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16 April 2021

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To whom it may concern,

Draft Medium Density Code – Proposed amendments to the Residential Design Codes Volume 1 for medium density – Submissions

Set out below are the submissions made on behalf of the Western Australian division of the National Environmental Law Association (**NELA(WA)**) regarding the consultation on the 'Draft Medium Density Code' (**Draft Code**) and the proposed supporting guidelines (**Draft Guidelines**).

About NELA

NELA is Australia's only national, multi-disciplinary, member-based association focused on environmental law and sustainability. NELA serves the needs of practitioners in law, planning, natural resources and environmental science and management. NELA obtains and exchanges information on issues relevant to environmental law and policy.

One of NELA's objectives is to provide a forum for and otherwise assist in the discussion, consideration and advancement of environmental law among the legal profession and the wider community.

Executive Summary

NELA(WA) submits that the Draft Code should address:

1. Sustainability in housing design, including:
    a. future proofing medium density housing and allowing for adaptability in relation to future sustainability infrastructure needs;
    b. reducing energy consumption and greenhouse gas emissions from the development;
    c. a more ambitious minimum NatHERS star rating requirement; and
    d. use of sustainable building materials.

2. Retention of the urban canopy, including:
    a. more ambitious targets for minimum tree requirements; and
    b. drought tolerant planting.

3. Reduction in stormwater runoff, including:
    a. amending the definition of 'raingarden';
    b. minimising 'effective imperviousness' of a development area; and
    c. specifying stormwater pollutant reduction targets.

4. Reduction of reliance on active rather than passive heating and cooling, including:
    a. not limiting environmental design principles to the 'primary living space' and instead encouraging such principles for the entire development; and
    b. specifying design principles and deemed to comply requirements in respect of:
        i. passive heating and cooling;
        ii. solar access; and
        iii. natural ventilation.

Background

Diversity of housing development in Western Australia and the provision of a liveable and climate resilient housing stock is much needed in Perth and other metropolitan areas in the State. The concept of 'good design' in housing extends beyond aesthetics and encompasses environmental aspects such as sustainability in housing design, decreasing the urban heat island effect, retention of the urban canopy, reducing stormwater runoff and reducing the current reliance on active rather than passive active heating and cooling.

The Draft Code seeks to address these environmental factors through proposed amendments to *State Planning Policy 7.3 Residential Design Codes Volume 1* (**R-Codes**). Because the R-Codes is a State planning policy made under Part 3 of the *Planning and Development Act 2005* (WA), decision makers must have due regard to the R-Codes.[1] This means that if the Draft Code is adopted, developers proposing a development in an area coded R30 to R60, ought to take the requirements of the Draft Code into account when preparing and submitting development applications.

Sustainability in Housing Design

NELA(WA) supports that an objective of the R-Codes is to assist in the widespread adoption of technologies that improve the sustainability of housing.[2] This is because housing in Western Australia should be designed to be climate resilient and be able to accommodate changing technologies in the future.

State Planning Policy 7.0 – Design of the Built Environment (**SPP 7.0**) applies to medium density housing and seeks to optimise sustainability of the built environment and contribute to positive environmental, social and economic outcomes. The connection between such outcomes and medium density housing design is supported by the findings of the SGS Economic and Planning Report on the 'Wider costs of Medium Density Development' (**SGS Report**).

[1] *Planning and Development (Local Planning Schemes) Regulations 2015* Schedule 2 clause 67(c)
[2] *State Planning Policy 7.3 Residential Design Codes Volume 1*, p 59

Improving the sustainability of housing stock also aligns with the Western Australian Climate Policy and the likely shift towards resilient low-carbon developments such as energy efficient social housing and a future State electric vehicle strategy. Currently, one in three households have rooftop solar installed and it is estimated that this will increase to one in two households over the next decade.[3] If this is the case, housing stock (especially medium density housing and developments) will need to be designed to include these technologies or ensure it can be retrofitted and adapted for future needs.

NELA(WA) submits that section 3 of the Draft Code in relation to 'The Building' should include a wider range of sustainability infrastructure principles and requirements extending beyond design element 3.7. As outlined in SPP 7.0, sustainable design includes the use of sustainable construction materials and harnessing of renewable energy sources. NELA(WA) proposes that these should be referenced more expressly in the Draft Code.

1.1 External fixtures

Sustainability infrastructure is referenced in design element 3.7 External Fixtures and deemed to comply requirement C3.7.4. NELA(WA) supports the adoption of the proposed definition of 'sustainability infrastructure', which includes but is not limited to solar collectors, invertors, batteries, electric vehicle charging, roof vents and rainwater tanks.

However, NELA(WA) proposes that design element 3.7 should also include deemed to comply requirements that future proof medium density housing and allow for adaptability in relation to future sustainability infrastructure needs. Such concepts are already provided for in DG4.11.4 in *State Planning Policy 7.3 – Residential Design Codes Volume 2 (Apartments)* (**R-Codes Volume 2**). An example of deemed to comply requirements for external fixtures are contained in the below table.

3.7 Fixtures Deemed to comply requirements *Development satisfies the following deemed to comply requirements (C)*	
C3.7.2	Roof design with useable roof space for future installation of photovoltaic collector panels, considering optimum solar collection angle for the roof and other sustainability infrastructure.
C3.7.3	Electrical distribution system and metering with capacity for future installation of systems such as a photovoltaic array or battery storage that can provide the equivalent of at least 1kW energy per dwellings.
C3.7.4	Providing conduits and capacity in the electrical distribution system and metering for future provision of electric car charging within car parking areas.

1.2 Energy efficiency

The Draft Code does not address energy efficiency requirements. NELA(WA) submits that design element 4.15 (energy efficiency) of the R-Codes Volume 2 should also apply to medium density housing. This is because energy efficiency is a significant factor to optimise the sustainability of the built environment.

[3] Western Australian Climate Policy (November 2020), p 18

The National Construction Code (**NCC**) encourages energy efficiency of all housing in Australia and medium density housing falls under building class 1 (detached or row houses) or class 2 (apartments with 2 or more units). Building classes 1 and 2 require a minimum Nationwide House Energy Rating Scheme (**NatHERS**) rating of 6 stars out a possible 10 stars. However, a NatHERS rating of 6 stars 'indicates good, but not outstanding, thermal performance'.[4]

NELA(WA) considers that maintaining a minimum of a 6 star NatHERS rating is not sufficient to ensure that the R-Codes improve the sustainability of medium density housing, and submits that a rating of 8 star NAtHERS would be appropriate.

This position is supported by findings in the SGS Report that:

> *if the dwellings were delivered with an 8 star [NatHERS] rating, two above the minimum, this could reduce energy use on heating and cooling by around 25%... for a typical household of [a single-storey triplex]*.[5]

Further, the SGS Report finds that only meeting the minimum NatHERS performance requirements creates additional costs to society due to the energy consumption impacts. For the reasons above, and as previously stated, NELA(WA) submits that the Draft Code should encourage exceeding the minimum NatHERS rating requirement by 2 stars.

Other sustainable housing rating systems, such as BASIX in NSW, take the approach that energy targets are based on location – similar to the climate zones referred to in the R-Codes for solar orientation – and type of building (e.g. different energy targets for 3 storey, 4-5 storey and 6 storey units or higher)[6]. While BASIX is based on benchmarking and is not directly comparable to NatHERS, NELA(WA) considers that a similar approach could be taken in the Draft Code in relation to setting minimum energy consumption requirements by location and type of building.

Alternatively, the Draft Code could provide a target for the minimum number of energy efficiency initiatives to be incorporated into the design of medium density housing. For example, in order to be accredited as a Housing Industry of Australia GreenSmart house, the building must incorporate 11 minimum criteria and at least two leading practice criteria to meet the energy management requirements.[7]

NELA(WA) proposes that section 3 of the Draft Code in relation to 'The Building' incorporates the approach set out in design element 4.15 (energy efficiency) of the R-Codes Volume 2, and go beyond those minimum requirements. An example of a design principle, a deemed to comply requirement and design guidance for energy efficiency are contained in the below tables.

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[4] NatHERS, 'Home energy star ratings', (2019) <https://www.nathers.gov.au/owners-and-builders/home-energy-star-ratings>

[5] SGS Economics & Planning, *Wider Costs of Medium Density Development* (May 2020), p 16

[6] BASIX, 'Energy target zones' <https://basix.nsw.gov.au/iframe/energy-help.html?id=384>

[7] HIA GreenSmart, 'HIA GreenSmart Protocol', (January 2015) < https://hia.com.au/-/media/HIA-Website/Files/ProductsServices/GreenSmart/GSHouseProtocol.ashx?la=en&hash=274051B7AB8864584BDA459C453E4EA99A9D3989>

3.9 Energy Efficiency Design principles *Development demonstrates compliance with the following design principles (P)*	
P3.9.1	Reduce energy consumption and greenhouse gas emissions from the development.

3.5 Energy Efficiency Deemed to comply requirements *Development satisfies the following deemed to comply requirements (C)*	
C3.5.1	(a) Incorporate at least two significant energy efficiency initiatives within the development that exceeds minimum practice (refer Design Guidance) OR (b) All dwellings exceed the minimum NATHERS requirement by 2 stars.

3.5 Energy Efficiency
Design guidance

Examples of energy efficient initiatives that exceed current minimum practice are provided below. Applicants are encouraged to propose other innovative solutions where supported by evidence demonstrating how minimum practice is exceeded:
— ceiling fans to all habitable rooms
— hot water systems that are more energy efficient than electric storage units
— provision of an external clothesline to every dwelling, located in an area out of direct view on an external wall or in a breezeway
— use of a photovoltaic array for communal services
— installation of a lift with regenerative braking
— solar powered lighting of external open space, circulation areas and common spaces.

Strategies to improve the NATHERs rating of individual dwellings can include:
— maximising dwellings with northerly orientation and opportunities for natural ventilation
— achieving effective shading from summer sun
— use of thermal mass for passive heating and cooling
— improving the thermal performance and insulative properties of glazing, openings and the building fabric, particularly on west facing elevations
— avoiding the use of electric storage systems as the primary domestic hot water system for individual dwellings.

1.3 Sustainable building materials

The choice of building materials affects the embodied energy of housing stock and this in turn affects the greenhouse gas emissions of the development. Embodied energy is the energy consumed by the processes associated with the production of building materials from processing, manufacturing, transport and product delivery. As energy efficiency technologies within the house increases, embodied energy of building materials will become an increasingly relevant factor when considering the energy efficiency of houses.[8] However, NELA(WA)

[8] Australian Government, 'Your Home – Embodied energy' (2013) < https://www.yourhome.gov.au/passive-design>

acknowledges that an accurate status of the embodied energy of materials is not always available, making it a difficult measure to implement.

Where possible, reused or recycled materials such as environmentally sustainable concrete made with recycled aggregate and fly ash, should be used to reduce the embodied energy of a building. This is especially applicable to medium density housing in infill developments where materials may be reused or recycled from construction and demolition waste from the existing site.

Accordingly, NELA(WA) submits that the Draft Code should include deemed to comply requirements and design guidance that encourages the use of sustainable building materials. An example of deemed to comply requirements for sustainable building materials are contained in the below table.

3.10 Sustainable building materials Deemed to comply requirements *Development satisfies the following deemed to comply requirements (C)*	
C3.10.1	Use of thermal massing or lightweight construction materials to suit climatic location.
C3.10.1	For infill developments – incorporate at least 1 type of reused or recycled material from construction and demolition wastes and materials produced from (a) the development site or (b) off-site. For greenfield developments – incorporate at least 1 type of reused or recycle material from construction and demolition wastes and materials.

Retention of the urban canopy

NELA(WA) recognises that urban infill development can often lead to the removal of trees during the pre-construction land clearance phase and that this often results in limited opportunities to replace the trees. Therefore, NELA(WA) supports the inclusion of an objective which seeks to retain and re-establish the urban tree canopy.

Further, NELA(WA) supports the proposed design principle P2.3.2 requiring that development to provide sufficient deep soil area to sustain healthy tree and plant growth to assist in increasing tree canopy over time.

1.4 More ambitious targets for minimum tree requirements

The Draft Code proposes minimum tree requirements for single houses, grouped and multiple dwellings in Table 2.3a. NELA(WA) submits that the minimum tree requirements for single houses, grouped dwellings and multiple dwellings should be more ambitious.

Dwelling Type		**Minimum Tree Requirements**
Single houses and grouped dwellings (trees per dwelling)		1 medium tree OR 2 small trees
Multiple dwellings (trees per site)	Less than 700m2	1 medium and 2 small trees OR 1 large tree and 1 small tree

Dwelling Type		Minimum Tree Requirements
	700-1000m2	2 medium trees and 1 small tree OR 1 large tree and 2 small trees
	Greater than 1000m2	2 large tree sand 4 medium trees OR 1 large tree and 6 small trees

Further, NELA(WA) submits that the Draft Code should clarify that the Minimum Tree Requirements must be met, even when a tree or multiple trees have been identified for retention,[9] for the following reasons:

(a) trees provide critical ecosystem services such as air and water filtration, shade, habitat, oxygen, carbon sequestration and nutrient cycling;[10]

(b) the addition of trees and other vegetation to the built environment provides the greatest benefit in mitigating the urban heat island effect;[11]

(c) trees reduce stormwater flows and nutrient loads by intercepting and mitigating the impacts of heavy rainfalls as well as reducing the nitrogen, phosphorus and heavy metal content in stormwater;[12] and

(d) trees benefit our health and wellbeing, providing a connection to nature which can be hard to find in urban areas.[13]

NELA(WA) proposes that an appendix could be included which specifies the preferred tree species to be planted. This would be to ensure that the trees are drought tolerant (as discussed in more detail below) and that trees with invasive roots are avoided. Some local governments in Perth have already prepared such lists.[14] Alternatively, the Draft Code should include a requirement for developers to show that they have given consideration to which species of trees are planted and that these trees are drought resistant and suitable in the area where they have been planted.[15]

1.5 Drought tolerant planting

NELA(WA) proposes the inclusion of a further design principle which recommends that drought tolerant plants and landscaping are to be preferred for any new planting. This is supported by the design guidance[16] provided in the R-Codes Volume 2. NELA(WA) notes that

[9] For example, see clause 2 of the Town of Victoria Park's *Local Planning Policy No. 39 – Tree Planting and Retention* (18 February 2020).
[10] SGS Economics & Planning, *Wider Costs of Medium Density Development* (May 2020), p 14
[11] City of Melbourne, *Urban Forest Strategy: Making a Great City Greener 2012 – 2032,* p 12
[12] City of Melbourne, *Urban Forest Strategy: Making a Great City Greener 2012 – 2032,* p 12
[13] SGS Economics & Planning, *Wider Costs of Medium Density Development* (May 2020), p 14
[14] For example see the City of Joondalup's preferred species list at https://www.joondalup.wa.gov.au/wp-content/uploads/2018/05/Preferred-Tree-Species-List.pdf
[15] For example, see the 'Suggested Species List' in the City of Stirling's Guidelines to *Local Planning Policy 6.11 – Trees and Development* (24 October 2017).
[16] See DG 4.12.6 and DG4.16.4 in *State Planning Policy 7.3 – Residential Design Codes Volume 2 (Apartments)*.

drought tolerant plants and landscaping have been beneficially included by several local governments in their local planning strategies[17] and local planning policies.[18]

The reason for this is that as the population grows the demand on fresh groundwater aquifers will grow. With climate change reducing the capacity for aquifers to be replenished, it is necessary to ensure that all steps are being taken to reduce the pressure on our State's water resources, noting that planting drought tolerant plants and landscapes will mean that less irrigation is required.

Reduction in stormwater runoff

Opportunities for potable and non-potable water supplies should be considered by new development in order to (a) reduce reliance on groundwater and (b) improve water use efficiency in a drying climate. Where possible, developments should incorporate alternative water sources such as recycled stormwater, harvested rainwater and recycled wastewater.

1.1 Inclusion of rain gardens in deemed to comply requirement C2.5.1

NELA(WA) supports the deemed to comply requirements in C2.5.1 of the Draft Code requiring all water draining from roofs, driveways, communal streets and other impervious surfaces to be retained on site, with run-off directed to garden areas, rainwater tanks and soakwells, appropriate to climatic, local soil and groundwater conditions.

NELA(WA) proposes that C2.5.1 should be expanded to encompass recommendations relevant to installation of raingardens as a means of reducing stormwater runoff. Accordingly, the 'Definitions' in Appendix A1 of the Draft Code should be amended to include the following:

> **Raingarden** means specially-designed garden beds that filter stormwater runoff from stormwater pipes and hard surfaces such as a downpipe, paved areas or roads. The rain garden should contain different layers of soil and gravel beneath to filter out the pollutants contained within stormwater. It should be vegetated with plants that have the ability to capture, filter and clean stormwater.

1.2 Minimising 'effective imperviousness' of a development area

NELA(WA) recommends that a further deemed to comply requirement be included requiring developers to demonstrate that where possible reasonable attempts have been made to retain and install pervious surfaces.

The Department of Water and Environmental Regulation's '*Decision process of stormwater management in Western Australia*' provides that 'effective imperviousness' is the proportion of a catchment that consists of impervious surfaces directly connected to receiving water bodies by pipes. Minimising effective imperviousness reduces the changes to pre-

[17] See for example City of Stirling, Local Planning Strategy – Part 2 (18 September 2018) p 35
[18] See for example City of Swan, Local Planning Policy – Guildford Precinct, p 33 and City of Swan Landscape Guidelines for Streetscapes and Open Space (April 2019), p 5

development hydrology and reduces the transport of pollutants to receiving water, by providing locations to retain runoff and treat pollutants.[19]

Additionally, the R-Codes Volume 2 suggest that minimising effective imperviousness can be achieved through:

> *maximising the use of permeable surfaces at ground level to enable groundwater recharge, and minimising impervious areas;*
>
> *incorporating on-site infiltration and detention systems such as garden beds, rain gardens, tree pits, infiltration cells and detention tanks (the latter shall be sited to avoid conflict with deep soil areas); and*
>
> *designing landscape treatments to slow down overland flows and minimise opportunities for scouring*.[20]

In order to minimise effective imperviousness, NELA(WA) suggests that the Draft Code references stormwater pollutant reduction targets (which developers should strive towards achieving). NELA(WA) recommends that the following targets are included in the Draft Code:

> Reduction in suspended solids – 80%
>
> Reduction in total phosphorus – 60%
>
> Reduction in total nitrogen – 45%
>
> Reduction in litter – 70%[21]

NELA(WA) further submits that the deemed to comply requirements in C2.5.1 of the Draft Code should not only apply to new medium density developments, but also apply to additions or extensions to medium density development larger than extensions over 50m^2.[22]

By providing actual targets, proponents of medium density developments will be able to measure the performance of the development. NELA(WA) considers that if proponents are necessarily alerted to the fact that developments are not meeting best practice standards, opportunities for alternative solutions to address stormwater runoff are likely to be generated.

Reducing reliance on active rather than passive heating and cooling

The Draft Code proposes design principle P3.1.3 which states that the primary living space should address environmental design principles such as passive solar heating, daylighting, passive cooling and shading. NELA(WA) submits that these design principles should not be limited to the 'primary living space' and should instead be encouraged for the entire development.

NELA(WA) submits that there should be specific deemed to comply requirements in respect of:

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[19] The Department of Water and Environmental Regulation, Decision process of stormwater management in Western Australia as a component of *Chapter 4:Integrating stormwater management approaches, Stormwater management manual for Western Australia* (November 2017), 8

[20] Design Guidance DG4.16.5 of State Planning Policy 7.3 – Residential Design Codes Volume 2 – Apartments

[21] City of Moreland, *Moreland Watermap 2020: Moreland's path to a water sensitive city* (2014) 22

[22] Department of Environment, Land, Water and Planning (Victoria), *Improving Stormwater Management Advisory Committee Report* (4 September 2018), p 8.

a) passive heating and cooling;
b) solar access; and
c) natural ventilation.

Such deemed to comply requirements can be partially informed by the Precinct Design Guidelines for State Planning 7.2 (**SPP 7.2 Guidelines**). Whilst NELA(WA) acknowledges that SPP 7.2 Guidelines apply to precinct design as opposed to individual developments, they still provide useful concepts which can be adapted for medium density development.

1.3 Passive Heating and Cooling

Despite the SGS Report being a supporting document for the Draft Code, noting that dwellings should reduce their reliance on active heating and cooling, the Draft Code does not promote passive heating and cooling.

Active heating and cooling entirely depend on energy consumption to operate mechanical systems which either produce or dissipate heat. Conversely, passive heating and cooling is a building design approach that focusses on heat gain control and heat dissipation in order to improve the indoor thermal comfort of dwellings with either low or no energy consumption.[23]

The SGS Report provides the following:

> *the importance of energy efficient homes has been highlighted by the COVID-19 pandemic. Homes are being used more intensely and as places of work during lockdown, demonstrating the increasing importance of considering running costs at the design stage of development.*[24]

Further to this, NELA(WA) understands that the most economical time to achieve good passive design in a dwelling is at the stage of initial design and build, rather than retrofitting measures at a later stage.[25]

Accordingly, NELA(WA) submits that section 3 of the Draft Code relating to 'The Building', and in particular the sections relating to 'indoor amenity', should include design principles and deemed to comply requirements which promote passive heating and cooling for new medium density buildings and dwellings. An example of design principles for passive heating and cooling are contained in the below table.

3.4 Passive heating and cooling Design principles *Development demonstrates compliance with the following design principles (P)*	
P3.4.1	Dwellings are oriented to take advantage of climatic features such as northern sun and cooling breezes
P3.4.2	Design of dwellings has given consideration to effective shading methods, such as eaves, window awnings, shutters, pergolas and plantings to reduce direct summer sun, but without blocking winter sun

[23] Santamouris, M.; Asimakoupolos, D. 'Passive cooling of buildings' (1996) (1st ed) James & James (Science Publishers) Ltd.
[24] SGS Economics & Planning, *Wider Costs of Medium Density Development* (May 2020), p 16
[25] Australian Government, 'Your Home – Passive Design' (2013) < https://www.yourhome.gov.au/passive-design>

3.4 Passive heating and cooling Design principles *Development demonstrates compliance with the following design principles (P)*	
P3.4.3	Consideration is given to ways in which the design of dwellings can incorporate thermal mass for passive heating and cooling
P3.4.4	Consideration is given to improving the thermal performance and insulative properties of glazing, openings and the building fabric, particularly on west facing elevations

1.4 Solar Access

Solar access is known to be an important factor in improving the amenity of dwellings whilst also being able to contribute significantly to reductions in energy consumption through good daylighting.

The SPP 7.2 Guidelines propose the following guidance for solar access:

> *Lots should be shaped and orientated to facilitate climate-responsive and energy efficient development…Lots located in climate zones 4, 5 and 6 (hot dry summers/ cool winters/warm to mild temperate) should be shaped and oriented to capture winter sun and minimise direct summer sun. Lots located in climate zones 1 and 3 (high humidity/ hot dry summers and warm winters) should be shaped and oriented to maximise shading and the effect of prevailing breezes and minimise exposure of areas to direct sunlight. Regardless of location, lots may be climate-responsive if orientating streets within 15 degrees of north-south and/or east-west and lot shape is square or rectangular.*

The Draft Code proposes that the Definitions define each climate zone. An example of design principles and deemed to comply requirements for solar access are contained in the below tables.

3.2 Solar Access Design principles *Development demonstrates compliance with the following design principles (P)*	
P3.2.1	Consider strategies to maximise solar access to ground floor apartments such as: • high ceilings and tall windows • trees and shrubs that allow solar access in winter and shade in summer.
P3.2.2	Daylight access is optimised when windows are visible from all parts of a habitable room and the window has direct access to the sky, rather than being within a deep façade, with overhangs above.
P3.2.3	In cooler climates south facing dwellings that receive no direct sunlight should be minimised. In tropical areas winter solar gain is less critical, however winter sun access on cooler dry mornings can still be beneficial. A more important design consideration in tropical areas is shading to southern and western elevations to protect against mid-summer sun.
P3.2.4	Where existing constraints exist (e.g. adjacent buildings or trees), consideration should be given to how the building envelope specifications or daylight design can be upgraded to partially offset the lack of heat gain and direct sunlight, for example by installing high performance skylights.

3.2 Solar Access Design principles *Development demonstrates compliance with the following design principles (P)*	
P3.2.5	Sunlight is available to a clothes drying area for at least two hours on June 21.
P3.2.6	Developments prioritise the use of deciduous trees to maximise solar access in winter months and provide shade in summer.

3.2 Solar Access Deemed to comply requirements *Development satisfies the following deemed to comply requirements (C)*	
C3.2.1	Every habitable room has at least one window in an external wall, visible from all parts of the room, with a glazed area not less than 10 per cent of the floor area and comprising a minimum of 50 per cent of clear glazing.
C3.2.2	In climate zones 4, 5, and 6, the primary living space of all single houses and grouped dwellings, and at least 70% of dwellings within a multiple dwelling development, have a major opening orientated between north and east (refer Figure. 3.2b) that can access at least three hours direct sunlight between 9am and 3pm on 21 June.
C3.2.3	Horizontal shading devices such as eaves, window hoods or fins are to be provided: • in climate zones 4, 5 and 6, to north facing windows to a depth of 600mm; and • in climate zones 1 and 3, to all windows to a depth of 900mm (refer Figure 3.2c).
C3.2.4	Lightwells and/or skylights do not form the primary source of daylight to any habitable room.
C3.2.5	Any new development will not reduce the solar access of an adjoining property to less than two hours per day in mid-winter.

1.5 Natural Ventilation

Natural ventilation is the movement of a sufficient volume of fresh air through a dwelling to refresh indoor air. The use of natural ventilation also reduces the need for mechanical ventilation and air conditioning.

NELA(WA) considers that it is important to identify how good natural ventilation can be achieved in the early stages of a new medium density project, bearing in mind that decisions relating to site orientation, building depth and the building envelope are unexceptionally made at that early stages.

Relevantly, NELA(WA) submits that section 3 of the Draft Code relating to 'The Building', and in particular the sections relating to 'indoor amenity', should include design principles and deemed to comply requirements which promote natural ventilation.

This submission is bolstered by SPP 7.3 which notes the following:

> *Good indoor air-quality is essential for healthy and comfortable living environments, with poor indoor air-quality being a significant contributor to poor respiratory health. In most situations, optimising natural ventilation is the most affordable and effective way to manage indoor air quality*.

NELA(WA) suggests that the design principles and deemed to comply requirements should be based on existing and accepted design objectives and outcomes for natural ventilation as set out in SPP 7.3 – Volume 2, noting that this would necessarily require adaptation of the principles to medium density developments rather than apartments. An example of design principles and deemed to comply requirements for natural ventilation are contained in the below tables.

3.5 Natural Ventilation Design principles *Development demonstrates compliance with the following design principles (P)*	
P3.5.1	Developments maximise the number of habitable rooms with natural ventilation.
P3.5.2	Individual dwellings within a medium density development are designed to optimise natural ventilation of habitable rooms. This can be achieved by designing dwellings to have openings with two different orientations so that breeze can flow through the room or dwelling to flush out hot or stale air.
P3.5.3	The effectiveness of built-in cross ventilation depends on placement of openings to create breeze pathways (or breeze-paths) with minimum obstruction. Therefore openings in a room are best placed in opposite walls to create air movement across the room and maximise the effect in that room.

3.2 Natural Ventilation Deemed to comply requirements *Development satisfies the following deemed to comply requirements (C)*	
C3.2.1	Habitable rooms have at least two openings to allow for natural ventilation, with at least one being on an external wall, and separated by a straight-line distance of at least 2m from a second opening, with the distance to be measured from the centre of each opening
C3.2.2	The depth of cross-over and cross-through developments with openings at either end and no openings on side walls does not exceed 20m.
C3.2.3	No habitable room relies on lightwells as the primary source of fresh-air.
C3.2.4	Bathrooms located on external walls (excluding boundary walls) must have a minimum of one openable window for natural ventilation.

NELA(WA) submits that an advice note should be included to the following effect:

> *Where sufficient natural ventilation cannot be achieved due to constraints such as external noise or poor outdoor air quality, consider providing ventilation by passive trickle vents, ceiling fans and/or energy-efficient mechanical air exchange systems. Split system air-conditioners do not provide air exchange or ventilation.*

Please contact us if you have any questions in relation to the above submissions.

Yours sincerely,

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