# **ATTACHMENT BOOKLET**

**ORDINARY COUNCIL MEETING 16 DECEMBER 2020** 





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# **ENFORCEMENT STANDARD**

Adopted:

310627.2020



## STANDARD TITLE

DIRECTORATE: City Economy & Growth

**BUSINESS UNIT: Community Standards** 

## 1. PURPOSE/ OBJECTIVES

- 1.1 This standard sets out the process required for authorised officers to act promptly, consistently and effectively in response to allegations of unlawful activities.
- 1.2 This standard emphasises that all authorised officers with enforcement duties, functions and responsibilities should:
  - a) Act at all times in good faith and within their powers of delegation.
  - b) Apply standards of reasonableness, common sense and good judgment, while remaining firm and maintaining their ability to put in place effective resolution solutions when disputes occur.
  - c) Comply with legislation.

## 1.3 This Standard aims to:

- a) Provide clear guidelines for the management of Council's enforcement actions relating to unlawful activities;
- b) Provide a consistent approach to the investigation of unlawful activities and the effective resolution of matters that would otherwise give rise to civil and/ or criminal enforcement action;
- Manage civil and criminal enforcement action in a consistent and transparent manner and through best practice operational procedures;
- d) Ensure the principles of procedural fairness and natural justice are followed;
- e) Provide an effective process of community education, awareness and consultation:
- f) Determine whether complaints relating to unlawful activity require investigation;
- g) Determine whether enforcement action is required;
- h) Establish clear guidelines for all authorised officers when they issue penalty notices;
- i) Provide the local community with a practical, convenient and equitable environment in accordance with legislative requirements.
- Ensure that all alleged offences are recorded accurately and photographic evidence is practically available for all issued penalty notices as a means of substantiating all offences committed.

#### 2. SCOPE

- 2.1 This Standard applies to all enforcement actions relating to:
  - a) Abandoned articles/ vehicles;
  - b) Companion animals;
  - c) Environmental protection;
  - d) Fire safety;
  - e) Food safety;
  - f) Non-compliance with development consent conditions;
  - g) Public health and safety;
  - h) Pollution control and waste;
  - Safety issues on public land; i)
  - i) Swimming pools;
  - k) Unauthorised development;
  - Unauthorised use of premises on land; and
  - m) Illegal parking.
- 2.2 Councils operate in an increasingly complex legal environment. Legislation that is the subject of enforcement by Council authorised officers or is otherwise relevant to the exercise of their delegated functions for the purposes of this Standard, includes but is not limited to the following:
  - a) Boarding Houses Act 2012;
  - b) Building Code of Australia;
  - c) Companion Animals Act 1998;
  - d) Contaminated Land Management Act 1997;
  - e) Environmental Planning and Assessment Act 1979;
  - f) Fines Act 1996;
  - g) Food Act 2003;
  - h) Impounding Act 1993;
  - i) Local Government Act 1993;
  - j) NSW Road Rules 2014
  - k) Protection of the Environment Operations Act 1997;
  - I) Public Health Act 2010;
  - m) Swimming Pools Act 1992;
  - n) Road Transport Act 2013; and
  - o) Roads Act 1993

## 3. **DEFINITIONS**

Authorised officer means an officer exercising delegated authority from the CEO.

CEO means the Chief Executive Officer of Council.

Council means Liverpool City Council

**Delegation** means the legal instrument whereby powers are conferred on an authorised officer by the CEO to act for and on behalf of Council as its agent where Council has been given those powers by legislation.

**Development** means the use of land or a building; demolition of a building or work; or any other thing controlled or regulated by legislation or an environment planning instrument.

**EPAA** means the *Environmental Planning and Assessment Act* 1979.

**Emergency Order** means a statutory order expressly given in an emergency under the LGA or EPAA.

LGA means the Local Government Act 1993.

**Notice** means a statutory notice issued under the Food Act 2003 (NSW), the PEOA, the EPAA, the LGA or any other Act.

Caution means an oral warning given by an authorised officer.

**Order** means a statutory order given or issued under the *Local Government Act* 1993 or the *Environmental Planning and Assessment Act* 1979.

PC means a Principal Certifier as prescribed in the EPAA.

**POEO** means the *Protection of the Environment Operations Act* 1997.

**Penalty notice** means a penalty notice which is used for offences prescribed by legislation whereby a fine is given. The value of the fine is also prescribed by legislation.

**Property Information System** means the computerised property database maintained by the Council.

**Unlawful Activity** means any activity or work that has been or is being carried out:

- a) Contrary to the terms or conditions of a development consent, construction certificate, approval, or licence;
- b) Contrary to an environmental planning instrument that regulates the activities or work that can be carried out on particular land;
- c) Without a required development consent, approval, or licence;
- d) Contrary to a legislative provision regulating a particular activity or work; or
- e) In contravention of an Act constituting an offence.

#### 4. UNLAWFUL ACTIVITIES AND THE EXERCISE OF DISCRETION

- **4.1** When undertaking enforcement action and undertaking administrative activities relating to such enforcement action, authorised Council officers are to adhere to the provisions of:
  - a) Relevant Council policies, including the Code of Conduct;
  - b) Guidelines issued by the NSW Ombudsman;
  - c) Government Information (Public Access) Act 2009; and
  - d) Privacy and Personal Information Protection Act 1998.

#### 4.2 Complaints process

- 4.2.1 Unlawful activities are generally identified through complaints received from members of the public or through routine inspections carried out by authorised officers.
- 4.2.2 Details about the unlawful activities are recorded onto the Council's Property Information System (Customer Requests).
- 4.2.3 Timeframes for responding to complaints about unlawful activities may vary. However, every effort will be made to ensure that all complaints about unlawful activities are actioned within a timely manner and that complainants are given sufficient feedback on the progress of their complaint.
- 4.2.4 Priority will be given to complaints in accordance with the following categories:
  - a) <u>Category 1</u>: Urgent and life threatening matters will be actioned immediately following receipt of complaints or through proactive detection, such as unsafe building works, food poisoning, serious incidents where public health and safety are at risk, serious environmental matters;
  - b) <u>Category 2</u>: General compliance matters should be dealt with on a priority basis having regard to the seriousness of the matter, such as. works carried out not in accordance with a development consent, or constructed without development consent, or illegal land use.
  - c) <u>Category 3</u>: Minor matters, such as minor non-compliance of development consents should be actioned as available Council resources permit.
- 4.2.5 Council must consider a range of factors when determining whether the particular matter will warrant further and detailed investigation. However, if a decision is made not to investigate or act upon a complaint, the decision must be recorded with clear reasons as to why the investigation did not proceed. The complainant must then be advised of the decision and the reasons why no further action is being taken.

## 4.3 Investigating unlawful activities

4.3.1 When deciding whether a complaint requires investigation, authorised officers ought to consider the following factors:

- a) Is the matter within the jurisdiction of Council or of a civil or private nature?
- b) Is the matter premature, e.g. does the complaint relate to some unfinished aspect of works that are still in progress?
- c) Is the activity or work permissible with or without development consent? If the work is permissible with development consent, is there consent in place?
- d) Is there another body that is more appropriate to investigate or deal with the matter?
- 4.3.2 As the appropriate regulatory authority, Council can take action in relation to any development or matter which it has power to regulate under an Act.
- 4.3.3 All complaints regarding unlawful activities and uses will be investigated by Council unless:
  - a) The matter has been actioned and resolved, or
  - b) A Principal Certifier is responsible for monitoring compliance with the conditions of development consent where a construction certificate has been issued for works to be carried out (i.e. construction of a building)
- 4.3.4 Council will investigate matters where there is evidence of:
  - a) Environmental harm;
  - b) Safety concerns;
  - c) Major breaches of a development consent.

## 4.4 Referring complaints for investigation by the Principal Certifier

- 4.4.1 Complaints in relation to a privately certified development is to be referred to the Principal Certifier. The Private Certifier must issue a direction for any non compliance with the development approval.
- 4.4.2 Where urgent action is required, where a significant breach of the development consent has occurred, or environmental harm is occurring Council Authorised Officers may be required to investigate.
- 4.4.3 Where clear evidence is available that the nominated Private Certifier has acted outside their authority, Council's authorised officers, through their manager or director, may make formal written representations to the Commissioner for Fair Trading.

#### 4.5 Determining the need for enforcement action

- 4.5.1 The enforcement options are as follows:
  - a) Issue a notice;
  - b) Issue an order;
  - c) Issue a penalty notice; and
  - d) Commence legal action.

#### 4.6 Notices and orders

- 4.6.1 Notice and orders provisions set out in the EPAA, LGA, POEO, Swimming Pools Act and the Food Act provide Council with formal, cost effective mechanisms to direct landowners and occupiers to do or refrain from doing something. These provisions involve the principles of natural justice and procedural fairness. Where appropriate, they should be used prior to the commencement of civil proceedings in the Land and Environment Court or the Local Court.
- 4.6.2 Both the EPAA and LGA set out the statutory framework to be followed when issuing notices of intention and giving orders. In summary the framework is as follows:
- 4.6.3 A notice of intention to issue an order must clearly:
  - a) State that Council intends to issue an order;
  - b) Set out the terms of the proposed order;
  - State the period proposed to be specified as the period within which the order is to be complied with; and
  - d) State that the person to whom the order is proposed to be given may make representations to a nominated person, as to the reason(s) that the order should not be given, or as to the terms of a period for compliance with that order.
- 4.6.4 A notice of intention may provide that the representations are to be made to the person who gives the order or a nominated person on a nominated date, being a date that is reasonable in the circumstances in the case.
- 4.6.5 If the recipient of an order fails to comply with the terms of the order, Council may commence class 4 proceedings in the Land and Environment Court to enforce compliance. The following matters are critical to the success of proceedings based on non-compliance with an order:
  - a) The notice of the proposed order is given under the appropriate section of the relevant Act or Regulation;
  - b) The period for making of a submission, stipulated in the notice of intention is reasonable:
  - The order is not issued prior to the expiry of the period for making submissions set out in the notice of intention;
  - any submission made by a recipient of a notice of intention was taken into consideration before an order is given; and
  - e) The period of compliance, stipulated in the order, is reasonable.

## 4.7 Building Information Certificates/ Development Applications

4.7.1 A person who has carried out unlawful works may apply for a Building Information Certificate under section 6.26 of the EPAA to prevent the unlawful works from being the subject of a demolition order and or a development application under the following circumstances:

- a) Any unauthorised class 10 structure that is ancillary to residential development does not require a DA and can only be legitimised by way of a Building Information Certificate. However, the building information certificate must be accompanied by a BCA report to ensure compliance with the BCA. It is important to note that a Building Information Certificate cannot be consented to unless compliance with the BCA is achieved.
- b) Any unauthorised class 1-10 (other than class 10 ancillary structures) structure will require a DA for use, which must also be accompanied by a BCA report to ensure compliance with the BCA. In this instance, a condition requiring a Building Information Certificate application will be included on any consent (if a Building Information Certificate application has not yet been lodged). However, it is important to note that consent can only be granted to after the BCA report has been reviewed by way of a building referral.

#### 4.8 Civil and criminal proceedings

- 4.8.1 As stated above, civil enforcement action can be taken in respect of an alleged breach of an Act. The most common examples where this type of action is taken relates to:
  - a) An application by Council to restrain an unauthorised use of land or the carrying out of illegal works upon land;
  - b) An application by Council to restrain breaches of conditions of development consent; or
  - c) An application by Council to seek a demolition order or orders that certain works be carried out to put a building in a satisfactory condition.
- 4.8.2 Council also has the option of initiating a criminal prosecution and thereby seeking a pecuniary (monetary) penalty in the Local Court or the Land and Environment Court.
- 4.8.3 It is critical when prosecuting a matter in either the Local Court or in the Land and Environment Court, that Council has sufficient prima facie evidence to prove each of the elements of the offence and that the evidence is in admissible form.
- 4.8.4 The decision to commence civil or criminal proceedings is to be discussed with the Manager Community Standards and advice provided by Council's Legal Services Unit where full consideration will be given to the complexity of the legal issues raised by the breach and the cost of any potential litigation. This includes adverse costs orders awarded to the respondent/ defendant in the event the matter is unsuccessful. Any litigation conducted in relation to enforcement must be undertaken in accordance with Council's Legal Services Policy.

## 4.9 Criteria for undertaking criminal prosecutions

- 4.9.1 When exercising its discretion to take action, particularly when considering whether to commence criminal proceedings (summary enforcement) for unlawful activities, Council must have regard to whether the public interest will be served by such a prosecution.
- 4.9.2 There are many factors which authorised officers should take into account when exercising their discretion to enforce the law. The relevant factors include, but are not limited to the following:
  - a) The seriousness of the alleged breach or offence, or whether it is of a technical nature; and the extent of the breach;
  - b) The public risk created by the breach;
  - c) The actual or potential harm to the environment;
  - d) The availability and efficacy of other alternatives to taking enforcement action:
  - e) Whether the breach is continuing;
  - f) The prevalence of the alleged offence or breach and the need for deterrence:
  - g) The effectiveness of proposed legal action;
  - h) Any precedent set if legal action is not taken in a particular instance;
  - i) The existence of mitigating circumstances;
  - j) Prior warning, breaches, convictions etc.; and
  - k) The public interest served by action being taken
- 4.9.3 Any decision to take criminal enforcement action must be based on proper grounds. Some key considerations include the following:
  - a) Does the available evidence establish an initial (prima facie) case for action?
  - b) Will the public interest be served by bringing such an action?
  - c) Does Council have a duty to act?
- 4.9.4 Decisions regarding criminal prosecutions should not be influenced by:
  - a) The alleged offender's political, business or community affiliations;
  - b) The alleged offender's status in the community;
  - c) Any aspects of discrimination; or
  - d) The political, social; or other affiliations of those officers responsible for exercising the enforcement powers.

## 4.10 Recovery of costs and penalties

The recovery of legal costs and penalties is always dependent upon the discretion of the court in either civil or criminal matters. It is Council's aim to recover costs if successful in the Land and Environment Court or Local Court proceedings on a fair and reasonable basis in accordance with section 694 of the LGA.

#### 5.0 PARKING ENFORCEMENT

## 5.1 Exercising discretion in regard to parking enforcement

- 5.1.1 An authorised officer will assess each situation based on the guidelines supplied by the Attorney General's Department under the *Fines Act* 1996. These guidelines specify circumstances whereby an authorised officer may issue a caution in lieu of a penalty notice depending on the circumstances and severity of the incident.
- 5.1.2 The guidelines under the Fines Act 1996 state that:
  - a) The decision to give a caution, rather than issue a penalty notice, requires the exercise of good judgment, involving an assessment of all the circumstances.
  - b) Without limiting the discretion to give a caution, the matters that should be taken into account when deciding whether it is appropriate to give a person a caution instead of a penalty notice include:
    - The offending behaviour did not involve risks to public safety, damage to property or financial loss, or have a significant impact on other members of the public;
    - 2) The authorised officer has reasonable grounds to believe that the person has a mental illness or intellectual disability;
    - 3) The authorised officer has reasonable grounds to believe that the person is homeless;
    - 4) The authorised officer has reasonable grounds to believe that the person is under 18;
    - 5) The authorised officer has reasonable grounds to believe that the person has a special infirmity or is in very poor physical health;
    - 6) The offending behaviour is at the lower end of the scale of seriousness for that offence or is minor in nature;
    - 7) The person claims on reasonable grounds that they did not knowingly or deliberately commit the offence;
    - 8) The person admits the offending behaviour and shows remorse; the person is cooperative and/ or complies with a request to stop the offending conduct. For example, a person stops in a no parking zone for longer than the required time but does not leave the vehicle unattended and agrees to move the vehicle when directed; and
    - There are other reasonable grounds for giving a caution in all the circumstances of the case. For example, the offence was committed because of a medical or other serious emergency.
  - c) The fact that one or more of these factors is present does not mean that the authorised officer is obliged to issue a caution. All the circumstances of the case should be taken into account to determine whether a caution is an appropriate and reasonable response to the offence.

#### 5.2 Evidence

- 5.2.1 An authorised officer, wherever possible, shall endeavour to obtain a digital image of any alleged offence of any Council administered legislation as a means of documenting the officers' observations.
- 5.2.2 The image may be used as corroborative evidence in a court.
- 5.2.3 All photographs (including digital images) taken will be stored in a secure environment, and access will only be available to authorised personnel for authorised purposes. The storage and disposal of evidence must be in accordance with General Retention and Disposal Authority Local Government Records (GA 39) and in compliance with the privacy protection principles.
- 5.2.4 Prior to issuing any form of warning, penalty notice or instigating legal proceedings, an authorised officer must ensure that they have established a prima facie case, meaning that all of the required elements of the offence are made out.
- 5.2.5 Authorised officers, as required, will attend Court and appear as witnesses on behalf of Council. The authorised officer will adhere to courtroom etiquette and conduct themselves as a credible witness. The authorised officer will ensure that all relevant information is available and a brief of evidence is provided to the Legal Services Unit prior to the Court date. This information has to be provided within the appropriate timeframe to avoid the matter from being withdrawn and legal cost incurred against Council.

## 5.3 Service of penalty notices

5.3.1 A penalty notice, once issued, must be served. For parking offences, the penalty notice will be sent to the registered owner of the offending motor vehicle.

#### 5.4 Cessation of enforcement action

5.4.1 If it comes to the attention of the authorised officer, that there is a deficiency contained within a penalty notice, or the notice was issued contrary to law, the authorised officer must cause the penalty notice to be cancelled, or if the matter is before the court, must cause the matter to be withdrawn with the approval of their Coordinator or Manager.

## 5.5 Specific enforcement programs

5.5.1 From time to time, authorised officers develop, implement or participate in specific programs related to targeted enforcement outcomes. Set our below are current programs undertaken by authorised officers:

#### a) School zones

Authorised Council officers, as well as the NSW Police Highway Patrol, are also authorised by Transport for NSW to conduct specific

enforcement in designated school zone areas. The intention of the NSW Parliament was clearly demonstrated when changes were made to the demerit point scheme to permit authorised Council officers to issue penalty notices for parking offences in school zones, which now attract demerit points.

Approved review guidelines are published and provide a disclaimer which states:

"Leniency will generally not be considered for certain offences where safety is an issue. These include demerit point offences in school zones."

#### Procedure:

- 1) Where an authorised officer detects an offence within a school zone, the officer obtains photographic evidence.
- An authorised officer should not verbally engage with an offending motorist, because this may cause the offending behaviour to continue, which jeopardises the safety of school children.
- 3) A penalty notice to the registered owner of the vehicle will be posted.

## c) Heavy/ long vehicles parked in a built-up area

The issue of illegal truck parking in Liverpool Local Government area is the subject of concern for many residents, a matter which is reflected in the large number of complaints received by Council.

Under NSW traffic law, large trucks and heavy vehicles are prohibited from parking in built-up areas (including but not limited to residential and industrial areas) for any period longer than one hour, (except for certain streets in the LGA which have been sign posted).

A heavy/ long vehicle is defined as a vehicle that has a Gross Vehicle Mass (GVM) greater than 4.5 tonnes, and/ or longer than 7 metres (Note: Buses are exempt).

Heavy/ long vehicles parking on streets cause impact to the amenity of the area by:

- 1) Impeding traffic flow;
- 2) Causing dangerous situations such as reducing visibility;.
- Damage caused to residential infrastructure.

Authorised officers respond to numerous complaints in relation to these vehicles and run specific programs to target these vehicles throughout the year. Penalty notices are issued for most offences relating to heavy / long vehicles, as the drivers of these vehicles have been determined by Transport for NSW to be professional drivers, and are expected to know the provisions related to the use of heavy / long vehicles and all restrictions imposed.

## Procedure:

- Where an authorised officer detects a heavy / long vehicle parked in a built up area for a period longer than one hour, the officer will prepare a penalty notice.
- 2) Subsequent patrols will continue, and further detected breaches will result in further penalty notices being issued.
- 3) Should a vehicle be in receipt of more than six penalty notices in a six month period, an authorised officer may prepare and serve a court attendance notice, in lieu of a penalty notice.
- 4) Any further detected breaches will result in court attendance notices being prepared and served on the registered owner of the vehicle, until such time as the parking of the vehicle complies with the Road Rules.

#### d) Vehicles parked on the footpath/ nature strip in residential streets

The population of the Liverpool Local Government Area is rapidly increasing. The demand for parking is growing, particularly in built-up residential areas. There are a number of households that park vehicles on the street, rather than using off street parking spaces which they are entitled to use. This situation is causing traffic problems, especially in narrow streets, where the increase in vehicles is restricting the use of the street, causing additional congestion, and impeding access for emergency and essential services vehicles and other vehicles. As a result, some residents are parking their vehicles on an adjacent footpath/ nature strip area, contrary to the NSW Road Rules 2014.

Rule 197 of the NSW Road Rules 2014 states:

A driver must not stop on a bicycle path, footpath, shared path or dividing strip, or a nature strip adjacent to a length of road in a built-up area, unless:

- the driver stops at a place on a length of road, or in an area, to which
  a parking control sign applies and the driver is permitted to stop at
  that place under these Rules, or
- the driver is permitted to stop under another law of this jurisdiction.

Penalty notices, without prior written warning, will apply for vehicles that unreasonably obstruct pedestrians, cause damage to Council's infrastructure, are located within a school zone (during school zone times), or where the vehicle is a heavy / long vehicle.

## Procedure:

 Where an authorised officer detects or receives a complaint of a vehicle parked on the footpath/ nature strip, the officer will issue an education letter to the offending vehicle, and/or all households within the street. The letter will remind motorists of their obligations under the NSW Road Rules and will seek a cooperative approach to making alternative parking arrangements. The letter will specify a time limit for compliance, will clearly outline that further patrols will be undertaken after the expiry of the time limit, and that penalty notices may apply.

- 2) Should a vehicle or household which has received a previous letter continue to offend, a penalty notice may be issued.
- 3) Any breach occurring within a school zone (during school zone times), or if the vehicle is a heavy/ long vehicle, a penalty notice may be issued, without a prior warning notice being issued as outlined above.

#### **AUTHORISED BY**

Chief Executive Officer

#### **EFFECTIVE FROM**

This date is the date the standard was approved by the CEO.

#### **REVIEW DATE**

The standard must be reviewed every two years or more frequently depending on its category or if legislative or policy changes occur.

## **VERSIONS**

The current and previous version of the procedure should be set out in the following table.

Version	Amended by	Changes made	Date	TRIM Number

## THIS STANDARD HAS BEEN DEVELOPED IN CONSULTATION WITH

Legal Services



Adopted: 14 March 2016

TRIM 009890.2016



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#### 1. PURPOSE

- 1.1 This policy sets out the standards required for authorised officers to act promptly, consistently and effectively during routine or programmed patrols, inspections and in response to allegations of unlawful activities, including complaints made by members of the public.
- 1.2 This policy emphasises that all authorised officers with enforcement duties, functions and responsibilities should:
  - a) Act at all times in good faith and within their powers of delegation.
  - b) Apply standards of reasonableness, common sense and good judgment, while remaining firm and maintaining their ability to put in place effective resolution solutions when disputes occur.
  - c) Comply with legislation.
- 1.3 This policy applies to all enforcement functions of Council.

#### 2. AIMS/ OBJECTIVES

- 2.1 This policy aims to:
  - a) Provide clear guidelines for the management of Council's enforcement actions relating to unlawful activities;
  - Provide a consistent approach to the investigation of unlawful activities and the effective resolution of matters that would otherwise give rise to civil and/ or criminal enforcement action;
  - Manage civil and criminal enforcement action in a consistent and transparent manner and through best practice operational procedures;
  - d) Ensure the principles of procedural fairness and natural justice are followed;
  - e) Provide an effective process of community education, awareness and consultation;
  - f) Determine whether complaints relating to unlawful activity require investigation;
  - g) Determine whether enforcement action is required;
  - h) Establish clear guidelines for all authorised officers when they issue penalty notices;
  - i) Provide the local community with a practical, convenient and equitable environment in accordance with legislative requirements.
  - j) Ensure that all alleged offences are recorded accurately and photographic evidence is practically available for all issued penalty notices as a means of substantiating all offences committed.

#### 3. DEFINITIONS

**Authorised officer** means an officer exercising delegated authority from the CEO.

CEO means the Chief Executive Officer of Council.

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**Delegation** means the legal instrument whereby powers are conferred on an authorised officer by the CEO to act for and on behalf of Council as its agent where Council has been given those powers by legislation.

**Development** means the use of land or a building; demolition of a building or work; or any other thing controlled or regulated by legislation or an environment planning instrument.

EPAA means the Environmental Planning and Assessment Act 1979.

**Emergency Order** means a statutory order expressly given in an emergency under the LGA or EPAA.

LGA means the Local Government Act 1993.

**Notice** means a statutory notice issued under the Food Act 2003 (NSW), the PEOA, the EPAA, the LGA or any other Act.

**Caution** means an oral warning given by an authorised officer which is recorded in the officer's notebook.

**Order** means a statutory order given or issued under the *Local Government Act* 1993 or the *Environmental Planning and Assessment Act* 1979.

**OSR** means Office of State Revenue.

**PCA** means a Principal Certifying Authority as prescribed by Part 4A of the EPAA.

POEO means the Protection of the Environment Operations Act 1997.

**Penalty notice** means a penalty notice which is used for offences prescribed by legislation whereby a fine is given. The value of the fine is also prescribed by legislation.

**Property Information System** means the computerised property database maintained by the Council.

**RMS** means Roads and Maritime Services.

**SDRO** means the State Debt Recovery Office.

Unlawful Activity means any activity or work that has been or is being carried out:

- a) Contrary to the terms or conditions of a development consent, construction certificate, approval, or licence;
- b) Contrary to an environmental planning instrument that regulates the

- activities or work that can be carried out on particular land;
- c) Without a required development consent, approval, or licence;
- d) Contrary to a legislative provision regulating a particular activity or work;
   or
- e) In contravention of an Act constituting an offence.

#### 4. BACKGROUND

- 4.1 In the course of its normal operations, Council receives numerous reports and complaints about unlawful activities within its local government area. Council officers also come across suspected unlawful or non compliant activities in the course of their duties. Unlawful activities are those where any activity or work has been (or is being carried) out:
  - a) Contrary to the terms or conditions of a development consent, construction certificate, approval, licence or order;
  - b) Contrary to an environmental planning instrument that regulates the activities or work that can be carried out on particular land;
  - c) Without a required development consent, approval, or licence;
  - d) Contrary to a legislative provision regulating a particular activity or work;
     or
  - e) In contravention of an Act constituting an offence.
- 4.2 Council officers also have to also enforce parking within and around the local government area.
- 4.3 This policy provides directions for authorised officers when dealing with allegations of unlawful activity, including complaints made by members of the public. The policy assists authorised officers in:
  - a) Assessing whether complaints of unlawful activities require investigation;
  - b) Having options for dealing with unlawful activity, and
  - c) Deciding whether enforcement action is warranted.
- 4.4 All authorised officers with delegations are authorised to investigate and undertake enforcement action relating to:
  - a) Abandoned articles/ vehicles;
  - b) Companion animals;
  - c) Environmental protection;
  - d) Fire safety;
  - e) Food safety;
  - f) Non-compliance with development consent conditions;
  - g) Public health and safety
  - h) Pollution control and waste;
  - i) Safety issues on public land.
  - j) Swimming pools;
  - k) Unauthorised development; and
  - I) Unauthorised use of premises on land.

- 4.5 Councils operate in an increasingly complex legal environment. Legislation that is the subject of enforcement by Council authorised officers or is otherwise relevant to the exercise of their delegated functions for the purposes of this policy, includes but is not limited to the following:
  - a) Boarding Houses Act 2012;
  - b) Building Code of Australia;
  - c) Companion Animals Act 1998;
  - d) Contaminated Land Management Act 1997;
  - e) Environmental Planning and Assessment Act 1979;
  - f) Fines Act 1996;
  - g) Food Act 2003;
  - h) Impounding Act 1993;
  - i) Local Government Act 1993;
  - j) NSW Road Rules 2014
  - k) Protection of the Environment Operations Act 1997;
  - I) Public Health Act 2010;
  - m) Swimming Pools Act 1992;
  - n) Road Transport Act 2013;
  - o) Roads Act 1993.
- 4.5 When undertaking enforcement action and undertaking administrative activities relating to such enforcement action, authorised Council officers are to adhere to the provisions of:
  - a) Relevant Council policies, including the Code of Conduct;
  - b) Guidelines issued by the NSW Ombudsman;
  - c) Government Information (Public Access) Act 2009; and
  - d) Privacy and Personal Information Protection Act 1998.

#### 5. UNLAWFUL ACTIVITIES AND THE EXERCISE OF DISCRETION

#### 5.1 Complaints process

- 5.1.1 Unlawful activities are generally identified through complaints received from members of the public or through routine inspections carried out by authorised officers.
- 5.1.2 Details about the unlawful activities are recorded onto the Council's Property Information System (Customer Requests).
- 5.1.3 Timeframes for responding to complaints about unlawful activities may vary. However, every effort will be made to ensure that all complaints about unlawful activities are actioned within a timely manner and that complainants are given sufficient feedback on the progress of their complaint.
- 5.1.4 Priority will be given to complaints in accordance with the following categories:
  - a) Category 1: Urgent and life threatening matters will be actioned immediately following receipt of complaints or through proactive

- detection, such as unsafe building works, food poisoning, serious incidents where public health and safety are at risk, serious environmental matters;
- b) <u>Category 2</u>: General compliance matters should be dealt with on a priority basis having regard to the seriousness of the matter, such as. works carried out not in accordance with a development consent, or constructed without development consent, or illegal land use.
- c) <u>Category 3</u>: Minor matters, such as minor non-compliance of development consents should be actioned as available Council resources permit.
- 5.1.5 Council must consider a range of factors when determining whether the particular matter will warrant further and detailed investigation. However, if a decision is made not to investigate or act upon a complaint, the decision must be recorded with clear reasons as to why the investigation did not proceed. The complainant must then be advised of the decision and the reasons why no further action is being taken.

## 5.2 Investigating unlawful activities

- 5.2.1 When deciding whether a complaint requires investigation, authorised officers ought to consider the following factors:
  - a) Is the matter within the jurisdiction of Council or of a civil or private nature?
  - b) Is the matter premature, e.g. does the complaint relate to some unfinished aspect of works that are still in progress?
  - c) Is the activity or work permissible with or without development consent? If the work is permissible with development consent, is there consent in place?
  - d) Is there another body that is more appropriate to investigate or deal with the matter?
- 5.2.2 As the appropriate regulatory authority, Council can take action in relation to any development or matter which it has power to regulate under an Act.
- 5.2.3 All complaints regarding unlawful activities and uses will be investigated by Council unless:
  - a) The matter has been actioned and resolved, or
  - A Principal Certifying Authority (PCA) is responsible for monitoring compliance with the conditions of development consent where a construction certificate has been issued for works to be carried out (i.e. construction of a building)
- 5.2.4 Council will investigate matters where there is evidence of:
  - a) Environmental harm;
  - b) Safety concerns;
  - c) Major breaches of a development consent.

# 5.3 Referring complaints for investigation by the principal certifying authority

- 5.3.1 It is preferable for any complaints in relation to a development to be referred to the PCA in the first instance, as this is likely to be the person with the most association and familiarity with events occurring on the site. The PCA may be able to effectively resolve the complaint without the issue of a legal instrument such as a notice or order.
- 5.3.2 The EPAA permits Councils to act in circumstances where a PCA has been appointed. However, Council's may first choose to refer such complaints to the PCA. This response may be appropriate depending on the nature and extent of any non-compliance.
- 5.3.3 Because of Council's more extensive range of powers it is more appropriate for the complaint to be investigated by Council authorised officers where urgent action is required, where a significant breach of the development consent has occurred, or where there has been non-compliance with the EPAA or the POEO.
- 5.3.4 Where clear evidence is available that the nominated PCA has acted outside their authority, Council's authorised officers, through their manager or director, may make formal written representations to the Building Professionals Board.

## 5.4 Determining the need for enforcement action

- 5.4.1 The enforcement options are as follows:
  - a) Issue a notice;
  - b) Issue an order;
  - c) Issue a penalty notice; and
  - d) Commence legal action.

## 5.5 Notices and orders

- 5.5.1 Notice and orders provisions set out in the EPAA, LGA, POEO, Swimming Pools Act and the Food Act provide Council with formal, cost effective mechanisms to direct landowners and occupiers to do or refrain from doing something. These provisions involve the principles of natural justice and procedural fairness. Where appropriate, they should be used prior to the commencement of civil proceedings in the Land and Environment Court or the Local Court.
- 5.5.2 Both the EPAA and LGA set out the statutory framework to be followed when issuing notices of intention and giving orders. In summary the framework is as follows:
- 5.5.3 A notice of intention to issue an order must clearly:
  - a) State that Council intends to issue an order;
  - b) Set out the terms of the proposed order:
  - State the period proposed to be specified as the period within which the order is to be complied with; and
  - d) State that the person to whom the order is proposed to be given may

make representations to a nominated person, as to the reason(s) that the order should not be given, or as to the terms of a period for compliance with that order.

- 5.5.4 A notice of intention may provide that the representations are to be made to the person who gives the order or a nominated person on a nominated date, being a date that is reasonable in the circumstances in the case.
- 5.5.5 If the recipient of an order fails to comply with the terms of the order, Council may commence class 4 proceedings in the Land and Environment Court to enforce compliance. The following matters are critical to the success of proceedings based on non-compliance with an order:
  - a) The notice of the proposed order is given under the appropriate section of the relevant Act or Regulation;
  - b) The period for making of a submission, stipulated in the notice of intention is reasonable;
  - The order is not issued prior to the expiry of the period for making submissions set out in the notice of intention;
  - d) any submission made by a recipient of a notice of intention was taken into consideration before an order is given; and
  - e) The period of compliance, stipulated in the order, is reasonable.

#### 5.6 Building certificates/ development applications

- 5.6.1 A person who has carried out unlawful works may apply for a building certificate under section 149D of the EPAA to prevent the unlawful works from being the subject of a demolition order and or a development application under the following circumstances:
  - a) Any unauthorised class 10 structure does not require a DA and can only be legitimised by way of a Building Certificate. However, the building certificate must be accompanied by a BCA report to ensure compliance with the BCA. It is important to note that a Building Certificate cannot be consented to unless compliance with the BCA is achieved.
  - b) Any unauthorised class 1-9 structure will require a DA for use, which must also be accompanied by a BCA report to ensure compliance with the BCA. In this instance, a condition requiring a building certificate will be included on any consent (if a building certificate has not yet been lodged). However, it is important to note that consent can only be granted to after the BCA report has been reviewed by way of a building referral.

## 5.7 Civil and criminal proceedings

- 5.7.1 As stated above, civil enforcement action can be taken in respect of an alleged breach of an Act. The most common examples where this type of action is taken relates to:
  - a) An application by Council to restrain an unauthorised use of land or the carrying out of illegal works upon land;
  - b) An application by Council to restrain breaches of conditions of development consent; or
  - c) An application by Council to seek a demolition order or orders that

certain works be carried out to put a building in a satisfactory condition.

- 5.7.2 Council also has the option of initiating a criminal prosecution and thereby seeking a pecuniary (monetary) penalty in the Local Court or the Land and Environment Court.
- 5.7.3 It is critical when prosecuting a matter in either the Local Court or in the Land and Environment Court, that Council has sufficient prima facie evidence to prove each of the elements of the offence and that the evidence is in admissible form.
- 5.7.4 The decision to commence civil or criminal proceedings is to be discussed with the Manager Community Standards and advice provided by Council's Legal Services Department where full consideration will be given to the complexity of the legal issues raised by the breach and the cost of any potential litigation. This includes adverse costs orders awarded to the respondent/ defendant in the event the matter is unsuccessful. Any litigation conducted in relation to enforcement must be undertaken in accordance with Council's Legal Services Policy.

## 5.8 Criteria for undertaking criminal prosecutions

- 5.8.1 When exercising its discretion to take action, particularly when considering whether to commence criminal proceedings (summary enforcement) for unlawful activities, Council must have regard to whether the public interest will be served by such a prosecution.
- 5.8.2 There are many factors which authorised officers should take into account when exercising their discretion to enforce the law. The relevant factors include, but are not limited to the following:
  - a) The seriousness of the alleged breach or offence, or whether it is of a technical nature; and the extent of the breach;
  - b) The public risk created by the breach;
  - c) The actual or potential harm to the environment;
  - d) The availability and efficacy of other alternatives to taking enforcement action:
  - e) Whether the breach is continuing;
  - f) The prevalence of the alleged offence or breach and the need for deterrence;
  - g) The effectiveness of proposed legal action;
  - h) Any precedent set if legal action is not taken in a particular instance;
  - i) The existence of mitigating circumstances;
  - j) Prior warning, breaches, convictions etc.; and
  - k) The public interest served by action being taken
- 5.8.3 Any decision to take criminal enforcement action must be based on proper grounds. Some key considerations include the following:
  - a) Does the available evidence establish an initial (prima facie) case for action?
  - b) Will the public interest be served by bringing such an action?
  - c) Does Council have a duty to act?

- 5.8.4 Decisions regarding criminal prosecutions should not be influenced by:
  - a) The alleged offender's political, business or community affiliations;
  - b) The alleged offender's status in the community;
  - c) Any aspects of discrimination; or
  - d) The political, social; or other affiliations of those officers responsible for exercising the enforcement powers.

#### 5.9 Recovery of costs and penalties

The recovery of legal costs and penalties is always dependent upon the discretion of the court in either civil or criminal matters. It is Council's aim to recover costs if successful in the Land and Environment Court or Local Court proceedings on a fair and reasonable basis in accordance with section 694 of the LGA.

## 6.0 PARKING ENFORCEMENT

#### 6.1 Exercising discretion in regard to parking enforcement

- 6.1.1 An authorised officer will assess each situation based on the guidelines supplied by the Attorney General's Department under the *Fines Act* 1996. These guidelines specify circumstances whereby an authorised officer may issue a caution in lieu of a penalty notice depending on the circumstances and severity of the incident.
- 6.1.2 The guidelines under the Fines Act 1996 state that:
  - a) The decision to give a caution, rather than issue a penalty notice, requires the exercise of good judgment, involving an assessment of all the circumstances.
  - b) Without limiting the discretion to give a caution, the matters that should be taken into account when deciding whether it is appropriate to give a person a caution instead of a penalty notice include:
    - The offending behaviour did not involve risks to public safety, damage to property or financial loss, or have a significant impact on other members of the public;
    - The authorised officer has reasonable grounds to believe that the person has a mental illness or intellectual disability;
    - The authorised officer has reasonable grounds to believe that the person is homeless;
    - The authorised officer has reasonable grounds to believe that the person is under 18;
    - 5) The authorised officer has reasonable grounds to believe that the person has a special infirmity or is in very poor physical health;
    - 6) The offending behaviour is at the lower end of the scale of seriousness for that offence or is minor in nature. For example, where there are signs prohibiting eating and drinking in a train carriage, and a person is observed eating a meal in a sensible and tidy manner;

- The person claims on reasonable grounds that they did not knowingly or deliberately commit the offence;
- 8) The person admits the offending behaviour and shows remorse; the person is cooperative and/ or complies with a request to stop the offending conduct. For example, a person stops in a no parking zone for longer than the required time but does not leave the vehicle unattended and agrees to move the vehicle when directed; and
- 9) There are other reasonable grounds for giving a caution in all the circumstances of the case. For example, the offence was committed because of a medical or other serious emergency.
- c) The fact that one or more of these factors is present does not mean that the authorised officer is obliged to issue a caution. All the circumstances of the case should be taken into account to determine whether a caution is an appropriate and reasonable response to the offence.

#### 6.2 Evidence

- 6.2.1 An authorised officer, wherever possible, shall endeavour to obtain a digital image of any alleged offence of any Council administered legislation as a means of documenting the officers' observations.
- 6.2.2 The image may be used as corroborative evidence in a court.
- 6.2.3 All photographs (including digital images) taken will be stored in a secure environment, and access will only be available to authorised personnel for authorised purposes. The storage and disposal of evidence must be in accordance with *General Disposal Authority Local Government Records* (GDA 10) and in compliance with the privacy protection principles.
- 6.2.4 Prior to issuing any form of warning, penalty notice or instigating legal proceedings, an authorised officer must ensure that they have established a *prima facie* case, meaning that all of the required elements of the offence are made out.
- 6.2.5 Authorised officers, as required, will attend Court and appear as witnesses on behalf of Council. The authorised officer will adhere to courtroom etiquette, and conduct themselves as a credible witness. The authorised officer will ensure that all relevant information is available and a brief of evidence is provided to the Legal Services Division prior to the Court date. This information has to be provided within the appropriate timeframe to avoid the matter from being withdrawn and legal cost incurred against Council.

## 6.3 Service of penalty notices

6.3.1 A penalty notice, once issued, must be served. For parking offences, where applicable, an authorised officer may leave a penalty notice under the front wiper of a vehicle. Alternatively, in certain circumstances (safety concerns) the authorised officer may send the penalty notice to the registered owner of the offending motor vehicle.

#### 6.4 Cessation of enforcement action

6.4.1 If it comes to the attention of the authorised officer, that there is a deficiency contained within a penalty notice, or the notice was issued contrary to law, the authorised officer must cause the penalty notice to be cancelled, or if the matter is before the court, must cause the matter to be withdrawn with the approval of their team leader or manager.

## 6.5 Specific enforcement programs

6.5.1 From time to time, authorised officers develop, implement or participate in specific programs related to targeted enforcement outcomes. Set our below are current programs undertaken by authorised officers:

## a) School zones

Authorised Council officers, as well as the NSW Police Highway Patrol, are also authorised by the RMS to conduct specific enforcement in designated school zone areas. The intention of the NSW Parliament was clearly demonstrated when changes were made to the demerit point scheme to permit authorised Council officers to issue penalty notices for parking offences in school zones, which now attract demerit points.

Approved review guidelines are published and provide a disclaimer which states:

"Leniency will generally not be considered for certain offences where safety is an issue. These include demerit point offences in school zones."

#### Procedure:

- Where an authorised officer detects an offence within a school zone, the officer obtains photographic evidence.
- An authorised officer should not verbally engage with an offending motorist, because this may cause the offending behaviour to continue, which jeopardises the safety of school children.
- Unless exceptional circumstances exist, the authorised officer will
  post a penalty notice to the registered owner of the vehicle,
  obtained from records held by the Roads and Maritime Services.

## b) Mobility Parking Scheme

The Mobility Parking Scheme (MPS) provides parking concessions to people with mobility disabilities.

Roads and Maritime Services (RMS) issues a licence-style card that includes the cardholder's photograph, and other security features such as a hologram and a 'ghost' photo image. Proof of identity is required to ensure only eligible people receive a card.

Council's authorised officers are very proactive in administering the enforcement provisions for the misuse of the Mobility Parking Scheme.

#### Procedure:

1) Authorised officers will check all mobility permits against the

database of revoked permits as provided on their electronic devices.

- If the permit is reported as revoked, the authorised officer will obtain photographic evidence of the permit, as well as the offending vehicle.
- 3) The authorised officer will notify the driver, by way of notice, that RMS records indicate the permit to be revoked, and the permit is being misused for the purposes of which it was issued. The notice also directs the driver to return the revoked permit to the RMS.
- 4) The authorised officer then issues a penalty notice for the parking offence, and a second penalty notice is issued to the driver for misuse of the permit.
- The authorised officer completes the template report and submits the report to the RMS. If confiscated, the revoked permit should accompany this report.

## c) Heavy/ long vehicles parked in a built-up area

The issue of illegal truck parking in Liverpool Local Government area is the subject of concern for many residents, a matter which is reflected in the large number of complaints received by Council.

Under NSW traffic law, large trucks and heavy vehicles are prohibited from parking in built-up areas (including but not limited to residential and industrial areas) for any period longer than one hour, (except for certain streets, in the LGA which have been sign posted).

A heavy/ long vehicle is defined as a vehicle that has a Gross Vehicle Mass (GVM) greater than 4.5 tonnes, and/ or longer than 7 metres (Note: Buses are exempt).

Heavy/ long vehicles parking on streets cause impact to the amenity of the area by:

- Impeding traffic flow;
- Causing dangerous situations such as reducing visibility;.
- 3) Damage caused to residential infrastructure.

Authorised officers respond to numerous complaints in relation to these vehicles, and run specific programs to target these vehicles throughout the year. Penalty notices are issued for most offences relating to heavy / long vehicles, as the drivers of these vehicles have been determined by the RMS to be professional drivers, and are expected to know the provisions related to the use of heavy / long vehicles and all restrictions imposed.

#### Procedure:

- Where an authorised officer detects a heavy / long vehicle parked in a built up area for a period longer than one hour, the officer will prepare a penalty notice.
- Subsequent patrols will continue, and further detected breaches will result in further penalty notices being issued.
- 3) Should a vehicle be in receipt of more than four penalty notices in a

six month period, an authorised officer may prepare and serve a court attendance notice, in lieu of a penalty notice.

4) Any further detected breaches will result in court attendance notices being prepared and served on the registered owner of the vehicle, until such time as the parking of the vehicle complies with the Road Rules.

#### d) Vehicles parked on the footpath/ nature strip in residential streets

The population of the Liverpool Local Government Area is rapidly increasing. The demand for parking is growing, particularly in built-up residential areas. There are quite a number of households that park vehicles on the street, rather than using off street parking spaces which they are entitled to use. This situation is causing traffic problems, especially in narrow streets, where the increase in vehicles is restricting the use of the street, causing additional congestion, and impeding access for emergency and essential services vehicles and other vehicles. As a result, some residents are parking their vehicles on an adjacent footpath/ nature strip area, contrary to the NSW Road Rules 2014.

Rule 197 of the NSW Road Rules 2014 states:

A driver must not stop on a bicycle path, footpath, shared path or dividing strip, or a nature strip adjacent to a length of road in a built-up area, unless:

- the driver stops at a place on a length of road, or in an area, to which a parking control sign applies and the driver is permitted to stop at that place under these Rules, or
- the driver is permitted to stop under another law of this jurisdiction.

Penalty notices, without prior written warning, will apply for vehicles that unreasonably obstruct pedestrians, cause damage to Council's infrastructure, are located within a school zone (during school zone times), or where the vehicle is a heavy / long vehicle.

#### Procedure:

- 1) Where an authorised officer detects or receives a complaint a of a vehicle parked on the footpath/ nature strip, the officer will issue an education letter to the offending vehicle, and/or all households within the street. The letter will remind motorists of their obligations under the NSW Road Rules, and will seek a cooperative approach to making alternative parking arrangements. The letter will specify a time limit for compliance, will clearly outline that further patrols will be undertaken after the expiry of the time limit, and that penalty notices may apply.
- Should a vehicle or household which has received a previous letter continue to offend, a penalty notice may be issued.
- 3) Any breach occurring within a school zone (during school zone times), or if the vehicle is a heavy/ long vehicle, a penalty notice may be issued, without a prior warning notice being issued as outlined above.

## **AUTHORISED BY**

Council

#### **EFFECTIVE FROM**

14 March 2016

#### **DEPARTMENT RESPONSIBLE**

Planning and Growth (Community Standards)

#### **REVIEW DATE**

14 March 2018

#### **VERSIONS**

Versions	Amended by	Changes made	Date	TRIM Number
1	Council Resolution	New policy	7 February 2011	094391.2010
2	Council Resolution	Complete review	14 March 2016	009890.2016

## THIS POLICY HAS BEEN DEVELOPED AFTER CONSULTATION WITH

Corporate Services (Governance and Legal Services) Planning and Growth (Development Assessment)

## **REFERENCES**

Attorney-General NSW: Caution Guidelines under the Fines Act 1993 Attorney-General NSW: Internal Review Guidelines under the Fines Act 1993

Liverpool City Council: Code of Conduct

NSW Ombudsman: Good Conduct and Administrative Practice: Guidelines for state

and local government, 2<sup>nd</sup> edition, 2010



# **POLICY DRAFTING STANDARD**

Adopted: 30 July 2020

TRIM 202335.2020-002



#### POLICY DRAFTING STANDARD

#### 1. PURPOSE/ OBJECTIVE

This standard seeks;

- a) To promote understanding of the standards and processes to be observed in drafting, reviewing and adopting Council Policies, Standards, Charters Procedures and Strategies;
- b) To ensure that Policies, Standards, Charters, Procedures and Strategies are drafted in plain English, consistent in format, up-to-date and readily accessible to all stakeholders;
- c) To apply to all Council staff, consultants, contractors, volunteers and delegates;
- d) To establish measurable objectives and targets for service performance;
- e) To plan strategically and ensure strategies that include actions have been included in the integrated planning and budget process; and
- f) To support the integrity of the integrated planning in Council, avoiding duplication of plans and associated reporting

#### 2. LEGISLATIVE REQUIREMENTS

Government Information (Public Access) Act 2009 Interpretation Act 1987 Local Government Act 1993 (s8A and 8C) Local Government State Award 2017 – Consultative Committees

#### 3. **DEFINITIONS**

Act means the Local Government Act 1993

CEO means Chief Executive Officer of Liverpool City Council.

**Charter**: A charter provides details of the manner in which a Council committee or panel operates and conducts its meetings.

**Code** refers to a document setting out a series of legal requirements for Council to adopt on a particular subject (such as Council meeting practice or the conduct of Councillors and of members of Council staff), which is prescribed by the Office of Local Government and adopted by Council.

Council means Liverpool City Council.

#### POLICY DRAFTING STANDARD

**Council resolved policy:** A policy approved by a Council resolution. It can only be revoked or amended by Council under section 372 of the *Local Government Act* 1993, unless delegated authority is given by the Council to the Chief Executive Officer (CEO) to do so under section 377 of the *Local Government Act* 1993, these policies include mandatory or 'other' Council resolved policies.

CSP: Community Strategic Plan

**EMT:** Executive Management Team

**Policy:** refers to a set of ideas or a plan of what to do in a particular situation or set of circumstances. Policies are adopted by a resolution of Council. These Council policies are mandated by legislation or can be strategic in nature. Some of these policies can only be adopted after public consultation, as set out in legislation

**Procedure**: refers to a documented set of actions that is the official or accepted way of doing something to implement a policy or standard or a legislative requirement. It usually identifies the person(s) responsible, provides a timeline and sets out the process for implementation.

**Standard**: A Standard is approved by the CEO under section 377 of the *Local Government Act* 1993. It can only be revoked or amended by the CEO, unless the CEO has given delegated authority to a member of Council staff to amend or revoke. Standards are a mandatory and prescriptive set of rules which should be consistently be followed by Council staff and other stakeholders which relate to a critical operational activity or function

**Strategy:** is a collection of statements of a strategic direction or intent aimed at addressing an identified need, gap or issue.

## 4. POLICY STATEMENT

## 4.1 How to determine if a matter is a Standard or a Council resolved policy?

- 4.1.1 To determine if a matter is the subject of a Council resolved policy or a Standard, one may ask:
  - a) Does the matter involve a day to day operational issue?
  - b) Does the matter concern members of Council staff? or
  - Under section 377 of the Local Government Act, is the CEO delegated to deal with this matter? (Note to append S377 alongside this document)
- 4.1.2 If the reply to any of these questions is "yes", the matter should be the subject of a Standard.

#### 4.2 Categorisation of corporate documents

Council uses different types of corporate documents to inform the public and direct or guide staff.

Category	Туре
1	Policies
2	Standards
3	Charters
4	Procedures
5	Strategy

#### 4.3 Category 1: Policies

- 4.3.1 Category 1 Policies are adopted by a resolution of Council. These Council policies are mandated by legislation or can be strategic in nature. Some of these policies can only be adopted after public consultation, as set out in legislation.
- 4.3.2 Mandatory Council resolved Policies include the:
  - a) Civic Expenses and Facilities Policy;
  - b) Code of Conduct;
  - c) Code of Conduct Procedures;
  - d) Code of Meeting Practice; and
  - e) Ethical Governance: Internal Reporting (Public Interest Disclosures) Policy.
- 4.3.3 Policies which are not mandated by legislation however categorised for strategic purposes and express the mind or a plan of Council are also Category 1.
- 4.3.4 Once adopted by Council, this becomes an official Council Policy. It must be added to the Council's Policy and Standards Register. It can only be amended or revoked by a subsequent Council resolution.

#### 4.4 Category 2: Standards

- 4.4.1 Category 2 Standards are a mandatory and prescriptive set of rules which must be consistently be followed by Council staff and other stakeholders. Standards relate to a critical operational activity or function.
- 4.4.2 Once adopted by the CEO, a Category 2 Standard becomes an official Council direction. It must be added to Council's Policy and Standards Register. It can only be amended or revoked by the CEO.

#### 4.5 Category 3: Charters

- 4.5.1 Charters are adopted by a resolution of Council. Charters provide the basis for the operation and activities of various Council committees subject to the *Local Government Act*. It can only be amended or revoked by Council.
- 4.5.2 Any Internal Committee set up which does not require the resolution of Council, should be referred to as an "Internal Committee Charter" and needs to meet the requirements of Charters as stipulated throughout this Policy
- 4.5.3 A draft Charter must be submitted to the accountable Director for approval prior to its adoption by Council.

#### 4.6 Category 4: Procedures

4.6.1 Category 4 Procedures refers to Council Operational Procedures. A Procedure identifies the steps that must be followed in performing certain actions in order to comply with a policy or a legislative requirement. A Procedure must be followed by all members of Council staff, irrespective of the particular unit or directorate to which they belong.

#### 4.7 Category 5: Strategies

- 4.7.1 Category 5: Strategies are only to be developed when required by legislation or Council resolution. They are a collection of statements of a strategic direction or intent aimed at addressing an identified need, gap or issue.
- 4.7.2 Strategies should be preceded by, and based on a study covering the subject of the Strategy. The details of such studies should not be included in the Strategy.
- 4.7.3 Strategies must include a strategic component that clearly articulates the problems, issues or challenges being addressed by the strategy (as identified in the preceding study) and the direction Council is planning to take to meet those problems, issues or challenges.
- 4.7.4 Where possible, development of a Strategy should align with the development of the Community Strategic Plan (CSP) including for community engagement. If this not plausible, a Strategy should be consistent with the content of the current CSP.
- 4.7.5 Any actions identified in the Strategy endorsed by Council must be included in, and reported through, the Integrated Planning and Reporting process as per section 406 of the Local Government Act.
- 4.7.6 All strategies should include a period that the strategy spans, where such dates, where practical, are aligned with periods covered by the current Delivery Program or CSP.

4.7.7 The version of Strategy being endorsed is to be clearly identified and recorded in TRIM. The date of endorsement by Council is to be added to the title page following that endorsement.

#### 4.8 Development process

- 4.8.1 All Policies, Standards, Procedures, Charters and Strategies must involve consultation with stakeholders, including consultation with the Coordinator Governance and if it is a Strategy, consultation with Corporate Strategy and Performance. The CEO will be consulted for the final review and feedback, prior to adoption.
- 4.8.2 The Policy, Standard, and Charter templates attached must be used when creating a new one. These templates ensure that Policies, Standards and Charters are clear, precise and consistent. Prompt text is shown in italics to indicate what type of information should be inserted.
- 4.8.3 Legislative requirements; the requirements of the Office of Local Government, other government agencies, and risk management and corruption prevention principles must be taken into account when developing Policies, Standards, Charters, Procedures and Strategies.
- 4.8.4 All policies need to be drafted identifying the risk associated with noncompliance to the policy. The policy needs to be identified as a risk mitigation tool in Council's Risk Register.
- 4.8.5 All Policies, Standards, Charters, Procedures and Strategies must contain a review date of not more than four years. A rationale for the period of review date needs to be applied to determine if there is a business need for a more frequent review.
- 4.8.6 Policies, Standards, Charters, Procedures and Strategies must be written in plain English with the needs of the reader foremost in mind.
- 4.8.7 All corporate documents within the scope of this Standard must contain requirements which are within the risk profile set out in Council's Risk Appetite Statement.
- 4.8.8 Council's Coordinator Governance can advise on Policies, Standards, Charters and Procedures. Council's Manager Corporate Strategy and Performance can advise on Strategies.
- 4.8.9 Council's CEO has delegated authority to make or to amend Council policies which have been approved by a decision of the Council, except as required by legislation or by organisational changes involving members of Council staff.

#### 4.9 Additional requirements for a Council resolved Policy, Charter or Strategy

4.9.1 All new or amended Policies, Charters or Strategies must be submitted to the Executive Management Team for endorsement prior to submission to Council.

- 4.9.2 Draft Policies and Strategies approved for public exhibition must be exhibited for public comment for a <u>minimum</u> period of 28 days, or for the required period, if a statutory exhibition period is specified.
- 4.9.3 At a minimum, public exhibition must consist of:
  - A notice in a local paper informing residents of the location of the exhibited material, the process for making a submission, and the proposed date of conclusion of submissions;
  - b) Publishing the draft policy on the Council website; and
  - c) Exhibiting the draft policy at Council's Customer Service Centre and at Council libraries.
- 4.9.4 At the closure of the exhibition period, a report detailing the submissions received must be made to Council, with any proposed amendments arising from the submissions received. Council by resolution may approve or reject the proposed amendments to an existing policy or strategy or may approve or reject the new policy or strategy. If there are no submissions received at the end of the closure of the exhibition period, the policy or strategy will be resolved under delegation by the CEO.

#### 4.10 Access

- 4.10.1 Council's Coordinator Governance is responsible for maintaining a register of all Council Policies, Standards and Charters, and making them available to Council staff and the public in accordance with the requirements of the Government Information (Public Access) Act 2009.
- 4.10.2 Council's Manager Corporate Strategy and Performance is responsible for maintaining a register of all Council Strategies and for making them available to Council staff and to the public in accordance with the requirements of the Government Information (Public Access) Act 2009.
- 4.10.3 Council Policies, Standards, Charters, Procedures and Strategies should be sent to Communications for publishing.

#### 4.11 Responsibilities

- 4.11.1 An author of a Policy, Standard, Charter, Procedure or Strategy:
  - a) Is accountable for the timely review, updating, and dissemination in their directorate;
  - Must identify those who are directly affected by new or revised Policies, Standards, Charters, Procedures and Strategies and consider their views early in development discussions, when developing or revising a Policy, Standard, Charter, Procedure or Strategy;

- c) Is responsible for ensuring that a new or amended Policy, Standard, Charter, or Procedure is presented in plain English using the appropriate template;
- d) Should consult with the Coordinator Governance or Manager Corporate Strategy and Performance to ensure the policy, standard, charter or strategy complies with relevant legislation and this Standard, prior to seeking approval by the CEO or the elected Council, as the case may be;
- e) Must forward a Word version of the adopted Policy, Standard, Charter, Procedure or Strategy, together with the signed form authorising the new or amended document, to the Coordinator Governance for recording in the Council Policy and Standards Register and publication on the Council website and intranet or to the Manager Corporate Strategy and Performance for recording in the Council Strategy Register and publication on the Council website.
- 4.11.2 The Coordinator Governance is responsible for:
  - a) Maintaining and updating the Council Policy and Standards Register;
  - b) Monitoring policy reviews; and
  - c) Providing appropriate advice, as necessary, to Council staff who are developing or reviewing Council Policies, Standards, Charters and Procedures.
- 4.11.3 The Manager Corporate Strategy and Performance is responsible for:
  - Maintaining and updating the Council Strategy Register;
  - b) Facilitating the monitoring and reporting of the actions pertaining to the Strategies, through the Integrated Planning & Reporting process; and
  - Providing appropriate advice, as necessary, to Council staff who are developing or reviewing Strategies
- 4.11.4 The Communications Unit is responsible for:
  - a) Publishing to Council's website and intranet.
- 4.11.5 The Council and Executive Services Unit is responsible for:
  - a) Publishing on the Councillor Intranet.
- 4.11.6 The relevant Director must ensure before a Policy, Charter or Strategy is submitted to Council or a Standard is submitted to the CEO, that it;
  - a) Is written in plain English;
  - b) Is presented using the correct template;
  - c) Takes into account any legal, financial, risk, administrative or other implications;
  - d) Takes into account the effect upon any existing Policy, Standard, Charter, Procedure or Strategy; and
  - e) Includes any necessary amendments to, or provides for the revocation of, an affected Policy, Standard, Charter, Procedure or Strategy.

4.11.7 The author of a draft Policy, Standard, Charter, Procedure or Strategy is responsible for ensuring that the new or revised forms are completed before forwarding a new or amended draft document to their relevant Manager and Director.

#### 4.12 New or amended Council Standards and Procedures

- 4.12.1 A draft Standard must be submitted to the CEO who approves or rejects the new or amended document.
- 4.12.2 A draft Procedure must be submitted to the accountable Director for approval prior to its adoption.

## 4.13 Recording and publishing Council Policies, Standards, Charters, Procedures and Strategies

- 4.13.1 Once a Council Policy, Standard, Charter, Procedure or Strategy is adopted, the author of the document must contact the Coordinator Governance or Manager Corporate Strategy and Performance to arrange for the Policy, Standard or Charter to be included in the Council Policy and Standards Register or the Strategy to be include in the Council Strategy Register.
- 4.13.2 The Coordinator Governance and the Manager Governance Legal and Procurement have been delegated to approve any minor amendments to policies, charters, standards, procedures or strategies, if the amendments do not:
  - a) Change the intent of the policy;
  - b) Have any impact upon the local community;
  - c) Conflict with any existing policy; and
  - d) Have legal or financial implications.

#### 4.14 Revoking

- 4.14.1 Policies, Charters and Strategies can only be revoked by a formal resolution of Council.
- 4.14.2 Council Standards and Procedures can only be revoked by the approval of the CEO.

#### **AUTHORISED BY**

Acting Chief Executive Officer

#### **EFFECTIVE FROM**

30 July 2020

#### **DEPARTMENT RESPONSIBLE**

City Corporate (General Counsel, Manager Governance Legal and Procurement)
Office of the Chief Executive Officer (Audit, Risk & Improvement, Corporate Strategy & Performance & Communications)

#### **REVIEW DATE**

30 July 2022

#### **VERSIONS**

Version	Amended by	Changes made	Date	TRIM Number
1	Approved by General Manager None		8 November 2011	168917.2011
2	Chief Executive Officer	Minor amendments to Guide and forms	21 October 2014	243268.2014
3	Acting Chief Executive Officer	Minor amendments and renaming 2016		292115.2016
4	Audit, Risk & Improvement  Endorsed by Council Resolution 28 October 2019	Holistic changes, renaming and inclusion of Category 5 Strategies	28 October 2019	212530.2018
5	Acting Chief Executive Officer	Minor amendments and consolidation of two forms into one	30 July 2020	202335.2020- 001

#### **ATTACHMENTS**

- 1. Policy Template TRIM reference 212539.2018
- 2. Standard Template TRIM reference 212537.2018
- 3. Charter Template TRIM reference 212546.2018
- New, Revocation or Amendments to Policy, Standard or Charter Form TRIM reference 200806.2020
- 5. Flowchart TRIM reference 213164.2018

**Attachment 1: Policy Template** 



## **POLICY TITLE**

Adopted: (Current date)

TRIM (Number)



#### **POLICY TITLE**

**DIRECTORATE:** Choose an item.

**BUSINESS UNIT:** Choose an item.

#### 1. PURPOSE/ OBJECTIVES

In this section please state why the policy is needed by your directorate or unit, who will benefit and the relevance of the policy to the objectives and strategies outlined in Council's Delivery Program and Operating Plan.

#### 2. **DEFINITIONS** (where applicable)

This section defines terms and acronyms.

#### 3. POLICY STATEMENT

A policy statement serves to clarify intent, describe how a policy is administered and defines the particulars of a policy. It serves to protect Council, Councillors, members of Council staff and the public from any misunderstanding or uncertainty that may result in unauthorised behaviour or unnecessary litigation.

The first part of a policy statement should give an overview of the policy and why it was created.

The second part of a policy statement, and one of its most important purposes, involves a description of who and what the policy applies to, who is responsible for monitoring adherence to the policy, and how and to whom appeals may be directed in case of any disagreement.

The third part of a policy statement should provide details about the entire policy, how it is to be applied, who and what are exempt from the provisions of the policy, and how misunderstandings and breaches are to be dealt with. The main purpose of a policy statement is to avoid confusion by setting out in detail what is expected in specific situations.

It is really helpful for reading purposes and for clarity if the text of a policy can be set out in numbered paragraphs.

#### 4. RELEVANT LEGISLATIVE REQUIREMENTS (where applicable)

In this section please refer to legislation which relates to this policy: the title(s) of the Act or Regulation and the year that it was originally enacted. Provide only a list not a detailed description of the legislation.

#### **RELATED POLICIES & PROCEDURE REFERENCES**

In this section please list all documents used to develop this policy or which are related to this policy (other policies, procedures etc. of Council and other relevant agencies, excluding legislation or regulations).

#### **AUTHORISED BY**

Council Resolution

#### **EFFECTIVE FROM**

This date is the date the policy is adopted by Council resolution.

#### **REVIEW DATE**

The policy must be reviewed every two years or more frequently depending on its category or if legislative or policy changes occur.

#### **VERSIONS**

The current and previous version of the policy should be set out in the following table.

Version	Amended by	Changes made	Date	TRIM Number

#### THIS POLICY HAS BEEN DEVELOPED IN CONSULTATION WITH

In this section please identify all the groups consulted with in the preparation of the policy such as members of Council staff, management, Councillors, community members, other government departments etc. You should consult with the Governance Coordinator before the policy is considered by the Chief Executive Officer or the elected Council.

#### **ATTACHMENTS**

In this section list all attachments if any.

#### Attachment 2: Standard Template



## STANDARD TITLE

Adopted: (Current date)

TRIM (Number)



#### STANDARD TITLE

DIRECTORATE: Choose an item.

**BUSINESS UNIT:** Choose an item.

#### 1. PURPOSE/ OBJECTIVES

Please set out the intent of the standard. If it relates to a specific policy, it should refer to that policy. If no policy exists and the standard is an administrative document, (e.g. the purchasing of supplies) then the purpose would be to provide formal evidence of the approved procedure for the ordering of supplies.

#### 2. SCOPE

Please set out the limits of the standard: How does the standard apply and how can it be implemented, for instance, the ordering of stationery but not office furniture? Any exceptions to the standard need to be stated here.

#### 3. **DEFINITIONS** (where applicable)

Please explain the words or actions which may have a specific interpretation in the context of the standard.

#### STANDARD STATEMENT

The standard explains what is to be done, by whom and when.

#### **AUTHORISED BY**

Chief Executive Officer

#### **EFFECTIVE FROM**

This date is the date the standard was approved by the CEO.

#### **REVIEW DATE**

The standard must be reviewed every two years or more frequently depending on its category or if legislative or policy changes occur.

#### **VERSIONS**

The current and previous version of the procedure should be set out in the following table.

Version	Amended by	Changes made	Date	TRIM Number

#### THIS STANDARD HAS BEEN DEVELOPED IN CONSULTATION WITH

In this section please identify all the groups consulted with in the preparation of the standard such as members of Council staff, management, Councillors, community members, other government departments etc. You should consult with the Governance Coordinator before the standard is considered by the Chief Executive Officer.

#### **REFERENCES**

In this section please list all documents used to develop this standard or that are related to this standard (other policies, guidelines etc. of Council and other relevant agencies, but not legislation or regulations).

#### **ATTACHMENTS**

In this section list all attachments if any.

### Attachment 3: Charter Template



## **CHARTER TITLE**

Adopted: (Current date)

TRIM (Number)



#### CHARTER TITLE

**DIRECTORATE**: Choose an item.

**BUSINESS UNIT:** Choose an item.

#### 1. PURPOSE/ OBJECTIVES

Please set out the intent of the charter. Why the charter has been established.

#### 2. **DEFINITIONS** (where applicable)

Please explain the words or actions which may have a specific interpretation in the context of the charter.

#### 3. FUNCTIONS

Please set out the functions of the charter: How does the charter apply and how it will function with Council, councillors, staff and community members.

#### 4. OUTCOMES

What the charter aims to assist Council in achieving.

#### 5. MEMBERSHIP

List who the representatives are on the charter.

#### 6. DELEGATIONS

List the members of the charter and their delegations of authority (if applicable) set it out as shown below.

Member	Delegation No

#### 7. QUORUM AND RECOMMENDATIONS

#### 8. MEETINGS PRACTICE AND PROCEDURES

### 9. OBSERVING THE CODE OF CONDUCT AND RELEVANT COUNCIL POLICIES

All members of the charter are required to observe the provisions of Council's Code of Conduct and any other relevant Council policy applicable to the proper functioning of the Panel.

If a member of the charter breach Council's Code of Conduct or any other relevant Council policy, the matter will be referred to the CEO to be dealt with in accordance with Council's Code of Conduct and Code of Conduct Procedures.

If a Charter member has a pecuniary interest in any matter with which the charter is concerned, and is present at a meeting of the charter at which the matter is being considered, they must disclose the interest to the meeting and must not be present during any discussion or decision making relating to that matter. Leaving the room is necessary because to remain in the presence of the meeting but refrain from voting is taken to be a vote against the motion.

A member of the charter who has a non-pecuniary conflict of interest in any matter with which the charter is concerned and is present at a meeting of the charter at which the matter is being considered must disclose the interest to the meeting as soon as practicable. If a member of the charter has declared a non-pecuniary conflict of interest, there exists a range of options for managing the conflict of interest. The option chosen will depend on an assessment of the circumstances of the matter, the nature of the interest and the significance of the issue being dealt with.

A Charter member will deal with a non-pecuniary conflict of interest in at least one of these ways:

- Where the potential for conflict is deemed minimal, take no action. However, the Councillor or charter member should consider providing an explanation as to why it is considered that only a minimal or non-existent conflict exists.
- b) Where the potential for conflict is more significant, take no part in the matter by leaving the room in which the meeting is taking place and take no part in any debate or vote on the issue, as if the provisions in section 451(2) of the Act applied.

Charter members declaring a conflict of interest, whether pecuniary or nonpecuniary, should complete a Declaration of Interest Form (Councillor) which is to be signed by the CEO and retained by Council in accordance with Council's Code of Conduct and its Ethical Governance: Conflicts of Interest Policy.

#### 10. CONFIDENTIALITY AND MANAGING PRIVACY

Charter members, through their involvement on the Charter, may come in contact with confidential or personal information retained by Council. Charter members are required to maintain confidentiality and security in relation to any such information and not access, use or remove that information, unless authorised to do so.

The Privacy and Personal Information Protection Act 1998 and Council's Privacy Policy deal with the collection, holding, use, correction, disclosure and transfer of personal information.

Should a charter member become aware of any breach of security, or misuse of Council's confidential or personal information, they should inform the CEO immediately.

#### 11. DISCIPLINARY ACTION

Should a member of the charter breach the Code of Conduct adopted by Council, the matter will be referred to Council's CEO and will be dealt with in accordance with Council's Code of Conduct and Code of Conduct Procedures.

#### 12. MEDIA PROTOCOL

The Mayor is the only person permitted to speak to the media on behalf of the charter. No other member of the charter is permitted to speak to the media in his or her capacity as a charter member.

#### **AUTHORISED BY**

Council Resolution

#### **EFFECTIVE FROM**

This date is the date the charter was approved by the Council.

#### **REVIEW DATE**

The charter must be reviewed every four years or more frequently depending on legislative or policy changes occur.

#### **VERSIONS**

The current and previous version of the Charter should be set out in the following table.

Version	Amended by	Changes made	Date	TRIM Number

#### Attachment 4:

New or Amendment or Revocation to Policy, Standard or Charter Form NEW OR AMENDMENT OR REVOCATION TO POLICY, STANDARD OR CHARTER FORM

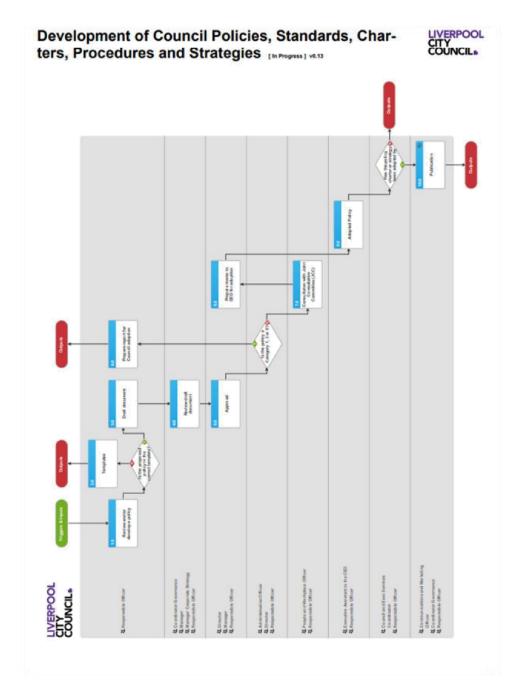
WILL THIS REPLACE AN EXISTING POLICY, STANDARD OR CHARTER?
□ No
☐ Yes. If yes, does an existing policy, standard or form have to be deleted from the Policy Register? Please provide the title of the Policy to be deleted.
WILL THIS POLICY, STANDARD, CHARTER OR STRATEGY BE REVOKED?
□ Yes □ No
Reasons for revocation?
Does the revocation of this policy/ procedure require consultation with other stakeholders?
□ Yes □ No
If yes, does the revocation of this policy/ procedure require a Council resolution?
□ Yes □ No
TITLE OF NEW POLICY, STANDARD, CHARTER OR STRATEGY
DIRECTORATE
Choose an item.
REQUESTED BY
REASON(S)
TRIM NUMBER DATE

POLICY DRAFTING STANDARD	)

FECT:		
□ Yes	□ No	
CER		DATE
GEN		DATE
	FECT:  Yes Yes Yes	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No

POLICY DRAFTING STANDARD		
DIRECTOR'S APPROVAL		
COMMENTS		
NAME & SIGNATURE OF DIRECTOR	DATE	
GOVERNANCE'S APPROVAL		
COMMENTS		
NAME & SIGNATURE OF GOVERNANCE OFFICER	DATE	
CHIEF EXECUTIVE OFFICER'S APPROVAL		
COMMENTS		
NAME & SIGNATURE OF CEO	DATE	

### Attachment 5: Flowchart



### Development of Council Policies, Standards, Charters, Procedures and Strategies [In Progress] v0.13



#### Summary

Objective
To assist staff in the writing and review of Council's policies standards, charters, procedures and strategies to ensure they are documented, communicated and applied consistently. Assuring in establishing measurable objectives and targets for service performance and continually looking for improvement opportunities with our commitment in Quality Management. Aimed also at supporting the integrity of the integrated planning in council and avoiding duplication and associated reporting.

Owner Michael Knight Ellen Whittingstall Expert

#### 1.0 Review and/or develop a policy

a Identify need for a new policy/procedure/charter or strat-egy or amendments to any existing policy/procedure/ charter or strategy. Is there a need to review/rescind the current policy?

#### NOTE Research

Identify gaps, relevant legislative changes or out-dated policy/procedures, charters or strategies. Identify industry practice and best practice standards

To Council's strategic direction and all relevant potential stakeholders who need to be consulted

#### Is the proposed policy in the correct template? Responsible Office

YES .... Continue

NO.... NEXT ACTIVITY

## 2.0 Templates Responsible Officer

Policy Template Aug 2018

Procedure Template Aug 2018

Charter Template Aug 2018

#### 3.0 Draft document

Responsible Officer

- a Draft the policy/procedure, charter or strategy based on the components listed in activity 1a and compare to existing policy (if applicable).
- b Consult with key stakeholders.

#### NOTE What other business units or directorates have responded?

Consider whether the document needs to be placed on public exhibition and if so, determine

PROCESS Book an ad in the local news-

paper

#### 4.0 Review draft document

Coordinator Governance, Manager, Manager Corporate Strategy, Responsible Officer

- Ensure the draft is presented in the correct template and format. Make changes as required.
- b Once the Manager has approved the document, policy, standards and charters are to be directed to the Gover-nance team for review. If the document is a strategy, this is to be directed to the Corporate Strategy and Performance team for review
- Once the Governance team or Corporate Strategy and Performance team has reviewed they will send back to the responsible business unit to make changes as required then forward to Director for approval

#### 5.0 Approval

Director, Manager, Responsible Officer

a Director to review and approve the draft policy.

#### NOTE What if the policy, charter or strategy requires amendment?

The Directors Executive Assistant will return the draft to the responsible Manager for updating.

- b Once the draft is approved by the Director, the Executive by the Director and all documents are to be returned to the document owner
- C The document owner is to determine the categorisation of policy/procedure, charter, strategy or plan with the assistance of the Governance Coordinator.
  - NOTE Categories are outlined in the Adoption, Review & Alteration of Council Policies & Framework Policy.

6.0 Prepare report for Council adoption

ls the policy a Category 1, 3 or 5?
Administration Officer, Director, Responsible Officer

YES.... NEXT ACTIVITY

Responsible Officer

7.0 Consultation with Joint Consultative Committee (JCC) eople and Workplace Officer, Responsible Officer

- Complete the JCC pro forma report document in its enti-
- rety and attach draft document.
- b Submit JCC pro forma document along with attachement and email to the People and Workplace Officer who will review the report and place onto the JCC agenda.

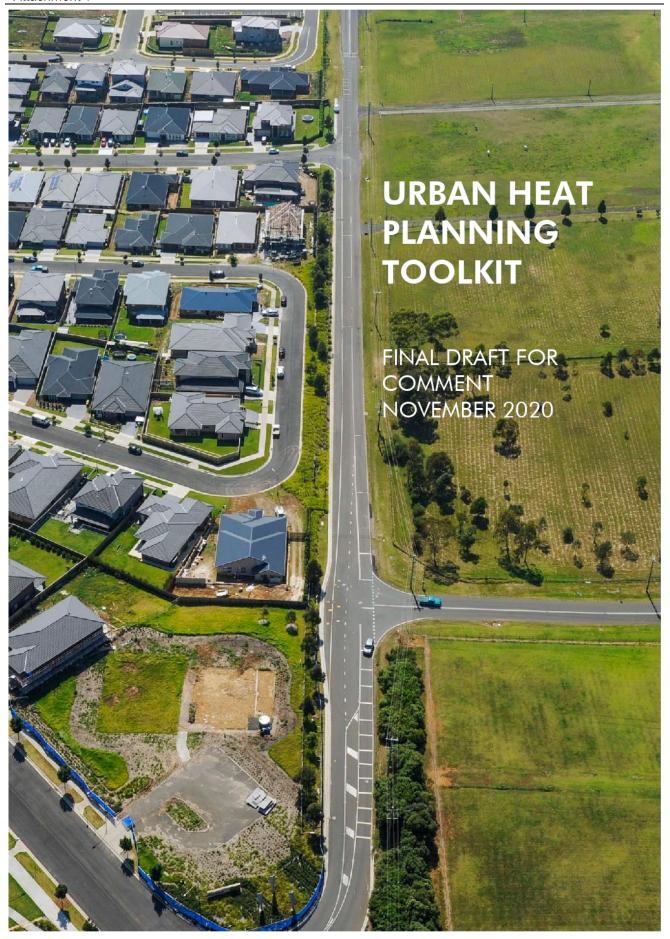
#### NOTE What if there are changes to the report?

The People and Workplace Officer will converse with you if changes need to be made.

None Noted

#### POLICY DRAFTING STANDARD

8.0	a Policy of to police	memo to CEO for adoption Manager, Responsible Officer owner to complete the new policy or amendment y/procedure form we or Amending Policy Template Aug 2018	Process Dependence Process Links For Process Name	ROM THIS I	PROCESS of Link	Assigned Role
		eted form forwarded to Manager for approval.	Book an ad in the loc	cal Note		Responsible Officer
		er to send approved form to Director for approval.	newspaper			Officer
	(1 Directo	r to forward to CEO for adoption.	PROCESS LINKS TO	O TUIC DD	vece.	
			None Noted	o inis PKC	/CE33	
9.0	Adopted	Policy Assistant to the CEO, Responsible Officer	Notice Notice			
	8 CEO si	gns form and directs back to policy owner.	RACI			
	NOTE	Workplace policies/procedures are sent to Joint Consultative Committee for item on agenda and consultation with all staff.	RESPONSIBLE Roles that perform p	rocess activi	ties	
	*****	***************************************	Administration Offic Coordinator Govern dinator, Director, E:	nance, Cour xecutive Ass	istant to the	Services Coor- CEO, Manager,
1	by Cour	policy, charter or strategy been adopted cil resolution? and Exec Services Coordinator, Responsible	Manager Corporate Responsible Office		eople and W	orkplace Officer,
	Officer		Systems that perform	n process ac	tivities	
	YES	NEXTACTIVITY	None Noted			
	NO C	continue	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~			
			ACCOUNTABLE For ensuring that pro	cess is effec	ctive and imp	roving
10.0		ications and Marketing Officer, Coordinator	Process Mi Owner	chael Knigh	t	
	8 Final ad Version	nce, Responsible Officer dopted document to be saved as PDF and Word to policy owner and emailed to the Governance	Process Ell Expert	en Whittings	stall	
	icy/Pro	nator for inclusion and updating on Council's Pol- cedure Register ande in Policy TRIM container.	CONSULTED			
	docum	ence Coordinator to arrange placement of final ent onto Council's website & intranet by sending n to Communications team for update.	Those whose opinior STAKEHOLDERS None Noted	ns are sough	it	
	NOTE	How do I send this through to Communi- cations?	STAKEHOLDERS	FROM LINE	CED PROCE	9959
		Either by selecting the IT self service help desk	Process	Owner	Expert	Process
		and selecting the digital services request, or by	1100033	Owner	Expert	Group
		sending through to a responsible officer within Communications unit.	Book an ad in the local newspaper		Tatjana Bozovic	Communicatio ns
		****************************	****			
Tri	ggers &	Inputs	INFORMED Those notified of cha	nges		
TRI	GGERS		All of the above, as	-	rrie Felthami	System
	ne Noted		Stakeholder], Mana Stakeholder]. Thes notifications.	ager Custom	er Experienc	e[System
	UTS					
NOI	ne Noted		Contamo			
O	itputs & 1	Targets	Systems			
			TRIM			
	TPUTS		Lean			
1091	ne Noted	******************	None Noted			
PER	REORMAN	CE TARGETS				

























The Western Sydney Regional Organisation of Councils' (WSROC) mission is to build collaboration between local governments across Greater Western Sydney, promoting Western Sydney, its people and places, through advocacy, business improvement, strategic leadership, research and partnerships. WSROC has facilitated the development of this toolkit.

The toolkit has been developed by Civille in collaboration with the University of New South Wales, Atelier Ten and the University of Adelaide, and has been published by WSROC with assistance and support from a range of organisations and individuals.

WSROC would like to particularly acknowledge the support of the project delivery group, consisting of: Blacktown City Council, Cumberland City Council, Hawkesbury City Council and the City of Parramatta Council.

This project has been assisted by the New South Wales Government and supported by Local Government NSW.





If you are looking for more information about this toolkit, please contact WSROC.

#### WSROC

Address: PO Box 63 Blacktown NSW 2148

Phone: 02 9671 4333

Web: https://www.wsroc.com.au/ Email: info@wsroc.com.au/ Facebook: facebook.com/WSROC Twitter: @WSROC\_Australia

LinkedIn: Linkedin.com/company/westernsydneycouncils

WSROC Urban Heat Planning Toolkit

Project name: Urban Heat Planning Review

Project number: 2009 (Civille)

Date: 27 November 2020

Report contact: Alexa McAuley, Civille

Report authors:
Alexa McAuley, Civille
Dr Paul Osmond, University of NSW
Dr Carlos Bartesaghi Koc, University of Adelaide
Paul Stoller, Atelier Ten

#### **DOCUMENT HISTORY AND STATUS**

Revision	Status	Date	Checked
А	Draft to project working group	27 July 2020	AMcA
В	Draft to project working group + workshop participants	25 September 2020	AMcA
С	Final draft for stakeholder comment	27 November 2020	AMcA, PO

#### DISCLAIMER

This document is for the confidential use only of the party to whom it is addressed (the client) for the specific purposes to which it refers. We disclaim any responsibility to any third party acting upon or using the whole or part of its contents or reference thereto that may be published in any document, statement or circular or in any communication with third parties without prior written approval of the form and content in which it will appear. This document and its attached appendices are based on estimates, assumptions and information sourced and referenced by the authors. We present these estimates and assumptions as a basis for the reader's interpretation and analysis. With respect to forecasts we do not present them as results that will actually be achieved. We rely upon the interpretation of the reader to judge for themselves the likelihood of whether these projections can be achieved or not. If financial models have been included, they have been prepared from the best information available at the time of writing, no responsibility can be undertaken for errors or inaccuracies that may have occurred both with the programming or the financial projections and their assumptions. In preparing this document we have relied upon information concerning the subject property and/or study area provided by the client and we have not independently verified this information except where noted in this document.

WSROC acknowledges Aboriginal and Torres Strait Islander peoples as the traditional custodians of the lands and waters of this place we now call Metropolitan Sydney. We pay our respect to Elders past, present and future of the Eora, Dharawal (Tharawal), Gundungurra, Dharug (Darug) and Guringai (Kuring-gai) peoples.

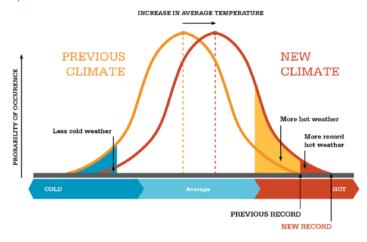
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### **EXECUTIVE SUMMARY**

Urban heat is a significant and growing issue for Western Sydney. This toolkit has been developed to help local councils strengthen local planning provisions to reduce the impacts of heat.



As the climate changes, Western Sydney is experiencing an increasing number of hot, very hot and extremely hot days and heatwaves. This chart, from the Climate Council (2013) shows how, as the climate warms, there will be significantly more hot and extremely hot weather.

Cities tend to be hotter than surrounding rural areas, (known as the urban heat island effect, UHI). Western Sydney is particularly exposed to heat, as:

- Sydney's geography and weather patterns intensify the UHI effect in the west, due to the prevalence of hot westerly winds and lack of cooling sea breezes.
- Western Sydney is urbanising rapidly, with an associated increase in hard surfaces and decrease in vegetation cover.
- This has the potential to exacerbate the urban heat island effect and worsen the local impacts of heat.

Sydney's District Plans establish three key priorities related to urban heat (Greater Sydney Commission, 2018 b, c):

- Adapting to the impacts of urban and natural hazards and climate change
- Reducing carbon emissions and managing energy, water and waste efficiently
- Increasing urban tree canopy cover and delivering Green Grid connections.

WSROC's "Turn Down the Heat Strategy" (2018) includes an action to develop "Land use and design controls that prioritise resilience". This action includes three steps:

- Develop a heat related State Environmental Planning Policy (SEPP), or modify the BASIX SEPP to address urban heat.
- Add consistent clauses outlining urban heat standards to local Development Control Plans (DCP) and Local Environment Plans (LEP).
- A systematic change to building codes and specifications to promote development that addresses and minimises UHI effects.

Urban heat has multiple interconnected impacts, including impacts on human health, urban infrastructure, the environment and the economy.



#### 6%

Higher heat-related mortality risks for residents living in warm neighbourhoods



#### Unmeasured

Impacts on flora and fauna. Mass deaths of flying foxes are one indicator of the scale of this impact



#### 100%

Increase in peak electricity demand when temperatures increase from 20°C to 40°C



#### \$6.9 billion

In lost productivity due to heat stress, annually Australia wide

A problem like urban heat can't be eliminated; we need to take a **resilience approach**, responding with strategies that minimise the impacts of intense shocks such as heatwaves and the ongoing stress of frequent hot and very hot weather.

Heatwaves will become more frequent and intense as our climate changes. Therefore, we need to improve the city's resilience to urban heat. A resilience approach involves not only reducing urban heat, but also helping people adapt, and being prepared to respond in extreme events. It also involves recovery after such events.

This toolkit is part of a suite of projects being delivered by WSROC to improve Western Sydney's resilience to urban heat. All of these follow the same resilience framework, which is shown on the right.

This toolkit focuses on strategies that can be implemented in new development and redevelopment, to reduce urban heat and help people adapt.

This toolkit has built on the resilience framework to include more detail on the steps where planning and design are most relevant. The diagram below expands on Steps 2 and 3 ("reduce" and "adapt"), with adaptation broken down into two main objectives: enabling people to thrive in a warmer climate; and helping people survive heatwaves. The toolkit identifies seven ways to tackle these objectives (below right).





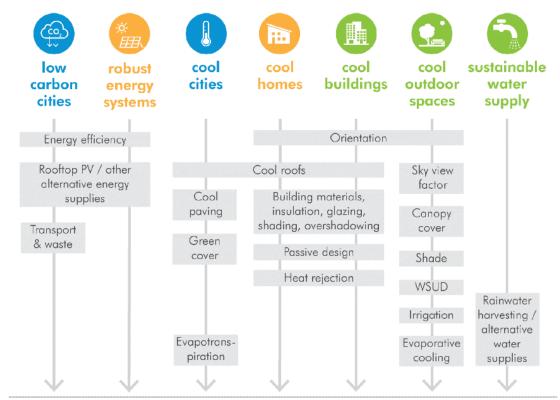
**Local planning provisions** are important mechanisms to influence built environment outcomes, and improved controls have the potential to reduce the impacts of urban heat. But this is also a new and complex space.

Key challenges are:

- Local planning provisions have a limited role a significant proportion of development bypasses local provisions, utilising other approval pathways.
- Key aspects of building design are regulated by national codes and state regulations, which prevail over any local provisions, but are not doing enough to address urban heat.
- Urban heat is an issue that cuts across many aspects of urban planning and design, and therefore provisions to address urban heat also need to balance multiple other objectives.

This toolkit identifies various design measures to reduce the impacts of urban heat, identifying how each measure works, summarising key evidence and noting limitations. Several case studies are included. The toolkit also identifies how to include these measures in local planning provisions. Three broad types of recommendations are made:

- New LEP and DCP provisions. To raise the prominence of urban heat in LEPs and DCPs, it is recommended that specific urban heat provisions should be included. The recommended provisions include cool roof targets, which address an issue not covered elsewhere in existing planning provisions.
- Improvements to existing provisions. Where LEP and DCP provisions need to meet multiple objectives including addressing heat, it is more appropriate to build on existing provisions. Recommendations are made to improve many existing provisions including landscape, tree and Water Sensitive Urban Design (WSUD) provisions.
- BASIX governs energy efficiency and thermal performance for residential development. The toolkit provides a strong case for including consideration of cooling initiatives in the BASIX tool.



The toolkit recommends new and updated local planning provisions for consideration by councils. It identifies that local provisions can play a key role in creating cool cities and cool outdoor spaces, and a supporting role to many other objectives.

**Key role** for local provisions:



#### cool cities



cool outdoor spaces

When it comes to a **cool city** and cool **outdoor spaces**, local planning provisions can be improved in three key areas:

- Local provisions can include new standards for building materials, to reduce their contribution to urban heat. This toolkit identifies cool roof provisions as a high priority, as this could be a straightforward addition. A cool roof standard can be readily defined, appropriate materials are already available that meet this standard, and there are few competing considerations.
- Local provisions for landscaped areas can be improved to better address urban heat. There is tension here with competing objectives, but potential to refine and strengthen existing provisions for total landscaped area, deep soils and trees. This toolkit makes a number of recommendations, including example provisions.
- 3. Local provisions for water sensitive urban design can be improved to include a greater emphasis on reducing runoff and retaining water in the landscape. This should include harvesting rainwater and stormwater as a sustainable supply for irrigation, filtering and storing runoff in vegetated stormwater treatment systems, and encouraging infiltration where appropriate.

New provisions could also be added on a few specific topics including shade, building façades, heat rejection from cooling systems, green roofs and green walls.

**Limited role** for local provisions - other mechanisms are needed:



#### cool homes

This toolkit identifies **cool homes** as a crucial element in addressing the impacts of urban heat, as cool homes enable people to survive heatwaves. But thermal comfort in homes is covered by the BASIX SEPP, and this would prevail over any competing local provisions.

Supporting role for local provisions:



low carbon cities



robust energy systems



sustainable water supplies



cool buildings

In other aspects of urban heat, local planning provisions need to play more of a supporting role:

- Local planning provisions can support low carbon cities and robust energy systems, but the most important strategies to reduce the city's carbon emissions and improve the reliability of the grid need to be driven from a higher strategic level for example in regional energy, transport and waste strategies. Local planning provisions can support these strategies but can't drive significant change on their own.
- Similarly, large-scale sustainable water supplies (stormwater harvesting, wastewater recycling) need higher-level strategic planning. Local planning provisions can encourage the use of rainwater tanks (at least for non-residential development) or can play a supporting role by establishing requirements for dual reticulation in new development.
- There are also other important aspects of urban heat mitigation (e.g. orientation, sky view factor) that are more important to consider at a larger scale or more strategic level, e.g. at precinct planning

The only real avenue to improve the thermal performance of Western Sydney homes is to improve the standards in BASIX. BASIX also covers energy efficiency and alternative water supplies in residential development, restricting any role for local planning provisions in these areas. However, local planning provisions can cover these aspects of non-residential buildings.

# PART 1: THE CHALLENGE OF URBAN HEAT IN WESTERN SYDNEY

Urban heat is a significant and growing issue for Western Sydney. The region will develop significantly over coming years, with the potential to exacerbate the urban heat island effect and worsen the local impacts of heat.

Urban heat has been identified as an important issue by the Greater Sydney Commission, and WSROC is tackling urban heat on multiple fronts. Planning and design has been identified as one important area for improvement.

Local planning controls are important mechanisms to influence built environment outcomes, and improved controls have the potential to reduce the impacts of urban heat. But this is also a complex space planning and design of new development is governed by many different regulatory instruments, policies, plans and codes, from national to local level, and urban heat is an issue that cuts across many different aspects of urban planning and design.

## 1 URBAN HEAT IN WESTERN SYDNEY

### 1.1 SYDNEY IS HOT AND GETTING HOTTER

Western Sydney experiences hot temperatures in summer. NSW Office of Environment and Heritage (2014) and the Greater Sydney Commission (2018a) have both defined "hot days" as those where the temperature reaches above 35°C, and the Greater Sydney Commission (2018a) has recommended the number of hot days as a performance measure for addressing urban heat.

A changing climate is increasing temperatures globally, although the effects are not evenly distributed. The former NSW Office of Environment and Heritage (OEH, 2014) has presented a snapshot of the expected temperature changes in Sydney:

 In the period from 2020-2039, maximum temperatures are projected to increase by 0.3-1.0°C, while minimum temperatures are projected to increase by 0.4-0.8°C.  By 2070, maximum temperatures are project to increase by 1.6-2.5°C and minimum temperatures by 1.4-2.5°C.

These increasing temperatures are contributing to an increasing number of hot days and record temperature events in Sydney. Heatwaves (periods of three or more consecutive days of high maximum and minimum temperatures which are unusual for that location) are becoming more frequent, longer and hotter.

Figure 1 illustrates how a relatively small increase in average ambient temperatures (from "previous climate" to "new climate") can lead to a surprisingly large effect on the number of hot days and record hot days. At the extreme end of the temperature range, the effects are pronounced.

Addressing climate change is therefore an important aspect to minimise the impacts of urban heat.

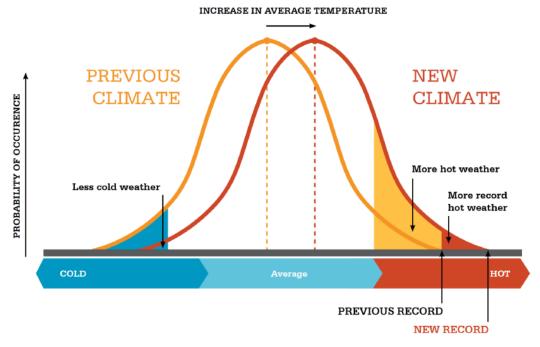


Figure 1: Relationship between temperature averages and extremes, showing the potential role for urban cooling strategies (Climate Council 2013)

### 1.2 WESTERN SYDNEY IS PARTICULARLY EXPOSED TO HEAT

Analysis of temperature records by the Climate Commission (2012) has shown that as the climate changes, Western Sydney is experiencing a greater increase in temperatures and number of hot days, compared to the city's east. There are several factors involved.

# Geography and weather patterns intensify the UHI effect in the west

The urban heat island (UHI) effect means that the average ambient temperature in cities tends to be hotter than surrounding non-urban areas. Urban heat islands occur because buildings and paved surfaces absorb, store and re-radiate heat from the sun back to the environment. In an urban environment, less vegetation cover and less water retained in the landscape also reduces evapotranspiration, which is a key process for removing heat from the environment. Waste heat from transport and (paradoxically) air conditioning also contributes to additional heat in urban areas.

Santamouris et al (2020, 2017a) investigated the magnitude and characteristics of the UHI effect in Sydney, finding that the temperature differences between urbanised Western Sydney and surrounding rural zones can range between 6-10°C. Importantly, the researchers also found that the UHI effect is non-uniform across the city, and its intensity is strongly

influenced by weather conditions; in particular hot westerly winds and cooling sea breezes. Being more frequently exposed to hot westerly winds and less frequently cooled by sea breezes, a high magnitude, positive UHI effect was more common in Western Sydney than in the city's east.

### <u>Urbanisation is having a more significant</u> <u>effect in Sydney's West</u>

Increasing urban development will also increase heat in Western Sydney over the coming decades. While the city's east will also see significant urban development, most of this is densification of existing urban areas. Western Sydney will also see large areas of woodland and grassland converted to urban development, with a greater effect on temperatures. Adams et al (2015, p.24) found that "[the] converting of areas in the northwest and south-west of Sydney from forest and grasslands to new urban development more than doubles the temperature changes already projected to occur as a result of climate change."

Figure 2 shows the expected change in the annual number of hot days (with temperatures above 35°C) in the period 2020-2039. The Western Sydney region is projected to experience an additional 5-10 hot days per year in the 2020-2039 period. This increases to 10-20 more hot days per year by 2079 (NSW OEH 2014).

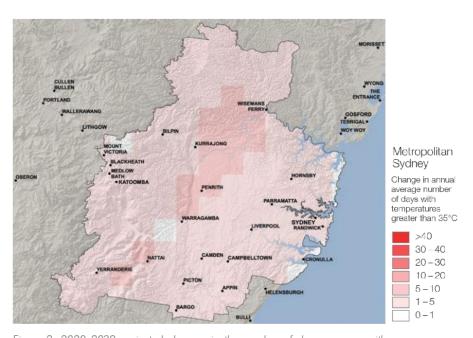


Figure 2: 2020–2039 projected changes in the number of days per year with maximum temperatures above  $35^{\circ}$ C (NSW OEH, 2014)

### There is local variability within Western Sydney

"Benchmarking Heat" studies undertaken in 2019 for the City of Parramatta, Cumberland and Campbelltown City Councils (Pfautsch and Rouillard 2019a, b, c) also showed the variability in heat across these LGAs. The benchmarking studies revealed significant temporal and spatial temperature variations between different parts of each LGA. Importantly, they found that at some locations, the number of days where air temperature reached above 35°C was much greater than others:

- In Parramatta LGA, some locations experienced temperatures greater than 35°C on 47 days during the study period, compared to 10-25 days at local BoM weather stations.
- In Cumberland LGA, suburbs in the west of the LGA experienced four times the number of days where temperatures exceeded 35°C (41 days during the study period) compared to the area around Sydney Olympic Park (10 days).
- In Campbelltown LGA, the official BoM weather station on the western edge of the LGA (Mt Annan) recorded temperatures above 35°C on 23 days, while 3 km to the east near Campbelltown Station, such temperatures were measured on 39 days during the study period.

The Benchmarking Heat studies also show evidence of significant heat variability at a smaller scale. In the Parramatta LGA, the study investigated temperature differences between different streets, including two streets in North Parramatta only 1 km apart but with different physical characteristics:

Daking Street, with an estimated 10.6% canopy

Galloway Street, with an estimated 30.5% canopy

The study found that the absolute difference in air temperature between the two streets at the same time of day can be up to  $8^{\circ}\text{C}$ , and the biggest differences occur on the hottest days, when temperatures are at their peak. Figure 3 shows air temperatures at the two streets over a five-day period during a hot spell. This shows that during this hot spell, Daking Street not only experienced higher peak temperatures, but also experienced more hot days, and high temperatures for a longer period each day.

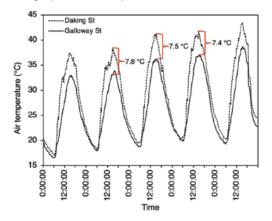


Figure 3: Air temperatures at Daking St and Galloway St during a hot spell, 25-29 December 2018 (Pfausch and Rouillard 2019a)

### 1.3 URBAN HEAT HAS MULTIPLE INTERCONNECTED IMPACTS

Urban heat causes major liveability and resilience problems in cities, with critical impacts for human health, infrastructure, emergency services, the natural environment and the economy. While there is a general trend of overall warming, it is the related but more episodic issue of longer, more frequent and more intense heatwaves that has the most significant impacts:

- Heat-related deaths: Heatwaves kill more Australians than any other natural disaster (Zander et al 2015). Living in warm neighbourhoods increases the heat-related mortality risks of residents by nearly 6% compared to those living in cooler suburbs, and older people are particularly vulnerable (Santamouris 2020, Schinasi et al. 2018). A 2011 heatwave in Western Sydney caused a 13% increase in mortality (Schaffer et al 2011).
- <u>Chronic human health impacts</u>: Urban heat causes a dramatic reduction in the amenity of the urban environment. Outdoor spaces become unusable, with impacts on health and wellbeing. These impacts are harder to quantify.
- Impacts on urban infrastructure: During heatwaves, demands for energy, water and health infrastructure are high, sometimes pushing these systems to their

limits. Peak electricity demand increases by almost 100% when temperatures rise from 20 to 40°C (Santamouris et al, 2017b). During heatwaves, extreme heat also puts physical stress on electricity infrastructure. Power outages therefore become more likely. This in turn affects other urban systems connected to the electricity grid, for example trains and traffic lights. QUT (2010) also found other significant impacts on transport infrastructure, including buckling of rail tracks and air conditioning failure in buses and trains.

- Environmental impacts: Heatwaves put flora and fauna under stress. Heatwaves can lead to mass deaths of sensitive species such as flying foxes and birds (Steffen et al 2014). Between 1994-2008, more than 30,000 flying foxes have died in heatwaves at sites along the east coast of Australia, with sometimes thousands dying in single events (Welbergen et al 2008). In the Sydney region, greyheaded flying foxes rely on urban habitat and are vulnerable to urban heat.
- Productivity impacts: Zander et al (2015) estimated Australia's annual lost productivity due to heat stress at work at \$6.9 billion.

### IMPACTS OF HEAT



### 6%

Higher heat-related mortality risks for residents living in warm neighbourhoods



### Unmeasured

Impacts on flora and fauna. Mass deaths of flying foxes are one indicator of the scale of this impact



### 100%

Increase in peak electricity demand when temperatures increase from 20°C to 40°C



### \$6.9 billion

In lost productivity due to heat stress, annually Australia wide

Figure 4: Heatwave impacts (modified based on WSROC 2018, p. 15)

## 2 ADDRESSING HEAT IN WESTERN SYDNEY

### 2.1 SYDNEY'S PLACE-BASED STRATEGIC PLANS

### Greater Sydney Region Plan

The Greater Sydney Region Plan (Greater Sydney Commission 2018a) sets the direction for Sydney's growth to 2056, showing how the city will accommodate growth within a liveability, productivity and sustainability framework. It establishes the objective that "heatwaves and extreme heat are managed", and includes Strategy 38.1: "Mitigate the urban heat island effect and reduce vulnerability to extreme heat". It notes:

- Particular exposure of the Western Parkland City to heat
- That climate change will increase urban heat
- Health aspects of urban heat
- The role of heat in placing pressure on infrastructure
   particularly the electricity network
- Impacts of heat on liveability

### District Plans

Below the Greater Sydney Region Plan, the city is divided into five districts. District Plans have been prepared for each of these districts. The District Plans (Greater Sydney Commission, 2018b,c,d,e,f) each include three Directions relevant to urban heat, which are listed in Table 1, along with the priorities and objectives relevant to urban heat. These provide a basis in the planning system to implement local planning provisions and development controls related to urban heat.

### Local Strategic Planning Statements

Local Strategic Planning Statements (LSPSs), newly adopted by each NSW council in 2020, give effect to regional and district plans, and inform local planning. An LSPS sets out the 20-year vision for a local government area, demonstrates how change will be managed and identifies local priorities for updating council Local Environmental Plans (LEPs). The LSPSs of Central and Western Sydney councils therefore pick up on the directions, priorities and objectives shown in Table 1, giving them local expression.

The LSPSs of WSROC's eight member councils were reviewed to understand how urban heat has been included in these documents. WSROC's members are diverse and heat is more of an issue to some than to others — in general, it is more relevant to those within the Sydney Metropolitan Area.

Table 1: Directions, priorities and actions in the District Plans, relevant to urban heat (Greater Sydney Commission, 2018b,c,d,e,f)

Directions	Relevant priorities	Relevant objectives	Relevant actions
A resilient city	Adapting to the impacts of urban and natural hazards and climate change	People and places adapt to climate change and future shocks and stresses Exposure to natural and urban hazards is reduced Heatwaves and extreme heat are managed	Support initiatives that respond to the impacts of climate change.  Avoid locating new urban development in areas exposed to natural and urban hazards and consider options to limit the intensification of development in existing urban areas most exposed to hazards.  Mitigate the urban heat island effect and reduce vulnerability to extreme heat.
An efficient city	Reducing carbon emissions and managing energy, water and waste efficiently	A low-carbon city contributes to net-zero emissions by 2050 and mitigates climate change Energy and water flows are captured, used and re-used	Support initiatives that contribute to the aspirational objective of achieving net-zero emissions by 2050, especially through the establishment of low-carbon precincts in Growth Areas, Planned Precincts, Collaboration Areas, State Significant Precincts and Urban Transformation projects.
A city in its landscape	Increasing urban tree canopy cover and delivering Green Grid connections	Urban tree canopy cover is increased	Expand urban tree canopy in the public realm.

### Urban Heat Planning WSROC Urban Heat Toolkit

The LSPSs of all metropolitan councils identify the issue of urban heat, its relevance to the local area, and include relevant planning priorities:

- All include a planning priority related to improving resilience and/or adaptation to natural hazards.
- Most include a priority related to resource efficiency, typically putting this in the context of climate change/sustainability.
- Most include a priority related to green infrastructure, and some include the concept of canopy cover. Only one of WSROC's member councils has set a tree canopy cover target in its LSPS, although several have discussed the challenge of increasing tree canopy cover from a relatively low baseline, and have included actions to begin increasing canopy cover.
- Four councils include a specific action to update planning controls to better address urban heat.

### 2.2 WESTERN SYDNEY'S TURN DOWN THE HEAT STRATEGY

The Western Sydney Regional Organisation of Councils (WSROC) are leading an initiative called "Turn Down the Heat" that takes a collaborative, multi-sector approach to tackling urban heat in Western Sydney, and focuses on achievable actions to reduce the impacts of heat

The Tum Down the Heat Strategy was launched in December 2018. Developed with the input of 55 different organisations, the Strategy lays out a five-year plan for a cooler, more liveable and resilient future. The Strategy aims to:

- Identify and leverage existing best practice to develop a program of effective actions at the household, precinct and regional levels;
- Acknowledge the limitations of the current policy framework with regard to urban heat to galvanise action across diverse stakeholders; and
- 3. Propose a series of priority actions for development with a broader stakeholder group.

The Strategy includes four targets and five strategic drivers, shown below.

The Turn Down the Heat Strategy (WSROC 2018, p.48) identifies that "managing the way that the built environment... contributes to urban heat will be imperative to making any substantial progress in lowering temperatures in Western Sydney". One of five strategic drivers is to "design and plan to cool the built environment", and one of the actions under this driver is "Land use and design controls that prioritise resilience". This action includes three steps:

- Develop a heat related State Environmental Planning Policy (SEPP), or modify the BASIX SEPP to address urban heat;
- Add consistent clauses outlining urban heat standards to local Development Control Plans (DCP) and Local Environment Plans (LEP); and
- A systematic change to building codes and specifications to promote development that addresses and minimises urban heat island effects.

### TURN DOWN THE HEAT TARGETS

- 1. Increase multi-sectoral collaboration and investment to deliver more projects to address the impacts of urban heat in Western Sydney by 2023.
- Reduce the average peak ambient temperatures in Western Sydney by 1.5°C through water, greening and cool materials strategies by 2023.
- **3.** Zero net increase in economic impacts of heatwaves by 2023.
- **4.** Zero net increase in morbidity and mortality impacts of heatwaves in Western Sydney by 2023.

### TURN DOWN THE HEAT STRATEGIC DRIVERS



Take action together



Design and plan to cool the built environment



Innovative and responsive infrastructure



Cool with green space and water



Build a community that is healthy and prepared

### 2.3 RESILIENT SYDNEY

Urban heat places both acute shocks and chronic stresses on people, urban infrastructure and the environment. Heatwaves and extreme heat take the form of an acute shock, while an increasing number of hot days is more of a chronic stress. Furthermore, while we can take action to reduce heat, and reduce the frequency of hot days, these shocks and stresses will still occur. A resilient Western Sydney would be better equipped to cope with the impacts of urban heat.

Resilience is a theme that comes through in the Turn Down the Heat Strategy (WSROC 2018), where Action 4 is "Land use and design controls that prioritise resilience". The Greater Sydney Region Plan (Greater Sydney Commission 2018) also includes a strong resilience theme, with one of the directions for sustainability being "A resilient city".

Resilient Sydney brought together 33 Sydney councils, several state agencies and other groups to develop a strategy for Sydney's resilience (Resilient Sydney 2018). The Resilient Sydney Strategy (2018) defines city resilience as:

### City resilience

"the capacity of individuals, communities, businesses and systems within a city to **survive**, **adapt and thrive** no matter what kinds of chronic stresses and acute shocks they experience"

In terms of urban heat, in a resilient city:

- Individuals would have greater capacity to survive heatwaves, and heat-related mortality would be reduced.
- The community, businesses and systems would have the capacity to adapt in heatwave conditions, so that social and economic disruption from urban heat would be minimised.
- Liveability would be maintained, allowing people to thrive in a warmer climate. Heat-related morbidity would be reduced.

This provides the starting point for the resilience framework that has been used in this toolkit to consider built environment strategies to respond to urban heat. It suggests different approaches to tackle different impacts of urban heat:

 To help people survive heatwaves, it is important to consider those most vulnerable to heat stress – those who are old, very young or have underlying health conditions. A crucial objective should be to improve the performance of homes in heatwaves, including making air conditioning available and affordable to use, reducing the risk of disruption to the electricity supply, and improving the "passive thermal performance" of homes, so that conditions remain survivable for longer, even when air conditioning fails.

 To help people adapt and thrive, the response also needs to consider how to enable people to continue moving around the city and undertaking activities such as working, shopping, social interaction and outdoor recreation. The objectives should broaden to improving thermal comfort in workplaces, public places and the outdoor environment.

Resilient Sydney (2018) also identifies seven guiding principles for resilience, which are listed below. These principles have also been considered in weighing up the options to modify planning provisions and development controls.

Resilience principles (Resilient Sydney 2018, p. 31)

# The resilience lens – 7 guiding principles

The resilience lens provides guiding principles at each phase to direct effective research, consultation, planning and action.

The lens helped us to:

- Approach the challenge in an integrated and holistic way that crosses silos, using the City Resilience Framework
- Consider impacts of multiple shocks and stresses identified through a broad risk and hazard assessment
- · Aim for short, medium and long-term benefits
- Consider resilience behaviours and qualities when proposing solutions
- Strive for equitable outcomes
- Leverage actions across a broad group of stakeholders
- Consider cross-jurisdictional implications at intercity, regional, national, global levels.

## 3 PLANNING AND DESIGN CHALLENGES

### 3.1 LOCAL PLANNING PROVISIONS HAVE A LIMITED ROLE

Local councils in Western Sydney understand the significance of urban heat to the region, and are taking steps to address its impacts. For example:

- Several councils have recently undertaken studies to better understand the distribution of heat and of vulnerable residents across the LGA (e.g. Pfautsch and Rouillard 2019a, b, c).
- Councils are looking at ways to reduce heat in the public domain, such as planting more trees and changing road surfaces.
- Councils are helping the community prepare and respond to heatwaves (e.g. the Cool Parramatta website is a good example).

Councils can also play an important role in improving the urban heat outcomes in new development, via local planning provisions and development controls. There are three key plans that each council prepares:

- The Local Strategic Planning Statement (LSPS), discussed in Section 2.1. LSPSs establish the policy basis for provisions in the LEP and DCP.
- The Local Environment Plan (LEP) is intended to implement the strategies and planning priorities described in the Local Strategic Planning Statements. LEPs establish land use zoning across local government areas, as well as including local provisions to provide a framework of controls and guidelines for development.
- The Development Control Plan (DCP) provides detailed planning and design guidance to support planning controls in LEPs. DCPs include a mix of specific controls and general guidance.

As noted in Section 2.1 above, several Western Sydney councils have included a specific action in their LSPS to update planning controls to better address urban heat.

Improved local provisions can help ensure that urban heat is considered in the design of new development and that each development meets the most appropriate design standards, however it is also important to note the limitations of local provisions. Many developments bypass these provisions with other approval pathways (e.g. exempt, complying and state-significant development) and there are also other planning instruments (e.g. BASIX) that prevail over certain local provisions. These limitations are discussed below.

### Exempt and complying development

The State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (The Codes SEPP) enables some development to be undertaken without development consent, as exempt or complying development. The NSW Housing Code, within the Codes SEPP, enables new residential dwellings, including several types of attached dwellings, to proceed as complying development, providing that they meet various basic minimum design standards.

One of the key features of the Housing Code is that it defines minimum landscaped areas for new residential development, allowing as little as 20% of a 600 sqm lot and 10% of a 300 sqm lot to be landscaped area. This is less than most council DCPs require, and puts a limit on the potential for green infrastructure to play a role in the private domain.

An increasing proportion of development in NSW is complying development, as shown in Figure 5. In Western Sydney, the proportion is even higher – in Camden, Campbelltown, Liverpool and Penrith LGAs in the 2018 financial year, the proportion was more than 50% (based on data from the Local Development Performance Monitoring Report, DPIE 2020).



Figure 5: Number of development applications approved by financial year, showing increasing proportion of Complying Development Certificates (CDCs) and reducing proportion of Development Applications (DAs) (NSW DPIE 2020)

### Site-specific SEPPs for major growth centres

There are site-specific SEPPs in effect for large areas in Western Sydney, including the SEPP (Sydney Region Growth Centres) 2006 and the SEPP (Western Sydney Employment Area) 2009. Another SEPP has been proposed for the Western Sydney Aerotropolis. These are accompanied by site-specific DCPs. While local councils are the consent authority within the Growth Centres and the Employment Area, the relevant SEPPs establish the planning framework in these areas, and the relevant DCPs are developed by the NSW Government.

### Site-specific LEPs and DCPs

Major growth precincts (for example, Wentworth Point Priority Precinct in the Parramatta LGA) also have their own DCPs, which are typically developed in collaboration between the relevant council, the NSW Government and the developer of the precinct.

Individual properties outside growth precincts may also have a site-specific LEP and DCP if the developer negotiates for rezoning.

The draft Aerotropolis DCP (Western Sydney Planning Partnership 2019) includes provisions related to urban heat. These are in the form of simple performance outcome statements, rather than detailed provisions.

### State-significant development

The State and Regional Development SEPP (2011) also provides a pathway for certain development, deemed to have state significance, to bypass local planning provisions. The Minister for Planning or the Independent Planning Commission becomes the consent authority and applies conditions to these developments.

### BASIX

In NSW, the State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004, also known as the BASIX SEPP, sets water efficiency, energy efficiency and indoor thermal performance requirements for residential buildings. The BASIX SEPP also explicitly prevails over any other environmental planning instruments (including LEPs and DCPs) in the case of any inconsistency. This prevents councils from mandating any provisions that relate to indoor thermal comfort, energy efficiency, or water efficiency of residential buildings.

### <u>Apartment Design Guide</u>

SEPP 65 - Design Quality of Residential Apartment Development, and its supporting Apartment Design Guide (NSW Department of Planning and Environment 2015), is also relevant for residential apartment development of three or more storeys and four or more dwellings.

It refers to BASIX requirements for energy efficiency, thermal comfort and water efficiency, but also has an additional requirement for natural cross ventilation (requiring natural cross-ventilation for 60% of apartments in the first nine storeys of a building).

It also includes some design guidance on principles and potential design solutions for passive solar design, natural ventilation and water sensitive urban design, which may encourage better design.

The Apartment Design Guide also includes guidance on some other design parameters relevant to urban heat, such as building separation, setbacks and orientation. It also includes a minimum design standard for deep soil zones (7% of the site area, with some additional requirements for minimum dimensions).

Unlike BASIX, SEPP 65 also leaves some scope for local DCP provisions to set different criteria on certain topics. Clause 6A(1) lists nine topics where local DCPs cannot be inconsistent with the guide, but leaves other topics

### Proposed Design and Place SEPP

The NSW Government is currently developing a new SEPP, "Design and Place", building on the Greener Places Framework (NSW Government Architect 2020a) and Draft Design Guide (ibid, 2020b). At this stage the proposed coverage and content of the Design and Place SEPP is largely unknown, but there is potential for significant overlap with topics related to urban heat, such as green cover and tree canopy. A Statement of Intended Effects is due for release in early 2021.

A draft version of this urban heat toolkit has been provided to staff from various sections of the Department of Planning, Industry and Environment (DPIE), including the team developing the Design and Place SEPP. This has been done both to inform their work and to seek their feedback on the toolkit.

### 3.2 CURRENT BUILDING CODES DO NOT ADDRESS URBAN HEAT

Building safety, health, amenity, and energy efficiency standards are set across Australia by the National Construction Code (NCC). Maintained by the Australian Building Code Board (ABCB), the requirements of the NCC apply to all new buildings, additions, and major renovations. The code recognises and sets specific requirements for four separate residential building types and six non-residential building types (NCC Building Classifications 1-10).

Within the NCC, Section J: Energy Efficiency, establishes the requirements for energy efficiency and ventilation. For non-residential buildings and hotels, Section J directly governs efficiency, ventilation, and comfort requirements. For residential buildings and homes, energy and thermal performance is governed through two sub-codes, BASIX for NSW and the National House Energy Rating Scheme (NatHERS) for all other states and territories. This is illustrated in Figure 6.

For non-residential structures (e.g. offices, cultural and industrial buildings), the recent 2019 NCC update included changes that indirectly improve urban heat outcomes for buildings. Notably, the update substantially increased the passive conditioning requirements for building envelopes (roof, walls, windows) that will help keep building interiors at safer temperatures during heatwaves. These passive design requirements for non-residential buildings are now relatively stringent compared to other international building codes and standards (such as ASHRAE 90.1 Standard for Energy Use in Buildings in the US, or Part L building regulations in the UK).

For residential buildings outside NSW, the NCC requires each State or Territory to set an energy efficiency requirement using NatHERS, which awards buildings a

rating of up to ten stars based on decreasing home heating and cooling energy use (a 10-star home using no purchased energy for heating/ or cooling, while maintaining comfortable conditions). Each state or territory sets its own NatHERS star rating; most states currently require new free-standing houses to achieve a 6-star rating (the Northern Territory requires only a 5-star rating). This system allows states to increase energy code stringency over time without changing the baseline measurement system.

For residential buildings within NSW, the energy efficiency requirement is set in BASIX, which rates home or unit energy use on a percentage reduction relative to a baseline building of the same type. However the energy efficiency standards in BASIX have not been increased regularly or substantially over its years in effect. Relative to international building standards like ASHRAE and Part L as of 2020, BASIX is substantially less stringent (Pitt & Sherry, p. 157).

Unlike NatHERS, BASIX also regulates aspects of thermal comfort inside homes (and water used across a residential property). However, there are significant limitations to the thermal comfort requirements in BASIX and NatHERS:

 There is no recognition of thermal safety or thermal autonomy as a fundamental objective of compliance. The NCC and its residential subcodes all conflate efficient energy use with thermal comfort outcomes. Thermal safety within buildings, let alone during heatwaves, is not identified in any of the codes as a guiding principle or critical outcome.

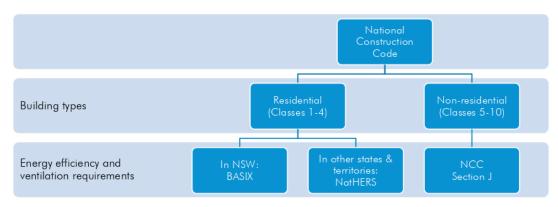


Figure 6: Energy efficiency and ventilation requirements for Australian buildings are defined by different codes depending on the building type and the state/territory

- There is an assumption that all buildings have (well-functioning) heating and cooling systems, so all references to maintaining safe indoor temperatures are related to the energy used by air conditioning or heating systems.
- Peak design conditions (outdoor temperatures) and weather data are out of date and do not reflect the severity nor the frequency of heatwaves experienced now, especially in environments like Western Sydney, which are particularly exposed to heat.
- There is no recognition of a building's contribution to urban heat island effects, so there are no measures to limit a building's absorption of solar radiation and re-emittance as heat, or to limit building mass heat retention.

There is also evidence to indicate that BASIX-compliant homes are both:

- Achieving a lower average NatHERS star rating for heating and cooling energy efficiency, compared to homes in other Australian states.
- In terms of actual post-occupancy performance, many homes are falling short of the standards reported in their BASIX certificates.

On the first point, CSIRO data tracking the NatHERS scores for single-family homes newly built between July 2017 and June 2020 shows this gap in reported NatHERS ratings (Figure 7, Figure 8):

- Outside NSW during this period, new homes averaged a 6.3 Star NatHERS rating, with 90% of homes achieving 6 stars or higher.
- Within NSW during the same period, new homes averaged only a 5.8 NatHERS rating, and 49% of new homes achieved less than a 6 star rating.

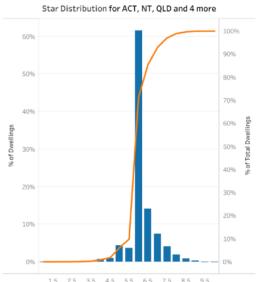


Figure 7: Average NatHERS star rating of residential dwellings certified between July 2017 and June 2020 outside of NSW (CSIRO 2020)

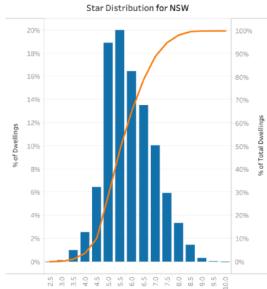


Figure 8: Average NatHERS star rating of residential dwellings with BASIX certificates issued between July 2017 and June 2020 within NSW (CSIRO 2020)

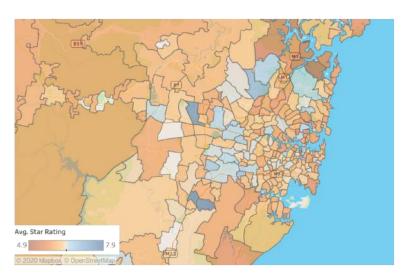


Figure 9: Average NatHERS star rating of residential dwellings built between July 2017 and June 2020 across Sydney (CSIRO 2020)

This means that houses or apartment units in NSW, including in Western Sydney, will typically get hotter, faster, than they would if built to the standards of other Australian states, let alone more stringent international residential building standards.

Because the BASIX SEPP prevails over any competing environmental planning instruments, local councils have little recourse to address urban heat challenges related to thermal comfort within residential buildings, or energy and or water used by buildings to stay cool. The NSW Government has suggested a potential review of BASIX targets as part of the Design and Place SEPP. It is unclear how extensive this review may be, but councils should advocate for substantial improvements to address urban heat and address the shortfalls outlined above.

On the second point above, post-construction monitoring has shown that BASIX-compliant homes are

not reliably thermally comfortable, despite the code's intention to deliver comfortable indoor conditions. This partly results from the BASIX assessment method (Lee, 2007), which doesn't directly calculate comfort, instead it calculates peak heating and cooling energy demands as a proxy for comfort. Furthermore, there is evidence that BASIX substantially underestimates average energy requirements for cooling, particularly in Western Sydney (Ding et al 2019). The same study found that in the homes with high cooling energy use, poor design and build quality were key issues. These poorly performing homes may be failing to achieve thermal comfort or thermal safety. This indicates a potential gap at the compliance stage. compliance gap is something that councils can potentially improve, noting that there are also limitations to councils' role at the compliance stage, including the widespread use of private certifiers.

### 3.3 URBAN HEAT IS INSEPARABLE FROM OTHER PLANNING ISSUES

Urban heat is inextricably interwoven with multiple other issues in urban development. Every building, paved surface and landscaped area plays a role in regulating heat in the urban environment. Buildings both contribute to the UHI effect and function to shelter people during heatwaves. Urban landscapes can make positive or negative contributions to urban heat and its impacts.

These elements of the built environment also play multiple other important roles, and therefore need to be designed to meet multiple objectives. Rather than urban heat being a separate consideration in urban development, that can be addressed with its own set of solutions, it needs to be seen as one of multiple interconnected considerations, that need to be addressed with an integrated design approach.

Local planning documents (LEPs and DCPs) already include multiple provisions with relevance to urban heat, including:

- Landscape provisions, including minimum landscaped areas for different types of development, requirements for landscaped setbacks, and minimum deep soil areas for certain development types.
- Tree provisions, including tree preservation requirements as well as provisions to replace or plant new trees in certain circumstances.
- Provisions for water sensitive urban design (WSUD), which typically include stormwater quality improvement targets, and encourage the use of green infrastructure to meet those targets.
- Provisions for energy and water efficiency and alternative energy and water supplies in nonresidential buildings.

These provisions have generally been written without considering urban heat mitigation as a specific

objective, but each of them has the potential for strong alignment with urban heat mitigation objectives, and could be modified to strengthen the outcomes from an urban heat perspective. For example, tree provisions could be modified to focus more on canopy cover as a key outcome.

A greater challenge is that each of these planning provisions has also been written to strike a balance with other competing objectives, for example housing affordability and life cycle costs. Green infrastructure is a good example. Integrating more green infrastructure into the urban environment would have multiple benefits, including urban heat mitigation, but it is in tension with other objectives:

- Green infrastructure can be seen as competing for space with other land uses. The trend in residential development has been a shift towards increasing density. This assists with keeping housing affordable, but in practice often leaves less space for green infrastructure. Figure 10 shows an example of recent development in Schofields.
- Streetscapes need to accommodate multiple elements including underground services as well as the roadway, footpaths and driveways. Trees are often seen as an essential element in streetscapes, but they are allocated limited space, which limits their potential size.
- Whether green infrastructure is located in the public or the private domain, long-term maintenance is a challenge. Green roofs and walls may overcome the issue of competition for space (although they don't provide the same outcomes as trees), but they have significant maintenance requirements, which few land managers are prepared to take on. Even when it comes to simpler forms of green infrastructure, many land managers (public and private) lack capacity for effective maintenance.



Figure 10: Recent development at Ludhiana Glade, Schofields (image: NearMap 2020)

# PART 2: PLANNING AND DESIGN APPROACHES TO ADDRESS URBAN HEAT

We can take action to reduce urban heat, but heatwaves will still occur, and will become more intense as our climate changes. Therefore, we also need to take action to improve the city's resilience to urban heat. This means designing our urban environment to equip its residents to survive heatwaves, and to thrive in hotter conditions.

# **4 RESILIENCE APPROACH**

The concept of resilience was discussed in Section 2.3. WSROC has developed a resilience framework for urban heat, which includes four steps, as shown in Figure 11:

- Awareness involves assessing the physical conditions in the area, and the vulnerability of residents and urban infrastructure to heat.
- Reduce: this involves reducing average ambient temperatures as much as possible in the design and making of the physical environment.
- 3. Adapt: At most, we can reduce ambient temperatures at the city scale by only approximately 2°C, so it is also important to design to help people survive heatwaves and thrive in hotter conditions. At smaller scales within the urban environment (e.g. within streets, parks, courtyards) it is possible to reduce site-specific temperatures to a much greater degree.
- Respond: There will still be residual heat-related risk in extreme events, and therefore we also need emergency preparedness and response measures, particularly to help the most vulnerable people in the community.

"Recovery" is also often included as a step in a resilience framework. However, the focus of this urban

heat planning toolkit is on measures to **reduce** urban heat and to help people **adapt** to urban heat. It is in these areas that planning and design can play the areatest role.

Climate change is a global issue, and urban cooling measures can only have a limited effect on ambient temperatures at the city scale. The CRC for Low Carbon Living (Osmond and Sharifi 2017) looked at a range of strategies for cooling the urban environment, including cool materials, green infrastructure and evaporative cooling options. The report recommends that all of these strategies have a maximum 2.0°C effect on "precinct scale" air temperatures. Local effects are often greater than 2.0°C, but even if all these strategies are used in combination, their cooling effect is not expected to be more than 2.0°C at the precinct scale.

Given the expected temperature increases associated with climate change, and the magnitude of the UHI effect in Western Sydney, urban cooling strategies can therefore only be expected to partially offset increasing temperatures in the long term. More frequent hot weather and extreme heat will remain a feature in Western Sydney, and therefore other strategies will also be important to help mitigate its impacts.



Figure 11: Urban heat resilience framework

Actions to **reduce** carbon emissions, and reduce the effects of climate change (e.g. reducing energy use and substituting fossil fuel consumption with renewable energy), are relevant to reducing the impacts of urban heat. Under high-emission, extreme climate change scenarios, adaptation alone is not likely to be a realistic strategy. Therefore, adaptation to climate change needs to built on a foundation of climate change mitigation.

Urban planning and design approaches can also reduce the intensity of the urban heat island effect (e.g. using cool materials that reflect heat, and increasing green cover in the urban environment).

To address the remaining impacts of urban heat, adaptation is a crucial area where urban planning and design approaches can have a positive impact.

Given the importance of adaptation, and the potential role of urban planning and design in this area, in this toolkit the "adapt" step has been broken down into two components:

 The first way we can help people adapt to urban heat is to help them thrive in a warmer climate.
 The focus here is on enabling normal economic, social and physical activities to continue in a warmer climate. If people can continue working,

- engaging in social and economic activity, and spending time outdoors for exercise, active transport and recreation, it will help reduce the non-lethal impacts of urban heat.
- The second (and arguably most important) way we can help people adapt to urban heat is to focus on enabling them to survive heatwaves. If vulnerable people can retreat during a heatwave to a safe environment at home, which remains cool and supplied with affordable, reliable power, this will reduce mortality in these extreme events.

These two approaches align with two of the other highlevel targets in the Turn Down the Heat Strategy (WSROC 2018): zero net increase in morbidity and mortality of heatwaves, and zero net increase in economic impacts of heatwaves.

Figure 12 identifies seven ways to address urban heat, aligned with the approaches of reducing urban heat and enabling people to survive heatwaves and thrive in a warmer climate. Section 5 expands on each of these, considering a range of different measures that could be implemented in the planning and design of new development, identifying how they contribute to addressing heat and its impacts and where possible, quantifying their potential effect.

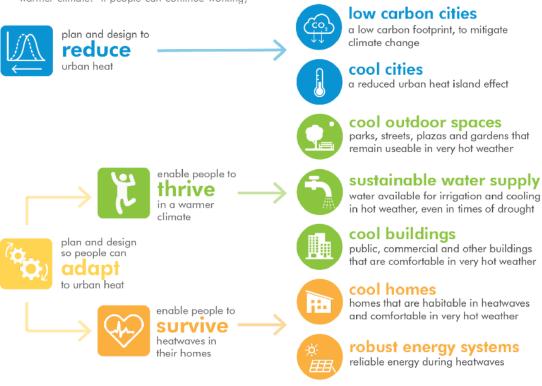


Figure 12: Urban planning and design approaches to reduce urban heat and help people adapt to urban heat

# **5 PLANNING AND DESIGN MEASURES**

Potential planning and design measures for new development, to mitigate urban heat, are shown in Figure 13. Note that in Figure 13 and in the following sections, the concepts of "cool homes" and "cool buildings" refer to the indoor environment. "Cool cities" and "cool outdoor spaces" both refer to the outdoor environment, but at different scales – the city (or large precinct) scale and the microclimate or "human" scale of outdoor spaces that people inhabit.

It is useful to make these distinctions, to distinguish between different outcomes of urban heat mitigation measures. However, there is significant overlap between the physical measures that could be employed to meet each different outcome. For example:

- Cool roofs would contribute to cooling at the city scale, as well as contributing to cooler homes and other buildings.
- Improved energy efficiency and installation of rooftop solar power would help both to reduce the

- carbon footprint of the city, and to create a more robust energy system with greater capacity to meet peak demands and avoid power outages.
- Greater green cover is listed as a "cool city" strategy, but many types of green cover particularly canopy cover and irrigated vegetation can also help create cool outdoor spaces (including private gardens, parks and streetscapes). When trees cast shade onto buildings, they also help cool the building.
- Rainwater harvesting, stormwater harvesting or recycled water systems would enable greater irrigation, including during times of drought. This would help create cooler outdoor spaces as well as contributing to cooling at the city scale. Water features and permeable paving also support evaporative cooling at both 'cool outdoor spaces' and 'cool cities' scale.

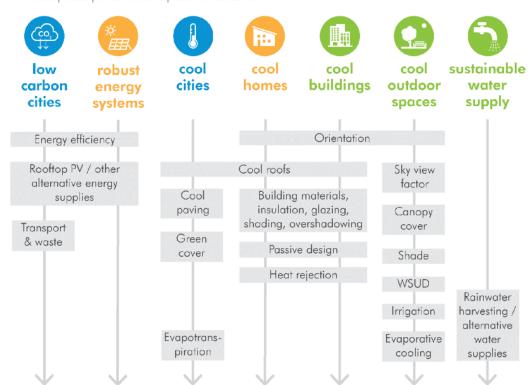


Figure 13: Potential design measures for reducing the impacts of urban heat

### 5.1 LOW CARBON CITIES



Given the role of climate change in increasing urban heat (refer to Section 1.1), measures that reduce carbon emissions are relevant to reducing urban heat.

At the national scale, Australia's carbon emissions are dominated by electricity generation, agriculture and transport, with smaller contributions from industrial fugitive emissions, industrial processes, land clearing and waste.

Figure 14 shows the sources of greenhouse gas emissions across Greater Sydney, showing how emissions are expected to change between 2015 and 2036. Emissions in Sydney are dominated by buildings, accounting for two-thirds of current emissions, and expected to increase their share in the future. Transport is the next biggest category, accounting for approximately 20% of the total. Waste accounts for just over 10% of the total.

Given this picture, some of the key actions which could reduce Sydney's greenhouse gas emissions are:

- Reducing energy use in buildings. Because a large proportion of buildings' energy use is linked to heating and cooling, improved building design for thermal performance (e.g. insulation, natural ventilation) could play an important role here.
- Increasing renewable electricity generation.
   Rooftop solar power can play an important role in urban areas.
- Reducing transport emissions. Reducing private vehicle use and increasing the role of electric vehicles can both play a role here. Local government can encourage these changes by providing infrastructure for active transport and electric vehicles.
- Reducing waste to landfill. There is potential to divert more recyclable and compostable waste from landfill.

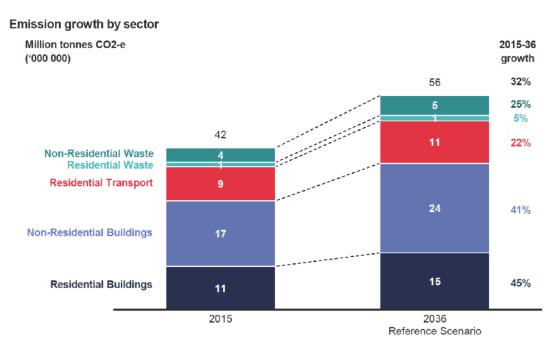


Figure 14: Greater Sydney greenhouse gas emissions by sector, 2015-2036 (Kinesis 2017)

### 5.2 COOL CITIES



The Turn Down the Heat Strategy (WSROC 2018) sets a target to "reduce the average peak ambient temperatures in Western Sydney by 1.5°C through water, greening and

cool materials by 2023". Temperatures can be reduced at a city-scale with strategies that reduce the UHI effect, including:

- The use of cool materials for example roofing, wall and paving materials – with greater reflectance, less capacity to store heat, and (in the case of paving materials) more permeability.
- Increasing green cover and minimising impervious surfaces. Vegetation reduces heat by increasing evapotranspiration and shading adjacent surfaces.
- Using water in the landscape to increase evaporation and evapotranspiration. This could include water features and irrigated vegetation.
   Vegetation with access to water can evapotranspire and reduce heat more effectively.
- Strategies that reduce waste heat production (e.g. heat associated with vehicles and air conditioning systems) would also help reduce the UHI effect.

Note that many of these strategies, as well as working to reduce the UHI effect and reduce heat at the city-scale, can also help contribute to cool homes, other buildings and outdoor spaces. Cool homes, buildings and outdoor spaces are the focus of Sections 5.6 to 5.3

### Design strategies for buildings

Buildings make up a large proportion of hard surfaces in the urban environment, and therefore they make a significant contribution to the UHI effect. Most buildings are exposed to full sunlight across their roofs and some of their walls. Traditional building materials like brick, concrete, and clay tile are thermally massive: they absorb large amounts of heat when in the sun or surrounded by hot air. This heat is released when the environment around the material is cooler, typically at night. This slow release of heat is a key contributor to the UHI effect.

A few fundamental design decisions can substantially reduce a building's urban heating effects. Any measures to limit urban heat caused by buildings should start with roofs, which are directly exposed to the sun and which are also the easiest to keep cool. Roof strategies to combat urban heat include:

 Use cool roof surfaces that reflect sunlight and/or rapidly radiate absorbed heat (depending on the material). Cool roofs are particularly useful as a

precinct-scale cooling strategy and to improve indoor thermal performance. They have a limited effect on local temperatures at ground level, however the effect of cool roofs is more noticeable at around level when roofs are closer to the ground. The performance metric for cool roof surfaces is the Solar Reflectance Index (SRI), a scale from 0 to 1, where a white membrane roof would score 1. Note that in general, the whiter a roof, the cooler it remains. Cool roofs are a straightforward measure, as it has become relatively common practice to provide SRI values for roofing materials, and a wide range of suitable products are readily available. Cool roofs are also low-cost, with no need to spend more on materials. However, one caveat is that roofs in view 'downslope' from the public realm in hilly areas, or in view from taller adjacent buildings should avoid white or very light-coloured finishes that would cause glare concerns. In these locations, mid-toned cool roof finishes are available or vegetated roofs (below) are also appropriate. Note also that a range of darkertoned, high SRI roofing and paving materials (with specially formulated coatings that are Low reflectance in the visible range, and high reflectance in the infrared/near-infrared range) are being developed (Santamouris and Yun, 2020) and starting to come onto the market.

- Consider alternatives to thermally massive roof materials, like concrete or tile, that absorb energy and release it slowly (noting that where a thermally massive material has a high SRI surface, it can still deliver a significant improvement over low SRI materials).
- 3. Use rooftop solar panels, where photovoltaic cells convert a portion of the sun's energy into electricity or hot water. Solar panels do get hot, though, as much of the residual solar energy is converted to heat. That said, the benefits of solar panels (refer to Sections 5.1 and 5.3) makes them a worthy roof topper, despite being less effective than cool roofs or green roofs at combatting local urban heat island effects. Interestingly, vegetation planted beneath rooftop solar panels can improve solar conversion efficiency by evapotranspirative cooling (Shafique et al, 2020).
- 4. Where feasible and appropriate, green roofs, where the uppermost roof surface is a layer of plants, are also effective at mitigating heat. Green roofs stay cool thanks to the insulation effects of the soil and vegetation layer, the plants that convert solar energy into growth, often have a higher albedo than typical roofing materials, and

through evapotranspiration. Some green roofs even include trees, which can shade adjacent surfaces. Green roofs that are irrigated will stay cooler than those relying on rainfall, which will get hotter during dry spells. Plant selection should reflect desired function; herbaceous perennials and small shrubs, for example, are more appropriate for cooling than very drought-tolerant species with low evapotranspiration.

The thermal mass of building walls also contributes to urban heat, and measures can be taken to limit this detrimental effect. However, building walls have more design requirements to balance than roofs. Walls should stay cool, but they also need to admit daylight to spaces within, allow views out, and they need to avoiding creating glare risks for drivers, pedestrians, and people in adjacent buildings. Walls that emit or reflect heat can also raise temperatures in adjacent outdoor areas, making them more uncomfortable in hot weather. These include glazed façades which are spectrally selective to meet the requirements of BCA Section J for reducing internal solar gain.

The primary steps to maintaining cool building walls are:

- Wherever possible, shade building walls. This is
  particularly important for western walls that receive
  afternoon sun and can absorb significant heat,
  and for glazed façades, which can reflect
  significant solar radiation downwards. Flux (2020)
  demonstrated that this effect could be significantly
  reduced with adequate shading. At low levels,
  shade is preferably achieved using surrounding
  trees or other vegetation that converts the sun's
  energy into growth. Where vegetation is not
  feasible, architectural features such as eaves, fins,
  returns etc. can also provide shade.
- 2. Use light coloured finishes that reflect sunlight into the landscape, where the energy can be absorbed by trees and other vegetation, or conversely, where the radiation can be reflected to the sky. However, if a building has no surrounding vegetation (e.g. in urban settings without street trees), this measure has more complex effects. It would mean less daytime heat absorption (and re-radiation overnight), but it would also mean solar energy is reflected from building walls to the surrounding streets and public realm. Less absorbent materials are the most desirable in most contexts, but design should consider the local place and its specific needs.
- Take particular care if employing thermally massive surface materials like concrete that absorb energy and stay warm. Correctly used, thermal mass can improve a building's energy performance, but it should be noted that these

- features work best in climates with large diurnal temperature ranges.
- 4. Where appropriate, also consider green walls, where small-scale vegetation covers the vertical surfaces of a building. Green walls typically require extensive irrigation to survive, let alone thrive, so this approach is best applied where localised cooling benefits are maximised or where there is an ample supply of rainwater or recycled water. These benefits include cooling the building by direct shading, evapotranspiration and insulation provided by the still air trapped between the foliage and building façade. Extended green walls can also contribute to street level cooling.

Applying a general requirement for building external walls to meet a cool surface standard like SRI would be difficult to implement for a number of reasons. The main problem is that, as noted in Step 3 above, surfaces that reflect solar heat to the ground will exacerbate urban heat at street level wherever there is no vegetation to absorb the energy or re-reflect it to the sky. This means more people will experience urban heat as direct thermal discomfort. Also, unlike roofing, few building wall materials have SRI data available currently, although this problem could be solved over time with manufacturer co-operation.

The key principle in developing guidance around façades/wall surfaces is to minimise the prospect of street level impact, which means consideration of urban geometry as well as material properties, and prioritising façades and walls that receive high solar radiation during summer and particularly during the afternoon. Where these impacts can be avoided, cool wall surfaces can play a role in urban cooling.

# <u>Design strategies for outdoor spaces (see also Section 5.3)</u>

Outdoor spaces, both public and private, also include significant paved areas, including roads, footpaths, plazas, courtyards and forecourts. These spaces also make a significant contribution to the UHI effect. Also, in order to thrive, people need access to cool spaces in their local environment, particularly in high pedestrian activity areas, active transport routes, parks and other places where people gather outdoors.

Therefore, in outdoor spaces, design strategies should aim to reduce both ambient temperatures at the city scale, and microclimate-scale temperatures that people experience within these places. The following design strategies are focused on reducing the heating effect at the city scale. Design strategies for the microclimate (or human) scale are presented in Section 5.3. There is overlap between these strategies, but it useful to understand how each of them works at different scales.

Design measures to reduce the city-scale heating effect of urban outdoor spaces are:

- 1. Increase green cover and reduce impervious areas as much as possible. In particular, establishment of contiguous tree canopy where possible will maximise opportunities for cooling and shading of the public realm. It can also help meet other objectives, such as biodiversity.
- 2. Where paved surfaces need to be provided, consider:
  - a. Shading paved areas wherever possible, preferably with surrounding trees.
  - b. Using cool paving, with high albedo (high solar reflectance) and/or high thermal emittance (which releases heat quickly) where there is limited opportunity to establish canopy cover (and few obstacles blocking view of the sky, so the reflected heat and light can escape). Also consider the risk of glare from light-coloured pavements.
  - c. Using permeable paving, which may be designed to promote deep soil infiltration or

- may be provided with near surface water storage instead - the latter possibly being more relevant on many Western Sydney clay soils. The latter type of design could also potentially facilitate pavement watering as an effective cooling strategy (where an appropriate water supply is available). However, permeable paving may not be appropriate for high traffic loads.
- 3. Where green cover is provided, ensure wherever possible that vegetation has access to water, by:
  - a. Providing an irrigation system, preferably supplied by rainwater or suitably treated stormwater/recycled water.
  - b. Enabling passive irrigation (i.e. direct runoff from surrounding surfaces into vegetated areas, so that water can be absorbed into the growing medium).
  - Designing vegetated areas as wetlands and rain gardens, which retain water.

### 5.3 COOL OUTDOOR SPACES



Cool outdoor spaces refer to parks, streetscapes and gardens (i.e. both public and private spaces). When outdoor spaces are considered at a human scale (as they are experienced

by people using them), temperature variations are more pronounced than those measured at a city or precinct scale. Within the urban environment, temperatures experienced at a human scale can vary significantly from place to place at the local level. Sometimes we refer to the "microclimate" of a place-for example the microclimate in a well-irrigated landscape under a shady tree will be different to the microclimate in a paved area with no shade and surrounding heat-reflective surfaces.

While only modest reductions can be achieved in ambient temperatures at the city-scale, the smaller-scale variability in temperatures in the urban environment mean that it is possible to create a mosaic of cool outdoor spaces that enable people to spend time outdoors even in hot conditions. As noted above, this can enable physical, social and economic activity to continue even when ambient temperatures are very high, reducing the impacts of urban heat.

### Measuring outdoor thermal comfort

How humans experience heat is influenced by physical factors such as air and surface temperatures, humidity

Figure 15: Thermal map of Parramatta CBD, 28/02/2018 (Santamouris et al 2020)

and local air movement (e.g. whether or not there is a breeze). It is also influenced by personal factors including metabolic rate (essentially, our level of activity), clothing, and our psychological response to heat.

In Section 1.2, it was noted that **air temperature** differences between nearby streets have been measured at up to 8°C. A thermal image of Parramatta CBD on a hot day (Figure 15) illustrates the range of **surface temperatures** across the CBD, which range from approximately 20 to 60°C. The greatest variability is in surface temperatures; there are significant variations in air temperature between sites; and relatively small variations in air temperature across subjudies.

Human thermal comfort is influenced by both air and surface temperatures as well as other factors. Often, alongside an actual air temperature, a relative temperature, more relevant to human thermal comfort, is expressed as a "feels like" temperature. One method to estimate a "feels like" temperature is the Universal Thermal Climate Index (UTCI). It combines personal factors (human activity and clothing) and thermal-physiological factors: air temperature, mean radiant temperature, relative humidity, and wind speed, to assess the effect of design measures on outdoor thermal comfort at pedestrian level. The UTCI temperature scale is shown in Figure 16.



Figure 16: UTCl thermal stress categories – high temperatures (source: en.institutparisregion.fr)

### Design measures for cool outdoor spaces

A "feels like" measure of outdoor thermal comfort can be used to assess how a design intervention will influence the physical comfort, health and well-being of pedestrians or users of the public realm (for example providing shade along a pedestrian walkway), or for assessing design interventions to support outdoor activities on hot days.

Table 2 lists potential effects on surface temperatures, air temperatures and thermal comfort (expressed as a "feels like" temperature) for a range of cooling strategies. Each of these temperature effects helps to indicate where each design measure is most effective:

- Cool materials, including pavements, roofs and walls are most effective for reducing surface temperatures. However, they have a limited effect on air temperatures or feels like temperatures.
- The most effective strategies for improving feels like temperatures are those that create shade, including mature trees and shade structures.
- Evaporative cooling measures, particularly misting fans, can create significant reductions in air temperatures, but they are expensive to install and maintain, they rely on a water supply and only work within a relatively small zone of influence. These measures could be appropriate for creating particular outdoor "cool zones" at strategic locations. It is worth noting that the presence of water features in the landscape such as fountains and ponds, as well as providing some 'real' cooling also provide users of the public realm with a perception of cooling.

Although not included in Table 2, air movement is also effective at reducing "feels like" temperatures, and is included at the top of the list of recommended design measures below.

The role of the above measures in city-scale cooling was discussed in Section 5.2. In certain locations, for example where people need to work outside, where people undertake recreation, where active transport is important, or even in private gardens (which for some, may be their only opportunity to spend time outdoors during hot weather), improving human comfort outdoors is also a relevant objective. Also consider where vulnerable people may be particularly exposed to heat, for example in car parks, at bus stops and transport nodes.

To improve outdoor human thermal comfort, it is recommended to apply the following measures, in approximate order of priority:

- Consider orientation of site features:
  - a. Consider prevailing breezes, skyview factor and solar aspect.
  - b. Place loading docks and outdoor work areas on the southern/eastern side of buildings to reduce northern and western sun exposure.
  - Prioritise canopy trees and shade structures on the northern and western sides of buildings.
- 2. Provide shade, particularly where people are likely to undertake outdoor activities in hot weather (including parks, streets and private gardens):
  - a. Wherever possible, provide trees with dense, contiguous canopy coverage, as green cover will also have a larger-scale cooling effect. Parks, streetscapes (especially priority pedestrian and cycle routes), plazas and private gardens should all include canopy.
  - b. Provide shade structures where trees are impractical, e.g. over playgrounds and picnic areas. These can include temporary 'pop-up' shading devices in the hottest times of the year. Awnings are already common in streetfront retail.
- 3. Provide evaporative cooling:
  - a. In key "cool zones", consider installing active evaporative cooling features such as misting fans and water fountains.
  - b. Wherever possible, provide sustainably sourced water supplies (see Section 5.4) and irrigation to maximise cooling. Cooling can be achieved by supplying vegetation with sufficient water in hot weather, so that evapotranspiration can work to reduce heat. Water can also potentially be applied to other urban surfaces to assist with cooling (e.g. night time watering of pavements is a strategy used in Japan for centuries).
  - c. In parks and gardens, include ponds, wetlands and rain gardens, which retain water and help cool the immediate area via evaporation/evapotranspiration.
- 4. Use permeable paving for pedestrian areas, or lighter coloured pavements (high reflectance and infrared emittance values) where appropriate, noting the caveats from Section 5.2.
- 5. Avoid walls which reflect solar radiation or absorb and re-emit heat into areas frequented by pedestrians.

Table 2: Cooling capacity of different strategies (updated based on Osmond and Sharifi 2017)

Heat mitigation strategy	Maximum air temperature reduction within the zone of influence <sup>a</sup>	Thermal comfort improvement (Feels-like temperature) <sup>b</sup>	Maximum surface temperature reduction <sup>c</sup>	Key constraints	
Cool pavements	2.5 °C	0.5 °C	33 °C	Reflectance changes over time Undesirable glare	
Permeable pavements	2.0 ℃	2 °C (after sprinkling with water)	20 °C	Less suitable for heavy traffic Evaporation is less effective in humid weather and only effective when there is moisture present Maintenance	
Cool roofs / walls 2.5 °C (indoors)		0.5 °C	33 ℃	Undesirable glare Complex reflectance in street canyon	
Green roofs and walls 4.0 °C		0.1 °C	20 °C	High cost to install and maintain Water supply for walls Heat- and water- stress	
Mature street trees	4.0 °C	8.0 °C	15 °C	Space/conflict with grey infrastructure	
Green open spaces	4.0 °C	4.0 °C	15 °C	Need to accommodate multiple needs	
Evaporative cooling <sup>d</sup>	8.0 °C	1.0 °C	N/A	High cost to install and maintain  Water supply required Less effective in humid weather Small zone of influence	
Misting fanse	15 °C	1.0 °C	N/A		
Solar control systems (shading)	0.8 °C	8.0 °C	15 °C	Installation cost	
Effectiveness <sup>f</sup>	Very high	High	Medium	Low	Negligible

### Notes:

- a. This indicator is best used when evaluating the overall temperature outcome along a street canyon, across an urban precinct, neighbourhood or development site. The zone of influence may vary depending on the type and size of intervention from few meters to several dozens of meters; as well as height of the intervention (i.e. cool/green roofs may have a stronger influence several meters above the ground).
- b. Outdoor thermal comfort is best used to assess the capacity of an intervention to improve people's thermal perception (feeling), or levels of heat stress in open spaces. This is typically assessed by thermal comfort indices such as the Universal Thermal Climate Index (UTCI) or Physiological Equivalent Temperature (PET) using a scale that ranges from very hot (extreme heat stress) to very cold (extreme cold stress) thermal perception.
- c. Surface temperature drops are best used to determine the potential impact of interventions on ameliorating urban overheating across large areas. It is also a relevant indicator on the potential outdoor thermal improvement that may be achieved as surface temperatures influence on the amount of heat directly emitted by surfaces towards pedestrians.
- d. Generally, it refers to water bodies like ponds that are passive technologies.
- e. Generally, it refers to active technologies such as sprinklers or misting fan systems.
- Effectiveness may vary depending on context (i.e. industrial versus residential site), macroclimatic conditions (i.e. during heatwave compared to a typical summer day), location and extent of the mitigation technology.

### **5.4 SUSTAINABLE WATER SUPPLIES**



Water can play an important role in reducing urban heat. Sydney Water (2017) looked at the role of water in reducing heat at the city scale, finding that "combining cool materials and

water-based technologies was the most effective strategy to mitigate the negative impacts of urban overheating on ambient temperatures, energy, peak electricity demand, heat-related mortality and thermal comfort" (Sydney Water 32017 p.14).

Water could play an even more important role at the human scale, in cooling outdoor spaces. Table 2 showed the significant potential effect of evaporative cooling and misting fans on nearby air temperatures. Irrigated landscapes have also been shown to be significantly cooler than dry landscapes. South Australia Water undertook an irrigation trial of turf areas at Adelaide Airport, finding an average 2.2-2.4°C air temperature reduction within the irrigation area, compared to adjacent non-irrigated area (Ingleton et al 2018). The CRC for Water Sensitive Cities (2020, p.12) found that "dry grass can be as hot as road surfaces on extreme heat days while irrigated grass can be as cool as trees" – see Figure 17.

Hot days and heatwaves may coincide with periods of drought and water restrictions, limiting the capacity for irrigation of urban landscapes in both the public and private domain, and may also limit the use of more active cooling measures such as water features and water play.

To improve resilience to droughts, existing planning policies aim to reduce water demands in urban development, encouraging xeriscaping (landscape design that reduces or eliminates the need for irrigation) and the use of more efficient irrigation systems. When it comes to specifying new vegetation, particularly long-lived plants such as trees, it is important to consider species that are heat and drought-resistant, considering future temperature rise projections. Macquarie University's "Which Plant Where" project aims to deliver a decision support tool for urban tree selection, which considers future climate change. When this becomes available, planning provisions could potentially refer to it for species selection. To improve resilience to urban heat, planning policies should also encourage the use of irrigation to help mitigate urban heat.

These two competing objectives can be reconciled if there is a strong emphasis on sustainable water supplies (e.g. rainwater, stormwater harvesting, recycled water) for irrigation purposes.

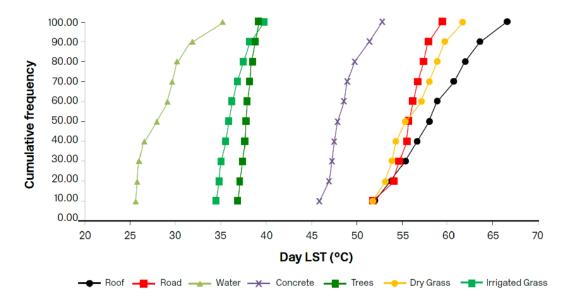


Figure 17: Temperatures of different urban surfaces (CRC for Water Sensitive Cities, 2020)

### 5.5 COOL BUILDINGS



Strategies to reduce the contribution of buildings to heating the urban environment were discussed in Section 5.2. This section is concerned with keeping buildings cool on the inside, to

ensure thermal comfort and safety of building occupants. While non-residential buildings don't have the same role as homes, which are essential places of shelter in extreme conditions, they still play important roles in our economy and society, and if they function reliably through hot weather and heatwaves, then social and economic disruption will be minimised.

The specific set of conditions defined as "comfortable" depends on the nature of the use of a building and can be calculated using the thermal comfort metric most appropriate to the building use. In the case of office or workplace environments, an appropriate thermal comfort metric is Predicted Mean Vote (PMV), which reports comfort on a scale from Cold to Neutral to Hot, and which varies the target comfortable range of temperatures based on personal activity and clothing levels, among other things. A variant of this metric is the Adaptive Comfort metric (described in ASHRAE Standard 55: Thermal Environmental Conditions for Human Occupancy), which reflects that indoor temperatures perceived as comfortable increase as it gets hotter outside.

As discussed in Section 3.2, the 2019 update to the NCC substantially improved the passive conditioning requirements for non-residential buildings, and therefore new non-residential buildings in Western Sydney should meet relatively high standards.

Heatwaves remain the crucial condition in which the performance of these buildings may be limited. Because almost all new office, civic, industrial, and other non-residential buildings are built with airconditioning and heating systems, the primary thermal comfort challenge these buildings face is achieving comfort during heatwaves, which pose higher cooling loads than current code design conditions recognise. The consequence of this is typically that indoor areas of buildings near windows get too warm, especially those directly in the sun. A secondary consequence is that buildings use more energy to keep spaces cool, which in turn strains the capacity of the electrical utility grid as noted above.

In circumstances where buildings lose power, or the air-conditioning equipment fails, there are rarely thermal safety concerns; most buildings can be closed temporarily, with occupants sent home or to other facilities to avoid any safety risks. Hospitals, police stations, and mission critical facilities that must remain occupied manage this risk through a combination of on-site emergency power generation and equipment redundancy.

### 5.6 COOL HOMES



Thermally safe environments – places that remain within a range of temperatures that protect us from injury or death resulting from over-heating or over-cooling – are critical to human health and wellbeing.

Thermal safety, or better still, thermal comfort, has traditionally been provided to people by buildings: a roof and walls to keep us dry, shaded, and not too hot or cool. The look and feel of Sydney's vernacular architecture – across many styles – was shaped by the need for walls and windows to create thermally comfortable indoor environments without supplemental heating or cooling.

Following the advent of reliable and affordable air conditioning in the latter  $20^{th}$  century, buildings no longer had to provide comfort passively. Accordingly, design conventions changed to prioritise views, lower-cost construction, and other outcomes. Passive design for thermal comfort became a lower priority.

### The importance of thermal safety in homes

Unlike most other building types, our homes have a fundamental requirement to provide us with safety at all hours of the day and night, under all circumstances.

The life-threatening events that affect Western Sydney most frequently are heatwaves. As noted in Section 1.3, heatwaves kill more Australians than any other natural disaster, and elderly people are particularly vulnerable. Ensuring that building interiors have the capacity to remain within a safe temperature range during a heatwave is a fundamental public health concern.

By day, some people have the option of seeking shelter from the heat in cooler public places: shady parks, swimming pools or riverine glens, or inside airconditioned buildings like libraries and shopping malls. But for many people, especially the elderly or those with mobility limitations, they have no choice but to shelter during the day at home. Accordingly, homes are the building type most in need of regulation for achievement of a safe thermal environment.

Within homes, the space where we most need safe temperatures is the bedroom. For some people, this is the only room in their residence; for everyone, this is room with the most reliable occupancy. Accordingly, this is the space in a home that should be subject to the most stringent thermal safety requirements.

### Ensuring thermally safe homes

As explained in Section 3.2, Building Codes in Australia do not recognise at all the principle of thermal safety, or the maintenance of building interior conditions within temperature range safe for human habitation. And as explained above, where the building codes do recognise thermal comfort, they only do so relative to the energy use limits placed on equipment to maintain that comfort.

The inherent assumption is that a home has air conditioning to maintain a safe indoor condition during heatwaves. However, not all homes have functional air conditioning, not all residents can afford to run it, and air conditioning is dependent on reliable power.

Two case studies comparing the thermal comfort outcomes of higher- and lower-performing homes are included on the following two pages. These both demonstrate the benefit of designing for high passive thermal performance. The second study (Brannon 2018) affirms that more stringent building envelope requirements than are currently required by BASIX would deliver homes in Western Sydney that are substantially more thermally comfortable and, during heat waves, much safer thermally.

### A 'thermal autonomy' design standard

A better and directly applicable metric for how our residential buildings should cope with heat waves is thermal autonomy: a measure of the percentage of time a building can maintain a specific set of comfort conditions passively (without air conditioning or heating), despite outdoor temperature fluctuations (Levitt, et.al., 2013) (Figure 18). Thermal autonomy is the aspect of passive survivability that gauges whether people will remain safe in their homes without air conditioning, during heat waves. Thermal autonomy is a better gauge of a building's resilience to heatwaves because its exclusion of supplemental air conditioning from the assessment of comfort reflects conditions where power is lost, and it reflects the performance of buildings that either have no air conditioning or cannot afford to use it.

The concept of thermal autonomy allows the nomination of specific thermal comfort, or thermal safety, conditions as required. The percentage of time a space is compliant can either be met by a thermal simulation over a span of time with particular weather conditions (typically a reference year) or could be met by complying with nominated Deemed to Satisfy passive design features of a building's envelope.

The concept of thermal autonomy aligns well with existing building codes, but can be defined as a distinctly separate thermal safety standard, focused on public health outcomes. This could help distinguish it from the energy efficiency and thermal comfort outcomes at the centre of BASIX, potentially enabling a separate requirement to be imposed in addition to BASIX.

For residences, thermal autonomy and the idea of adaptive comfort (perceived comfort that adjusts with varying outside conditions) come together in a new design guide from the UK focused on overheating risk assessment in homes (CIBSE TM 59). This guideline defines an upper comfort limit, which increases with average outdoor temperature, and requires that indoor temperatures stay below that limit, without assistance from air-conditioning, for all but 3% of occupied hours. For bedrooms, an absolute upper limit on temperature of 26°C can only be exceeded for 1% of hours between 8 pm and 7 am, which acknowledges that at night people cannot flee to other publicly accessible airconditioned places.

CIBSE TM59 is widely used in the UK to assess homes, residential, and non-residential buildings for risk of overheating. Indoor overheating risk assessments, including design team thermal simulation evidence, are required by the Greater London Authority during the

initial and final stages of planning approvals for all residential and commercial "Major Developments".

The CIBSE TM 59 design standard was used by Brannon (2018) in the second case study, to define thermal autonomy.

### Next steps for cool homes

Cool homes are a vital element in addressing the impacts of urban heat, as houses are a key refuge in heatwaves, and need to maintain safe temperatures during extreme events. Current codes and regulations don't acknowledge this.

When it comes to cool homes in particular, technical complexity, combined with a complicated planning and regulatory system, makes it challenging to set new standards. However, there is good design guidance on passive design to achieve thermal safety/passive survivability objectives, and new design tools are available to inform better design decision making. There are international precedents for stronger thermal performance standards, and the key question now is how to include similar standards in our planning system. This will only become more important with time, as average temperatures and days of extreme heat both increase.

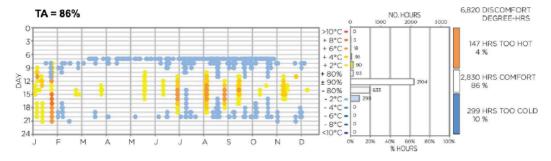


Figure 18: Thermal autonomy reporting example (Levitt et.al, 2013). In the dot plot portion of the diagram (left), blue dots represent hours Too Cold, while yellow and orange dots represent hours too hot. The Discomfort degree-hour total combines hours of discomfort with intensity of discomfort into a secondary but less precise metric of discomfort.

### CASE STUDY: THERMAL PERFORMANCE OF NON-AIR-CONDITIIONED HOMES DURING A HEATWAVE

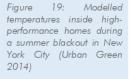
Thermal autonomy benefits resulting from good passive design were illustrated in a 2014 study of indoor temperatures across a range of residential buildings in New York City, with no air-conditioning available during a summer heatwave (Urban Green, 2014). The summer ambient temperatures during the week of this study are comparable to those of Western Sydney (daytime highs at 95°F / 35°C, night lows around 72°F / 21°C), so the trends illustrated in this study are relevant in both locations (Figure 19, Figure 20).

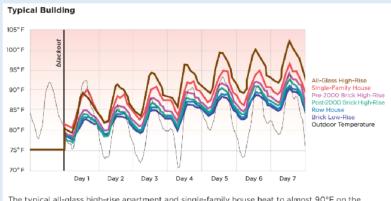
Compared to conventional buildings (Figure 20), high performance residences with good passive design strategies – analogous to meeting a stringent energy code like Passive House or the UK Part L building regulations – would see much cooler indoor temperatures through the heat wave (Figure 19). For some building types, indoor temperatures would increase by only a few degrees – even after five consecutive days without air conditioning.

This study also makes explicit that detached houses are particularly susceptible to overheating during heat waves, a consequence of the high surface to volume ratio and windows on all orientations (Figure 19 and Figure 20, "Single Family House" cases). The study also makes it very clear that highly glazed apartment buildings respond to heat waves like solar ovens, quickly heating during the day but not cooling as much at night (Figure 20, "All Glass High Rise" case).



High-performing brick buildings, including the row house and brick low- and high-rise apartments, would stay below 80°F for the first half of the week, and never go above 85°F. The high-performing glass building reaches 88°F and the single-family house still rises above 90°F.





The typical all-glass high-rise apartment and single-family house heat to almost 90°F on the first day. The all-glass apartment climbs above 95°F on the fourth day and peaks over 100°F. The brick buildings, including the row house, low-rise and high-rise apartments, stay cooler throughout the week but still end above 85°F.

Figure 20: Modelled temperatures inside low performance homes during a summer blackout in New York City (Urban Green 2014)

### CASE STUDY: THERMAL AUTONOMY IN RESIDENTIAL BUILDINGS IN WESTERN SYDNEY

A more recent study of thermal resilience in residential buildings in Western Sydney (Richmond weather data was used) illustrates the positive benefit of building homes to a higher passive design standard (Brannon 2018). In one case, a unit modelled with a minimally code compliant building envelope exposed to recent weather achieved thermal autonomy only 46% of the time, with 23% of hours too warm (Figure 21). That same unit, using synthetic weather data based on climate change forecasts for 2090, shows 33% of hours uncomfortably warm.

By comparison, that same unit exposed to recent weather but modelled with a high-performance envelope (analogous to compliant with current UK Part L residential regulations), achieved thermal autonomy 89% of the time, with only 3% of the hours too warm (Figure 22). Exposed to 2090 weather, the percentage of time too warm increases to 12%, but percentage of time too cold almost disappears. Thermal autonomy remains almost unchanged at 87%.



Figure 21: Modelled thermal autonomy for a minimally code-compliant apartment in Western Sydney, using both recent weather (TMY7 case) and predicted weather (2090 90% case) (Brannon 2018).



Figure 22: Modelled thermal autonomy for a high performance envelope apartment in western Sydney, using both recent weather (TMY7 case) and predicted weather (2090 90% case) (Brannon 2018).

Brannon (2018) also points out the consequences of continued climate change on thermal comfort and safety in Western Sydney. Even with best practice building envelopes, residences exposed to recent weather will exceed the threshold of overheating risk at night by 4% of overhight hours annually. By 2090, though, these homes could be overheated by as much as 16% of overhight hours annually, a four-fold increase (Figure 23).

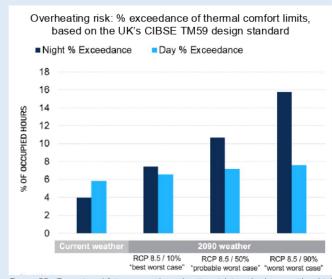


Figure 23: Current and future annual overheating risk to a bedroom with a high performance building envelope, without using air conditioning. The three 2090 cases reflect arrange of future weather models and show that thermal comfort and safety will be particularly vulnerable to night time temperature increase. Intermediate time forecasts were not modelled. (Brannon, 2018)

### 5.7 ROBUST ENERGY SYSTEMS



Most buildings have air conditioning, and in a changing climate, its use is likely to become more frequent, and more critical to safeguarding the health of people living and working in

Western Sydney.

Air conditioning only works when there is power to run it, and as has been noted in Section 1.3, extreme heat places multiple stresses on the electricity network, increasing the likelihood of power outages:

- During hot weather, peak electricity demands are driven by air conditioning. As temperatures increase, air conditioning demands increase and electricity use increases accordingly. demand typically occurs in the late afternoon.
- Extreme heat places physical stress on the grid, reducing the efficiency of generation infrastructure and reducing the capacity of the transmission and distribution system. Gas and coal fired power plants are also more likely to break down in very hot conditions (The Australia Institute 2018).

If the electricity grid fails and people are unable to run air conditioning during hot conditions, their homes can quickly overheat, with severe impacts on health. Therefore, an important strategy for reducing heatrelated mortality is to improve the reliability of the electricity network.

The capacity of the electricity network has been expanded in the past by increasing the capacity of both the fossil fuel-based generators and the transmission and distribution system. However, continual expansion increases the cost of electricity, with impacts on vulnerable people in the community. Furthermore, with extreme heat placing increased stress on this infrastructure, we are chasing an ever higher peak capacity.

If we shift our approach to focus on reducing peak demands, we can improve the resilience of the electricity network. Two broad options to achieve this

- 1. To reduce reliance on air conditioning; and
- 2. To reduce reliance on centralised electricity aeneration.

The former option is discussed in Sections 5.6 and 5.5, which focus on improving the passive thermal performance of homes and other buildings. The latter option involves provision of on-site power generation and/or storage.

In urban areas, solar power has become popular with residential and commercial building owners, as it can offer a sound financial return on investment. Rooftop solar is reliable on hot days due to ample sunshine. Although PV output drops as temperatures rise, it can still play an important role reducing peak demands on hot days. Across Australia's National Electricity Market, rooftop solar is already assisting to reduce peak demands in heatwaves.

Local development controls could encourage or require the installation of solar power, at least for nonresidential development, and some already include provisions to prevent overshadowing of existing systems (e.g. to prevent trees from overshadowing).

When rooftop solar systems are combined with on-site battery storage, there is potential to further reduce the magnitude of peak demands, by storing energy for use in the late afternoon and evening, as solar generation declines and demand remains high (The Australia Institute 2018). Battery systems are also becoming more affordable and residential installations are increasing.

A further measure to consider, particularly for buildings that house vulnerable residents, is to enable them to disconnect (to be "islanded") from the grid when there is a power outage. This is not something most buildings are set up to do, however, in order for PV and battery storage systems to power a building during a utility blackout, the building's power system needs to be configured to enable this.

Air-conditioning system efficiency is affected by heat waves, with most cooling units losing some cooling capacity above 40°C as the equipment reaches its design limits. Some equipment stops working entirely when ambient temperatures reach a temperature, sometimes  $40^{\circ}\text{C}$  and often  $45^{\circ}\text{C}$ , to protect the unit from overheating damage.

In order to ensure that air conditioning works reliably when it is most needed, design guidelines and building codes should all establish a basic requirement that air conditioning equipment must work through peak ambient temperatures of 45°C, which are experienced in Western Sydney with increasing frequency.

### CASE STUDY: ROOFTOP SOLAR

The Australia Institute (2018, p.3) found that "rooftop solar consistently reduces the size of the crucial summer day demand peaks and delays the timing of the peak to later in the day".

18 January 2018 was very hot and was the second-highest demand day of that month. On that day, Victoria's Low Yang B coal-fired power station broke down, reducing power supplied to the grid by over 500 MW. However, that day in the states connected to the national grid, rooftop solar reduced the peak demand by around 1,600 MW, greatly reducing the consequences of the breakdown (The Australia Institute 2018).

Figure 24 shows total electricity demand in NSW on 19 January 2018, which was the highest demand day of the month. Figure 24 highlights the quantity of total demand supplied by rooftop solar power. The contribution of solar power reduced the magnitude of the peak demand by 10%, and delayed the timing of peak demand on the grid. Across all of the states connected to the national grid, on 19 January 2018, solar power reduced peak demand by more than 2,000 MW (The Australia Institute 2018).

Similar effects are seen in other Australian cities and on other hot days as well.

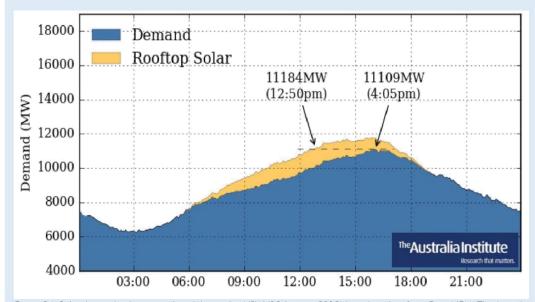


Figure 24: Solar demand reduction and total demand in NSW (19 January 2018) based on data from OpenNEM (The Australia Institute 2018)

# PART 3: RECOMMENDATIONS FOR LOCAL PLANNING PROVISIONS

Evidence from research findings indicates many design strategies that could be employed to reduce the impacts of urban heat, however it is also important to consider what can actually be codified effectively in local planning provisions, while balancing competing objectives.

# **6 LOCAL ENVIRONMENT PLANS**

Each council prepares a Local Environment Plan (LEP), which provides controls and guidelines for development. It defines what types of development can occur on land zoned for different purposes, and maps where each of these land use zones apply across the local government area.

LEPs are legal instruments, which means they have more weight than Development Control Plans (DCPs) in planning decisions, however they need to be prepared in line with a standard template. The Standard Instrument LEP template defines:

- The land use zones, the objectives for each zone and what types of development are permitted with/without consent or prohibited within each zone. Limited modification of these zoning clauses is permitted.
- Compulsory provisions on specific topics (e.g. bush fire hazard reduction) and other optional provisions. Few of these compulsory provisions have a relationship with urban heat, energy efficiency or green infrastructure.

There is the option to include additional local provisions on any topic of local importance, including a topic such as urban heat. There is now an opportunity, and even an imperative, for councils to escalate and incorporate urban heat objectives into their LEPs to strengthen the consideration of urban heat and associated planning and design requirements early in the development assessment process.

Note that LEPs need to go through the Planning Proposal process and be approved by DPIE. DPIE will consider whether proposed local clauses are appropriate in the context of strategies and planning priorities established in District Plans and Local Strategic Planning Statements.

The District Plans clearly identify urban heat as an important issue to address in Sydney's growth — see Section 2.1, which included a summary of the directions, objectives and actions relevant to urban heat in the Central and Western Sydney District Plans.

Previous advice from Boston Planning (2019) stated that "LEPs must give effect to the District Plans... The District Plan specifically mentions urban heat objectives/actions. Therefore, by virtue of clause 3.8 (3) of the Environmental Planning and Assessment Act, 1979, each council to which the district plan applies must review their local environmental plan(s) for the area and prepare a planning proposal to give effect to the District Plan".

Also discussed in Section 2.1, most Western Sydney councils have included heat-related planning priorities (e.g. to improve resilience, resource efficiency, and green infrastructure) in their Local Strategic Planning Statements. Some have included a specific action to update planning controls to better address urban heat.

As discussed above, there are many different aspects to addressing urban heat, and different ways that urban heat provisions could be incorporated into an LEP. Three important high-level recommendations are:

- That urban heat should be addressed with a standalone local provision, which means that it is clearly identified as a priority with its own section.
- That urban heat provisions should apply across the whole LGA. This could include specific considerations or requirements for different land use zones, but there is no need for additional mapping to define where urban heat provisions apply.
- That other sections of the LEP should also be reviewed to see where there are opportunities to improve provisions that have some relationship with urban heat. For example, some LEPs include a "design excellence" section, which could be amended to include urban heat as a matter to address. Some include landscaped area and/or water sensitive urban design clauses, which could also be strengthened with respect to urban heat.

Suggested wording for a standalone urban heat provision is included in the box on the following page.

### Suggested Local Provision: Urban Heat

- 1) The objective of this clause is to ensure new development incorporates effective planning and design to reduce the impacts of urban heat, to help the community survive heatwaves and thrive in a warmer climate.
- 2) This clause applies to all developments in residential, business, industrial, recreation, special purpose and environmental living zones.
- 3) Before granting development consent to development on any land to which this Plan applies, the consent authority must be satisfied that:
  - a) The development makes adequate allowance for green infrastructure, including making an appropriate contribution to tree canopy cover targets adopted by Council, including allowing for sufficient deep soil and plantable area to encourage root development and minimise conflicts with utilities;
  - b) Building roofs (other than green roofs) have been designed as *cool roofs*, wherever they are not designed as green roofs or covered with solar panels;
  - Building exteriors are designed to minimise solar radiation reflected and heat emitted into outdoor spaces frequented by people;
  - d) Buildings are designed to achieve high passive thermal performance and reduce reliance on air conditioning to maintain comfortable and safe indoor conditions, even during heatwaves;
  - Public and private outdoor spaces that are accessible to residents, workers or the general public, including gardens, courtyards, parks, plazas and streetscapes, are designed as cool spaces; and
  - f) The development makes a contribution, proportionate to its scale, to local sustainable electricity generation, which will reduce the peak demands on the grid during heatwaves; and
  - g) The development has access to an appropriate sustainable supply of non-potable water (e.g. rainwater, harvested stormwater or recycled water) to enable irrigation for cooling, even at times when drinking water use is restricted.

### 4) In this clause:

- a) Green infrastructure includes all types of vegetation found in urban areas, including natives and exotic species, remnant and planted vegetation, trees, shrubs, grasses and groundcovers, vegetation in parks, streetscapes, public and private domain. It includes elements such as green walls and roofs, rain gardens, wetlands and swales, productive, ornamental and native gardens, trees, turfed areas, bushland and riparian vegetation.
- b) Cool roofs use materials of high reflectivity (particularly in the infrared and near infrared spectrum) and/or high thermal emittance (they easily re-radiate any absorbed solar energy).
- c) Passive thermal performance is achieved by designing using passive heating/cooling measures (such as orientation, natural ventilation, cool materials, external shading, glazing and appropriate use of thermal mass), to reduce the reliance on mechanical heating or cooling to maintain thermal comfort.
- d) Cool spaces in the outdoor environment (in both the public and private domain, including parks, streetscapes, plazas/public squares, private gardens, courtyards, balconies, outdoor work areas) are designed to implement principles that maximise human thermal comfort in outdoor environments, including:
  - i) Maximising summer shading (e.g. via shade structures or tree canopy);
  - Minimising heat reflected from building walls and facades into pedestrian gathering or circulation areas;
  - Minimising heat input to pedestrian circulation areas from sources such as vehicles and building heat rejection systems;
  - iv) Maximising the amount of water retained in the landscape, including both rainfall intercepted and retained in soils, and the use of irrigation (using sustainable water supplies such as rainwater, harvested stormwater or recycled water) to maintain healthy vegetation and maximise evapotranspiration;

- Incorporating evaporative cooling systems such as water features or misting fans to create particular cool zones; and
- vi) Using permeable paving where possible and prioritising the use of cool paving materials wherever glare is not a constraint and there are potential cooling benefits.

# 7 DEVELOPMENT CONTROL PLANS

A principal aim of this toolkit is to provide advice to local government on urban heat provisions they can include in Development Control Plans (DCPs), however, as noted in Section 3, there are some challenges to incorporating urban heat provisions into DCPs:

- When it comes to thermal comfort, energy and water efficiency of residential dwellings, the BASIX SEPP prevails over any local planning provisions on the same topics.
- Urban heat is a complex issue, inseparable from other planning issues. Most DCPs include an extensive set of existing provisions covering topics such as trees, landscaped areas, water sensitive urban design, energy efficiency (non-residential), and other topics relevant to urban heat. Addressing urban heat with separate provisions, overlapping with the same topics, doesn't make sense.
- Furthermore, existing provisions on these topics have been negotiated to strike a balance with competing objectives such as housing affordability and public/private life cycle costs. Modifying these provisions may not be straightforward – each council will need to weigh up the issues in their local context and consider what is appropriate.

Given these challenges, the following opportunities emerge for improving DCPs to better address urban heat:

- Modify existing provisions, particularly those relating to trees, landscaped areas, water sensitive urban design and energy efficiency (non-residential), to improve their potential urban heat-related outcomes. Each council will need to navigate their own way through this process; this toolkit provides principles, evidence that could be used to support a business case, and best practice examples from existing DCPs (refer to Appendix A).
- 2. Add new provisions where there is a clear gap in existing DCPs, and where new provisions can be added without raising major concerns about affordability, life cycle costs, or legal contestation. A model cool city provision has been provided in this toolkit, which aims to cover this territory. Example provisions are also included in Appendix A on more specific topics

- including cool façades, heat rejection, green roofs and walls, and electric vehicles.
- 3. Keep working on topics where there are concerns about the above, gathering more evidence to build the case for local planning reform. Recognise that urban heat is a relatively new area for local planning controls, and it is likely to take several iterations to refine the first generation of DCP provisions.

Table 3 brings together all of the objectives and a summary of the planning and design strategies recommended in Section 5, identifying where they could be included in DCPs, and whether the DCP should play a central or supporting role in each objective.

Table 3 then identifies what provisions should be included in DCPs, and whether each should be included as new/standalone provisions, or by modifying existing provisions (which makes sense for provisions that are already embedded in DCPs and where there is a need to meet multiple objectives). These two categories should be the highest priorities for councils updating their DCPs. Table 3 also lists potential additional provisions that could be considered, but where their applicability is likely limited to more specific situations. These should be a lower priority.

The following sections: 7.1, 7.2 and 7.3 expand on the recommendations in Table 3.

Suggested wording for a standalone urban heat provision is included on the pages following Table 3. As has been identified above, although DCPs include many existing provisions related to urban heat, they don't address urban heat directly. A set of provisions directly addressing urban heat would give the issue more prominence in the DCP, clearly identifying it a priority.

However, it has also been identified that not all aspects of urban heat can be addressed with a separate standalone urban heat provision, as it is important to acknowledge all of the complex interconnected objectives that DCPs are trying to balance, including provisions that indirectly mitigate urban heat. It is also preferable to keep DCPs organised in a logical manner, so provisions on specific topics (for example trees) are grouped together, rather than appearing multiple times and potentially creating confusing or conflicting requirements.

Table 3: How to address urban heat in DCPs

Aspects of heat resilient planning	Objectives	Planning and	Roles for local planning provisions		
and design		design strategies	Central	Supporting	No role
Low carbon cities	Reduce carbon emissions	Energy efficiency Renewable energy Transport and waste management	Energy efficiency: non-residential	Renewables, transport, waste	Energy efficiency: residential (BASIX prevails)
Cool cities	Reduce temperatures at the city/precinct scale	Cool materials Green cover Water in the landscape	Key roles in all these areas		
Cool outdoor spaces	Create cool outdoor spaces in public and private domain Prioritise areas with high activity, consider vulnerable groups	Cool materials Tree canopy Shade structures – permanent or removable Evaporative cooling	Key roles in all these areas		
Sustainable water supply	Use sustainable water supplies for evaporative cooling	Rainwater harvesting Stormwater harvesting Recycled water	Rainwater harvesting: non- residential	Recycled water	Rainwater harvesting: residential (BASIX prevails)
Cool buildings	Thermal comfort in non-residential buildings	Cool materials Climate responsive architecture Efficient cooling systems		No need to set higher standards than the NCC, but DCPs can encourage good design	
Cool homes	Thermal comfort in hot conditions Thermal autonomy (passive survivability in extreme heat conditions)	Cool materials Climate responsive architecture			BASIX clearly prevails on thermal comfort; thermal autonomy standards are likely also be viewed as conflicting with BASIX

Table 3 – continued

New/standalone provisions to include (Section 7.1)	Existing provisions to strengthen (Section 7.2)	Additional considerations (Section 7.3)	Examples in Appendix A
Energy efficiency for non- residential development		Consider incentives for developers to meet higher energy efficiency standards.  Solar power could be encouraged with appropriate provisions (if not mandated).  Electric vehicles can be encouraged, e.g. with provisions for dedicated parking and charging stations.	Energy efficiency for non- residential development Electric vehicles (provisior for parking)
Cool roofs	Tree provisions Landscape provisions Deep soils Water Sensitive Urban design	Green roofs are expensive and not appropriate as a mandatory measure – but they can be encouraged.  Irrigation should also be encouraged.  Consider mandating irrigation where this could be considered appropriate (preferably in connection with sustainable water supply).	Green roofs Heat rejection Trees
Cool façades Heat rejection	Tree provisions Landscape provisions Deep soils Water Sensitive Urban design	Green walls are expensive and not appropriate as a mandatory measure – but they can be encouraged.  Irrigation and shade should also be encouraged. Consider mandating where these measures could be considered appropriate.	Cool façades Green walls Trees
Rainwater/stormwater narvesting and other alternative water supplies for non-residential development (public and private realm)			

# Suggested DCP Provision: Urban Heat

In the LGA, all development will be required to implement design principles that minimise the impacts of urban heat. This means that each development should minimise its carbon emissions, reduce its peak demand on the electricity grid and minimise its contribution to the urban heat island effect; as well as being designed to ensure that both indoor and outdoor spaces are designed to stay as cool as possible in hot weather.

The requirements for urban heat mitigation and the information required to support a Development Application varies for different types and scales of development.

#### Objectives:

- To reduce carbon emissions from the development, considering both construction and operational emissions.
- To reduce peak demand on the electricity grid and support a robust electricity network, by improving energy
  efficiency and installing solar panels.
- To reduce the development's contribution to the urban heat island effect, by minimising hard surfaces, using
  cool materials, maximising landscaped area, and using water in the landscape to encourage evaporation and
  evapotranspiration.
- To design homes for high passive thermal performance, so that they stay as cool as possible through heatwaves, and maintain habitable conditions even in the event of an extended power outage.
- To design non-residential buildings for high passive thermal performance, so that they remain comfortable for workers and visitors in hot weather, while also minimising energy demands.
- To design outdoor areas that are accessible to residents, workers or the general public to stay as cool as possible
  during hot weather, so that people can still work, socialise and recreate outdoors and also use active transport
  modes.

#### Design principles:

- Design buildings for high passive thermal performance, to reduce reliance on energy for cooling (and heating).
- Install energy-efficient fittings and appliances.
- Install solar power to offset energy demands and reduce peak electricity demands.
- Design outdoor spaces to stay cool in hot weather, considering orientation, including shade and irrigated vegetation in the landscape.
- Minimise the use of thermally massive surface materials like concrete that absorb energy and stay warm, reemitting heat into outdoor areas.
- Use cool roofing materials, with a high Solar Reflectance Index (SRI). Green roofs are also encouraged, particularly where there is a need to minimise glare from roofs.
- Consider cool paving (high albedo and/or high thermal emittance) or permeable paving. Although these
  materials are not suitable in all situations, they should be used wherever possible. Use cool paving wherever
  glare is not a constraint and there are potential cooling benefits. Use permeable paving where traffic loads are
  light and where there is an opportunity for rainfall to soak into soil below the pavement.
- Shade paved surfaces and walls where possible, also considering solar access in the cooler months.
- Limit the solar reflectivity of glazed façades, and shade reflective façades with vegetation and/or architectural features.
- Maximise landscaped area within the development. Within landscaped areas, maximise soil volumes, and plant trees that will grow to have large, dense canopies. Also include understorey plantings.
- Provide irrigation to landscaped areas, to support healthy vegetation and enable evapotranspiration, which has
  a cooling effect.
- Where an irrigation system is not feasible, provide passive irrigation enable runoff from adjacent hard surfaces
  to soak into landscaped areas.

- Include features that store water in the landscape for example rain gardens, wetlands and ponds. Also
  consider the use of fountains, misting fans or water play features to create particular cool zones in the landscape.
- Connect irrigation systems and water features to a sustainable supply of non-potable water (e.g. rainwater tank, stormwater harvesting scheme, recycled water) so that a water supply is more likely to be available for cooling, even in times of drought and restricted mains water use.
- Provide for active transport (e.g. pedestrian routes where thermal comfort is prioritised, bike parking and other
  end-of-trip facilities) and electric vehicles (e.g. appropriate parking spaces with access to power) to encourage
  their use.

#### Development controls:

- All development must consider the design principles above.
- All buildings are to minimise their contribution to the urban heat island effect by meeting the following cool roof requirements:
  - At least 75% of the roof area is to meet nominated Solar Reflectance Index (SRI) values or be designed as a green roof and covered with vegetation.
  - Areas where PV is mounted flat on roof are excluded; all other roof areas with PV count toward the Cool Roof calculation.
  - o Nominated SRI minimums:
    - for roof pitch < 15°, 3-year SRI minimum of 64</li>
    - for roof pitch > 15°, 3-year SRI minimum of 34
    - for terrace areas, 3-year SRI minimum of 28.
  - o Provide a plan illustrating all roof surface areas and associated SRI values or notation as green roof.
  - o Provide roof product cut sheets to verify SRI performance.
- There are other requirements listed elsewhere in this DCP that are also relevant to meeting the urban heat objectives above:
  - o Energy efficiency in non-residential buildings
  - Rooftop solar power
  - o Landscaped areas (including minimum total areas, minimum deep soil areas, minimum irrigated areas)
  - O Trees (including tree protection, tree replacement and requirements for new trees)
  - o Alternative water supplies for non-residential development
  - Water sensitive urban design
  - Active transport
  - o Electric vehicles.
- For residential buildings, thermal performance and energy efficiency standards are set within BASIX.
- For non-residential buildings, thermal performance standards are defined in the National Construction Code, for the relevant building type.

#### Further information

WSROC 2020 Urban heat planning toolkit

# 7.1 NEW PROVISIONS

#### Cool roofs

Recommended wording for a cool roof standard is included in the suggested urban heat provision above. Note that the these standards match those in the current Green Star rating system and the planned Green Star for Homes scheme currently in development (due to be finalised early 2021). These standards also align closely with the LEED building rating system used internationally.

#### Cool façades

The City of Parramatta has been developing draft DCP provisions for urban heat in the Parramatta CBD, and they have developed a proposed DCP provision to minimise the reflection of solar radiation from façades. This is a particular concern for the CBD where reflective materials are often used on building façades. It may be relevant in other town centres.

The City of Parramatta's draft provision is included in Appendix A. This was developed following a technical study (Flux 2020) to investigate available evidence and define suitable parameters. The draft clause includes requirements for both minimising the solar reflectivity of façade materials, as well as for minimum shading of façade surfaces.

#### Heat rejection

The City of Parramatta's draft CBD DCP also includes a proposed clause relating to heat rejection from cooling systems. Again, this is applicable to high density development. The proposed clause, included in Appendix A, encourages centralised heat rejection from the upper most roof.

# <u>Energy efficiency in non-residential</u> <u>development</u>

Many DCPs already include energy efficiency targets for non-residential buildings (i.e. those buildings not covered by BASIX). A simple approach is to set a target with reference to the National Australian Built Environment Rating System (NABERS). There are several councils that now require minimum NABERS ratings (based on actual building energy use) above and beyond minimal code design. An example from the City of Sydney's DCP (2012) is included in Appendix A. It sets a NABERS 5.5 star target for new developments above a certain size.

Note that the City of Parramatta has taken a different approach with their proposed "high performing

buildings" clause in the draft LEP provisions for the CBD. This clause is proposed to apply to a range of development types including residential and commercial buildings above certain size thresholds. The clause takes a different approach for commercial and residential development (or the commercial/residential components of a mixed-use development).

For commercial buildings, the proposed approach uses a 'best-in-market' target. A new development must meet a performance standard which is "within the top 15% of the performance of similar existing buildings of a similar usage type in the Sydney metropolitan region, benchmarked on an emissions ( $CO_2$ e/sqm) basis at the time of application" (City of Parramatta 2020). This example is also included in Appendix A, however it is important to note that this is only a draft provision, and a Planning Proposal is currently with DPIE for review.

# <u>Alternative water supplies for non-</u> residential development

Some DCPs include provisions for alternative water supplies in non-residential development. Typically, these are included along with other water-related provisions in DCPs, under a water conservation objective. Examples include:

- Blacktown DCP 2015 Part J (p.17) includes a
  provision "Industrial and business developments
  must supply 80% of their non-potable demand
  using non potable sources. Rainwater shall be the
  primary source and only supplemented by recycled
  water when rainwater cannot meet 80% of the
  demand. When the 80% demand threshold cannot
  be met, the use of non-potable sources shall be
  maximised and be considered on a merits basis by
  Council."
- Parramatta DCP 2011 Part 3, Section 3.3.6.2 (pp.68-69) includes the following requirements for non-residential developments above certain size thresholds:
  - "Rainwater tanks or other alternative water sources are to be installed to meet 80% of toilet and laundry demands."
  - "Irrigation, water features and other open space features are to be supplied from alternative sources (e.g. rainwater, greywater, or wastewater) to meet 80% of demand."

# 7.2 EXISTING PROVISIONS TO STRENGTHEN

The following topics are multi-objective, and often covered already in existing DCPs. Recommendations are provided on how these existing provisions could be strengthened to better address urban heat. Relevant examples are provided in Appendix A.

#### Tree preservation

Most DCPs define prescribed trees on the basis of tree height, sometimes also trunk diameter. A simple yet important amendment to improve urban heat outcomes would be to add a canopy spread/crown width criteria to the definition of a prescribed tree. Some DCPs include canopy spread as an additional consideration, but ideally it should be included as one of the basic criteria.

North Sydney's DCP 2013 Section 16 (Tree and Vegetation Management) is a good example that focuses on canopy throughout. It includes a crown width of 10m as one of the criteria defining a prescribed tree. This section of North Sydney's DCP is included for reference in Appendix A.

## Tree replacement and new plantings

Some DCPs include provisions for tree replacement and/or an in-lieu contribution to tree planting in the public domain, if new trees cannot be accommodated on site.

Consider strengthening provisions for tree replacement and new plantings as follows:

- Where prescribed trees are removed, consider requiring their replacement with multiple trees, depending on the size of the tree removed.
- Specify where new trees are required to be planted (e.g. within setbacks, deep soil zones), and required planting density.
- Provide clear requirements for any new trees, e.g. minimum pot size, expected height, canopy spread.
- Provide a list of suitable species, including species appropriate to different situations, and considering species likely to be resilient to climate change. Where councils have not developed their own species lists, the 'Which Plant Where' project may provide a useful resource when its proposed plant selection tool becomes available.
- Provide guidance on establishment and long-term maintenance of trees, including active or passive irrigation.

Cumberland City Council's draft DCP 2020 includes a simple requirement for replacement of larger trees with

multiple offsets. This clause is included for reference in Appendix A.

Coutts and Tapper (2017) argue that trees should be placed strategically throughout the landscape so as to deliver the largest cooling and thermal comfort benefits possible. The priorities are:

- Hotspots, e.g. where there is a large amount of impervious surface;
- Areas of concentration of vulnerable populations (elderly and very young); and
- Areas where people move and gather outdoors (behavioural exposure).

For maximum outdoor cooling, target the southern side of east-west oriented streets (greater solar exposure) and the eastern side of north-south oriented streets. Use of deciduous species is recommended where solar gain is desired for either buildings or outdoor open spaces in winter.

While contiguous shade can be important (e.g. for active transport corridors), it is also important to allow sufficient gaps between groups of trees to prevent trapping of heat at night — heat should be able to dissipate to the night sky.

#### Landscaped areas

Most existing DCPs include landscaped area targets (as a proportion of the site area) for different development types. Targets often vary according to lot size.

Consider strengthening these provisions by:

- Specifying minimum landscaped areas for all development types.
- Increasing targets where possible.
- Defining landscaped areas as a percentage of the site area, so that overall outcomes are clear.
- Clearly defining the landscaped area as a vegetated, pervious area.
- Including requirements for minimum dimensions of landscaped areas, as landscaped areas with more generous dimensions should be better able to support large canopy trees. For example, the Warringah DCP 2011, Section D1 states that "any open space areas with a dimension of less than 2 metres are excluded from the calculation [of landscaped open space]".
- For subdivisions, including requirements that a specified proportion of the landscaped area is provided in a consolidated area (e.g. as

communal open space) which can support multiple large trees.

Currently most landscaped area provisions in DCPs are focused on minimum targets, but new approaches are emerging that encourage higher performance (e.g. landscaped areas that work harder to reduce urban heat) beyond minimum requirements. An approach currently being used internationally and trialled on a voluntary basis in the City of Melbourne is a 'green factor' scorecard, which can be designed to account for a wide variety of landscape/green infrastructure features in a development, and give each element a weighted score. Developers may be asked to meet a minimum score, but are given flexibility as to how that score is achieved. Developers could also potentially be offered incentives to meet higher scores.

#### Deep soils

Some DCPs include provisions for deep soil zones in medium and high density residential development, typically as a proportion of the site area.

Consider strengthening these provisions by:

 Clearly define what is meant by a deep soil zone (i.e. no structures below such as underground car parks).

- Defining minimum targets for all types of development.
- Defining minimum dimensions for deep soil zones (e.g. a minimum width or square area or similar dimension) so that the space can support a tree/s of a specific sizes (small, medium, large) depending on the site and immediate context)
- Defining physical features to be avoided, wherever possible, in deep soil zones (e.g. shallow bedrock, steeply sloping land), to maximise potential for deep soil zones to support canopy cover and retention of water for evapotranspiration.
- Defining suitable alternatives (e.g. structural soils) where deep soil is not achievable.
- Defining not only the required area of deep soils, but also requirements for tree planting and other vegetation within deep soil zones.

The Victorian Planning Provisions, Clause 58.03-5 tabulates deep soil and canopy tree requirements for developments of different scales. These are included in Table D2, which is reproduced below.

Table D2 Deep soil areas and canopy trees

Site area	Deep soil areas	Minimum tree provision
750 - 1000 square metres	5% of site area (minimum dimension of 3 metres)	1 small tree (6-8 metres) per 30 square metres of deep soil
1001 - 1500 square metres	7.5% of site area (minimum dimension of 3 metres)	1 medium tree (8-12 metres) per 50 square metres of deep soil     or     1 large tree per 90 square metres of deep soil
1501 - 2500 square metres	10% of site area (minimum dimension of 6 metres)	1 large tree (at least 12 metres) per 90 square metres of deep soil or 2 medium trees per 90 square metres of deep soil
>2500 square metres	15% of site area (minimum dimension of 6 metres)	1 large tree (at least 12 metres) per 90 square metres of deep soil or 2 medium trees per 90 square metres of deep soil

Note: Where an existing canopy tree over 8 metres can be retained on a lot greater than 1000 square metres without damage during the construction period, the minimum deep soil requirement is 7% of the site area.

#### Water sensitive urban design

Water sensitive urban design (WSUD) is often identified as a key strategy to reduce urban heat, however its main objective is typically focused on improving the health of urban waterways.

In principle, WSUD involves reducing impervious cover and retaining more water in the landscape, encouraging more infiltration and evapotranspiration, reducing runoff and treating any stormwater runoff before it is discharged off site. Vegetated stormwater treatment systems including wetlands, rain gardens and swales are classic features of a WSUD approach.

However, when WSUD provisions have been written into DCPs (and most metropolitan councils now include such provisions) the focus has been on stormwater quality outcomes. While the objectives listed in the DCP may be broader, typically the only quantitative targets set are to reduce stormwater pollutant loads. These have become the focus of development approvals, as they form a clear performance standard against which development can be assessed.

The response of the development industry has been to optimise stormwater treatment systems to meet stormwater quality targets in the smallest possible footprint, at the lowest possible cost. Rather than vegetated systems, many developers (particularly on smaller, infill sites) are installing cartridge filters, which can be accommodated in the basement of a building. This approach involves no increase in green infrastructure, no additional water retained in the landscape, and no tangible reduction in urban heat.

There are several organisations currently working towards better implementation of WSUD in Western Sydney, including:

Sydney Water has been testing development scenarios for Western Sydney growth areas, and investigating how to improve water management outcomes (Sydney Water 2020).

The Parramatta River Catchment Group (PRCG) are currently investigating options to improve planning provisions both at local and state level, to help realise the goals of the Parramatta River Masterplan (McAuley and Davies, 2020).

In both cases, their work has recommended more focus on reducing runoff and retaining water in the landscape, via:

- Increasing the landscaped area and tree canopy area in new development.
- Use of vegetated stormwater treatment systems, which filter water, encourage infiltration and retain water in the landscape.
- A much stronger emphasis on rainwater or stormwater harvesting and reuse.

These measures would support better outcomes for urban waterways as well as better green infrastructure outcomes in the catchment.

Among the recommended improvements to planning provisions in McAuley and Davies (2020) there is significant overlap with the suggestions above, particularly to improve provisions for landscaped areas, deep soils, trees, and alternative water supplies. There are also recommendations to:

- Include stormwater flow volume reduction targets in DCPs. This would be defined as a percentage reduction from baseline mean annual flow volume (where the baseline is usually defined as postdevelopment, before stormwater management measures are applied).
- Encourage vegetated stormwater treatment systems, particularly bioretention systems with saturated zones.

Both of these recommendations would also improve urban heat outcomes by encouraging the retention of more water in the landscape, and therefore both should be supported from an urban heat perspective.

# 7.3 OTHER IDEAS TO CONSIDER

# Incentives for higher performance

As mentioned above, the City of Parramatta's draft high performing buildings clause for their CBD LEP is also proposed to apply to residential buildings. As residential buildings are subject to the BASIX SEPP, higher performance targets would not be mandatory for residential buildings (or residential components of mixed use development), but developers would be encouraged to meet higher standards, with an incentive of a floor space bonus (5% additional FSR).

In the City of Parramatta's proposed LEP, the high performance standards for residential buildings would be set with reference to BASIX, calling for BASIX energy and water scores 10-25 points above the minimum (depending on the height and FSR of the building). The targets are based on a study that investigated the potential for different types of buildings to meet higher BASIX scores.

The City of Parramatta example is also included in Appendix A. A similar approach may be applicable in other high-density (e.g. CBD) locations. Beyond these areas, bonus floor space may not be an appropriate incentive, but other incentives could potentially be devised. When it is released, Green Star Homes could also be used as the benchmark for high performance residential development.

## Rooftop solar power

Mandatory solar power may be appropriate for large developments (e.g. industrial developments with large roof areas and high energy demands), where the upfront expense is easier to justify. However no examples of existing DCP provisions have been identified.

Most DCPs currently include solar access provisions, which minimise the extent to which development can block solar access to neighbouring properties, particularly to their principal living areas and principal open space. Sometimes these provisions mention overshadowing of solar panels as a relevant consideration, however this is not usually accompanied by any strict controls. One example where the DCP encourages new buildings to avoid overshadowing is the Tweed DCP 2016, Section A1, 4.3 (p. 54): "New dwelling design should minimise overshadowing on existing adjacent solar panels where other reasonable design alternatives are possible."

In Victoria, Moreland Council has a stronger provision in their planning scheme (within Clause 55.03-5, Standard B10):

"Buildings should be:

- "Sited and designed to ensure that the energy efficiency of existing dwellings on adjoining lots is not unreasonably reduced.
- "Sited and designed to ensure that the performance of existing rooftop solar energy systems on dwellings on adjoining lots in a General Residential Zone, Neighbourhood Residential Zone or Township Zone are not unreasonably reduced. The existing rooftop solar energy system must exist at the date the application is lodged."

Moreland Council has also published an 'Advisory Note' on assessing overshadowing impacts on solar panels, which establishes a process where Council can request a detailed technical report assessing the 'reasonableness' of the impact, and suggesting a pathway where the applicant is encouraged to enter into discussions with an objector to explore mutually agreeable alternatives such as re-designing the development to reduce the overshadowing impact on the solar panels, contributing to the supply of new panels or relocating existing panels.

More commonly, current NSW DCPs encourage developers to consider potential future development and anticipate potential future overshadowing in the placement of solar panels (e.g. Marrickville DCP 2011, Part 2.7).

#### Active transport and electric vehicles

Transport is a significant factor in city-scale carbon emissions. To a large extent, transport planning is beyond the remit of local council planning provisions and development controls, however there are a few important levers available to councils in local planning instruments, such as provisions for parking (both car and bicycle parking) and electric vehicles.

DCPs can encourage less car use, a transition to electric vehicles and active transport, by:

- Requiring fewer car parking spaces and more bicycle parking in new developments.
- Requiring end-of-trip facilities for active transport in commercial and industrial buildings (e.g. showers and change rooms).
- Providing for electric vehicles, for example by requiring dedicated parking and charging stations in new development.

An example electric vehicle clause is included in Appendix A, from Waverley's DCP (2012).

#### Green roofs and walls

While mandatory green roofs and walls are not appropriate, a DCP can encourage these measures by including appropriate design guidance.

An example DCP clause, developed by the City of Parramatta for their draft CBD DCP, is included in Appendix A. This establishes minimum design standards for situations where these features are included in a development. This example could be strengthened by including reference to design and technical factors which support cooling, for example insulation values.

#### <u>Irrigation</u>

Most DCPs encourage xeriscaping rather than irrigation, however this potentially has negative consequences for urban heat.

Consider setting targets for minimum irrigated areas in different development types.

Sutherland DCP 2015 Chapter 4 (Multi Dwellings) requires irrigation systems to be installed in common open space areas and for podium planting, with rainwater tank connection.

Councils typically seek to limit irrigation in the public domain, to minimise operation and maintenance costs. However some councils are experimenting with passive irrigation reservoirs under street tree plantings. If preferred designs can be established for such systems in a particular LGA, then these could be included in planning provisions.

#### Shade

Some DCPs require awnings in certain situations. Consider additional requirements for shade cover, particularly where development will extend into the public domain and where there is high use or pedestrian traffic. Consider temporary structures, or structures that can be removed and replaced with the seasons, as well as permanent structures. Streetscape and public domain design guidelines could provide more detailed design guidelines for shade.

# <u>Heat rejection (in low and medium density</u> development)

Some DCPs include requirements for locating residential air conditioning units with respect to neighbouring properties.

Existing provisions are typically focused on noise and sometimes visual amenity. To meet these objectives, DCPs may include a requirement that air conditioning units are located away from property boundaries and/or away from the habitable rooms of adjoining properties, however some also allow noise and visual objectives to be met with a screening structure.

Consider stricter requirements for air conditioning units to be located away from the habitable rooms of adjacent properties, to minimise heat transfer.

# 8 BEYOND LOCAL PLANNING CONTROLS

#### 8.1 IMPROVING BASIX

In the first part of this document, the point was made that local planning provisions have a limited role, and several important aspects of urban heat are covered by the NCC and BASIX.

Furthermore, the current limitations of BASIX were explained in some detail. This makes the basis of a case for substantial revision to the BASIX SEPP, to include:

- Updated climate data;
- Stronger energy efficiency and thermal comfort targets;
- An additional performance target for thermal safety/thermal autonomy, similar to CIBSE TM 59;
- The ability for local councils to impose higher or more detailed standards where local circumstances like urban heat stress warrant this consideration.

WSROC and its member councils should engage with DPIE to press the case for improving BASIX.

# 8.2 IMPROVING PLANNING FOR MAJOR PRECINCTS

In precinct-scale development, particularly in greenfield areas, there are important decisions made in the early planning stages (e.g. at structure planning stage) that have a bearing on urban heat outcomes. For example:

- Orientation of streets, and the buildings that address them, in relation to solar exposure and prevailing breezes.
- Geometry of streets the ratio between street width and the height of the built form on either side.
- Street design in the early planning stages when space is allocated to road reserves, canopy cover and water sensitive urban design need up-front consideration.
- Planning for parks, open space and green grid connections should consider how the precinct will provide appropriate opportunities for outdoor recreation and active trasnsport connections to

community facilities and transport nodes, which are appropriate for use during hot conditions.

General design considerations around outdoor thermal comfort, with a view to optimising urban design for solar access, shading, materials and appropriate vegetation, are:

- Open spaces between low buildings experience higher temperatures during the day due to high solar exposure – in comparison, narrow spaces between tall buildings that are shaded during the day may trap heat at night. Large street trees would provide a higher cooling benefit in the former situation.
- Building spacing and (where possible) street orientation should facilitate cross-ventilation and wind circulation. Santamouris et al (2020) identifies the directions of the main cooling breezes in Western Sydney.
- Topography is a significant factor: placing tree canopy on the northern side of a development which slopes to the south is a much more effective design measure than applying shading devices to the southern side of the building; and green open space at the top of a hill may distribute cool air to its surroundings more effectively than green open space at a low point in the landscape.

These considerations are mainly relevant in larger development precincts, where there are opportunities to define such major features of the urban form. Therefore, rather than including these considerations in councils' main DCP document, it would be worth considering other avenues, such as precinct master planning, to encourage their consideration in precinct planning.

Other potential opportunities in larger precincts could include:

- Strategic location of cool zones, cool streets and cool refuges (including links with the Green Grid).
- Higher site-specific standards (e.g. NABERS or BASIX targets, landscaped area targets, etc.).
- Precinct-wide strategies for energy, water, transport and other services, that enable innovation.

# 8.3 IMPROVING LOCAL DESIGN GUIDELINES

Councils often publish design guidelines on specific topics where more detailed design guidance is required beyond the DCP. These may include:

- Public domain design guidelines
- Streetscape design guidelines
- Water sensitive urban design guidelines

These guidelines could also have a strong influence on urban heat outcomes, by defining design standards.

These more detailed design guidelines are beyond the scope of this toolkit, but have been the subject of other recent projects, particularly for streetscapes. A recent Western Sydney project has developed (to final draft stage) the Western Sydney Street Design Guidelines (Aspect 2019). These are a good model that accounts for all the spatial conflicts in streetscapes and aims for better landscape outcomes.

Other guidelines from elsewhere (e.g. Coutts and Tapper 2017, E2Designlab 2019) include more specific design guidance related to urban heat in streetscapes, including guidance on planting design for cooling in relation to street geometry, and guidance on integrating WSUD with trees to support cooler streets.

Other design guidelines and tools are also emerging, including:

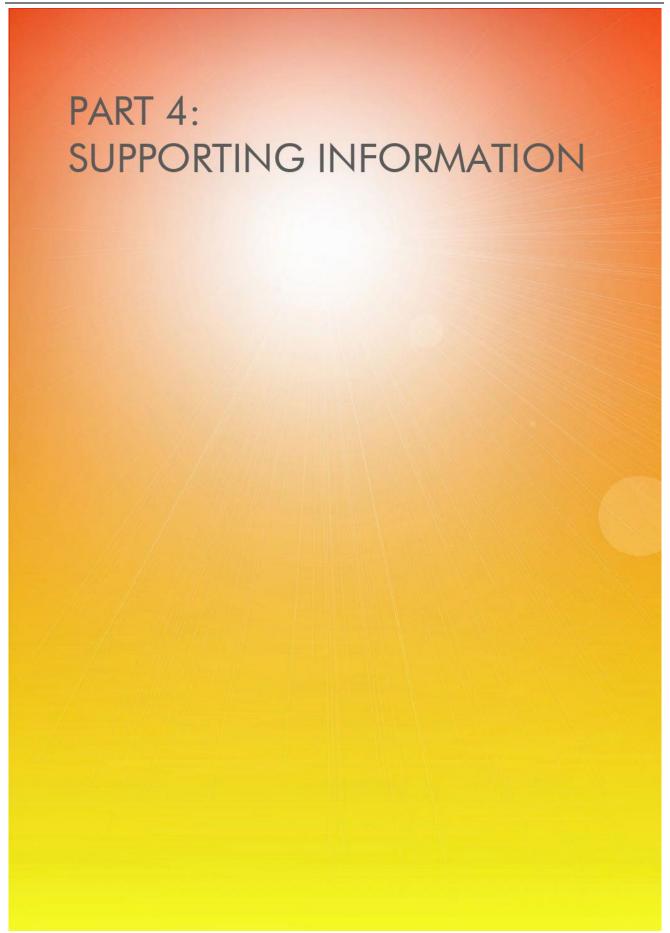
- Which Plant Where, a project being undertaken in partnership between Macquarie University and Western Sydney University, is developing guidance on selection of appropriate plant species for locations around Australia, considering which species will be suitable as the climate changes.
- WSROC, in collaboration with Resilient Sydney and the Greater Sydney Commission, is developing a 'Cool Suburbs' rating tool, which will provide a 'cool score' for new and existing

At some point it would be useful to bring various design guidance together into one place, possibly adding to the Western Sydney Street Design Guidelines, to cover cool streets in more detail. Public domain design guidelines and WSUD guidelines could also be updated to better address urban heat.

# 8.4 IMPROVING LEP AND DCP PROVISIONS OVER TIME

As noted above, the first generation of local planning provisions for urban heat will need to be reviewed and improved over time. This should include:

- Monitoring and review to understand effectiveness of the provisions in practice, identify unintended outcomes and opportunities for improvement.
- Including updated research findings as the field progresses.
- Incorporating new tools and methods as these are developed.



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# **GLOSSARY**

Perceived thermal comfort that adjusts with varying outside conditions. Adaptive comfort

Albedo A measure of the diffuse reflection of solar radiation from a surface, measured on a scale

Ambient temperature Average air temperature in the environment. In this toolkit, the term "ambient temperature"

is used to refer to the average air temperature at the city-scale or precinct-scale (as distinct

from a microclimate scale).

Extremely hot days/ Extreme heat

Defined by the Climate Council as temperatures 40°C and over.

Feels like An expression of the equivalent temperature defined by human experience. "Feels like" temperature generally takes into account wind speeds and humidity, and may include other (temperature)

factors, to assess how the human body actually feels temperature.

Green infrastructure Any vegetation in the urban environment.

Heatwaves Defined by the Australian Bureau of Meteorology as a period of three or more consecutive

days of high maximum and minimum temperatures which are unusual for that location.

Hot days Defined by the Climate Council as days between 30°C and 35°C.

Microclimate The climatic conditions of a very small or restricted area, especially when this differs from

> the climate of the surrounding area. In the case of urban heat, microclimate typically refers to conditions experienced at a human scale in different places within the urban environment - for example the microclimate in a well-irrigated landscape under a shady tree will be different to the microclimate in a paved area with no shade and surrounding heat-reflective

Passive survivability A building's ability to maintain critical life-support conditions in the event of extended loss of

power, heating fuel, or water.

Passive thermal performance

A building's ability to maintain a comfortable and relatively stable internal temperature,

without powered heating or cooling, in fluctuating external conditions.

Radiant temperature A measure of thermal radiation emitted from adjacent surfaces.

Solar Reflectance Index (SRI)

A measure of a constructed surface's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black surface (reflectance 0.05, emittance

0.90) is 0 and a standard white surface (reflectance 0.80, emittance 0.90) is 100.

Surface temperature Temperature measured at a surface.

Thermal autonomy A measure of the percentage of time a building can maintain a specific set of comfort

conditions passively (without air conditioning or heating), despite outdoor temperature

Thermal comfort The condition of mind that expresses satisfaction with the thermal environment; i.e. the

conditions in which a person feels neither too cold nor too warm.

Thermal emittance The rate at which heat is radiated from a surface

The condition of body that maintains balanced heat gains and losses with the environment Thermal safety

> to avoid inducing a dangerously low or high body temperature. A thermally safe environment remains within a range of temperatures that protect people from injury or death resulting

from over-heating or over-cooling.

Universal Thermal Climate Index (UTCI) A standard measure of "feels like" temperature.

Urban heat A general term that refers to high temperatures in urban areas that pose a risk to our

communities and infrastructure.

Urban heat island (UHI) effect

The tendency of cities to be much warmer than their rural counterparts. Urban surfaces such as roads and roofs absorb, hold, and re-radiate heat; raising the temperature in our urban areas. Human activities such as traffic, industry, and electricity usage also generate heat

that adds to the urban heat island effect.

Very hot days Defined by the Climate Council as days between 35°C and 40°C.

Water sensitive urban design (WSUD)

An approach to urban water management that aims to minimise impacts on the natural

water cycle.

Xeriscaping The practice of designing landscapes to reduce or eliminate the need for irrigation.

# APPENDIX A EXAMPLE CLAUSES

# **COOL FACADES**

# City of Parramatta draft urban heat controls developed for the Parramatta CBD DCP

#### **Objectives**

O1. To minimise the reflection of solar heat downward from the building façade into private open space or the public domain.

#### Controls

C1. The extent of the vertical façade of street walls (or if no street wall, as measured from the first 12 metres from the ground plane) that comprise Reflective Surfaces must demonstrate a minimum percentage of shading as defined in Table 1 as calculated on 21 December on the east facing façade at 10am, northeast and southeast facing façade at 11.30am, north facing façade at 1pm, northwest and southwest facing façade at 2.30pm and the west facing faced at 4pm (as shown in Figure 1.2).

Table 1
Minimum podium percentage shading

Reflective Surface Ratio (RSR)	<30%	30%-70%	>=70%
Minimum percentage shading (%)	0	1.5*RSR-45	75

Shadow diagrams must be submitted with the development application quantifying the extent of shading at 10am, 11.30am, 1pm, 2.30pm and 4pm on 21 December for each relevant façade. Shadows from existing buildings, structures and vegetation are not considered in the calculations. Refer to Table 2 for sun angles corresponding to shading reference times.

Calculation of RSR for each relevant façade must also be submitted with the development application.

Table 2 Shading sun angles

Façade Orientation	Sun Angles	
East ± 22.5°	Reference Time: 10am AEDT (UTC/GMT+11)	
	Sun Elevation: 51°	
	Sun Azimuth: 86°	
Northeast/Southeast ± 22.5°	Reference Time: 11.30am AEDT (UTC/GMT+11)	
	Sun Elevation: 69°	
	Sun Azimuth: 66°	
North ± 22.5°	Reference Time: 1pm AEDT (UTC/GMT+11)	
	Sun Elevation: 80°	
	Sun Azimuth: 352°	
Northwest/Southwest ± 22.5°	Reference Time: 2.30pm AEDT (UTC/GMT+11)	
	Sun Elevation: 67°	

	Sun Azimuth: 290°
West ± 22.5°	Reference Time: 4pm AEDT (UTC/GMT+11)
	Sun Elevation: 48°
	Sun Azimuth: 272°

C2. The extent of the vertical façade of the tower (above the street wall or if no street wall, as measured above the first 12 metres from the ground plane) that comprise Reflective Surfaces must demonstrate a minimum percentage of shading as defined in Table 3 as calculated on 21 December on the east facing façade at 10am, northeast and southeast facing façade at 11.30am, north facing façade at 1pm, northwest and southwest facing façade at 2.30pm and the west facing faced at 4pm (as shown in Figure 1.4).

Table 3
Minimum tower percentage shading

Reflective Surface Ratio (RSR)	<30%	30%-70%	>=70%
Minimum percentage shading (%)	0	0.8*RSR-24	40

Shadow diagrams must be submitted with the development application quantifying the extent of shading at 10am, 11.30am, 1pm, 2.30pm and 4pm on 21 December for each relevant façade. Shadows from existing buildings, structures and vegetation are not considered in the calculations. Refer to Table 2 for sun angles corresponding to shading reference times.

Calculation of RSR for each relevant façade must also be submitted with the development application.

- C3. Shading may be provided by:
  - a) External feature shading with non-reflective surfaces;
  - b) Intrinsic features of the building form such as reveals and returns; and
  - c) Shading from vegetation such as green walls that is consistent with the controls on Green Roofs or Walls in Section #### Landscaping.
- C4. Non-reflective surfaces of vertical facades do not require shading and these areas can be excluded from the calculations.
- C5. Where it is demonstrated that shading cannot be achieved in accordance with the above controls, a maximum external solar reflectance as defined in Table 4 and as indicated in Figure 1.1 is generally acceptable.

Table 4
Maximum solar reflectance of Reflective Surfaces.

Reflective Surface Ratio (RSR)	<30%	30%-70%	>=70%
Maximum External Solar Reflectance (%)	No Max.	62.5-0.75*RSR	10

- C6. Where multiple reflective surfaces or convex geometry of reflective surface introduce the risk of focussing of solar reflections into the public spaces:
  - a) Solar heat reflections from any part of a building must not exceed 1,000W/m2 in the public domain at any time;
  - b) A reflectivity modelling report may be required to qualify extent of reflected solar heat radiation.

# HEATING AND COOLING SYSTEMS - HEAT REJECTION

# City of Parramatta draft urban heat controls developed for the Parramatta CBD DCP

#### **Objectives**

- O2.To reduce the impact of heat rejection from heating, ventilation and cooling systems from contributing to the urban heat island effect in the Parramatta Local Government Area; and
- O3.To avoid or minimise the impact of heat rejection from heating, ventilation and cooling systems on user comfort in private open space and the public domain.

#### Controls

- C1. Residential apartments within a mixed use development or residential flat building, and non-residential development should incorporate efficient heating, ventilation and cooling systems which reject heat from a centralised source on the upper most roof.
- C2. Where the heat rejection source is located on the upper most roof, these should be designed in conjunction with controls in this Section of the DCP relating to Roof Surfaces and the controls on Green Roofs or Walls in Section #### Landscaping.
- C3. No heat rejection units shall be located on the street wall frontage on the primary street.
- C4. Heat rejection units are strongly discouraged from being located on building facades or on private open space, such as balconies and courtyards. However, where it is demonstrated that heat rejection cannot be achieved in accordance with the above controls C1 and C2 above and these units are installed, the HVAC system must demonstrate:
  - a) Heating, ventilation and cooling systems exceeds current Minimum Energy Performance Standard requirements; and
  - The heat rejection units are situated with unimpeded ventilation, avoiding screens and impermeable balcony walls; and
  - The area required by the heat rejection units is additional to minimum requirements for private open
- C5. Where a mixed use development or residential flat building proposes wintergardens as the primary private open space, no heat rejection source from heating, ventilation and cooling systems are permitted to be located in the wintergarden (add Wintergarden cross reference ####)

# **GREEN ROOFS OR WALLS**

## City of Parramatta draft urban heat controls developed for the Parramatta CBD DCP

#### **Objectives**

- O1. To ensure that green roofs or walls are integrated into the design of new development.
- O2. To encourage well designed landscaping that caters for the needs of residents and workers of a building.
- O3. To design green walls or roofs to maximise their cooling effects.
- O4. To ensure green walls and roofs are designed and maintained to respond to local climatic conditions and ensure sustained plant growth.

#### Controls

- C1. Green roof and wall structures are to be assessed as a part of the structural certification for the building. Structures designed to accommodate green walls should be integrated into the building façade.
- C2. Waterproofing for green roofs and walls is to be assessed as a part of the waterproofing certification for the building.

- C3. Where vegetation or trees are proposed on the roof or vertical surfaces of any building, a Landscape Plan must be submitted which demonstrates:
  - Adequate irrigation and drainage is provided to ensure sustained plant growth and health and safe use of the space;
  - Appropriate plant selection to suit site conditions, including wind impacts and solar access; and
  - Adherence to the objectives, design guidelines and standards contained in the NSW Department of Planning and Environment's Apartment Design Guide for 'Planting on Structures'.
- C4. Green roofs or walls, where achievable, should use rainwater, stormwater or recycled water for irrigation.
- C5. Container gardens, where plants are maintained in pots, are not considered to be green roofs.
- C6. Register an instrument of positive covenant to cover proper maintenance and performance of the green roof and walls on terms reasonably acceptable to the Council prior to granting of the Occupancy Certificate.

## **ENERGY EFFICIENCY**

# City of Sydney DCP 2012, Section 3.6.1

- 1) Development is to be designed and constructed to reduce the need for active heating and cooling by incorporating passive design measures including design, location and thermal properties of glazing, natural ventilation, appropriate use of thermal mass and external shading, including vegetation.
- Lighting for streets, parks and any other public domain spaces provided as part of a development should be energy efficient lighting such as LED lighting.
- 3) In multi-tenant or strata-subdivided developments, electricity sub-metering is to be provided for lighting, airconditioning and power within each tenancy or strata unit. Locations are to be identified on the development plans.
- 4) Electricity sub-metering is to be provided for significant end uses that will consume more than 10,000 kWh/a.
- 5) Car parking areas are to be designed and constructed so that electric vehicle charging points can be installed at a later time.
- Where appropriate and possible, the development of the public domain should include electric vehicle charging points or the capacity for electric vehicle charging points to be installed at a later time.
- Applications for new developments containing office premises with a net lettable area of 1,000sqm or more are to be submitted with documentation confirming that the building will be capable of supporting a Base Building National Australian Built Environment Rating System (NABERS) Energy Commitment Agreement of 5.5 stars with the NSW Office of Environment and Heritage. Such an agreement is to be entered into prior to any construction certificate being issued for the approved development.
- 8) Applications for developments involving alterations, additions and refurbishments to existing office premises where the estimated cost of works is over \$5 million, and contains a net lettable area of 1,000sqm or more, are to be submitted with documentation confirming that the building will be capable of supporting a Base Building National Australian Built Environment Rating System (NABERS) Energy Commitment Agreement of 5 stars with the NSW Office and Environment Heritage. Such an agreement is to be entered into prior to any construction certificate being issued for the approved development. Notwithstanding, a Base Building National Australian Built Environment Rating System (NABERS) Energy Commitment Agreement of 5 stars is not required where the consent authority is satisfied that:
  - the upgrade works would negatively impact on significant heritage fabric or the heritage significance of a listed heritage item, or
  - b) the costs associated with the energy efficiency upgrade works are unreasonable when compared to the overall estimated cost of works for the alterations, additions and refurbishment.
- Any application which may impact on significant heritage fabric or the heritage significance of a listed item is to be supported by a Heritage Impact Statement prepared by an appropriately experienced heritage consultant.

10) Where it is asserted that the costs are unreasonable under subclause (8) (b) the development application is to be supported by a registered Quantity Surveyor's detailed cost report itemising and verifying the cost of the required energy efficiency upgrade works.

## City of Parramatta draft LEP provisions for the CBD, Clause 7.6A

#### High performing buildings

- 1) The objectives of this clause are as follows:
  - a) to encourage high performing building design (namely the built form, layout and services) of office premises, large-scale retail premises, hotel or motel accommodation, serviced apartments, residential flat buildings and mixed use development in the Parramatta City Centre that minimises the consumption of energy and water, and
  - b) to provide increased amenity to occupants over the long term, and
  - to ensure the increase in gross floor area is compatible with surrounding buildings in terms of bulk, height and amenity
  - d) to ensure high performing building measures improve over time to reflect new technologies and commercial viability.
- 2) This clause applies to:
  - a) development for the purposes of office premises with a gross floor area of 1,250 square metres or greater; or
  - b) development for the purposes of retail premises with a gross floor area of 5,000 square metres or greater; or
  - c) development for the purposes of serviced apartments or hotel or motel accommodation; or
  - d) development for the purposes of residential flat buildings and mixed use development that includes residential accommodation, but only where:
    - the lot on which the development will be sited is at least 24 metres wide at the front building line and has a minimum site area of at least 1,800 square metres, and
    - the lot on which the development will be sited has a maximum floor space ratio of at least 6:1, as shown on either the Floor Space Ratio Map or Incentive Floor Space Ratio Map (as applicable to the development), and
    - iii) the applicant for the development has chosen to develop their building utilising this clause; or
  - e) significant alterations and additions (that have a capital value of more than \$5 million) to existing retail premises (with a gross floor area of 5,000 square metres or greater), office premises, hotel or motel accommodation or serviced apartments.
- 3) Before granting development consent to development under this clause, the consent authority must be satisfied
  - a) the part of any building used for the purposes in Column 1 of the table, does not exceed the energy emission in Column 2 of the table and the water usage in Column 3 of the table:

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Column 1	Column 2	Column 3
Retail premises (including as part of a mixed use development) – common areas only	< 52.8 kgCO2/m²/annum	< 1.1 kl/m²/annum
Office premises (base building)	< 63.8 kgCO2/m²/annum	< 0.5 kl/m²/annum
Hotel or motel accommodation or serviced apartments (whole building)	< 5,220 kgCO <sup>2</sup> /guest room/annum	< 76.1 kl/guest room/annum

Note: The energy and water requirements in Columns 2 and 3 were extracted from the Federal Government's National Australian Built Environment Rating System (NABERS) registry on 26February 2020 and represent the 15th percentile of best performance of similar existing buildings of a similar usage type in the Sydney metropolitan region. These requirements will be regularly reviewed by Council to ensure high performing building measures improve over time to reflect new technologies and commercial viability.

- b) a report prepared by a qualified consultant to the satisfaction of the Council verifies that:
  - (a) the necessary annual emissions intensity and water performance targets to meet the requirements under this subclause at the time of application have been established and confirmed, and
  - (b) the building will meet the annual energy and annual water performance targets established under this subclause, has adequate allowance (including budget) in the design of the building and its services to meet these targets, and is committed to a post occupancy verification against the targets.
- 4) The part of any building that is a dwelling, including as a part of a residential flat building or mixed use development, complies with the following higher BASIX Energy and BASIX Water standards (shown Column 2) than the minimum standards as provided in State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004, which correspond to the height of the building (shown in Column 1) and its floor space ratio (also shown in Column 2), as indicated in the table to this subclause.

Column 1	Column 2			
Building Height	Higher BASIX Energy and Water Standards			
	BASIX standard	Points above minimum BASIX standard for development with a floor space ratio of 6:1 or greater, up to, but not including, 14:1	Points above minimum BASIX standard for development with a floor space ratio of 14:1 or greater	
5-15 storeys	Energy	+25	+15	
	Water	+15	+15	
16-30 storeys	Energy	+20	+10	
	Water	+15	+15	
31-40 storeys	Energy	+10	+10	
	Water	+15	+15	
41+ storeys	Energy	+10	+10	
	Water	+15	+15	

**Note.** These higher BASIX standards may be subject to review following changes to the State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 by the NSW Government.

- 5) A residential flat building or a mixed use development (that contains dwellings) which complies with this clause is eligible for an amount of additional residential floor space (above that already permitted elsewhere under this Plan) equivalent to that which exceeds the floor space ratio as shown on the Floor Space Ratio Map or Incentive Floor Ratio Map (as applicable to that development) by up to 5%, subject to the consent authority being satisfied that this additional residential floor space does not adversely impact on neighbouring and adjoining land in terms of visual bulk and overshadowing.
- 6) This clause does not apply to land on which development to which clause 13 of State Environmental Planning Policy (Affordable Rental Housing) 2009 applies is to be carried out.
- 7) In this clause:

BASIX means a rating under State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004.

mixed use development means a building or place comprising two or more different land uses, where at least one of these land uses is dwellings.

#### **TREES**

# North Sydney DCP 2013, Section 16 [excerpts]

#### SECTION 16.2, Subsection 16.2.2 Clause P2:

Development Consent or a Tree Management Permit is required in accordance with Clause 5.9 of NSLEP 2013 for the removal or pruning of a prescribed tree or vegetation. The following trees and vegetation are prescribed for the purposes of this DCP:

- a) Any tree or vegetation on public land, regardless of size;
- b) Any tree or vegetation with a height of 10m, or a crown width of 10m, or a trunk circumference of 1.5m measured at 1m above ground level (existing); or
- c) Any tree that is declared a noxious weed and comprises a mature canopy tree;
- d) Any tree or vegetation more than 5 metre tall on land identified as a heritage item;
- e) Any tree or vegetation that is declared a noxious weed on land identified as a heritage item under cl.5.10 of NSLEP 2013 regardless of size;

# SECTION 16.5 NEW TREE PLANTING

#### 16.5.1 Objectives

- O1 To ensure that the current level of canopy cover in North Sydney is maintained and enhanced over the long term.
- O2 To ensure that sustained amenity is achieved by establishing a range of age classes within the urban tree population.
- O3 To ensure a species diversity that maintains or enhances the current urban character of North Sydney.
- O4 To enhance biodiversity through the strategic connectivity of canopy and habitat plantings between areas of bushland remnants (i.e. wildlife corridor creation).

#### 16.5.2 Provisions

#### Species Selection

P1 Species should be chosen after carefully evaluating the site constraints and the desired function of the tree (e.g. habitat, shade, safety, privacy or aesthetics).

P2 When planting is to take place on public land, Council's arborists will advise the appropriate species in accordance with the North Sydney Street Tree Strategy.

P3 When planting is to take place in bushland or bushland habitat areas, Council's Bushland Management Staff will determine appropriate species in accordance with the North Sydney Natural Area Survey 2010 and relevant Bushland Rehabilitation Plans.

P4 When planting on private property Council strongly recommends the use of a qualified arborist when selecting species.

P5 When selecting a species, the physical, ecological and horticultural characteristics should be considered.

- a) Physical characteristics include: mature dimensions (height, spread, trunk diameter) foliage density, evergreen or deciduous, tree shape or form.
- b) Ecological characteristics include: climatic durability, water efficiency, fauna habitat, invasivity in bushland.
- c) Horticultural considerations include: fruit/flower/seed drop, suitability to the site growing conditions, poisonous or allergic qualities, weed potential, suckering, root vigour, structural soundness, and longevity in the urban environment.

#### Planting Locations

P6 New trees should be located where there is adequate space for the chosen species to grow to its natural mature dimensions, survive in the long term and make a positive contribution to the amenity of an area.

P7 Any new street trees should be located in accordance with the North Sydney Council Street Tree Strategy.

P8 Any new trees on private property should be located in accordance with the objectives of the landscaping provisions throughout this DCP and the North Sydney Urban Forest Strategy.

#### Planting techniques

P9 All planting must be carried out in accordance with the detailed specifications appropriate to the site as set out in Council's Infrastructure Specification Manual for Roadworks, Drainage & Miscellaneous Works.

P10 Planting trees in footpaths adjacent to heavily trafficked streets may need:

- a) To be undertaken outside of peak hour traffic times.
- b) The approval of the RMS if it involves a state or arterial road.
- c) A Traffic Management Plan and/traffic control depending on the road.

#### Plant Establishment and Maintenance

To ensure the long term survival of any new vegetation a condition may be imposed on a Development Consent outlining a minimum landscape maintenance period. The length of the landscape maintenance period shall vary according to the specific works carried out and will be generally a minimum of 13 weeks.

P11 Erosion and sedimentation controls may need to be provided subject to the scale of the planting work proposed and the potential of causing pollution. These devices must be maintained regularly. Failure to install and maintain these devices may result in a fine and/or legal action.

P12 It is the responsibility of the developer/applicant to comply with the terms of any Development Consent issued by the Council in respect of maintenance requirements of trees or vegetation within the time stated in the consent.

## Cumberland draft DCP 2020, Part G Section 2.3

C2. For existing trees that are approved to be removed by Council as part of a proposed development, the following tree replacement offset planting is required:

- for existing trees removed that are a height of between 4m-9m, a 1:1 replacement offset applies; and
- for existing trees removed that are a height greater than 10m, a 2:1 replacement offset applies.

The preference is for offset planting to be undertaken on the property related to the development application. Any alternate locations are to be considered on merit by Council, with reference to applicable strategies and plans.

- C3. Tree species to be used for offset planting must be installed as minimum 45L container stock size and be of a species that is capable of reaching a height greater than 10m, given the proposed location and soil volume.
- C4. Landscaping shall be provided to enhance the streetscape and setting of development, incorporating a mix of trees, shrubs and ground covers planted appropriately and where necessary, providing essential screening or solar access roles.
- C5. Where trees are to be planted, consideration must be given to the species type, height and size of the tree at maturity and to the distance of the tree to any structure including stormwater pits and services such as overhead powerlines and underground pipework.
- C6. Proposed locations for tree species that reach a height of 10m or greater must maintain a minimum distance of 2m from all adjoining boundary fence lines at the time of planting.

## **ELECTRIC VEHICLES**

# Waverley DCP 2012, Part B, Section B8

8.8 Electric Vehicle Charging Points

#### Objectives

- (a) To accommodate changing technology in the design of developments to provide services for future users.
- (b) To accommodate hybrid and electric vehicles by ensuring that adequate charging points for these vehicles are provided in off-street private and public car parking areas.

#### Controls

- (a) All multi-residential developments, mixed use developments and commercial developments are to comply with this
- (b) The conditions of consent outlined in Table 6 below will be applied to any commercial, mixed use or multiresidential developments. Applicants are to demonstrate that the power provision on site is appropriate to be able to service these requirements.

Conditions of Consent for EV Charging Points

- All charging point locations are to be identified on CC Plans.
- All electric charging points are to have clear signage identifying:
  - Location;
  - Fees and charges, if any; and
  - Whether the bay is for public or private use only.
- A dedicated space and charging point for electric bicycles and mobility scooters to be charged must be provided.
- The installation of appropriate electrical infrastructure and capacity to allow at least 20% of Lot Owners (Eligible Lot Owner) to charge an electric vehicle at any one time in their own car space. Such infrastructure should:
  - (i) Allow for a minimum of 16A single phase charging per Eligible Lot Owner;
  - (ii) Be easily accessible for any Lot Owner to run a dedicated circuit to their own car space for the purposes of EV charging;
  - (iii) Be monitored by the Owners Corporation or a 3rd party on behalf of the Owners Corporation;
  - (iv) Include capacity for a billing system to account for the amount of electricity used; and

- (v) Measure electricity used by using utility grade, NMI registered electricity meters.
- The installation of 'Level 2' AC fast charging EV charging point/s is required in the common or visitor parking areas as follows:

#### Residential

- 1 charging point for developments with 5-10 dwellings; and
- 1 additional charging point for every 10 dwellings thereafter.

#### Commercial

• 1 charging point for every 10 commercial car spaces.

The circuit is to be suitably located to provide for convenient, shared access for residential and commercial users. The charging point should:

- (i) Be equipped with 62196-2 Type 2 socket;
- (ii) Provide up to 22kW or 32A three phase charging per port;
- (iii) Be installed on a dedicated circuit;
- (iv) Allow for monitoring and individual billing payment through an OCPP compatible software back end;
- (v) Provide dedicated space for electric vehicles to park and charge.