

# Submission by the Curtin Residents Association (CRA) on the proposed new Territory Plan, Draft Woden District Strategy and Dual Occupancy Developments

## SUMMARY

In critical areas the model for the new planning system is not yet pinned down: definitions are missing; supporting documents are incomplete and ambiguous; and, there also many inconsistencies. A way forward would be to use submissions to inform revised Drafts, which would be made available for further consultation and comment. Redrafting the proposed new Territory Plan could contribute to restoring confidence and trust. This submission is made in the hope this approach is taken up by Government.

The Curtin Residents Association (CRA) welcomes the opportunity to contribute to a discussion about Canberra's future. Additional dwellings in existing urban areas are needed. In supporting densification, we are also conscious that it can be well, or badly, carried out. Policy settings are important, but implementation assessments and decision making even more so. Tracking the probable negative impact on open green space and tree canopy cover and consequently on the health and well-being of residents has been revealing. Consequently, the CRA urges the ACT Government to begin an open engagement and dialogue with the community about urban densification.

More dwellings in residential zones (densification) must not be at the expense of the community's health and well-being. A critical test for any proposed densification must be "no adverse impact on the health and well-being of individual Canberrans". **The proposed new Territory Plan and Draft Woden District Strategy fail this test as they would exacerbate urban heat which will decrease health and well-being.** New urban heat islands. This will **increase inequity**, which is contrary to the objective of the ACT Urban Forest Strategy 2021-2045 that Canberrans enjoy equitable distribution of canopy coverage.

Recent research has found that **tree canopy cover in residential areas needs to be >40%** in order to provide cooling during the hottest part of the day when people are most vulnerable to the adverse health impact of urban heat islands. This must be incorporated into assessment requirements for developments in residential areas.

An overarching objective for the Territory Plan and the District Strategies must be to adapt the urban environment for climate change and to mitigate its effects such as increased heat. Despite high-level policy statements, implementation mechanisms, such as the technical specifications in the draft Territory Plan, fall woefully short of what's needed.

The proposed new Territory Plan and draft District Strategies must be consistent with the ACT Climate Change Strategy and the ACT Urban Forest Strategy. The CRA agrees strongly with the statement on page 31 of the Urban Forest Strategy that "A healthy urban forest with significant canopy cover can be compatible with urban intensification."

The troubling disjunction between policy statements about climate change and mechanisms for their implementation is an example of the separation of policy and its implementation that has occurred by putting assessment requirements in non-legislated supporting documents. This is problematic as the impact of policy occurs entirely through the mechanisms for implementation.

The CRA is deeply concerned about the processes by which assessments and decision making have been enabled by the Planning Bill (2022), the draft Territory Plan and the District Strategies taken together. Incorporation of views of those most impacted by developments, especially community views, into assessments and decision making must be an essential part of governing the planning system. Under TP B.6 (Assessing and Deciding Development Applications) there is no requirement to consult with identified residents or organisations who are highly impacted by a particular development. It is critical that this omission be rectified.

**Good solar access for the central courtyard of the Curtin Group Centre** was a major issue for the Curtin community during the master planning process for the Centre and consideration of the development to the west of the Square. The result was that protection of solar access for the square was incorporated into the Territory Plan. **It is not acceptable to the community to decrease the level of protection of solar access. Errors and omissions** in the draft assessment requirements for buildings in the Curtin Group Centre **must be corrected** as if they are not there will be a substantial increase in overshadowing the central courtyard.

**The Yarralumla Creek corridor** is very important to the community for recreation, active travel and for reducing urban heat. **A number of proposals in the Draft Strategy are not acceptable** as they would destroy the amenity this treed open space provides for the community. The proposed new streets on the north, north-east and south-east edges of Curtin are particularly objectionable.

**The former Curtin horse paddocks** is a greenfield site. It is currently a strong urban heat island. Any development must remove this urban heat island effect and reduce the impact of climate change.

The roundabout in the **Woden north 'key site and change area'** is a significant heat island and is flood-prone. It is not a suitable site for buildings. The best use of the whole area is treed parkland.

**A 'Local Centre' on Theodore Street, Curtin** is identified in the Draft District Strategy for Woden. This is an isolated 1039m<sup>2</sup> block by itself. It does not meet the functional definition of a Local Centre on page 159 of the Draft Woden District Strategy. Consequently, it cannot be treated as a Local Centre equivalent to those in Lyons or Hughes, for example. The Draft Woden District Strategy should be amended to reflect this.

For **dual occupancy developments**, any subdivision of blocks, especially in RZ1, must preserve the existing character of these areas. Specific implementation requirements will be required to achieve this.

## 1. An Important Qualification: Revised Drafts and Additional Consultation

The Curtin Residents Association (CRA) has consulted widely among Curtin Residents over the years and made many submissions to Government, mostly based on public meetings and direct expressions of residents' concerns. Focussed consultations have been held on the new model for Canberra's planning system. This document is derived from those consultations.

Of the very many submissions the CRA has made, this one is unique.

The problem is that in critical areas the model for the new planning system is not yet pinned down. Definitions are missing and documents offered in support of the model are incomplete and ambiguous. There also many inconsistencies. In some areas the text is simply incoherent.

Examples of surprising difficulties which prevent considered feedback on critical aspects of the Drafts:

- a) Administration and Governance (Part A) has yet to include governance.
- b) Constraints or enablement from Planning Act 2022 are referred to when the "Act" is non-existent, and the Bill is subject to remedial recommendations from an Assembly Inquiry.
- c) In areas familiar with the current Territory Plan, there are several apparent transcription errors in translating requirements in this Plan to the proposed new Plan (some of them are mentioned below). To the extent that they are not errors there is a bigger issue going to duplicity and trust; in the absence of additional information, at this stage we reject that interpretation in favour of unintentional error.
- d) Requirements for key aspects of "character" (such as privacy) have been moved from the legal framework of the current Territory Plan to qualitative Design Guidelines, outside of legislated assessment requirements. This separation of policy and its implementation is problematic as the impact of policy occurs entirely through the mechanisms for implementation. One example is the troubling disjunction between policy statements about climate change and mechanisms for their implementation.
- e) District Strategies affecting Curtin are seriously divergent from Government undertakings as recently as two years ago.

Further, the 49 Recommendations from the Assembly Inquiry into Planning Bill 2022, several of which address the need to plug gaping governance holes in the proposed planning system, have not been responded to and, as we understand it, will not be made until late next month. No doubt the Drafts and most supporting documents have been rushed out to meet deadlines for other purposes; however, to consider the system as a whole without knowing the fate of these 49 Recommendations, seems futile indeed.

Accordingly, it is premature to request submissions until a great deal of additional information is available. A way forward would be to use submissions (such as this one) to inform revised Drafts, which would be made available for further consultation and comment. This submission is made in the hope this approach is taken up by Government. Among other

benefits it would respond to the widespread impression that the current exercise has been bungled.

### **Community trust and confidence in the ACT's planning system**

Redrafting the proposed new Territory Plan could contribute to restoring confidence and trust. Public reactions to recent statements made about moving to the new Planning System are indicative of the need to take trust seriously. For example, the following three statements are copied from the ACT Planning System Review and Reform, November 2020. Public reactions we are repeatedly aware of follow in italicised text.

The current system does not adequately accommodate consideration of design quality or development appropriateness, putting at risk the valued character of Canberra and its suburbs.

*Maybe the new system better accommodates design quality, however it also accommodates outcomes far worse than the existing system and, in addition, is devoid of any measures to ensure judgements about development appropriateness are independent and accountable.*

The disconnect between strategic and statutory planning means the system is not well placed to address future planning challenges and aspirations of the long-term Planning Strategy

*The disconnect is still there, and arguably it is more strongly disconnected. Rules to ensure strategic goals are replaced by unaccountable decisions made without protection against interest conflicts.*

These issues, along with the general complexity of the system, is compromising the community's confidence in the system and their ability to fully participate in planning and development

*This is a strong rationale for revising the planning system. However the revised system has not only failed to address the issue, the community's confidence has been decisively lessened and in some respects destroyed. Removal of community engagement in DA decision making illustrates just how empty this statement was, or has become.*

The CRA urges the Government to explore the public opinions expressed here. There is little doubt that the extent of the loss of confidence and trust would be revealed, along with the need for redrafting.

## 2. Overall Comments: Community Views and Prevention of Negative Outcomes

The CRA welcomes the opportunity to contribute to a discussion about Canberra's future. Additional dwellings in existing urban areas are needed. In supporting densification we are also conscious that it can be well, or badly, carried out. Policy settings are important, but implementation assessments and decision making even more so. Tracking the probable negative impact on open green space and tree canopy cover and consequently on the health and well-being of residents has been revealing. Consequently, the CRA urges the ACT Government to begin an open engagement and dialogue with the community about urban densification.

At a policy level the proposed new Territory Plan and Draft Woden District Strategy seek to enable positive aspects of an imagined future but do not include mechanisms and measures to prevent negative outcomes. Also, outcome-criteria are overwhelmingly subjective in character and coupled to decision making without accountability. In the absence of rules-based planning, it is essential then that strong compliance measures be added as part of an effective governance model. Such a model would also deal with the pervasive conflicts of interests surrounding planning decision making and the need for independent, evidence-based conflict resolution.

We are deeply concerned about the processes by which assessments and decision making have been enabled by the Planning Bill (2022), the draft Territory Plan and the District Strategies taken together. Our concerns have been captured in our submission to the Assembly Inquiry and are acknowledged to some extent in the Recommendations of the Inquiry.

Development Applications are to be considered against a wide range of criteria. Depending on priorities at decision time, very poor outcomes can slip through as one priority is stressed without balance across other priorities. Much will depend upon independent advice at approval time, but the requirement to consider such advice is not encoded in the planning system. Nor is transparency and distancing of conflicts of interest.

Residents have an important role to play in establishing such priorities, given their long-term interests, area specific knowledge, and commitment to realising a vision for Canberra. Local (district) knowledge and "lived experience" are critical to achieving the desired outcomes as highlighted in the Drafts. Incorporation of views of those most impacted by developments, especially community views, into assessments and decision making is an essential part of governing the planning system.

## 3. Failure: Urban Heat Islands, Climate Change and Urban Densification

**More dwellings in residential zones (densification) must not be at the expense of the community's health and well-being.** A critical test for any proposed densification must be "no adverse impact on the health and well-being of individual Canberrans". The proposed new Territory Plan and Draft Woden District Strategy fail this test as they would exacerbate urban heat which will decrease health and well-being.

It is very clear from the material in Appendix 1 of the Draft District Strategies (Urban transect analysis and urban character types), together with the assessment requirements for tree canopy cover in the draft supporting material for the Proposed new Territory Plan (Draft TS1 - Technical Specification – Residential), that the proposals for densification will result in substantially less open green space and tree canopy cover: see Appendix 1 (Tree canopy cover, the urban heat island effect and the proposed new Territory Plan) for more information. This will create **new urban heat islands**.

### 3.1 Health impact of urban heat islands

Increased heat in urban heat islands has a direct effect in human health<sup>1</sup>. Examples:

- asthma
- kidney disease, including kidney stones
- cardiovascular disease
  - A 1°C increase in temperature is associated with a significant increase in cardiovascular disease-related death and illness<sup>2</sup>

Current proposals for densification will increase the residential area with an urban heat island effect and so decrease health and well-being. The current proposals do this in a way that **increases inequity** in Canberra, which is contrary to the objective of the ACT Urban Forest Strategy 2021-2045 that Canberrans enjoy equitable distribution of canopy coverage.

### 3.2 Cooling by tree canopy cover

Recent research results<sup>3</sup> about cooling by tree canopy cover are:

- overall canopy cover: limited cooling until 25% – 50% cover, becoming more substantial at higher values
- treed patches, such as urban parks, cool at all times of day
- canopy over unpaved surfaces - minimal cooling in the afternoon, the hottest part of the day, until ~40% cover, after which cooling strengthens

Consequently, **tree canopy cover in residential areas needs to be >40%** in order to provide cooling during the hottest part of the day when people are most vulnerable to the adverse health impact of urban heat islands.

### 3.3 Conclusions for the Territory Plan and the District Strategies

An overarching objective for the Territory Plan and the District Strategies must be to adapt the urban environment for climate change and to mitigate its effects such as increased heat. Despite high-level policy statements, implementation mechanisms, such as the technical specifications in the draft Territory Plan, fall woefully short of what's needed.

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<sup>1</sup> (a) Bartholy and Pongrácz, A brief review of health-related issues occurring in urban areas related to global warming of 1.5°C, *Current Opinion in Environmental Sustainability*, vol.30, pp 123 - 132 (2018)  
(b) ACT Urban Forest Strategy 2021-2045

<sup>2</sup> Liu et. al., Heat exposure and cardiovascular health outcomes: a systematic review and meta-analysis, *Lancet Planet Health* vol.6, e484–95 (2022)

<sup>3</sup> Alonzo et. al., Spatial configuration and time of day impact the magnitude of urban tree canopy cooling, *Environ. Res. Lett.* 2021 <https://doi.org/10.1088/1748-9326/ac12f2>

More dwellings in residential zones must not be at the expense of public and private open space and tree canopy cover. The amount of local public open space must be maintained or increased. 40% of private blocks must be soft planting area to enable 30% - 40% tree canopy cover on each block.

Technical specifications for adapting to, and mitigating, the impact of climate change are critically important:

- 40% of residential blocks must be soft planting area to enable adequate tree canopy cover;
- 30% - 40% tree canopy cover; and,
- buildings in residential zones RZ1, RZ2, RZ3 and RZ4 must be 4 storeys or less to enable cooling of north and west facing walls and windows by trees.

The proposed new Territory Plan and draft District Strategies must be consistent with the ACT Climate Change Strategy, Goal 4I – reduce urban heat and improve liveability, for example and the ACT Urban Forest Strategy 2021-2045. The CRA agrees strongly with the statement on page 31 of the Urban Forest Strategy that "A healthy urban forest with significant canopy cover can be compatible with urban intensification."

#### **4. Proposed New Territory Plan: General Comments and Suggestions**

The CRA's primary focus is on the quality of living in the Curtin area. This focus requires the CRA to be active at regional (Woden Valley) and 'whole of Canberra' levels. The following comments relate to Curtin's broader environment.

Under TP B.6 (Assessing and Deciding Development Applications) there is no requirement to consult with identified residents or organisations who are highly impacted by a particular development. It is critical that this omission be rectified; it will likely be mandated by an appropriate governance mode; hopefully to be devised in the near future.

The focus on outcomes has merit; however, it also has dangers unless there are clear measures for assessing whether a proposal satisfies the desired outcome. Outcomes used to judge approvals should be recorded at assessment time and their realisation evaluated at the end of a development build. An appropriate bond should be in place for remedy if they are not. This approach would also aid transparency and accountability.

Design Guides fall outside of outside of legislated assessment requirements. The boundary between being "legally required" and having given "sufficient consideration" is very important. A number of criteria need to cross from the latter to the former. We can propose some, such as privacy, but it would be much better if the current design guide documents remain drafts until specifics have been worked through with impacted communities.

## 5. Proposed New Territory Plan: Solar access for the central courtyard of the Curtin Group Centre and assessment requirements in the Woden District Policy

Assessment requirements for buildings in the Curtin Group Centre contain translations from the recently completed Curtin Precinct Code as expected. However, there are errors in the maximum height of buildings and the 5m 'solar fence' around the central courtyard of the Group Centre is not part of the assessment requirements in the draft Woden District Policy. **These errors must be corrected** as if they are not there will be a substantial increase in overshadowing the central courtyard.

Good solar access for the central courtyard of the Curtin Group Centre (Curtin Square) was a major issue for the Curtin community during the master planning process for the Centre and consideration of the development to the west of the Square. The result was that protection of solar access for the square was incorporated into the Territory Plan. **It is not acceptable to the community to decrease the level of protection of solar access.**

The errors that must be corrected are:

- The maximum height of buildings to the north, east and west of the central courtyard (Area 'a' in Figure 2 of the draft Woden District Policy). The 5m limit encoded in the Precinct Code as necessary for "reasonable sunlight to public spaces" (an assessment outcome) has become 6m. Restore the requirement that the maximum height is one storey with a total height not more than 5 metres.
- The 5m 'solar fence' was encoded in the Precinct Code as necessary for "reasonable sunlight to public spaces" (an assessment outcome). So restore "Buildings close to the central courtyard do not overshadow the courtyard beyond the shadow cast by a notional 5 metre high fence measured at the boundary adjoining the central courtyard at winter solstice between 9:00am and 2:30pm" to the assessment requirements.
- the 18m maximum height around the central square in area "b" in Figure 2 of the draft Woden District Policy is not included as an assessment requirement. Rather it is included in the list of assessment outcomes but with a higher figure, 19m. It should be moved to the assessment requirement list with the 18m height limit.
- The draft assessment criterion "Maximum height of buildings in the CZ1 zone is 10m." should be replaced with the requirement from the Precinct Code "The maximum *height of building* is two storeys with a total height not more than 9 metres above *datum ground level*." (10m instead of 9m is surely a typo.)

Perhaps it would help if in this case the draft was informed by the extraordinary effort put into arriving at maximum heights against character and sunlight criteria.

## 6. Draft Woden District Strategy (impacting Curtin)

### 6.1 The Yarralumla Creek corridor must be preserved and enhanced

Designation of the Yarralumla Creek corridor as a primary connection in the ACT's blue-green network is supported strongly. Enhancing ecological connectivity corridors has special resonance for Curtin given the urgent need to preserve and further develop distribution pathways for flora and fauna linking west Canberra nature and Red Hill reserves. There is

strong support for restoring natural environments along Yarralumla Creek as part of an enhanced blue-green connection.

The Yarralumla Creek corridor is very important to the community for recreation, active travel and for reducing urban heat. All the key sites and change areas for Curtin in the Draft Woden District Strategy involve the Yarralumla Creek corridor and its value to the community must be preserved and enhanced in any changes.

A number of proposals in the Draft Strategy are not acceptable as they would destroy the amenity this treed open space provides for the community.

### **6.2 Key site and change area: Curtin edge north and south**

A 'new edge street' through the Yarralumla Creek corridor, supposedly 'to clarify the urban edge to Yarra Glen', is not acceptable as it would destroy the amenity this treed open space provides for the community. The Yarralumla Creek corridor defines the urban edge to Yarra Glen perfectly well and the proposed street would significantly degrade the blue-green connection of the Yarralumla Creek corridor. Losing trees would increase the urban heat island effect for this part of Curtin, which is not acceptable. Planting trees elsewhere would not compensate as cooling by tree canopy cover is a local effect.

Retaining the open green space, increasing the number of trees, and naturalising the Creek would be a better blue-green enhancement than the proposed 3-storey dwellings on an edge street.

Separate pedestrian and cyclist pathways for active travel are needed here rather than new streets.

A new street crossing Yarralumla Creek is not acceptable as it would significantly degrade the Yarralumla Creek corridor and destroy the amenity this treed open space provides for the community. It would also increase traffic in local residential streets.

A bridge for pedestrians and cyclists over Yarralumla Creek is strongly supported as it would connect the new residential area in the former horse paddocks with the rest of Curtin and its active travel routes. It would also open the north side of the Creek to community recreational use.

### **6.3 Key site and change area: Former Curtin horse paddocks**

This is a greenfield site. It is currently a strong urban heat island. Any development must remove this urban heat island effect and reduce the impact of climate change: there must be a significant amount of treed public open space; 40% of residential blocks must be soft planting with 30%–40% tree canopy cover on each block; buildings must be no more than 4 storeys to enable cooling by trees.

A bridge for pedestrians and cyclists over Yarralumla Creek is essential to connect this new residential area with the rest of Curtin and open the north side of the Creek to recreational use by the community.

#### **6.4 Key site and change area: Woden north**

The roundabout area is a significant heat island and is flood-prone. Severe flooding of Yarralumla Creek and associated loss of life is well documented. Improvements to capacity were made in response; however, with intensification of climate change, prediction of flood flows has become extremely uncertain, particularly as severe rain events will be more intense.

This area is not a suitable site for buildings. The best use of the whole area is treed parkland to ameliorate the urban heat island; provide a cool place for residents of the nearby apartments; and to enhance the Yarralumla Creek corridor.

A new street between Holman Street and Theodore Street through the Yarralumla Creek corridor is not acceptable as it would significantly degrade the Yarralumla Creek corridor and destroy the amenity this treed open space provides for the community.

#### **6.5 'Local Centre' on Theodore Street, Curtin**

A 'Local Centre' on Theodore Street, Curtin is identified in the Draft District Strategy for Woden. In reality there is no such local centre. This block 23, Section 29, Curtin (83 Theodore St) is currently zoned CZ4 (Local Centre). However, this is one block by itself. It is no bigger than a single residential block (1039m<sup>2</sup>) and does not meet the functional definition of a Local Centre on page 159: *Smaller shopping centres that provide convenience retailing and community and business services that meet the daily needs of the local population*. Consequently, it cannot be treated as a Local Centre equivalent to Lyons or Hughes, for example. The Draft Woden District Strategy should be amended to reflect this.

The elliptical area marked in the map around the supposed local centre at block 23, Section 29, Curtin (Daana Restaurant site) in Fig 31 suggests a 200m metre zone towards Yarra Glen, outlined in mauve as "rapid stop to local centre". There is no light rail stop on Yarra Glen at the nearest point to Daana in current plans. To provide a new stop on the closest point of Yarra Glen would require a creek crossing into Curtin, for a walking distance of approximately 600m + 100m. Such a stop would be approximately midway between Carruthers St overpass stop and Phillip Oval stop (800m to either). For comparison the tram stops on Northbourne Ave are ~1000m apart. This proposal fails to consider the reality of the existing zoning blocks and the feasibility of making access to the future light rail.

The proposed residential redevelopment within 200m of the identified local centre at block 23, Section 29, Curtin appears to be directed at the intention to allow easier double occupancy or splitting of standard blocks. This area is not suitable for dividing blocks. The area is currently RZ1 but many of the existing blocks are already dense duplex housing: the blocks are small at 360 to 430 square metres. On Carruthers St they are larger and deeper, 560 sqm. All of these are too small to be further divided, and the existing duplex housing has already met the density objectives.

#### **6.6 Radburn Heritage Area**

The assessment outcome in the Draft Woden Policy section of the proposed new Territory Plan "Maintain and improve the existing 'Radburn' housing pattern" is strongly supported. Assessment requirements should be put in place to ensure that this outcome is realised.

The Radburn area in Curtin is currently zoned RZ2. The D7 Woden District Strategy identifies the Radburn housing pattern to be maintained and improved (assessment outcome 18). Any development that would subdivide blocks in the Radburn is incompatible with preserving this housing pattern and its successful character. There are few blocks that are large enough to subdivide to 400 sqm and fewer possibilities considering the requirement to provide access to both the open green space and the service street in keeping with the Radburn design pattern that is essential to maintaining this as a heritage area.

### **6.7 Curtin Group Centre as an economic node**

The Draft Woden District Policy identifies an outcome '2. Develop Curtin and Mawson group centres as economic nodes connected by future stages of light rail.' The difference in ground truth and planning provision between Mawson and Curtin group centres is striking. The plans for Mawson include blocks of land and carparks that are identified for redevelopment as commercial zones, and the Mawson group centre has additional flat space in undeveloped areas. No similar areas are identified in the Curtin Group Centre, and the carpark areas are noted to be retained with no other development permitted. The distance from Curtin centre to the light rail route is larger than appears likely for Mawson centre, and the Yarralumla Creek corridor cuts through a narrower, steeper valley than the broad, flatter areas around Mawson.

Any planning for economic growth in the Curtin Group Centre must identify specific parts of the Centre or other nearby land – all of which is currently residential – which has access to light rail stops. This cannot include areas that are merely have a distant view of the light rail route from across the creek. Any economic development zone must identify sufficient areas for parking and transport access, and provision for other infrastructure.

### **6.8 Adapting to, and mitigating, the impact of climate change**

There is too little emphasis in the Draft Strategy on adapting to, and mitigating, the impact of climate change. For example, "Development precincts should achieve improved tree canopy cover, permeability and urban heat outcomes when compared to similar previous precincts." (Table 13: *Woden initiatives – Sustainable neighbourhoods*, page 112) is far too weak given existing levels of tree canopy cover, permeability and urban heat.

## **7. Dual Occupancy Developments**

Any subdivision of blocks, especially in RZ1, must preserve the existing character of these areas. To implement this principle:

- the minimum block size after subdivision should not be less than 400m<sup>2</sup>;
- in RZ1 all dwellings should front a public road or public open space;
- maximum building height of two storeys; and,
- 40% of each block to be soft planting area with 30% - 40% tree canopy cover on each block.

## Appendix 1: Tree canopy cover, the urban heat island effect and the proposed new Territory Plan

*Tree canopy cover requirements in the proposed new Territory plan are abysmally inadequate in the light of the research findings about tree canopy cover and urban heat.*

### Tree canopy cover and the urban heat island effect

#### Research results

- overall canopy cover: limited cooling until 25% – 50% cover, becoming more substantial at higher values
- treed patches, such as urban parks, cool at all times of day
- canopy over unpaved surfaces - minimal cooling in the afternoon, the hottest part of the day, until ~40% cover, after which cooling strengthens; strong cooling for all cover fractions in the evening
- canopy over paved surfaces - small cooling in the afternoon: 0.2°C between 0% and 25% cover cf. 0.0°C cooling for canopy over unpaved surfaces

Source: Alonzo et. al., Spatial configuration and time of day impact the magnitude of urban tree canopy cooling, *Environ. Res. Lett.* 2021 <https://doi.org/10.1088/1748-9326/ac12f2>

### Tree canopy cover and the new Territory Plan

*From Draft TS1 - Technical Specification – Residential*

tree size	Height	Min. canopy diam	canopy area
S	5 - 8m	4m	12.6m <sup>2</sup>
M	8 - 12m	6m	28.3m <sup>2</sup>
L	>12m	8m	50.3m <sup>2</sup>

### Single dwelling blocks

BLOCK SIZE	PLANTING AREA	TREES	TREE CANOPY COVER
compact <250 m <sup>2</sup>	15%	1S	6.5%
medium 251 - 500 m <sup>2</sup>	20%	2S	6.3%
large >500 m <sup>2</sup>	24%	1S + 1M	~7%
large >800m <sup>2</sup>	24%	1M + 1L	~5% - 9%

### **Multi-unit housing in RZ1 and RZ2 zones**

- Planting area is a minimum of 35% of the block area.
- All new and existing trees provide at least 15% canopy cover to the block at maturity.

**AND**

- For large blocks less than or equal to 800m<sup>2</sup>, at least one small tree and one medium tree
- For large blocks more than 800m<sup>2</sup>, at least one medium tree and one large tree; and one additional large tree or two additional medium trees for each additional 800m<sup>2</sup> block area.  
*which is the same as for large single dwelling blocks.*

**Note** the inconsistent requirements.

### **Multi-unit housing in RZ3, RZ4 and RZ5 zones**

- Planting area is a minimum of 25% of the block area.
- All new and existing trees provide at least 20% canopy cover to the block at maturity.

**AND**

- For blocks less than or equal to 800m<sup>2</sup>, at least one small tree and one medium tree
- For blocks more than 800m<sup>2</sup>, at least one medium tree and one large tree; and one additional large tree or two additional medium trees for each additional 800m<sup>2</sup> block area.  
*which is the same as for large single dwelling blocks.*

**Note** the inconsistent requirements.