas of Sydney, Melbourne and Perth based on their distance to the central business district and area level of Relative Socio-economic Disadvantage (IRSD, low, medium or high) [8]. To be eligible, buildings needed to: have >40 apartments; be three or more storeys; be built between 2006 and 2016 and have available endorsed architectural or development plans (including floor plates for each building level and elevations for each aspect). Further detail on the methodology for identifying eligible apartment buildings is available elsewhere [8]. The final sample comprised $n = 173$ buildings (NSW = 57; WA = 69; VIC = 47) containing $n = 10{,}533$ apartments (NSW = 2679; WA = 4462; VIC = 3412).

Identifying potential health-enhancing residential design policy requirements

The three apartment design policies vary slightly in their structure and terminology. However, they are broadly consistent in their content, setting out a series of design elements that deal with a different aspects of building siting and design. Each design element contains several objectives describing the desired design outcomes and a list of 'design criteria' (SEPP65) or 'acceptable outcomes' (SPP7.3) or 'standards' (BADS) that provide specific, measurable requirements for achieving an objective. Further, 'design guidance' provides advice on additional design responses for how the objectives, design criteria or standards can be achieved in cases where design criteria cannot be met.

Each of the apartment design policies was reviewed for requirements across the following eight design elements: (1) solar and daylight access; (2) natural ventilation; (3) acoustic privacy; (4) outlook and visual privacy; (5) indoor space; (6) private open space; (7) communal spaces; (8) circulation spaces. These design elements were derived from prior research that audited apartment design policies for their potential to promote health [8] and were broadly consistent with the groupings of design requirements in all three policies. Additional design requirements that impacted the ease and experience of apartment living were also extracted. These were bicycle and car parking, and apartment mix. Despite its importance for health, thermal comfort was not included as a separate design objective because the policies had few requirements that could be measured using our methodology. Moreover, other relevant requirements were embedded within the solar and daylight access and natural ventilation assessments.

All design requirements across the elements were reviewed and extracted if they: (1) had a plausible relationship with promoting positive health and well-being outcomes; (2) included a stated

and potentially measurable criterion or standard, rather than simply outlining general suggestions to help deliver a design outcome; and (3) related to the design of the (i) apartment, (ii) residential floors, or (iii) the wider building. For example, under the element of outlook and visual privacy, a requirement advocates for 'setbacks to adjacent buildings and uses to ensure adequate amenity' [7]. This did not qualify as a measurable requirement. In contrast, provisions outlining minimum corridor widths [5] were included In this instance, the corridor widths of each residential floor were measured and all apartments were assigned the corridor width of the respective floor level and corridor on which they were located. For each building, the percentage of residential floors that met (or exceeded) the width requirement were then computed. Similarly, the solar and daylight access element, requiring that buildings 'configure internal apartment layouts to optimise solar access opportunities' was not an eligible requirement [7], whereas stipulating a percentage of apartments that must receive two hours of direct sunlight between 9 am and 3 pm at mid-winter [5] was. In this instance, the number of hours of sunlight received between 9 am and 3 pm was measured for each apartment, and for each building the percentage of apartments (in that building) that received at least 2 h of sunlight was computed.

A total of 122 unique, quantifiable, and measurable health-related apartment-, floor- and building-level design requirements from SEPP65 ($n = 78$), SPP7.3 ($n = 75$) and BADS ($n = 35$) were identified. Table 1 presents a detailed breakdown of these design requirements and their policy of origin. Some requirements were repeated in multiple elements as they were relevant to several design objectives. For instance, the policy requirement specifying the size of windows in habitable rooms to be no less than 10% of the floor area of the room was relevant to both solar and daylight access and indoor space and layout elements.

Measuring the implementation of the potential health-enhancing residential design policy requirements

Tailored policy-specific measures were created for each of the 122 policy requirements from the sourced architectural or development plans (including floor plates for each building level and elevations for each aspect) submitted as part of the development applications for the apartment buildings. To ensure the plans accurately depicted the final constructed buildings, all buildings in the sample were checked using: (1) strata plans prepared by a registered surveyor after building completion; (2) site visits; and (3) online real-estate websites to validate apartment layouts and numbering. Buildings were excluded from the study if the plans were noticeably different from the constructed building. This approach increased confidence in the measures broadly reflecting the final built form/outcomes of the respective buildings.

The method of measurement and extraction from the architectural plans were informed by (and developed with) guidance from an expert stakeholder panel. The panel was comprised of qualified architects and urban design and policy professionals, and also included representatives from the WA state government overseeing the development of the WA apartment design guide / SPP7.3. Data extraction and measurement of the requirements from the development application plans, floor plates and elevations were undertaken by a team of architecturally trained research assistants for all residential apartments ($n = 10{,}553$) and residential floors ($n = 1094$) within the buildings ($n = 173$). This process involved multiple methods, including visual inspection of layouts, measuring dimensions from scaled pdfs, measuring building separation and setbacks in Nearmap [11] and sun path modelling using Rhinoceros software with a Ladybug plugin [12].

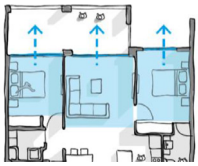
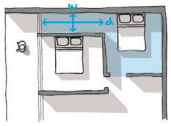
Table 1 outlines the selected policy design requirements and respective standards, the method of measurement and extraction of data/information from the architectural plans, grouped by the ten design elements.

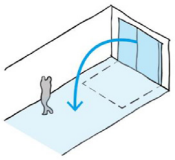
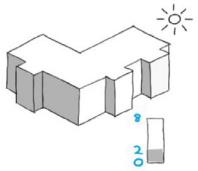
Developing a scoring system to quantify policy compliance/implementation

A scoring system was developed to quantify policy implementation at both the apartment and building levels. Table 1 also outlines the scoring system applied for each respective design requirement at both the apartment and building levels, grouped by the ten design elements.

Table 1
Apartment design policy requirements, measures, methods and policy implementation scoring.

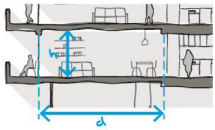
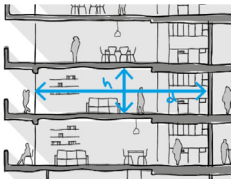
Solar and daylight access

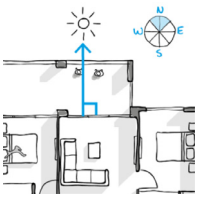
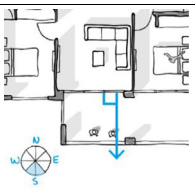
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Windows in all rooms: Every habitable room must have a window in an external wall visible from all parts of the room.	• Habitable rooms were assessed and coded for the presence of an external window • Compute: (number of habitable rooms with a window ÷ total number of windows) x 100. 	Do all habitable rooms in the apartment have a window? • No / <100% = 0 pts • Yes / 100% = 1 pt	Percentage of apartments in the building that have windows in all habitable rooms • <100% = 0 pts • 100% = 1 pt	✓	✓	✓
Snorkel dimensions: A window may provide daylight to a bedroom from a smaller secondary area (or snorkel) within the bedroom where the window is clear to the sky. The secondary area should be a minimum width of 1.2m and a maximum depth of 1.5 times the width, measured from the external surface of the window.	• Habitable rooms were assessed and coded for the presence of snorkel windows • The width and depth of the snorkel measured 	Percentage of bedrooms with a snorkel window that meet the dimension requirements • <100% = 0 pts • 100% = 1 pt	Percentage of apartments in a building with 100% of bedrooms with a snorkel window that meets the dimension requirements • <100% = 0 pts • 100% = 1 pt			✓

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Living window to floor area ratio: Every habitable room must have a window in an external wall with a total minimum glass area of not less than 10% of the floor area of the room.	• Living room window height (h) and width (w) measured; window area computed (w x h) • Area of the designated living area (polygon) of the designated area of living space as displayed on the architectural plans (i.e., with furniture or label) • (Living room window area ÷ living room floor area) x 100 	Is the living room window area ≥10% of the open-plan floor area: • No = 0 pts • Yes = 1 pt	Percentage of apartments in the building where the living room window is ≥10% of the open-plan floor area: • <100% = 0 pts • 100% = 1 pt	✓	✓	
Sun Exposure: Living rooms of at least 70% of apartments in a building receive a minimum of 2 hours of direct sunlight between 9 am and 3 pm in mid-winter. A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm in mid-winter (i.e., 21st June)	• Solar assessment of the buildings was conducted using environmental analysis tools within Rhinoceros software with a Ladybug plugin. • Building footprint and heights were used to generate building massing blocks with individual floorplates. The terrain was sourced from Google Maps using the Ladybug terrain plugin, and surrounding buildings were generated through a combination of available GIS data and OpenStreetMap. • A sunlight hours analysis was conducted using Ladybug solar analysis. The algorithm identified the number of hours of direct sunlight that fall on the exterior façade of the buildings between 9 am – 3 pm in mid-winter and outputted a mesh colour code to indicate these outputs by building face (aspect) and floor. • The number of hours of solar incidence (i.e., sunlight) (0-7 hours) was identified for each apartment. 	Does the apartment receive ≥2hrs sun exposure per day in mid-winter? • No / <2 hrs = 0 pts • Yes / ≥2 hrs = 1 pt	Percentage of apartments in the building (block) that have ≥2hrs sun exposure per day in mid-winter: • <70% = 0 pts • ≥70% = 1 pt	✓	✓	
		Does the apartment receive 0 hrs of sun exposure per day in mid-winter? • Yes / 0 hrs = 0 pts • No / >0 hrs = 1 pt	Percentage of apartments in the building (block) that receive 0 hrs of sun exposure per day in mid-winter: • >15% = 0 pts • ≤15% = 1 pt	✓	✓	

(*continued on next page*)

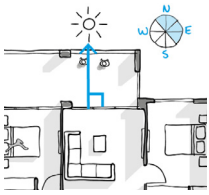
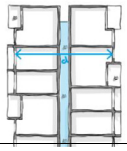
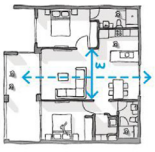
Table 1 (*continued*)

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Ceiling height to apartment depth ratio: Habitable room depths are limited to a maximum of 2.5 (or 3 for open-plan apartments) x the ceiling height.	• Finished floor ceiling height measured in the living area of the apartment • Depth of the open-plan floor area measured to the back wall of the open-plan area from the main balcony/window of the open-plan area • Ceiling to depth ratio computed = ceiling height ÷ open-plan floor depth. 	What is the ceiling height to room depth ratio of the main living space in the apartment? • >3.0 = 0 pts • <=3.0 = 1 pt • <=2.0 = 1.5 pts	Percentage of apartments in a building with the ratio of ceiling height to depth ≤3 • <100% = 0 pts • 100% = 1 pt	✓	✓	
		(In single aspect apartments only) – what is the ceiling height to room depth ratio? • >3.0 = 0 pts • <=3.0 = 1 pt • <=2.0 = 1.5 pts	Percentage of single aspect apartments in a building with a ceiling height to depth ratio of the ≤3 • <100% = 0 pts • 100% = 1 pt		✓	
		(In single-aspect apartments only) – what is the ceiling height to room depth ratio of the main living space? • >2.5 = 0 pts • <=2.5 = 1 pt	Percentage of single-aspect apartments in a building with a ceiling height to depth ratio of the main living area ≤2.5 • <100% = 0 pts • 100% = 1 pt			✓
Open-plan maximum room depths: Where a habitable room is an open-plan layout (combined living area, dining area and kitchen) and: has a ceiling height of 2.7m, the maximum room depth is 9m, or has a ceiling height of 2.4m, the maximum room depth is 6m	• Finished floor ceiling height measured in the living area of the apartment • Depth of the open-plan floor area measured to the back wall of the open-plan area from the main balcony/window of the open-plan area • If ceiling height ≥2.7m, is the open-plan depth ≤9m (No / Yes) • If ceiling height ≥2.4m - <2.7m, is the open-plan depth ≤6m (No / Yes) 	(In single-aspect apartments only) – the apartment has the specified open-plan room depth for its ceiling height: • No = 0 pts • Yes = 1 pt	Percentage of single aspect apartments with the specified open-plan depth for their ceiling height: • <100% = 0 pts • 100% = 1 pt			✓

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Northerly aspects The number of dwellings with a northern aspect is maximised.	• Aspect direction was measured from the perpendicular angle of the main living area window using a 32-point compass • "Northerly" aspect = NNW or N by W, or N or N by E, or NNE 	Does the apartment have a northerly aspect? • No = 0 pts • Yes = 1 pt	Percentage of apartments in the building with a northerly aspect: • <50% = 0 pts • ≥50% = 1 pt	✓	✓	✓
Single aspect south-facing apartments The design minimises the number of a single aspect, south-facing apartments.	• Aspect direction was measured from the perpendicular angle of the main living area window using a 32-point compass • "Southerly" aspect = SSE or S by E, or S or S by W, or SSW 	(In single-aspect apartments only) – does the apartment have a southerly aspect? • Yes = 0 pts • No = 1 pt	Percentage of single aspect apartments in the building that do NOT have a southerly aspect • <50% = 0 pts • ≥50% = 1 pt	✓		

(*continued on next page*)

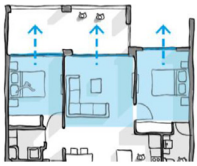
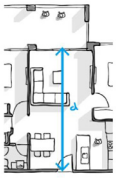
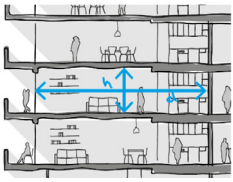
Table 1 (*continued*)

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Single aspect north-east facing apartments Single aspect, single-storey apartments should have a northerly or easterly aspect.	• Aspect direction was measured from the perpendicular angle of the main living area window using a 32-point compass • "Northerly" aspect = NNW or NbW or N or NbE or NNE • "Easterly" aspect = ENE or EbN or E or EbS or ESE 	(In single-aspect apartments only) – does the apartment have a northerly or easterly aspect? • No = 0 pts • Yes = 1 pt	Percentage of single aspect apartments in the building with a northerly or easterly aspect • <50% = 0 pts • ≥50% = 1 pt	✓		
Dual aspect apartments To optimise direct sunlight to habitable rooms, dual-aspect apartments are preferred.	• Apartments were assessed for the number of different aspects • Aspect #1 = main living area; • Aspect #2 = another habitable room on a different face of the building with a window or balcony. 	Does the apartment have a dual aspect? • No = 0 pts • Yes = 1 pt	Percentage of apartments in the building (block) with a dual aspect • <50% = 0 pts • ≥50% = 1 pt	✓	✓	
Double-loaded building apartment depths Developments that comprise single-aspect apartments on each side of a central circulation corridor shall have a maximum building depth of 20m.	• Building depth is measured from the external face of the two opposite faces. 	N/A	If the building has double-loaded corridors, is the building depth ≤20m? • No = 0 pts • Yes = 1 pt • Single-loaded = 1 pt		✓	
Living room width – cross-through apartments In cross-through apartments, the width of the living room is a minimum of 4m.	• Measured the width of the designated area of living space as displayed on the architectural plans (i.e., with furniture or label) [A] • The width of the living room was measured from the walls perpendicular to the living-balcony door (main light source). In angled rooms, the mid-point for the width measures was used [A] 	If a cross-through apartment, is the living room width ≥4m? • No = 0 pts • Yes = 1 pt	Percentage of cross-through apartments in a building with a living room width ≥4m • <100% = 0 pts • 100% = 1 pt		✓	
Apartment: maximum score				**6.0 - 9.5**	**6 - 10.5**	**2 - 5**
Building: maximum score				**6 - 9**	**8-11**	**2 - 5**

(*continued on next page*)

Table 1 (*continued*)

Natural ventilation

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Windows in all rooms Every habitable room must have a window in an external wall visible from all parts of the room.	• Habitable rooms assessed and coded for the presence of a window [A] • (Number of habitable rooms with a window ÷ total number of windows) x 100. 	Do ALL habitable rooms in the apartment have a window? • No / <100% = 0 pts • Yes / 100% = 1 pt	Percentage of apartments in the building that have windows in ALL habitable rooms • <100% = 0 pts • 100% = 1 pt	✓	✓	✓
Open-plan area depths Maximum depths for open-plan layouts (living, dining, kitchen) from a window are limited to maximise ventilation and airflow.	• Measured to the back wall of the open-plan area from the main balcony/window of the open-plan area. 	Depth of the open-plan area in the apartment: • >8m = 0 pts • ≤8m = 1 pt	Percentage of apartments in a building with an open-plan depth ≤8m: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt	✓		
		(In single-aspect apartments only) – depth of the open-plan area in the apartment: • >9m = 0 pts • ≤9m = 1 pt	Percentage of single aspect apartments in a building with an open-plan depth ≤9m • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt		✓	
Apartment depth Apartment depths are limited to maximise ventilation and airflow.	• Measured to the back wall of the open-plan area from the main balcony/window of the open-plan area. 	Depth of the apartment: • >18m = 0 pts • >12m - ≤18m = 0.5 pts • ≤12m = 1 pt	Percentage of apartments in a building with depths ≤18m • <100% = 0 pts • 100% = 1 pt	✓		
Open-plan maximum room depths: Where a habitable room is an open-plan layout (combined living area, dining area and kitchen) and: has a ceiling height of 2.7m, the maximum room depth is 9m, or has a ceiling height of 2.4m, the maximum room depth is 6m	• Finished floor ceiling height measured in the living area of the apartment • Depth of the open-plan floor area measured to the back wall of the open-plan area from the main balcony/window of the open-plan area • If ceiling height ≥2.7m, is the open-plan depth ≤9m (No / Yes) • If ceiling height ≥2.4m - <2.7m, is the open-plan depth ≤6m (No / Yes) 	(In single-aspect apartments only) – the apartment has the correct open-plan room depth for its ceiling height: • No = 0 pts • Yes = 1 pt	Percentage of single aspect apartments with the correct open-plan depth for their ceiling height: • <100% = 0 pts • 100% = 1 pt			✓

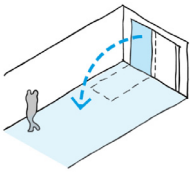
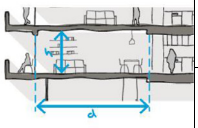
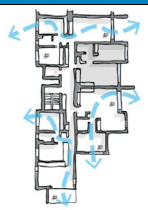
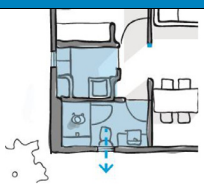
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Window openings The area of unobstructed window openings should be equal to at least 5% of the floor area served.	• Living room window height and width measured and window area computed (w x h) • Area of the designated living area (polygon) of the designated area of living space as displayed on the architectural plans measured • Assume 50% of the living room window (glass sliding door) can be opened: ((Living room window area ÷ 2) ÷ living room floor area)) x 100 	Is the area of the openable portion of the living room window at least 5% of the open-plan floor area? • < 5% = 0 pts • ≥5% = 1 pt	Percentage of apartments in a building with the area of the openable portion of the living room window at least 5% of the open-plan floor area: • <100% = 0 pts • 100% = 1 pt	✓		
Ceiling height to apartment depth ratio: Habitable room depths are limited to a maximum of 2.5 (or 3 for open-plan apartments) x the ceiling height.	• Finished floor ceiling height measured in the living area of the apartment • Depth of the open-plan floor area measured to the back wall of the open-plan area from the main balcony/window of the open-plan area • Ceiling to depth ratio computed = ceiling height ÷ open-plan floor depth. 	What is the ceiling height to room depth ratio in the apartment? • >3.0 = 0 pts • <=3.0 = 1 pt • <=2.0 = 1.5 pts	Percentage of apartments in a building with a ceiling height to room depth ratio ≤3 • <100% = 0 pts • 100% = 1 pt	✓	✓	
		(In single aspect apartments only) – what is the ceiling height to room depth ratio? • >3.0 = 0 pts • <=3.0 = 1 pt • <=2.0 = 1.5 pts	Percentage of single aspect apartments in a building with a ceiling height to room depth ratio ≤3 • <100% = 0 pts • 100% = 1 pt		✓	
		(In single aspect apartments only) – what is the ceiling height to room depth ratio? • >2.5 = 0 pts • <=2.5 = 1 pt	Percentage of single aspect apartments in a building with a ceiling height to depth ratio ≤2.5 • <100% = 0 pts • 100% = 1 pt			✓

Table 1 (*continued*)

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Naturally ventilated apartments Apartments are naturally cross-ventilated with openings on at least two walls in habitable rooms.	• Apartments inspected for the presence of window openings on two sides (different aspects) of the apartment for air flow in/through/out: • No; • Yes with windows on opposite walls; • Yes with windows on two sides / perpendicular walls. 	Is the apartment naturally cross-ventilated? • No = 0 pts • Yes = 1 pt	Percentage of apartments in a building that are naturally cross-ventilated • <60% = 0 pts • ≥60% = 1 pt	✓	✓	
			Percentage of apartments in a building that are naturally cross-ventilated • <40% = 0 pts • ≥40% = 1 pt			✓
Cross-through apartment natural ventilation The depth of cross-over and cross-through apartments with openings at either end and no openings on side walls should be optimised to assist natural breeze paths (maximum 20m).	• Depth of all cross-through apartments with windows measured from each window opening. 	If a cross-through apartment with opposite openings, is the depth ≤20m? • No = 0 pts • Yes = 1 pt	Percentage of cross-through apartments with openings on opposite sides ≤20m • <100% = 0 pts • 100% = 1 pt		✓	
		If a cross-through apartment with opposite openings, is the depth ≤18m? • No = 0 pts • Yes = 1 pt	Percentage of cross-through apartments with openings on opposite sides ≤18m • <100% = 0 pts • 100% = 1 pt			✓

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Bathroom windows Where possible, bathrooms should have an external openable window.	• Apartments assessed for the presence of bathrooms: Main bathroom (accessible only from the main living area); ensuite (accessible only from the bedroom); semi-ensuite (accessible from a bedroom and the main living area) • All bathrooms were assessed and coded for the presence of a window [A] • (Number of bathrooms with a window ÷ total number of bathrooms) x 100. 	Percentage of bathrooms in the apartment with a window: • 0 - <50% = 0 pts • ≥50% - <100% = 0.5 pts • 100% = 1 pt	Percentage of apartments in a building with at least 50% of their bathrooms having a window • <100% = 0 pts • 100% = 1 pt	✓		
Laundry windows Where possible, laundries should have an external openable window.	• Apartments assessed for the presence of a designated laundry – identified on the architectural plan as a separate laundry room • Laundries assessed and coded for the presence of a window [A] • (Number of laundries with a window ÷ total number of apartments with a laundry) x 100. 	If the apartment has a laundry, does it have a window? • No = 0 pts • Yes = 1 pt	Percentage of apartments in a building with a laundry room that that has a window: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt	✓		
Apartment: maximum score				7.5 - 8.5	3 - 8	3 - 5
Building: maximum score				7 - 8	3 - 6	3 - 5

(*continued on next page*)

Table 1 (*continued*)

Indoor space and apartment layout

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Apartment size (area) Apartments are required to have the following minimum internal areas: - Studio = 35 m^2 - 1 bedroom = 50 m^2 - 2 bedroom = 70 m^2 - 3 bedroom = 90m^2 + 5m^2 2nd+ bathrooms - 4 bedroom = 102m^2 + 5m^2 2nd+ bathrooms	• Measure the entire apartment area from the inside of the walls and windows on the inside perimeter of the apartment. • Compute the minimum size (area) per apartment based on the number of bedrooms. • (Number of apartments meeting the size requirements ÷ total number of apartments) x 100 	Does the apartment meet the size (area) requirement based on the number of bedrooms? • No = 0 pts • Yes = 1 pt	Percentage of apartments in a building meeting the minimum size (area) requirement: • <100% = 0 pts • 100% = 1 pt	✓		
Apartment size (area) Dwellings have a minimum internal floor area in accordance with: - Studio = 37m^2 - 1 bedroom = 47m^2 - 2 bedroom & 1 bath = 67m^2 - 3 bedroom & 1 bath = 90m^2 An additional 3m^2 shall be provided for designs that include a second or separate toilet, and 5m^2 for designs that include a second bathroom.	• Measure the entire apartment area from the inside of the walls and windows on the inside perimeter of the apartment. • Compute the minimum size (area) per apartment based on the number of bedrooms • (Number of apartments meeting the size requirements ÷ total number of apartments) x 100 	Does the apartment meet the size (area) requirement based on the number of bedrooms? • No = 0 pts • Yes = 1 pt	Percentage of apartments in a building meeting the minimum size (area) requirement: • <100% = 0 pts • 100% = 1 pt		✓	

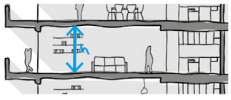
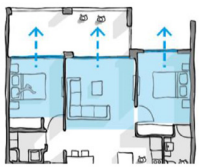
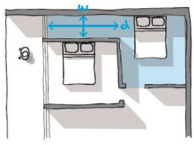
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Ceiling heights Ceiling height achieves sufficient natural ventilation and daylight access. Measured from finished floor level to finished ceiling level, minimum ceiling heights are 2.7m for habitable rooms.	• Height from the finished floor to the finished ceiling level of the main living area (m) 	Ceiling height of the apartment: • <2.7m = 0 pts • ≥2.7m = 1 pt	Percentage of apartments in a building with ceiling heights of habitable rooms ≥2.7m • <100% = 0 pts • 100% = 1 pt	✓	✓	✓
Windows in all rooms Every habitable room must have a window in an external wall visible from all parts of the room.	• Habitable rooms were assessed and coded for the presence of a window • (Number of habitable rooms with a window ÷ total number of windows) x 100. 	Do all habitable rooms in the apartment have a window? • No / <100% = 0 pts • Yes / 100% = 1 pt	Percentage of apartments in the building that have windows in ALL habitable rooms • <100% = 0 pts • 100% = 1 pt	✓	✓	✓
Snorkel dimensions A window may provide daylight to a bedroom from a smaller secondary area within the bedroom where the window is clear to the sky. The secondary area should be a minimum width of 1.2m and a maximum depth of 1.5 times the width, measured from the external surface of the window.	• Habitable rooms were assessed and coded for the presence of snorkel windows • Width and depth measured 	Percentage of bedrooms with a snorkel window that meet the dimension requirements • <100% = 0 pts • 100% = 1 pt	Percentage of apartments in a building with 100% of bedrooms with a snorkel window that meets the dimension requirements • <100% = 0 pts • 100% = 1 pt			✓

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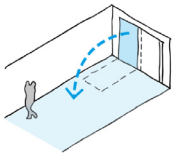
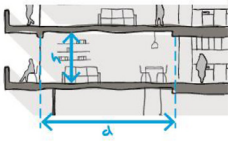
Table 1 (*continued*)

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Living window to floor area ratio Every habitable room must have a window in an external wall with a total minimum glass area of not less than 10% of the floor area of the room.	• Living room window height and width measured and window area computed (w x h) • Area of the designated living area (polygon) of the designated area of living space as displayed on the architectural plans measured • (Living room window area ÷ living room floor area) x 100 	Is the living room window area ≥10% of the open-plan floor area? • No = 0 pts • Yes = 1 pt	The percentage of apartments in the building where the living room window is ≥10% of the open-plan floor area: • <100% = 0 pts • 100% = 1 pt	✓	✓	
Ceiling height to apartment depth ratio: Habitable room depths are limited to a maximum of 2.5 (or 3 for open-plan apartments) x the ceiling height.	• Finished floor ceiling height measured in the main living area of the apartment • Depth of the open-plan floor area measured to the back wall of the open-plan area from the main balcony/window of the open-plan area • Ceiling to depth ratio = ceiling height ÷ open-plan floor depth 	What is the ceiling height to room depth ratio in the apartment? • >3.0 = 0 pts • <=3.0 = 1 pt • <=2.0 = 1.5 pts	Percentage of apartments in a building with a ceiling height to room depth ratio ≤3 • <100% = 0 pts • 100% = 1 pt	✓	✓	
		(In single aspect apartments only) – what is the ceiling height to room depth ratio? • >3.0 = 0 pts • <=3.0 = 1 pt • <=2.0 = 1.5 pts	Percentage of single aspect apartments in a building with a ceiling height to room depth ratio ≤3 • <100% = 0 pts • 100% = 1 pt		✓	
		(In single aspect apartments only) – what is the ceiling height to room depth ratio? • >2.5 = 0 pts • <=2.5 = 1 pt	Percentage of single aspect apartments in a building with a ceiling height to depth ratio ≤2.5 • <100% = 0 pts • 100% = 1 pt			✓

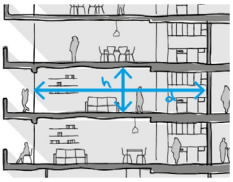
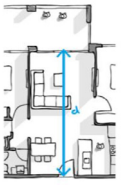
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Open-plan maximum room depths: Where a habitable room is an open-plan layout (combined living area, dining area and kitchen) and: has a ceiling height of 2.7m, the maximum room depth is 9m, or has a ceiling height of 2.4m, the maximum room depth is 6m	• Finished floor ceiling height measured in the living area of the apartment • Depth of the open-plan floor area measured to the back wall of the open-plan area from the main balcony/window of the open-plan area • If ceiling height ≥2.7m, is the open-plan depth ≤9m (No / Yes) • If ceiling height ≥2.4m - <2.7m, is the open-plan depth ≤6m (No / Yes) 	(In single-aspect apartments only) – does the apartment have the correct open-plan room depth for its ceiling height? • No = 0 pts • Yes = 1 pt	Percentage of single aspect apartments in a building with the correct open-plan depth for their ceiling height: • <100% = 0 pts • 100% = 1 pt			✓
Open-plan area depths Maximum depths for open-plan layouts (combined living area, dining area and kitchen) from a window are limited to maximise ventilation and airflow.	• Measured to the back wall of the open-plan area from the main balcony/window of the open-plan area. 	Depth of the open-plan area in the apartment: • >8m = 0 pts • ≤8m = 1 pt	Percentage of apartments in a building with an open-plan depth ≤8m: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt	✓		
		Depth of the open-plan area in the apartment: • >9m = 0 pts • ≤9m = 1 pt	Percentage of apartments in a building with an open-plan depth ≤9m • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt		✓	

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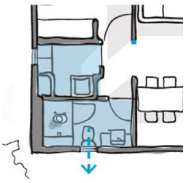
Table 1 (*continued*)

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Living room width – cross-through apartments In cross-through apartments, the width of the living room is a minimum of 4m	• Measure the width of the designated area of living space as displayed on the architectural plans (i.e., with furniture or label) • The width of the living room was measured from the walls perpendicular to the living-balcony door (main light source). In angled rooms, the mid-point for the width measures was used 	If a cross-through apartment, is the living room width ≥4m? • No = 0 pts • Yes = 1 pt	Percentage of cross-through apartments in a building with a living room width ≥4m • <100% = 0 pts • 100% = 1 pt		✓	
Habitable rooms on external faces All living areas and bedrooms should be located on the external face of the building.	• All habitable rooms (living area, bedrooms, designated study rooms) assessed and coded for being located on an external face/wall or not • (Number of habitable rooms located on an external face ÷ total number of habitable rooms) x 100. 	Percentage of habitable rooms in the apartment located on an external face/wall: • <100% = 0 pts • 100% = 1 pt	Percentage of apartments with 100% of living areas and bedrooms located on an external face/wall: • <100% = 0 pts • 100% = 1 pt	✓	✓	
Bathroom windows Where possible, bathrooms should have an external openable window.	• Apartments assessed for the presence of bathrooms: Main bathroom (accessible only from the main living area); ensuite (accessible only from the bedroom); semi-ensuite (accessible from a bedroom and the main living area) • All bathrooms were assessed and coded for the presence (or absence) of a window • (Number of bathrooms with a window ÷ total number of bathrooms) x 100. 	Percentage of bathrooms in the apartment with a window: • 0 - <50% = 0 pts • ≥50% - <100% = 0.5 pts • 100% = 1 pt	Percentage of apartments in a building with at least 50% of their bathrooms having a window • <100% = 0 pts • 100% = 1 pt	✓		

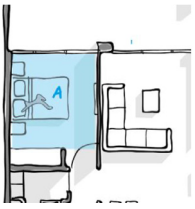
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Laundry windows Where possible, laundries should have an external openable window.	• Apartments assessed for the presence of a laundry – identified on the architectural plan as a separate laundry room • Laundries were assessed and coded for the presence of a window • (Number of laundries with a window ÷ total number of apartments with a laundry) x 100. 	If the apartment has a laundry, does it have a window? • No = 0 pts • Yes = 1 pt	Percentage of apartments in a building with a laundry that has an external window: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt	✓		
Bedroom floor areas Master bedrooms should have a minimum floor area of 10m^2 and other bedrooms 9m^2.	• Assume that the room indicated as "Bed 1" is the master bedroom or the bedroom with an ensuite, or the largest bedroom • Measure the entire area of the bedroom: including the wardrobe; excluding the walk-in wardrobe and wardrobes walled off or separated by a door. Any wardrobe walled off or used as a corridor to the ensuite was excluded from the area. 	Is the main bedroom ≥10m^2? • No = 0 pts • Yes = 1 pt	Percentage of apartments in the building where the main bedroom area is ≥10m^2 • <100% = 0 pts • 100% = 1 pt	✓	✓	
		Is bedroom #2 ≥9m^2? • No = 0 pts • Yes = 1 pt	Percentage of apartments (excluding studios) with all other bedroom floor areas ≥9m^2 = (∑2+3+4 *bed meeting 9m^2* / ∑ 2+3+4 *bed apartments):* • <100% = 0 pts • 100% = 1 pt	✓	✓	
		Is bedroom #3 ≥9m^2? • No = 0 pts • Yes = 1 pt				
		Is bedroom #4 ≥9m^2? • No = 0 pts • Yes = 1 pt				

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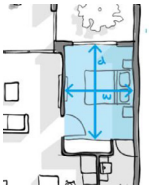
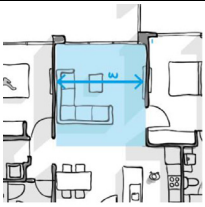
Table 1 (*continued*)

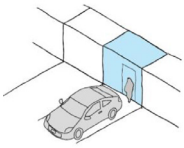
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Bedroom dimensions Habitable rooms have minimum floor areas and dimensions. Bedrooms have a minimum dimension (excluding wardrobe space).	• Assume that the room indicated as "Bed 1" is the master bedroom, or the bedroom with an ensuite, or the largest bedroom • Categorise in descending order from bedroom 1 to 4 by size. • Measure the depth of the bedroom from the main light source (window). Walk-in wardrobes and built-ins excluded. • Measure the width of the bedroom at its widest point, excluding the walk-in wardrobe and wardrobes 	Does the main bedroom have a width of ≥3m and a depth of ≥3m? • No = 0 pts • Yes = 1 pt	Percentage of apartments (excluding studios) with the main bedroom meeting the minimum width AND depth dimensions: • <100% = 0 pts • 100% = 1 pt	✓	✓	
		Does the main bedroom have a width of ≥3m and a depth of ≥3,4m? • No = 0 pts • Yes = 1 pt	Percentage of apartments (excluding studios) with the main bedroom meeting the minimum width AND depth dimensions: • <100% = 0 pts • 100% = 1 pt			✓
		Does bedroom #2 have a width of ≥3m and a depth of ≥3m? • No = 0 pts • Yes = 1 pt	Percentage of apartments (excluding studios) with all other bedrooms meeting the minimum 3m width and 3m depth dimensions = *(∑2+3+4 bed meeting 9m2 / ∑ 2+3+4 bed apartments):* • <100% = 0 pts • 100% = 1 pt	✓	✓	✓
		Does bedroom #3 have a width of ≥3m and a depth of ≥3m? • No = 0 pts • Yes = 1 pt				
		Does bedroom #4 have a width of ≥3m and a depth of ≥3m? • No = 0 pts • Yes = 1 pt				

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Living room minimum width Habitable rooms have minimum floor areas and dimensions. Living rooms or combined living/dining rooms have a minimum width of: - 3.6m for studio and 1 bedroom apartments - 4m for 2 and 3 bedroom apartments	• Measure the width of the designated area of living space as displayed on the architectural plans (i.e., with furniture or label) from the walls perpendicular to the living-balcony door (main light source) • On angled rooms, take the mid-point for width/depth measures 	Does the apartment meet the minimum width dimension for the living area for its particular apartment type? • No = 0 pts • Yes = 1 pt	Percentage of all apartments that meet the minimum width dimension for the living area for the particular apartment type • <100% = 0 pts • 100% = 1 pt	✓	✓	
Living rooms or combined living/dining rooms have a minimum width of: - Studio or 1 bedroom apartment = minimum living width of 3.3m - 2+ bedrooms = minimum living width of 3.6m		Does the apartment meet the minimum width dimension for the living area for its particular apartment type? • No = 0 pts • Yes = 1 pt	Percentage of all apartments that meet the minimum width dimension for the living area for the particular apartment type • <100% = 0 pts • 100% = 1 pt			✓
Living room floor area Living area minimum dimensions: - Studio and 1 bedroom dwelling= 10m^2 - 2 or more bedroom dwelling= 12m^2	• Measure the area of the designated living area – contained to a single floor finish / the area break aligns with the floor finish break as designated on the architectural plan [A] • Measure the largest square or rectangle of the area that can be used as a living area. 	Does the apartment meet the minimum living floor area (m^2) requirement? • No = 0 pts • Yes = 1 pt	Percentage of apartments meeting the living room area (m^2) requirement • <100% = 0 pts • 100% = 1 pt			✓

(*continued on next page*)

Table 1 (*continued*)

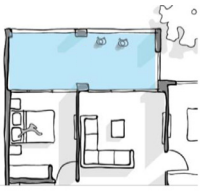
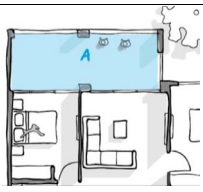
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Bedrooms off living areas Access to bedrooms, bathrooms and laundries is separated from living areas, minimising direct openings between living and service areas.	• Apartments were assessed for the presence of door entries into bedrooms off the living room / open-plan area (as designated on the architectural plan) • Where doors entered directly off the living area / from a shared party wall, this was coded as being directly off the living area (see ☒ to the right). • Where doors/entries were not directly off the living area wall, these were deemed as compliant (see ☑ to the right) • (Number of bedrooms not accessed directly off the living area ÷ the total number of bedrooms in the apartment) x 100 	Percentage of bedrooms in the apartment not accessed directly off the living area • 50% - 100% = 0 pts • 0 - 50% = 0.5 pts • 0% = 1 pt	Percentage of apartments in a building with at least 50% of their bedrooms NOT located off the main living area • <100% = 0 pts • 100% = 1 pt	✓	✓	
Bathrooms off living areas Access to bedrooms, bathrooms and laundries is separated from living areas, minimising direct openings between living and service areas.	• Apartments were assessed for the presence of door entries into bathrooms off the living room / open-plan area (as designated on the architectural plan) • Where doors entered directly off the living area / from a shared party wall, this was coded as being directly off the living area • Where doors/entries were not directly off the living area wall, these were deemed as compliant (see ☑ to the right) • (Number of bathrooms not accessed directly off the living area ÷ the total number of bathrooms in the apartment) x 100 	Percentage of bathrooms in the apartment not accessed directly off the living area • 50% - 100% = 0 pts • 0 - 50% = 0.5 pts • 0% = 1 pt	Percentage of apartments in the building with the main bathroom (or semi ensuite) access NOT directly off the main living area: • 50% - 100% = 1 pt • 0 – 50% = 0.5 pts • 0% = 0 pts	✓	✓	

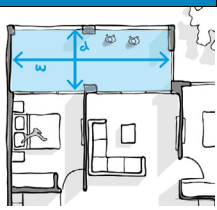
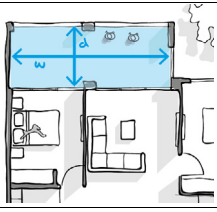
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
External storage Additional storage is conveniently located, accessible and nominated for individual apartments. Storage not located in apartments is secure and allocated to specific apartments. Storage is provided for larger and less frequently accessed items. Storage space in internal or basement car parks is provided at the rear or side of car spaces or in cages so that allocated car parking remains accessible.	• Plans assessed for the presence/allocation of designated external storage for each apartment • (Number of apartments with allocated external storage ÷ the total number of apartments) x 100 	Does the apartment have designated external storage? • No = 0 pts • Yes = 1 pt	Percentage of apartments with designated external storage: • <100% = 0 pts • 100% = 1 pt	✓	✓	✓
Apartment: max score				**11.5 - 23.5**	**12 - 25.5**	**4 - 12**
Building: max score				**15 - 17**	**14 - 17**	**6 - 11**

(*continued on next page*)

Table 1 (*continued*)

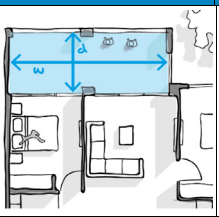
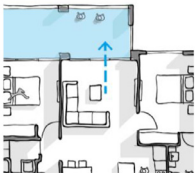
Private open space and balconies

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Private open space Apartments provide appropriately sized private open spaces and balconies to enhance residential amenities. For apartments at ground level or on a podium or similar structure, a private open space is provided instead of a balcony.	• Plans were assessed for the presence of a balcony or courtyard off the main living area • (Number of apartments with a private open space ÷ the total number of apartments) x 100 	Does the apartment have a private open space (balcony or courtyard)? • No = 0 pts • Yes = 1 pt	Percentage of apartments with any private open space • <100% = 0 pts • 100% = 1 pt	✓	✓	✓
Balcony/courtyard size All apartments are required to have primary balconies with minimum areas as follows: - Studio = 4m² - 1 bedroom = 8m² - 2 bedroom = 10m² - 3 bedroom = 12m² - Courtyards = 15m²	• Using scaled-pdf plans - measure the area of the entire balcony or courtyard, including small areas from inside the balustrade/wall not including any staircases 	Does the balcony meet the minimum size standard for that apartment type? • No = 0 pts • Yes = 1 pt OR Does the courtyard meet the minimum size standard? • No = 0 pts • Yes = 1 pt	Percentage of apartments in the building that meet the balcony minimum size standards • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt AND (where a building has apartments with balconies and courtyards) Percentage of apartments in the building that meet the courtyard minimum size standards • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt	✓	✓	✓
All apartments are required to have primary balconies with minimum areas as follows: - Studio or 1 bedroom dwelling = 8m² - 2 bedroom dwelling = 8m² - 3+ bedroom dwelling = 12m² - Courtyards = 25m²						✓

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Balcony/courtyard depth Minimum depth: - Studio = n/a - 1 bedroom = 2m - 2 bedroom = 2m - 3 bedroom = 2.4m	• Using scaled-pdf plans - measure the depth (at the deepest point) of the MAIN balcony/courtyard perpendicular to the living-balcony access point/glass doors 	Does the balcony OR courtyard depth meet the minimum size standard for that apartment type? • No = 0 pts • Yes = 1 pt	Percentage of apartments in the building that meet the balcony minimum depth standards: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt AND (where a building has apartments with balconies and courtyards) Percentage of apartments in the building that meet the courtyard minimum depth standards: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt	✓	✓	
Balcony/courtyard long side out Primary open space and balconies should be orientated with the longer side facing outwards or be open to the sky to optimise daylight access into adjacent rooms.	• Using scaled-pdf plans - measure the depth (at the deepest point) of the MAIN balcony/courtyard perpendicular to the living-balcony access point/glass doors • Measured the width (at the widest point) of the MAIN balcony/courtyard • Compute score to indicate if the balcony depth < width 	Does the apartment have a balcony or courtyard where the depth < width? • No = 0 pts • Yes = 1 pt	Percentage of apartments with a balcony / courtyard where the depth < width: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt	✓		

(*continued on next page*)

Table 1 (*continued*)

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Balcony/courtyard minimum dimensions A dwelling should have private open space with minimum dimensions of: - Studio or 1 bedroom dwelling = 1.8m - 2 bedroom dwelling = 2m - 3+ bedroom dwelling = 2.4m	• Using scaled-pdf plans - measure the depth (at the deepest point) of the MAIN balcony/courtyard perpendicular to the living-balcony access point/glass doors • Measured the width (at the widest point) of the MAIN balcony/courtyard • Compute score to indicate if the balcony depth AND width meet the minimum dimension based on the number of bedrooms 	Does the balcony or courtyard meet the width AND depth requirements? • No = 0 pts • Yes = 1 pt	Percentage of apartments where the balcony or courtyard meets the width AND depth requirements? • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt			✓
Access to private open space Primary open space and balconies should be located adjacent to the living room, dining room or kitchen to extend the living space	• Plans were assessed and apartments were coded to indicate if the main balcony was accessible off/from the main living area • (Number of apartments with access off the main living area ÷ the total number of apartments) x 100 	Is access to the main balcony from the main living area? • No = 0 pts • Yes = 1 pt	Percentage of apartments in the building with the main balcony accessible off the main living area • <100% = 0 pts • 100% = 1 pt	✓	✓	✓

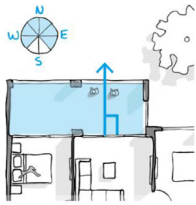
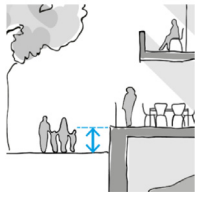
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Aspect of private open space Private open spaces and balconies predominantly face north, east or west.	• Aspect direction was measured from the perpendicular angle of the access point (glass door) from the main living area window using a 32-point compass • "Northerly" aspect = NNW or NbW or N or NbE or NNE • "Easterly" aspect = ENE or EbN or E or EbS or ESE • "Westerly" aspect = WSW or WbS or W or WbN or WNW • (Number of apartments with north, east or west private open space aspect ÷ the total number of apartments) x 100 	Does the balcony/courtyard face northerly, easterly or westerly? • No = 0 pts • Yes = 1 pt	Percentage of apartments (with a private open space) where the balcony / courtyard face northerly, easterly or westerly • <25% = 0 pts • 25% - ≤75% = 0.5 pts • >75% = 1pt	✓		
Elevated courtyards Changes in level between private terraces, front gardens and the ground floor level of the building and the street level average less than 1m and do not exceed 1.2m.	• Using elevation plans, apartments with a courtyard private open space were assessed to indicate if the courtyard floor level was elevated above street level 	If a courtyard apartment, was the courtyard private open space elevated above street level? • No = 0 pts • Yes = 1 pt	Percentage of courtyard apartments where the courtyard private open space was elevated above street level • <100% = 0 pts • 100% = 1 pt	✓	✓	✓
Apartment: max score				6 - 7	4 - 5	5 - 6
Building: max score				7 - 9	4 - 8	4 - 5

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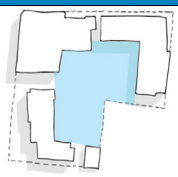
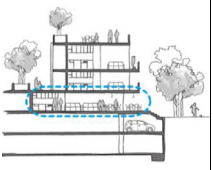
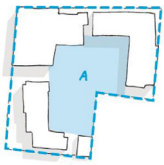
Table 1 (*continued*)

Communal spaces

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Communal open / outdoor space An adequate area of communal open space is provided to enhance residential amenities and provide opportunities for landscaping.	• Asses the architectural plans to identify the presence of an open/outdoor communal space within the complex. 	Does the apartment complex have a communal open/outdoor space? • No = 0 pts • Yes = 1 pt	Does the apartment complex have a communal open/outdoor space? • No = 0 pts • Yes = 1 pt	✓	✓	✓
Communal indoor space Are any communal indoor spaces provided in the complex?	• Identify the presence of other interior communal spaces as displayed on the architectural plans • E.g., games room, kitchen, common room, bar 	Interior communal spaces provided: • No = 0 pts • Yes = 1 pt	Interior communal spaces provided: • No = 0 pts • Yes = 1 pt	✓		
Area of communal open/outdoor space The area of communal open space provided should be 25% of the total site area.	• Measure the entire area of the outdoor communal space as displayed on the architectural plans • Measure the area of the site – identifying the designated land cadastral parcel/s of the building and compute the area • (Area of communal outdoor space ÷ number of apartments) • (Area of communal outdoor space ÷ gross site area) x 100 	Percentage of the site area provided as communal open space: • <25% = 0 pts • ≥25% = 1 pt	Percentage of the site area provided as communal open space: • <25% = 0 pts • ≥25% = 1 pt	✓		

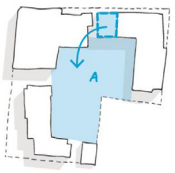
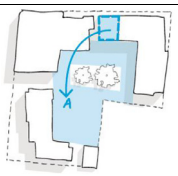
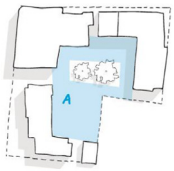
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
The area of communal open/outdoor space provided is either 250m² or 2.5m² per apartment	• Measure the entire area of the outdoor communal space as displayed on the architectural plans • (Area of communal open space ÷ the number of apartments in the complex) 	Area of communal open space: • <250m² or 2.5m² / apartment = 0 pts • ≥250m² or 2.5m² / apartment = 1 pt	Area of communal open space: • <250m² or 2.5m² / apartment = 0 pts • ≥250m² or 2.5m² / apartment = 1 pt			✓
The area of communal open/outdoor space provided is 6m² per apartment		Area per apartment: • <6m² = 0 pts • ≥6m² = 1 pt	Area per apartment: • <6m² = 0 pts • ≥6m² = 1 pt		✓	
Hard landscaped communal spaces Minimum accessible/hard landscaped area is at least 2m² per apartment	• Measure the entire area of the hard-landscaped communal space as displayed on the architectural plans • (Area of the hardscaped area in the communal open outdoor space ÷ number of apartments) 	Area per apartment of hard landscaped communal outdoor space: • <2m² = 0 pts • ≥2m² = 1 pt	Area per apartment of hard landscaped communal outdoor space: • <2m² = 0 pts • ≥2m² = 1 pt		✓	
The area of hardscaped outdoor/open communal space (permeable paving or decking within a deep soil area) does not exceed 20% of its area	• Measure the entire area of the hard-landscaped communal space as displayed on the architectural plans • (Area hardscaped surfaces within the outdoor communal space ÷ total area of outdoor communal space) x 100 	Percentage area of communal open outdoor space hardscaped: • >20% = 0 pts • ≤20% = 1 pt	Percentage area of communal open outdoor space hardscaped: • >20% = 0 pts • ≤20% = 1 pt		✓	

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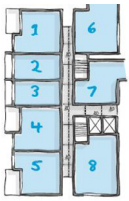
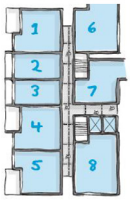
Table 1 (*continued*)

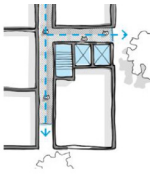
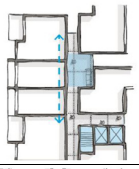
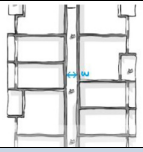
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Minimum dimension of the communal open/outdoor space Communal open space should have a minimum dimension of 3m (SEPP65) or 4m (SPP7.3).	• Identify and measure the width of the space at its narrowest point • Identify and measure the length of the space on its shortest side • Compute score to indicate if the width and length ≥ the policy standard	Is the length or width of the outdoor communal space: • <3m = 0 pts • ≥3m = 1 pt	Is the length or width of the outdoor communal space: • <3m = 0 pts • ≥3m = 1 pt	✓		
		Is the length or width of the outdoor communal space: • <4m = 0 pts • ≥4m = 1 pt	Is the length or width of the outdoor communal space: • <4m = 0 pts • ≥4m = 1 pt		✓	
What is the location of the communal open/outdoor space? Where communal open space cannot be provided at ground level, it should be provided on a podium or roof	• Identify the location of the communal open (outdoor) space	What is the location of the communal open space? • None provided = 0 pts • Roof or podium = 0.5 pts • Ground floor = 1pt	What is the location of the communal open space? • None provided = 0 pts • Roof or podium = 0.5 pts • Ground floor = 1pt	✓		
Passive surveillance of communal open/outdoor space Communal open space is designed to maximise safety. Communal open space and the public domain should be readily visible from habitable rooms and private open space areas while maintaining visual privacy.	• Measure the perimeter of the communal open space (m) • Measure the length of the communal space perimeter overlooked by apartments (m) with main / living area balconies. • Calculate the percentage of the perimeter overlooked by apartments living area balconies = (length overlooked ÷ perimeter) x 100	Percentage of the perimeter of the communal outdoor space overlooked by apartments: • None = 0% = 0 pts • Low = ≤25% = 0.5 pts • High = >75% - 100% = 0.5 pts • Medium = ≥25% - ≤75% = 1 pt	Percentage of the perimeter of the communal outdoor space overlooked by apartments: • None = 0% = 0 pts • Low = ≤25% = 0.5 pts • High = >75% - 100% = 0.5 pts • Medium = ≥25% - ≤75% = 1 pt	✓	✓	✓
Deep soil zones Deep soil zones should be provided to allow for the retention of significant trees	• Using the architectural plans and Nearmap high-resolution imagery, identify if there are any significant trees located on-site	Are any significant trees on-site? • No / none = 0 pts • Yes / 1 or more = 1 pt	Are any significant trees on-site? • No / none = 0 pts • Yes / 1 or more = 1 pt	✓	✓	✓
Plot ratio The ratio of the floor area of a building is expressed relative to the site area. Sets the building massing for a development site - Up to 3 storeys = 0.8 - 4 storeys = 1.3 - 5+ storeys = 2.0	• The plot ratio area included the gross floor area of all dwellings and commercial spaces but excludes the floor area of some circulation and service areas • Digitised and computed the area of the building footprint • Measured the area of the site – identifying the designated land cadastral parcel/s of the building and compute the area. • (80% of the building footprint area x number of floors) ÷ cadastre (site) area	Is the plot ratio correct for the number of storeys? • ≤ 3 storeys + plot ratio <= 0.8 = 1 pt • = 4 storeys + plot ratio ≤ 1.3= 1 pt • 5+ storeys + plot ratio ≤ 2.0 = 1 pt • Otherwise = 0 pts	Is the plot-ratio correct for the number of storeys? • ≤ 3 storeys + plot ratio <= 0.8 = 1 pt • = 4 storeys + plot ratio ≤ 1.3= 1 pt • 5+ storeys + plot ratio ≤ 2.0 = 1 pt • Otherwise = 0 pts		✓	
Apartment: max score				7	8	4
Building: max score				7	8	4

(*continued on next page*)

Table 1 (*continued*)

Circulation spaces

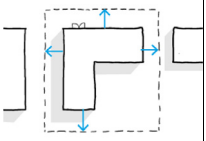
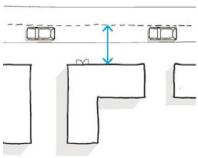
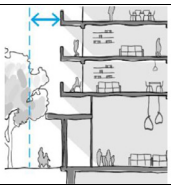
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Apartments per floor The number of apartments off a circulation core on each floor is limited. The maximum number of apartments off a circulation core on a single level is eight Where this is not achieved, no more than 12 apartments should be provided off a circulation core on a single level	• The number of apartments on each (residential) floor, located off a single circulation core, was identified and counted. 	Number of apartments on the floor on which the apartment is located: • ≤8/floor = 1 pt • 9-12 /floor = 0.5 pts • 13+/floor = 0 pts	Percentage of floors within the building that have ≤8 apartments per floor / circulation core: • <75% = 0 pts • ≥75% = 1 pt	✓		
			Percentage of floors within the building that have 9-12 apartments per floor / circulation core: • <75% = 0 pts • ≥75% = 1 pt	✓		
		Number of apartments on the floor on which the apartment is located: • >12 = 0 pts • ≤12 = 1 pt	Percentage of floors within the building that have ≤12 apartments per floors • <100% = 0 pts • 100% = 1 pt		✓	
Lifts For buildings of 10 storeys and over, the maximum number of apartments sharing a single lift is 40	• Each building was assessed for the presence of a lift • The number of units sharing that lift was identified • Where two or more elevators were present that were accessible by all apartments, the number of units per lift was calculated • (Numbers of apartments ÷ the number of lifts) 	Number of apartments per lift core if the building ≥10 storeys: • >40 = 0 pts • ≤40 = 1 pt	Number of apartments per lift core if the building ≥10 storeys: • >40 = 0 pts • ≤40 = 1 pt	✓		
		(If the building has a lift) – number of apartments per lift: • >40 = 0 pts • ≤40 = 1 pt	Number of apartments per lift: • >40 = 0 pts • ≤40 = 1 pt		✓	

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Windows in corridors Circulation corridors contain a window to maximise natural light and ventilation. Windows should be provided in common circulation spaces and should be adjacent to the stair or lift core or at the ends of corridors.	• Using the floor plate plans, the circulation core/corridor on each residential floor was assessed for the presence of a window 	Is there a window in the circulation corridor on the floor on which the apartment is located? • No = 0 pts • Yes = 1 pt	Percentage of residential floors with an external window in the corridor: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1pt	✓	✓	✓
Corridor lengths Provide short, straight sightlines by minimising corridor lengths. Longer corridors greater than 12m in length from the lift core should be articulated.	• Using the floor plate plans measure the length of the longest run of the corridor on all residential floors from the lift core to the end of the corridor or an articulation 	Is the corridor ≤12m in length from the lift core (or before an articulation) on the floor on which the apartment is located? • No = 0 pts • Yes = 1 pt	Percentage of floors ≤12m in length from the lift core (or before an articulation) • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1pt	✓	✓	
Corridor width Circulation corridors are a minimum of 1.5m in width.	• Used the floor plate plans to measure the width of the corridor at its narrowest point on all residential floors 	Is the corridor ≥1.5m wide on the floor on which the apartment is located? • No = 0 pts • Yes = 1 pt	Percentage of floors with corridors ≥1.5m wide: • <100% = 0 pts • 100% = 1 pt		✓	
Apartment: max score				3 - 4	4 - 5	1
Building: max score				4 - 5	4 - 5	1

(*continued on next page*)

Table 1 (*continued*)

Acoustic privacy

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Apartment setbacks Building separation to adjoining property boundaries from habitable rooms/balconies is at least 12m.	• Setback distance measured in Nearmap from all faces of the building with apartment living grounds areas (balconies) to the edge of the boundary / cadastral parcel • Where there are multiple blocks on the same site/complex with different street frontage, the front = is the side/face with an entrance to the street 	Is the face/aspect on which the living area of the apartment is located ≥12m from the site boundary? • No = 0 pts • Yes = 1 pt	Percentage of apartments where the living aspect / wall is ≥12m from the site boundary • <100% = 0 pts • 100% = 1 pt	✓		
Street setbacks The setback of the development from the street has a minimum primary and secondary street setback, and rear and side setback, of 3m.	• Setback distance measured in Nearmap from the front of the building (defined as the main pedestrian entrance) to the street centreline • Apartments assigned the setback of the aspect/building face on which they are located. 	Is the setback ≥3m? • No = 0 pts • Yes = 01 pt	Percentage of apartments where the setback ≥3m? • <100% = 0 pts • 100% = 1 pt		✓	
Balcony setbacks The setback of the apartment from the balcony (based on the face it's located) should be ≥6m to an adjacent site.	• The distance measured in Nearmap from the exterior of the balcony on all building faces with apartment living areas, to the boundary of an adjacent site • Apartments assigned the setback of the aspect/building face on which they are located. 	Is the setback ≥6m? • No = 0 pts • Yes = 1 pt	Percentage of apartments where the setback ≥6m? • <100% = 0 pts • 100% = 1 pt		✓	

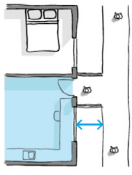
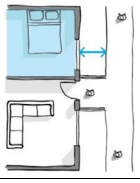
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Building separation The separation between windows and balconies is provided to ensure visual privacy is achieved. Minimum required separation distances from buildings to the side and rear boundaries.	• The measured distance from the face to any closet building (internal/same complex) or external • Measured from the ground floor; all floors assigned the same value on that face/aspect. • Percentage of apartments with building separation meeting requirements based on if the adjacent building is external or internal (on-site) • 	Is the building separation of the face of the apartment living area located on ≥12m? • No= 0 pts • Yes = 1 pt	Percentage of apartments whose living aspect / wall is ≥12m from an adjacent building: • <100% = 0 pts • 100% = 1 pt	✓	✓	
Living window & circulation spaces Primary living room windows should not open directly onto common circulation spaces and should be designed to ensure visual privacy and manage noise intrusion.	• Identify the location of the living room windows and assess if these open directly onto a communal space or circulation area • A void or structural separation between the window and the circulation corridor is allowed 	Does the living room window open onto an external circulation space? • No = 1 pt • Yes = 0 pts	Percentage of apartments where the living room window does NOT open onto an external circulation space • <100% = 0 pts • 100% = 1 pt	✓	✓	
Bedroom windows & circulation spaces Primary bedroom windows should not open directly onto common circulation spaces and should be designed to ensure visual privacy and manage noise intrusion.	• Identify the location of the main bedroom (bedroom #1) windows and assess if these open directly onto a communal space or circulation area • A void or structural separation between the window and the circulation corridor is allowed 	Does the main bedroom window open onto an external circulation space? • No = 1 pt • Yes = 0 pts	Percentage of apartments where the main bedroom #1 window does NOT open onto an external circulation space • <100% = 0 pts • 100% = 1 pt	✓	✓	

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Table 1 (*continued*)

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Living area & circulation spaces Living areas are separated from the external circulation spaces. Storage, circulation areas and non-habitable rooms should be located to buffer noise from external sources.	• Identify the location of the main living area and assess if it is separated from circulation areas by other rooms 	Is the main living room separated from the circulation space? • Yes = 1 pt • No = 0 pts	Percentage of apartments where the main living room is separated from the circulation space: • <75% = 0 pts • 75% - <100% = 0.5 pts • 100% = 1 pt	✓	✓	✓
Bedrooms & circulation spaces The main bedroom is separated from the external circulation spaces.	• Identify the location of the bedroom and assess if it is separated from circulation areas by other rooms 	Is the main bedroom separated from the circulation space? • Yes = 1 pt • No = 0 pts	Percentage of apartments where the main bedroom is separated from the circulation space: • <75% = 0 pts • 75% - <100% = 0.5 pts • 100% = 1 pt	✓	✓	✓
Party walls – residential neighbours The number of party walls (walls shared with other apartments) are limited and are appropriately insulated.	• Floors plans were assessed and the number of common party walls with other residential apartments was identified and counted 	Apartment has ≤2 party walls / side neighbours • ≤2 = 1 pt • >2 = 0 pts	Percentage of apartments with ≤2 party walls / side neighbours • <100% = 0 pts • 100% = 1 pt	✓		✓

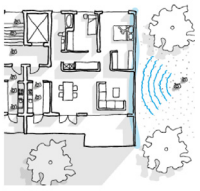
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Party walls – communal spaces Potential noise sources, such as communal open space, are not located adjacent to the external wall of habitable rooms.	• Floor plans were assessed to determine if the apartment adjoined/shared a party common wall with a communal space 	Does the apartment adjoin a communal space? • Yes = 0 pts • No = 1 pt	Percentage of apartments not adjoining communal spaces • <100% = 0 pts • 100% = 1 pt		✓	
Bedrooms off living areas Access to bedrooms, bathrooms and laundries is separated from living areas, minimising direct openings between living and service areas.	• Apartments were assessed for the presence of door entries into bedrooms off the living room / open-plan area (as designated on the architectural plan) • Where doors entered directly off the living area from a shared party wall, this was coded as being directly off the living area (see ☒ to the right). • Where door entries were not directly off the living area wall, these were deemed as compliant (see ☑ to the right) • (Number of bedrooms not accessed directly off the living area ÷ the total number of bedrooms in the apartment) x 100 	Percentage of bedrooms in the apartment not accessed directly off the living area • 50% - 100% = 0 pts • 0 - 50% = 0.5 pts • 0% = 1pt	Percentage of apartments in a building with at least 50% of their bedrooms NOT located off the main living area • <100% = 0 pts • 100% = 1 pt	✓	✓	

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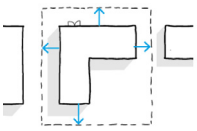
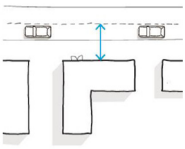
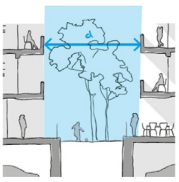
Table 1 (*continued*)

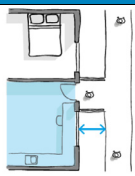
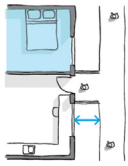
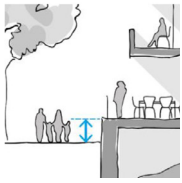
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Bathrooms off living areas Access to bedrooms, bathrooms and laundries is separated from living areas, minimising direct openings between living and service areas.	• Apartments were assessed for the presence of door entries into bathrooms off the living room / open-plan area (as designated on the architectural plan) • Where doors entered directly off the living area / from a shared party wall, this was coded as being directly off the living area (see ☒ to the right). • Where doors/entries were not directly off the living area wall, these were deemed as compliant (see ☑ to the right). • Compute: (Number of bathrooms not accessed directly off the living area ÷ the total number of bathrooms in the apartment) x 100 	Percentage of bathrooms in the apartment not accessed directly off the living area • 50% - 100% = 0 pts • 0 - 50% = 0.5 pts • 0% = 1pt	Percentage of apartments in the building with the main bathroom (or semi ensuite) access NOT directly off the main living area: • 50% - 100% = 1 pt • 0 – 50% = 0.5 pts • 0% = 0 pts	✓	✓	
Apartment: max score				9	10	3
Building: max score				9	10	3

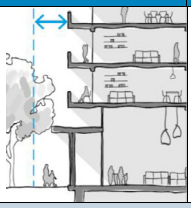
Outlook and visual privacy

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Apartment setbacks Building separation to adjoining property boundaries from habitable rooms/balconies is at least 12m.	• Setback distance measured in Nearmap from all faces of the building with apartment living grounds areas (balconies) to the edge of the boundary / cadastral parcel • Where there are multiple blocks on the same site/complex with different street frontage, the front = is the side/face with an entrance to the street 	Is the face/aspect on which the living area of the apartment is located ≥12m from the site boundary? • No = 0 pts • Yes = 1 pt	Percentage of apartments where the living aspect / wall is ≥12m from the site boundary • <100% = 0 pts • 100% = 1 pt	✓		
Street setbacks The setback of the development from the street has a minimum primary and secondary street setback, and rear and side setback, of 3m.	• Setback distance measured in Nearmap from the front of the building (defined as the main pedestrian entrance) to the street centreline • Apartments assigned the setback of the aspect/building face on which they are located. 	Is the setback ≥3m? • No = 0 pts • Yes = 01 pt	Percentage of apartments where the setback ≥3m? • <100% = 0 pts • 100% = 1 pt		✓	
Building separation The separation between windows and balconies is provided to ensure visual privacy is achieved. Minimum required separation distances from buildings to the side and rear boundaries.	• The measured distance from the face to any closet building (internal/same complex) or external • Measured from the ground floor; all floors assigned the same value on that face/aspect. • Percentage of apartments with building separation meeting requirements based on if the adjacent building is external or internal (on-site) 	Is the building separation of the face of the apartment living area located on ≥12m? • No= 0 pts • Yes = 1 pt	Percentage of apartments whose living aspect / wall is ≥12m from an adjacent building: • <100% = 0 pts • 100% = 1 pt	✓	✓	

(*continued on next page*)

Table 1 (*continued*)

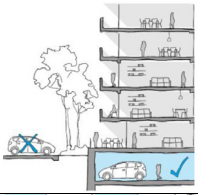
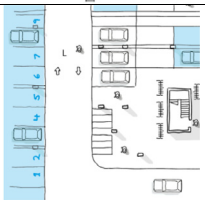
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Living window & circulation spaces Primary living room windows should not open directly onto common circulation spaces and should be designed to ensure visual privacy and manage noise intrusion.	• Identify the location of the living room windows and assess if these open directly onto a communal space or circulation area • A void or structural separation between the window and the circulation corridor is allowed 	Does the living room window open onto an external circulation space? • No = 1 pt • Yes = 0 pts	Percentage of apartments where the living room window does NOT open onto an external circulation space • <100% = 0 pts • 100% = 1 pt	✓	✓	
Bedroom windows & circulation spaces Primary bedroom windows should not open directly onto common circulation spaces and should be designed to ensure visual privacy and manage noise intrusion.	• Identify the location of the main bedroom (bedroom #1) windows and assess if these open directly onto a communal space or circulation area • A void or structural separation between the window and the circulation corridor is allowed 	Does the main bedroom window open onto an external circulation space? • No = 1 pt • Yes = 0 pts	Percentage of apartments where the main bedroom #1 window does NOT open onto an external circulation space • <100% = 0 pts • 100% = 1 pt	✓	✓	
Elevated courtyards Changes in level between private terraces, front gardens and the ground floor level of the building and the street level average less than 1m and do not exceed 1.2m.	• Using elevation plans, apartments with a courtyard private open space were assessed to indicate if the courtyard floor level was elevated above street level 	If a courtyard apartment, was the courtyard private open space elevated above street level? • No = 0 pts • Yes = 1 pt	Percentage of courtyard apartments where the courtyard private open space was elevated above street level • <100% = 0 pts • 100% = 1 pt	✓	✓	✓

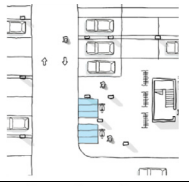
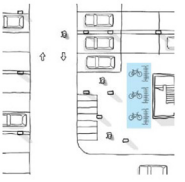
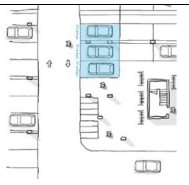
Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Balcony setbacks The setback of the apartment from the balcony (based on the face it's located) should be ≥6m to an adjacent site.	• The distance measured in Nearmap from the exterior of the balcony on all building faces with apartment living areas, to the boundary of an adjacent site • Apartments assigned the setback of the aspect / building face on which they are located. 	Is the setback ≥6m? • No = 0 pts • Yes = 1 pt	Percentage of apartments where the setback ≥6m? • <100% = 0 pts • 100% = 1 pt		✓	
Apartment: max score				4 - 5	5 - 6	0 - 1
Building: max score				4 - 5	5 - 6	0 - 1

(*continued on next page*)

Table 1 (*continued*)

Bicycle and carparking

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Car park location On-grade car parking should be avoided.	• Floor plans were assessed to identify the location of the car parking 	Where is the car parking located? • On-grade / surface = 0 pts • Anywhere else = 1 pt	Where is the car parking located? • On-grade / surface = 0 pts • Anywhere else = 1 pt	✓		
Unit parking allocations Parking is provided for cars.	• Floor plans assessed to identify the provision of car parking allocated to the apartments • Identify the number of car bays allocated to each unit • Compute number of required parking bays = (no. 1 bed apartments x 1 space) + no. 2+ bedroom apartments x 1.25 spaces) 	Does the unit have an allocated car bay? • No = 0 pts • Yes = 1 pt	N/A	✓	✓	
Residential parking bays Minimum parking provision: 1 bedroom apartment = 1 space 2+ bedroom apartment = 1.25 spaces		Are the number of residential parking spaces provided ≥ the computed number of required residential parking bays? • No = 0 pts • Yes = 1 pt	Are there the number of residential parking spaces provided ≥ the computed number of required residential parking bays? • No = 0 pts • Yes = 1 pt		✓	
Residential parking ratio The maximum parking provision does not exceed double the minimum number of bays specified.		Is the ratio of provided parking vs needed ≥.0? (i.e. > double) • ≤2.0 = 0 pts • >2.0 = -0.5pts (i.e., lose ½ a point as too much parking provided)	Ratio of provided parking vs needed ≥.0 (i.e. > double) • ≤2.0 = 0 pts • >2.0 = -0.5pts (i.e., lose ½ a point as too much parking provided)		✓	

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Scooter & motorcycle parking Motorcycle/scooter space bays are provided.	• Floor plans assessed to identify the provision of dedicated motorcycle/scooter parking 	Is dedicated motorcycle/scooter parking provided? • No = 0 pts • Yes = 1 pt	Dedicated motorcycle/scooter parking provided? • No = 0 pts • Yes = 1 pt	✓	✓	
Bicycle parking Secure undercover bicycle parking should be provided that is easily accessible from both the public domain and common areas.	• Floor plans assessed for the provision of dedicated bicycle parking/racks/cages 	Is dedicated bicycle parking provided? • No = 0 pts • Yes = 1 pt	Dedicated bicycle parking provided • No = 0 pts • Yes = 1 pt	✓	✓	
Visitor parking Visitor parking is provided: - 1 bay per four dwellings up to 12 dwellings - 1 bay per eight dwellings for the 13th dwelling and above	• Compute the number of visitor bays required based on the number of units • ((No. units-12)/8)+3 	Are there the number of visitor parking spaces provided ≥ the computed number of required visitor parking bays? • No = 0 pts • Yes = 1 pt	The number of visitor parking spaces provided ≥ the computed number of required visitor parking bays? • No = 0 pts • Yes = 1 pt		✓	
Apartment: max score * Ranges based on whether single aspect or snorkels present				4	6	0
Building: max score				3	6	0

(*continued on next page*)

Table 1 (*continued*)

Apartment mix

Australian apartment design requirements	Method of measurement and extraction of data/information from the architectural plans	High Life scoring method to assess policy implementation and compliance		Policies including the design requirement		
		Apartment Scoring	Building Scoring	SEPP 65	SPP 7.3	VIC
Apartment diversity Different dwelling types are well distributed throughout the development, including a mix of dwelling types on each floor.	• Architectural and floor plans were assessed to count the number of different apartment types (number of bedrooms) provided in the building	Number of different apartment types are provided in the building: • 1 type = 0 pts • 2 types = 0.5 pts • 3 types = 0.75 pts • 4+ types = 1 pt	Number of different apartment types provided in the building: • 1 type = 0 pts • 2 types = 0.5 pts • 3 types = 0.75 pts • 4+ types = 1 pt	✓	✓	
Apartment mix Different dwelling types are well distributed throughout the development, including a mix of dwelling types on each floor.	• Entropy formula to quantify the apartment mix which takes into account the relative percentage of two or more apartment types within a building. • The Entropy Index varies from 0 to 1. Higher levels of Entropy mean higher mix level $ENT = -\left[\sum_{j}^{k} p^j \ln(p^j)\right] \Big/ \ln(k)$ • P^j is the percentage of each apartment type j in the building, and k > 2 is the number of apartment use types j	Entropy scores / apartment mix: • <0.25 = 0 pts • >0.25 - <0.5 = 0.5 pts • >0.5 - <0.75 = 0.75 pts • >0.75 to 1 = 1 pt	Entropy scores / apartment mix: • <0.25 = 0 pts • >0.25 - <0.5 = 0.5 pts • >0.5 - <0.75 = 0.75 pts • >0.75 to 1 = 1 pt	✓	✓	
Apartment types Developments of greater than 10 dwellings include at least 20 per cent of apartments of differing bedroom numbers.	• The number of apartments by type is computed as a percentage of the total number of apartments in the building	Does any one type of apartment (no. of beds) exceed 80% of all the apartments in the building? • Yes = 0 pts • No =1 pt	One type of apartment (no. of beds) exceeds 80% of all the apartments in the building • Yes = 0 pts • No =1 pt		✓	
Apartment floor mix Different dwelling types are well distributed throughout the development, including a mix of dwelling types on each floor.	• Architectural and floor plans were assessed to count the number of different apartment types (number of bedrooms) provided on each floor • The number of floors with 2+ apartment types computed as a percentage of the total number of floors	Percentage of floors in the building with 2+ apartment types: • <50% = 0 pts • 50 - <75% = 0.5 pts • ≥75% = 1 pt	Percentage of floors in the building with 2+ apartment types: • <50% = 0 pts • 50 t- <75% = 0.5 pts • ≥75% = 1 pt		✓	
Apartment: max score				2	4	0
Building: max score				2	4	0

** Scoring ranges: Only apartments and buildings with multiple bedrooms, single aspects, cross-through apartments, courtyards and snorkel bedrooms were assessed against the specific design requirements for those respective features; * Buildings that had missing data on certain design features were not assessed against those i.e., the denominator was reduced; * Total compliance scores = duplicate measures across multiple design themes only counted once*

d Depth h Height L Length ⟷ Dimension ⇠⇢ View
w Width D Distance A Area ⇢⇠ Airflow ⌐ Perpendicular

The building level scores will enable the study team to benchmark whether design policy requirements were being implemented in different cities or contexts (e.g., whether implementation differed by area socio-economic status), whereas the apartment level scores will be linked with a survey of apartment residents to examine the associations between design and health and wellbeing [8]. Similar to other successful policy evaluations devised by our team [13], a simple scoring system was developed to quantify the extent to which the selected health-promoting design requirements had been implemented as intended by the respective policies. Each measured design requirement was assigned a maximum attainable score of one point. A full score of one point was assigned if the measured design feature met or exceeded the policy standard for that requirement, and a score of zero was assigned if it failed to meet the policy standard. This approach weighted all requirements equally to provide a simple quantification and a basic barometer of the 'amount' of the policy implemented.

Depending on the nature of the requirement, measures were extracted at three levels, from which implementation scores were calculated for each apartment and building: (1) Apartment level – each apartment (n = 10,533) within the 173 buildings was assessed, and measures created for each requirement; (2) Floor level – all residential floors (n = 1094) within each of the 173 buildings were measured against the requirements specific to a floor level (e.g., the width and length of the corridors and the numbers of units per floor). Apartments were assigned the implementation scores of the respective floor on which they were located.; (3) Building level – the proportion of individual apartments and floors within a the building that met a standard was used to calculate a building level policy implementation score. These were supplemented with measures specific to the wider building e.g., building separation and setback distances and the amount of communal outdoor space provided.

At the apartment level, a maximum score was attained if the design feature in that apartment met the required standard.Buildings were then scored on the percentage of apartments that met the respective apartment-level design requirement. For example, the SEPP65 and SPP7.3 requirements for the primary bedroom size are =>10m^2. Each apartment was assigned a score of zero if the main bedroom was <10m^2 and the maximum one-point if the main bedroom was =>10m^2. At the building level, one point was assigned (indicating full compliance with the policy standard) if all (100%) of the apartments in that building had main bedrooms =>10m^2. If <100% of the apartments met the main bedroom size standard, the building was assigned zero points.

Other measures had lower thresholds for scoring maximal points (i.e., 1.0) based on the policy specification and logic of the standard. For example, the NSW and WA policies require ≥70% of apartments in a building to receive ≥2 h of direct sunlight between 9 am and 3 pm in mid-winter. The hours of solar exposure for all individual apartments in the building were measured. If the apartment received =>2 h of solar exposure, it scored one-point. At the building-level, if ≥70% of the apartments met the policy standard, the building scored a maximum of one-point. Buildings with <70% of apartments receiving 2+ h of sunlight per day received a score of zero-points.

In some instances, graduated scores were possible. These were applied in cases where the wording of the policy requirement was less stringent, no threshold or standard was stipulated, or optimal ranges were provided in the standard. For example, SEPP65 stated that "Where possible, bathrooms should have an external openable window". However, given there was not an explicit requirement for all bathrooms to have a window, a graded points allocation was used at the apartment level, e.g., if <50% of the bathrooms in the apartment had a window, it scored zeropoints, but if 50% to <100% had a window (i.e., typically meaning at least one bathroom in a two bathroom apartment), or if ALL bathrooms had a window, the apartment scored the maximum one-point. Similarly, optimal apartment depths of 12 m scored one-point, however, the policy standard indicates depths should not exceed 18 m. Hence apartment depths between 12 and 18 m scored 0.5 points, and those >18 m scored zero- points.

One apartment-level policy requirement was allocated a maximum score of 1.5 points (i.e., exceeding the one-point scoring convention). The ceiling height to apartment depth ratio requirement scored one-point for meeting the policy standard (habitable room depths limited to a maximum of 2.5, or 3 for open-plan apartments x the ceiling height), but scored a bonus of 0.5 points if it performed better than the policy standard (i.e. <2.5) as SEPP65 noted that room depths of <2.5 times the ceiling height were preferable (i.e., classified in the policy as 'good' or 'very good').

All residential floors (n = 1094) within each of the buildings (n = 173) were measured against the floor-specific requirements. Floor level measures were allocated to the apartment level and building level scores. For example, corridors are required to be a minimum width of 1.5 m based on SPP7.3. Every corridor on each residential floor of the building was measured. An apartment scored one point if the floor it was located on had a corridor width of =>1.5 m. At the building level, the building scored one point indicating full compliance with the policy of all (100%) of the residential floor corridors were =>1.5 m wide.

Determining maximum policy scores attainable

Table 2 outlines the maximum attainable scores for each design element and the overall state-based policy at both the apartment and building levels. For example, under the SEPP65 policy a maximum score of 7.5 – 9.5 points were attainable at the apartment-level and a maximum score of 9.0 points attainable at the building-level for the solar and daylight access design element. Across all ten design elements a maximum score of 48.5 – 60.5 points was attainable at the apartment-level, and maximum scores of 54 – 58 points attainable at the building-level.

The maximum possible scores obtainable for each apartment or building varied depending on the design policy content (i.e., how many quantifiable design requirements were stipulated in NSW, VIC or WA) and the applicability of the requirements to the design of the apartment and building. This is reflected in the ranges of maximal scores presented in Table 2. Only apartments and buildings with multiple bedrooms, single aspects, cross-through apartments, courtyards and 'snorkel' bedrooms were assessed against the specific design requirements for these respective features. For example,

Table 2
High Life policy compliance – maximum scores attainable by policy and design element*.

	NSW: SEPP65		WA: SPP 7.3		VIC: DESIGN GIUDE	
	Apartment	Building	Apartment	Building	Apartment	Building
Solar and Daylight Access	7.5 - 9.5	9	8.5 - 10	10 - 11	2 - 5	2 - 5
Natural ventilation	8.5	8	3.5 - 7	5 - 6	3 - 5	3 - 5
Indoor space	13.5 - 21.5	17	12.5 - 22	16 - 17	6 - 12	7 - 10
Private open space & balconies	6 - 7	7 - 9	4 - 5	4 - 8	5 - 6	4 - 5
Communal spaces	7	7	8	8	4	4
Circulation spaces	3 - 4	4 - 5	4 - 5	4 - 5	1	1
Acoustic privacy	9	9	10	10	3	3
Outlook and Visual Privacy	4 - 5	4 - 5	5 - 6	5 - 6	0 - 1	0 - 1
Bicycle and car parking	4	3	6	6	0	0
Apartment mix	2	2	4	4	0	0
Total compliance	**48.5 - 60.5**	**54 - 58**	**47.5 - 60**	**55 - 58**	**20 - 27**	**22 - 26**

* Scoring ranges: Only apartments and buildings with multiple bedrooms, single aspects, cross-through apartments, courtyards and snorkel bedrooms were assessed against the specific design requirements for those respective features.
* Buildings that had missing data on certain design features were not assessed against those i.e., the denominator was reduced.
* Total compliance scores = duplicate measures across multiple design themes only counted once.

apartments with snorkels included an additional one-point in the maximum attainable score for BADS policy solar and daylight access element score relating to the dimensions of the snorkel.

Many apartment complexes in the study were made up of multiple buildings which were each measured and scored separately as they often differed in their design and scale. The exception to this was the measurement of communal spaces and parking which are shared by all buildings in the complex; hence policy implementation scores for these requirements were assigned to all apartments and buildings in that complex. Buildings with missing data on specific design features (i.e. where a particular detail could not be discerned from the architectural plans) were not assessed against that requirement and the maximum attainable score was reduced accordingly.

Computing apartment- and building-level implementation scores

Implementation scores for each of the ten design elements were computed at both the apartment and building levels by summing the points attained for the measured design requirements from each respective element.

An overall policy implementation score was calculated by adding the attained scores for each design requirement across all ten design elements. Requirements present in multiple elements were included in each respective design element score but were only counted once in the overall policy implementation score. e.g. SEPP65 apartment-level scores: a maximum one-point score for having windows in all habitable rooms was included in both the individual design element implementation scores for (1) solar and daylight access and (2) natural ventilation, but was only included once in the total apartment-level SEPP65 policy implementation score; SEPP65 building-level scores: a maximum one-point score for having 100% of apartments having windows in all habitable windows was included in both the both the individual design element implementation scores for (1) solar and daylight access and (2) natural ventilation, but was only included once in the total building-level SEPP65 policy implementation score.

Computing percentage implementation scores

Policy implementation was defined as *the degree to which the apartments and buildings (inclusive of their communal spaces) adhered to the requirements outlined by the apartment design policies*. Percentage implementation scores were calculated at both the apartment and building levels; as the percentage of the maximum implementation score attainable, that was achieved/implemented for each of the ten design elements (i.e. the degree to which the developments met the design standards within that design element) and overall (i.e. total policy implementation). Higher scores (percentages) represent

an increased implementation of / compliance with the design requirements stipulated within the policy.

Conclusion

The methods presented here enabled all High Life Project apartments and buildings to be systematically assessed for their implementation of the design requirements stipulated within their state-specific design policy: Sydney buildings were evaluated for compliance with the SEPP65 design requirements; Perth buildings for the implementation of SPP7.3 requirements; and Melbourne buildings for their implementation of BADS requirements. While the methods for extracting and measuring policy implementation are specific to the health-promoting requirements included in the three Australian state policies, the approach could be applied elsewhere and tailored to the local policy context.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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