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F5 Technical Information

A. Background

This Appendix contains more detailed information to support the controls in this DCP. It also refers to policies of Council.

It is recommended that applicants contact Council's Development Services Department to check for updates to this information prior to commencing their development application.

B. General Objectives

- a) To provide technical information to support the controls in other sections of the DCP;
- b) To refer to existing policies and guidelines of Council; and
- c) To provide information about the existing policies and guidelines of other agencies and organisations.

C. Other Information

This Appendix refers to the technical information and policies of Council. In many cases, applicants will also be required to comply with the policies and technical standards of State and Commonwealth agencies and utility agencies. Applicants should directly contact these agencies to obtain this information.

1. Policy and Guideline Documents of Council

The following policy and guideline documents provide background and technical information to support Penrith DCP 2014 and are separately available from Council's website at www.penrithcity.nsw.gov.au:

- Penrith City Council Landscape Character Strategy (2006)
- Penrith City Council Sustainability Blueprint for Urban Release Areas (June 2005)
- Penrith City Council Biodiversity Strategy (May 2004)
- Penrith City Council - Heritage Study (May 2006) prepared by Paul Davies Pty Ltd
- Penrith Integrated Transport and Land Use Strategy 2008
- Penrith City Council On-site Sewage Management and Greywater Reuse Policy (April 2014).
- City Strategy

2 Technical Information

2.1 Social Principles

A. Background

A socially sustainable society is one that is just, equitable, inclusive and democratic, and provides quality of life for current and future generations.

As the population of Penrith grows, increasing residential and working populations will put pressure on open space areas and natural resources as well as on the existing built form, services and infrastructure. Increasing the population in an area will require an increase in amenity to ensure that places remain liveable for the whole community.

Understanding the social context and needs of the local community in terms of lifestyle, affordability, access to social facilities and employment opportunities influences the choice and location of all land uses. Quality design outcomes and successful project delivery requires an integration of the proposed development's aims, Council's goals for a particular area and processes which involve and support the local community.

B. Objectives

The objective of this section is for development proposals to consider and, where relevant, address the following:

- a) Conducting a social impact assessment for major developments;

- b) Ensuring a development addresses Council's social goals as set out in the Principles in Chapter B of this DCP;
- c) Ensuring a development addresses the proximity and accessibility of community facilities in the area; and
- d) Promoting housing choice in the form of a mix of dwelling types, affordability and accessibility.

C. Social Impact Assessment

The key way to determine whether a proposed development will impact on social sustainability is to conduct a Social Impact Assessment (SIA). A SIA will not be required for all developments. However, an applicant (in collaboration with Council) should assess whether there will be any social impacts, and if so, lodge a SIA with the application. The types of development that may require a SIA include residential developments, new industry, commercial development, retail development, entertainment and place of worship.

A social impact assessment can be defined as,

"The processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment." (International Principles of SIA).

The aim of a SIA is to predict, anticipate and understand what may happen as a result of a development. In doing this, it aims to find out how to maximise the desired outcomes and minimise the adverse outcomes to the community.

A SIA should include an in depth assessment about actual and potential social impacts. Both positive and negative impacts need to be considered as well as the extent of the impact.

Council, the applicant and the community all have a role in the identification and assessment of social impacts that may result from a development. For the purposes of everyday planning, such as major changes in land use, social impact assessment requires an analysis of three key factors:

- Impact on the existing community;
- Impact on the community associated with the new development; and
- Impacts on the future community.

To do this, the following steps are generally taken:

- a) Identifying the Community** - Identifying the existing, future, and proposed communities;
- b) Identifying the Needs** - Identifying the needs that relate to the existing, future and proposed communities;
- c) Identifying the Issues** - Identifying the issues that will impact on those communities and needs; and

d) Developing the Recommendations and Mitigating Measures - Assessing how the proposal will avoid or mitigate social impacts. Once impacts have been identified, measures to address these impacts, called mitigating measures, and recommendations can be developed.

Further details of these steps are provided below.

1. Identifying the Community

Identifying the community involves the following steps:

- a) Identify the existing community (residents, businesses, schools, churches, surrounding land uses, age structure, household types, income etc.) by:
 - Looking at ABS Census of Population and Housing.
 - Looking at SEIFA (Social Economic Index of advantage/disadvantage and wellbeing), Community Profile; and Community Atlas and population forecast on Council's website;
 - Looking at regional plans.
 - Looking at Council's City Strategy which includes policy documents: Penrith Inclusion Plan; Planning for an Ageing Community Strategy 2010; Service for Men Study; Women's Services Advocacy Strategy; Youth Action Plan 2010.
- b) Identify the future community using population projections (see Population Forecast on Council's website).
- c) Identify the future community that your proposal would bring to the area (i.e. if you are proposing a major residential development then provide a snapshot of total number and breakdown of some key characteristics - age, household type, size, etc).

2. Identifying the Needs

Identifying the needs involves the following steps: (This will require some discussion with local service providers and the existing community).

- a) Identify the level of services and facilities that the existing community has available (e.g. type of service, availability of service, affordability of service).
- b) Identify the current gaps in current service and facility provision.
- c) Identify what the needs of the future community will be and what services will be required to meet this need.

3. Identifying the Issues

When considering the issues you need to be mindful of both positive and negative impacts, e.g. will the development bring more children into the area and therefore make better use of or put pressure on existing school infrastructure.

The key issues to be considered in a SIA are outlined in Table F5.1. The table is intended to guide you in developing your SIA. You need to address the areas that are relevant to your application. Remember to document who you consulted, what issues were raised, how

you will enhance positive and reduce negative impacts and whether there are any other issues you need to consider.

Table F5.1

Possible Social Impacts (positive and negative)	Questions to consider
Demographic and population change	<p>Will the proposal create a significant change to the existing population in terms of overall numbers and makeup (i.e. will it double the size, will it create a significant increase in older people, etc)?</p> <p>What is the current makeup of the existing community (e.g. age groups, family type, household income, employment status etc)?</p> <p>What is the total expected increase/decrease? What percentage is this of the total population of the suburb, area, LGA?</p>
Accommodation and housing	<p>Will the proposal change the current provision of housing? Will it create shortages or too much? Will it impact on affordability? Will it change the household size and characteristics of the community for the positive or negative? Will the proposal respond to current demands in housing type, etc.? You may need to undertake an assessment on housing affordability.</p> <p>Consider quantity, type and density of housing.</p>
Mobility and access	<p>Will the proposal create a strain on existing transport services? Can the existing transport services be augmented to meet demand or will they need to be expanded? Can people currently get to places they need to go to (e.g. what is the current level of mobility, what is needed, etc)?</p>
Community facilities and social infrastructure requirements	<p>What facilities and infrastructure is currently available? How will the proposal impact on existing community access to these facilities? Can existing facilities meet the anticipated increase in demand? Will the proposal result in the need to upgrade existing facilities or will new facilities be required? What new facilities may be required?</p>
Needs of service age groups	<p>What service age groups currently meet in the area? Will the proposal create impacts on existing social groups? Will the proposal create the need for new service age groups? For example, if the development is for student accommodation or seniors housing, will the community be able to service this group? Will this new group create impacts on the existing community?</p>
Heritage and cultural values and beliefs	<p>Will the proposed development impact on Indigenous and European heritage? Is there an item of local significance to be considered on the site? How will the existing or incoming communities' cultural needs be met?</p>
Community identity	<p>Will the proposal change the socio economic makeup of the</p>

Possible Social Impacts (positive and negative)	Questions to consider
and cohesion	community? Will the proposal change the age characteristics of the community? Can the incoming community integrate with the existing community to ensure community cohesion or will it create issues? How will these issues be minimised?
Cohesion of the development and its surrounds	Is the proposal consistent with development that surrounds it? Is the proposal significantly larger in scale and type than existing development? Is the proposal going to result in a distinct change in the locality (e.g. from rural to urban)?
Health	Will the proposal create issues associated with health? There are a number of social indicators of health. Examples include opportunities for building community interaction, community capacity, wealth, activity, etc.
Leisure and recreation	Will the proposal create opportunities or constraints for leisure and recreation? Does the proposal meet the future community's needs in this area? Will the proposal create demands on existing recreation and leisure facilities that cannot be met? Will the proposal justify the ongoing operation of recreation and leisure facilities?
Risk perception in the community and crime and public safety	Have CPTED principles being considered? (Chapter C1 'Site Planning and Design Principles' contains information about CPTED). Will the proposal create a higher incidence of crime or create more opportunities for informal surveillance? Will the proposal create more opportunities for crime?
Social amenity	Will the proposal contribute or impact on the overall character of an area? For example, will changes impact on open land, trees, historic buildings and the inter-relationship between all elements in the environment? Will the proposal contribute to or impact on the overall social makeup of an area in terms of population, levels of service and facility provision, etc.?
Equity and universal design	An overarching principle of social inclusion is that of equity of access to resources, services and opportunities. This includes the principle of universal design which seeks to promote accessibility in both the public and private domains to all people. How has the principle of equitable access and universal design been incorporated into the proposal?
Employment	Will the proposal create employment opportunities and contribute to the surrounding community? Will the proposed employment be able to be met in the local community with local skills or will a whole new group of people be required? Will the proposal lead to issues of displacement? Use your demographic profile to discuss.
Local economic effects	Will the proposal boost or take away from the local economy? Will the proposal threaten the existing economic environment?

Possible Social Impacts (positive and negative)	Questions to consider
Property value	This can be incorporated into the principle above and it may be useful to use an economic consultant. However, you may be able to research impacts of similar proposals to yours and whether there were any impacts to property values.

4. Developing the Recommendations and Mitigating Measures

Against each issue, the impacts for existing residents within the community and impacts on future residents of the development need to be considered and strategies or mitigating measures, if appropriate, to address any impacts identified.

Recommendations will identify the means by which the negative impacts associated with the proposal may be minimised or avoided and the positive impacts enhanced.

Mitigating measures are those steps that could be taken to reduce or enhance the levels of impact identified (e.g. provision of a transport service, creation of community facilities, provision of a bus shelter, etc) to meet future community needs. These measures are usually required to be provided by the developer (e.g. if your proposal will increase demand on public transport, you may need to recommend augmenting the existing public transport provision or creating a new service that meets your development's needs).

The final recommendation of the SIA needs to support or not support the proposal. You need to outline reasons why.

2.2 Economic Principles

A. Background

Economic capacity is tied to the physical ability of a locality to support growth and change, including the provision of community infrastructure and services. It is important to balance the interests of the public domain and the community's goals with realistic commercial expectation, market demands, real estate and development profit.

Not every aspect of economic sustainability will be governed by this DCP. However, several key aspects of economic sustainability addressed in this DCP include, but are not limited to:

- a) The economic equity of access to natural resources;
- b) Economic cost of provision of transport, services and infrastructure;
- c) Economic impacts of specific land uses.

B. Objectives

The objective of this section is for development proposals to consider and, where relevant, address the following:

- a) Conducting an economic impact analysis for major developments;
- b) Ensuring a development addresses Council's economic goals as set out in the Principles in Chapter B of this DCP;
- c) Ensuring a development addresses the proximity and accessibility of employment and services in the area; and
- d) Promoting development that is economically sustainable.

C. Economic Assessment

The key way to determine whether a proposed development will impact on economic sustainability is to conduct an Economic Assessment. An economic assessment will not be required for all developments. However, an applicant (in collaboration with Council) should assess whether there will be any significant economic impacts from a proposal, and if so, lodge an economic assessment with the application. Many economic impacts are closely related to social impacts and this should be addressed.

1. Market demand

Is the proposal based on a thorough market appraisal to determine the need for the proposed land use, the required amount of floor space needed and whether the market has any particular design requirements? This needs to be assessed not just for the immediate future, but also for longer term projections. If there is uncertainty, then proposals need to include a level of adaptability to allow it to change as the market demand requires.

2. Employment

Will the proposal create employment and contribute to the surrounding community? Will the proposed employment be able to be met in the local community with local skills or will a whole new group of people be required, leading to issues of displacement, opportunities, etc.? Use your demographic profile to discuss.

3. Local economic effects

Will the proposal boost or take away from the local economy? Will it threaten the existing economic environment?

4. Property value

This can be incorporated into the principle above and it may be useful to use an economic consultant. However, you may be able to research impacts of similar proposals to yours and whether there were any impacts to property values.

2.3 Environmental Principles

A. Background

There are a number of environmental objectives and controls set out in this DCP. The broad aim in addressing these environmental issues is to address them in a holistic manner - to avoid fixing one problem by causing another. For this reason, environmental issues have been grouped as issues relating to:

- a) Vegetation Management ;
- b) Water Management;
- c) Land Management;
- d) Waste Management; and
- e) Landscape Design.

In addition, there are a number of 'human environment' issues that impact on the natural environment, including:

- a) Site Planning and Design Principles;
- b) Culture and Heritage;
- c) Public Domain;
- d) Advertising and Signage; and
- e) Transport, Access and Parking.

Therefore, environmental issues permeate all aspects of development and all of these chapters need to be addressed to understand the potential impact of any development proposal.

B. Objectives

The objective of this section is for development proposals to consider and, where relevant, address the following:

- a) Conducting an environmental assessment for major developments;
- b) Ensuring a development addresses Council's environmental goals as set out in the Principles in the DCP Principles Section of this DCP;
- c) Ensuring a development responds to the environmental constraints and opportunities as set out in the Site Planning and Design Principles Section of this DCP; and
- d) Ensuring that development is environmentally sustainable.

C. Environmental Assessment

The environmental principles that should be covered by the contextual analysis and addressed by the design/development (as set out in this DCP) include:

Air Quality and Climate

- a) Protecting air quality.

Vegetation Management and Landscape Design

- a) Protecting threatened species, populations or ecological communities

- b) Protecting wildlife/fauna and habitats
- c) Protecting native vegetation/bushland and biodiversity corridors
- d) Protecting significant trees and landscape
- e) Minimising weed species and infestation
- f) Minimising bushfire risk.

Water Management

- a) Protecting water catchments and surface water and ground water (quality and quantity)
- b) Protecting watercourses, wetlands, groundwater dependent water systems and riparian corridors
- c) Managing flood liable lands
- d) Managing stormwater and drainage patterns.

Land Management

- a) Protecting soils and soil quality/condition
- b) Responding to topography, landform and site stability
- c) Minimising earthworks, excavation and filling
- d) Minimising erosion and sedimentation
- e) Addressing contaminated soils
- f) Addressing salinity
- g) Addressing and avoiding landfill.

Waste Management

- a) Minimising and managing existing and potential waste generation during design and operation, demolition and construction
- b) Managing on-site sewage
- c) Addressing hazardous waste.

2.4 Built Form and Infrastructure Principles

A. Background

In addition to the principles of sustainability, there are a number of built form and infrastructure principles that are supported by more than just economic, social or environmental reasoning. These are sometimes referred to as principles of good 'urban design'.

B. Objectives

The objective of this section is for development proposals to consider and, where relevant, address the following:

- a) Conducting an urban design assessment for major developments;
- b) Ensuring a development addresses Council's built form and urban design goals as set out in the Principles in Section B – DCP Principles of this DCP; and
- c) Ensuring a development responds to the built form constraints and opportunities as set out in Section C1 of this DCP.

C. Urban Design Assessment

The built form and infrastructure principles that should be covered by the contextual analysis and addressed by the design/development (as set out in this DCP) include:

Site Planning and Design Principles

- a) Responding to climatic conditions and maximising passive solar design and energy conservation in the built form
- b) Responding to topography and minimising visual impact
- c) Responding to areas of scenic or visual importance
- d) Providing appropriate height, scale and massing
- e) Providing an articulated built form
- f) Designing for safety and security
- g) Providing accessibility.

Culture and Heritage

- a) Minimising impact on heritage items, conservation areas or landscapes
- b) Providing appropriate development in the vicinity of heritage items
- c) Minimising impact on archaeological sites.

Public Domain

- a) Providing open spaces and recreational opportunities
- b) Providing outdoor dining and trading areas
- c) Enhancing the streetscape
- d) Providing public art opportunities
- e) Providing pedestrian amenity.

Advertising and Signage

- a) Controlling signage and advertising to minimise visual impact and integrate with existing built form and landscape character.

Transport, Access and Parking

- a) Protecting the character of key transport corridors
- b) Integrating access and driveway design into site design
- c) Integrating vehicle parking into site and building design
- d) Integrating alternative transport means such as footpaths and cycleways.

Noise and Vibration

- a) Providing acoustic amenity.

Infrastructure and Services

- a) Providing utilities such as water, sewerage, gas, electricity, telephone
- b) Managing on-site sewage
- c) Controlling the design of infrastructure, engineering and construction works.

2.5 Specific Land Use Principles

In addition to the above controls that apply to all land uses, applicants are required to provide contextual analysis and respond in the design/development to issues described in the specific land use chapters including:

- a) Rural Land Uses
- b) Residential Land Uses
- c) Commercial and Retail Land Uses
- d) Industrial Land Uses
- e) Other Land Uses.

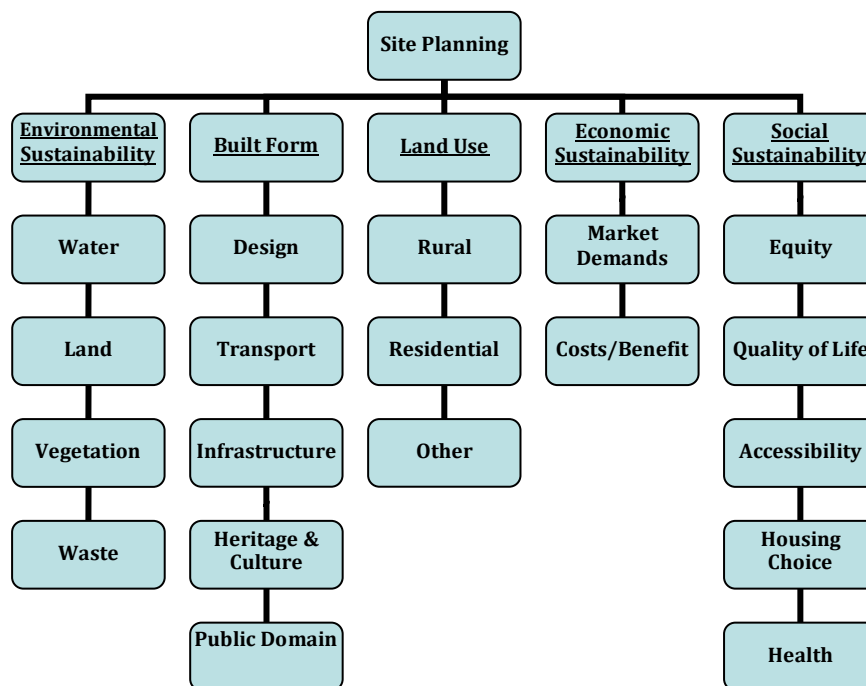
2.6 Site Planning

Planning of a site needs to analyse the opportunities and constraints of a site for a proposed development across a number of broad issues. Figure F5.1 below provides a general guide to the wide range of factors that influence the design, layout, construction and ongoing use and maintenance of a development site. These issues can be broadly categorised as follows.

- a) Social opportunities and constraints;

- b) Economic opportunities and constraints;
- c) Environmental opportunities and constraints; and
- d) Built form and infrastructure opportunities and constraints.

Figure F5.1



2.6.1 Regional Analysis

Regional analysis involves looking at the regional context, including but not limited to:

- a) Regional locational context and urban centres (e.g. nearest major centres);
- b) Regional topography (e.g. general terrain for region);
- c) Regional transport (e.g. major rail and road connections);
- d) Regional environmental systems (e.g. major watercourses and open space connections/facilities); and
- e) Regional infrastructure/services (e.g. major shopping, cultural, civic, educational facilities and services/utilities).

Regional contextual analysis can range from 10 to 100 kilometres from the site (depending on the scale of development, the proposed land uses and its impacts). Regional transport networks, cycle and pedestrian routes, existing land uses, ecological and infrastructure systems, open space networks and visual connections extend beyond the local boundaries and have significant influence on local decision making and appropriate land use outcomes.

Not all of the elements listed above will be relevant for every development or site. It is strongly recommended that you contact Council's Development Services Department to discuss the requirements for your proposal prior to lodgement of a development application.

2.6.2 Local Analysis

Local analysis involves looking at the local context around the site, including but not limited to:

- a) Local locational context (e.g. nearest neighbourhood and local centres);
- b) Local climate (e.g. prevailing winds);
- c) Local infrastructure/services (e.g. local shopping, education, employment, utilities and community facilities);
- d) Local topography (e.g. nearest mountains and valleys);
- e) Local transport (e.g. local rail, bus and pedestrian/bicycle paths);
- f) Local street hierarchy and layout;
- g) Local visual analysis (e.g. visibility of site from local area);
- h) Local environmental systems (e.g. local watercourses, drainage channels, and parks);
- i) Local built form outcomes (e.g. area character);
- j) Local subdivision pattern (e.g. block and road pattern);
- k) Local heritage items, conservation areas or streetscapes; and
- l) Adjacent land uses.

Local contextual analysis can range from 50 metres to 10 kilometres from the site (depending on the scale of development).

Not all of the elements listed above will be relevant for every development or site. It is strongly recommended that you contact Council's Development Services Department to discuss the requirements for your proposal prior to lodgement of a development application.

2.6.3 Site Analysis

Site analysis involves looking at the features of the site and the immediately surrounding area and, where possible, presenting the information in a diagram(s). That diagram should include the following minimum elements:

- a) The site's dimensions and areas;
- b) North point and the site's orientation (e.g. solar access);
- c) Topography (with 0.5 to 1 metre contours);
- d) Road and pedestrian access points;

- e) Services and infrastructure (e.g. electricity poles, stormwater drainage lines, natural drainage, kerb crossings and easements);
- f) Rights of way;
- g) Views to and from the site;
- h) Site overland flows and drainage patterns;
- i) Geotechnical characteristics of the site and suitability for development;
- j) Location of site in relation to shops, community facilities and transport;
- k) Heritage items on site or on adjoining properties;
- l) Form and character of adjacent and opposite buildings in the streetscape, including both sides of any street that the development fronts;
- m) Location and use of any existing buildings or built features on the site;
- n) Location and important characteristics of adjacent public, communal and private open spaces;
- o) Location of significant vegetation on the site;
- p) Location of any significant noise sources on and in the vicinity of the site; and
- q) Assessment of site contamination and/or remediation.

Site analysis includes the site and the immediate context - usually up to 50 to 100 metres in any direction from the site (depending on the scale of development, the proposed land uses and its impacts). Site analysis should include plan and section drawings of the existing features of the site at the same scale as the site plan and landscape plan.

Not all of the elements listed above will be relevant for every development or site. It is strongly recommended that you contact Council's Development Services Department to discuss the requirements for your proposal prior to lodgement of a development application.

2.7 Key Areas with Scenic and Landscape Values

This section provides further information on what is meant by gateways and why they are important.

2.7.1. Gateways

Gateways are distinctive sites or spatial sequences which denote a change in a spatial or visual experience. They serve to reinforce the legibility of the environment. The design of development at these sites requires a special response given the visual sensitivities of these locations.

Gateways have a variety of configurations and scales from regional significance to neighbourhood scale. They can be marked by changes such as land use, density of development, vegetation, topography and space. Gateways should relate to a region's

natural resources, scenic views and local cultural heritage. Some are site specific places of environmental identity and others provide a sense of transition or even anticipation. They can identify entrances and destinations.

Located mostly on thoroughfares that convey significant numbers of people, such as major roads and rail corridors, gateways communicate to people that they are entering a unique or different area. The sense of arrival is important in gaining a first impression of a place, contributing to how we perceive the City and can be a lasting positive experience. A legible gateway defines the edges or boundaries of a place on the continuous and recognisable environmental identity of the road or rail corridor, marking it as a special place or landscape.

It is the combination of particular landscape elements, buildings and the sense of place that contributes to the clear legibility and recognisable environmental identity of gateways. Particular landscape elements that contribute to the overall character and environmental identity of the place include vegetation, street trees, road width, depth of front setbacks and lighting. Views to distant natural features and backdrops provide a context to the site, also contributing to the uniqueness of the place or its 'sense of place'. Gateways should be distinctive, bold and uncomplicated.

Gateways may also be located at sites such as significant community congregation areas, public art installations, municipal buildings and ceremonial places. By distinction, a gateway in this context is not the ubiquitous 'entry feature'. It is not a monument to establish a development, nor a marketing tool to create a distinct boundary between a new development and surrounding developments and land uses.

Types of gateways in the City of Penrith may include:

- a) Crossings;
- b) Village bookends;
- c) Land use interfaces;
- d) Intersections; or
- e) Cultural elements.

Chapter C1 'Site Planning and Design Principles' identifies the gateways in the City of Penrith.

New development must contribute to the importance of these gateway locations through sensitive integration in the gateway setting and excellence of design.

2.8 Vegetation

Contact Council for advice.

2.9 Landscape Technical Specifications

2.9.1 Tree/Vegetation Protection during Construction

Trees, which are to be retained, are to be protected during construction. The method and detail of the protection is to be provided by the consulting arborist who prepared the Tree Management Plan.

2.9.2 Landscape Quality Assurance Standards

1. Landscaping materials

Standards have been developed to guide the manufacture of composts, soil conditioners, potting mixes, topsoils, landscape soil mixes and mulches. The standards detail the processing requirements for these products as well as the physical and chemical requirements of these products.

All of the products required for landscaping works specifications must first meet the requirements of the relevant Australian Standards:

AS 4419 Soils for Landscaping and Garden Use

This Standard sets requirements for bulk density, organic matter, weed content, wettability, pH, electrical conductivity, ammonium toxicity, phosphorous content, dispersability, toxicity, nitrogen drawdown, permeability, soil texture and large particles.

AS 4454 Composts, soil conditioners and mulches

This Standard sets requirements for compliance with National health standards; physical, chemical, pasteurization and composting requirements; weed propagules; packaging; marking and documentation; and product analysis.

One of the most effective ways of achieving environmental sustainability is through specifying the use of landscaping materials that contain a minimum percentage of recycled garden and wood waste, as follows:

Mulches	100%
Composts and soil conditioners	80%
Landscaping, garden mixes and on slab soils	40%
Top dressing mixes	20%
Potting mixes	40%

Quality Assurance of products

Some landscaping products have been certified to the relevant Australian Standard and contain the minimum percentages of composted garden and wood waste as specified above.

In order to ensure the quality and environmental sustainability of products delivered to the site, contractors will be required to:

- a) Source product from any of the certified range of products. For example, the certified 'Garden to Garden' manufacturers are available from Waste Service NSW. Your selected manufacturer must provide you with a Manufacturers Australian Standards Licence Number for that particular product; or
- b) If you source product from outside the Garden to Garden range you must:
 - i) Provide certified proof that the manufacturer you have chosen has a Quality Assurance System in place;

- ii) Provide a current test certificate from an approved independent laboratory indicating full compliance with all the physical and chemical requirements (including toxicity and containment levels) of the relevant Australian Standard for the batch from which the product has been sourced; and
- iii) Provide records that will satisfy the principal's representative that the products provided contain the minimum percentage of recycled garden and wood waste as outlined in the specification.

2. Plant Material

Plant substitutions may only be made with written consent of those preparing/designing Landscape Plans. All plants are to be obtained from a nursery located in an area having a similar climate to the site or hardened off for a minimum six week period. All plant material is to be:

- a) True to species and sizes;
- b) Healthy, of good form, not soft or forced;
- c) With large robust root systems that are not root bound;
- d) Free from disease and insect pests; and
- e) Trees are to have a single leading shoot and conform to 'NATSPEC Specifying trees - a guide to assessment of tree quality' (Clark 2003). The NATSPEC guide provides a list of important characteristics which should be checked when assessing the quality of tree stock, and briefly explains why they matter.
- f) In line with current standards.

3. Before planting

Pre-planting

Parts of the site to be landscaped are to have all weeds removed prior to landscaping work commencing. Use hand tools on smaller weeds and, as a last resort, spot application of herbicide to larger, perennial and vigorous weeds.

Backfill retaining walls and make other garden beds after brickwork, electrical and drainage works and adjoining pavements have been completed. Water to settle the soil down and eliminate air pockets. This must be done with a fine gentle spray to prevent surface erosion. If planting is delayed by more than one week from backfilling or other soil preparation then mulch is to be applied to each area left unplanted.

Hardening off plants

Plant root systems shall be maintained moist at all times with particular attention being paid to watering during the onsite installation period before and during planting`.

4. Further Information and Contacts

General Contacts

- a) Australian Institute of Horticulture

- b) Australian Institute of Landscape Architects
- c) Australian Institute of Landscape Designers and Managers
- d) NSW Landscape Contractors Association
- e) National Arborists Association of Australia.

Government Agencies and Authorities

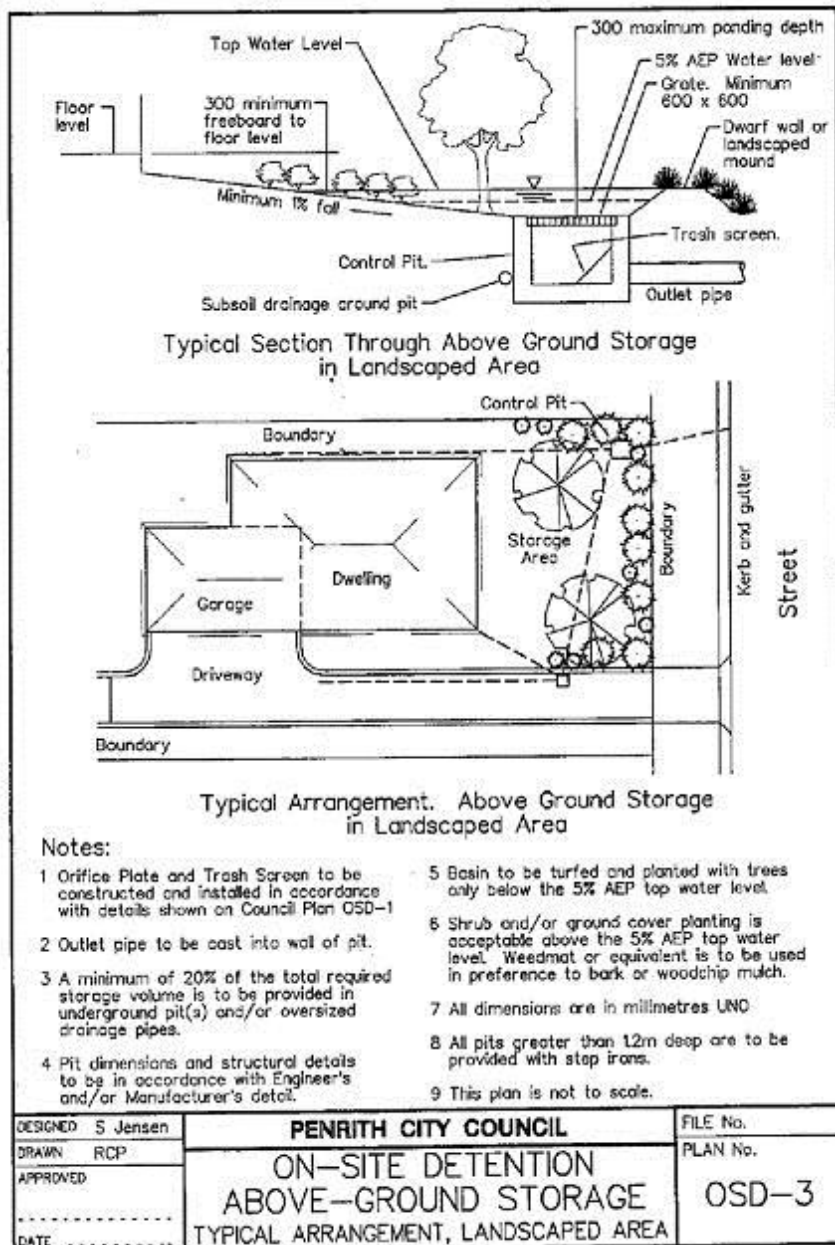
- a) NSW Department of Planning and Environment
- b) NSW Office of Environment and Heritage
- c) NSW Environment Protection Authority.

Non-government agencies

- a) Australian Association of Bush Regenerators
- b) Australian Garden History Society
- c) Australian Plant Society
- d) Landcare Australia
- e) Landcare/Bushcare/Coastcare
- f) Local Government and Shires Association
- g) National Trust.

2.9.3 Above Ground On Site Stormwater Detention and Landscaping

Figure F5.3



2.10 Green Roofs and Roof Gardens

A. Background

Roof space has significant potential to contribute to the amenity, comfort and sustainability of our cities and surrounding areas. Green roofs are one way in which roof spaces can be designed, or retrofitted, to enhance urban areas.

Green roofs are divided into two broad categories, extensive and intensive. Intensive gardens are similar to traditional parks or gardens, but are raised above the ground level, at the top of buildings or at an intermediate level. Extensive gardens are typically not intended for recreational use, are comprised of hardy, low maintenance ground cover species covering large areas of roof space.

Extensive	Intensive
<ul style="list-style-type: none">• Have shallow layer of soil (less than 15cm)• Use hardy groundcover plants (drought and heat tolerant)• Entire area often not suitable for recreational use• Require minimal maintenance• In many cases existing buildings can be retrofitted to enable installation	<ul style="list-style-type: none">• Similar to traditional gardens• Use deeper soils to enable planting of trees and shrubs• Often used as open space or recreation• Are more expensive to construct and maintain• Require purpose built structures and reinforcing due to increased weight• Can incorporate decorative paving and shade structures

B. Benefits

Green Roofs (extensive and intensive) provide a range of benefits, directly (to the individual building) and indirectly (contributing to improved amenity within the urban area).

These benefits can be grouped as amenity, environmental and economic benefits.

1. Amenity Benefits

Leisure and functional open space – In urban environments with limited areas of open space, intensive green roofs and elevated gardens provide recreational space.

Visual amenity value – A significant benefit of intensive and extensive green roofs is the enhanced view and amenity from overlooking buildings.

2. Environmental Benefits

Air quality - Vegetation has the capacity to filter out fine air-borne particles and gaseous pollutants. This process is increasingly beneficial as the cumulative area of vegetation increases.

Ecological value - The enhancement of biodiversity through the use of green roofs is closely linked to the type of vegetation being used and its location.

Water management - Green roofs provide a stormwater detention and retention function, slowing runoff of rainfall into stormwater systems. The transpiration of water held in the soil can also reduce the volume of stormwater runoff.

Reduced 'heat island effect' - The urban heat island effect is localised warming due to the increase in the large amounts of paved and dark coloured surfaces, such as roads, roofs and car parks as a result of urban development. Increasing vegetation and reducing the hardscape on site will assist the urban heat island effect.

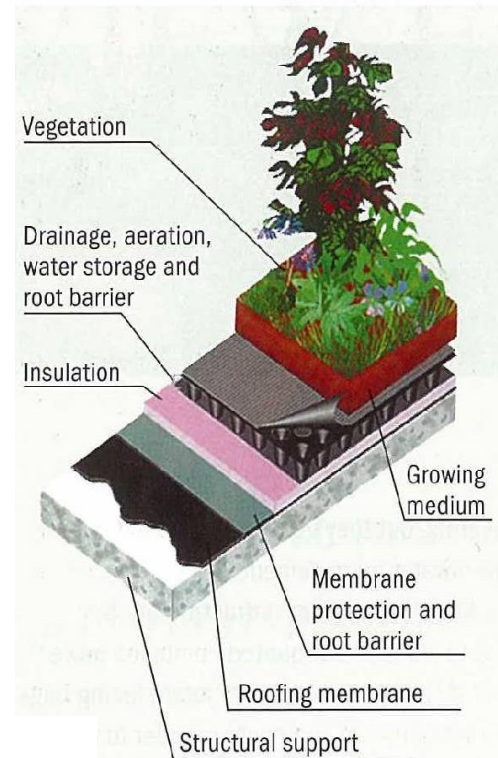
3. Economic Benefits

Building insulation and energy efficiency - One of the most important tangible benefits that green roofs offer is reduced maintenance and cooling costs due to increased building insulation and energy efficiency.

Employee satisfaction - Green roofs provide various social benefits by providing 'green relief' to the urban landscape. Green roofs have the potential to increase employee satisfaction by enhancing their surroundings. This, in turn, could improve productivity (*Growing Up-The Blueprint to Green Proof Melbourne*).

Figure F5.4: Green roof construction

Green Roofs: View from the Top (July 2007) Urban: sustainable solutions for a developing Australia (p16)



Green roof design, construction and maintenance

A green roof is comprised of a series of layers that provide an environment suitable for plant growth and protecting the underlying building structure, shown in Figure F5.4. Appropriate design, construction and maintenance is critical to ensure success. See the following links for further information in this regard: greenroofs.wordpress.com/ and commons.bcit.ca/greenroof/case.html.

C. Further information

Green Roofs Australia (www.greenroofs.wordpress.com) has further information on a range of case studies and examples of green roofs in Australia and internationally, as well as information about technical guidelines and manuals.

2.11. Contaminated Lands

2.11.1. List of potentially contaminating activities

This list is for guidance only as examples of activities that can cause contamination of a site. The list is not exhaustive.

Some activities that may cause contamination:

• acid/alkali plant and formulation	• agricultural/horticultural activities
• airports	• asbestos production and disposal
• chemicals manufacture and formulation	• defence works
• drum re-conditioning works	• dry cleaning establishments
• electrical manufacturing (transformers)	• electroplating and heat treatment premises
• engine works	• explosives industry
• gas works	• iron and steel works
• landfill sites	• metal treatment
• mining and extractive industries	• oil production and storage
• paint formulation and manufacture	• pesticide manufacture and formulation
• power stations	• railway yards
• scrap yards	• service stations
• sheep and cattle dips	• smelting and refining
• tanning and associated trades	• waste storage and treatment
• wood preservation	

Source: ANZECC and NHMRC 1992, Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites.

2.11.2. List of industries and chemicals used

This list is for guidance only as examples of activities that can cause contamination of a site. This list is not exhaustive.

Industry	Type of Chemical	Associated Chemicals
Agricultural/ horticultural activities		See fertiliser, insecticides, fungicides, herbicides under 'Chemicals manufacture and use'.
Airports	Hydrocarbons Metals	Aviation fuels Particularly aluminium, magnesium, chromium
Asbestos production and disposal		Asbestos
Battery manufacture and recycling	Metals Acids	Lead, manganese, zinc, cadmium, nickel, cobalt, mercury, silver, antimony Sulphuric acid
Breweries/distilleries	Alcohol	Ethanol, methanol, esters
Chemicals manufacture and use	Acid/alkali	Mercury (chlor/alkali), sulphuric acid and nitric acids, sodium and calcium hydroxides
	Adhesives/resins	Polyvinyl acetate, phenols, formaldehyde, acrylates, phthalates
	Dyes	Chromium, titanium, cobalt, sulphur and nitrogen organic compounds, sulphates, solvents
	Explosives	Acetone, nitric acid, ammonium nitrate, pentachlorophenol, ammonia, sulphuric acid, nitroglycerine, calcium cyanamide, lead, ethylene glycol, methanol, copper, aluminium, bis(2-ethylhexyl) adipate, dibutyl phthalate, sodium hydroxide, mercury, silver
	Fertiliser	Calcium phosphate, calcium sulphate, nitrates, ammonium sulphate, carbonates, potassium, copper, magnesium, molybdenum, boron, cadmium
	Flocculants	Aluminium
	Foam production	Urethane, formaldehyde, styrene
	Fungicides	Carbamates, copper sulphate, copper chloride, sulphur, chromium, zinc
Herbicides	Ammonium thiocyanate, carbamates, organochlorins, organophosphates, arsenic, mercury, triazines	

Industry	Type of Chemical	Associated Chemicals
	Paints - Heavy Metals - Solvents	Arsenic, barium, cadmium, chromium, cobalt, lead, manganese, mercury, selenium, zinc, titanium Toluene oils natural (e.g. pine oil) or synthetic
	Pesticides - Active ingredients - Solvents	Arsenic, lead, organochlorines, organophosphates, sodium tetraborate, carbamates, sulphur, synthetic pyrethroids Xylene, kerosene, methyl isobutyl ketone, amyl acetate, chlorinated solvents
	Pharmaceutical - Solvents	Acetone, cyclohexane, methylene chloride, ethyl acetate, butyl acetate, methanol, ethanol, isopropanol, butanol, pyridine methyl ethyl ketone, methyl isobutyl ketone, tetrahydrofuran
	Photography	Hydroquinone, sodium carbonate, sodium sulphite, potassium bromide, monomethyl para-aminophenol sulphate, ferricyanide, chromium, silver, thiocyanate, ammonium compounds, sulphur compounds, phosphate, phenylene diamine, ethyl alcohol, thiosulphates, formaldehyde
	Plastics	Sulphates, carbonates, cadmium, solvents, acrylates, phthalates, styrene
	Rubber	Carbon black
	Soap/detergent - General	Potassium compounds, phosphates, ammonia, alcohols, esters, sodium hydroxide, surfactants (sodium lauryl sulphate), silicate compounds
	- Acids	Sulphuric acid and stearic acid
	- Oils	Palm, coconut, pine, teatree
	Solvents - General - Hydrocarbons - Chlorinated	Ammonia e.g. BTEX (benzene, toluene, ethylbenzene, xylene) e.g. trichloroethane, carbon tetrachloride,

Industry	Type of Chemical	Associated Chemicals
	organics	methylene chloride
Defence works		See explosives under 'Chemicals manufacture and use', 'Foundries', 'Engine works', 'Service stations'
Drum reconditioning		See 'Chemicals manufacture and use'
Dry cleaning		Trichlorethylene and 1,1,1-trichloroethane Carbon tetrachloride Perchloroethylene
Electrical		PCBs (transformers and capacitors), solvents, tin, lead, copper, mercury
Engine works	Hydrocarbons Metals Solvents Acids/Alkalis Refrigerants Antifreeze	Chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons Ethylene glycol, nitrates, phosphates, silicates
Foundries	Metals Acids	Particularly aluminium, manganese, iron, copper, nickel, chromium zinc, cadmium and lead, and oxides, chlorides, fluorides and sulphates of these metals Sulphuric and phosphoric Phenolics and amines Coke/graphite dust
Gas works	Inorganics	Ammonia, cyanide, nitrate, sulphide, thiocyanate Aluminium, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium, zinc
	Organics	BTEX, phenolics, PAHs and coke
Iron and steel works		BTEX, phenolics, PAHs, metals and oxides of iron, nickel, copper, chromium,

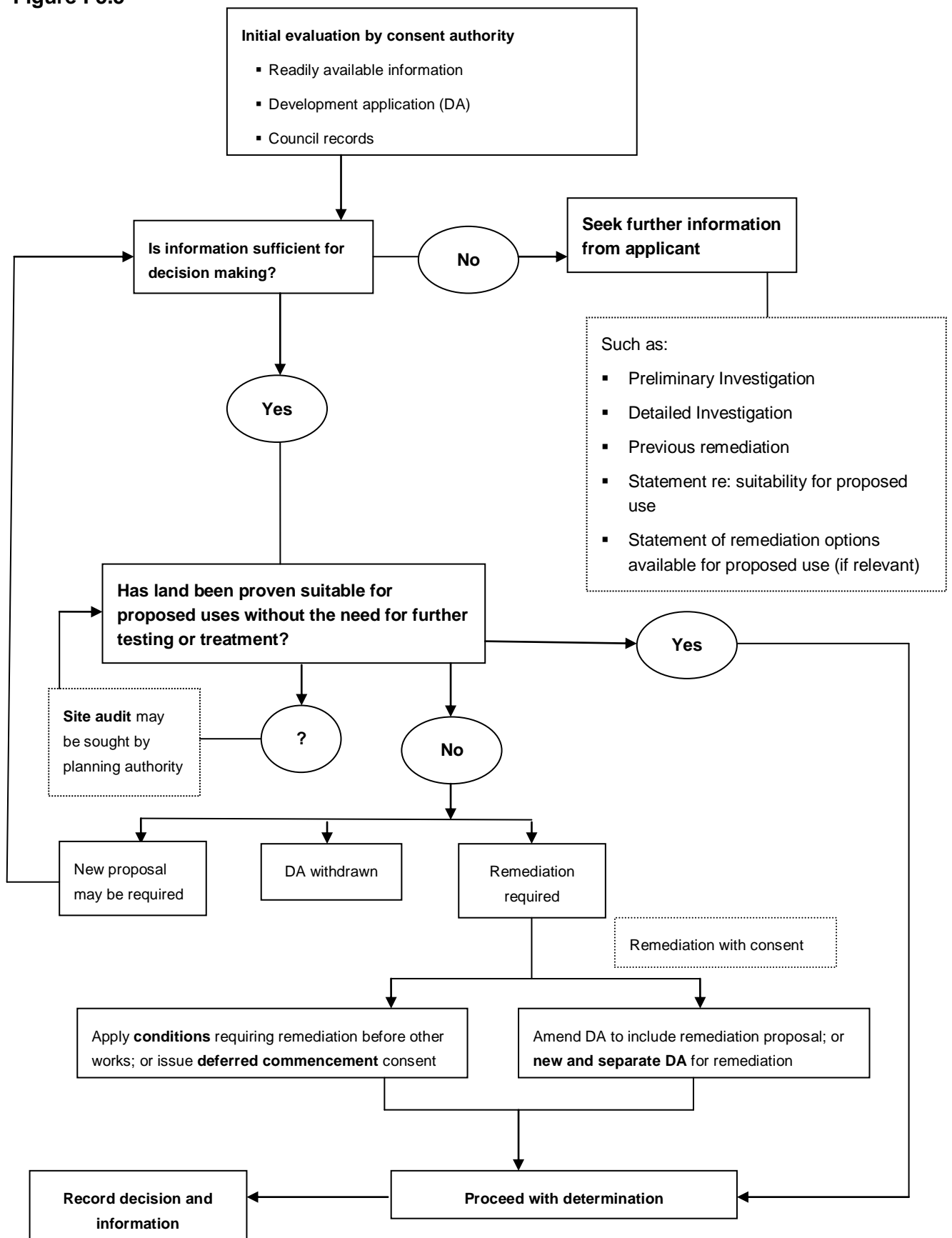
Industry	Type of Chemical	Associated Chemicals
		magnesium manganese and graphite
Landfill sites		Alkanes and ammonia, sulphides, heavy metals, organic acids
Marinas	Antifouling paints	See engine works, electroplating metals under 'Metal treatments' Copper, tributyltin (BTB)
Metal treatments	Electroplating - Metals - Acids - General Liquid carburizing baths	Nickel, chromium, zinc, aluminium, copper, lead, cadmium, tin Sulphuric, hydrochloric, nitric, phosphoric Sodium hydroxide, 1,1,1-trichloroethane, tetrachloroethylene, toluene, ethylene glycol, cyanide compounds Sodium, cyanide, barium, chloride, potassium chloride, sodium chloride, sodium carbonate, sodium cyanate
Power stations		Asbestos, PCBs, fly ash metals, water treatment chemicals
Printing shops		Acids, alkalis, solvents, chromium (see photography)
Railway yards		Hydrocarbons, arsenic, phenolics (creosote), heavy metals, nitrates and ammonia
Scrap yards		Hydrocarbons, metals, solvents
Service stations and fuel storage facilities		Aliphatic hydrocarbons BTEX (i.e. benzene, toluene, ethylbenzene, xylene) PAHs Phenols Lead
Sheep and cattle dips		Arsenic, organochlorines and organophosphates, carbamates, and synthetic pyrethroids
Smelting and refining		Metals and the fluorides, chlorides and oxides of copper, tin, silver, gold, selenium, lead, aluminium

Industry	Type of Chemical	Associated Chemicals
Tanning and associated trades	Metals General	Chromium, manganese, aluminium Ammonium sulphate, ammonia, ammonium nitrate, arsenic phenolics, formaldehyde, sulphide, tannic acid
Water and sewerage treatment plants	Metals	Aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, fluoride, lime and zinc
Wood preservation	Metals	Chromium, copper, arsenic Naphthalene, ammonia, pentachlorophenol, dibenzofuran, anthracene, biphenyl, ammonium sulphate, quinoline, boron, creosote, organochlorine pesticides

Source: Appendix 1 of the Australian Standard AS4482.1 – 2005 – Guide to the investigation and sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.

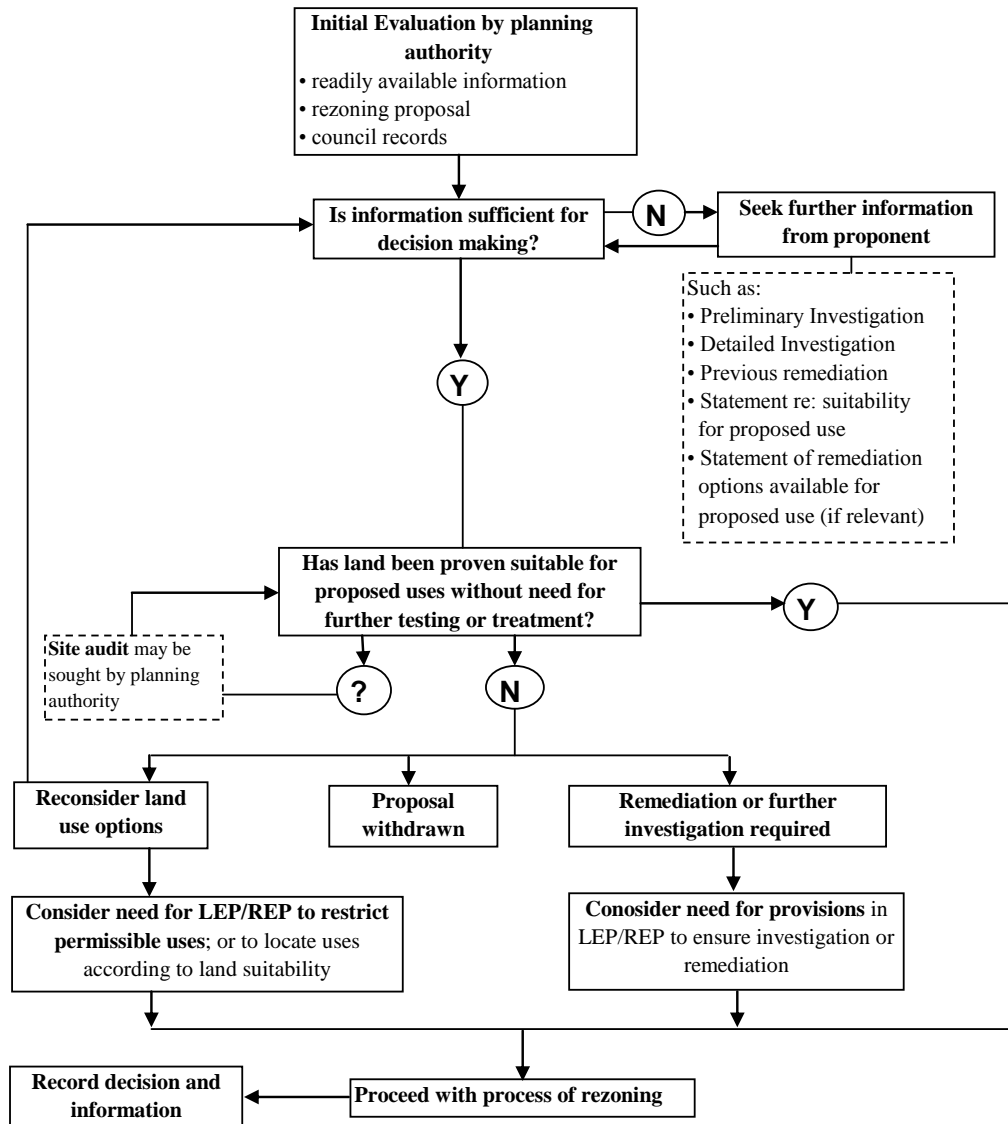
2.11.3 Options available in the development application process

Figure F5.5



2.11.4 Options available in the rezoning process

Figure F5.6



2.12 Waste Generation Rates

Generation Rates – Construction

When estimating wastes for a waste management plan, it is important to remember that no two building sites are the same and that the volumes of waste generated depend on factors such as the design of the building, the waste minimisation practices in place, and the skill of the tradespersons involved.

It is for this reason that applicants are only required to provide estimate volumes on the waste management plan. These estimates can be later checked against recycling and disposal receipts.

There are many techniques that can be used to estimate volumes for construction and demolition wastes. The method detailed below is a simple yet accurate method of estimating waste quantities for a waste management plan:

- a) Quantify materials for the project;
- b) Use margins normally allowed for ordering; and
- c) Copy these quantities across to your waste management plan.

Generation Rates – Residential

The volumes in Table F5.7 are provided as a general guide to assist in the estimation of wastes for the ongoing use of a residential development.

It is recommended that applicants confirm details of Council's current waste and recycling services prior to designing waste storage areas.

Table F5.7

Waste Stream	Allowance
Garbage	80 L/Unit/Week
Co-mingled Recycling	40 L/Unit/Week
If paper and containers are collected separately	
Paper Recycling	25 L/Unit/Week
Containers Recycling	15 L/Unit/Week

Generation Rates - Commercial

The volumes in Table F5.8 are provided as a general guide to assist in the estimation of wastes for the ongoing use of various commercial type developments.

Table F5.8

Type of Premises	Waste Generation	Recycling Generation
Backpackers accommodation	40L/occupant/week	20 litres/occupant/week
Boarding house, Guest house	60L/occupant/week	20 litres/occupant/week
Hotel or motel accommodation	5L/bed/day 50L/100m ² /bar area/day 10L/1.5m ² /of dining area/day	50L/100m ² /of bar and dining areas/day
Registered club	50L/100m ² /bar area/day 10L/1.5m ² /dining area/day	50L/100m ² /of bar and dining areas/day
Food Premises		
- Butcher	80L/100m ² floor area/day	Discretionary
- Delicatessen	80L/100m ² floor area/day	Discretionary
- Fish shop	80L/100m ² floor area/day	Discretionary
- Greengrocer	240L/100m ² /day	120L/100m ² /day
- Restaurants	10L/1.5m ² floor area/day	2L/1.5m ² /day dining
- Supermarket	240L/100m ² floor area/day	240L/100m ² /day
- Takeaway	80L/100m ² floor area/day	Discretionary
Offices	10L/100m ² /day	10L/100m ² /day
Retail		
(other than food sales)	50L/100m ² floor area/day	25L/100m ² floor area/day
Shop less than 100m ² floor area	50L/100m ² floor area/day	50L/100m ² floor area/day
Shop over 100 m ² floor area	60L/100m ² floor area/day	Discretionary
Showrooms	40L/100m ² floor area/day	10L/100m ² floor area/day

3. Other Guidelines, Documents and Technical Information

Penrith DCP 2014 makes reference to a range of publications and other technical information produced by organisations and agencies other than Penrith City Council. The following is not an exhaustive or definitive list of available information, however, serves as a starting point for meeting the requirements of Penrith DCP 2014.

3.1. NSW State Legislation

The primary legislation for planning in New South Wales is the *Environmental Planning and Assessment Act 1979*, with further administrative and operational information detailed in the *Environmental Planning and Assessment Regulation 2000*.

In addition, there is a range of New South Wales (and Commonwealth) legislation and/or regulation that may be relevant to your land use or development. All legislative requirements for your land use or development must be met. Information about the currency and status of legislation is available from the NSW Parliamentary Counsel's Office. The official NSW Government site for online publication of legislation is www.legislation.nsw.gov.au. Each NSW Government Department is able to advise of the legislation it administers, and of the requirements under that legislation. You should therefore contact the relevant Department directly. Information about NSW Government Departments can be obtained from the NSW Government Directory on www.directory.nsw.gov.au.

3.2. Commonwealth Legislation

A number of Commonwealth Acts such as the *Environment Protection and Biodiversity Conservation Act 1999* may be relevant. See <http://www.comlaw.gov.au/>.

3.3. State Environmental Planning Policies (SEPP)

State Environmental Planning Policies are environmental planning instruments prepared by the NSW Department of Planning and Environment and made by the Minister for Planning. Unless otherwise stated, the requirements of a SEPP will generally have precedence over Local Environmental Plans (LEPs) or Development Control Plans (DCPs).

The SEPP documents can be obtained from the NSW Government legislation website (www.legislation.nsw.gov.au).

Questions in relation to a particular SEPP should be referred to the NSW Department of Planning and Environment.

3.4. Residential Flat Design Code 2002

Residential Flat Design Code 2002 is available from the NSW Department of Planning and Environment and may also be accessed from www.planning.nsw.gov.au.

The Residential Flat Design Code is a resource to enable councils, planners, developers and architects to improve residential flat design. The Code sets broad parameters for good residential flat design by illustrating the use of development controls and consistent guidelines.

The Design Code supports the ten design quality principles identified in *State Environmental Planning Policy No. 65 — Design Quality of Residential Flat Development*. It supplies detailed information about how development proposals can achieve these principles.

With the other Design Quality Program initiatives, the Residential Flat Design Code provides comprehensive guidance to improving the design quality of residential flat buildings.

3.5 Certification Systems

3.5.1 National Australian Built Environment Rating System

NABERS is a national rating system that measures the environmental performance of Australian buildings, tenancies and homes. NABERS measures the energy efficiency, water usage, waste management and indoor environment quality of a building or tenancy and its impact on the environment. For information on NABERS, see www.nabers.gov.au.

3.5.2 Green Star

Green Star is an environmental rating scheme that provides formal accredited evaluation of the environmental design and achievements of buildings across nine categories (management, indoor environment quality, energy, transport, water, materials, land use and ecology, emissions, innovation). Green Star provides certified ratings of 4, 5 or 6 Stars. Information about Green Star is available from <http://www.gbca.org.au/green-star/>.

The Green Star certification system was developed and is administered by the Green Building Council of Australia, a not-for-profit organisation.

3.5.3 Building Sustainability Index (BASIX)

Information about BASIX is available from www.basix.nsw.gov.au. BASIX is online program that assesses a house or unit design, and compares it against energy and water reduction targets. The design must meet these targets before a BASIX Certificate can be printed. Every development application for a new home must be submitted to Council with a BASIX Certificate.

BASIX uses information such as site location, house size, type of building materials and fittings for hot water, cooling and heating. It is important to realise that the commitments made during the BASIX process are shown on the final certificate and must be marked on the plans, and adhered to during the building process. Any changes made to the house design means another BASIX assessment must be completed and a new BASIX Certificate submitted to Council.

BASIX was introduced by the NSW Government to ensure homes are built to be more energy and water efficient. BASIX is free and allows users to determine how they will meet targets from a wide range of options such as rainwater tanks, water-saving fixtures, improved insulation, passive solar orientation, natural lighting and native plants for gardens.

3.6 Native Vegetation of Western Sydney

The Native Vegetation of the Cumberland Plain Maps and Interpretation Guidelines were prepared by the NSW National Parks and Wildlife Service (part of the Office of Environment and Heritage). The maps and guidelines can be downloaded from the OEH website (www.environment.nsw.gov.au).

3.7 Threatened Species Assessment Guidelines – The Assessment of Significance (2007)

The *Threatened Species Assessment Guidelines – The Assessment of Significance* are designed to help applicants of a development or activity with interpreting and applying the factors of significance assessment. The aim of the guidelines is to help ensure that a consistent and systematic approach is taken when determining whether an action, development or activity is likely to significantly affect threatened species, populations or ecological communities, or their habitats either directly or indirectly. These guidelines are available from the OEH website (www.environment.nsw.gov.au).

3.8 Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (2009)

The Significant Impact Guidelines provide overarching guidance on determining whether an action is likely to have a significant impact on a matter protected under national environment law; i.e. the *Environment Protection and Biodiversity Conservation Act 1999*. These guidelines are available from the Commonwealth Department of Environment website (www.environment.gov.au).

3.9 Planning for Bushfire Protection

Prepared by the NSW Rural Fire Service, 'Planning for Bushfire Protection' provides information on the planning matters that must be considered when developing residential uses in residential, rural residential, rural and urban locations on sites in close proximity to areas likely to be affected by bushfire events. The Rural Fire Service 'Guidelines for Single Dwelling Development Applications' has been designed to assist applicants meet the requirements of 'Planning for Bushfire Protection' when submitting a development application for a single dwelling. These documents can be downloaded from the Rural Fire Service website (www.rfs.nsw.gov.au).

3.10 Water extraction licenses and approvals

The NSW Office of Water is responsible for the overall management of freshwater resources in NSW including water in rivers, streams and lakes (surface water), and water held under the ground in aquifers (groundwater). For further information, see www.water.nsw.gov.au.