

B5 Environmental

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B5 Environmental

1. Vegetation management

1.1 Preservation of trees and vegetation

Introduction

It is important to protect and where possible enhance the trees and other vegetation in our City for several reasons including biodiversity conservation, habitat protection, preserving amenity, cleaning our air, cooling our City and contributing to the positive health and well-being of our community.

This section of the DCP seeks to address the requirements for tree and vegetation management while achieving an appropriate balance between protecting and enhancing trees and other vegetation, minimising risks to people and property, ensuring public safety and facilitating sustainable development.

Other sections of this DCP may have a relationship or influence vegetation management outcomes, so it is important to read all relevant parts of this DCP.

If you are proposing to remove trees or other vegetation, you may be required to obtain approval from other government agencies that administer the following Acts. This is in addition to gaining approval from Council. Before commencing any works involving tree or vegetation removal you should check if approval is also required under other legislation including:

- Biodiversity Conservation Act 2016
- Biosecurity Act 2015
- Environment Protection and Biodiversity Conservation Act 1999
- Environmental Planning and Assessment Act 1979 (and amendments)
- Fisheries Management Act 1994
- Heritage Act 1977
- Local Land Services Act 2013
- National Parks and Wildlife Act 1974
- Rural Fires Act 1997
- State Environmental Planning Policy (Biodiversity and Conservation) 2021
- Water Management Act 2000

Chapter 2 of State Environmental Planning Policy (Biodiversity and Conservation) 2021

While some areas of Penrith are zoned rural, for the purposes of Chapter 2 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 all land within the City of Penrith is considered as a non-rural area of the State. From this policy instrument Council is provided with the mechanism to require and issue permits for the removal or clearing of vegetation. The following sections of this Chapter set out approval and permit requirements and other matters for consideration relating to vegetation management in the City.

Objectives

- a) To protect and conserve the biodiversity values of trees and other vegetation in the City.
- b) To maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change.
- c) To support conservation and threat abatement action to minimise biodiversity loss and conserve threatened species and ecological communities in nature.
- d) To protect and enhance biodiversity corridors, landscape character and scenic values of the City.
- e) To recognise the importance and function of trees and other vegetation for Cooling our City.
- f) To preserve the amenity of the City through the preservation of trees and other vegetation.
- g) To preserve existing trees and other vegetation where possible during the planning, design, development and construction process.
- h) To firstly avoid or minimise impacts of a proposed development and land use change on biodiversity and if impacts are unavoidable provide appropriate offsets.
- i) To achieve an appropriate balance between the protection of trees and other vegetation and mitigating risks from natural hazards.

Controls

Approval requirements

1. Vegetation means “a tree or other vegetation, whether or not it is native vegetation.” Native Vegetation has the same meaning as defined in Part 5A of the Local Land Services Act 2013.

General approval requirements

2. A person must not remove, clear, prune or otherwise cause harm to any tree or other vegetation prescribed by this DCP without an appropriate approval. This includes the following activities in relation to trees and other vegetation which are not permitted without approval:
 - i. Removal by cutting down, clearing, under scrubbing, thinning or any other method
 - ii. Removal of bark around part of or full circumference of a tree trunk (i.e. ring-barking)
 - iii. Cutting off the top of a tree to reduce its height (i.e. topping)
 - iv. Cutting off branches on one side of a tree (i.e. lopping)
 - v. Cutting off or pruning branches greater than 50mm diameter
 - vi. Cutting, removal or otherwise damaging the roots or root system
 - vii. Poisoning or any other activity which causes harm or injury

Development consent

3. A person must not remove, clear, prune or otherwise cause harm to any tree or other vegetation prescribed by Penrith DCP, which is proposed as part of development without Development Consent. These works must be assessed as part of a Development Application.

Advisory note: Clearing of trees or other vegetation will only be considered where it is proposed in conjunction with a use permissible on that land.

Native Vegetation Panel approval

4. If proposed clearing of native vegetation is not associated with development (i.e. not for a purpose requiring development consent) and

the proposed area of clearing exceeds the area clearing threshold (see Table 1 below), or the vegetation is identified on the Biodiversity Values Map then approval is required from the Native Vegetation Panel (not Council).

The area clearing threshold (see Table 1 below) varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan), or actual lot size (where there is no minimum lot size provided for the relevant land under the Local Environmental Plan).

If the land on which the proposed development is located has different minimum lot sizes the smaller or smallest of those minimum lot sizes is used to determine the area clearing threshold.

Table 1: Area clearing thresholds

Minimum lot size associated with the property	Threshold for clearing, above which the BAM* and Biodiversity Offsets Scheme apply (requires Native Vegetation Panel approval)
Less than 1ha	0.25ha or more
1ha to less than 40ha	0.5ha or more
40ha to less than 1000ha	1ha or more
1000ha or more	2ha or more

* BAM means Biodiversity Assessment Method

Vegetation Permits

5. Where the area clearing threshold is not exceeded (see Table 1 above) and development consent is not required, a person must not remove, clear, prune or otherwise cause harm to any tree or other vegetation prescribed by this DCP without a Vegetation Permit.

There are two types of Vegetation Permit Application:

- i. Application to Remove or Prune Trees, or
- ii. Application to Clear Native Vegetation

A Vegetation Permit is not required if works are carried out in accordance with an exemption as detailed in Section 3 – Vegetation Permit Exemptions.

Advisory Note: A Vegetation Permit will generally not be issued to facilitate Complying Development. A Development Application will be required if a complying development proposal does not meet the complying development controls in relation to trees and other vegetation.

Prescribed Vegetation

6. Prescribed trees or other vegetation covered by this Chapter of the DCP includes:
- i. Any native tree (both living and dead) or other vegetation that is on land zoned C2 Environmental Conservation in the Penrith LEP 2010 Land Zoning Map, or on natural resources sensitive land identified in the Penrith LEP 2010 Natural Resources Sensitivity Land Map.
 - ii. In all areas, any native vegetation community including remnant native vegetation.
 - iii. In all areas, any tree or other vegetation whether native or introduced having a height of 3.5m or more or a trunk diameter exceeding 100mm at 1400mm above ground level.
 - iv. Any tree or other vegetation that is, or forms part of, a Heritage Item or is within a Heritage Conservation Area.
 - v. Any tree or other vegetation that is culturally, socially or biologically significant or a unique specimen and has been formally recognised by an appropriate government authority (e.g. a significant tree or vegetation register).

Vegetation permit exemptions

7. A Vegetation Permit is not required for pruning or removal of:
- i. a tree that is dead and is not habitat for native fauna
 - ii. a tree that is an imminent risk or threat to human life or property
 - iii. deadwood that is not habitat for native fauna
 - iv. a tree located within 3.0 metres of an external enclosing wall of a dwelling, as measured from the centre of the trunk at 1400mm above ground level
 - v. an exempt tree species published by Council (refer to website)

- vi. a tree or other vegetation that produce an edible fruit, excluding Australian natives and ornamental fruit trees
- vii. a tree or other vegetation removed in accordance with the NSW Rural Fire Service 10/50 Vegetation Clearing Code of Practice
- viii. a tree or other vegetation within bushfire asset protection zones maintained in accordance with an approved Bushfire Risk Management Plan. The term 'asset protection zone' is defined in the NSW Rural Fire Service Planning for Bush Fire Protection 2019 (as amended in 2022 and 2025)
- ix. a tree or other vegetation subject to written approval or direction from the NSW Rural Fire Service for the purpose of property protection and bushfire hazard reduction
- x. a tree that will cause imminent damage to the structural integrity or function of an existing perimeter boundary fence on rural land
- xi. a tree or other vegetation growing within an approved constructed dam or dam wall where maintenance is required to prevent impacts on structural integrity or function
- xii. a tree or other vegetation where works are carried out in accordance with a Development Consent, or approval issued by the Native Vegetation Panel
- xiii. trees or other vegetation that grow within a timber plantation
- xiv. a tree or other vegetation that are on Council owned or managed land provided the work is undertaken by persons authorised by Council, and is in accordance with Council approved works, a Council policy or a Plan of Management, AS 4373 - 2007, Pruning of Amenity Trees and statutory approvals
- xv. a tree or other vegetation where action is required or authorised to be done by or under the Electricity Supply Act 1995, the Roads Act 1993 or the Surveying and Spatial Information Act 2002
- xvi. a tree or other vegetation declared as weeds and covered by a Biosecurity Priority Weeds Plan prepared under the Biosecurity Act 2015 and Biosecurity Regulation 2017 (see the NSW Department of Primary Industries and Hawkesbury River County Council websites)

- xvii. a tree or other vegetation to control pests in accordance with a pest management plan prepared under the Biosecurity Act 2015 and Biosecurity Regulation 2017 (see the NSW Department of Primary Industries website).
8. A Vegetation Permit is not required to prune a tree in accordance with AS 4373 – 2007, Pruning of Amenity Trees providing:
- i. the branches to be pruned are no greater than 50mm diameter and the shape and structure of the tree will not be significantly modified
 - ii. the branches to be pruned are within 3m of a dwelling roof, and the final cut is only back to the nearest branch junction or collar and the largest cut is no greater than 150mm in diameter
 - iii. the branches to be pruned are located within 2m of ground level and the tree is greater than 6m in height, where the final cut is only back to the nearest branch junction or collar and the largest cut is no greater than 150mm in diameter.
9. Exemption Advisory Notes:
- i. Property owner's consent is required before carrying out any exempt works.
 - ii. For the purpose of this section, imminent means "likely to happen at any moment".
 - iii. Before carrying out exempt works under section 3 a) i), ii), iii) and x), property owners should first obtain a report from a suitably qualified arborist (or other suitable evidence) clearly identifying a tree as dead, or as an imminent risk or threat to human life or property, or as an imminent risk of damage to an existing perimeter boundary fence on rural land.
 - iv. All pruning work should be carried out in accordance with AS 4373 – 2007, Pruning of Amenity Trees.
 - v. Property owners must be able demonstrate exempt criteria have been met if requested by Council.
 - vi. Property owners should contact Council for advice if they are uncertain whether an exemption applies.

Application submission requirements

10. The level of information required to assess a development or permit application to remove or clear trees or other vegetation will depend on:
- i. the scale and extent of proposed works
 - ii. site location and characteristics
 - iii. whether the site contains any significant trees
 - iv. whether the site contains any threatened species, threatened ecological communities, or protected plants and animals listed under the Biodiversity Conservation Act 2016
 - v. whether the site is identified on the NSW Office of Environment and Heritage Biodiversity Values Map.
11. A report prepared by a suitably qualified and experienced arborist may be required with a tree removal application and as a minimum should address the following in relation to trees:
- i. The location, number and type (species) of trees proposed to be removed
 - ii. A clear site plan identifying tree(s) proposed for removal and other relevant site features such as a dwelling, fences and driveways
 - iii. Details of the proposed works and the reasons for the works
 - iv. The age, health and condition, including structural soundness and the condition of the root zone
 - v. The aesthetic, scientific, ecological and/or historic importance
 - vi. The impact of the proposed work on the appearance, health or stability of trees or vegetation and the general amenity of the surrounding area, including any effect on the streetscape
 - vii. In the case of an application to remove a tree(s) or vegetation, whether pruning would be a more practicable and desirable alternative
 - viii. Any risk the tree(s) may pose to people, dwellings, structures or services
 - ix. The extent of other trees and vegetation on the property

- x. Whether the tree(s) is likely to be used as habitat, or is a source of food or shelter for native animals
 - xi. Whether the tree(s) is a threatened species or forms part of a threatened community
 - xii. Whether all alternatives to removing or pruning the tree or vegetation have been considered.
12. A Flora and Fauna Assessment Report including a Test of Significance under Part 7, Division 1, Section 7.3 of the Biodiversity Conservation Act 2016 may be required with an application to remove or clear native trees or other native vegetation. The report must be prepared by a suitably qualified and experienced ecological consultant.
13. A Biodiversity Development Assessment Report (BDAR) will be required for an application to remove or clear native trees or other native vegetation on land identified by the Biodiversity Values Map, or where clearing exceeds the Biodiversity Offset Scheme area clearing thresholds, or after applying the Test of Significance the impacts are likely be significant. A BDAR must be prepared by an accreditor assessor under the Biodiversity Conservation Act 2016.

Applicants should seek advice from Council if assistance is needed in relation to submission requirements.

Trees causing property damage

14. In relation to trees causing property damage, it must be demonstrated (e.g. by a report from a practising qualified structural engineer) that the tree, its trunk, or its root system is causing damage to a structure and the damage cannot be controlled by measures such as the installation of a root barricade.

Trees and new development – site planning and design

15. The following controls apply where the removal of trees and other vegetation is proposed as part of a development application for a proposed use permissible under the relevant zone of Penrith LEP 2010:
- i. Australian Standard AS 4970-2025 Protection of Trees on Development Sites should be considered.

- ii. The siting and layout of a development should consider, at the initial concept stage, the location of trees and other vegetation (including on adjoining land) and favour their retention.
- iii. Buildings, Asset Protection Zones and Effluent Management Areas are to be sited on existing cleared land, where possible.
- iv. Where a stand of trees is to be retained, any associated native understorey should also be retained.
- v. Trees and vegetation should be retained on steeply sloping sites (slopes greater than 20%) or where there is unstable soil to minimise erosion or geo-technical instability. (See also the controls in the Land Management section of this Chapter relating to Geotechnical Stability).
- vi. Trees and vegetation must be retained along watercourses (See also the controls in the Water Management section of this Chapter, relating to Riparian Corridors).
- vii. An application is required to address the effect of the proposed development on existing vegetation, the landscape character and the scenic quality of the locality.
- viii. Trees and vegetation must be retained where they shield existing or proposed buildings from views from public areas.
- ix. Trees and vegetation must be retained where they form part of the landscape character of an area, including on or near ridgelines.
- x. Any proposed building or structure are to be located outside the tree protection zone for retained trees. Council may consider a variation based on an appropriate arboricultural assessment.
- xi. Hard (or impervious) surfaces are not permitted under the drip line of any tree.
- xii. Where possible services (and particularly pipes carrying water/moisture) are to be located outside the tree protection zone of any tree to be retained. Council may consider a variation based on an appropriate arboricultural assessment.
- xiii. Wherever trees or vegetation are removed (with consent) as a consequence of the development, an equal or greater number of replacement trees that grow to a similar or greater height or

canopy should, where practical, be incorporated into the landscaping design of the new development.

- xiv. The siting and layout of a development should also consider, at the initial concept stage, bushfire risk. (See the Bushfire Management section of this Chapter).

Protection of trees during construction

- 16. Tree protection must be in accordance with an approved Tree Protection Plan (TPP) prepared with consideration of Australian Standard AS 4970-2025 Protection of Trees on Development Sites.
- 17. During construction, an adequate fence or similar structure must be constructed around any trees or other vegetation to be retained in accordance with the approved TPP.
- 18. Tree protection zones identified by an approved TPP must not be used by vehicles or machinery, for stockpiling wastes, for storage of any building materials or any other construction activities. This will help protect the tree or vegetation from soil compaction and contamination; root, trunk and limb damage; and changes in surface levels that affect the health of the tree or vegetation.

1.2 Biodiversity corridors and areas of remnant native vegetation in non-urban areas

Background

The protection and rehabilitation of biodiversity corridors between areas of remnant native vegetation help maintain biodiversity and the integrity of ecosystems. Fragmentation and isolation of habitat reduce the diversity and viability of flora and fauna populations.

This section seeks to reinforce and supplement the controls set out in the 'Development on natural resources sensitive land' clause of Penrith LEP 2010. These controls focus on biodiversity corridors and areas of remnant native vegetation in Penrith's non-urban areas, which are identified as natural resources sensitive land on the Penrith LEP 2010 Natural Resources Sensitivity Land Map.

Objectives

- a) To promote the establishment and retention of biodiversity corridors and areas of remnant native vegetation that contribute to the long-term survival of native fauna and flora species in the area.
- b) To maintain (and where possible increase) the current area of native bushland and retain the natural species diversity of bushland as far as possible.
- c) To encourage the planting of a diversity of native species to enhance biodiversity values, scenic quality and landscape character.
- d) To facilitate the implementation of weed control and management measures that act upon the processes causing weed invasion of natural areas.

Controls

Development consent

- 1. Biodiversity corridors and areas of remnant native vegetation are shown as natural resources sensitive land on the Penrith LEP 2010 Natural Resources Sensitivity Land Map.
- 2. In accordance with the 'Development on natural resources sensitive land' clause of Penrith LEP 2010, development consent is required for the following in biodiversity corridors and areas of remnant native vegetation:
 - i. the subdivision of land
 - ii. earthworks (including removal of rock or other natural material or alteration of a natural waterway or drainage line)
 - iii. the carrying out of a work
 - iv. development site preparation works clearing vegetation (including slashing or under-scrubbing)
 - v. irrigation with treated effluent.
- 3. Control 2 (iv) of this section (above) does not include slashing or under-scrubbing undertaken for the purposes of controlling declared pests under the Biosecurity Act 2015 or to maintain dams, fences or asset protection zones.

Matters to be considered

4. The 'Development on natural resources sensitive land' clause of Penrith LEP 2010 lists matters that must be considered for any new development or work described in Control 2 of this section. .
5. Council must also be satisfied that any development or work is designed, located and managed to avoid or minimise any potential adverse environmental impact.
6. The matters listed in the 'Development on natural resources sensitive land' clause must be addressed in supporting documentation submitted with the application.

Submission requirements

7. The level of information required to assess a development or permit application to remove or clear trees or other vegetation will depend on:
 - i. the scale and extent of proposed works
 - ii. site location and characteristics
 - iii. whether the site contains any significant trees
 - iv. whether the site contains any threatened species, threatened ecological communities, or protected plants and animals listed under the Biodiversity Conservation Act 2016
 - v. whether the site is identified on the NSW Office of Environment and Heritage Biodiversity Values Map.
8. A report prepared by a suitably qualified and experienced arborist may be required with a tree removal application and as a minimum should address the following in relation to trees:
 - i. The location, number and type (species) of trees proposed to be removed
 - ii. A clear site plan identifying tree(s) proposed for removal and other relevant site features such as a dwelling, fences and driveways
 - iii. Details of the proposed works and the reasons for the works
 - iv. The age, health and condition, including structural soundness and the condition of the root zone

- v. The aesthetic, scientific, ecological and/or historic importance
 - vi. The impact of the proposed work on the appearance, health or stability of trees or vegetation and the general amenity of the surrounding area, including any effect on the streetscape
 - vii. In the case of an application to remove a tree(s) or vegetation, whether pruning would be a more practicable and desirable alternative
 - viii. Any risk the tree(s) may pose to people, dwellings, structures or services
 - ix. The extent of other trees and vegetation on the property
 - x. Whether the tree(s) is likely to be used as habitat, or is a source of food or shelter for native animals
 - xi. Whether the tree(s) is a threatened species or forms part of a threatened community
 - xii. Whether all alternatives to removing or pruning the tree or vegetation have been considered.
9. A Flora and Fauna Assessment Report including a Test of Significance under Part 7, Division 1, Section 7.3 of the Biodiversity Conservation Act 2016 may be required with an application to remove or clear native trees or other native vegetation. The report must be prepared by a suitably qualified and experienced ecological consultant.
10. A Biodiversity Development Assessment Report (BDAR) will be required for an application to remove or clear native trees or other native vegetation on land identified by the Biodiversity Values Map, or where clearing exceeds the Biodiversity Offset Scheme area clearing thresholds, or after applying the Test of Significance the impacts are likely be significant. A BDAR must be prepared by an accreditor assessor under the Biodiversity Conservation Act 2016.
11. Where vegetation works are proposed on land that is a heritage item or within a heritage conservation area, a Heritage Impact Statement may be required in accordance with Clause 5.10 Heritage conservation of Penrith LEP 2010. In this regard, applicants should consult with Council's Development Services Department.

Applicants should seek advice from Council if assistance is needed in relation to submission requirements.

Protecting and enhancing biodiversity corridors and areas of remnant native vegetation

12. As the purpose of biodiversity corridors and areas of remnant native vegetation is to conserve native plants and animals, no clearing of native vegetation should occur within these areas.
13. As far as possible, biodiversity corridors and areas of remnant native vegetation should be retained with the smallest possible edge-to-area ratio. Measures must be taken to avoid fragmentation of vegetation by roads, tracks, services and the like.
14. Management of biodiversity corridors and areas of remnant native vegetation must allow natural processes to continue. Measures must be taken to prevent disturbance to existing vegetation, including roots, the hydrological regime and surrounding soil.
15. Management of biodiversity corridors and areas of remnant native vegetation must have regard to the value of the vegetation as fauna habitat. In particular, old trees (both living and dead), fallen logs, bush rock and a diverse vegetation structure, including understorey species, should be maintained for fauna habitat.
16. Where land disturbance occurs, natural regeneration is the preferred method of rehabilitation.
17. Locally native species must be used for revegetation and restoration of biodiversity corridors and areas of remnant native vegetation, if regeneration is unlikely to occur.
18. Where possible, new native vegetation must be planted in clusters and connected to isolated patches of vegetation to enhance the network of biodiversity corridors.
19. Non-native or introduced vegetation removed from a site is to be disposed of away from biodiversity corridors and areas of remnant native vegetation to avoid the spread of seed and regenerative vegetative material.

20. Where possible, structures and any associated fire protection zones must be sited on existing cleared land and not within biodiversity corridors and areas of remnant native vegetation.
21. Regular maintenance is required for existing tracks, especially to control track damage and erosion.
22. Non-essential roads and tracks in biodiversity corridors and areas of remnant native vegetation must be closed and rehabilitated.
23. Road signs should be erected where biodiversity corridors and areas of remnant native vegetation cross roads to alert motorists to the significance of fauna at these sites.
24. Activities such as horse riding and motorcycle riding can cause damage to tracks and native vegetation, spread weeds and introduce nutrients. Therefore these activities must not occur in biodiversity corridors and areas of remnant native vegetation.

Development near biodiversity corridors and areas of remnant native vegetation

25. All new development adjacent to biodiversity corridors and areas of remnant native vegetation must be located, designed and constructed to prevent or minimise, as far as possible, adverse impacts on native vegetation, fauna and habitat.
26. The layout of new development is to:
 - i. Ensure low intensity land uses are situated directly adjacent to the biodiversity corridor or area of remnant native vegetation
 - ii. Ensure viability and functionality of the biodiversity corridor or area of remnant native vegetation
 - iii. Maximise connectivity to neighbouring biodiversity corridors
 - iv. Maximise connectivity to other areas of remnant native vegetation retained on-site or on neighbouring sites
 - v. Ensure retained vegetation is configured to provide low edge-to-area ratios and avoid narrowing or bottlenecks within the biodiversity corridor

- vi. Ensure associated road infrastructure avoids core vegetation, or where not possible, provides for wildlife under/overpasses and minimises the intrusion, length and width
- vii. Where possible mitigate or prevent the impact of light pollution on fauna and habitat in adjacent biodiversity corridors and areas of remnant native vegetation.

Natural regeneration and planting native species

27. Natural regeneration is the preferred method of rehabilitation. However, if planting is to be undertaken, native species related to the local vegetation community should be selected when planting on both public lands and private lands to aid the restoration or expansion of bushland.

Management of weeds and invasive species

28. Weed control refers to the control of non-native or introduced plants, particularly invasive species. Important elements of weed control are gaining an understanding of the causes of weed invasion and taking measures to minimise these causes.

29. Measures are to be taken to prevent the occurrence of factors leading to weed invasion. Weed invasion occurs within native vegetation areas mainly as a result of the following factors:

- i. Physical site disturbance
- ii. Increased soil moisture due to runoff from adjacent areas
- iii. Increased nutrients from runoff or waste dumping
- iv. Increased light levels due to clearing or dieback
- v. Increase in weed propagules and seed dispersal agents.

30. Weed control techniques are to be carried out in a manner that minimises negative environmental impacts. Different techniques are required in varying situations, especially along watercourses, which are very sensitive to pollution impacts. Regular monitoring of weeds is to be carried out on an ongoing basis to identify and respond to the occurrence of new plant species that pose a potential threat to native vegetation.

31. Biosecurity matter declared under the Biosecurity Act 2015 include weed plant species posing a threat to primary production, the environment or human health. Please refer to the Biosecurity Act 2015 for the requirements and a list of biosecurity matter. Further details on weed management in the Hawkesbury River County Council area (which includes the Penrith local government area) can be found at <http://hrcc.nsw.gov.au/>.
32. Weeds not declared as biosecurity matter (commonly called environmental weeds) should also be controlled as part of a weed management program.

1.3 Bushfire management

Background

This section applies to land identified on the Bushfire Prone Land Map. It also contains controls for development which, while not proposed on bushfire prone land, may still be subject to the impact from bushfires, particularly through ember attack.

To determine whether a particular site is 'bushfire prone land', Council has produced a Bushfire Prone Land Map which has been certified by the Rural Fire Service in accordance with Section 146 'Bush fire prone land' of the Environmental Planning and Assessment Act 1979. Applicants should review the Bushfire Prone Land Map to determine whether their site is 'bushfire prone land' and what category of risk of bushfire affects the site.

Alternatively, applicants can request a Section 10.7 Certificate from Council which will specify land that is identified as 'bushfire prone'.

The key objectives and controls to address bushfire risk are not set out in this DCP but are incorporated into the Rural Fire Service publication entitled *Planning for Bushfire Protection 2019* (as amended in 2022 and 2025), as well as the *Rural Fires Act 1997* and the *Environmental Planning and Assessment Act 1979*.

By dealing with bushfire protection measures at the beginning of the planning and/or design process:

- Hazardous land uses can be avoided on bushfire prone land.

- Councils, developers and consultants can ensure subdivisions are designed and dwellings constructed to minimise the risk of bushfire attack.
- The safety of people, property and the environment can be maximised.

Objectives

- a) To minimise the risk to life, property and the environment in the event of a bushfire, including the lives of emergency personnel.
- b) To ensure that all development on bush fire prone land makes adequate provision for access for emergency personnel, vehicles and equipment.
- c) To balance the risk of bushfire to life and property with the other principles in this DCP, including the need to protect and enhance existing vegetation where possible.
- d) To recognise that land not classified as 'bushfire prone land' may still be subject to the impact from bushfire, particularly through ember attack.

Controls

Planning for Bushfire Protection

1. If land is identified as 'bushfire prone land' on the Bushfire Prone Land Map, then any development application on that land must address the bush fire protection measures set out in the document 'Planning for Bushfire Protection 2019 (as amended in 2022 and 2025) (PBP).
2. If the development proposes the subdivision of land for residential and rural-residential purposes or is a development which has been identified as 'special fire protection purposes', then the development will be Integrated Development under the *Environmental Planning and Assessment Act 1979*.

A development identified as 'special fire protection purposes' includes:

- i. a school
- ii. a child care centre
- iii. a hospital
- iv. a hotel, motel or other tourist accommodation

- v. seniors housing
- vi. a group home
- vii. any other purpose prescribed by section 100B (6) of the *Rural Fires Act 1997*.

Bushfire assessment report

- 3. A Bushfire Assessment Report, prepared in accordance with the PBP, must accompany all development applications on land identified as bush fire prone land. (For report requirements, see EI Appendices).
- 4. The Single Dwelling Application Kit (available on the Rural Fire Service website www.rfs.nsw.gov.au) provides applicants with a streamlined approach to meeting the requirements of the PBP for single dwellings. It has been designed to assist applicants to provide information in support of a development application and presents options that can be incorporated into the building to mitigate the impact of bush fire on life and property.

Land that is not classified as bushfire prone land

- 5. Development on land zoned RU1, RU2, RU4, RU5, C2, C3, C4 and R5, or on land within 250m of any of these zones that is not identified as 'bushfire prone land' on the Bushfire Prone Land Map must consider ways to minimise the risk of ember attack, particularly with regard to roof design, building materials and landscape design. These matters must be addressed in the Statement of Environmental Effects.

Bushfire hazard reduction

- 6. Although consent is not required for bushfire hazard reduction work, it must be authorised by the *Rural Fires Act 1997*.

Other information

People seeking further information on bushfire management or preparing development applications may wish to refer to the following:

- Penrith City Council's Bushfire Prone Land Map
- Rural Fire Service Planning for Bush Fire Protection 2019 (as amended) available on the Rural Fire Service's website at www.rfs.nsw.gov.au

- Rural Fire Service Single Dwelling Application Kit at www.rfs.nsw.gov.au.
- 10/50 Vegetation Clearing Code of Practice for New South Wales at www.rfs.nsw.gov.au.
- Bush Fire Environmental Assessment Code for New South Wales at www.rfs.nsw.gov.au.

2. Water management

General Objectives

- a) To adopt an integrated approach that takes into account all aspects of the water cycle in determining impacts and enhancing water resources.
- b) To promote sustainable practices in relation to the use of water resources for human activities.
- c) To minimise water consumption for human uses by using best practice site planning, design and water efficient appliances.
- d) To address water resources in terms of the entire water catchment.
- e) To protect water catchments and environmental systems from development pressures and potential pollution sources.
- f) To protect and enhance natural watercourses, riparian corridors, wetlands and groundwater dependent ecosystems.
- g) To protect, conserve and enhance surface and groundwater resources.
- h) To integrate water management with stormwater, drainage and flood conveyance requirements.
- i) To utilise principles of Water Sensitive Urban Design in designing new developments or infill development in existing areas.

2.1 The water cycle/water conservation

Background

Key Issues

Key issues for preserving the quality of water supplies and minimising impact on the water cycle include:

- Pursuing more sustainable consumption practices for water
- Regulating the pumping of water from ground water and surface water systems.
- Promoting the trapping of surface run-off in dams and storage areas, where appropriate

- Minimising water consumption for new developments and
- Recycling greywater and stormwater, including rainwater collection.

Relevant water conservation policies

For residential development, the current water conservation requirements are set out in *State Environmental Planning Policy (Sustainable Buildings) 2022*. Other building types do not currently have any legislative requirements for water conservation. However, there are a number of tools available for testing the water conservation initiatives of a range of developments (e.g. the Greenstar and NABERS rating tools). The following controls supplement the existing legislative requirements for all developments.

All naturally occurring water (both surface and ground water) in NSW that is capable of being used for irrigation or for watering stock is regulated by the provisions of the *Water Management Act 2000* or the *Water Act 1912*. Any 'work' (which includes any dam, pump, weir, regulator, race, channel, cutting, well, excavation, etc.), which affects the quantity of water flowing to or from, or contained in, a river, stream or lake comes within the provisions of the *Water Management Act 2000* in areas where water sharing plans have commenced (includes Penrith LGA). Licences are issued to authorise (construct/install and use) such works. In relation to groundwater, the construction of any bore (which includes any bore, spear point or excavation) requires authorisation under *the Water Management Act 2000*.

Objectives

- a) To minimise impacts on the water cycle and natural ecosystems from redirection of water for human land uses and activities.
- b) Where possible, to recycle water for non-drinking uses.

Controls

Alterations/additions to existing buildings

1. Extensions to existing residential buildings will, in most cases, need to comply with the requirements of BASIX, the sustainability tool developed by the State Government.

For extensions to non-residential buildings or residential extensions that do not trigger BASIX, the following controls apply:

- i. Water saving devices must be incorporated into any internal renovation (taps, toilets, etc.)
- ii. Rainwater tank(s) and gutter systems shall be installed to capture rainwater and reuse for irrigation, toilet flushing and other non-drinking purposes. Installation of rainwater tanks shall comply with the relevant standards established by Sydney Water.
- iii. If water saving devices and/or rainwater tanks are not to be installed, the applicant will need to submit a statement explaining why the installation of these measures is not economically feasible or is technically difficult.

Pools, spas and water features

- 2. Any proposal for a permanent residential swimming pool, spa pool or water feature with a capacity of greater than 40,000 litres must consider the following:
 - i. Provision of shading or covers to minimise evaporation
 - ii. Other mechanisms to reduce water consumption.

Proposed industrial land uses

- 3. Any new industrial development or significant alteration and/or addition to an industrial building needs to reduce water consumption by a combination of careful site planning, design and water efficient appliances.

Significant alterations/ additions are those where the roof or hard surface area is increased to the minimum standard AND those additions are not less than 25% of the existing roof area. The minimum standard is:

- 200m² in control (3)(i)
- 1000m² in control (3)(ii)
- 600m² in control (3)(iii)

The following controls apply to new industrial buildings and significant alterations/additions to industrial buildings:

- i. All proposed industrial buildings with a roof area greater than 200m² are required to install a rainwater tank of minimum capacity of 100,000 litres on the site for re-use of water in irrigation,

industrial processes, toilet flushing or for other non-drinking purposes through a separate reticulated water supply system.

- ii. All proposed industrial sites with a hard surface area (including roof area, driveways, parking areas, loading bays, covered storage areas, etc.) greater than 1,000m² shall submit a water management plan which estimates required water needs, and includes an investigation into the feasibility of the measures listed below, outlines those to be adopted on the site and explains why any measures not adopted were unable to be implemented:
 - Rainwater tanks connected to roof and gutter systems and installed to enable reuse of rainwater for irrigation, industrial processes, toilet flushing or other non-drinking purposes.
 - Stormwater detention systems installed and maintained to enable the reuse of stored water for irrigation, industrial processes, toilet flushing or other non-drinking purposes, and to minimise the impact of runoff from the site.
 - Roof gardens, either for recreational purposes or as a means to reduce hard stand area.
- iii. Any proposed industrial development with a roof area greater than 600m² must submit a documented investigation into the feasibility of a roof garden to reduce hard surface area and associated runoff.

Proposed rural land uses

4. Any application for a new rural land use that requires the consent of Council and will increase the water needs of a particular rural area must submit a water management plan which:
 - i. Estimates future water needs of the proposed development
 - ii. Indicates the proposed water source to meet those needs
 - iii. Outlines water conservation measures to be implemented.
5. Where new rural dwellings are proposed and reticulated water supplies are not available, each allotment or dwelling should demonstrate that it has an adequate and self sufficient water supply without having to pump from streams or groundwater sources.

Requirements for extraction of water

6. Rural landholders have rights to access water for some basic purposes, such as domestic and stock water, harvestable rights from farm dams and native title rights (see other provisions in this section).

Whether or not you need a licence (or other approval) from the WaterNSW to access surface water (water from rivers, lakes etc.) depends on how and why you want to use the water. Please consult with WaterNSW regarding any proposed water extraction.

Access to groundwater for any purpose requires a licence or approval from the WaterNSW (see other provisions in this section).

If you want to extract water from rivers or aquifers and use it for commercial purposes, you must hold a water access licence and an approval from the WaterNSW.

Lifting the bar

The following represent some ways in which applicants can demonstrate additional commitment to the water conservation principles expressed in this DCP. Demonstration of this commitment may lead to Council considering variation of development controls. Applications that vary the development controls listed in this section will need to demonstrate that the proposed development complies with the objectives relevant to the development controls it seeks to vary.

- Exceeding BASIX for proposed residential dwellings: Whilst BASIX sets the minimum requirement for reduction in water consumption for new residential dwellings (depending on location), Council recommends that an additional 10% water reduction is sought for any residential developments over 3 dwellings.
- Recycling of grey-water / stormwater: Where possible, any new developments or substantial re-developments of a site should seek to include opportunities for recycling of grey-water and stormwater on the site to minimise use of potable (drinking) water.
- Reticulated recycling systems: New large scale developments resulting in 5 or more dwellings should seek to provide a reticulated water system that enables on-site treatment and re-use of grey water from the site.

Other information

People seeking further information on water management may wish to refer to the following:

- Penrith City Council's *Stormwater Drainage Specification for Building Developments*
- BASIX – the online program that assesses a house or unit design and compares it against energy and water reduction targets. A BASIX Certificate must be submitted with every development application for a new home. The design must meet these targets before a BASIX Certificate can be provided (www.planningportal.nsw.gov.au/development-and-assessment/basix).
- Greenstar rating tool for commercial and other developments (new.gbca.org.au/green-star/rating-system/)
- National Australian Built Environment Rating System (NABERS) water tool for commercial and other developments (www.nabers.gov.au)
- Australian Drinking Water Guidelines (2011) National Health and Medical Research Council (NHMRC) (compliance regulated by NSW Health)
- Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) (2006) Environment Protection and Heritage Council, Natural Resource Management Ministerial Council and Australian Health Ministers' Conference
- Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) – Augmentation of Drinking Water Supplies (2008) Environment Protection and Heritage Council, Natural Resource Management Ministerial Council and Australian Health Ministers' Conference
- Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) – Stormwater Harvesting and Reuse (2009) Environment Protection and Heritage Council, Natural Resource Management Ministerial Council and Australian Health Ministers' Conference
- Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) – Managed Aquifer Recharge (2009) Environment Protection and Heritage Council, Natural Resource

Management Ministerial Council and Australian Health Ministers' Conference

- Management of Private Recycled Water Schemes (Interim NSW Guidelines) (2007) NSW Department of Water and Energy
- Penrith City Council's Sustainability Blueprint for urban release areas (June 2005)
- NSW Water Conservation Strategy (Oct 2000) NSW Department of Land and Water Conservation
- Sydney Metropolitan Water Plan (reviewed 2010) NSW Department of Water and Energy
- Water for Life (www.waterforlife.nsw.gov.au).

2.2 Catchment management and water quality

Background

Catchment management requires protecting water systems from:

- Chemicals (including pesticides and insecticides)
- Untreated sewage from on-site effluent treatment and disposal systems
- Nutrient run-off from application of fertilisers and animal manure
- Soil erosion and sedimentation from poor construction/land use practices
- Removal of natural vegetation around watercourses that could trap sediment and provide treatment of surface run-off to reduce pollution entering water systems
- Stormwater run-off and surface pollution.

Water Sensitive Urban Design (WSUD) involves adopting design and management practices that take advantage of natural site features and seek to minimise impacts on the water cycle. WSUD requires consideration of issues such as water conservation, water quality and stormwater management. It seeks to minimise the extent of impervious surfaces and mitigate changes to the natural water balance through on-site re-use of water as well as through temporary storage.

WSUD relies on an integrated approach to both water and stormwater management. This integrated approach regards stormwater as a resource and involves considering all aspects of runoff within a development, including environmental and social issues. For example, the inclusion of a multi-purpose corridor in an integrated stormwater management system may provide water features, stormwater treatment, habitat protection and recreation.

Council's Water Sensitive Urban Design Policy (2013) was prepared to improve water conservation, quality and quantity in both new developments and some redevelopments. The Policy sought to clarify which developments needed to achieve water conservation, quality and quantity outcomes. The Policy has now been incorporated into this section of Penrith DCP.

Objectives

Catchment management

- a) To adopt a total catchment management approach to water quality and protection of water systems.
- b) To prevent direct pollution of existing groundwater or surface water systems.
- c) To ensure appropriate management of land uses and activities to minimise the risk of indirect water pollution.
- d) To improve the water quality of the Hawkesbury–Nepean River system and tributaries.
- e) To ensure the high quality of discharge to sewer and drainage systems.
- f) To protect the aquatic environment through the use of ecologically sustainable development principles.

Water sensitive urban design

- g) To protect and enhance natural land and water systems such as creeks and rivers, particularly water quality.
- h) To maintain and restore the natural water balance.
- i) To make more efficient use of water resources by conserving water, particularly potable (drinking) water.

- j) To reduce flood risk in urban areas.
- k) To reduce erosion of waterways, slopes and banks.
- l) To control stormwater pollution and improve water quality in waterways and groundwater.
- m) To integrate stormwater management with water supply and wastewater treatment.
- n) To integrate stormwater treatment into the landscape to maximise the visual and recreational amenity of urban development.

Controls

Approval to discharge contaminants

1. Water discharge from any development must not contain contaminants, unless necessary licences and/or approvals are obtained from relevant government authorities.

All liquids (including water) produced and/or discharged from the site shall not contain pollutants above acceptable levels. Acceptable levels will be determined at the time of consideration of individual proposals by Council, the Office of Environment and Heritage and, if required, Sydney Water.

Addressing potential catchment impacts

2. All applications to Council, where there is the potential to impact upon a water system, are required to identify in the application the relevant water systems in the catchment area of the site that may be affected and address how any potential impacts will be mitigated/avoided.

Water quality for all land uses

3. Council's Water Sensitive Urban Design (WSUD) Policy (2013) has been prepared to improve water conservation, quality and quantity in both new development and some redevelopments. The policy seeks to clarify which developments need to achieve the targets for water conservation, quality and quantity.

Where any development could result in water quality impacts in nearby surface water systems, the water quality at that system is to be

monitored for pollutants prior to the commencement of works, and at regular intervals during construction and/or operation.

Water quality entering natural areas shall either maintain or improve on pre-development levels.

All monitoring is to be undertaken in accordance with any relevant guidelines of the Office of Environment and Heritage (or any other applicable guidelines).

Council approval requirements for WSUD systems

4. Development types required to meet water conservation and stormwater quality and quantity targets are defined in Table 2. The performance criteria required to be met are listed below under 'WSUD Development Controls'. Affected developments must submit a WSUD Strategy (report dealing with measures to be implemented as part of the development) with a Development Application.

A WSUD Strategy is a written report detailing potable water savings and stormwater quality and quantity control measures to be implemented as part of a development. The required content of the Strategy is outlined in Council's WSUD Technical Guidelines. The WSUD Technical Guidelines must be considered when undertaking certain developments within the City. The guidelines outline the information to be submitted with development applications and construction certificates, in order to demonstrate compliance with the objectives and performance criteria outlined below. The WSUD Technical Guidelines provide a list of:

- Council's requirements for the location, ownership and ongoing maintenance responsibilities of WSUD measures
- What is to be submitted with a development application or construction certificate application
- What is required to be included in a WSUD Strategy
- Parameters to be used in MUSIC modelling
- Where to get further information on the design, construction, operation and maintenance of stormwater treatment measures
- Council's expectations in relation to the proposed WSUD measures.

The Technical Guidelines should be read in conjunction with a number of referenced industry best practice guidelines/documents including the following:

- Draft NSW Music Modelling Guidelines (prepared for the Sydney Metropolitan CMA)
- WSUD Conceptual Design Information (prepared by Water by Design)
- WSUD Technical Design Guidelines (prepared by Water by Design)
- Typical Drawings (prepared for the Sydney Metropolitan CMA).

When preparing supporting documentation for a development application or construction certificate application, Council requires applicants and developers to engage appropriately qualified and experienced practitioners for the development of appropriate WSUD designs and strategies. Discussion with Council is encouraged at an early stage of a development proposal to agree on a general design approach before a detailed WSUD Strategy is prepared.

Nothing in this section is to be construed as limiting, in any way, Council's right to impose differing conditions when approving development proposals, or limiting the discretion of Council's nominated representative to vary any necessary requirements in respect of a particular development or Council project, having regard to potential site restrictions and best practice.

The WSUD Technical Guidelines will be periodically reviewed and updated to reflect changes in industry best practice and are available on Council's website.

Table 2: Developments Required to Consider Water Sensitive Urban Design

Land Use	Development Type	Water Conservation	Stormwater Quality	Water Quantity Flow
	Alterations and additions, detached dwellings and residential land uses not addressed below	✓ - BASIX	No	No

Land Use	Development Type	Water Conservation	Stormwater Quality	Water Quantity Flow
Residential	New single dwellings and dual occupancy	✓ - BASIX	No	No
	Existing residential villas, flats and townhouses with additional impervious area greater than 250m ²	✓ - BASIX	No	No
	Residential development of 5 or more dwellings including multi dwelling housing, residential housing, residential flat buildings and mixed use development	✓ - BASIX	✓	✓
Commercial and Industrial	All new commercial, retail, mixed use and industrial development greater than 2,500m ² total site area	✓ - WELS	✓	✓
	Alterations and additions where the increase in roof area and impervious area* is equal to or	✓ - WELS	✓	✓

Land Use	Development Type	Water Conservation	Stormwater Quality	Water Quantity Flow
	greater than 250m ² .			
	Commercial, retail, mixed use and industrial development not addressed above	✓ - WELS	No	No
Subdivision (where new road and or carriageway works are involved)	Residential (5 or more lots) or commercial and industrial subdivision	N/A	✓	✓
Other development not listed above	Any development which results in an increase of the existing impervious area by greater than 250m ² . Development includes but not limited to additional roads, driveways, vehicle parking areas, manoeuvring areas, loading and storage areas	✓ - WELS (as required)	✓	✓

Note: ✓ means performance criteria detailed in the 'WSUD Development Controls' in this Chapter apply.

*Additional impervious area includes building footprint (including roof area), vehicle access ways and parking spaces.

WSUD development controls

2.2.1 Water conservation

Background

Water conservation seeks to reduce the demand for potable water. Reduced potable mains water demand is a key commitment of the NSW Government as outlined in the Metropolitan Water Plan (see <http://www.waterforlife.nsw.gov.au>). The NSW Government's BASIX Scheme requires all new residential development to incorporate water savings measures. There are, however, no such requirements for other development types (e.g. commercial or industrial), which are addressed by these controls.

Objectives

- a) To reduce consumption of potable water for all development types within the City.
- b) To use harvested rainwater, treated urban stormwater or treated wastewater for non-potable substitution where appropriate.

Performance Criteria

Water conservation requirements for development types identified in Table 2 are:

- 1. All residential buildings are to demonstrate compliance with State Environmental Planning Policy (Sustainable Buildings) 2022, as required.
- 2. All buildings not covered by the State Environmental Planning Policy (Sustainable Buildings) 2022:
 - i. That are installing any water use fittings must demonstrate minimum standards defined by the Water Efficiency Labelling and Standards (WELS) Scheme. Minimum WELS ratings are 4 star dual-flush toilets, 3 star showerheads, 4 star taps (for all taps other than bath outlets and garden taps) and 3 star urinals. Water efficient washing machines and dishwashers are to be used wherever possible.
 - ii. To install rainwater tanks to meet 80% of non-potable demand including outdoor use, toilets and laundry

- iii. To incorporate passive cooling methods that rely on improved natural ventilation to supplement or preclude mechanical cooling.
- 3. Where cooling towers are used, they are:
 - i. To be connected to a conductivity meter to ensure optimum circulation before discharge
 - ii. To include a water meter connected to a building energy and water metering system to monitor water usage
 - iii. To employ alternative water sources for cooling towers where practical and in accordance with the Public Health Act and NSW Health Guidelines.
- 4. Water use within public open space (for uses such as irrigation, pools, water features, etc.) should be supplied from sources other than potable mains water (e.g. treated stormwater or greywater) to meet 80% water use demand.

2.2.2 Stormwater Quality

Background

Urban development increases the pollution load entering receiving environments. Stormwater quality controls have been derived through the modelling of numerous combinations of WSUD elements for a range of urban development types. They reflect a cost-effective level of stormwater treatment considered to be technically feasible in terms of land-take (or footprint) of stormwater and WSUD measures. Stormwater quality elements are to be sized using MUSIC modelling (the model for Urban Stormwater Improvement Conceptualisation, or equivalent) using Penrith data, which is available in the associated WSUD Technical Guidelines.

Objectives

- a) To safeguard the environment by improving the quality of stormwater run-off entering receiving waters.

Performance Criteria

Stormwater quality requirements for all development types identified in Table 2 are:

1. Pollution load reductions:
 - i. 90% reduction in the post development mean annual load total gross pollutant (greater than 5mm)
 - ii. 85% reduction in the post development mean annual load of Total Suspended Solids (TSS)
 - iii. 60% reduction in the post development mean annual load of Total Phosphorus (TP)
 - iv. 45% reduction in the post development mean annual load of Total Nitrogen (TN)
 - v. 90% Free Oils and Grease with no visible discharge.
2. Modelling for the determination of the mean annual loads of land uses must be undertaken in MUSIC and in accordance with the associated WSUD Technical Guidelines.
3. Any changes to the flow rate and flow duration within the receiving watercourses as a result of the development shall be limited as far as practicable. Natural flow paths, discharge point and runoff volumes from the site should also be retained and maintained as far as practicable.
4. Impervious areas directly connected to the stormwater system shall be minimised. Runoff from impervious areas such as roofs, driveways and rainwater tank overflows shall be directed onto grass and other landscaped areas designed to accept such flows.

2.2.3 Stormwater quantity – Stream forming flows

Urban development has the potential to significantly increase surface runoff flow rates and volumes leading to impacts on stream stability, receiving water ecology and flooding in receiving waters.

Objectives

- a) To manage the volume and duration of stormwater flows entering local waterways so as to protect the geomorphic values of those waterways.

Performance Criteria

1. The post development duration of stream forming flows shall be no greater than 3.5 times the pre developed duration of stream forming flows. The comparison of post development and pre development

stream flows is commonly referred to as the Stream Erosion Index (SEI). The approach to evaluating the SEI is outlined in the associated WSUD Technical Guidelines.

Use and Storage of Chemicals/Pesticides/Fertilisers

2. Any application for a land use/activity that involves significant use of chemicals/fertilisers must demonstrate what measures are proposed to minimise and control nutrients or chemicals entering watercourses, water bodies or groundwater.
3. All land uses, particularly rural land uses, should avoid use of chemicals and pesticides in areas or situations where they are likely to enter surface water or ground water sources.
4. Chemical pesticides must be stored in such a way as to prevent accidental leakage into water systems or the on-site stormwater system. This may include:
 - i. Secure storage in a bunded area
 - ii. Secure storage in water proof/spill proof containers.

Other relevant areas of this DCP

- Provisions relating to on-site effluent disposal, soil erosion and sedimentation and protection of vegetation near watercourses are all highly relevant to water quality. Applicants should also refer to the infrastructure section and the Rural Land Uses Chapter of Penrith DCP for more information.

Lifting the bar

The following represent some ways in which applicants can demonstrate additional commitment to the catchment management/water quality principles expressed in this DCP. Demonstration of this commitment may lead to Council considering variation of development controls. Applications that vary the development controls listed in this section will need to demonstrate that the proposed development complies with the objectives relevant to the development controls it seeks to vary.

- On-site water monitoring for water pollutants to identify practices/activities impacting on the water systems
- Best-practice farming practices including minimising the use of chemicals and fertilisers (where possible).

Other information

People seeking further information on water quality may wish to refer to the following:

- Penrith City Council's *Stormwater Drainage Specification for Building Developments*
- ANZECC Guidelines and Water Quality Objectives in NSW (2000)
Department of Environment (Australian Government)
- Office of Environment and Heritage's website –
www.environment.nsw.gov.au
- Sydney Catchment Authority's website – www.sca.nsw.gov.au
- Sydney Water Corporation's website – www.sydneywater.com.au
- Penrith City Council's Sustainability Blueprint for urban release areas (June 2005)
- Penrith City Council's *Water Sensitive Urban Design Technical Guidelines*, (December 2013)
- www.wsud.org

2.3 Watercourses, wetlands and riparian corridors

Background

A riparian corridor is the land directly adjacent to (or surrounding) a natural or artificial waterway and provides a crucial link between terrestrial and stream ecosystems.

Wetlands and riparian corridors help purify water, improving the quality of larger water bodies. As runoff from surrounding land is critical to the performance of a wetland or riparian corridor, buffer areas are needed around wetlands and riparian corridors to minimise the entry of pollutants.

In addition to the water catchment management issues above, the following issues need to be addressed in relation to land uses and activities which can impact on watercourses, wetlands and riparian corridors:

- Preserving the natural alignment of watercourses

- Avoiding disturbance to the watercourse banks and channels
- Retaining native vegetation along creek corridors to stabilise banks and treat surface water run-off
- Protecting wetland and riparian corridor flora and fauna
- Providing setbacks to development in proximity to watercourses, wetlands and riparian corridors
- Protecting the watercourses natural stream flow regimes.

Objectives

- a) To protect water quality and terrestrial and aquatic life forms by identifying a riparian corridor along identified waterways and establishing specific planning controls for land within those corridors
- b) To minimise disturbance and/or impacts on natural waterbodies
- c) To rehabilitate existing riparian corridors and ensure that width, buffers to development, quality of landscape and diversity of vegetation to support principles of ecological sustainability are provided.

Controls

Controlled Activity Approval under the *Water Management Act 2000*

1. If any activities/land uses are proposed near a watercourse, the *Water Management Act 2000* may apply and you may be required to seek a Controlled Activity Approval from the WaterNSW. Please consult with this Office regarding your proposal. Except for certain exemptions, you are likely to need a controlled activity approval for:
 - i. The erection of a building or the carrying out of a work (within the meaning of the *Environmental Planning and Assessment Act 1979*) on the bank or shore of any river, estuary or lake or within 40m from the top of its bank or shore.
 - ii. Excavation in a river, estuary or lake, or within 40m from the top of its bank or shore.
 - iii. Removal of material (including vegetation) from the bank or shore of any river, estuary or lake or from within 40m from the top of the bank or shore.

- iv. Deposition of material, whether by way of landfill operations or otherwise on or within the bank or shore of any river, estuary or lake or within 40m from the top of the bank or shore.
- v. Anything which affects the quantity or flow of water in a water source or is likely to do so.

Even if there is an exemption from the requirement for an approval from this Office, you may still require the approval of Council. You may also require approval from Fisheries (NSW).

Preserving alignment of watercourses

- 2. Where possible, the natural (or historic) alignment of an existing wetland or watercourse should be retained along with its natural dimensions and flow regimes.
- 3. Watercourses should not be straightened to reduce the natural meander or flow path or to improve flood conveyance.
- 4. The alignment of major overland flow paths should be recognised in site planning and development design.

Avoiding modifications to natural waterbodies

- 5. There should be no modifications to a natural (or historic) waterbody in its dimensions, depth or bank height unless it seeks to enhance the ecological outcomes of the waterbody.
- 6. Watercourses should not be modified to maximise flood conveyance unless there are no other means to avoid damage to existing dwellings or infrastructure that cannot be relocated.
- 7. Natural hydrological processes are to be maintained where possible, including natural vegetation and the flow regimes to maintain creek line stability and the health of terrestrial and aquatic plant communities.

Protection and enhancement of riparian corridors

- 8. All riparian corridors should comprise a vegetated riparian zone along each side of the waterway (see Figure 1).
- 9. The vegetated riparian zone should retain or be vegetated with, fully structured native vegetation (trees, shrubs and groundwater species).

10. In relation to activities within the vegetated riparian zone, such as cycleways and paths, detention basins, stormwater management devices and essential services, compliance is required with the 'riparian corridor matrix' in the NSW Office of Water's *Guidelines for riparian corridors on waterfront land* (July 2012).
11. A managed buffer zone outside the vegetated riparian zone should be provided (where possible), to provide an additional buffer between development and the vegetated riparian zone. Land uses within the managed buffer zone could include roads, paths, playgrounds and stormwater management devices.
12. Asset protection zones should be located outside the vegetated riparian zones.
13. Appropriate widths for vegetated riparian zones will depend on the specific ecosystems being managed. Council's approach to determining the Order of Stream is based on the Strahler methodology, which is consistent with the NSW Office of Water.

Council reserves the right to assess each riparian corridor and each development on its merits. In general, however, the width will depend on the order of the stream/watercourse (see Figure 2) which provides an indication. The width should be measured from the top of the highest bank on both sides of the stream/watercourse, excluding any managed buffer zone, and shall comply with the requirements outlined in Table 3.

Figure 1: Riparian corridor

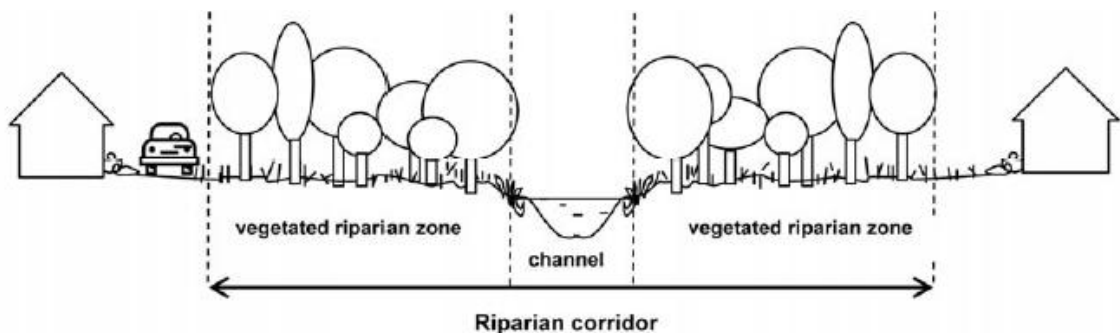


Figure 2: Stream classification

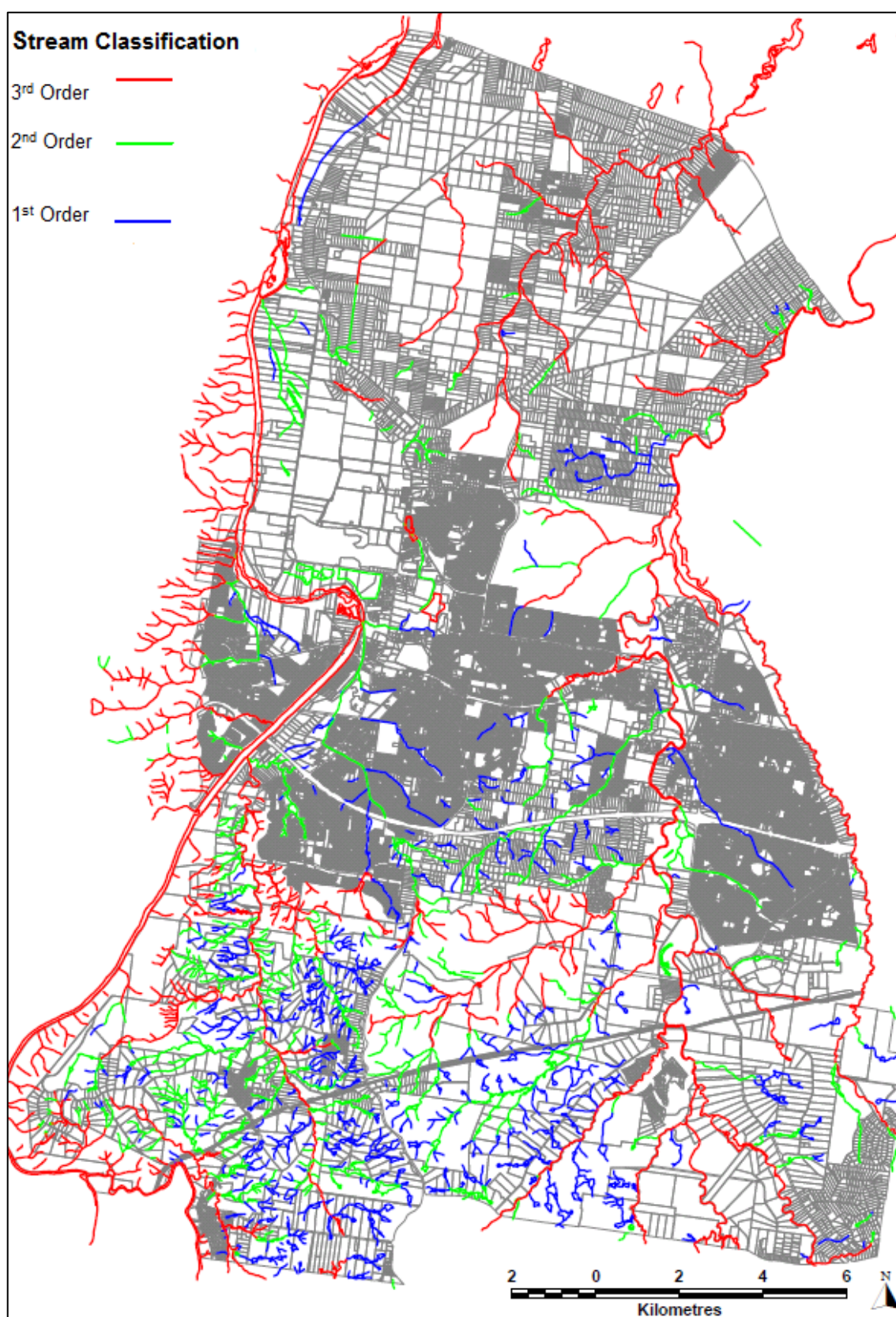


Table 3: Riparian corridor width requirements

Water Course Type	Vegetated Riparian Zone Width	Total Riparian Corridor Width
1 st Order (Blue)	10m	20m + channel width
2 nd Order (Green)	20m	40m + channel width
3 rd Order (Red) except Nepean River	30m	60m + channel width
Nepean River	90m	
Wetland	40m	80m + channel width

14. Where, a watercourse has had a gabion wall or channellisation constructed, this should be removed to restore a natural meander for ecological purposes, except where:
- The length of the watercourse through the development site is less than 50m or
 - The watercourse through the development site is a middle section of the overall watercourse, and it is technically unfeasible to reverse the channellisation or
 - Restoring the natural meander will create a hazard.
15. Enhancement of riparian corridors should, where possible:
- Mimic natural hydrological regimes for watercourse treatments
 - Replicate the natural watercourse through creation of a meandering channel, rather than straight channels
 - Simulate natural roughness having regard to riparian requirements and flow velocities to sustain vegetation groupings
- Roughness: A watercourse's shape, smoothness of its channel and amount of vegetation in the channel all affect the 'roughness' of that watercourse and the speed of water conveyed in the channel.
- Minimise ongoing maintenance requirements through channel design
 - Establish a functional riparian zone and natural channel section

- vi. Maintain or create a full assemblage of vegetation with likely natural obstructions
- vii. Create variations in channel cross-section and provide an opportunity for meandering of the channel within the flood plain
- viii. Minimise likely damage to channel banks and vegetation from storm flow through channel design
- ix. Ensure that the channel has the capacity for appropriate flood flows having regard to the steepness of the catchment; channel modifications and future liability for land owners, Council and government agencies.

There may be a need for a sensitivity analysis for a range of flood hydrology and design flows having regard to supporting flood studies for development.

Lifting the bar

The following represent some ways in which applicants can demonstrate additional commitment to the protection of watercourses, wetlands and riparian corridors expressed in this DCP. Demonstration of this commitment may lead to Council considering variation of development controls. Applications that vary the development controls listed in this section will need to demonstrate that the proposed development complies with the objectives relevant to the development controls it seeks to vary.

No development or site disturbance occurs:

- Within 40m on either side, measured from the top of the bank, of a 2nd Order stream/watercourse or
- Within 20m on either side, measured from the top of the bank, of a 1st Order stream/watercourse or significant natural drainage line, and
- Where riparian corridors are also acting as a significant wildlife corridor (subject to Council's review), the minimum area to be protected or revegetated is 40m on either side of the watercourse. This may be increased to up to 60m if the wildlife corridor is significant, or if it forms a major link to an extensive area of natural bushland (e.g. nature reserve or national park).

Other information

People seeking further information on watercourses, wetlands and riparian corridors may wish to refer to the following:

- Penrith City Council's *Stormwater Drainage Specification for Building Developments*
- Guidelines for riparian corridors on waterfront land (2012) (Office of Water)
- NSW Wetlands Policy (2010) (Office of Water)
- NSW Rivers and Estuaries Policy (1993) (Office of Water)
- Penrith City Council's Sustainability Blueprint for urban release areas (June 2005)
- Rehabilitation Manual for Australian Streams (1999) Rutherford et al
- Natural Channel Design Guidelines (2003) (Brisbane City Council)
- Stream Corridor Restoration: Principles Processes and Practices (2000) United States Department of Agriculture
- Fairfull, S. and Witheridge, G. (2003) Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries, Cronulla, 16pp
- NSW Fisheries (2013) Policy and Guidelines for Fish Habitat Conservation NSW Department of Primary Industries, Policy and Guidelines for Fish Friendly Waterway Crossings.

2.4 Groundwater

Background

Groundwater is water located beneath the ground surface in soil pore spaces and in the fractures of rock formations. Water can become trapped in aquifers which provide useable quantities of water. The depth at which soil pore spaces or fractures and voids in rock become fully saturated with water is called the water table. Groundwater is recharged from, and eventually flows to, the surface naturally. Natural discharge often occurs at springs and streams and may also form oases or wetlands.

Groundwater is often withdrawn for agricultural, residential, construction (i.e. dewatering where construction is below the water table) and industrial use. However, due to demand for water, there are increasing pressures on groundwater and aquifer supplies and groundwater dependent ecosystems which need to be managed. Most controls relating to groundwater use are

governed by State Government and not Council. A summary of the key issues is set out below to guide any developments that may impact on groundwater.

Objectives

- a) To protect groundwater supplies against excessive water extraction
- b) To protect groundwater supplies against pollution and contaminants
- c) To provide equity in access to groundwater supplies.

Controls

Utilising groundwater/bores

1. Where groundwater is proposed to be accessed, satisfactory arrangements for the proper utilisation and protection of the groundwater resource must be made with the Office of Water. All piezometers or bores must be licensed by the Office of Water.

A bore must be at least:

- i. 40m from the nearest bank of any river or creek
- ii. 500m from any town water supply bore
- iii. 400m from any irrigation bore on an adjoining property
- iv. 50 – 100m from a property boundary
- v. 200 – 400m from any Office of Water observation bores.

For distance rules, applicants are advised to consult the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources – Part 9 – Rules for Water Supply Work Approvals.

Protecting groundwater

2. Applicants are required to consider the impact of the proposed development on underlying and surrounding groundwater resources and adopt appropriate measures to avoid these impacts.
3. The following matters should be considered:

- i. The design of the development and the potential for its below-ground extent to impede, dam or otherwise obstruct the passage of groundwater flow
 - ii. The management of stormwater or roof runoff within and around the development and any potential degradation or deterioration of local groundwater quality that may occur as a result
 - iii. The management of greywater or wastewater generated from the development and any potential degradation or deterioration of local groundwater quality that may occur as a result
 - iv. The existence of groundwater users in the vicinity of the development and the potential for them to be adversely impacted by the proposed development
 - v. The vulnerability of groundwater locally and the pollution potential of the development
 - vi. The presence and distribution of groundwater dependent systems (environmental attributes having a dependence on groundwater) in the vicinity and the potential for adverse impacts to occur as a result of the development.
4. Groundwater shall not generally be pumped or extracted without specific licensed approval for any purpose other than temporary construction dewatering at the site identified in the development application.
5. Where construction is proposed below the water table:
- i. The volume of any groundwater abstracted for the purposes of temporary dewatering should be minimised, e.g. by minimising the length of time that any basement excavations below the water table are left open. In general, the Office of Water will not authorise temporary construction dewatering for periods of more than 12 months.
 - ii. The design and construction of the building should prevent any long-term take of groundwater by making any below-water table levels watertight for the anticipated life of the building. Waterproofing of below-ground levels must be sufficiently extensive to incorporate adequate provision for unforeseen high water table elevations to prevent potential future inundation.

- iii. A reasonable estimate of the total volume of groundwater to be extracted shall be calculated and a report provided to the NSW Office of Water. Details of the calculation method shall be included in the report.

Other information

People seeking further information on groundwater may wish to refer to the following:

- NSW State Groundwater Policy Framework Document (1997) NSW Government
- NSW State Groundwater Quality Protection Policy (1998) NSW Government
- NSW State Groundwater Dependent Ecosystems Policy (2002) NSW Government
- Hawkesbury-Nepean Catchment Groundwater Vulnerability Map (1998) Department of Land and Water Conservation
- Hawkesbury-Nepean Catchment Groundwater Availability Map (1998) Department of Land and Water Conservation.

2.5 Flood planning

Background

Impact of Flooding

The Hawkesbury/Nepean River system has one of the most dramatic flood behaviours in the world. The geography and topography of the area mean that flood waters are contained in the Nepean Gorge until they reach the floodplains at Penrith, resulting in unusually rapid rises in water levels. These floods continue to modify the physical environment of the valley as well as causing social and economic challenges to the valley's inhabitants.

Relevant Policies

Local government is the primary authority responsible for both flood risk management and land use planning in NSW. However, the State Government has introduced the Flood Prone Land Policy and the associated Floodplain Development Manual (2005) (FDM) to reduce the impacts of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods wherever possible. To achieve this objective, the supporting FDM acknowledges a broad risk management hierarchy of:

- avoidance of flood risk
- minimisation of flood risk using appropriate planning controls and
- flood risk mitigation.

Generally, the Flood Prone Land Policy adopts the following approach:

- The impact of flooding and flood liability on existing developed areas shall be reduced by flood mitigation works and measures, appropriate development and building controls and the voluntary acquisition of property in hazardous areas
- The potential for flood losses in all new developed areas shall be contained by the application of effective planning and development controls
- A merit approach to all development and building decisions which takes account of social, economic factors, as well as flooding considerations, should be followed.

Local Environmental Plan

The LEP contains provisions for development on land at or below the flood planning level, defined in the LEP as the level of a 1:100 Average Recurrence Interval (ARI) (1% AEP (100 year ARI)) flood event plus 0.5m freeboard.

The 1% AEP (100 year ARI) flood event is a tool for broadly assessing the suitability of land for development. It is not an assessment of flood risk, nor does reference to the 1% AEP (100 year ARI) flood event mean that properties and development above this level are not subject to flood risk.

Average Recurrence Interval (ARI) is the long term average number of years between the occurrence of a flood as big as or larger than the selected event. For example, floods with a discharge as great as or greater than the 100 year ARI flood event will occur on average once every 100 years.

Consideration of Floods Larger than the 1% AEP (100 year ARI) Flood Event

The 1% AEP (100 year ARI) flood is not, in most cases, the largest flood that can occur. There have been documented floods which exceeded this level for the Nepean River on a number of occasions over the last 200 years. The highest flood event at Penrith occurred in June 1867 and is estimated at greater than the 1:200 ARI event. Floodwaters reached a peak height of 27.5m above Australian Height Datum and covered most of the present day Emu Plains and large parts of Penrith. The 1967 flood for Ropes Creek and the 1956 and 1988 floods for South Creek were also major flood events.

For this reason, developments that may have a significant impact on the extent of flooding experienced by nearby or downstream properties may be asked to consider floods larger than the 1% AEP (100 year ARI) flood event. Significant areas of Penrith are affected by the Probable Maximum Flood (PMF) and in some cases this will need to be considered in determining flood hazard.

Probable Maximum Flood (PMF) is the largest flood that could conceivably occur at a particular location.

Flood Hazard Classifications

In order to determine what development may occur in areas subject to partial or full flooding, it is necessary to classify land according to flood hazard.

The greatest flood hazard occurs in land that is a 'floodway'. They are often aligned with obvious naturally defined channels.

Floodway is defined as those areas of the floodplain where a significant discharge of water occurs during floods.

In addition, there are significant risks in 'flood storage areas'.

Flood storage areas are defined as those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood.

Floodplain is defined as the area of land which is subject to inundation by floods up to and including the PMF event.

The remaining area of land affected by flooding after floodway and flood storage areas have been defined is the 'flood fringe area'.

Alterations to Land at or below the Flood Planning Level/Watercourses

One key issue with the development of land at or below the flood planning level is that some developments have the potential to adversely affect flood behaviour (including flow distributions and velocities). This can result in detrimental increases in the potential flood impacts on other development or properties and/or impacts on the floodplain environment that could cause erosion, siltation, destruction of riparian vegetation or a reduction in the stability of the river bank/watercourse.

Developments that would partially or fully block floodways or flood storage areas may result in redistribution of flood flows or impacts. The greatest impact comes from filling land at or below the flood planning level in order to raise development above the flood planning level. Therefore, these impacts must be minimised in the location and design of any structures on the land.

Minimising Flood Impacts on Property

Flood impacts on property can be reduced not only by appropriate location of development but also by design, layout and structure. This DCP provides controls for appropriate levels for 'habitable rooms' or 'flood proofing' of buildings.

Habitable rooms are defined as a living area such as a lounge room, dining room, rumpus room, kitchen and bedroom and excluding garages.

Flood proofing refers to the combination of measures incorporated in the design, construction and alteration of individual buildings or structures subject to flooding to reduce or eliminate flood damages.

Objectives

- a) To ensure floodplain risk management minimises the potential impact of development and other activity upon the aesthetic, recreational and ecological value of the waterway corridors.
- b) To maintain the existing flood regime and flow conveyance capacity and avoid significant adverse impacts on flood behaviour.
- c) To avoid significant adverse effects on the floodplain environment that would cause erosion, siltation, destruction of riparian vegetation or a reduction in the stability of the riverbank/watercourse.
- d) To reduce the impact of flooding and flood liability on individual owners and occupiers.
- e) To limit the potential risk to life and property resulting from flood events.
- f) To contain the potential for flood losses in all new developed areas by the application of effective planning and development controls.
- g) To apply a “merit approach” to all development and building decisions, which takes account of social, economic and ecological factors as well as flooding considerations.
- h) To prevent the introduction of unsuitable land uses on land subject to the flood planning provisions of the LEP.
- i) To deal equitably and consistently (where possible) with applications for development on land affected by potential floods, in accordance with the principles contained in the Floodplain Development Manual, issued by the NSW Government.

Controls

The following controls only apply to land subject to the flood planning provisions of the LEP.

Submission requirements

1. Where relevant, a comprehensive flood study, incorporating:

- i. a survey of the main watercourse
- ii. a survey of the site and
- iii. a detailed flood and drainage investigation which establishes the estimated 1% AEP (100 year ARI) flood level

is to be submitted with any development application on land identified as fully or partially flood affected. The levels on the survey are required to be verified during construction by a survey certificate.

2. The applicant shall be required to demonstrate to the satisfaction of Council (on the basis of a qualified consultant report) that:
 - i. The development will not increase the flood hazard or risk to other properties
 - ii. The structure of the proposed building works shall be adequate to deal with flooding situations
 - iii. The proposed building materials are suitable
 - iv. The buildings are sited in the optimum position to avoid flood waters and allow safe flood access for evacuation
 - v. The proposed redevelopment will not expose any resident to unacceptable levels of risk or any property to unreasonable damage
 - vi. Compliance of any existing buildings with the Standard - Construction of Buildings in Flood Hazard Area and the accompanying handbook developed by the Australian Building Codes Board (2012).

Flood hazard classifications

3. Council will consider development on land subject to the flood planning provisions of the LEP but will not grant consent to new development in floodways or in high hazard areas.

Flood hazard (high) or high flood hazard occurs when there is possible danger to life and limb; evacuation by trucks is difficult; there is potential for structural damage; and social disruption and financial losses could be high.

4. Consideration will be given to such matters as depth and nature of flood waters, whether the area forms flood storage, the nature and risk posed to the development by flood waters, the velocity of floodwaters and the speed of inundation, and whether the development lies in an area classed as a 'floodway', 'flood fringe area' or 'flood storage area'.

Residential – new developments – single dwellings

5. Residential – upper storey additions will not be considered as 'New Development' provided; the first floor additions are above the Flood Planning level and the additions and alterations do not increase the building footprint at ground level beyond 35m². (Ground floor additions include all non-habitable buildings such as garages, storage areas, carports and the like).
6. Floor levels of habitable rooms shall be at least 0.5m above the 1% AEP (100 year ARI) flood, i.e. the flood planning level.
7. The lowest floor level of habitable rooms shall be not more than 3.0m above ground level.
8. Any portion of buildings subject to inundation shall be built from flood compatible materials.
9. Flood safe access and emergency egress shall be provided to all new developments and for dwelling replacements where practicable.

Flood safe access means access that is generally considered satisfactory when the depth of flooding over vehicular driveways and roads is limited to approximately 0.25m with low velocities.

10. All services associated with the development shall be adequately flood proofed.
11. A certificate, prepared by a registered surveyor to verify the lowest floor level of a habitable room of a residential building to the required Australian Height Datum (AHD) level, shall be submitted to the Council upon completion of the building to that level. The building shall not be further constructed until approval is given by Council to proceed with construction works.

Residential – minor extensions

12. This section does not apply to minor extensions for the purpose of dual occupancy development, an existing single storey home which retains essentially the outer walls of the existing dwelling and proposes an upper floor addition, a knockdown rebuild that retains exactly the same building footprint, or a building burnt down and replaced with the same building footprint. These shall be treated as new development.
13. Once only extensions with a floor area up to 30m² may be approved with floor levels below the 1% AEP (100 year ARI) flood, if the applicant can demonstrate that no practical alternatives exists for constructing the extension above the 1% AEP (100 year ARI) flood.
14. Once only extensions which increase the existing floor area by between 30 and 35m² may be approved with floor levels at or above the 1% AEP (100 year ARI) flood.
15. Extensions greater than 35m² will be treated as a new development.

Non-habitable extensions or alterations, outbuildings and swimming pools

16. All electrical services shall be adequately flood proofed.
17. All flood sensitive equipment (including electric motors and switches) shall be located above the 1% AEP (100 year ARI) flood.

Industrial/commercial – new development

18. Floor levels shall be at least 0.5m above the 1% AEP (100 year ARI) flood or the buildings shall be flood-proofed to a least 0.5m above the 1% AEP (100 year ARI) flood. If floor levels are below the 1% AEP (100 year ARI) flood the matters listed in Extensions and Infill Development shall be addressed.
19. Flood safe access and emergency egress shall be provided to all new developments.

Industrial/commercial – extensions and infill development

20. Where the application is for an extension to an existing building on land at or below the flood planning level or for new development that can be classed as infill development, Council may approve of the development with floor levels below the 1% AEP (100 year ARI) flood if it can be demonstrated by the applicant that all practical measures will be taken to

prevent or minimise the impact of flooding. In considering such applications and determining the required floor level, Council shall take into account such matters as:

- i. The nature of the business to be carried out
 - ii. The frequency and depth of flooding
 - iii. The potential for personal and property loss
 - iv. The utility of the building for its proposed use
 - v. Whether the filling of the site or raising of the floor levels would render the development of the property unworkable or uneconomical
 - vi. Whether the raising of the floor levels would be out of character with adjacent buildings and
 - vii. Any risk of pollution of water from storage or use of chemicals within the building.
21. Any portion of the proposed building extension subject to inundation shall be built from flood compatible materials.

Change of use of existing buildings

22. Development consent for change of use of an existing building with floor levels below the 1% AEP (100 year ARI) flood will only be given where it can be demonstrated by the applicant that:
- i. There is no foreseeable risk of pollution associated with the proposed use of the building in the event that the 1% AEP (100 year ARI) flood occurs
 - ii. All practical measures shall be taken to minimise the risk of flood damage to the property within the building by the 1% AEP (100 year ARI) flood. These measures could include:
 - Flood proofing the building to the level of the 1% AEP (100 year ARI) flood by either construction of a wall or levee bank or some other means of preventing water entry
 - Raising the floor level of the building to the level of the 1% AEP (100 year ARI) flood and/or

- Storing all equipment, machinery and stock above the 1% AEP (100 year ARI) flood level.

Rural uses

23. Applications for minor extensions to existing buildings and new buildings associated with rural uses that are below the 1% AEP (100 year ARI) flood (other than residential buildings) will be considered on their merits having regard to the proposed use and the potential for property loss.

Subdivision

24. Generally, subdivision of land below the flood planning level will not be supported. Further provisions relating to the proposed subdivision of such land can be found in the Subdivision Section of this DCP.

Residential accommodation and caravan parks

25. Applications for residential accommodation, defined in the LEP, with the exception of dwelling houses, will be treated as per subdivisions. Applications for caravan parks will also be treated as per subdivisions. Other land uses which may attract large numbers of people.
26. Council will generally not support an application for any land use which may attract large numbers of people (including schools, function centres, child care centres, hostels, etc.) on land below the flood planning level and on land that cannot be safely and effectively evacuated during a 1% AEP (100 year ARI) flood event.

Storage of potential pollutants above 1% AEP (100 year ARI) Flood

27. All potential pollutants that are stored or detained on-site (such as on-site effluent treatment plants, pollutant stores or on-site water treatment facilities) should be stored above the 1% AEP (100 year ARI) flood. Details must be provided as part of any application to Council.

Overland flow flooding

28. Council has undertaken a Penrith Overland Flow Flood 'Overview' Study. Consideration must be given to the impact on any overland flow path. Generally, Council will not support development obstructing overland flow paths. Development is required to demonstrate that any overland flow is maintained for the 1% AEP (100 year ARI) overland flow. A merit based

approach will be taken when assessing development applications that affect the overland flow.

29. Council's *Stormwater Drainage Specification for Building Developments* provides information on the details required in the preparation of an overland flow study.

Filling of land at or below the flood planning level

30. Council will not grant consent to filling of floodways or high hazard areas. The filling of other land at or below the flood planning level will generally not be supported; however, Council will adopt a merits based approach. In particular, an application to fill land shall also describe the purpose for which the filling is to be undertaken. Council may consider such an application when the following criteria are met:

- i. Flood levels are not increased by more than 0.1m by the proposed filling
- ii. Downstream velocities are not increased by more than 10% by the proposed filling
- iii. Proposed filling does not redistribute flows by more than 15%
- iv. The potential for cumulative effects of possible filling proposals in that area is minimal
- v. There are alternative opportunities for flood storage
- vi. The development potential of surrounding properties is not adversely affected by the filling proposal
- vii. The flood liability of buildings on surrounding properties is not increased
- viii. No local drainage flow/runoff problems are created by the filling and
- ix. The filling does not occur within the drip line of existing trees.

31. The above criteria can only be addressed and satisfied by the submission of a detailed flood study report by an appropriate consulting engineer. The flood study report would involve both hydrologic and hydraulic analysis of the watercourse and the effects of the proposed filling on flood levels, flow velocities and distribution of flows as listed in i) to iii)

above. In addition, the report needs to address items iv) to ix) listed above. Any filling of land also needs to be in accordance with the other provisions in this DCP.

Rezoning of land

32. Council will not support the rezoning of any land located in a floodway or high hazard area.
33. Council will generally not support the rezoning of rural land situated below the 1% AEP (100 year ARI) flood where the development of that land may require or permit the erection of buildings or works even if the surface of the land can be raised to a level above the 1% AEP (100 year ARI) flood by means of filling.
34. Where land below the flood planning level is currently zoned to permit urban development, Council will generally not support the rezoning of land to permit a higher economic use or an increase in the density of development.

Other information

People seeking further information on flood planning lands or preparing development applications may wish to refer to the following:

- Penrith City Council's *Stormwater Drainage Specification for Building Developments*
- NSW Government's Flood Prone Land Policy and associated Floodplain Development Manual (2005)
- Penrith City Council's Sustainability Blueprint for urban release areas (June 2005)
- Standard – Construction of Buildings in Flood Hazard Areas and accompanying handbook, developed by the Australian Building Codes Board (2012).

2.6 Stormwater management and drainage

Background

Stormwater is a term used to describe water that originates primarily from rainfall or from runoff water that enters the stormwater system. Stormwater

that does not soak into the ground becomes surface runoff, which either flows into surface waterways or is channelled into stormwater systems. In Penrith, stormwater generally drains to the street drainage system or drainage easements in urban areas.

There are two main issues in relation to stormwater – one related to the volume and timing of runoff water (flood control and water supplies) and the other related to potential contaminants that the water is carrying (water pollution).

Because impervious surfaces (parking lots, roads, buildings) do not allow rain to infiltrate into the ground, more runoff is generated than in the undeveloped condition. This additional runoff can erode watercourses as well as cause flooding when the stormwater collection system is overwhelmed. Excess water can also infiltrate soils and raise water tables resulting in additional salinity issues.

One solution to address stormwater issues is on-site detention. On-site detention is the provision of depressed areas or specific storage in paved or landscaped areas, with relatively small stormwater outlets, that detain a volume of water for a short duration during more intense storms. This prevents or mitigates any increase in peak stormwater flow rates from development and delays the peak volume of runoff. It is important to note that on-site detention systems are required to release water after the peak storm event to provide capacity for future events. Therefore, on-site detention systems do not include rainwater tanks, water retention basins or dams. These are dealt with later in this section of the DCP.

In addition, to help address stormwater issues, drainage structures off-site may need to be upgraded as a result of new development. Generally, the developer is responsible for the full or partial cost of upgrading structures where it can be demonstrated that the proposed development overloads the existing drainage system.

The aim of these controls is to ensure that developments minimise their impact on the water cycle by minimising impervious surfaces, providing on-site storage for stormwater to reduce peak events and ensuring that stormwater systems are upgraded to manage any additional stormwater flows.

Relevant Stormwater Drainage Policy

Council has adopted the *Stormwater Drainage Specification for Building Developments*. This policy provides guidance to ensure that stormwater drainage for building developments is designed to provide a robust, safe and low maintenance system to manage stormwater impacts on the drainage network and surrounding properties in a holistic manner that is incorporated aesthetically with the overall development.

This policy sets out Council's minimum requirements for the provision of stormwater drainage principally to building development sites, and should be used in conjunction with the Penrith DCP and other policies referred to in the *Stormwater Drainage Specification for Building Developments*.

Objectives

- a) To prevent damage by stormwater to the built and natural environment.
- b) To ensure that new development does not generate stormwater discharges that exceed the capacity of the existing drainage network.
- c) To ensure that an adequate and environmentally acceptable method of removing surface water and stormwater is implemented.
- d) To minimise nuisance flows of stormwater from one property to adjoining properties.
- e) To maximise reasonable on-site detention, to provide opportunities for rainwater re-use.
- f) To minimise hardstand and impervious areas on developed land to minimise run off.
- g) To provide a stormwater system which can be maintained economically.
- h) To provide a stormwater system which utilises open space in a manner compatible with other uses.
- i) To control flooding and enable access to allotments, stabilise the landform and control erosion.
- j) To minimise urban runoff pollutants to watercourses.

Controls

Natural environment

1. Runoff must not be discharged into bushland areas, including threatened ecological communities.
2. Pipe outlets shall be treated with measures to dissipate stormwater velocity, except where waters enter a formed channel or similar structure that is unlikely to be damaged by water flowing in at high velocity.
3. Permeable ground surfaces are to be maintained as far as possible, and where suitable conditions exist, stormwater is to be infiltrated on-site.

Drainage

4. Council's *Stormwater Drainage Specification for Building Developments* provides details on drainage requirements including on-site detention, new drainage systems and the like.
5. The development of any lot should take into account the existing drainage patterns of the area, including any localised ponding, and whether the proposed development is likely to affect:
 - i. Access to the site
 - ii. Drainage on adjoining properties
 - iii. Localised nuisance flooding on adjoining properties
 - iv. Natural overland flow or drainage paths.
6. In areas where there are no defined drainage patterns, Council may require the applicant to liaise with the adjoining owners regarding the construction of a drain or channel to an existing watercourse. This may include the provision of drainage easements.
7. Depending on the scale of the proposed development, the applicant may be required to address the following matters in their application:
 - i. The drainage capacity available for the site (e.g. if the site is connected to a centralised stormwater system, the existing drainage network capacity)
 - ii. Where capacity may be limited, appropriate drainage measures, including possible on-site detention (determined by liaising with Council's Development Engineering Unit and receiving detailed advice from a qualified engineering consultant)

- iii. If the site is affected by drainage constraints, the current stormwater discharge and likely future discharge. In this regard, a report prepared by a qualified engineer will be required and should demonstrate that the development will not overload trunk drains during peak storm events or cause localised flooding
 - iv. If the proposed development will result in additional pollutant loading (and the appropriate licences have been obtained from the relevant government authorities), details demonstrating that the drainage systems have adequate capacity for those pollutants and runoff will comply with the water quality requirements referred to in this DCP
 - v. Any required easements across neighbouring properties. Where easements are required, Council requires the submission of the adjoining owner's consent with the development application.
8. If the site does not have access to Council's stormwater drainage system, all drainage should be designed to ensure that the intensity, quantity and quality of surface runoff is not detrimental to downstream properties and watercourses. A legal point of discharge will be required.
9. If the site has access to Council's stormwater drainage system, all roof and surface water that is not recycled for use on the site must be discharged into Council's stormwater drainage system. No surface drainage will be permitted to discharge across Council's footways or reserves or enter adjoining land.
10. The applicant should demonstrate how existing soil type and associated constraints (e.g. salinity and poor percolation) have been considered in the drainage design).

Onsite Stormwater Detention (OSD)

11. Council's *Stormwater Drainage Specification for Building Developments* provides details on drainage requirements for on-site detention.
12. Adequate stormwater systems shall be designed and constructed to ensure that, for all rainwater events up to and including the 1:100 Average Recurrence Interval (ARI) event, new developments and redevelopments do not increase stormwater peak flows in any downstream areas.
13. On-site stormwater detention systems must release water after any rainfall event to maximise future capacity and, therefore, cannot include rainwater tanks, water retention basins or dams.

14. Detention storage is to be located at a level that is above the 1:5 ARI flood level.
15. On-site detention systems are to be designed using a catchment wide approach. Advice should be sought from Council's Development Engineering Unit in this regard.
16. On-site stormwater detention mechanisms should have a maintenance program in place.
17. Onsite stormwater detention mechanisms should be placed on the title of the relevant allotment/property to ensure their retention and maintenance.

New drainage design

18. Any new piped drainage system shall be designed to control minor stormwater flows under normal operating conditions for an ARI of 5 years.
19. Any new drainage system shall be designed to control major stormwater flows under normal operating conditions for an ARI of 100 years.
20. Council's *Stormwater Drainage Specification for Building Developments* provides details on drainage requirements for on-site detention.

Lifting the bar

The following represent some ways in which applicants can demonstrate additional commitment to the stormwater management principles expressed in this DCP. Demonstration of this commitment may lead to Council considering variation of development controls. Applications that vary the development controls listed in this section will need to demonstrate that the proposed development complies with the objectives relevant to the development controls it seeks to vary.

- Stormwater detention on site should have capacity to improve the quality of water leaving the site from pre-development state. This may involve treatment of water flowing into the site from upstream properties.

Other information

People seeking further information on stormwater management and drainage or preparing development applications may wish to refer to the following:

- Penrith City Council's *Stormwater Drainage Specification for Building Developments*
- Australian and New Zealand guidelines for fresh and marine water quality (2000) Australian and New Zealand Environment Conservation Council
- National Water Quality Management Strategy No 10: Australian Guidelines for Urban Stormwater Management (2000)
- Penrith City Council's Water Sensitive Urban Design Policy, (December 2013)
- Penrith City Council's Water Sensitive Urban Design Technical Guidelines, (December 2013).

2.6 Water retention basins/dams

Background

Relevant Policies for Water Harvesting

The NSW Farm Dams Policy (harvestable right dams' policy) allows rural landholders to harvest a basic volume of water (10% of runoff), store and use that water for any purpose without the need to obtain a licence under the Water Management Act 2000. The policy has a number of exceptions, exemptions and location variations and advice from the Office of Water should be sought. Any take of water over and above 10% runoff would require a water access licence and an approval.

Information on water sharing and how to calculate harvestable rights can be found on the Office of Water website <http://www.water.nsw.gov.au/>.

Relevant Policies for Dam Construction and Safety

Dams that are classified as prescribed under the *Dams Safety Act 1978* need to be registered with the Dam Safety Committee. Prescribed dams are those dams that have a significant impact on community interests in the event of dam failure. All dams higher than 15m are prescribed. For smaller dams, the

Dam Safety Committee determines whether prescription is necessary based on the consequence of dam failure occurring in the:

- event of a natural flood (Flood Consequence Category)
- absence of a natural flood (Sunny Day Consequence Category).

Although registration is required for very few dams, proposed dams should be checked with the Dam Safety Committee.

Dam safety can be a major issue depending on the stability of the geology/soils, the size of the dam and the size and characteristics of the dam's catchment. Specific advice on the construction of dams can be obtained from the Office of Water.

Factors to be considered include:

- i. The location of the dam in relation to local water flows
- ii. Dam construction – wall design, heights, method of construction, etc
- iii. Volume of water and extent of the land inundated when the dam is at capacity
- iv. The relative height and dimensions of the by-wash to control the dam's capacity or the provisions to ensure that inundation of land does not exceed the specified extent; and
- v. Provision for passing flows.

Information on the type, size, location and consequence category (i.e. failure consequences) of new dams is critical for the Dam Safety Committee's consideration to determine the need, or otherwise, to prescribe the dam. The Dam Safety Committee's website provides a form to assist with enquiries. Once approved, the dam design or location should not be altered without the agreement of the Dam Safety Committee.

Objectives

- a) To provide controls for water harvesting to limit the impacts on the natural water cycle and ensure water flows to natural waterways and river systems.
- b) To allow water harvesting to support essential rural land uses, especially agricultural uses.

- c) To ensure that water retention basins and dams are designed and constructed in accordance with the relevant State policies and guidelines for safety.

Controls

1. Council's consent is required to construct or form a dam, pond, lake or water retention basin where it will collect more than 10% of surface run-off (as determined by a hydraulic engineer and/or by Council).
2. The design and location of any water retention basin/dam should be carefully considered within the catchment area of the site to protect natural flows to natural waterways and river systems.
3. Dams need to be appropriately constructed to ensure they will not have an adverse impact on surrounding properties either by ponding water back up onto upstream properties or by concentrating water to any downstream properties.
4. Where possible, water retention basins/dams should seek to minimise disturbance to existing vegetation. Where possible, they should also be landscaped to minimise visual impact and provide shade to minimise evaporation losses and reduce algae growth.
5. If a dam is to be breached intentionally, an analysis of the sediment in the dam must be carried out prior to breaching to identify potential pollutants. If necessary, a remediation action plan or plan for disposal of contaminated sediment must be developed. Dam breaching must be carried out in a manner which does not impact on downstream properties.

2.7 Rainwater/storage tanks

Background

This section aims to ensure that the location, types, materials and colours for any rainwater or other storage tanks are considered as part of the entire site design and are sympathetic to the rural and landscape character of the area. Use of rainwater tanks is consistent with the NSW State Government's objective of reducing the amount of potable (drinking) water consumed for non-potable uses, like flushing toilets and in gardens. Therefore, provision of

a rainwater tank can form part of a BASIX commitment listed within the BASIX certificate to meet reduced water consumption targets.

If water in rainwater tanks is intended for human consumption, the tank must be appropriately maintained. Refer to the Australian Government's *Guidance on use of rainwater tanks* (2010) produced by the Environmental Health Committee for further information.

Objectives

To ensure that rainwater or other water storage tanks and associated structures are:

- a) Appropriately located and designed (with appropriate types, materials and colours) to minimise the visual impact on any rural, scenic or landscape character of any area
- b) Integrated into the design of any cluster of buildings or as part of the primary dwelling during the site planning and design process
- c) Designed and/or constructed in accordance with the necessary guidelines to ensure safety and structural stability
- d) Designed to minimise the entry of contaminants into any water that may be harvested for drinking purposes.

Controls

- 1. In many cases, rainwater tanks may be exempt development under *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* and development consent may not be required. Where development consent is necessary, the following additional requirements apply:
 - i. Rainwater tanks must not exceed 3m in height above ground level (including stand).
 - ii. Rainwater tanks must not collect water from a source other than gutters or down pipes on a building or a water supply service pipe.
 - iii. Rainwater tanks must be structurally sound.
 - iv. The rainwater tank, and any stand for the tank, must:

- Be assembled and installed in accordance with the manufacturer's specifications and
 - Not rest on a footing of any building or other structure on the property including a retaining wall.
- v. Rainwater tanks must utilise prefabricated materials or be constructed from prefabricated elements designed and manufactured for the purpose of construction of a rainwater tank.
- vi. A rainwater tank must be enclosed and inlets screened or filtered to prevent the entry of foreign matter or creatures.
- vii. A rainwater tank must utilise a non-reflective finish. Materials and colours should complement those used on the dwelling house and any other buildings on the land.
- viii. Plastic rainwater tanks are not to be used in bushfire prone areas.
- ix. Rainwater tanks on land zoned C3 Environmental Management or C4 Environmental Living must have a maximum total capacity for the entire property of:
- 90,000 litres (where the property has an area of 10 hectares or greater) or
 - 45,000 litres (where the property has an area of less than 10 hectares).

Other relevant information

People seeking further information on rainwater/storage tanks may wish to refer to Penrith City Council's *Stormwater Drainage Specification for Building Developments*.

3. Land management

Background

Need for land management

Land degradation and the associated loss of agricultural potential has been a serious problem since the advent of European settlement. Land degradation is not restricted to the rural environment. Urban environments also suffer from introduced weeds, erosion and contamination of soil and water, including pollution from run-off. As the population expands, pressure on land from urban development intensifies and the agricultural industry increasingly must use marginal lands, thereby increasing the threat of significant land degradation.

Key issues

Some of the key issues associated with land management in the Penrith Local Government Area (LGA) include:

- Impacts of changing the natural landform through excavation and filling
- Erosion and sedimentation
- Salinity
- Contamination of land
- Landfill and leaching of contaminants
- Land rehabilitation
- Sustainable land use practices, including sustainable farm management
- Native vegetation cover, especially near watercourses
- Appropriate intensities of agricultural land uses
- Balancing land for rural and urban development

Benefits of sustainable land use

Sustainable land use is about taking a holistic approach to managing our natural resources based on ecological, social and economic considerations. It requires, among other things, integrating land, water, vegetation and biodiversity management so land uses can occur without damaging ecological processes or reducing biodiversity over the long term. Sustainable land use practices can improve profitability, maintain the productive capacity of land and improve the capacity of land to cope with severe climatic conditions, while maintaining or enhancing the natural resource base.

Objectives

- a) To promote sustainable land use practices for all land use types.
- b) To minimise land degradation in the Penrith LGA and promote restoration of degraded lands.
- c) To control erosion, sedimentation and dust to maintain soil and water quality and protect amenity.
- d) To minimise land contamination through inappropriate landfill or pollution of land and maximise remediation of contaminated land.
- e) To reduce the likelihood of salinity and its impact on land and development.

Other relevant sections of Penrith DCP

This DCP is a multi-layered document that recognises the relationship of a number of issues to achieving sustainable outcomes. Therefore, when addressing land management issues, it is important to read all relevant parts of this DCP to ensure they are aware of all land management issues.

3.1 Site stability and earthworks

Background

This section seeks to ensure that site planning for any proposed development takes into account the topography, geology and soils of the site and surrounding land. This is necessary to minimise disturbance to existing landforms and costly earthworks, to protect existing and proposed development from becoming unstable, and to minimise erosion.

Objectives

- a) To take into account the stability of land having regard to its topography, geology and soils as part of site planning principles.
- b) To minimise the extent of earthworks when creating a building site.
- c) To minimise disturbance of vegetation that stabilises land, particularly on sloping sites.

Controls

Development Consent

- 1. In accordance with the earthworks provisions of the LEP, development consent is required for any earthworks unless:
 - i. The work is exempt development under *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* or
 - ii. The work is ancillary to other development for which development consent has been given.
- 2. Consent is required when material is imported or removed from a property or is relocated on the same property.

Matters to be Considered

- 3. The LEP contains clauses that list the matters that must be considered before granting development consent for earthworks.
- 4. These matters must be addressed in the supporting documentation submitted with the development application.

Development Application Requirements

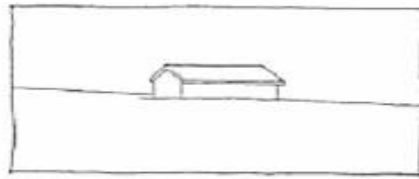
- 5. Any development application that proposes earthworks and therefore changes to the levels of a site, is required to clearly address the following in the Statement of Environmental Effects or a Geotechnical Report (if required, see Control 6 below):
 - i. The location and extent of the earthworks on the site

- ii. Justification for the need to change the land levels in terms of the overall development
 - iii. Any other impacts from the changed land levels as a consequence of the earthworks.
- 6. Where a building is proposed on land where the existing slope gradient is higher than 15% (or the land is likely to be subject to any land stability issues), the development application may be required to include a Geotechnical Report (prepared by a suitably qualified consultant).
- 7. Council will not permit a building to be placed on land where the existing slope gradient before development is greater than 20%.
- 8. Applicants should refer to the following sections of this DCP:
 - i. Vegetation Management, to ensure vegetation is protected on the site, particularly where the vegetation is important to site stability
 - ii. Site Planning and Design Principles, to ensure any proposed development responds to the natural topography of the site
 - iii. The other sections of this section relating to landfill, erosion and sedimentation, contaminated lands and salinity to determine if any additional information is required to address these issues.

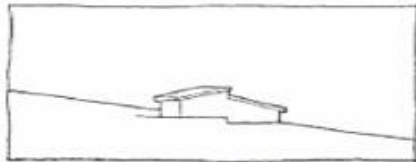
Limitations on Earthworks

- 9. Earthworks to create a building platform shall not be undertaken where excavation and/or filling would exceed 1m from the existing natural ground level of the site.
- 10. On sloping sites, site disturbance is to be minimised by using split level or pier foundation building designs (see Figure 3).
- 11. All retaining walls proposed for the site are to be identified in the development application for the proposed development. Retaining walls are to be kept to a minimum to reduce earthworks. Use of materials that complement the natural environment is encouraged.
- 12. During any earthworks, any topsoil should be preserved on site for re-use and should be stockpiled and covered to avoid dust or loss of topsoil. Refer to the Landscape Design Section of Penrith DCP for controls on stockpiling topsoil on site.

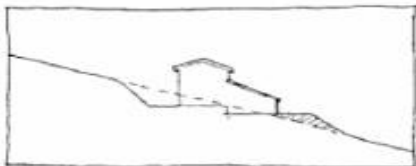
Figure 3: Building on Sloping Land



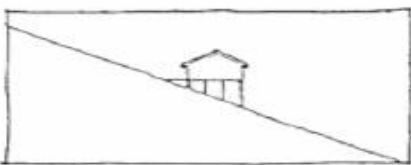
Flat land provides a great range of opportunities for variations in siting and the design of buildings. On flat land interesting development can be created through good building design and landscaping.



Gentle slopes require split level designs. The costs associated with building and access are higher. Sloping sites can provide interesting building design and landscape opportunities.



Steep slopes can become very difficult and expensive to build on. Access can also be difficult. Choosing the best site requires considerable thought. Advice from Council will be of value.



On very steep slopes you have very limited building opportunities. Specialized building, engineering and drainage advice will be required. The cost of building will be much higher.

3.2 Landfill

Background

In determining applications for landfill (either on its own or as part of another development), Council will consider the possibility of land contamination and the implications it has for any proposed future use of the land (Refer to the Contaminated Lands Section of this DCP). Council will also have regard to the method, nature and effect of landfill to ensure all material is managed appropriately and in accordance with:

- relevant legislation and
- The Environment Protection Authority (EPA) requirements and guidelines.

The use of waste building materials as landfill is not permitted apart from the use of crushed bricks or similar for vehicular access areas.

Objectives

- a) To require an applicant to justify the use of landfill on any site and ensure that it enhances the use of a property.
- b) To ensure that any landfill utilises appropriate materials that do not result in pollution or contamination of land or water on a site.
- c) To ensure that landfill does not adversely impact on local drainage characteristics.
- d) To ensure that landfill will not increase flood hazard or risk to other properties.

Controls

Development Application Requirements

- 1. Applicants seeking Council's consent for landfill must provide a Landfill Validation Report (written by an appropriately qualified person).
- 2. Council may require a further detailed investigation to occur if contamination is, or may be, present in the fill material to prove that the fill material is suitable for the proposed use. (Refer to the Contaminated Land Section of this Chapter for further requirements).

Landfill Requirements

- 3. Imported fill shall not include putrescible waste (i.e. waste that breaks down) or building material. Clean fill including soil, sand or virgin excavated natural material (VENM) is generally acceptable.
- 4. The filled area shall be drained to Council's satisfaction and not impact upon the drainage characteristics of other properties in the catchment area.
- 5. The material shall be suitably compacted and treated to prevent runoff and siltation of watercourses.
- 6. Compaction of filled areas is to be 98% standard compaction and in accordance with relevant Australian Standards, including AS1289 Method of testing soils for engineering purposes and AS3798 Guidelines on earthworks for commercial and residential development, and Council's engineering standards. Compaction certificates are to be submitted to the private certifier or Council.

7. The finished area shall be revegetated and stabilised to blend the filled area and natural surfaces.
8. Earth moved from areas containing noxious weed material must be disposed of at an approved waste disposal facility and transported in compliance with the *Noxious Weed Act 1993*.
9. Fill within 10m of adjoining bushland must not be carried out. Any fill in the vicinity of bushland must only use material from the local area (in order to minimise spread of weeds) and must be carried out in a manner that does not cause adverse impacts to surrounding properties, local drainage systems and existing vegetation. Material which is likely to have an adverse environmental effect due to it being combustible, toxic, hazardous or dangerous must not be used.
10. Fill must not be carried out within the drip line of existing trees.

3.3 Erosion and sedimentation

Background

One of the major impacts of erosion is the removal of the topsoil, which results in the loss of essential nutrients for plant development and animal nutrition, and the loss of soil structure and permeability to water. This reduces the viability of plants and soil habitats which support ecosystems, agriculture and the natural landscape.

Another major impact is the relocation of the eroded soil to other locations, called sedimentation. Sedimentation can damage natural vegetation, block stormwater drains and flowpaths, and cause significant impacts on natural watercourses and other waterbodies such as wetlands. The impact on natural waterbodies includes the smothering of aquatic plants and animals, with additional nutrient loads promoting rapid growth of invasive organisms and species such as blue-green algae and water hyacinth. This reduces water quality and the recreational value of these water systems.

This section applies to all land where any proposed development or land use:

- Involves disturbing the existing ground surface or placing fill, and/or results in changes to the shape of the land

- Involves changes in the velocity and/or volume of water runoff entering directly or indirectly into a watercourse or wetland or flowing over the land.

While this will include the excavation and filling of land, it may also include significant landscaping works and topsoil stockpiling.

This section also seeks to supplement the controls set out in clauses relating to earthworks of the LEP.

Objectives

- a) To minimise site disturbance during the construction and operation of developments and land uses.
- b) To reduce the amount of erosion and/or sedimentation of land within the Penrith LGA.
- c) To maximise the amount of vegetation retained on development sites and ensure its protection during construction and operation of the development.
- d) To protect the natural environment, particularly natural water bodies, from erosion and sedimentation.
- e) To encourage prompt rehabilitation of development sites by the implementation of revegetation strategies.

Controls

Erosion and Sediment Controls Plans (ESCP)

1. All applications for subdivision and development which involve site disturbance must be accompanied by an Erosion and Sediment Control Plan (ESCP), except in the following circumstances:
 - i. The construction of minor structures including carports, pergolas, verandahs, garden sheds and the like
 - ii. Dwelling additions and alterations which are deemed by Council as not likely to cause erosion and sediment loss from the site.
2. An ESCP is necessary to ensure that a strategy to manage erosion and sedimentation is considered at an early stage in the planning process. The ESCP must consider the potential for soil erosion and sedimentation

during all stages of the development – demolition, construction and operation of the development. The ESCP must demonstrate that appropriate controls have been planned which will, when implemented, minimise erosion of soil from the site and, accordingly, sedimentation of drainage systems and waterways.

3. The ESCP must be submitted in accordance with best practice guidelines for erosion and sediment control, including Landcom's, Managing Urban Stormwater – Soils and Construction, 2004.
4. Where the applicant is uncertain of the most suitable method of control for a particular situation, the applicant is requested to consult with Council officers to discuss the proposal prior to the submission of an ESCP.

Requirements for Erosion and Sediment Control

5. Soil erosion and sediment control measures are to be provided on-site before the commencement of any earthworks or development activity, in accordance with the approved ESCP. These must be maintained throughout the course of construction until disturbed areas have been revegetated and the soil stabilised. The applicant will be required to provide certification to this effect, which is to be lodged with Council prior to construction.
6. All erosion and sediment control measures are to be installed to the satisfaction of Council or the proposed Certifier, in accordance with best management practices recommended by recognised authorities (including Managing Urban Stormwater – Soils and Construction).
7. The work supervisor is responsible for ensuring that all erosion and sediment control measures are implemented in accordance with conditions of approval and are maintained until a final inspection has indicated that the site is sufficiently rehabilitated and stabilised.
8. The decision to install a particular mechanism to prevent erosion and/or sedimentation depends on the location and type of activity proposed and may vary from site to site.
9. Council may require erosion and sediment control works to be carried out in addition to, or in variation from, the approved ESCP, should circumstances necessitate it. Any variations are to be approved by Council and implemented in accordance with this section and current

best practice guidelines (including Managing Urban Stormwater – Soils and Construction), where relevant.

10. All erosion and sediment control measures should be maintained for the duration of the specified maintenance period. An established, stabilised ground cover must be in place and approval should be obtained from the Certifying Authority before removing erosion and sediment control measures.

Additional Measures for Large Sites

11. Where an application is for a site over 2,500m² and there will be substantial earthworks, the applicant is required to address a number of additional measures in the ESCP, including:
 - i. Identify all areas likely to cause pollution of waterways from the transport of stormwater run-off containing sediment and silt and implement appropriate devices to stop the risk of pollution
 - ii. Divert clean water around the construction site to prevent contamination
 - iii. Retain as much natural vegetation as possible and limit site disturbance
 - iv. Control stormwater that enters the construction site from upstream
 - v. Divert stormwater from undisturbed upper slopes onto stable areas
 - vi. Retain and stockpile all excavated topsoil on site for future landscaping and to minimise risk of erosion
 - vii. Prevent sediment/silt from entering adjoining public or private property (especially drains) by installing sediment control devices at the low side of sites and wash down areas
 - viii. Provide a single, stabilised entry/exit point to the site
 - ix. Prevent sediment, including building materials, from reaching the road or Council's stormwater system. Sediment is to be removed by sweeping, shovelling or sponging. Under no circumstances shall sediment be hosed

- x. Where a work zone permit over public property is applicable, ensure that appropriate debris control devices are implemented to prevent spillage of building materials into stormwater drains
- xi. Compact all drainage lines when backfilling
- xii. Connect downpipes to the stormwater system as early as possible
- xiii. Revegetate all disturbed areas, after on-site works are completed, in order to stabilise the surface
- xiv. Maintain all sediment control devices during earthworks and construction to standards acceptable to Council.

Implementation, Monitoring and Maintenance

- 12. Requirements for erosion and sediment control will be incorporated in approval conditions for development consents. The supervisor of the development is responsible for ensuring that all conditions are implemented and maintained throughout the development process. All control measures are to be regularly inspected and maintained by the work supervisor in accordance with current best practice (including Managing Urban Stormwater – Soils and Construction).
- 13. In the case of new dwellings, the frame inspection will not be carried out by Council unless erosion and sediment control measures are satisfactorily installed and gutters and downpipes are connected to direct roof water to the stormwater system approved by Council.
- 14. The consent holder, owner, contractor builder and all persons on site are responsible for controlling soil erosion and preventing the discharge of sediment from the building site.
- 15. Erosion and sediment control measures will be inspected in the course of Council site inspections following issue of a construction certificate.
- 16. The Landscape Design Section of this DCP also contains requirements relating to erosion and sedimentation control during landscape works.

Penalties for Non-Compliance

- 17. An environmental bond/security may be required to be lodged with Council and may be used to make good any damage that has the potential to cause pollution.

18. Where there is non-compliance with any controls in this DCP relating to erosion and/or sedimentation, Council may charge a reinspection fee, claim the environmental bond, or issue a Clean-up Notice, Prevention Notice or Penalty Infringement Notice if a pollution incident has occurred or has the potential to occur.
19. Any person(s) who fails to satisfactorily implement erosion and sediment controls may be subject to action under state or federal legislation.
20. In more serious cases, legal action may be considered under legislation dealing with environmental protection.

Other information

This section must be read in conjunction with:

- *Guidelines for Engineering Works for Subdivisions and Developments* (Penrith City Council, November 2013)
- *Managing Urban Stormwater – Soils and Construction* ('The Blue Book') (Landcom, March 2004)

3.4 Contaminated lands

Background

Impacts of Contamination

There are a number of activities that use, store and dispose of contaminants which can potentially impact on soils, groundwater, surface water and air. The Technical Information Appendix of this DCP lists key uses/activities that may result in contamination and the likely chemicals used in such activities. Such contamination can impact on the health and well-being of the community and on the integrity of buildings, structures and service facilities.

Adverse impacts from contamination can occur as a result of accidents or of ongoing poorly managed industrial, agricultural or commercial activities. Accordingly, steps need to be taken to minimise the creation of contaminated sites and to prevent the further contamination of already contaminated sites. Contaminated land is to be remediated before development can occur on that land. Remediation involves the treatment and/or mitigation of the contaminants.

Addressing Contamination

Under the *Environmental Planning and Assessment Act 1979*, Council has a duty of care, when considering development proposals, to fully consider the possibility of land contamination and the implications it has for any proposed future use of land. In particular, this section refers to, and formally adopts, the *Managing Land Contamination – Planning Guidelines* (Department of Urban Affairs and Planning & NSW Environmental Protection Authority, 1998) and other relevant legislative requirements.

In recognition of its duty of care, Council will adopt a precautionary approach to its consideration of applications involving contaminated or potentially contaminated land. The object of this approach is to enable any land contamination issues to be identified and dealt with at an early stage in the planning process.

In order for this to occur, Council has developed a set of procedures to be followed for development proposals. These procedures allow for a merit-based consideration of land contamination issues. All investigations, reporting, sampling, development of plans, etc in relation to contaminated land must be completed by a suitably qualified person in accordance with the relevant guidelines.

In considering the implications of contamination, Council will have regard for the sensitivity of a proposed land use, in addition to any technical standards or requirements published by:

- The NSW Environment Protection Authority (EPA)
- National Health and Medical Research Council (NHMRC)
- National Environment Protection Council (NEPC)
- Any other relevant authority.

Objectives

- a) To prevent or minimise the risk of contamination of land and any associated impacts or harm from any such contamination
- b) To enable Council to more adequately identify, record and manage known and potentially contaminated land

- c) To provide direction for Council in the gathering and assessment of information in relation to previous land use activities that may have resulted in contamination
- d) To assist Council in the discharge of its functions and responsibilities in relation to existing and potential contaminated land with reasonable care and due diligence to minimise potential risk to both public health and the environment
- e) To inform the community, particularly those interested or involved in the planning and development process, of Council's procedures relating to existing or potential contaminated land
- f) To ensure that all stakeholders are aware of their responsibilities for the ongoing management of contaminated land.

3.4.1. Preventing contamination

Background

A proactive approach which ensures that the potential for contamination is reduced or prevented must be linked to the nature of an activity on a particular site. Contamination of land may often be associated with new developments that involve potentially contaminating activities. Such activities may result in accidental releases of chemicals to land which, in turn, will render the land contaminated.

Controls

1. Development applications for new or for expanding existing developments may be required to include information on the potential for the activity to contaminate.
2. Environmental impact assessments are required to address the potential and likelihood of contamination.
3. In assessing development applications for activities which could be potential sources of contamination, Council will ensure it is satisfied that the proposed technical and management controls will be adequate to prevent contamination. Conditions of consent may be imposed by Council to ensure adequate controls are applied to an activity or development.

4. Periodic environmental audits of activities may be required as a condition of consent by Council.

3.4.2. Triggers for contamination investigation

Background

A contamination investigation is triggered when a land use change is proposed on lands which have previously been used for certain purposes that have the potential to result in contamination. A list of activities and land uses that could potentially result in contamination is included in the Technical Information Appendix of Penrith DCP.

In determining applications for development proposals, Council will fully consider the possibility of land contamination and the implications it has for any proposed future use of the land. A precautionary approach will be taken to ensure that any land contamination issues are identified and dealt with early in the planning process. Accordingly, Council will:

- Proceed with the application according to its usual practice if the site has been proven suitable for the proposed uses without the need for further testing or treatment or
- Proceed with the application according to its usual practice if the site has been proven to be capable of being remediated to a standard that is suitable for the proposed use either in its contaminated state or after remediation or
- Request the applicant to provide additional information or
- Refuse the application with stated reasons.

Controls

1. Any application must provide appropriate information relating to past, present and proposed land uses.
2. Council will evaluate the site's potential for contamination in accordance with procedures established by this section. If there is any indication of a past land use or activity that may have caused contamination, Council will require additional information to prove that the site is suitable for the proposed use.

3. Council may require any site investigation report or similar information submitted in support of an application to be referred to a site auditor for an independent review. The auditor shall be nominated by Council. All costs associated with the review shall be borne by the applicant. All communication with the auditor shall be either with the knowledge of Council or in the presence of Council officers.

3.4.3. Stages of contamination investigation

Background

If contamination is, or may be, present the applicant must investigate the site and provide Council with the information it needs to carry out its planning functions.

There are four main stages in the investigation of contaminated or potentially contaminated land. At each stage, it is the applicant's responsibility to provide the necessary documentation to Council and to fund the work required to prepare such documents. Not every site will require all four stages of investigation. The appropriate level of investigation will depend on the circumstances and may involve one or more stages. In providing the necessary information to Council, the applicant must engage an appropriately qualified person, experienced in contaminated site assessment and management.

Controls

The four stages are as follows:

Stage 1 – Preliminary Investigation

1. To identify any past or present potentially contaminating activities
2. To provide a preliminary assessment of any site contamination and
3. To provide the basis for a more detailed investigation, if required.

This stage involves the investigation and reporting of the site history and is typically based on readily available information such as historical records of land use, aerial photographs, consultations with previous occupants and relevant authorities, and a site inspection.

Where contaminating activities are suspected to have had an impact on the land, some initial sampling and analysis will need to be undertaken to

confirm and support any conclusions reached from the site history appraisal.

Stage 2 – Detailed Investigation

A detailed investigation is only necessary when a preliminary investigation indicates that the land is contaminated or is, or was, formally used for a potentially contaminating activity.

The objectives of a detailed investigation are to:

4. define the nature, extent and degree of contamination
5. assess potential risk posed by contaminants to health and the environment
6. obtain sufficient information for the development of a Remedial Action Plan (RAP), if required.

Should the initial investigations fail to clearly demonstrate that the land is suitable for its proposed use, a more detailed assessment and evaluation must be undertaken. This detailed evaluation stage involves formal sampling. Typically, a site specific work plan is developed during this stage, based on previous investigations.

Stage 3 – Remedial Action Plan

The objectives of a RAP are to:

7. Set remediation objectives.
8. Document the process to remediate the site.

The RAP or plan of remediation should demonstrate how the applicant or their consultant proposes to reduce risks to acceptable levels and achieve the desired clean-up levels. The ultimate goal of site clean-up is to ensure that the site is remediated to a level where the proposed development/land use can occur on that land and there will be no risk of harm to human health or any other aspects of the environment in accordance with that use.

Stage 4 – Validation and Monitoring

9. The objectives of validation and monitoring are to demonstrate whether the objectives stated in the RAP and any conditions of development consent have been achieved.

The purpose of validation is to confirm whether the pre-determined clean-up objectives have been attained and whether any further remediation or restrictions on land use are required. Ideally, validation should be conducted by the same consultant that conducted the rest of the site investigation and remediation process.

Depending on the extent of contamination and the method of remediation (e.g. containment), there may be a need for continual site monitoring and/or restrictions on the development potential of the land. A proper monitoring program should include a monitoring strategy, the parameters to be monitored, the monitoring locations, the frequency of monitoring and the appropriate reporting requirements. Any restrictions on the land's development potential would normally be imposed by Council at the stage the application is determined.

As a general rule, Council prefers remediation strategies that do not rely on site monitoring or land restrictions. Such strategies may include the removal of contaminants and their off-site disposal or their in-situ treatment (e.g. bio-remediation). (See the Technical Information Appendix of Penrith DCP for further details).

3.4.4. Site audit

Background

In determining applications for development proposals, Council may require an independent review (Site Audit) of any or all stages of the site investigation, remediation or validation process, conducted in accordance with the *Contaminated Land Management Act 1997* (CLM Act).

A site audit will lead to the provision of a site audit statement, stating for what use the land is suitable, including any conditions that should be adhered to for that land use. Only site auditors accredited by the EPA under the CLM Act 1997 can issue site audit statements. A site audit statement must be prepared in accordance with the *Guidelines for the NSW Site Auditor Scheme* and must be in a prescribed form.

Controls

1. Council may require a site audit if it:

- i. Believes on reasonable grounds that the information provided by the applicant is incomplete
 - ii. Wishes to verify whether the information provided by the applicant has adhered to appropriate standards, procedures and guidelines or
 - iii. Does not have the internal resources to conduct its own technical review.
2. Council will inform the applicant if a site audit is required, after Council has conducted a review of the contamination reports and associated documents submitted to Council.
3. The applicant is responsible for engaging an EPA accredited site auditor for contaminated land to perform a site audit.
4. If Council requires a site audit to make its planning decision, the cost shall be fully borne by the applicant and not Council.
5. The Guidelines for the NSW Site Auditor Scheme outline what may be included in a site audit, however, the guidelines state that, in some situations, Councils may also need to contribute to defining the scope of the site audit.
6. When Council requests a site audit, Council will specify any issues that shall be included within the scope of the site audit. Either the applicant or the appointed EPA accredited site auditor shall liaise with Council during the preparation of the site audit to ensure that the scope of the site audit addresses the concerns raised by Council.
7. A copy of all statutory site audit statements must be given to the EPA and Council at the same time as the site auditor gives the statutory site audit statement to the person who commissioned the site audit.
8. A request for a site audit included as a condition in any development consent is a statutory site audit.
9. The "Guidelines for the NSW Site Auditor Scheme" indicate the content and format of Site Audit Statements.
10. Before issuing a site audit statement, the site auditor must prepare and finalise a summary site audit report. The *Guidelines for the NSW Site Auditor Scheme* outline what must be included in a site audit report.

3.4.5. Remediation procedures

Background

It is the policy of Council that all remediation required to be carried out will be done so in such a manner that will not cause any adverse impact or harm to the environment. The preferred remediation method should result from a consideration of the cost benefit analysis of options, including their practicability, reliability and impact.

Remediation of contaminated land will require development consent, even if the proposed land use does not require consent. A RAP must be submitted to Council for approval with the development application for remediation.

All remediation work must be consistent with the *Managing Land Contamination – Planning Guidelines* and be carried out in accordance with *Sydney Regional Environmental Plan No. 20 Hawkesbury-Nepean River (SREP 20)*, *State Environmental Planning Policy No. 55- Remediation of Land (SEPP 55)*, the *Contaminated Land Management Act 1997*, all relevant EPA guidelines and this section.

Controls

When is consent required for remediation?

1. Council consent is required for the remediation of all contaminated land within the Penrith LGA. This requirement is prescribed by SREP 20 and SEPP 55.

Determination procedures

2. For land which has been previously remediated, Council may still require further investigation and a statement from the applicant's consultant that the site has been remediated in accordance with applicable guidelines and standards, and other appropriate regulatory requirements to allow the intended use.
3. If Council considers that contamination makes the land unsuitable for the proposed use and requires remediation, Council may enforce remediation requirements by:
 - i. Requiring the applicant to amend the development application to include a remediation proposal; or

- ii. Requiring a new and separate development application for the remediation before the development application for the use is considered.
- 4. If Council considers that contamination makes the land unsuitable for the proposed use and the land may not be appropriately remediated or the applicant does not wish to remediate:
 - i. The proposal may be modified to a use that is suitable for the land without remediation or
 - ii. The application may be withdrawn or
 - iii. The application may be refused.
- 5. In issuing any development consent, Council may impose conditions relating to contaminated land. Such conditions will be consistent with the requirements of this section and any relevant legislation or guidelines.
- 6. Where Council requires further information prior to the commencement of a development activity, it may issue a deferred or staged consent incorporating relevant conditions.
- 7. Applicants are advised to carefully read any consent issued to them and identify all matters requiring attention.
- 8. Council will not refuse consent to a development application to carry out remediation work on land unless the work would present, or result in, a more significant risk of harm to human health or some other aspect of the environment (whether or not the harm would occur on the same land) than not proceeding with that work.

Advertised development

- 9. A development application for Category 1 remediation work is advertised development in accordance with SEPP 55.

Remedial Action Plan (RAP)

- 10. A RAP shall be prepared for all remediation proposals and shall be submitted to Council with a development application for assessment. The RAP may form part of an environmental impact statement if the remediation work is designated development.

11. The RAP shall:
 - i. establish remediation goals that ensure the site will be suitable for the proposed land use and will pose no unacceptable risk to human health or to the environment
 - ii. determine the most appropriate remedial strategy
 - iii. provide details of the selected remedial strategy
 - iv. identify all necessary approvals or licences required from all relevant regulatory authorities and
 - v. provide details of monitoring to be undertaken both during and after the remedial works.
12. The RAP shall demonstrate how the risk posed by contamination will be reduced to acceptable levels and how the remediation goals could be met. The objectives of the remediation strategy and the clean-up criteria recommended shall be clearly stated in the RAP. Applicable EPA guidelines provide details of what the RAP should cover.

Independent Review of the RAP

13. Council may require the RAP to be reviewed by an EPA accredited site auditor. All costs associated with the review shall be borne by the applicant.
14. Council may require the applicant to incorporate the comments of the site auditor into their RAP and to provide evidence that all necessary licences and permits have been obtained.

Monitoring of remediation

15. All remediation work must be carried out in accordance with:
 - i. the Managing Land Contamination – Planning Guidelines
 - ii. any guidelines made under the CLM Act 1997
 - iii. applicable OEH/EPA guidelines and
 - iv. the RAP submitted to and approved by Council with the development application.

16. Council may undertake visits to the site during the remedial works to monitor the progress of such works. These visits may be carried out with personnel from the EPA, other relevant regulatory authorities or the site auditor. All costs (as described in Council's approved Fees and Charges Schedule) associated with such visits shall be borne by the applicant.

Validation Report

17. Council will require the applicant to submit to Council a validation report confirming that the remediation goals established in the RAP have been achieved. (The degree of validation required will depend on the degree of contamination originally present on the site, the type of remediation processes that have been carried out and the proposed land uses).
18. The validation report must confirm statistically that the remediated site complies with the clean-up criteria, and does not pose an unacceptable risk to human health or the environment.
19. The validation report shall assess the results of the post-remediation testing against the clean-up criteria nominated in the RAP. Where these have not been achieved, reasons for such failure must be stated and additional site work shall be proposed that will achieve the original objectives. The validation report shall also detail any ongoing monitoring requirements for the site. If clean-up criteria cannot be achieved, other development options may need to be considered.
20. Development applications for sites where remediation has been undertaken prior to lodgement must include a validation report.

Review of Validation Report

21. Council may require the validation report to be reviewed by an EPA accredited site auditor. All costs associated with the review shall be borne by the applicant.

3.4.6. Clean up notices

Background

Clause 21 of the SEPP 55 states that the SEPP provisions do not apply to clean-up notices. At present, all appropriate regulatory authorities

(including Penrith City Council), as defined in the *Protection of the Environment Operations Act 1997* can issue a clean-up notice.

Controls

Any development or activity carried out for the purpose of complying with a clean-up notice:

1. May be carried out without development consent
2. To the extent that it involves carrying out any remediation work must be carried out in accordance with:
 - i. the *Managing Land Contamination – Planning Guidelines*
 - ii. any guidelines in force under the *Contaminated Land Management Act 1997*.

3.4.7. Council records and community information

Council does not hold comprehensive information about land contamination. In the past, little information was kept about contaminated land. Council holds specific information about contamination on only a very small number of sites.

Land contamination is dynamic and no information system can record the nature of all contamination within the local government area at any one time. Council records will change over time as information comes to light. Specifically, the following information will be added to the record for individual parcels of land from time to time:

- Information contained in development applications, indicating the use of a site for a potentially contaminating activity listed in the Submission Requirements Appendix of Penrith DCP.
- Reports submitted to Council, including preliminary investigation, detailed investigation, remedial action plans, validation and monitoring reports, and site audit statements.
- EPA declarations and orders issued under the *Contaminated Land Management Act 1997* (including voluntary management proposals approved by EPA).
- Notification of completion of Category 1 and Category 2 remediation work.

Information about land contamination held within the Council's records will be supplied to the public by the following means (subject to payment of any prescribed fees):

- By issuing planning certificates (Section 10.7 Certificates) on application.
- By providing access to documents in accordance with the *Freedom of Information Act 1989* and other legislation.

Total reliance should not be placed on Section 10.7 certificates. Interested parties should request a detailed search by Council of its records in regard to previous uses of a site and/or have a contamination assessment conducted by a qualified consultant.

Other information

People seeking further information on contaminated lands or preparing development applications may wish to refer to the following:

- NSW Department of Urban Affairs and Planning and the NSW Environment Protection Authority (1998) – Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land.
- NSW EPA (2003) Contaminated Sites: Guidelines for Assessing Service Station Sites.
- NSW EPA (1995) Contaminated Sites: Guidelines for the Vertical Mixing of Soil on Former Broad-Acre Agricultural Land.
- NSW EPA (1995) Contaminated Sites: Sampling Design Guidelines.
- NSW EPA (2003) Contaminated Sites: Guidelines for Significant Risk of Harm from Contaminated Land and the Duty to Report.
- Department of Environment and Conservation NSW (2005) Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens.
- Department of Environment and Conservation NSW (2007) Guidelines for the Assessment and Management of Groundwater Contamination.
- ANZECC & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000) Australian and New Zealand guidelines for fresh and marine water quality: Volume 1 – The Guidelines.

- NHMRC Natural Resource Management Ministerial Council (NRMMC) (2011) Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy.

Council considers these guidelines to be a mandatory reference for consultants assessing contamination levels and undertaking remediation works. Consultants preparing contamination reports should also have a practical working knowledge of the various EPA and National Environment Protection Council (EPC) publications on contaminated land including:

- NSW EPA (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.
- National Environment Protection Council (NEPC) (2013) National Environmental Protection (Assessment of Site Contamination) Measure 1999.
- NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites.

3.5 Salinity

Background

Salinity is increasingly recognised as an issue that can potentially cause significant economic, environmental and social costs in both rural and urban areas. Some areas in the Penrith LGA are affected by levels of salinity that are high enough to damage buildings and corrode concrete structures. Salinity can also result in the degradation of vegetation and soils, including the loss of productive agricultural land.

Salinity occurs when salts naturally found in soil or groundwater mobilise and rise to concentrate at the ground's surface. This is due to changes in the natural water cycle caused by such activities as vegetation removal and replacement with shallow rooted, high water using plants; concentrated stormwater flows; leaking underground water pipes; and over-watering of parks and gardens.

This section seeks to ensure that consideration is given to the impact of new development on salinity processes, as well as the impact of salinity on new development. It seeks to supplement the salinity controls set out in the LEP.

Objectives

- a) To avoid or mitigate the impacts of development on salinity processes to prevent any degradation in soils, groundwater or vegetation.
- b) To avoid or mitigate the impacts of salinity on development, including damage to buildings and infrastructure and the loss of productive agricultural land.
- c) To ensure development will not significantly increase the salt load in existing watercourses.

Controls

Salinity Analysis

- 1. A detailed salinity analysis will be necessary if:
 - i. The site of the proposed development has been identified as being subject to a potential risk of salinity (refer to the map Salinity Potential in Western Sydney 2002) or
 - ii. An initial investigation shows the site is saline or affected by salinity.
- 2. Investigations and sampling for salinity are to be conducted in accordance with the requirements of Site Investigations for Urban Salinity.
- 3. The author of the salinity analysis must sign off on the project on completion of works and submit this to Council prior to an occupation certificate being issued, if required.

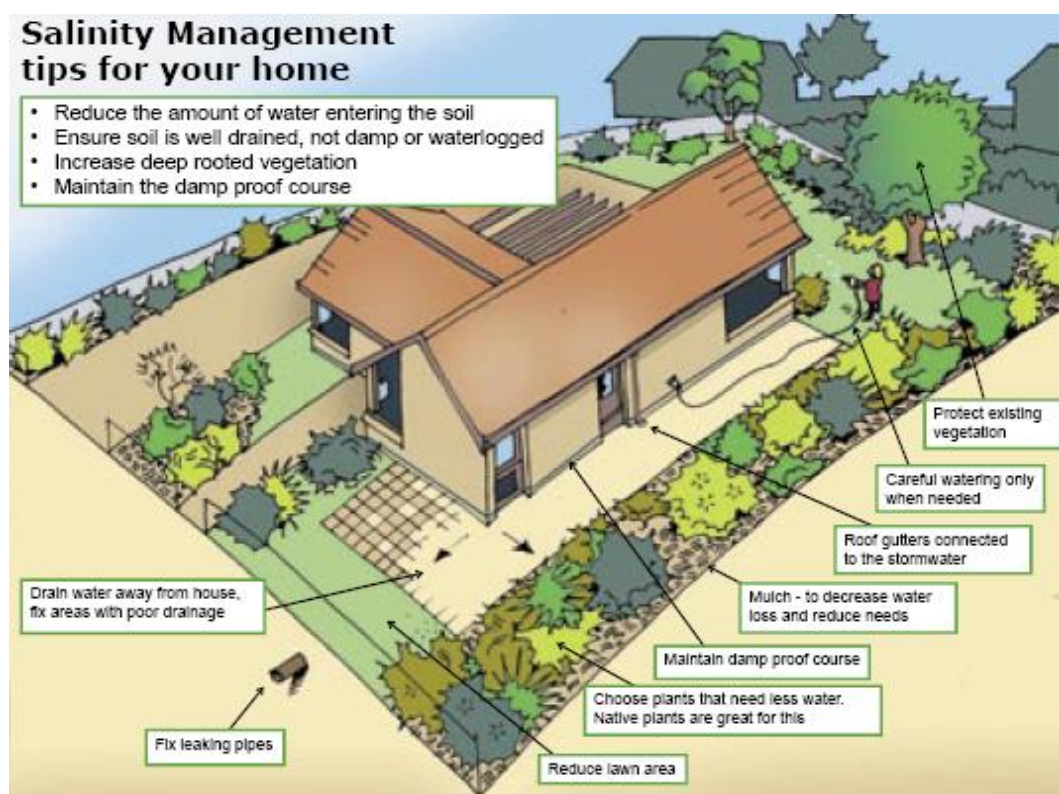
Salinity Controls

- 4. Disturbance to the natural hydrological system shall be minimised by maintaining good drainage and reducing water logging on the site.
- 5. Groundwater recharge shall be minimised by such measures as:
 - i. Directing runoff from paved areas (roads, car parks, domestic paving, etc) into lined stormwater drains rather than along grassed channels as necessary

- ii. Lining or locating any water storages/ponds/drainage basins higher in the landscape to avoid recharge where proximity to the water table is likely to create groundwater mounding
 - iii. Encouraging on site detention of roof water runoff.
- 6. Soil erosion and sediment control measures, in accordance with erosion and sedimentation controls in this section, shall be incorporated into the development during its construction and following its completion.
- 7. Construction techniques shall be employed that prevent structural damage to the development as a result of salinity (see “Building in a Saline Environment”). For example, building footings shall be constructed so as not to impede groundwater movement and building materials that are resistant to salt effects shall be used.
- 8. The removal of vegetation, particularly native vegetation, on the site shall be minimised.
- 9. All landscape designs should undertake the following practices:
 - i. Select salt tolerant plant species (generally native trees and shrubs)
 - ii. Use mulch in all garden beds
 - iii. Minimise the area of lawn as this requires large quantities of water
 - iv. Use ‘water wise’ garden and landscape design (including timers, selection of plants with low water needs, grouping plants of similar water usage together, etc)
 - v. Use non-corrosive materials when constructing pipes and channels.
- 10. All works are to conform with the Western Sydney Salinity Code of Practice, June 2003.

Figure 4 below illustrates some of these controls.

Figure 4: Salinity Management Tips



(Source: WSROC 2005, Good Housekeeping to Manage Urban Salinity)

Other information

People seeking further information on salinity or preparing development applications may wish to refer to the following:

- Department of Planning, Infrastructure and Natural Resources 2002, Map of Salinity Potential in Western Sydney and accompanying Guidelines
- Western Sydney Regional Organisation of Councils (WSROC) 2003, Western Sydney Salinity Code of Practice
- WSROC 2005, Good Housekeeping to Manage Urban Salinity
- Local Government Salinity Initiative series by the former Department of Natural Resources (2002) including:
 - i. Site Investigations for Urban Salinity
 - ii. Land Use Planning and Urban Salinity
 - iii. Building in a Saline Environment

4.Noise and vibration

Background

This Section provides objectives and controls for controlling environmental noise in relation to:

- Road traffic noise
- Rail traffic noise
- Aircraft noise
- Industrial and commercial development
- Rural development
- Open air entertainment
- Vibration from development.

Generally, the controls in this DCP will only be applied to new development or substantial alterations and additions to existing development. In this case, new development may also include development applications for new land uses in existing buildings.

The controls in this Section will be applied at the discretion of Council where it is considered necessary or appropriate.

Objectives

The objective of this Section is to ensure that future development that generates noise or vibration does not adversely affect the amenity of surrounding land uses.

Other relevant sections of Penrith DCP

Any applicant seeking to propose a development that has the potential to cause excessive noise or vibration impacts should consider the provisions not just of this Section of the DCP, but also the relevant provisions in other sections of Penrith DCP.

Council will consider each development application on its merit, having regard to this section, other relevant sections of Penrith DCP and relevant environmental planning instruments, contributions plans or Council policies. Compliance with this section alone does not guarantee that consent will be granted to an application.

In cases where Council determines that an acoustic report is required, applicants should refer to the DA Submission Requirements Appendix of this DCP, which sets out the requirements for preparing a Noise Impact Statement.

Other relevant sources of information

Some additional sources of information, including relevant legislation, Australian Standards and guidelines, include, but are not limited to:

- Protection of the Environment Operations Act 1997
- State Environmental Planning Policy (Transport and Infrastructure) 2021.
- Development Near Rail Corridors and Busy Roads – Interim Guideline, Department of Planning, 2008
- Industrial Noise Policy, Environment Protection Authority, Environment Protection Authority, 2000
- Noise Guide for Local Government, Environment Protection Authority, 2013
- NSW Road Policy, Department of Environment, Climate Change and Water NSW, 2011
- Environmental Noise Management Manual, Roads and Traffic Authority, 2001
- Interim Construction Noise Guideline, Department of Environment, Climate Change NSW, 2009.

4.1 Road traffic noise

Background

Currently, road traffic is the most widespread source of environmental noise. The controls below seek to minimise the impact of road traffic noise.

This section of Penrith DCP applies to all development that generates a significant level of traffic noise (as determined by Council) that has potential to impact upon residential and other sensitive land uses.

This section is also applicable to any residential development, subdivision or other sensitive land uses, which propose to locate near existing areas of significant road traffic noise.

Objectives

- a) To ensure that the amenity of all residential development and other sensitive land uses is not significantly affected by road traffic noise.
- b) To ensure that the traffic associated with development does not significantly impact upon the amenity of surrounding land uses.
- c) To ensure that the traffic associated with development does not have a significant noise impact on the existing road network.
- d) To ensure that any subdivisions are designed to minimise the impact of road traffic noise on any residential development or other sensitive land uses.

Controls

Road traffic noise criteria including sensitive land uses

1. Council will not grant consent to development, particularly residential development, including subdivisions, unless the impact of traffic noise from freeway, arterial, designated or collector roads complies with the standards and guidelines for road traffic noise prepared by the relevant State Government authorities or agencies, as well as relevant Australian Standards.
2. Council will not grant consent to development for sensitive land uses unless it complies with the provisions and standards for road traffic noise prepared by the relevant State Government authorities or agencies, as well as relevant Australian Standards.
3. Sensitive land uses subject to road traffic noise criteria referred to in 2. above include educational establishments (including schools), places of public worship, hospitals, and passive and active recreation areas.

Noise Impact Statements – specific requirements

4. Where a site is likely to be affected by unacceptable levels of road traffic noise, the applicant is required to provide a Noise Impact Statement prepared by a qualified acoustic consultant in accordance with the requirements set out in the DA Submission Requirements Appendix of this DCP.
5. The Noise Impact Statement should demonstrate acoustic protection measures necessary to achieve an indoor environment meeting residential standards, in accordance with EPA and Department of Planning Criteria, as well as relevant Australian Standards.

Note: To determine whether your site is likely to be exposed to levels of road traffic noise that exceed residential standards:

- Contact Council regarding main road frontages known to exceed residential noise standards
- Obtain detailed advice from a qualified acoustic consultant regarding appropriate planning and design measures.

4.2 Rail traffic noise and vibration

Background

Penrith is serviced by the Main Western Rail Line. With the population spreading further away from the Sydney metropolitan area, the Western Rail Line has experienced an increase in the number of passenger trains, both suburban and inter-urban. Freight train movements along the Main Western Rail Line are also considerable. To reduce congestion on commuter lines and to improve efficiency, the number of wagons per train has been increased which has resulted in an increase in average noise levels (or the LAeq) because pass-by times increase correspondingly.

The extent of properties affected by rail traffic noise is far more concentrated than noise due to road traffic owing to the single rail corridor. This Section of Penrith DCP applies to all development in the vicinity of the rail corridor as defined by Council.

Objectives

- a) To ensure that the amenity of all development, including residential development and other sensitive land uses is not adversely affected by rail traffic noise.
- b) To ensure that the amenity of all development, including residential development and other sensitive land uses is not significantly affected by the vibration of rail traffic.

Controls

Rail noise and vibration

1. The siting and design of developments on land sited on, or within, 80m of an operating rail corridor or land reserved for the construction of a railway line is to address the matters raised in the *Development Near Rail Corridors and Busy Roads – Interim Guideline* (Department of Planning, 2008) and, where appropriate, incorporate any recommendations into the design of the development.
2. Council will not grant consent to residential development, residential subdivision or other sensitive land uses on land in the vicinity of a rail corridor unless it complies with the relevant standards and criteria set by the EPA and Department of Planning, as well as any relevant Australian Standards.
3. Council will not grant consent to any development which potentially has sensitive occupancies (such as residential, office or laboratory premises) and is proposed to be constructed within 20m of the rail line unless an assessment of the vibration impacts from the rail line has been carried out. This is to be undertaken by a recognised acoustic consultant to demonstrate that the impact of vibration from the rail corridor will not significantly impact upon the future occupants of the development.
4. Sensitive land uses subject to rail noise and vibration criteria referred to in Control 2 of this Section (above) include educational establishments (including schools), places of public worship, hospitals, nursing homes, mixed use development, offices/workplaces, and passive and active recreation areas.

Noise Impact Statements – specific requirements

5. Where a site is likely to be affected by unacceptable levels of rail noise or vibration, the applicant is required to provide a Noise Impact Statement prepared by a qualified acoustic consultant in accordance with the requirements set out in Appendix – Submission Requirements of Penrith DCP.
6. The Noise Impact Statement should demonstrate acoustic protection measures necessary to achieve an indoor environment meeting residential standards, in accordance with EPA and Department of Planning criteria, as well as relevant Australian Standards and Clause 2.100 – ‘Impact of rail noise or vibration on non-rail development’ of *SEPP (Transport and Infrastructure) 2021*.

Note: To determine whether your site is likely to be exposed to levels of road traffic noise that exceed residential standards:

- Contact Council and
- Obtain detailed advice from a qualified acoustic consultant regarding appropriate planning and design measures.

4.3 Aircraft noise

Background

To date, the City of Penrith has not been subject to significant numbers of commercial aircraft operations, with the exception of light aircraft movements, periodic helicopter activity and RAAF overflights.

The LEP contains provisions to ensure that incompatible development does not occur in the vicinity of the site reserved for a second Sydney airport.

The controls below supplement the provisions of the ‘Development of land in the flight paths of the site reserved for the proposed Second Sydney Airport’ clause of the LEP. The controls seek to ensure that any new development in the Penrith LGA is not significantly affected by any potential future aircraft noise.

This Section applies to all development that is located within the vicinity of the proposed second Sydney airport as defined by Council.

Objectives

- a) The objective of this section is to ensure that all development is not significantly affected by aircraft noise.

Controls

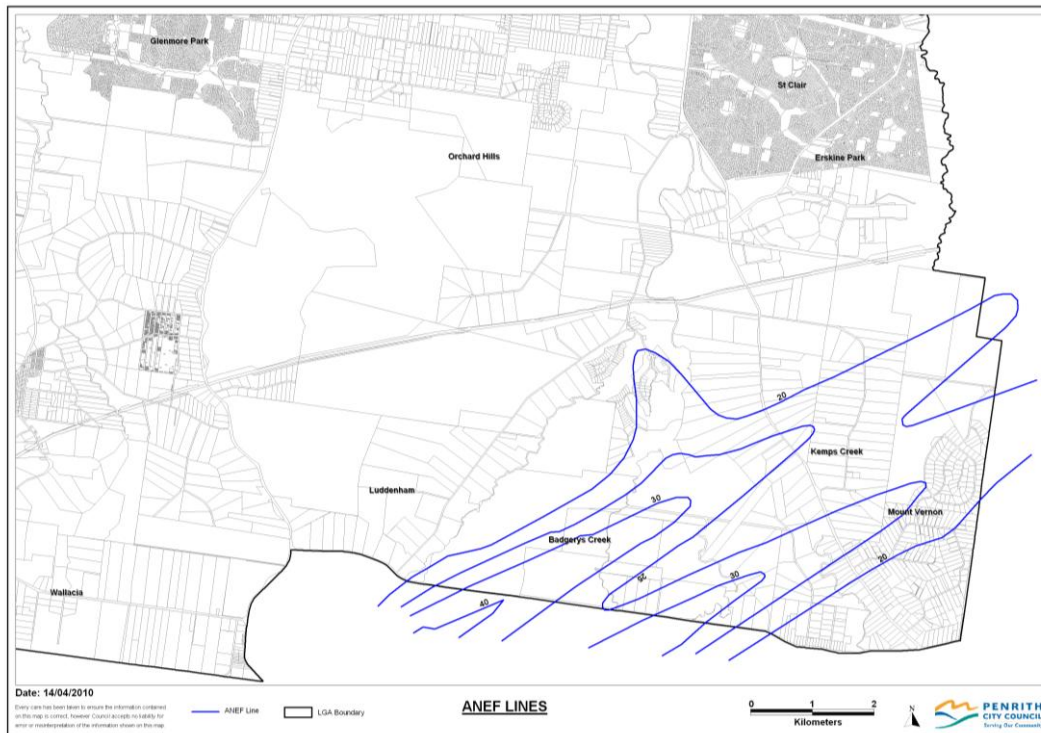
General

1. Council will not grant consent to any development unless it is demonstrated to Council's satisfaction that:
 - i. The building site is considered acceptable for the proposed development based upon ANEF (Australian Noise Exposure Forecast) zones in accordance with Australian Standard 2021-2000.
 - ii. Where a building site is classified by AS 2021-2000 as 'conditionally acceptable', an assessment of the proposed development is to be conducted by an accredited acoustical consultant in accordance with the procedures set out in Australian Standard 2021-2000 to ensure that the indoor design sound levels of the Standard are achieved within the various areas of occupancy.

Determination of noise levels

2. Assessment of site acceptability shall be determined by means of the most recent ANEF contour map available for the Second Sydney Airport (see Figure 5).
3. Determination of maximum noise levels due to aircraft flyovers at the site shall be conducted in accordance with the procedures laid down in Australian Standard 2021-2000.

Figure 5: Land affected by ANEF contours for the proposed Second Sydney Airport



Noise Impact Statements – specific requirements

4. Any development classified as 'conditionally acceptable' in Australian Standard 2021-2000 is to include a Noise Impact Statement which is to be prepared in accordance with the minimum requirements set out in Appendix of Penrith DCP. In addition, the following additional specific information is to be provided:
 - i. The site acceptability classification based upon ANEF zones in accordance with AS 2021-2000
 - ii. The maximum noise level due to aircraft flyover at the site and the method used for determination (i.e. in accordance with AS 2021-2000, or based upon information supplied by the relevant Government Aviation Authority)
 - iii. The indoor design sound level for aircraft flyovers in accordance with AS 2021-2000
 - iv. The aircraft noise reduction(s) (ANR) required to be incorporated in the building envelope

- v. Details of building components and construction techniques required to provide sufficient noise reduction
- vi. A map clearly indicating the location of the development site in relation to the most recent ANEF contour map produced for the second Sydney airport
- vii. Sketch plans of the site illustrating building locations and any other relevant details, together with detailed floor plans and elevations
- viii. Any other significant or relevant acoustic information concerning the project
- ix. A statement of opinion confirming compliance with the acoustical design criteria requirements.

4.4 Industrial and commercial development

Background

This Section of the DCP applies to all industrial development, commercial development (including recreation facilities) and licensed premises which, in the opinion of Council, will impact upon the amenity of surrounding developments.

Industrial Development

There are industrially zoned precincts in Penrith City, extractive industries and employment zones at North Penrith, Erskine Park and within a number of new urban release areas. With this new development for industrial and employment related uses, there are likely to be conflicts between noise created in industrial areas and adjoining sensitive land uses.

Commercial Development

The main source of noise generated by commercial development is from the operation of machinery and equipment. In particular, noise generated from air conditioning, exhaust and refrigeration systems have been major sources of noise complaints received by Council.

The other major source of noise generated from commercial development is often of a transient nature, for example, when an entertainment facility, such as a cinema, closes.

Objectives

- a) To ensure that industrial development does not adversely impact on the amenity of neighbouring residential development and other sensitive land uses
- b) To ensure that the amenity of development surrounding commercial development and licensed premises is not adversely impacted.

Controls

General

- 1. Council will not grant consent to any noise generating industrial development, commercial development or licensed premises unless it can be demonstrated that:
 - i. The development complies with the relevant State Government authority or agency standards and guidelines for noise, as well as any relevant Australian Standards
 - ii. The development is not intrusive (as defined in the EPA's Industrial Noise Policy)
 - iii. Road traffic noise generated by the development complies with the provisions in 4.1 'Road traffic noise' of this Section
 - iv. The development complies with rail noise and vibration criteria (refer to 4.2 'Rail traffic noise and vibration' of this Section) and
 - v. The development does not adversely impact on the amenity of the area or cause sleep disturbance.

Noise Impact Statements – specific requirements

- 2. All development applications where the above controls are relevant are required to provide a Noise Impact Statement prepared by a qualified acoustic consultant in accordance with the requirements set out in the DA Submission Requirements Appendix of Penrith DCP.
- 3. The Noise Impact Statement should demonstrate acoustic protection measures necessary to achieve an indoor environment meeting residential standards, in accordance with relevant noise criteria, as well as relevant Australian Standards.

Note: Council considers all forms of recreation facilities, as commercial development. Any applications for these land uses would be subject to the above provisions.

4.5 Rural development

Background

Noise from rural developments, such as poultry farms, piggeries, animal boarding establishments, etc have the potential to cause significant disturbance to neighbouring properties due to the nature of the noise emitted and the times at which it occurs.

The controls below seek to reduce the noise impact of rural developments to a reasonable level.

This Section particularly focuses on the following uses:

- Dog boarding, training and breeding establishments
- Piggeries
- Poultry farms
- Cattle feed lots
- Bird scare guns.

Objectives

- a) To promote the acoustical amenity of rural properties by controlling noise emissions from rural development.
- b) To reduce the exposure of properties to noise from road traffic.

Controls

Dog Boarding, Training and Breeding Establishments

1. Council will not grant consent to applications for dog boarding, training and breeding establishments unless it can be demonstrated that:
 - i. The development complies with the relevant State Government authority or agency standards and guidelines for noise, as well as any relevant Australian Standards

- ii. The development complies with the following locational criteria:
 - Kennels are located a minimum distance of 150m from any existing dwelling or potential dwelling site
 - Kennels, which are located 150m from existing or future dwellings, are limited to cater for 10 dogs
 - Council may permit a proportional increase in the number of dogs as the distance from existing or future dwellings is increased, to a maximum of 40 dogs for 300m
 - iii. Road traffic noise generated by the development complies with the provisions of 4.1 'Road traffic noise' of this Section
 - iv. The development manages and mitigates noise so as to not adversely impact on the amenity of surrounding rural properties. This is to be demonstrated in a Noise Impact Statement. The DA Submission Requirements section within the Appendices sets out the minimum requirements for a Noise Impact Statement.
2. All development applications for dog boarding, training and breeding establishments shall also demonstrate the following noise mitigation measures in the design and management procedures:
- i. All kennel buildings to be of masonry construction, concrete floors and incorporate screening measures to adequately restrict external stimulation
 - ii. Kennels to be separated by a solid divider of adequate height
 - iii. Sound-proofed kennels to be provided, incorporating internal absorptive lining to reduce reverberant sound, for particularly noisy dogs. A minimum of one sound-proofed kennel shall be provided for every 10 dogs accommodated
 - iv. Dogs to be housed and exercised singly or in compatible pairs
 - v. Feeding to be restricted to late afternoon or early evening
 - vi. Lights to be extinguished after evening feeding
 - vii. No animals permitted in the run areas between the hours of 8.00pm to 7.00am Monday to Friday and 8.00pm to 8.00am Weekends and Public Holidays.

Noise Impact Statements – specific requirements for Dog Boarding, Training and Breeding Establishments

3. All development applications for dog boarding, training and breeding establishments are required to provide a Noise Impact Statement prepared by a qualified acoustic consultant in accordance with the requirements set out in Penrith DCP.

The Noise Impact Statement should demonstrate acoustic protection measures necessary to achieve an indoor environment meeting residential standards, in accordance with relevant noise criteria, as well as relevant Australian Standards.

Note: The above noise controls should be read in conjunction with the specific development controls for dog boarding, training and breeding establishments in the Rural Land Uses Section of Penrith DCP.

Piggeries, Poultry Farms, Cattle Feed Lots, Bird Scare Guns

4. Council will not grant consent of any new piggeries, poultry farms, cattle feed lots or bird scare guns unless it can be demonstrated that:
 - i. The development complies with the relevant State Government authority or agency standards and guidelines for noise, as well as any relevant Australian Standards
 - ii. Road traffic noise generated by the development complies with the provisions of 4.1 'Road traffic noise' of this Section
 - iii. The development manages and mitigates noise so as to not adversely impact on the amenity of surrounding rural properties. This is to be demonstrated in a management plan for the development.

Noise Impact Statements – specific requirements for Piggeries, Poultry Farms, Cattle Feed Lots, Bird Scare Guns

5. Council may require a Noise Impact Statement to be submitted, depending on the scale and location of sheds or external structures to residential and other sensitive land uses. Information on the requirements of a Noise Impact Statement is provided in Appendix – DA Submission Requirements of Penrith DCP.

Note: The above noise controls should be read in conjunction with the specific development controls for piggeries, poultry farms and cattle feed lots in the Rural Land Uses Chapter of Penrith DCP.

4.6 Open air entertainment

Background

Open-air entertainment events, such as concerts or motor racing, have the potential to significantly impact upon the amenity of surrounding areas. Consequently, these activities usually require the consent of Council.

This Section focuses on the following uses:

- Motor sport
- Open air concerts
- Sporting activities

Objectives

- a) The objective of this section is to minimise the likelihood of disturbance to the surrounding community as a result of open air entertainment or outdoor facilities.

Controls

Motor Sport

1. Council will not grant consent to a motor sport event unless it can be demonstrated that the motor sport event or facility will operate between the following hours:
 - i. Monday to Friday – 7.00am to 10.00pm
 - ii. Weekends and Public Holidays – 8.00am to 10.00pm
 - iii. The event occurs only once in a twelve month period.
2. Council will not grant consent to a motor sport event unless it can be demonstrated that the event or facility will operate within the following criteria:

- i. LAeq noise level not exceeding 55 dBA when measured in the immediate vicinity of the external structure of any residential premises; and
- ii. The maximum noise level when measured at 30 metres from any vehicle shall not exceed 95 dBA.

Open Air Concerts

- 3. Council will not grant consent to open air concerts unless it can be demonstrated that the concert will operate within the following criteria:
 - i. The LAeq noise level measured over any 5 minute period during the broadcasts of amplified music does not exceed 55 dBA when measured in the immediate vicinity of the external structure of any residential premises; and
 - ii. The event is completed by 10.00pm.
- 4. In cases of special cultural or social significance, Council may permit an exceedance of the above criteria subject to the preparation of a Noise Impact Statement which must address the following:
 - i. Stage orientation
 - ii. Fold back monitors
 - iii. Speaker stack height
 - iv. Location, orientation and implementation of noise control measures.
- 5. In these special cases, all open air entertainment must operate so that:
 - i. The maximum permissible noise level measured in the immediate vicinity of the external structure of the nearest and most potentially affected residential premises does not exceed 70 dBA L_{max}; and
 - ii. A warning is issued to the mixing desk when the maximum level reaches 65 dBA at the nearest or most potentially affected residential premises.

Outdoor Sporting Activities

- 6. Outdoor sporting activities are to operate between the hours of:
 - i. Monday to Friday – 7.00am to 6.00pm

- ii. Weekends and Public Holidays – 8.00am to 6.00pm.
- 7. Outdoor sporting activities are permitted provided the LAeq noise level, measured over a representative period, does not exceed the background LA90 sound level by more than 10 dBA when measured in the vicinity of the external structure of any residential premises.

Noise Impact Statement – specific requirements

- 8. Council may require a Noise Impact Statement to be submitted, depending on the scale, nature and location of the development to residential areas and other sensitive land uses. Information on the requirements of a Noise Impact Statement is provided in the DA Submission Requirements Appendix of Penrith DCP.

4.6 Vibration and blasting

When development may have a vibration impact on neighbouring premises, a Vibration Impact Assessment is to be prepared by a suitably qualified consultant and submitted with the development application. This assessment is to be carried out with consideration of the *Assessing Vibration: a technical guideline* (Department of Environment and Conservation NSW, 2006) and demonstrate that there will be no impact or recommend suitable mitigation measures.

5. Urban heat management

Background

The Western Parkland City has been experiencing a trend of reduced rainfall, increasing temperatures and an increasing duration of extended periods of heat.

In addition to the above impacts, the Western Parkland City has experienced increased heat in developed areas, when compared with the temperatures in nearby areas with less development. This is called an Urban Heat Island Effect. This effect results from the impact of increased urbanisation including the increase in hard, dark surfaces which retain heat and prevent the absorption of water. It is further exacerbated by loss of vegetation.

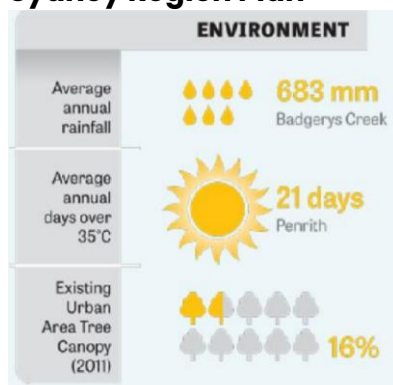
Land in the Western Parkland City is susceptible to urban heat impacts due to the region's existing climate, topography, and geographic position, as well as a large and growing residential population and rapid urban development.

The intensity of urban heat is also influenced by the flow of warm air into Penrith through:

- Hot winds from the desert (west, south-westerly and north-westerly) which carry and exacerbate heat and
- Cool winds from the sea (north-easterly) which do not reach Western Sydney.

As our city grows and becomes more urbanised, reducing and removing heat from the urban environment is critical to achieving an environment that has high amenity, provides opportunities for active, healthy, and safe activities and is comfortable throughout summer.

Figure 6: Western Parkland City environment context Source: Greater Sydney Region Plan



Poorly designed development contributes to the impact of the Urban Heat Island Effect by reducing vegetation, preventing rainwater infiltration, using materials which absorb heat and producing buildings which are not designed to mitigate the impacts of hot weather, thus increasing the risk to the Penrith community.

Other relevant sections of Penrith DCP

This section should be considered in conjunction with other relevant chapters of Penrith DCP, to achieve sustainable outcomes and reduce the impacts of the urban heat island effect. Council will consider each development application on its merit, and in conjunction with consideration of other relevant instruments outlined in the 'Application' part of this Section.

Aims of this Section

This section is intended to support Penrith Local Environmental Plan 2010 Part 7 Additional Local Provisions, clause 7.30 the Penrith Local Strategic Planning Statement, and the Penrith Cooling the City Strategy and Penrith Resilience Action Plan in managing and mitigating the Urban Heat Island Effect.

Definitions

Cool refuges: provide temperatures of no more than 27°C on extreme heat days and should also aim to achieve between 40% to 60% relative humidity. Principally through passive design for thermal comfort.

Efficient/Efficiency: The operational effectiveness of the subject is maximized by its design and location and any impacts on the effectiveness of the subject are managed or mitigated.

Extreme Heat: days where maximum air temperatures exceed 40°C.

Green roof: A green roof is vegetation covering at least 30% of available rooftop space -that is, space which is not occupied by structures housing plant, equipment, or stairway accesses. A green roof should provide measurable environmental benefits. The green roof includes a vegetated layer, growing medium, and a waterproof membrane. Plants grown in sectioned lots are acceptable, however, potted plants/planter boxes which cover less than 30% of available rooftop space are not considered as a green roof. Additional to the minimum 30% vegetation cover, a green roof can include facilities for renewable energy, water collection infrastructure, walkways, furnishings, and the like.

Green wall: Green walls are either free standing or part of a building that is partially or completely covered with vegetation. The wall may incorporate soil and/or inorganic material as the growing medium. There are two main types of green wall: green façades and living walls. Green façades are made up of climbing plants either growing directly on a wall or on specially designed supporting structures. The plant's shoot system grows up the side of the building while being rooted in the ground. With a living wall, modular panels are affixed to the wall and geo-textiles, irrigation and a growing medium combine to support a dense network of plants.

High Albedo: high solar reflectance High thermal emittance: materials that release heat quickly. Hot days: where maximum air temperatures exceed 35°C.

Solar Reflectance Index: (SRI) measures a surface's ability to reflect solar heat, as shown by a small temperature rise caused by the materials reflectance and emittance properties. It is defined so that a black surface is 0 and a white surface is 100.

Thermal comfort/thermally comfortable: temperatures of between 22°C to 27°C, with a relative humidity of 40% to 60%.

Urban Heat Island Effect: increased heat in developed areas, when compared with the temperatures in nearby areas with less development.

Application

This Section of Penrith DCP applies to all development within the Penrith LGA except for development within the following land use zones:

Table 4: Land use zones excluded

Zone Type	Does not apply to:
Waterway Zones	All zones
Conservation	• C1 National Parks and Nature Reserves • C2 Environmental Conservation • C3 Environmental Management
Rural	• RU1 Primary Production, • RU2 Rural Landscape, • RU4 Primary Production Small Lots

Development involving Heritage Items

For development involving Heritage Items or conservation areas identified under Penrith Local Environmental Plan 2010, a merit assessment will be

undertaken to ensure the outcomes sought under this chapter are balanced with heritage conservation outcomes.

Development in bush fire prone areas

Development on land identified as bush fire prone must address the bush fire protection measures set out in Planning for Bush Fire Protection 2019 (as amended in 2022 and 2025) (PBP). Section 1.3 'Bushfire management' in Section 1 'Vegetation Management' of this Chapter provides further details. While applicants should seek to achieve the outcomes sought in this chapter, where there is an inconsistency between the PBP provisions and the controls in this chapter, the PBP provisions prevail.

Excluded Development

Certain development may be subject to State Environmental Planning Policies (SEPP) that contain provisions that prevail over some of the controls within this Section. Applicants are to ensure that the outcomes sought within this Section are achieved to the extent that they are consistent with applicable SEPPs.

Development Controls

5.1 Cooling with Landscape

5.1.1 Landscape Design

Objectives

- a) To ensure outdoor areas incorporate cooling design elements to provide cool refuge during hot weather events.
- b) To reduce the contribution of development on the Urban Heat Island Effect in Penrith through:
 - i. integration of grey, green, and blue infrastructure in development
 - ii. adequate and appropriate provision of landscaping and
 - iii. incorporating permeable materials into landscape design.
- c) Retain and enhance existing vegetation and canopy coverage to reduce the impact of urban heat on the community.

- d) Deliver appropriate quality and quantity of vegetation as green infrastructure with an integrated design approach to reduce development's contribution to the urban heat island effect.
- e) To ensure development provides long term solutions to address the Urban Heat Island Effect in Penrith by:
 - i. Delivering green infrastructure which positively contributes to the amenity of the locality, while recognising the context and existing development patterns.
 - ii. Ensuring adequate and appropriate vegetation and conditions for healthy growth are provided, including vegetation that contributes to increasing the amount and health of the local tree canopy.
 - iii. Supporting passive design principles with landscaping to deliver landscaping that contributes to the conservation of energy and supports thermal comfort.

Controls

- 1. All required landscape design plans are to be prepared in accordance with appendices. Plans are to demonstrate that:
 - i. Trees are supported by understorey planting.
 - ii. Internal and external passive solar access is managed through tree and vegetation selection and location.
 - iii. Shading is provided to exposed Western façades.
 - iv. Adequate solar access has been provided to the dwelling and any proposed or future solar panels
 - v. Where feasible, there is shading to parking spaces and paved surfaces.
 - vi. Vegetation is co-located with existing trees, and/or clustered to improve its cooling effect, where this is not in conflict with other controls such as planning for bushfire prevention.
 - vii. Plantings include drought tolerant and heat resilient varieties and contribute to canopy coverage.
 - viii. Where feasible, permeable materials such as dry laid paving, permeable pavers, unbound aggregate, or bound paving are utilised and are appropriate for site conditions.

2. Developments are to be designed to ensure that existing mature trees including street trees can be retained.
3. Tree species selection and location must demonstrate consideration of the Landscape Design and Vegetation Management Sections of this Chapter, the List of Appropriate Trees, as well as the following:
 - i. Shading effect, including location and maximisation of possible canopy size and density,
 - ii. Heat and extreme heat resilience
 - iii. The character and constraints of the locality
 - iv. Planting density
 - v. Nearby services, public authority requirements, easements, and hardstand areas
 - vi. The availability of tree stock and species that are locally endemic and appropriate to the site
 - vii. Tree pot sizes and mature growth sizes are appropriate for the site and ensure longevity
 - viii. The site conditions, including soil type and salinity
 - ix. NATSPEC "Specifying Trees – a Guide to Assessment of Tree Quality" (Clark, R. 2003)
 - x. Australian Standard AS2303
 - xi. Council's Street and Park Tree Management Plan
 - xii. Any disruption of solar access for solar panels on existing or adjoining present and future development should be minimised
 - xiii. Any services or utilities infrastructure within the road reserve, such as power poles, overhead wires, drainage inlet pits, existing street trees and any existing driveways.

5.1.2 Green roofs and walls

Objectives

- a) Deliver appropriate quality and quantity of vegetation that will contribute to green infrastructure with an integrated design approach to reduce development's contribution to the urban heat island effect.
- b) To ensure development provides long term solutions to address the Urban Heat Island Effect in Penrith by:
 - i. Delivering green infrastructure which positively contributes to the amenity of the locality, while recognising the context and existing development patterns.
 - ii. Ensuring adequate and appropriate vegetation and conditions for healthy growth are provided, including vegetation that contributes to increasing the amount and health of the local tree canopy.

Controls

- 1. Where the use of green walls and roofs is proposed, developments should demonstrate consistency with technical guidelines provided in Appendix of Penrith DCP, and ensure:
 - i. Roofs and walls include appropriate load bearing and waterproofing to support installation of green features.
 - ii. Plants selected provide coverage and are resilient to extreme heat and drought if provided outside buildings.
 - iii. Automatic watering systems are installed to irrigate green roofs and walls, and are connected to sustainable, non-potable water supplies.
 - iv. The cooling benefit of green walls should be maximised by co-locating functions within the site that benefit from the cooling effect of the green infrastructure to reduce reliance on mechanical cooling systems.
 - v. Green walls and roofs must be delivered by a landscape architect or designer with experience in successfully delivering this type of infrastructure. Examples of the landscape architect or designer's previous work should be supplied with the landscape design.

- vi. The landscape architect or designer should demonstrate in their plans how wind exposure, local temperature variations and rainfall have been considered in the designs.
- vii. A maintenance plan must be supplied with applications which include green roofs or walls that demonstrates long-term viability and access for maintenance.

5.1.3 Soil volumes

Objectives

- a) To ensure development provides long term solutions to address the Urban Heat Island Effect by ensuring the longevity of tree plantings through provision of adequate and appropriate conditions for healthy growth, including sufficient deep soil area and structure.

Controls

- 1. Minimum soil volume and planting area to be provided is to be based on minimum tree sizes, in accordance with Table 5.

Table 5: Tree size and planting site area

Maximum tree size at maturity	Planting site area required	Planting site depth required	Soil Volume per tree
Small (less than 8m tall or under 4m wide)	Less than 9.5m ²	1.0 to 1.3m	30m ³
Medium (9-12m tall or under 4- 8m wide)	9.5m ² to 18.5m ²	1.3m to 2.5m	35m ³
Large (Taller than 13m or wider than 8m)	More than 18.5m ²	>2.5m	80m ³

Guidance on tree sizes is provided in the List of Appropriate Trees.

5.1.4 Tree planting specifications

Objectives

- a) To ensure development provides long term solutions to address the Urban Heat Island Effect in Penrith by:

- i. Delivering green infrastructure which positively contributes to the amenity of the locality, while recognising the context and existing development patterns.
- ii. Ensuring adequate and appropriate vegetation and conditions for healthy growth are provided, including vegetation that contributes to increasing the amount and health of the local tree canopy.
- iii. Delivering appropriate quality and quantity of vegetation as green infrastructure, with an integrated design approach to reduce development's contribution to the urban heat island effect.

Controls

1. Tree Planting location and numbers are to be provided in accordance with development type as detailed in Table 6:

Table 6: Minimum tree canopy cover by development type

Development type	Tree canopy and planting
Single and secondary dwellings	Front Setback: At least 1 small tree positioned to provide summer shade to the dwelling or hard surfaces. Side Setback: Where a side setback of 3m or more is proposed, planting alongside boundaries is to provide small-to medium trees for sun-shading. Rear Setback: At least 3 trees situated to provide an interlocking canopy of small and medium trees and shrubs: predominantly species indigenous to the soils of Penrith City
Dual occupancies	Front Setback: At least 1 small tree positioned to provide summer shade to the dwelling or hard surfaces. Side Setback: Where a side setback of 3m or more is proposed, planting alongside boundaries is to provide small-to medium trees for sun-shading. Rear Setback: At least 3 trees situated to provide a corridor of habitat with an interlocking canopy of low to medium-height trees and shrubs.
Multi dwelling housing, boarding houses, manor	Front Setback: At least 1 small tree positioned to provide summer shade to the dwelling or hard surfaces. Rear Setback: At least 3 trees are to contribute to an interlocking canopy of low to medium-height trees and shrubs.

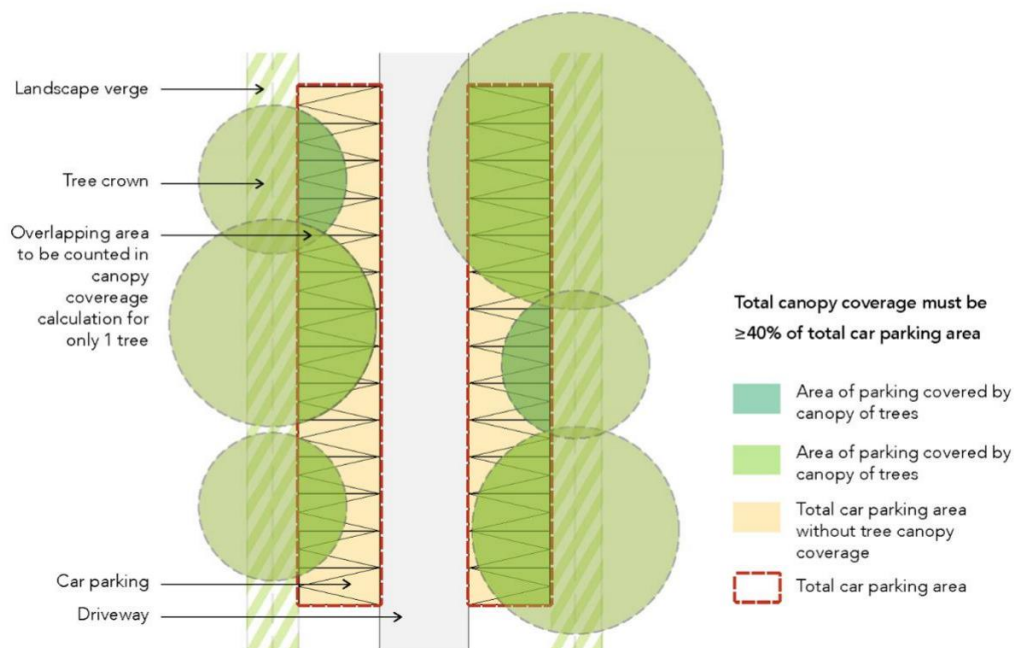
Development type	Tree canopy and planting
houses and group homes	Alongside boundaries: At least 1 small-to medium height canopy tree per dwelling for sun-shading. Parking Spaces: Open parking spaces that are to be lined by an "avenue" of shady, overhanging trees.
Residential flat buildings or equivalent	Front Setback: At least 3 small to medium trees positioned to provide summer shade to dwellings or hard surfaces. Along driveway verges and surrounding parking basements. Screen plantings of small to medium trees. Side Setback: Planting alongside boundaries is to provide small-to medium trees for sun-shading. Rear Setback: At least 3 trees to contribute to an interlocking canopy of low to medium-height trees and shrubs:
Industrial, business, tourism and commercial development	Open car parks on private land • A minimum of 40% tree canopy cover must be provided over the total combined area of all car parking spaces, where car parking is to be provided on the development site. • Canopy cover is to be calculated by finding: The percentage of the specified area covered by the anticipated canopy at 2/3 of the selected species total maximum width, when fully grown. Figure 7 provides an example of how canopy cover should be calculated. • Trees should be provided across the car park area and can be located within landscaped setbacks and deep soil zones. • Where tree roots are expected to grow beneath car parking spaces, engineered tree pits or vaults and aeration infrastructure must be provided and designed in accordance with design guidance provided in engineering design guidelines, the Penrith Street and Park Tree Management Plan and this DCP. • Wherever possible, canopy trees are to be orientated to the north, east or west of parking spaces to maximize shade during the day. • Trees and woody plants above 200mm high should be planted a minimum of 600mm back from the wheel stop, measured from their trunks. Low planting should be provided in this space.

Development type	Tree canopy and planting
Additional controls for Industrial, Business, Commercial and Tourism development where landscaped setbacks are required.	• Landscape setbacks must provide adequate soil area for tree planting and be filled with as many large trees as possible. • Canopy from large trees should be supported with medium and small trees and vegetation to provide a collective cooling effect, where they will not obstruct views, signage, or impact safety.

2. All trees, including street trees, should be located to consider:

- i. integration with development design to produce improved cooling effects through measures such as maximisation of shade provided to exposed building walls, hard surfaces, and pedestrian walkways
- ii. any disruption of solar access for solar panels on existing or adjoining present and future development should be minimised
- iii. whether there is appropriate soil area for root volume
- iv. any services or utilities infrastructure within the road reserve, such as power poles, overhead wires, drainage inlet pits, existing street trees and any existing driveways
- v. requirements in the Penrith Street and Park Tree Management Plan.

Figure 7: Canopy cover to be achieved over car parking spaces



5.1.5 Irrigation

Objectives

- a) To reduce demand on potable water resources through an appropriate and sustainable supply of non-potable water for irrigation for cooling.
- b) To ensure vegetation is irrigated, enabling it to better withstand urban heat impacts and enable the cooling effects of evaporation and evapotranspiration.

Controls

1. All development not covered by the State Environmental Planning Policy – BASIX is to provide drip irrigation or passive irrigation to private vegetated landscaped areas, that are:
 - i. serviced by sustainable supply of non-potable water that is of a scale that sufficient to supply a minimum of 80% of non-potable demand for the development, including indoor and outdoor use, toilets and laundry
 - ii. designed to be gravity fed and
 - iii. passive irrigation must be provided to turfed areas, street trees and landscaping where a drip irrigation system is not feasible.

5.1.6 Cooling with water

Objectives

- a) To reduce the contribution of new development on the urban heat island effect by minimising impermeable surfaces to increase rainwater infiltration and allow improved cooling effects of evaporation.
- b) To retain and provide design elements that retain water in landscapes to support cooling and allow for increased rainwater infiltration and evaporation.

Controls

- 1. All development must consider and incorporate features to store water in the landscape. These features must be incorporated into Landscape Plans to create cool zones and support vegetation. This can include:
 - i. swimming pools, subject to controls in Penrith DCP and state legislation
 - ii. fountains and bird baths
 - iii. water play features, subject to Council agreement and asset maintenance requirements when on public land
 - iv. rain gardens, wetlands, ponds or
 - v. shallow trenches or swales within or near garden beds, where erosion is not an issue.

The selected feature/s should be of an appropriate scale to maximise retention of rainwater on the site without affecting operation.

5.1.7 Street trees

Objectives

- 1. To ensure development provides long term solutions to address the Urban Heat Island Effect in Penrith by:
 - i. Delivering green infrastructure which positively contributes to the amenity of the locality, while recognising the context and existing development patterns.

- ii. Ensuring that there is adequate and appropriate provision of trees and that conditions for healthy growth and canopy are provided.
- iii. Delivering appropriate quality and quantity of vegetation as green infrastructure.

Controls

1. Street trees are to be provided at a rate of one tree for every 10m of site frontage, rounded down to the nearest 10m. At least one tree must be provided. Where possible, trees should be of a scale sufficient to produce interlocking canopies, unless specific requirements are provided elsewhere in Penrith DCP.
2. Street trees planted on the streets running in an East to West direction are to be native trees and trees planted on streets running from North to South are to be deciduous.

5.2 Cool colours and materials

Objectives

- a) To ensure new development provides long term solutions to the Urban Heat Island effect.
- b) Design and construct roofs and exterior walls and hardscaping with consideration of the impacts of material selection on urban heat.
- c) Limit negative impacts of heat absorption by demonstrating that materials used are appropriate for the climate and their intended use, such as using green roofs/walls or cool roofs/walls and materials of low Solar Reflectivity Index to ensure high reflectivity and/or high thermal emittance, and that design responses are the most effective for the site.

Controls

1. A materials and finishes schedule is to be provided, and must include:
 - i. product specifications where certain materials are relied upon to address the criteria of BASIX, Section J of the NCC or this DCP.
 - ii. Product specifications should include energy efficiency properties, such as:
 - thermal mass

- effect on air flow
 - appropriate colour and reflectivity
 - material permeability in landscape design.
2. Dark coloured roofs which retain heat will not be supported. All buildings and ancillary development are to minimise their contribution to the urban heat island effect by meeting the following requirements for cool roofs:
- i. Achieve the nominated Solar Reflectance Index (SRI) minimums:
 - for roof pitches less than 15, a SRI minimum of 64, with a minimum 3 year manufacturer guarantee.
 - for roof pitches greater than 15, a SRI minimum of 34, with a minimum 3-year manufacturer guarantee.
 - for rooftop terraces a SRI minimum of 28, with a minimum 3-year manufacturer guarantee.
 - ii. At least 75% of the roof area is to meet nominated SRI values and/or be designed as a green roof. Areas where solar panels (PV) are mounted flat on a roof are excluded, all other roof areas with PV count toward the Cool Roof area calculation.
 - iii. Buildings in Mixed Use, Business, Tourism, and Industrial zones are to provide roof product cut sheets to confirm the materials used are within the required SRI. Other buildings may demonstrate consistency by illustrating materials and colours to be used within plans and design drawings and providing this information in their Schedule of Materials and Finishes. Assessing officers may request further product information, if required.
 - iv. Roofs that are 'downslope' from the publicly accessible places, such as in hilly areas, scenic areas or which are in view from taller adjacent buildings should avoid reflective white or very light-coloured finishes that could cause glare.
 - v. Thermally massive surfaces such as concrete should be avoided as a roofing material where shade or other coverage is not provided, or where roofs are not light in colour.
 - vi. Roof tiles may be used, providing that the roofing is insulated in addition to ceiling insulation and provides a sufficient gap

between insulation layers to allow for access and air movement.
This is to be certified on any plan showing materials and finishes.

3. Walls, car parking spaces, driveways and landscaping materials should have a high albedo (be as light as possible) so that heat can be reflected into the landscape and absorbed, or where shade is provided.
4. Medium colours and materials with high thermal emittance (which release heat quickly) and/or permeable materials should be used in pedestrian areas where no shade is provided to minimise heat reflection and to mitigate heat retention.

5.3 Cooling through building design

Objectives

- a) To ensure development in zones which are vulnerable to urban heat island impacts incorporates additional design responses to effectively manage increased heat loads on hot and extreme heat days.
- b) To reduce carbon emissions from the development, considering both construction and operational emissions.
- c) Design buildings for high passive thermal performance, to reduce reliance on energy for cooling and heating.
- d) To ensure buildings are thermally comfortable by designing:
 - i. Floor plans that respond to the site and building use and orientation
 - ii. Climate appropriate windows and glazing and the appropriate location of windows
 - iii. Thermal mass orientated and situated to retain cool temperatures
 - iv. Improved air movement and ventilation, particularly to encourage the flow of cool north-easterly breezes and night air and to extract hot air
 - v. Passive cooling features
 - vi. Improved insulation and management of air exchanges,
 - vii. Appropriate shading
 - viii. Efficient operation of mechanical cooling systems.

- e) To deliver internal spaces within every new development where temperatures remain thermally comfortable all year round.

Controls

Air circulation

1. Building design must demonstrate how it responds to the following considerations affecting air movement and ventilation:
 - i. Capture and direction of north-easterly prevailing cool breezes (north-easterly) and internal circulation should be prioritised for window and door design, number, size, and location, and considered in building orientation.
 - ii. Shading devices and/or window glazing should be provided to support:
 - Minimisation of solar heat gain during summer and
 - optimisation of solar heat gain during winter.
 - iii. Minimising air gaps by ensuring all openings can be closed and sealed when necessary, and that the building is well insulated. Window and door seals should be provided.
 - iv. The ability to isolate spaces through zoning sections of the floor area and building services to provide individual control of heating and cooling, particularly where mechanical systems regulate temperature.
 - v. Security screens or fly screens should be provided over openings, where feasible and consistent with safety and fire controls.
 - vi. Promoting air circulation.
 - vii. Support for any other passive design elements.

External building design

2. Buildings should be designed on passive solar design principles which:
 - i. Respond to orientation to maximise the northerly aspect and solar access in the cooler periods. Where the site permits, designs should deliver long, thin buildings with increased northern and

southern exposure and limited exposure on eastern and western-facing facades and moderate depths.

- ii. Reduce overheating in summer and promote solar gain in winter.
3. Development below 3 storeys must provide eaves with a minimum of 450mm overhang (measured to the fascia board) and a minimum 600mm overhang on western facing elevations, except where any walls are permitted to be built to the boundary. Alternative solutions to eaves may be considered, where it can be demonstrated that these provide appropriate sun shading and are integrated with the design of the development and have architectural merit.
4. Design for moderate size and number of openings with the majority to the north.
5. Where east and west facing residential walls are proposed to be brick or concrete and are exposed to summer sun, these walls should either be double brick or wall insulation should be provided and walls should be shaded.
6. Where concrete is used for walls in industrial, business, and commercial development and western walls are exposed, at least 50% of western elevations must be shaded from summer afternoon sun using either design features or vegetation. Where there is a zero-lot setback, this control does not apply.
7. Ensure roof design maximises opportunities for future installation of solar power and hot water adaptation through the consideration of:
 - i. North-facing surface
 - ii. Overshadowing and
 - iii. Structural support.

Internal Building Design

8. Cool Refuges for certain buildings are to be provided in accordance with Table 7, and must be identified on floor plans:

Table 7: Cool Refuge Requirements

Development Type	Cool Refuge Requirements
Residential development	• At least one habitable room on the ground floor of each dwelling or in the lobby and common rooms of residential flat buildings/ Apartments, should be provided as a cool refuge in summer, and at least one habitable room as a warm refuge in winter. • These spaces may be the same or separate.
Publicly accessible buildings (amenity buildings excluded)	• A cool refuge which may accommodate a minimum of 20 people.
Business, industrial, and commercial development (excluding shopping centres)	• Provide indoor and outdoor staff break areas that act as cool refuges. • Where feasible, workspaces should be designed to maintain thermal comfort. This is of particular importance to high density workplaces and commercial spaces.

9. In addition to the ability to be mechanically cooled (i.e., air conditioned), a cool refuge must demonstrate the following design criteria have been addressed to support thermal comfort:

- i. Use of passive shading principles that considers the location of the refuge within the dwelling and use of moveable shade structures, window boxes or wider eaves
- ii. Use of insulation and type in the walls, floor, and ceiling with the highest r-value appropriate for the site, or that the materials provide sufficient insulative properties so that insulations are not required,
- iii. Use of cross-ventilation is focused to channel cool north-easterly breezes through the space and provide optimal cooling effects,
- iv. Minimising air exchanges so that spaces can also be enclosed when required.

10. At least three of the following design measures are to be provided in a cool refuge:

- i. be located on the southern side of the building.

- ii. have increased shade on walls or windows that are exposed to the north or west.
 - iii. have thermal mass levels appropriate to the amount of passive cooling available (cool north-easterly breezes, consistent diurnal variations) and use thermal mass to delay peak cooling needs until after the peak demand period.
 - iv. have appropriate glazing of windows
 - v. provide efficient mechanical cooling or ceiling fans.
 - vi. have space that is zoned to reduce air exchange
 - vii. use of photovoltaic, solar, biomass or wind-powered cooling mechanisms to regulate air temperatures and movement, such as solar chimneys, evaporative cooling or earth coupling.
11. If a cool refuge is provided as an ancillary structure, roofing must be insulated.

5.4 Optimising mechanical heating and cooling

Objectives

- a) To minimise excess power usage and heat gain from mechanical heating and cooling systems.
- b) To reduce the impact of heat rejection from heating, ventilation, and cooling systems from contributing to the urban heat island effect and prevent impacts to thermal comfort.
- c) To reduce peak demand on the electricity grid and support a robust electricity network, by improving energy efficiency

Controls

- 1. To mitigate the impact of heat rejection from mechanical cooling, units should not vent into areas where they may result in the heating of the public or private domain. This includes venting onto outdoor recreation spaces, windows of adjoining properties and hard surfaces that may retain heat including, paths, balconies, and courtyards.

2. Where it cannot be demonstrated that heat rejection cannot be achieved without venting into these spaces, this area must be excluded from any calculation of private and communal open space.
3. Mechanical cooling systems must be sited so that:
 - i. airflow isn't impeded from and around units
 - ii. there is ease of maintenance access
 - iii. any structure complies with controls for cool roofs and finishes.
4. Mechanical cooling systems must be shaded by:
 - i. an awning or shade structure or
 - ii. locating the unit on the southern side of a dwelling where possible.

Note: Shading structure must comply with other controls within Penrith DCP.

6. Landscape design

Background

Landscaping can have an impact on the scenic quality of an area. It can complement built forms and enhance the amenity of adjacent spaces and buildings. It can also improve a development's environmental performance in terms of managing water and land impacts.

The process for preparing and submitting landscape designs for development is described in Table 8. The table also describes the process for the implementation and approval of landscaping works, including the role of landscape design professionals in overseeing and reporting on such works.

Table 8: Process for preparing and submitting landscape designs

Step No.	Summary	Detail
1	Decision to develop	Determine what landscaping category the proposal falls within.
2	Employment of appropriate landscape professional	Landscape design consultant undertakes design in accordance with the controls outlined in this Section.
3	Lodgement of DA	Development application, including required landscaping information, is lodged with Council.
4	Determination of DA	Council approves or refuses DA.
5	Conditions of consent	If approval is granted, the consent may include conditions relating to one or all of the following issues: • Requirement for various post approval landscaping reports. • Requirement for a landscaping bank guarantee to be paid.
6	Employment of appropriate landscape contractor to implement proposal.	Approved landscaping works are constructed and implemented in accordance with the consent.

Step No.	Summary	Detail
7	Implementation Report	On completion of the landscaping works, an implementation report is to be provided to and approved by Council. This will provide written certification that the works have been completed in accordance with the consent and this section .
8	Occupation certificate	On receipt of an acceptable implementation report and any other non-landscape requirements of Council, the occupation certificate may be issued.
9	Maintenance Report	A maintenance report is to be provided 12 months after the occupation certificate date. This is to certify that the landscaping works are still in accordance with the consent and that the plant material has established and is thriving.
10	3 year landscaping report	Council may place a condition on consents for larger and more visually prominent developments requiring that a 3 year landscaping report be provided. This report is to be provided 3 years after the issuing of an occupation certificate and is to certify the following: • That landscaping has matured and is in accordance with the original landscape approval, or • That landscaping has not matured and is in accordance with the original design philosophy and requires significant restoration. If the latter is the case, restoration plans are to be submitted to Council for approval and implemented at the expense of the property owners

Legal Qualifier: This Section provides guidance and advice on landscaping and the development process and in some cases minimum acceptable standards which must be met. The provision of this advice, minimum standards and the approval of landscape information with a development application in no way results in Council being legally responsible for the damage that a plant species or landscape element may cause to property or person.

Objectives

- a) To promote landscape design and planning as part of a fully integrated approach to site development.
- b) To ensure landscape design takes into account the site's context, landscape and visual character, existing landscape features and amenity, both at the local and regional scale.
- c) To encourage the development of quality landscape design associated with new development that is consistent with industry best-practice
- d) To encourage the retention of existing trees and vegetation to enhance landscape character.
- e) To ensure landscape design adequately complements the proposed built form and minimises the impacts of scale, mass and bulk of the development in its context.
- f) To encourage landscape design that can be effectively maintained to a high standard for the life of that development.
- g) To establish a framework for allowing "Controlled Private Certification" of the landscape design components of new developments.

Controls

6.1 Development Process

Development categories

1. This section classifies all development in the Penrith local government area into 3 categories (see
2. Table below). Each of these categories has different requirements in relation to the landscape design component of the development (i.e. different parts of this section apply to different types of developments).

Table 9: Development categories

Category	Definition
Category 1	• New single dwelling houses • Alterations and additions to single dwelling houses • Minor alterations and additions to commercial and industrial development as determined by Council

	• Complying development • Other minor development that in the opinion of Council would not have a significant impact on the amenity of the locality.
Category 2	• All work below \$2 million that is not listed in category 1 • Any development in category 1 which in the opinion of Council would have a significant impact on the amenity of the locality.
Category 3	• All developments that are above \$2 million in value • Any development that is on a site with significant environmental considerations as determined by Council. • Any development that will have a significant public domain impact as determined by Council. • Any development that involves the alteration or addition to a heritage item or a property in a heritage conservation area.

In

Table , there are several parameters that require an opinion or determination from Council to determine which category applies. In this regard, applicants will need to contact Council's Development Services Department for advice.

Submission requirements

3. Depending on the type of development proposed, different types of vegetation and landscaping information will be required as part of the development application. Table 10 below lists the type of information to be submitted for the various categories of development.

Note: Applicants should also refer to the 'Vegetation Management' section of this Chapter where landscaping works involve ringbarking, cutting down, topping, lopping, removing, injuring or wilfully destroying any tree or other vegetation prescribed under that section.

Table 10: Required information

Required Information	Category 1	Category 2	Category 3
Site Analysis	✓	✓	✓
Tree Survey and Assessment Report/Arboricultural Survey Report	❖	❖	✓
Tree Management Plan	❖	❖	❖
Landscape Concept Plan	❖	✓	✓
Landscape Detail Plan and additional details		❖	✓

✓ Required Information

❖ Information may be required depending on the scale of the project, the site conditions and location. (Please discuss with Council).

4. Detailed requirements for the information that must be addressed by these reports is set out in Appendix of Penrith DCP. All applicants should review and address these information requirements in their submissions.
5. If more than one type of information is to be submitted with the development application, it may be appropriate for the information to be combined in the one plan or document. This depends on the scale and complexity of the proposal, and its potential impact on the environment and amenity.
6. Landscape plans must be prepared by a suitably qualified consultant. Landscape design consultants who are members of accredited organisations should be engaged to ensure professional standards are achieved. Accredited organisations include: Australian Institute of Landscape Architects and Australian Institute of Landscape Designers and Managers.
7. Landscape construction should be carried out by a qualified landscape contractor to ensure that adequate standards of workmanship are achieved. Landscape contractors who are members of the Landscape Contractors Association of NSW should be engaged where possible.
8. Development that falls into Category 1 will generally not be required to submit landscaping information, however, landscaping of such development should be designed in accordance with the landscape

requirements of this section. In some cases, Council may consider that a proposal in Category 1 warrants a tree survey and assessment report (see the 'Vegetation Management' Section of this Chapter) and/or Landscape Concept Plan. If this is the case, this information may be prepared by anyone provided it is of a suitable standard.

9. On completion of the landscaping works (and prior to an occupation certificate being issued by Council), an Implementation Report is to be submitted to Council. This is to provide written certification that the works have been completed in accordance with the consent and the provisions of this DCP (See Appendix of Penrith DCP for further details).
10. 12 months after the date of the occupation certificate, the Implementation Report and the approved landscape design must be submitted with a Maintenance Report. This is to certify that the landscaping works are still in accordance with the consent and that the plant material has established and is thriving (See Appendix of Penrith DCP for further details).
11. Council may place on consents for larger and more visually prominent developments, a condition requiring that three years after the date of the occupation certificate, an Implementation Report and Maintenance Report and 3 Year Landscaping Report must be submitted (see Appendix of Penrith for further details). This is to certify one of the following:
 - i. The landscaping has matured and is in accordance with the original landscape approval. (This includes retained vegetation being in good condition) or
 - ii. The landscaping has not matured in accordance with the original design philosophy and requires significant restoration. (This includes retained vegetation declining in condition or has died). If this is the case, restoration plans are to be submitted to Council for approval and implemented at the expense of the property owners.

6.2 Protection of the environment

Environmentally Sustainable Design

1. Council requires that all landscape designs promote best practice Environmentally Sustainable Development principles. Some of these measures are addressed in the controls below and include the following:

- i. Planting deciduous trees – These are best planted on northern and western aspects. This will allow the sun in during winter, and provide shelter from the sun in summer and morning sun year round adding to energy efficiency
- ii. Selecting low water/low maintenance plants, including drought tolerant species
- iii. Planting native or indigenous plants – These plants have lower water requirements and have evolved to cope best with the existing conditions, hence reducing maintenance, fertilising and watering requirements
- iv. Using irrigation systems that utilise drip irrigation systems
- v. Using recycled and biodegradable products in the landscape design – Such elements could include recycled soils and other hard paving features
- vi. Allowing for composting, mulching and worm farms on site
- vii. Using quality, long lasting materials
- viii. Using soils and mulches manufactured with recycled waste.

Soil landscapes

2. Any Landscape Plan or assessment should include a study of the soil profile on the particular site and select plant species accordingly. In this regard, soil landscape maps and accompanying interpretive reports for Western Sydney have been produced (by the former Department of Natural Resources) and may be of assistance.

Minimising soil erosion

3. Landscaping works must comply with the 'Erosion and Sedimentation' in the 'Land Management' section of this Chapter, including the submission of an Erosion and Sediment Control Plan where required under that section.
4. Care should be taken when undertaking landscaping works to ensure that soil from the site and any that may be brought to the site is not lost into the drainage system or surrounding environs as this may impact on indigenous flora and fauna and local waterways.

5. Sediment control measures are to be installed prior to any excavation on site. These measures are to be maintained throughout construction of the landscaping works and until the landscaping is established.

Avoidance of excavation and filling

6. Landscape works must comply with the 'Site Stability and Earthworks' controls in the 'Land Management' section of this Chapter.
7. Landscaping works should minimise any earthworks by accommodating the natural landform and utilising designs that require minimal cut and fill, particularly around existing trees to be retained.

Conserving site soil

8. Where it is necessary to remove areas of topsoil as a result of cut and fill requirements, this should not be removed from the site but stockpiled in another part of the site for re- use in the landscaping process. This is both beneficial for the environment and saves money.
9. The following controls apply to topsoil stockpiled on-site:
 - i. Do not store topsoil in any of the tree protection areas (see controls below under '*Protection of trees and vegetation on construction sites and adjoining public and privately owned land*').)
 - ii. Ensure that the stockpile is stabilised during the construction period by covering it with hessian, mulch or a cover crop
 - iii. Ensure that the stockpile will not blow away on windy days by either providing adequate covering or ensuring that it is kept well-watered
 - iv. Use appropriate sediment and erosion control techniques to ensure that the stockpile is retained and does not leave the site.
10. The proposed location and management of stockpiles of topsoil should be detailed in the landscape information that accompanies the development application.

Species selection

11. Plant selection for all landscaping works must consider and will be assessed for its suitability to existing site conditions such as soils, aspect, drainage and micro-climate.

12. Native species is encouraged for any landscape design.
13. The use of exotic or introduced species may be considered if they are part of a site's and locality's existing landscape character and there is a low chance of spreading into native bushland.
14. If a site has remnant native bushland or is located adjacent to native bushland, the plant species that should be used in the landscape design should be those that occur in the bushland, preferably provenance stock.
15. Species selected should not include those listed in the *Noxious Weeds Act 1993* or on the list of environmental weeds (see Appendices Technical Information of Penrith DCP).
16. Planting should consist of a variety of trees, shrubs and ground covers to contribute to biodiversity.

Bushfire resistant species

17. To determine whether a particular site is 'bushfire prone land', advice should be sought from Council's Development Services Department. In these areas, appropriate landscape design and plant species selection will help reduce the risk of bushfires. While no plant is fire proof or completely fire resistant, some plants are less flammable than others.

Landscape design and plant selection should consider bushfire risk. The recommended list of indigenous species in Appendices has a reference to some plants, which are appropriate to these areas due to their low level of flammability and ability to regenerate after a fire.

Protection of trees and vegetation on construction sites and adjoining public and privately owned land

18. If a Tree Management Plan is required, it must identify the vegetation that is to be retained with the development and how it will be protected during and after construction. Tree protection measures must be in accordance with Australian Standard AS4970:2025 Protection of trees on development sites.
19. Where existing vegetation is to be retained, that vegetation must be protected from soil compaction, root, trunk and limb damage, soil contamination and changes in surface levels that affect the health of the vegetation.

20. The Tree Management Plan is to be in place prior to commencement of any site works. "Site works" includes the demolition of existing structures or the entrance onto the site of any machinery for excavation, demolition or large scale rubbish removal. Protection measures are to be installed prior to the commencement of any site work in accordance with Australian Standard AS4970:2025 Protection of trees on development sites.
21. Trees, vegetation and their root zones on public property and private land adjacent to the development site may also need to be protected during the construction process. A common example of this is the protection of street trees located in the public footpath. These trees and vegetation will also need to be included in the Tree Management Plan and protected in accordance with its recommendations.

Vegetation communities

22. In some cases, there may be sites that contain remnant native vegetation. Where remnant native vegetation exists on a site, a flora and fauna assessment report will be required. (See the 'Vegetation Management' section of this Chapter for further details). The purpose of the flora and fauna assessment report is to determine whether the proposed development, including landscaping works, are likely to significantly affect any threatened species, populations or ecological communities or their habitats listed under the *Threatened Species Conservation Act 1995*.

Irrigation/water consumption

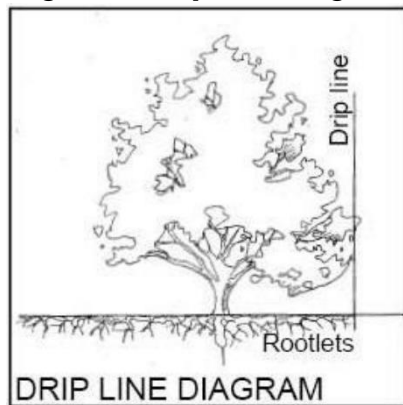
23. Landscape design should minimise water consumption through selection of indigenous and drought-tolerant species and use of water retaining mulches and soil treatments. It should also include species that can act to establish a micro-climate quickly to assist slower growing species and reduce water consumption.
24. If additional watering is required, preference is for low water usage irrigation devices, such as drip irrigation systems, during the plant establishment period.
25. The proposed irrigation system should be detailed in the landscape information submitted as part of the development application.

Minimisation of impervious surfaces

26. Where possible, all landscape designs should include permeable paving options. Permeable paving includes the use of permeable/porous paving units, ornamental gravel and paving on a compacted sand bed. The benefits of using permeable paving include:

- i. Ensuring that air and water are available to roots to ensure healthy, secure growth
- ii. Providing a safe and stable pedestrian/vehicular surface treatment
- iii. Assisting in the protection and conservation of large, established trees where the root system extends beyond the drip line.

Figure 8: Drip line diagram



27. The following minimum areas of permeable surfaces are required to facilitate on-site stormwater infiltration for each land use:

- i. Residential: please refer to controls included in the Residential Development Chapter of Penrith DCP.
- ii. Industrial: 15% of the site area.

Salinity

28. Landscape designs must take into account the salinity controls in the 'Land Management' section of this Chapter.

29. All landscape designs should consider soil salinity and undertake the following practices:

- i. Select salt tolerant plant species and raise garden beds, ensuring adequate drainage

- ii. Use mulch in all garden beds
- iii. Minimise the area of lawn as this requires large quantities of water
- iv. Use 'water wise' garden design features (including timers, selection of plants with low water needs, grouping plants of similar water usage together, etc)
- v. Plant native trees and shrubs
- vi. Use non-corrosive materials when constructing pipes and channels
- vii. Assess current and proposed water storages, artificial lakes and drainage basins as they contribute to groundwater recharge, and minimise where possible
- viii. Correct drainage to protect building footings and foundations
- ix. Refer to the Map of Salinity Potential in Western Sydney (DIPNR, 2002) and the accompanying Guidelines for advice on specific ways salinity may affect a particular site.

30. Soil tests and urban capability mapping are recommended to determine whether salinity is likely to be a problem. If the land is potentially affected by salinity, prevention and monitoring strategies should be employed, such as:

- i. Carrying out soil tests as advised by the Office of Environment and Heritage
- ii. Ensuring adequate drainage is located away from buildings and associated infrastructure to avoid ponding
- iii. Connecting roof drainage to stormwater systems, rather than sillage pits
- iv. Monitoring changes in water table levels and groundwater quality by installing piezometer ('monitoring bore') networks
- v. Avoiding over-watering of lawns and gardens
- vi. Selecting plants with low water requirements and applying mulch
- vii. Checking and repairing water leaks as soon as possible.

Materials selection

31. Landscaping works must comply with the controls relating to the use of sustainable materials in the 'Waste Management' Section of Penrith DCP.
32. The use of recycled and biodegradable products is preferred in landscape design, such as recycled on-site soils and recycled hard landscaping materials.

6.3 Neighbourhood amenity and character

Landscape character

1. Landscape design should reinforce the identified natural attributes of the site including, but not limited to, watercourses, landmark elements, landforms, views and vistas, significant trees, vegetation patterns and historic buildings.
2. Remnant native vegetation should be retained, managed and incorporated into landscape designs to conserve the natural biodiversity across the landscape.
3. Landscape design should enhance the amenity and visual quality of the site. Landscaping solutions are to be used to screen and enhance visually obtrusive land uses or building elements within their setting.

Integration of design

4. All landscape and building designs should be complementary and aim to achieve similar design outcomes. The design of both buildings and landscaping should utilise the same site analysis drawings and concepts. In this way, the site will be developed with a building design and a landscape design that deliver the best possible development solution for the owners and the community.

Streetscape

5. All sites make a contribution to the streetscape by way of the design of any structures or vegetation. Therefore, any landscape submission must include an assessment of the streetscape.
6. Generally, Council requires that dominant positive streetscape elements are to be continued in the design of any landscaping works to ensure that

the development integrates into and enhances the existing streetscape character. Features that contribute to the existing streetscape include:

- i. Street trees and vegetation
- ii. Pavement materials/details
- iii. Architectural character
- iv. Setbacks of buildings and other structures
- v. Existing uses, e.g. residential/retail/industrial
- vi. Heritage items
- vii. Traffic – vehicular and pedestrian
- viii. Car parking – off street, on street, access, etc
- ix. Privacy
- x. Building heights, mass, material and colour
- xi. Links with other spaces
- xii. Street dimensions/scale – street width, verge and path treatments
- xiii. Lighting
- xiv. Maintenance issues, e.g. rubbish collection, letterboxes
- xv. Landscape style
- xvi. Street furniture, fences, gates and signage.

7. Some elements of landscape design and streetscape that should be implemented include the following:

- i. Landscape design should be used to soften the impact of buildings and as a visual element between the street and the development
- ii. Fencing that is forward of the building line should be incorporated with the landscape and consistent with that in the street or locality
- iii. Landscape design should be used to soften the impact of car parking areas

- iv. In open car parking areas, one large shade tree for every 6 car spaces is to be provided as a minimum to improve visual amenity and reduce the heat island effect.

Community safety

- 8. Landscape designs must comply with the safety and crime prevention controls in the 'Safety and Security' Chapter of Penrith DCP.
- 9. All landscape designs should promote the safety of the community through the maximisation of natural surveillance and appropriate lighting. Such measures include the following:
 - i. Appropriate levels of lighting of public spaces such as driveways, gardens and links through the site
 - ii. Appropriate lighting and visibility of the entry to dwellings
 - iii. Provision of appropriate plant species that minimise opportunities for concealment of intruders and do not provide hidden recesses
 - iv. Dwelling entries that are visible from the street or other public areas
 - v. Fences or planting that allow glimpses or overview of the street, private courtyards and other open space areas
 - vi. At driveways, street intersections and other crossing points, landscaping that does not block views between pedestrians and approaching vehicles
 - vii. Landscaping that does not prevent surveillance of car parking areas.

Fencing and retaining walls

- 10. Landscape designs must comply with fencing controls required by Penrith DCP.
- 11. Fencing and retaining walls are an important part of any landscape design and can alter the style and character of the development and the streetscape. Considerations when designing fencing or screening include:
 - i. Rights of access
 - ii. Community safety

- iii. Design
 - iv. Aesthetics
 - v. Existing vegetation
 - vi. Boundaries, easements and emergency access routes – these are not to be compromised
 - vii. Materials and size relative to the proportions, scale and character of the street, surrounding buildings and landscape
 - viii. Maintenance issues to avoid graffiti and vandalism, and life cycle cost (i.e. considering the cost of a product over its entire life span).
12. Retaining walls are to be kept to a minimum to reduce earthworks. See the 'Land Management' Section of this Chapter for requirements for excavation and filling.
13. All retaining walls are to be constructed of masonry or concrete material. Timber retaining walls are not permitted.
14. Development involving earthworks and retaining walls need to have regard for the amenity of any adjoining/surrounding properties and natural flow of water across the land. See Council's *Stormwater Drainage Specification for Building Developments*.

Planting on structures

15. Landscape designs that propose planting on structures will require a Landscape Concept Plan which must outline how the area of planting on structures will be maintained for the life of the development.

Buffer zones

16. Where buffer zones are provided to help minimise land use conflicts, they must be densely planted in accordance with the requirements of this Section of Penrith DCP, using generally native or indigenous species. Council requires that these buffer areas be fully maintained continuously, with failed plants and trees to be replaced immediately with new plantings of the same species.

6.4 Site amenity

Contextual design

1. Landscape designs should seek to screen development, particularly from the sides and rear of an allotment.
2. Landscape design should be used to highlight architectural features, define entry points, indicate direction, and frame and filter views into the site. Landscape design should also be responsive to the bulk and scale of the development.
3. Shrubs and small trees should be used to screen service areas and block unwanted views that reduce privacy.
4. Plantings should be of advanced species except where it is demonstrated to Council's satisfaction that semi-advanced stock is more suited to soil and/or plant characteristics.
5. Landscape design should ensure that plantings when mature will not conflict with structures and services.

Open space requirements

6. The amount of open space is crucial to the landscape design. This amount will vary depending on:
 - i. The use proposed on the site
 - ii. The requirements of the occupants
 - iii. Character of the neighbourhood
 - iv. Requirements in other sections of Penrith DCP
 - v. Retention of mature/significant trees/vegetation
 - vi. Whether the space is a private or public space.
7. Communal space/recreational facilities must be located and designed to avoid nuisance or danger to neighbours, residents and visitors. Consideration should be given to the type of activities to be undertaken, hours of use, noise generation and on-going maintenance and safety of the space/recreational facility. Consideration should also be given to:

- i. Separating conflicting activities (e.g. play spaces away from driveways)
 - ii. Including equipment such as seating, shade structures and children's play equipment.
- 8. Communal open space should generally have access only from within the site. Communal open space for multi dwelling housing should be accessible from all dwellings within the development. Surveillance of this space should be possible from at least 2 dwellings.
- 9. The design of a development should maximise solar access to all open spaces.
- 10. Trees should be selected and located to regulate solar access to buildings. Deciduous trees are best planted on northern and western aspects to allow solar penetration in winter and shade in summer.

Deep soil zones

- 11. Landscape design should maximise the area of a deep soil zone, especially around existing trees to provide sufficient soil depth for roots.
- 12. The following minimum areas for a deep soil zone are required for each land use:
 - i. Residential: please refer to controls included in the Residential Development Chapter of Penrith DCP
 - ii. Industrial: 10% of the site area.

Equal access

- 13. In accordance with the *Federal Disabilities Discrimination Act 1992* and the *NSW Anti Discrimination Act 1977*, and all relevant Australian Standards, the following design elements must be considered when designing any landscape projects to ensure equal access for people with disabilities:
 - i. Pedestrian routes
 - ii. Tactile warning strips with a strong contrast to adjoining paving
 - iii. Stairways/steps
 - iv. Landings

- v. Ramps
- vi. Handrails
- vii. Seating
- viii. Lighting
- ix. Signage
- x. Luminance contrast of street and park furniture.

Heritage

- 14. Landscape designs must comply with any relevant requirements of the 'Heritage and Archaeology' Section of Penrith DCP.
- 15. If a site is listed as a heritage item or is within a Heritage Conservation Area, a heritage impact statement may be required. The landscape design is to retain any natural, cultural or architectural features that are essential to the conservation of the heritage significance of the place. The landscape design should respect the importance of these heritage features, be of a sympathetic style and form, and should be influenced by any relevant heritage landscape evidence.

For more information contact Council's Development Services Department.

Noise, vibration and dust reduction

- 16. Where appropriate, all landscape designs are to incorporate landscape techniques to act as a barrier or buffer to reduce dust, noise and vibration levels from adjoining activities. Examples include fencing and planting adjacent to driveways and the like which can contribute to noise attenuation.

Location of utility services

- 17. The location of utility services, such as gas and electricity, can significantly impact upon existing vegetation and locations for proposed vegetation. As such, the following requirements are applicable:
 - i. Common trenching for compatible underground services should be maximised to reduce repeated disturbance to established plantings.

- ii. Overhead cabling of services should be placed in allocated easements.
- iii. Selected plant species should not obstruct or interfere with infrastructure facilities having regard to:
 - The mature height of trees and shrubs beneath overhead services
 - The root growth of trees and shrubs and underground services.
- iv. Services should be located away from existing and proposed vegetation and their root zones.

Utility areas

- 18. Waste and recyclables storage facilities should be located behind the building line and not adjacent to communal outdoor seating/recreation areas.
- 19. The storage area is to be suitably screened.
- 20. Outdoor clothes drying facilities are to be hidden from the street.

Landscaping and above ground on-site stormwater detention

- 21. Landscape works must comply with the stormwater management and drainage requirements in the 'Water Management' Section in this Chapter.
- 22. All landscape works are to include provision for adequate drainage including collection or dispersal of stormwater runoff, prevention of ponding of water on pavements or discharge of runoff onto adjoining properties or public areas.
- 23. Above ground detention structures should be suitably landscaped to improve the visual amenity of the development.
- 24. Detention structures should be suitably integrated into the landscaping for the whole site, including common open space areas. Ideally, such structures should appear as a feature as opposed to an engineered structure or element.
- 25. Plant species used in these areas must be capable of withstanding periodic inundation and must not impact upon the functioning of the area as a detention structure.

26. Where above ground storage of detained water is proposed, the landscape design will be required to accommodate this through the following:

- i. The maximum allowable depth of ponding in residential areas is 300mm, and in industrial/business areas is 1.2m
- ii. Subsoil drainage is to be installed around the outlet to prevent the area remaining saturated during wet weather
- iii. The maximum batter slope around a landscaped area is to be 1 in 4, with 1 in 6 being preferable
- iv. Mulching with wood or bark chip in storage areas subject to inundation in more frequent storm events (i.e. up to and including the 20% Annual Exceedance Probability (AEP) storm) is not considered desirable. Weedmat or similar should be used in these areas
- v. Those areas of the basin subject to inundation up to and including the 5% AEP storm are to be turfed. Trees may be planted in the turfed area. Shrubs and/or groundcovers may be planted above the 5% AEP water level
- vi. Careful consideration should be given to the types of planting within the basin to ensure the area can be maintained and the storage volume is not reduced to an unacceptable level. If substantial planting is proposed within the basin, the storage volume is to be increased to accommodate this. Refer to the Landscape Technical Specifications in Appendix of Penrith DCP for a plan relating to some of the above details.

On-site effluent disposal and landscaping

27. As sewer is not available to some areas of Penrith, some developments may need to consider on-site effluent disposal, and in particular, land application areas for the disposal of treated effluent. If this is the case, specific vegetation will be required that can cope with this treated effluent. Appendix of Penrith DCP provides a list of species which are appropriate for such land application areas. Additional requirements for on-site sewage management are included in the 'Infrastructure and Services' section of Penrith DCP.

Car wash bays

28. Where appropriate, landscape designs should incorporate an area with a permeable surface where a car can be washed.

1. The car wash bay may be turfed or gravel and should prevent contaminants from entering the stormwater system.

6.5 Construction

1. All landscaping construction is to meet the minimum 'Landscape Technical Specifications' in the Appendix of Penrith DCP.

Lifting the bar

The following represent some ways in which applicants can demonstrate additional commitment to the landscape principles expressed in Penrith DCP. Demonstration of this commitment may lead to Council considering variation of development controls. Applications that vary the development controls listed in this section will need to demonstrate that the proposed development complies with the objectives relevant to the development controls it seeks to vary.

- Landscape irrigation/watering systems should, where possible, utilise recycled grey- water/stormwater or water from on-site detention systems to avoid use of potable drinking water for this purpose; and
- 'Greening' of all suitable roof spaces in order to reduce energy needs for cooling and create more sustainable roof designs.

Other information

It is recommended that applicants seeking to address this issue also refer to other relevant information including:

- Centre for Architectural Ecology – Collaborations in Green Roofs and Living Walls: BCIT School of Construction and the Environment at <http://commons.bcit.ca/greenroof/case.html>
- Green Roofs Australia at <http://greenroofs.wordpress.com/>
- Penrith City Council's Landscape Character Strategy (2006)
- Penrith City Council's Sustainability Blueprint for urban release areas (June 2005)

- SEDA: Solar Access for Lots, Available at www.energysmart.com.au/brochures/Solar_Access_for_Lots_Guide.pdf

7. Application of certification systems and energy efficient design

Objectives

- a) To ensure that development is undertaken in a sustainable manner, demonstrating this through the application of the Building Sustainability Index (BASIX), Green Star and/or Australian Buildings Greenhouse Ratings certification system, where appropriate.
- b) To ensure that development is designed on a 'whole of building' approach by:
 - i. responding to the site's context, the desired scale and character of an area, and minimising impacts on key views, scenic values and where applicable, rural character
 - ii. responding to climatic and contemporary environmental conditions by:
 - encouraging passive solar building design
 - allowing reasonable daylight access to all developments and the public domain
 - reducing the necessity for, or improve the control of, mechanical heating and cooling
 - reducing the energy consumed by installed appliances and equipment
 - improving the indoor environmental quality of occupants;
 - minimising greenhouse gas emissions
 - iii. minimising likely bulk and scale impacts of a building
 - iv. considering the natural topography and landform and minimise excavation and likely visual impacts of the development
 - v. ensuring that the development (including the public domain):
 - has incorporated the Crime Prevention Through Environmental Design (CPTED) principles of surveillance, access control, territorial management and space management into its design
 - is accessible and useable for all members of the community.

Controls

1. Non-residential developments, including mixed-use developments, with a construction cost of \$1 million or more are to demonstrate a commitment to achieving no less than 4 stars under Green Star or 4.5 stars under the Australian Building Greenhouse Rating system, now part of the National Australian Built Environment Rating System (NABERS).

7.1 Built Form – Energy Efficiency and Conservation

Controls

1. The selection criteria for construction materials, including internal fit-out work, should include detailed documentation of their energy efficiency properties.
2. Buildings should be designed on passive solar design principles which:
 - i. Respond to orientation to maximise the northerly aspect and solar access in the cooler periods
 - ii. Reduce overheating in summer and promote solar gain in winter
 - iii. Ensure there is adequate cross flow of air by utilising natural ventilation, resulting in a reduction in the use of mechanical ventilation and/or air-conditioning systems.
3. The future use and occupants of the building should be considered in the design and location of building services/equipment to ensure that:
 - i. The thermal comfort of occupants is optimised through zoning sections of the floor area of building services is provided enable individual control of heating and cooling
 - ii. Lighting systems and fittings have reduced energy consumption that are also appropriate for the use/activity located in that part of the building
 - iii. The equipment or service will be used and its future use will not affect other elements of sustainability
 - iv. Sub-metering to individual tenancies within the development to enable individual monitoring of consumption performance.

4. Common and service areas in the building should incorporate energy and water efficiency/conservation measures in their design and location.

Figure 9: Diagram showing application of design principles to enhance amenity and to provide good water and energy efficiency. (Source: Urban: sustainable solutions for a developing Australia (January 2008) Socially Sound p32.)

