Economic Development Queensland

Non-resident worker accommodation

PDA guideline no. 3

March 2014

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Source of photo's used on the front cover: The MAC Services Group Ltd Accommodation Villages

Introduction

The need for this guideline

The sustained growth of resource sector in regional Queensland has put significant pressure on local towns in resource areas, both in terms of responding to the direct needs of the workforce and in dealing with the flow-on effects.

An immediate effect of increased activity in the resource sector is usually a sharp rise in the demand for accommodation in these towns, leading to significant pressure on the cost and availability of existing accommodation. There is also demand for the provision of special-purpose accommodation to cater for the associated large non-resident workforce.

Non-resident worker accommodation, often referred to simply as "mining camps", varies according to the needs of the occupants, the regulatory provisions in local government planning schemes and the styles of accommodation provided by the individual providers.

The quality of these developments has varied, as have their impacts on the local communities. In many cases they have been perceived as having negative impacts on the towns and their residents. Poor quality buildings and associated works, lack of integration with the existing building form in the town, provision of services and facilities that compete with those provided in the town, or conversely excessive demands being placed on the town's existing services and facilities, are some of the perceptions commonly associated with non-resident worker accommodation facilities.

The Minister for Economic Development Queensland (MEDQ) is committed to providing high quality, diverse and affordable communities in areas declared as priority development areas (PDA). It is in these areas that the MEDQ is responsible for the planning and management of development and, also to varying extents, undertaking development. PDAs have been declared in a number of resource towns, including the towns of Blackwater and Moranbah where non-resident worker accommodation is an important form of residential development.

With respect to worker accommodation within resource town PDAs, the MEDQ's role is to prepare development schemes that will integrate any suitable accommodation that is proposed, by ensuring it is appropriately located and by applying development standards that achieve a high level of amenity.

The purpose of this guideline

The guideline is intended to assist in delivering high quality non-resident worker accommodation for the benefit of the occupants and the towns that host the accommodation.

The purpose is to:

- outline an approach for the planning and design of non-resident worker accommodation in a way that encourages innovative and high quality development outcomes
- provide guidance for the interpretation and application of interim land use plans (ILUPs) and development schemes.

Terminology: non-resident worker accommodation

In the interests of brevity, non-resident worker accommodation is often referred to in this guideline using the shortened term of "accommodation facility".

Relationship with other guidelines

PDA guideline no. 01 - *Residential 30* and PDA guideline no 04 - *Residential infill in the Blackwater PDA* are not applicable to Non-resident worker accommodation within a PDA.

PDA guideline no. 02 - *Accessibility* does not apply to forms of accommodation that are single person's quaters. However, if the accommodation proposal incorporates other forms of housing, then the Accessibility Guideline may be applicable.

PDA guideline no. 16 - *Housing*

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Types of non-resident worker accommodation

Non-resident worker accommodation may take a variety of forms and scales, including large camp-style facilities, in-fill micro camps and apartment or motel type developments in a range of scales. Some accommodation facilities may also include a mix of permanent and temporary housing forms, and housing for singles, couples or families.

Dining, laundry and recreational facilities may be provided on site, perhaps in a number of separate, purpose-built facilities, or for smaller facilities in a shared group house. Worker accommodation may also be combined with other uses, such as restaurants, gyms or laundromats, where those facilities are available for the general public as well as occupants of the accommodation. Worker accommodation facilities may also vary in terms of the intended period of operation, for example, from one to five to ten years or more, depending on whether the facilities cater for construction or operational workforces.

This guideline caters for non-resident worker accommodation in its various forms and circumstances. However, some design benchmarks, such as those for landscaping, internal access, parking, recreation areas and open space, have been determined having particular regard to larger-scale, camp-styles facilities. For other forms of accommodation facilities, other approaches or measures may be appropriate. This may be demonstrated in a particular case and considered acceptable in those circumstances. See the explanation of design benchmarks in part 4 of this guideline.

However, in an urban setting, the intended period of operation of an accommodation facility does not offer a strong basis for lower standards of provision. This applies particularly to potential impacts of the proposed facility on local amenity. Instead, it may be appropriate to consider more cost-effective and innovative options for achieving the planning and design criteria.

For larger-scale camps, over 100 rooms, a contribution towards housing affordability will be required.

Who this guideline is for

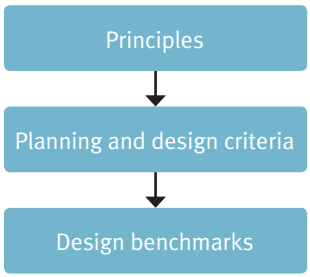
This guideline has been prepared specifically for use by planners, urban designers, resource companies and developers responsible for preparing proposals for non-resident worker accommodation in resource town PDAs.

It is recommended this guideline be used when preparing proposals and associated development applications for approval of proposed non-resident worker accommodation in PDAs. Such accommodation is likely to be associated with the resource sector, but could also be in association with another type of activity, such as the construction of major infrastructure.

In addition, the guideline may be beneficial to those preparing development applications for non-resident worker accommodation outside PDAs, as well as local governments seeking to address this type of accommodation in their planning schemes.

Structure of the guideline

The guideline is structured in relation to two overarching principles. For each principle there is a separate part of the guideline within which a number of planning and design criteria are identified and discussed under one or more topics. These in turn are supported by one or more sets of design benchmarks.



There are also separate parts of the guideline that provide:

- an outline of the MEDQ approach to planning and design, and the relationship between the planning and design of a proposed use of land, and how the use will operate
- application information
- references and
- a glossary of terms used in the guideline.

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Principles

This guideline has two overarching principles sought to be achieved by non-resident worker accommodation[1].

Principle 1:

- non-resident worker accommodation is located and designed to be integrated within or on the edge of the town

Principle 2:

- non-resident worker accommodation adequately provides for occupants and has a high level of on-site amenity

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1 These principles are identified as Housing and Community PDA-Wide Criteria in the respective Development Schemes for Blackwater and Moranbah PDAs.

Planning, design and operation

Planning and design process

The MEDQ development assessment process is in accordance with the provisions of the *Economic Development Act 2012*.

Development assessment is performance-based to encourage both innovation and high quality development outcomes. Performance-based approaches to regulation demand high standards from all parties involved in the assessment process.

The MEDQ seeks to work actively with development proponents throughout the development process, well before the formal development application is lodged, from the concept or pre-design phase and continuing through the assessment process to ensure a high quality outcome is achieved. This approach provides the opportunity to discuss, develop and refine development proposals in ways that meet the expectations of proponents while achieving high quality planning and development outcomes sought by the MEDQ.

This facilitated development process is the cornerstone of performance-based planning by the MEDQ and underpins this guideline and the associated regulatory provisions. This guideline is intended to complement that facilitated process by providing guidance and points for discussion with the MEDQ from concept through to detailed design.

Operation

An integral aspect of planning and designing a proposed use of land, is how the use will operate. For example, in the case of non-resident worker accommodation, the occupancy of separate accommodation units, which is related to work rosters and practices for sharing units between workers on different rosters, has implications for the number of units provided for the workforce being catered for. Whether workers fly in and fly out to work in a mine, or drive in or drive out, also has design implications, for example, in terms of the number of car parks that need to be provided. Whether workers are bused between their accommodation and the worksite has implications for whether bus drop off and pick up areas are required on site.

Landscaping is an important element in ensuring a high level of amenity both within the accommodation facility and in relation also to adjoining development. Operational matters in this regard are likely to relate to implementing a planting program, and also a long term maintenance plan to ensure the landscaping continues to play its essential role in achieving a high level of amenity.

Other matters which may be the subject of ongoing management and operational arrangements, depending on the circumstances of particular proposals, include decommissioning, any necessary arrangements for co-located uses, or potentially monitoring of impacts on the surrounding community and the local economy. Operational matters may be reflected in conditions of development approval, including perhaps the endorsement of detailed management plans. The MEDQ by-laws may also have a role in managing ongoing operational matters.

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Planning and design criteria and design benchmarks

Planning and design criteria

The planning and design criteria[2] for each principle together contribute towards achieving that principle. For Principle 1, six criteria are identified, and for Principle 2, a further two criteria.

Principle 1: Non-resident worker accommodation is located and designed to be integrated within or on the edge of town

Criterion 1.1	Identifying a suitable location
Criterion 1.2	Designing to connect to services, facilities and networks in surrounding areas
Criterion 1.3	Preserving amenity to achieve desirable integration
Criterion 1.4	Planning for changing circumstances over time
Criterion 1.5	Catering for non-residential uses and facilities
Criterion 1.6	Providing access to infrastructure and community facilities and services

Principle 2: Non-resident worker accommodation adequately provides for occupants and has a high level of on-site amenity

Criterion 2.1	Responding to the characteristics of the workers
Criterion 2.2	Providing for the safety and comfort of occupants

Design benchmarks

For each planning and design criterion, design benchmarks are identified to provide further guidance on how the criterion may be achieved.

It is important to note that design benchmarks are not mandatory compliance standards. Rather, they are reference points or indicators for planners and designers to consider when addressing planning and design issues. Alternative approaches and measures may be proposed and accepted. It is important when an alternative design approach or measure is proposed, to consider:

- how that alternative contributes to achieving the relevant criterion, and
- the reasons why the alternative is an acceptable or better option in the circumstances.

If a development scheme states a standard that is different from the design benchmark in this guideline, the development scheme standard prevails.

A development scheme may also apply additional criteria.

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2 These planning and design criteria are identified as PDA-wide criteria for Neighbourhood, infill, block and lot design in the respective development schemes for the Blackwater and Moranbah PDAs.

Principle 1:

Non-resident worker accommodation is located and designed to be integrated into the town

Integration into the town is about more than just the physical design and orientation of buildings and activities on a site. It is important that non-resident worker accommodation is physically integrated as well as, to the extent practicable, contributing to the economic activity and community values of the town.

Proposed sites for this form of accommodation need also to be suitable in terms of their physical characteristics and accessibility to existing or logical sequencing of physical infrastructure and community facilities and services.

Accommodation proposals need to ensure that there is minimal impact on visual, environmental and community values, as well on transport and other infrastructure. Development on the site also needs to be oriented and designed to ensure that impacts on the accommodation facility arising from adjoining uses or transport infrastructure are avoided or minimised.

Another consideration is the scale of proposed non-resident worker accommodation, in terms of any potential to dominate residential development in a particular locality within a town. In some circumstances it may be appropriate to consider splitting the proposed number of rooms between separate sites, or avoiding sites close to other accommodation facilities.

The underpinning context is also integral to the planning and design process. This includes knowledge of assumptions such as workforce composition, size, occupancy patterns and changes over time. These can all affect planning for expected growth in the town, how the town functions, and the adequacy of the town's services, facilities and infrastructure.

The facilities and uses provided on the site to meet the needs of the occupants may also be able to complement and support existing town services.

Criterion 1.1 Identifying a suitable location

The circumstances of each resource town are different, as are the size and characteristics of the non-resident workforce that needs to be accommodated. Accordingly, identifying the most suitable location for non-resident worker accommodation needs to be determined on a case-by-case basis having regard to a range of factors, including:

- the size of the workforce to be accommodated and the scale of new development relative to the scale of existing or planned development
- the availability of suitable land within or adjoining an existing town (e.g. suitability in terms of size of land parcels, compatibility with adjoining uses, access to physical infrastructure)
- the capacity of existing infrastructure and services to accommodate additional demand, or to respond to an increase in demand
- physical suitability of the site for the intended development (e.g. in terms of any constraints imposed by natural drainage, vegetation, flood risk or significant environmental values)
- any cultural or community values on, near or in close proximity to the site
- significance of the site regarding the visual values of the landscape.

Design benchmark 1-1

Identify a suitable location for non-resident worker accommodation ensuring:

- the scale of the proposal is compatible with the scale and nature of existing or planned development in the immediate locality
- the land is physically suitable for development and the site adequately accommodates any constraints (e.g. flooding, contamination, dust intrusion)
- any impacts on significant natural features and environmental values on and off-site are acceptable and minimised
- significant community or cultural values of the site can be protected or enhanced
- access can be provided to required physical infrastructure and community services and facilities (whether provided on or off-site) to meet the needs of proposed development while continuing to meet the needs of the community
- compatibility with land uses and major infrastructure adjoining or in close proximity to the site can be achieved through design considerations.

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Criterion 1.2 Designing to connect to services, facilities and networks in surrounding areas

The form, scale and density of non-resident worker accommodation may be significantly different from typical forms of housing in an established resource town. However, similar to residential areas, an accommodation facility will also likely include internal roads/access ways and pedestrian/cycle paths, areas of open space, landscaping, probably a range of ancillary uses, and possibly co-located uses. These features provide opportunities for integrating accommodation facilities into their surroundings.

The design of the site should seek to utilise these features in ways that both respect and respond appropriately to the local conditions. Connections can be provided to existing town facilities, services and movement networks in the surrounding area as a way of encouraging use of these facilities as well as appropriate movement between the surrounding neighbourhood and the accommodation site.

Vehicle entry and exit from the site also is an important integration consideration, both in terms of safety and amenity.

Design benchmark 1-2

Connect to services, facilities and networks by:

- establishing strong physical links to and from existing neighbouring areas and to retail, entertainment and recreational services and facilities available in the town. This is achieved through the appropriate layout and connection of internal roads, open spaces, pedestrian and cycle routes within the accommodation site and to the town's facilities. This can also be achieved by the appropriate location of any co-located uses (e.g. shopping, recreation, social activities, personal services)
- accommodating the impact of additional traffic on the road network, and maintaining the amenity and safety of the surrounding area.

Criterion 1.3 Preserving amenity to achieve desirable integration

There are specific considerations relevant to the location of an accommodation facility in a town setting that relate to adverse impacts on the surrounding areas from activities in or associated with the accommodation. Conversely, there are potential impacts from adjoining uses on the safety and comfort of accommodation occupants, such as noise or air emissions. Planning, design and management measures can be applied to ensure the location of an accommodation facility does not adversely affect either surrounding or on-site amenity. In each case the actual physical design measures need to be tailored to individual site circumstances.

Managing potential impacts on the amenity of adjoining residential areas.

While it is acknowledged most accommodation for non-resident workers is provided in modular or relocatable buildings, the appearance of the facility from the surrounding area has a significant impact on the community's perception of its "permanency" and integration into the town more broadly. The higher density nature of the use, combined with the extent and often repeated form of the buildings, also set these facilities apart from standard residential areas.

Among other things, it is important in the detailed design phase to consider the potential impacts including sound and light on nearby uses. Various measures may be used to manage these impacts. Physical design measures including building placement, orientation and screening, access and location of car parking arrangements should be considered together with the overall placement and concentration of activities on the site. For example, a single car parking area close to the site entrance may be better for managing the impacts of internal traffic movements than separate parking bays attached to individual units.

Although activities associated with non-resident worker accommodation - dining, recreation, vehicle movement and the like - are essentially the same as for other residential uses, the higher density and intensity and the peak activity times due to shift work means there is potential for some or all of these activities to have adverse impacts on nearby residential activities if sites are not properly designed and managed. The siting and operation of any co-located uses open to the general public also need special consideration in terms of potential impacts on neighbouring uses.

The working patterns of the occupants and the potential for peak traffic movement periods, especially during sensitive periods (e.g. travel to and from school periods, late nights and early mornings), are matters requiring particular attention.

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Design benchmark 1-3

Manage potential impacts on the amenity of adjoining residential areas by:

- for any buildings highly visible from adjoining residential areas, using building materials and finishes that complement those in the surrounding area or landscape
- generally avoiding reflective materials and treatments due to the high visibility and potential for glare. However, if heat reflective treatments are proposed, consideration is given to mitigating measures, including landscaping and screening to minimise any adverse visual impacts
- along adjoining residential boundaries, providing screen fencing and a minimum setback of three metres between accommodation units and the side and rear boundaries. This area is not to be used for any active purpose
- ensuring security fencing does not detract from the appearance of the facility, with consideration given to incorporating feature perimeter fencing or transparent fencing in association with landscaping[3]. The design of fencing should have regard to amenity for surrounding uses. Barbed wire fencing is generally unacceptable
- retaining, to the extent practicable, any existing established landscape trees on the site
- limiting buildings and structures generally to one to two storeys with a maximum height of 8.5 metres, although particular circumstances of the site or surrounding development may allow for taller buildings without adverse impact on amenity (up to three or four habitable levels with a maximum height of 10 metres for buildings with a concealed roof or 12 metres for buildings with a pitched roof)
- locating and screening non-residential buildings, activity areas and vehicle manoeuvring and car parking areas to avoid lighting, noise or air quality impacts on adjoining residential areas
- managing the movement of vehicles on and off the site to minimise the impact of noise and light on adjoining residential areas
- providing sufficient on-site vehicle parking to meet the demand generated by the accommodation facility.

3 See Appendix 2: Landscape guide.

Building materials and finishes complement those in the surrounding landscape and buildings are generally 1-2 storeys with a maximum height of 8.5 metres

Source: Photograph and graphic representation from Ausco Modular Pty Ltd

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Contributing to the amenity of adjoining street frontages

Contributing positively to the streetscape is important in terms of both the immediate local amenity and making a contribution to the town more broadly. It is desirable to avoid developments that create jarring or unexpected streetscape patterns or gaps, particularly where accommodation facilities are proposed on infill sites with established buildings fronting the street on either side of the site, or on the opposite side of the street.

Design benchmark 1-4

Contribute to the amenity of adjoining street frontages by:

- placing more permanent or substantial buildings on the street frontage, including administrative building or dining hall. This benchmark can also complement the potential for certain buildings to be adapted and reused when the need for the accommodation facility ends (see Element 1.4 - Planning for changing circumstances over time)
- creating a "street address" on any bounding residential streets through the placement and orientation of buildings (e.g. by using similar building setbacks and orientating building front entrances towards the street) and using building materials and colours, open fencing and planting (particularly along street boundaries) to complement those in the surrounding area[4]
- avoiding car parking areas and other hard-standing areas on the street frontage. Such areas may be either located behind buildings or behind a well landscaped buffer area[5]
- for developments involving the co-location of commercial components open to the public, such as a shop, gym or restaurant, locating these uses on the street frontage, with accesses directly off the street.

4 See Appendix 2: Landscape guide.
5 See Appendix 2: Landscape guide.

Creation of a 'street address' on any bounding residential street by placing more permanent or substantial buildings on the street frontage and orienting the building entrances to the street frontage.

Source: Graphic representation from Ausco Modular Pty Ltd

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Source: Deicke Richards

Contributing to amenity from a public road or public place

In some circumstances, the site for an accommodation facility may adjoin a public road or public place. For example, the facility may adjoin a park or open space or, an outer boundary may be on the edge of town making the site highly visible from a public road, or other more distant public places such as sporting fields or other recreation areas. In these circumstances, the accommodation facility needs to be visually screened from public view.

Topography is an important consideration in determining measures necessary to mitigate impacts from view points. For an elevated site (as viewed from a road or public place), particular consideration needs to be given to screening, or at least intercepting internal views of the facility. Physical measures for dealing with this issue include planting, fencing and other structural features, site layout, building siting, orientation and materials. In certain circumstances, perhaps where sites are prominent or highly valued, an alternative site may be the most appropriate measure.

Design benchmark 1-5

Contribute to amenity from a public road or public place by:

- using planting, fencing and other structural features to intercept views of the accommodation facility from view points on public roads and public places, while avoiding extensive lengths of solid screening. To the extent practicable, the vegetation structure should maximise visual screening of facility buildings. Consideration should also be given to layering of species (ground cover, shrub and canopy trees) and supplementary planting of native vegetation along drainage gullies, boundaries, recreation areas and the like to assist in fragmenting views into the accommodation facility[6]
- to the extent practicable, selecting materials and colours and locating and orientating buildings, to complement the natural setting and minimise visibility and glare in the surrounding area.

6 See Appendix 2: Landscape guide

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Non-resident worker accomodation

Source: Deicke Richards

Considering adjoining non-residential uses

Adjoining non-residential uses, depending on their nature, may have the potential to either impact on the accommodation facility or vice versa. For example, in the case of an adjoining industrial use, school or other educational facility, it may be necessary to provide a buffer to protect the amenity of the accommodation facility, or locate less sensitive uses within the facility near the boundary.

In other circumstances, the noise arising from an industrial use could disturb sleeping shift workers. Conversely, adjoining non-residential uses may provide opportunities to support the accommodation facility. For example, it may be appropriate to provide direct pedestrian access between an accommodation facility and an adjoining retail use.

Design benchmark 1-6

Consider adjoining non-residential uses by:

- using building forms and setbacks, planting, fencing and other structural elements along boundaries and street frontages that are in keeping with the local context[7]
- avoiding locations that adjoin incompatible uses, where impacts from noise, light or other emissions cannot be mitigated
- locating sensitive uses within the accommodation facility away from the shared boundary or incorporating protective buffers
- recognising any potential benefits from locating adjacent to non-residential uses.

7 See Appendix 2: Landscape guide.

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Considering operations

Important operational matters relevant to the planning and design of non-resident worker accommodation are the occupancy of separate accommodation units, and whether workers fly in and fly out, or drive in and drive out. For example, this has implications for the number of units provided for the workforce being catered for and the number of car parks that need to be provided. Whether workers are bussed between their accommodation and the work site has implications for whether bus drop off and pick up areas are required on site. Proposals for accommodation facilities need to specifically address such matters in the design of the facility and include supporting documentation.

Operational matters in relation to the provision of landscaping are likely to relate to implementing a planting program, and also a long term maintenance plan to ensure the landscaping continues to play its essential role in achieving a high level of amenity.

Other matters which may be the subject of ongoing management and operational arrangements include decommissioning (see Element 1.4), any necessary arrangements for co-located uses, or potentially monitoring of impacts on the surrounding community and the local economy. The relevance of such matters needs to be determined in the case of each proposal, and also the most appropriate mechanism for implementation.

Design benchmark 1-7

Consider operational matters:

- in the number of rooms, car parking and transport access provided
- in the preparation of landscaping plans
- for a facility involving a co-located use, in the appropriate siting, servicing and operating hours of that use.

Criterion 1.4 Planning for changing circumstances over time

The numbers of workers to be accommodated and their characteristics can change significantly over time, reflecting changes in the resource industries as a whole, and the different phases and changing operations of individual enterprises. It is important when initially providing accommodation to consider how accommodation needs may change, and how the accommodation may potentially be modified to meet those changing needs.

Also, as the total demand for accommodation is likely to ultimately decline, the form of accommodation is an important aspect of site development and design to minimise the visual effect on street amenity when buildings are removed. The adaptation and reuse of some buildings for other residential, or perhaps commercial or community uses, is a possible alternative to eventual removal and should be considered as part of the design process, particularly on street frontages near to town services and facilities.

Design benchmark 1-8

As part of the planning and design process, plan for changing circumstances over time by:

- identifying any longer term options for the accommodation facility, including options for downsizing or reusing buildings, particularly on sites that are close to services or facilities
- identifying any opportunities for any co-located uses to continue under different ownership, or for associated buildings to be adapted and reused for other appropriate purposes
- considering opportunities within the site for standard road layout for future development access
- considering opportunities for landscaping to be maintained in relation to longer term options for the site[8].

Note: depending on likely timeframes for downsizing or ceasing operation of an accommodation facility, it may be appropriate for such options and considerations to be addressed in a decommissioning strategy prepared as part of a development proposal.

8 See Appendix 2: Landscape guide.

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Criterion 1.5 Catering for non-residential uses and facilities

An important element in considering the extent to which retail, personal, entertainment or recreational services and facilities are provided on-site as non-resident worker accommodation can enhance the local economy by accessing commercial services and facilities available in the host town. This has important benefits in terms of providing tangible ways of integrating accommodation facilities into the town fabric. Other social benefits also arise from the sharing of facilities.

Conversely, integration and the benefits of sharing facilities can also be achieved if the accommodation facility provides retail, personal, entertainment or recreational services or facilities that are available for use by both accommodation occupants and the broader community. This can be achieved through the co-location of uses within the accommodation site[9] in such a way that the uses are readily accessible both from within and outside the accommodation site. Examples include retail outlets, restaurant, gym, swimming pool or hairdresser. The preferred approach is for co-location of uses to occur only in situations when there are benefits for the town overall or at least any adverse consequences on existing business are avoided or adequately minimised. It is also important that any non-residential uses do not significantly detract from any intended consolidation or focus of particular uses in business or recreational centres.

Design benchmark 1-9

Cater for non-residential uses and facilities by:

- designing and servicing non-resident worker accommodation to encourage use of the services and facilities available in the town (e.g. retail, recreation, laundry services and the like)
- if practicable, co-locating appropriate retail, personal, entertainment or recreational services and facilities with an accommodation facility in a way that complements and does not detract from existing town services and facilities.

9 Separate development approval is likely to be required for any 'co-located use', although a combined application may be made for multiple uses.

Criterion 1.6 Providing adequate infrastructure and community facilities and services

Providing adequate physical infrastructure and community facilities and services (including sport, recreation, health and community support) is a fundamental consideration for all urban-related development and necessary for integrating within a town and its community.

Providing adequate community facilities and services

The occupants of new non-resident worker accommodation are likely to create additional demands for a range of community facilities and services. The capacity of the host town to meet these needs is an important consideration in assessing the impact of a new accommodation facility.

The expected needs of the occupants for community facilities and services need to be identified for each accommodation facility. In response if applicable, having regard to the scale of the proposal, it is important to determine any additional services or facilities required to meet these needs immediately and in the longer term.

It is also appropriate to identify any linkages to any applicable Social Impact Management Plan.

The delivery of key services can be impacted by a lack of housing that is affordable to non-resource workers. In many cases, the need for single rooms outstrips demand, with flow-on effects in other housing types. Non-resident worker accommodation can provide a solution for a range of needs in resource communities.

Design benchmark 1-10

Provide adequate community facilities and services by:

- identifying the need for community facilities and services likely to be generated by the occupants
- identifying any additional services or facilities required to meet this need
- 5 per cent of all rooms to be made available at a discount that is affordable to non-resource workers as defined in Appendix 3.

Providing adequate physical infrastructure

Infrastructure issues, particularly existing infrastructure capacities and the impacts of development on these capacities and future augmentation needs are importantant considerations in planning and designing accommodation facilities. Water supply and sewerage are two key infrastructure services that must be adequately provided and in a town setting the expectation is that accommodation facilities would be connected to the existing reticulation systems.

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Understanding the impact of a facility on existing infrastructure networks is therefore an important aspect of the application preparation and assessment process. Connection to the road network and any associated traffic impacts are also important design considerations, as are any issues related to stormwater drainage on the site, both in terms of volume and the environmental quality of the water discharged from the site.

While it is expected in an urban context that the site will be connected to existing networks, there may be a need to provide on-site waste disposal or water storage facilities that supplement or meet the entire needs of the use.

Design benchmark 1-11

Provide adequate physical infrastructure by:

- identifying and responding to the expected impact of development on existing infrastructure networks (i.e. water, sewerage, stormwater and transport networks), including reserve capacities
- locating and designing services and utilities in ways that maximise efficiency, ease of maintenance and opportunities for water sensitive urban design[10].

10 See Appendix 2: Landscape guide.

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Principle 2:

Non-resident worker accommodation adequately provides for occupants and has a high level of on-site amenity

Physical site conditions, climate, and the surrounding environmental context are major influences on the living environment, as are the standards of design of buildings and the layout and orientation of buildings and activities on the site. The underpinning context of the development proposal is integral to the planning and design of the accommodation facility. This context includes knowledge of assumptions, such as workforce composition, size, occupancy patterns and changes over time.

Criterion 2.1 Responding to the characteristics of the workers

Non-resident worker accommodation represents a special form of residential accommodation. These facilities are provided in response to high, uncertain and changeable accommodation demands arising from resource or other location-based employment opportunities. Due to the nature of work rosters, different groups of workers may have different daily patterns for sleeping, eating, recreation, vehicle movements and general activity.

There also can be considerable uncertainty surrounding the estimation of demand for non-resident worker accommodation. Accommodation circumstances can also vary depending on whether the accommodation need is short term (for construction purposes) or longer term (to satisfy ongoing operational needs).

The required nature and mix of non-resident worker accommodation can also take different forms depending on:

- the characteristics of the workforce - singles, couples or families; males or females;
- the periods of individual occupation - days, weeks, months or longer.

Meeting the needs of the workforce will be the primary driver determining the actual mix of accommodation forms in a particular situation. However, as part of its overall purpose, the MEDQ has an interest in encouraging a range of housing options to meet the needs of the non-resident workforce.

Design benchmark 2-1

Respond to the characteristics of the expected workers by:

- identifying the assumptions underpinning the proposal, including numbers of workers, staff and other occupants, planned occupancy levels, male/female ratios, any provision for families. These assumptions have implications for the provision of amenities such as dining and recreation facilities and space, provision of ancillary facilities such as vehicle parking, storage areas, staff and servicing areas, and demand for services such as water, sewerage, work transport arrangements and the like.

Criterion 2.2 Providing for the safety and comfort of occupants

Occupant comfort and safety are recognised as key considerations in the design and operation of any accommodation facility. This involves striving for best practice design to promote appropriate levels of privacy, health, comfort, security, respite and overall amenity. It starts at the design concept stage and influences each subsequent stage in the design process. It involves all facets of design from layout to location to materials and treatments. It also involves consideration of safety in design elements by adopting principles for Crime Prevention Through Environmental Design (CPTED) and limiting hazards and risks due to environmental factors within the facility.

Managing the impacts of climate

In climates such as those applicable to many resource towns, air conditioning is necessary to ensure adequate comfort for occupants, particularly when sleeping, at any time of the day and year. However, passive design principles should be employed to take maximum advantage of natural site conditions and to minimise climatic extremes allowing air conditioning to be turned off in milder conditions and to moderate energy demands.

Also design approaches that minimise energy use should be considered including, for example, a centralised system. This will achieve additional amenity benefits for occupants, particularly with respect to noise and dust.

Superseded

Design benchmark 2-2

Manage the impacts of climate by:

- orientating buildings to appropriately manage solar access while also considering prevailing breezes
- providing shelter to western building facades, including through landscaping treatments[11]
- separating buildings to maximise penetration of cooling summer breezes
- using eaves and overhangs on buildings
- insulating roofs, walls and floors to a high standard to moderate indoor air temperatures
- locating large hard-standing areas downwind of habitable areas to minimise heat island transfer to buildings and occupant spaces
- using planting and other landscaping to create comfortable microclimates in outdoor communal areas[12]
- providing energy efficient air conditioning for each accommodation unit. Note: to maximise the efficient use of energy to the extent practicable, a centralised air conditioning system should be considered
- incorporating measures to minimise the impact of dust (including dust filters on air conditioning units).

Providing adequate vehicle parking

Sufficient vehicle parking needs to be provided to meet the needs of occupants having regard to assumed occupancy rates and the expected travel profiles of occupants (e.g. fly-in fly-out, drive in-drive out). Vehicle parking areas also need to be located to avoid detracting from the overall amenity of the facility. Also refer to Design benchmark 2-4 for advice about siting of car parking areas.

Design benchmark 2-3

Make adequate provision for vehicle parking by providing:

- car parking spaces consistent with projected occupancy rates - a minimum design benchmark of 0.75 car parking spaces per accommodation unit is required for predominantly drive-in drive-out facilities
- one car washing space per 100 accommodation units

11 See Appendix 2: Landscape guide.
12 See Appendix 2: Landscape guide.

Providing for vehicle, pedestrian and cycle movement

At a site layout level, access from the external road, the location of internal drop off points, parking and internal circulation patterns and supporting facilities all impact on occupant safety and comfort.

Depending on the operation of the accommodation facility and the needs of occupants, consideration may also need to be given to safely and conveniently accommodate larger vehicles onsite, in terms of parking, manoeuvring and access. For example, goods and services may need to be delivered to the site, and workers may be transported to the mine on buses.

Design benchmark 2-4

Provide for vehicle, pedestrian and cycle movement by:

- concentrating car parking areas close to the external access road and drop off points, and separating them from accommodation buildings, to reduce internal vehicle movements and traffic noise impacts in accommodation areas
- locating car parking areas downwind of habitable areas to minimise heat island transfer to buildings and spaces used by occupants
- if relevant, providing adequate areas for off-street bus parking and manoeuvring in the car parking area or providing a dedicated bus area
- providing a holding area for temporary parking while conducting check in/out
- maximising opportunities, for both recreation and access purpose, convenient pedestrian and cycling movement around the site
- designing necessary internal vehicle streets to maximise convenience and safety (including appropriate speed control devices, signage and lighting) while also applying design and landscaping techniques to reduce visual and other impacts of hard-standing areas in accommodation areas[13]
- providing appropriate pavement treatment suitable for the type and volume of traffic (including car washing areas) that minimises the impact of noise and dust and contributes in a positive way to the visual amenity
- providing access, manoeuvring and parking for service vehicles required to deliver goods and services to the site, as well as any other large vehicles expected on site
- applying acceptable and appropriate design and safety standards for vehicle, pedestrian and cycle networks (see table 1).

13 See Appendix 2: Landscape guide.

Superseded

Table 1 - Guide for internal vehicle, pedestrian and cycle networks

Feature	Dimensions
Entrances and exits	
» two-way entrance/exit street	7.0 metres wide
» major street servicing common buildings	7.0 metres wide
» where coach/bus access is required	9.0 metres wide
» one way exit street	5.0 metres wide
» holding area provided as a separate bay or extension of a one way entrance street	4.0 metres x 20.0 metres
Internal streets within the site (beyond entrances/exits)	
» one way streets or cul-de-sac	4.0 metres wide
» two-way streets	6.0 metres wide
Pedestrian and cycleways - self draining, hard and durable surfaces	
» pedestrian only	1.2 metres wide
» pedestrian/cycling and shared on-site service vehicles	1.5 metres wide
» pedestrian/cycling and shared service/emergency vehicles and cycling	As required for safe access
» planted buffer strip on either side of uncovered paths	1.5 metres wide

Designing buildings, structures and facilities for internal amenity

The quality of accommodation buildings is a major factor in satisfying occupant comfort and amenity needs. Other factors include the range, nature and placement of recreation, leisure, open space and communal buildings (e.g. dining rooms, and passive and active recreation facilities), and the use of signage to facilitate convenient movement around the facility. Striking the appropriate balance between convenience, seclusion of accommodation areas and personal safety is a key design consideration, particularly in light of the different work-shift patterns of the occupants.

Design benchmark 2-5

Design appropriate buildings and structures by:

- » providing an ensuite bathroom with a closable door in each accommodation unit
- » providing "black out" window tinting or blinds to all windows in each accommodation unit
- » providing dust filtered/screened air conditioning systems
- » constructing each accommodation unit and accommodation building to minimise light and sound intrusion
- » separating facing front doors to accommodate: a 1.2 metre wide concrete pathway, landscape strips at least 1.2 metre wide and front entry deck thresholds[14]
- » separating the rear walls of adjacent buildings by at least 1.5 metre to accommodate services including stormwater collection and air conditioning units
- » ensuring weather protection is provided at dwelling thresholds
- » incorporating CPTED principles.

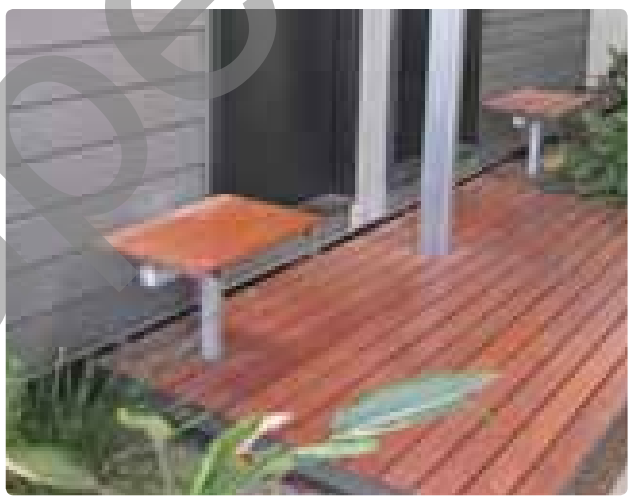
Include appropriate facilities by:

- » conveniently locating buildings and spaces used for active purposes (e.g. dining, recreation, laundry) while ensuring their adequate separation or screening from accommodation buildings to avoid noise intrusion
- » ensuring landscaping upon maturity will suitably screen or soften the appearance of vehicle parking and external storage areas, bin compounds and other structures[15]
- » locating office administration and reception areas near the site entrance/exit
- » providing receptacles for rubbish in appropriate locations
- » providing signage to assist convenient movement around the site.

14 See Appendix 2: Landscape guide.
15 See Appendix 2: Landscape guide.

Superseded

Covered, landscaped, entry walkway to each accommodation unit



Timber front entry threshold with seats for functional purposes and casual interaction

Source: The MAC Services Group Ltd Accommodation Villages

Superseded

Attractive and effective screening to service areas at the rear of groups of accommodation buildings

Clear signage at an entrance to a group of accommodation buildings

Concrete pathway and landscaping buffering car park area from accommodation buildings

Comfortable accommodation unit with ensuite bathroom, storage, desk and "black out" window

Source: The MAC Services Group Ltd Accommodation Villages

superseded

Providing for fire and other emergency

Adequate provision is required within the accommodation facility for fire prevention and protection, for responding to other emergencies. Relevant considerations include providing sufficient water for fire fighting purposes, installing fire hydrants and other fire protection measures, and providing access for emergency service vehicles. In certain circumstances formalised and practised Emergency Management Plans may be required.

The requirements under the *Sustainable Planning Regulation 2009* for referral of assessable building work to the Queensland Fire and Rescue Service (QFRS) provide for these matters to be addressed at the building stage of a proposal. In the case of accommodation facilities, Building Code of Australia, clause E1.10 (Provisions for Special Hazards) is often applicable and the QFRS may request additional requirements to deal with the location of buildings in relation to a water supply for fighting purposes, or the nature or quantity of materials stored or used on the site. In addition, building certifiers have responsibility for commenting on fire extinguishers, fire hose reels, fire blankets, exit signs and emergency lighting which fall outside the jurisdiction of the QFRS.

Despite this detailed consideration at the building stage, it is important that the overall planning and design of the accommodation facility take account of measures likely to be required for fire and other emergencies, particularly in the design of internal access roads and the availability of a suitable water supply for fire-fighting purposes. Early consultation with QFRS is appropriate to address these matters.

Design benchmark 2-6

As part of the planning and design process, allow for adequate provision for fire safety and emergency by incorporating any significant physical elements likely to be required for these purposes and providing supporting advice from QFRS. These elements may include:

- access for emergency vehicles (fire and ambulance), possibly as part of a secondary road network primarily for on-site service vehicles or as part of a shared access with pedestrian/cycle network on the site
- a lake, dam, water tank or swimming pool that provides sufficient water for fire-fighting purposes.

Providing adequate recreation areas and open space

A high standard and range of recreational and open space within the non-resident worker accommodation site is important to meet the varying needs and demands of occupants and, where appropriate, local residents.

Design benchmark 2-7

Provide for adequate recreation areas and open space (including sheltered seating and barbeque areas) as follows:

- at a rate of 10 per cent of the site area or 5m² per person (excluding boundary landscaping). These areas may be reduced if recreational infrastructure such as a swimming pool, gym or covered barbecue areas are provided, or if the facility adjoins a developed public recreation area
- in consolidated recreation areas at a rate of one recreation area per 100 units in areas separated or screened from accommodation units
- if relevant, designed and equipped for family recreation (e.g. with children's playgrounds and appropriate security and surveillance features)
- in ways that enhance the external appearance of the accommodation facility and promote visual amenity and safety for users.

Locate passive and active recreation areas, including sheltered seating, barbeque areas and community facilities (e.g. a park, pool, gym):

- conveniently for the use of all occupants, including, if relevant, external users (e.g. town residents)
- close to visitor parking areas and any commercial on-site retail facilities, such as a cafe or convenience store.

Superseded

Providing accommodation in permanent on-site caravans or cabins

On-site caravans or tourist park-style cabins may be an appropriate way of extending the range of accommodation within an accommodation facility, subject to appropriate standards being applied. It also may be appropriate in some cases for dual public (tourist park) and private (non-resident worker accommodation) uses to be established. This poses specific design issues to ensure appropriate separation of the workers' accommodation from the tourist park use to ensure high standards of amenity, safety and comfort are achieved within the site. The use patterns of tourist parks are quite different from those of an accommodation facility and specific consideration of these issues would be required if a dual use facility were to be proposed.

Design benchmark 2-8

If providing accommodation in permanent on-site caravans or cabins:

- apply the same design, access, siting and amenity standards to those applying to other forms of accommodation on the site
- as part of a combined tourist park and accommodation facility use, give special consideration to ensuring the compatibility of the respective uses (noting that separate approvals are required for the uses).

Superseded

Appendix 1: Application information

This part sets out information that should be provided in support of a development application. The relationship between the information and the planning and design elements described in 'Planning and design elements' is shown in the right hand column of table 2 follow. As such, table 2 may be used as checklist of matters addressed.

It is recognised that the relevance and need for the information listed in the table may vary depending on the specifics of an application. The facilitated development assessment process advocated by the MEDQ will, among other things, assist applicants identify appropriate information requirements for applications to better ensure timely and efficient processing of applications.

Information to accompany a development application

Drawings or documents	Relevant planning and design element
1. Description and plans depicting the accommodation proposal, and demonstration of its suitability to provide for the comfort and safety of occupants, including:	**Element 2.1 - 2.2**
» characteristics of the workers to be accommodated	2.1
» number, layout and style of accommodation units	2.2
» design of internal roads, open spaces, pedestrian and cycle routes	2.2
» types and layout of ancillary facilities and uses	2.2
» elevations of proposed buildings	2.2
» landscaped areas	2.2
» lighting	2.2
» external colours, finishes and materials of buildings and structures and other treatments and features to address climate	2.2
» measures for fire safety and other emergency	2.2
» any staging of development proposed	2.1
» any modification of physical features over time, including any removal of accommodation	2.1
» numbers and sizes of vehicle spaces, and design and treatment of vehicle parking areas	2.2
2. Demonstrated suitability of the proposed site, having regard to such matters as:	**Elements 1.1 - 1.6**
» form of accommodation proposed	1.1
» required site area	1.1
» potential to physically integrate the accommodation with the town	1.2
» availability of required physical infrastructure	1.1
» any environmental hazards (e.g. contaminated land, areas prone to flooding, dust intrusion or land slip)	1.1
» any impact on cultural or environmental values (e.g. cultural heritage, significant vegetation, wildlife corridors) or features (e.g. waterways, drainage lines)	1.1

Superseded

Drawings or documents	Relevant planning and design element
» effects of noise, dust, traffic generation or other impacts on amenity from nearby uses or road or rail infrastructure	1.2, 1.3
» effect of traffic generated on existing road capacity, traffic flows and local amenity	1.2
3. Demonstration of the physical and visual integration of the proposed non-resident worker accommodation within or on the edge of the town including:	**Elements 1.2 & 1.3**
» the character, form and design of existing buildings, particularly houses, in the vicinity of the proposed site	1.3
» photographs of existing buildings and other physical features in the vicinity of and adjoining the development site	1.3
» plans showing design of internal roads, open spaces, pedestrian and cycle routes linking to those external to the development site	1.2
» a streetscape perspective view	1.3
4. Having regard to the nature, scale and location of existing personal, entertainment and recreational services and facilities in the town, demonstration:	**Element 1.5**
» for on-site ancillary uses - that there is no significant competition with equivalent services and facilities in the town	1.5
» for co-located uses -that there is convenient access to users both within and outside the accommodation site, and siting does not significantly detract from any intended consolidation of business or recreational centres	1.5
5. Having regard to the extent, capacity and any planned augmentation of physical infrastructure and community facilities and services assessment of:	**Element 1.6**
» the demand created by the development	1.6
» the share of any spare capacity of existing or planned infrastructure taken up by the development	1.6
» any augmentation required by the development. In regard to physical infrastructure, where reticulated infrastructure is not available, details of proposals for on-site provision of services	1.6
6. Demonstration of the compatibility of the proposed non-resident worker accommodation with adjoining and nearby uses in terms of potential visual, noise and light impacts including plans showing:	**Element 1.3**
» the location and nature of nearby and adjoining uses	1.3
» the location of proposed parking areas, ancillary uses, co-located uses, outdoor activity areas	1.3
» features and treatments along site boundaries, including buildings, structures, landscaping and other works	1.3
» features and treatments within the site, including structures, landscaping and other works, if the site is visible from a public road or public place	1.3
» the location and nature of any proposed visual or acoustic screening	1.3

Superseded

Drawings or documents	Relevant planning and design element
» the location and light sheds for proposed exterior lighting of site entry/exists, buildings, car parking areas, roads, pedestrian/cycle paths, outdoor activity areas	1.3
» estimates of vehicle movements at each site entry/exist and in connecting roads	1.3
7. Description of the intended operation of the accommodation facility including:	**Elements 1.3, 1.6, 2.1**
» short and long term rostering of worker occupants	1.3, 1.6
» arrangements for the transporting of workers to and from the site, e.g. drive in/drive out, fly in/fly out, use of buses	1.3, 2.1
» number, nature and timing of expected vehicle usage, including private vehicles, buses, delivery vehicles	1.3, 2.1
8. Decommissioning plan - for proposals involving the eventual removal or modification of accommodation, the intended timing and process for managing the change, including site rehabilitation or conversion and opportunities for long term use.	**Element 1.4**
9. Demonstrate that 5 per cent of all rooms are made available for non-resource workers as defined in Appendix 3.	**Element 1.6**

Superseded

Appendix 2: Supplementary landscape guide

Superseded

Purpose

This guide provides further detailed guidance for landscaping associated with non-resident worker accommodation as mentioned in a number of design benchmarks. Each relevant benchmark is dealt with separately in the guide.

In particular, this guide:

- illustrates landscape design approaches for a variety of circumstances to achieve the outcomes identified in the design benchmarks. These design approaches are described and depicted through illustrative drawings and annotated photographs
- provides a quick reference guide to plant species suitable for the Blackwater and Moranbah priority development areas
- provides advice on plant establishment and plant maintenance.

Definitions

Landscaping can be divided into two categories, softscape and hardscape.

Softscape refers to the landscaping that is comprised of living horticultural elements such as trees, shrubs, groundcovers and turf, and associated materials such as soil and rocks.

Any landscaping that is not part of the softscape can be considered a hardscape element. Hardscape includes all concrete, masonry, steelworks and woodwork, and can include elements such as pavements, walls, arbors, fencing, screens and signage.

Role of landscaping

The role of landscaping in managing impacts of non-resident worker accommodation facilities and contributing to desired outcomes includes:

- providing visual and functional amenity that is pleasant for occupants and pleasing to neighbours and others with external views of the facility
- maintaining or enhancing plant biodiversity and habitat through integrating vegetation that is suited to site conditions and is native to the local area
- contributing to drainage and stormwater management on site
- influencing microclimates to make places more comfortable through provision of shade and reducing heat loading to hard-standing areas
- establishing or reinforcing boundaries between internal uses or with adjacent neighbourhood uses
- minimising noise by using landscape treatments that require minimal machine maintenance.

Superseded

Examples of landscaping to achieve design benchmarks

Superseded

Design benchmark 1-3

Managing potential impacts on the amenity of adjoining residential areas

Landscaping along side and rear boundaries

Within the building setback between accommodation and side and rear boundaries, suitable landscape treatments include articulated fencing, softscape screening, mounding and drainage.

Fencing

The alignment, colour, choice of material and adjacent softscape can affect the overall aesthetic quality of a site boundary, and how successfully an accommodation facility integrates with the surrounding character of the area.

Where security fencing is not required, using materials that are in keeping with the residential context and complement the character of the surrounding neighbourhood is ideal. This would typically include materials such as timber and steel.

Using open or transparent fencing, in association with softscape, can reduce the lineal appearance of a fence line, while maintaining a clear delineation of areas and boundaries. However, consideration should be given to views to and from the accommodation facility during the period plants are establishing and growing.

Alternatively, opaque fencing can be used to provide an instant visual barrier between the accommodation facility and adjoining residential areas. Whilst this style of fencing can be practicable for security reasons, long unarticulated stretches can be visually obtrusive. In these circumstances provision of ancillary softscape is appropriate.

Chain link security fencing should be restricted to a practical minimum. Planting on both sides of the fence may be necessary to soften the visual impact of fencing. The transparency of fencing can be enhanced through colour.

Fencing style that compliments surrounding context/character

Articulated fenceline

Transparent fencing with softscape to one side

As a general rule, darker coloured (black) coated steel appears considerably more transparent than lighter colours. Coloured plastic or polymer wire coatings can be applied to base metallic-coated wire, and powder coating paint finish can be applied to galvanised steel.

Softscape screening

Softscape screening can contribute to the aesthetics of boundaries and overall integration of accommodation facilities by:

- reinforcing local character and integrating with existing local plant communities by using local native species
- enhancing local biodiversity and wildlife habitat through provision of 'green corridors'
- fragmenting and softening continuous lengths of fencing
- concealing undesired views into and from accommodation facilities.

Plant species selected for the purpose of screening can take many forms. Hedges and climbers are commonly adopted for screening, however other types of plants can also be considered. Almost any plant can be trimmed to become a narrow plant suitable for screening.

In deciding what plants make good screening specimens, the following characteristics are applicable:

- multi-branched
- dense foliage
- tolerant of pruning
- able to tolerate harsh growing conditions
- will not grow too large to cause damage to structures such as fences and buildings, carparks or subsurface infrastructure.

Layering of plant species both vertically and horizontally can create opaque screens through the bulk and variety in planting. Low groundcovers and native grasses can be integrated to conceal trunks of small trees or leggy shrubs. Taller canopy trees can be integrated with columnar shrubs where views into or from accommodation facilities/buildings are elevated. Lower key plantings can be appropriate for side and back boundaries adjoining residential uses.

Plants should be positioned a distance slightly less than the spread that a fully grown plant would reach, to ensure a dense screen in achieved.

Hedges and screening plants along boundaries will require maintenance and will therefore need to be regularly trimmed.

Formal softscape screening

Informal softscape screening

Superseded

While electric and petrol powered hedge trimmers are efficient and convenient, they are noisy. A maintenance programme that accommodates noise restrictions associated with shift work should be implemented if electric or powered trimmers are to be used. Alternatively, the use of manual shears may be required at certain times to minimise noise.

Earth mounding

Mounding can be integrated in the landscape design of accommodation facilities for the following purposes:

- creating topographical interest
- emphasising desired views
- aiding screening
- improving plant establishment and health by providing soil depth (imported) in poor soil conditions
- aiding overland flow and drainage
- noise mitigation.

Limiting mounding to the following grades will reduce erosion and provide manageable conditions for maintenance:

Softscape Treatment	*Grade/Slope*
Turfed areas	1:4 or flatter
Planted areas	Equal to or flatter than 1:3
Planted areas with bio-degradable erosion control matting	Steeper than 1:3, but flatter than 1:2

Creating mounds and depressions can create a significant, dramatic effect in an otherwise uniform landscape.

Combinations of earth mounding and planting can also reduce the scale and visual impact of fencing and walls.

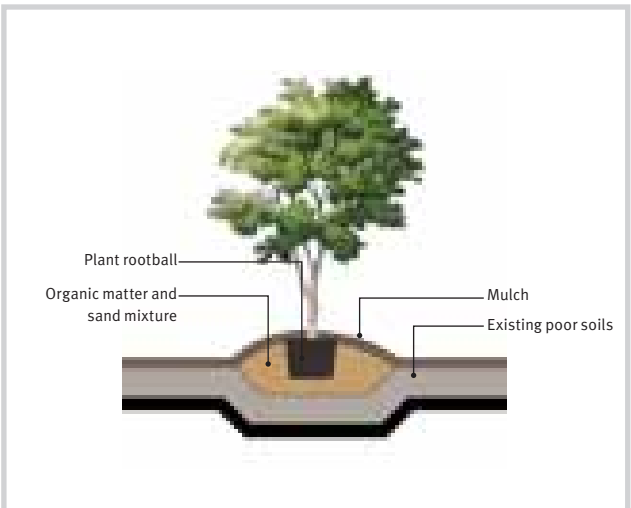
Mounding can be used with planting for screening purposes. Where smaller plant specimens are used for screening, mounding can aid by producing an instant screen by emphasising height.

While dense screen planting has visual and privacy benefits, on its own it provides only minor acoustic attenuation. Integrating mounding with planting can help to mitigate noise.

Soils located around the central Queensland mining towns of Blackwater and Moranbah are typically poorly draining, clay based soils. Mounding using a mixture of one third each of existing site soil, sand and organic matter/topsoil will help with the establishment and health of plants in clay soils.

Layering plants provides an opaque screen

Screen planting integrated with mounding



Mounding to aid plant establishment and growth

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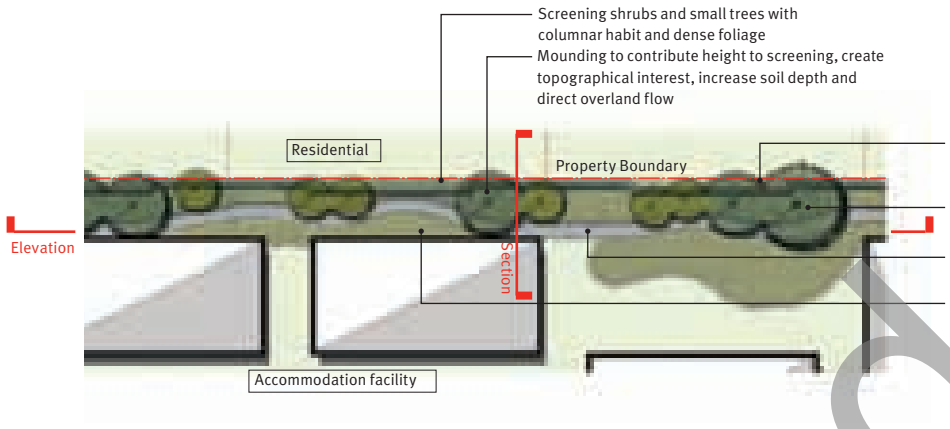
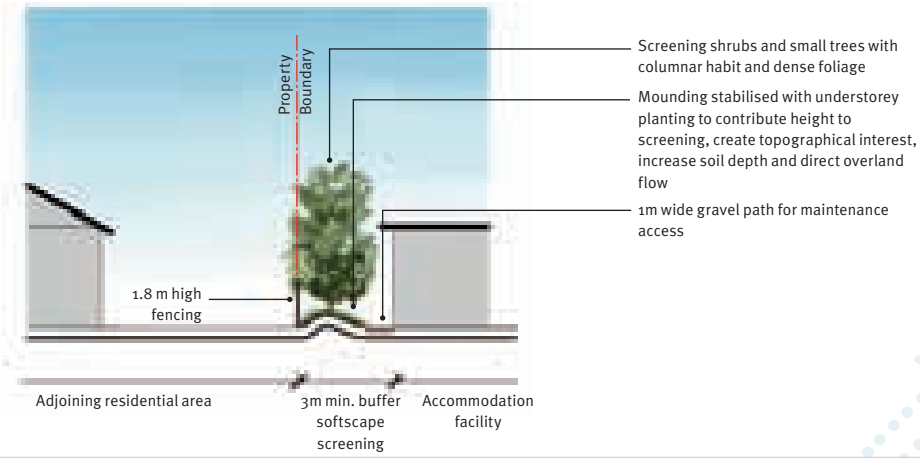


*Fenceline colour for representative purposes only

Indicative plan of accommodation facility adjoining residential area: articulated fenceline with integrated softscape and mounding

Indicative elevation of accommodation facility adjoining residential area: articulated fenceline with integrated softscape and mounding



Indicative section of accommodation facility adjoining residential area: articulated fenceline with integrated softscape and mounding

Superseded

Species suitable for Design benchmark 1-3: Managing potential impacts on the amenity of adjoining residential areas

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Trees			
Black she oak	Allocasuarina littoralis	ï	
Bull oak	Allocasuarina luehmannii	ï	
Forest oak	Allocasuarina torulosa	ï	ï
Rusty gum	Angophora leiocarpa	ï	
White cypress pine	Callitris glaucophylla	ï	
Black cypress pine	Callitris endlicheri	ï	ï
River she oak	Casuarina cunninghamiana	ï	ï
Pink bloodwood	Corymbia intermedia	ï	ï
Blueberry ash	Elaeocarpus reticulatus	ï	ï
Narrow-leaved ironbark	Eucalyptus crebra	ï	ï
Silver-leaved ironbark	Eucalyptus melanophloia	ï	ï
Poplar box	Eucalyptus populnea	ï	ï
Forest red gum	Eucalyptus tereticornis		ï
Weeping lilly pilly	Waterhousia floribunda	ï	ï
Shrubs			
Hickory wattle	Acacia glaucocarpa	ï	ï
Midgenberry	Austromyrtus dulcis	ï	ï
Coast banksia	Banksia integrifolia		ï
Rainbow falls callistemon	Callistemon pearsonii ëRainbow Fallsí	ï	ï
Emu bush	Eremophila maculata		ï
Hopbush	Dodonaea viscosa	ï	ï
Bankís grevillea	Grevillea banksii	ï	
Long styled grevillea	Grevillea floribunda		ï
Seven dwarfs grevillea	Grevillea longistyla	ï	ï
Claret tops	Melaleuca linariifolia	ï	ï
Scrub cherry	Syzygium australe	ï	ï
Small leaf lilly pilly	Syzygium luehmannii	ï	
Groundcovers, Grasses and Vines			
Rocky rambler	Callistemon pearsonii	ï	ï
Dietes	Dietes bicolor	ï	ï
Spreading flax lily	Dianella revoluta	ï	
Bronze rambler	Grevillea ëBronze Ramblerí	ï	
Spiny-headed mat-rush	Lomandra longifolia	ï	ï
Wonga wonga vine	Pandorea pandorana	ï	ï
Purple flag	Patersonia sp.	ï	ï
Tassel cord-rush	Restio tetraphyllus	ï	ï
Kangaroo grass	Themeda triandra	ï	ï

Note: Maximum use of locally occurring native species in landscaping is required under EDQ Guideline no. 14 Environment and natural resources sustainability

Superseded

Eucalyptus tereticornis

Elaeocarpus reticulatus

Acacia glaucocarpa

Banksia integrifolia

Allocasuarina littoralis

Lomandra longifolia

superseded

Design benchmark 1-4

Contributing to the amenity of adjoining street frontages

Landscaping along street frontages

Landscape treatments along street frontages should relate to the positioning of buildings and amenities within the proposed accommodation facility and the character of the adjoining residential streetscape.

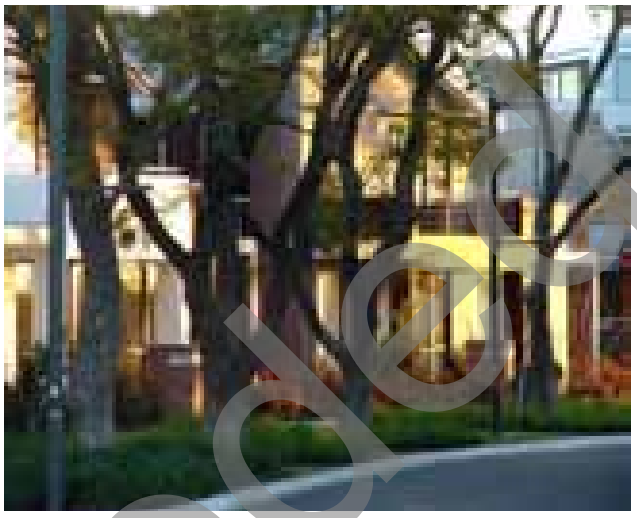
Landscaping associated with administrative buildings, public use buildings and entries

As the focal point for site management and the point of entry, landscaping near administrative buildings and entrances can assist visitors and residents find their way and improve overall presentation to the street.

Similarly, landscaping associated with buildings open to the public can make an impact on how the building is perceived from outside in terms of ease of access and internal movement, while enhancing their visual qualities.

Landscaping features that may be appropriate for streetscape areas associated with administrative and public buildings and site entry points include:

- plant species and hardscape components having a distinct character with which the community can identify
- feature trees and formal street tree planting
- integrated signage
- feature and amenity lighting
- integrated public art that reflects the natural environment and/or the local cultural heritage
- feature fencing that allows views through
- provision of shared cycle/pedestrian access path
- irrigation
- a pick-up/set-down space providing shelter and seating
- formal street tree planting immediately on approach to the entry.



Planting can be incorporated as an alternative to fencing by providing an edge to street frontages

Softscape planting

It may be appropriate to minimise screening of administrative and public use buildings to ensure views are provided into and from these buildings.

It is recommended that remnant or significant existing trees and vegetation be retained where possible to maintain shade, character and visual amenity of the streetscape. It may be appropriate to untertake selective tidying of retained vegetation, such as pruning and removal of dead branches.

Existing vegetation can be enhanced through provision of additional planting. Integration of groundcovers, low shrubs and tall canopy trees with a clear trunk can highlight the importance of an entry precinct and public areas, while providing views into the facility and a sense of openness.

Formal feature planting can be integrated to:

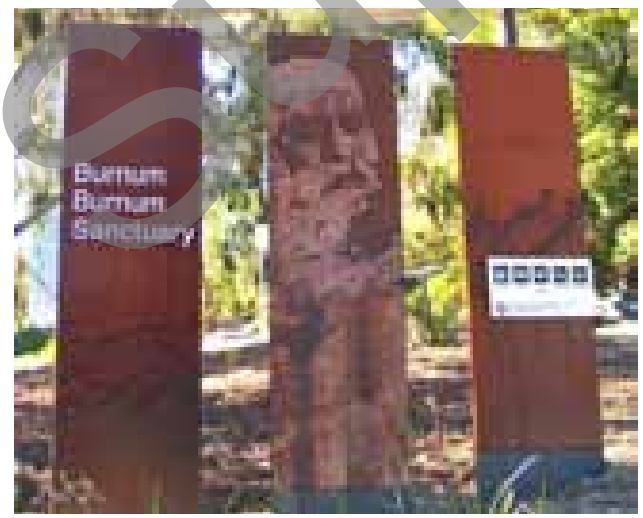
- impart a 'sense of arrival'
- enhance local character
- enhance aesthetic quality of the street frontage
- delineate a destination or focal point
- complement the built form.

Feature mature trees such as the Illawarra flame tree may be integrated for their striking colour. Iconic trees such as the bottle tree may be planted for their interesting trunk form and local relevance. Clusters of low native shrubs and grasses can provide form and colour to street frontages.

Superseded

Feature landscaping at an entry

Feature planting and place making signage at an entry



Place making signage

Signage

Entrances, administrative buildings and public use buildings should be clearly defined through highly visible signage. The integration of signage facilitates a number of functions, including:

- identifying the location of a place or entry (place making signage)
- providing directions
- accommodating all regulatory, statutory and operational requirements
- providing information on the environmental, historic, cultural or other values of an area.

All signage should be clear, concise and unambiguous. The choice of sign location can contribute to the effectiveness and readability of information.

Place making signage can help define the character of a place through materials and design. Locally sourced and recycled materials can contribute to reinforcing local character. For example, materials such as galvanised steel and corten steel may promote the 'industrial' sense of place within mining towns.

Durability of materials may be considered in exposed locations.

Superseded

Landscape lighting

Lighting of street frontages associated with administrative buildings, public use buildings and entries may represent a significant element in the streetscape, while respecting the privacy and amenity of neighbours.

Landscape lighting can be integrated for amenity or to light paths and signage, and to highlight features within the landscape such as walls, feature trees and vegetation, and public art or scultpural elements.

The following design principles are appropriate for landscape lighting of street frontages:

- avoid overlighting. Low light levels are subtle and often more pleasing to the eye
- vary light levels when emphasising important landscape elements such as place making signage. Bright spots should be chosen carefully as they will become the focal points of the landscape
- integrate multiple sources of light, rather than a few powerful sources to reduce glare and achieve balance
- use uplighting and downlighting vertical elements to aid in achieving a three-dimensional effect, although uplighting fixture placement and angle should be carefully considered to minimise glare
- select fixtures and lamps that are durable, vandal proof (where possible), and reflect the scale of the external area being lit
- consider the varying refective qualities of hardscape finishes and plants depending on their texture and colour. Some plants absorb light while others reflect light. Generally, lighter coloured and glossy or waxy leaves are more reflective than darker, textured leaves. A plant's reflective quality is also dependent on the openness of its branches or the density of foliage
- use a relatively uniform level of light for pedestrian footpaths with post mounted fixtures, light bollards and ground level lights.

Public art

Like signage, public art can be incorporated within street frontages associated with an entry precinct and public areas to assist in place making. Public art can help establish local character and culture through the choice of themes, materials and design.

Feature corten fencing and sculptural softscape

Public art to entry precinct

Feature wall/interpretive art element to entry precinct

Superseded

Fencing

As with softscape screening, to enhance transparency and define semi-private spaces, it may be appropriate to minimise or even exclude fencing at main entry points, administration buildings and public facilities which address the street frontage.

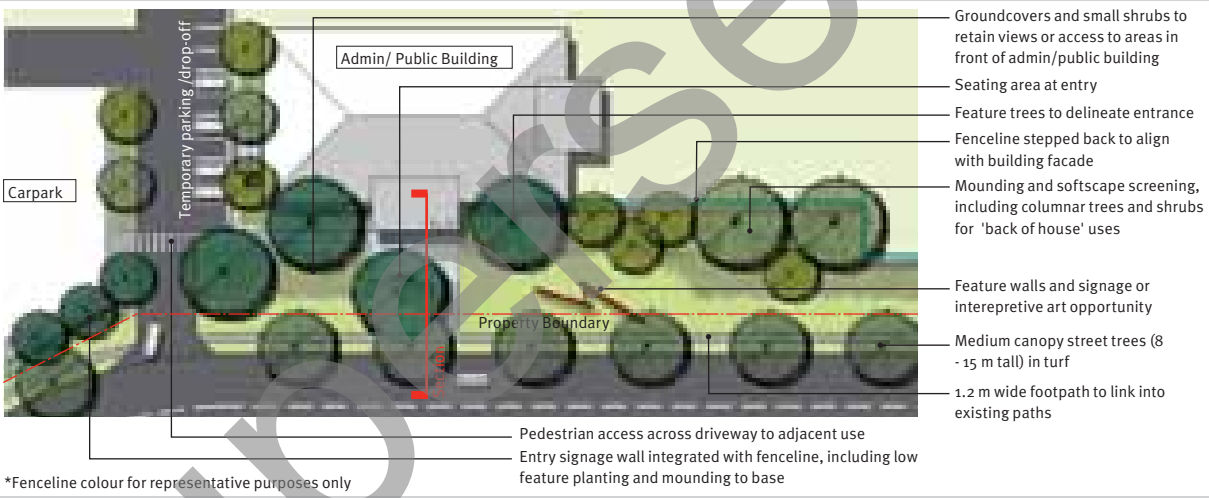
Where it is appropriate to include fencing, feature fencing types may be explored. This could include fences that are transparent, sculptural, patterned, or comprised of a variety of materials. Choice of materials and design can complement the character of the surrounding neighbourhood.

Streetscape design

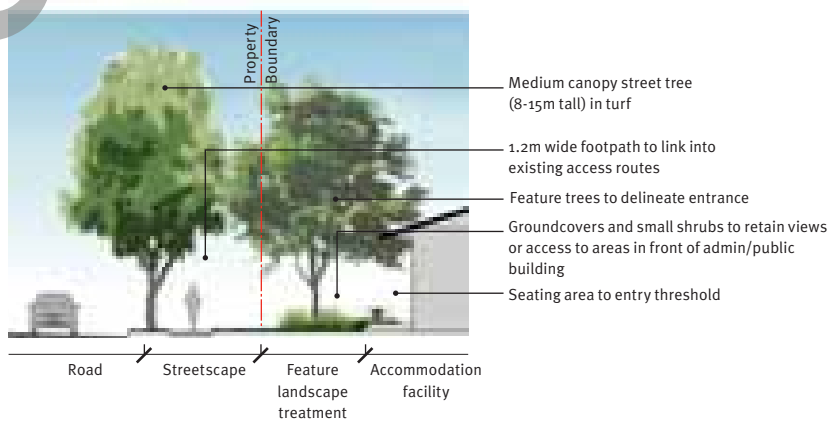
Streetscape design and choice of plant species should always aim to integrate with existing surrounding conditions.

Typically, this would include:

- street trees placed at 10-15m intervals with a minimum distance of 0.6m from kerb edge
- 1.2m minimum width concrete path positioned 1.0-1.5m from the kerb edge
- maintained turf
- in some locations, possible integration of grasses or groundcovers to the kerb edge.



Indicative plan of accommodation facility entry precinct



Indicative section of administration or public use building adjoining street frontage

Superseded

Landscaping associated with recreational uses

Landscape treatments to street frontages will vary according to the different uses sited along the boundary. For example, landscaping associated with an administrative building will differ to that adjacent to a recreation facility.

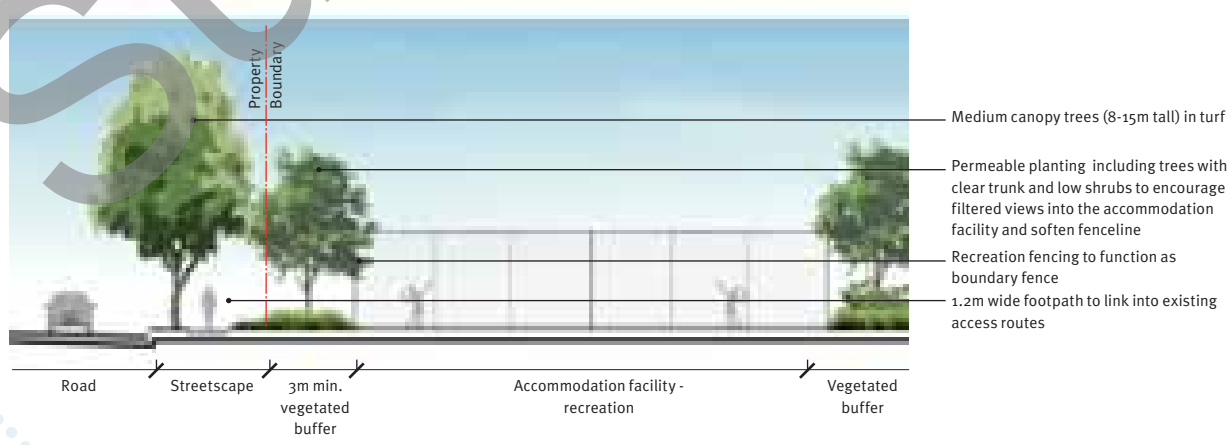
External recreational uses within non-resident worker accommodation can often include facilities such as open space areas or 'kickabout' areas/tennis courts, basketball court/half court, swimming pool and fitness stations. Many of these facilities do not create adverse visual impacts to streetscapes, therefore it may be appropriate to consider retaining filtered views between the street and recreational uses.

Filtered views through vegetation can be achieved by integrating groundcovers and low shrubs with canopy trees that have a clear trunk.

To avoid multiple fencelines along street frontages, it may be preferable to integrate recreational facility fencing with boundary fencing. Allowing the fenceline to be set back from the boundary in some locations, may be necessary to ensure a vegetated buffer is maintined to the street frontage.

*Fenceline colour for representative purposes only

Indicative plan of accommodation facility recreation area adjoining street frontage



Typical section of accommodation facility recreation area adjoining street frontage

Superseded

Landscaping associated with large hard-standing areas

When sited along a street frontage, large hard-standing areas such as carparks can have an unfavourable visual effect on streetscapes.

There are two methods of mitigating negative aesthetic impacts associated with large hard-standing areas:

- integrate landscaping to the edge of the hard-standing area
- integrate landscaping 'internally' to break-down the overall scale of the hard-standing area.

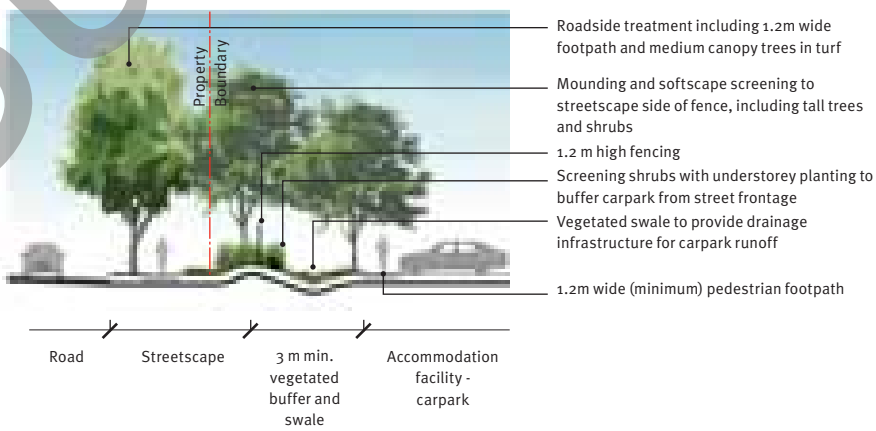
Planting around and throughout hard-standing areas can also accommodate practical purposes such as shading and reducing heat load.

For further guidelines on landscaping to carparks, refer to Design benchmarks 1-11 and 2-4

Landscaping to edges of hard-standing areas can integrate softscape with various hardscape materials

*Fenceline colour for representative purposes only

Indicative plan of large hard-standing area adjoining street frontage



Indicative section of large hard-standing area adjoining street frontage

Superseded

Species suitable for Design benchmark 1-4: Contributing to the amenity of adjoining street frontages

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Trees			
Soap tree	Alphitonia excelsa	ï	
Hoop pine	Araucaria cunninghamii	ï	
Bottle tree (broad leaved)	Brachychiton australis	ï	ï
Bottle tree (narrow leaved)	Brachychiton rupestris	ï	ï
Tuckeroo	Cupaniopsis anacardioides	ï	ï
Blueberry ash	Elaeocarpus reticulatus	ï	ï
Weeping fig	Ficus microcarpa var. hillii	ï	
Wilga / Australian willow	Geijera parviflora	ï	ï
Crow's ash	Flindersia australis	ï	ï
Brush box	Lophostemon confertus	ï	
Peltophorum pterocarpum Swamp box	Lophostemon suaveolens	ï	
Yellow poinciana	Peltophorum pterocarpum		
Weeping lilly pilly	Waterhousia floribunda	ï	ï
Shrubs			
Agave	Agave attenuata	ï	
Kangaroo paw	Anigozanthos 'Bush Ranger'	ï	
Birds nest fern	Asplenium nidus	ï	
Hairpin banksia	Banksia spinulosa	ï	
Swamp banksia	Banksia robur	ï	ï
Rainbow falls callistemon	Callistemon pearsonii 'Rainbow Falls'	ï	ï
Fine leaf cordyline	Cordyline stricta	ï	ï
Jade plant	Crassula ovata	ï	ï
Emu bush	Eremophila maculata	ï	ï
Bankís grevillea	Grevillea banksii	ï	
Bronze rambler	Grevillea 'Bronze Rambler'	ï	ï
Byfield spider flower	Grevillea venusta	ï	
Hibbertia	Hibbertia vestita	ï	
Moore's cycad	Macrozamia moorei		ï
Dwarf claret tops	Melaleuca linariifolia (dwarf)	ï	ï
Slender rice-flower	Pimelea linifolia	ï	ï
Aussie boomer lilly pilly	Syzygium australe ëBoomerí	ï	ï
Laurustinus	Viburnum tinus	ï	ï
Coastal rosemary	Westringia fruticosa	ï	ï
Soft-tipped yucca	Yucca elephantipes	ï	
Cardboard palm	Zamia furfuracea	ï	
Groundcovers, Grasses and Vines			
Paper daisy	Bracteantha bracteata 'Dragon Hill Monarch'	ï	ï
Native daisy	Brachyscome multifida	ï	
Little buttons	Chrysocephalum apiculatum	ï	ï
Spreading flax lily	Dianella revoluta	ï	
Gazania	Gazania rigens	ï	
Mooreís cycad	Macrozamia moorei		ï
Purple flag	Patersonia sp.	ï	ï
Tassel cord-rush	Restio tetraphyllus	ï	ï
Aussie Boomer lilly pilly	Syzygium australe ëBoomerí	ï	ï
No mow grass	Zoysia tenuifolia	ï	

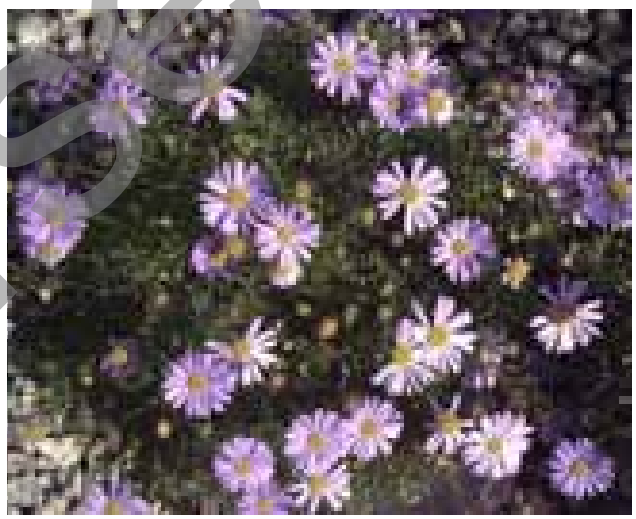
Note: Maximum use of locally occurring native species in landscaping is required under EDQ Guideline no. 14 Environment and natural resourses sustainability

Superseded

Brachychiton rupestris

Syzygium australe 'Boomer'

Lophostemon confertus



Brachyscome multifida

Melaleuca linariifolia (dwarf)

Agave attenuata

Superseded

Design benchmark 1-5

Contributing to amenity from a public road or public place

Landscaping for views from outside

Landscaping boundary interfaces

To increase visual amenity of boundary interfaces, the following methods can be adapted for integration:

- selecting plant species and materials to correspond with natural or established surrounding landscape
- articulating boundary lines or fence lines through varied vertical and horizontal alignments
- varying materials
- varying landform.

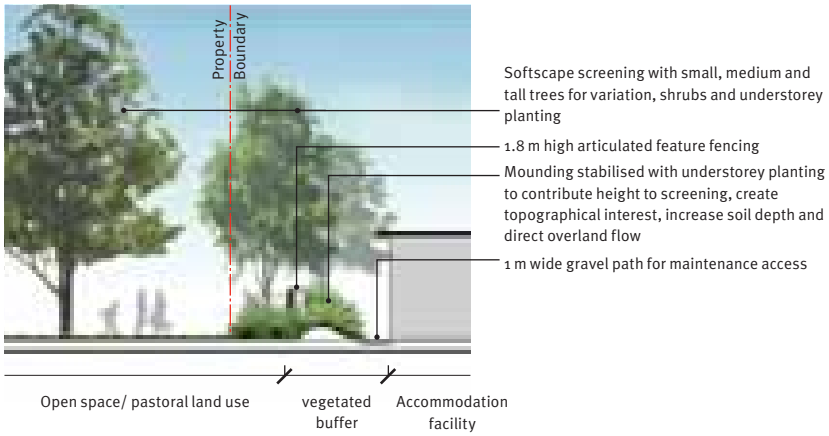
Articulating boundary lines through planting and fencing can create variation along an extensive boundary.

If required, very tall landscaping may be appropriate in some locations to prevent views into, or from, an accommodation facility.

This could be accomplished through incorporation of tall, columnar trees and raised hardscape elements such as feature fencing or walls. The horizontal alignment of fences, walls and softscape can also vary. Fencing can be louvered to retain desired views, or stepped to break down the extent of long lengths of fencing.

Fences and walls can be over extended or slotted to create points of interest through shadowing. It may be appropriate to consider using different materials for highly visible fence lines. For example, the visual amenity of Colourbond and timber palings (particularly in long lengths) can be improved by introducing variation through integration of materials such as corten, perforated metal or masonry walls.

Informal screening to boundary interface



Indicative section of landscaping to boundary adjoining public place/open space

Superseded

Internal site planning and landscaping to break-up distant views

Distant views into an accommodation facility, particularly from a higher view points, can be improved through provision of internal green pockets and corridors.

Integration of medium to tall trees (15-30m) with broad canopies throughout an accommodation facility will help to break down the overall building mass and hard-standing areas.

The planting will soften the appearance of an accommodation facility and help it appear as a series of smaller built areas. Tall trees will also provide height and interest to what can be a low and repetitious building type.

Superseded

*Fenceline colour for representative purposes only

Indicative plan of landscaping integrated internally and to boundary interface of non-resident worker accommodation

Species suitable for Design benchmark 1-5: Contributing to amenity from a public road or public place

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Trees			
Black she oak	Allocasuarina littoralis	ï	
Soap tree	Alphitonia excelsa	ï	
Hoop pine	Araucaria cunninghamii	ï	
Bottle tree (broad leaved)	Brachychiton australis	ï	ï
Bottle tree (narrow leaved)	Brachychiton rupestris	ï	ï
Freshwater powderpuff	Barringtonia acutangula	ï	ï
Yellow siamea	Cassia siamea	ï	
Bangalay / Southern mahogany	Eucalyptus botryoides	ï	ï
Blackbutt	Eucalyptus pilularis	ï	ï
Poplar box	Eucalyptus populnea	ï	
Wallangarra white gum	Eucalyptus scoparia	ï	ï
Forest red gum	Eucalyptus tereticornis	ï	ï
Wilga / Australian Willow	Geijera parviflora	ï	ï
Brush Box	Lophostemon confertus	ï	
Yellow poinciana	Peltophorum pterocarpum	ï	
Pink trumpet tree	Tabebuia palmeri		
Weeping lilly pilly	Waterhousia floribunda		ï
Shrubs			
Snowy river wattle	Acacia boormanii	ï	ï
Midgenberry	Austromyrtus dulcis	ï	
Swamp banksia	Banksia robur	ï	ï
Wallum bottlebrush	Callistemon pachyphyllus	ï	
Fine leaf cordyline	Cordyline stricta	ï	ï
Pinnate hop bush	Dodonea pinnata	ï	
Emu bush	Eremophila maculata	ï	ï
Seven dwarfs grevillea	Grevillea floribunda	ï	ï
Dwarf claret tops	Melaleuca linariifolia (dwarf)	ï	ï
Coastal rosemary	Westringia fruticosa	ï	ï
Groundcovers, Grasses and Vines			
Kangaroo paw	Anigozanthos 'Bush Ranger'	ï	
Burr daisy	Calotis cuneifolia	ï	ï
Yellow buttons	Chrysocephalum apiculatum	ï	ï
Paroo lily	Dianella caerulea	ï	ï
Spreading flax lily	Dianella revoluta	ï	
Dietes	Dietes bicolor	ï	ï
Creeping goodenia	Goodenia rotundifolia	ï	ï
Bronze rambler	Grevillea 'Bronze Rambler'	ï	ï
Spiny-headed mat-rush	Lomandra longifolia	ï	
Many-flowered mat-rush	Lomandra multiflora	ï	
Purple flag	Patersonia sp.	ï	ï

Note: Maximum use of locally occurring native species in landscaping is required under EDQ Guideline no. 14 Environment and natural resourses sustainability

Superseded

Araucaria cunninghamii

Grevillea 'Bronze Rambler'

Callistemon pachyphyllus

Westringia fruticosa

Anigozanthos 'Bush Ranger'

Dianella caerulea

Superseded

Design benchmark 1-6

Considering adjoining non-residential uses

Landscaping to improve visual impacts and mitigate noise

Design strategies for boundaries adjoining non-residential uses may differ from those for boundaries adjoining residential uses. Consideration of visual amenity from both sides of the boundary may be necessary, in addition to any noise impacts arising from non-residential uses.

Visual amenity

The visual impact of non-residential areas on non-resident worker accommodation can be reduced through integrating both hardscape and softscape landscape treatments. Hardscape can provide an opaque barrier between the uses, while softscape can provide softening and articulation. In some cases, particularly along street frontages, it may be appropriate to consider fence treatments that are similar to that used on the adjacent land use. This could include adapting materials such as galvanised or corten steel sheeting, concrete or timber.

Softscape treatments such as dense planting and mounding can provide further screening to undesired views. Planting along boundaries adjoining non-residential uses is similar to that described under Design benchmark 1-3.

Noise mitigation

Where an accommodation facility adjoins noisy uses, it may be appropriate to consider noise mitigation measures. When determining a suitable noise attenuation treatment it should be noted that effective sound control is dependent on the interaction of several factors, including:

- local climatic conditions such as temperature, humidity and wind direction and speed
- topography
- intensity, frequency and direction of noise
- location of noise attenuation treatment
- spacing, species and density of the plant screening (if integrated).

Indicative plan depicting possible layout solution for noise mitigation

Superseded

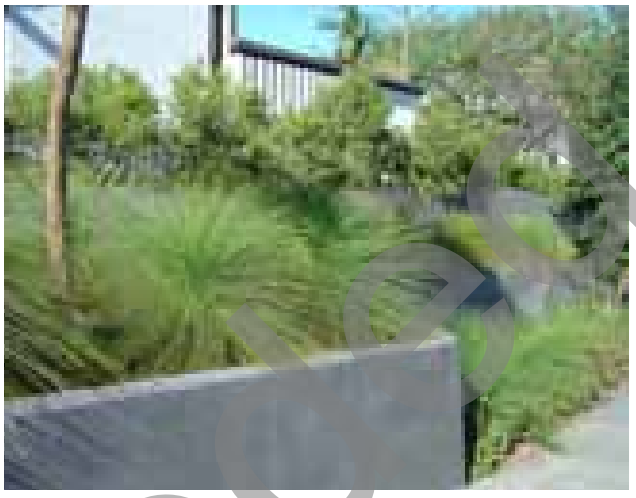
In many instances these interrelationships are complex and unpredictable; therefore it can be appropriate to engage an acoustic specialist to measure noise types and levels prior to developing noise mitigation strategies.

Additionally, the following principles may be considered during the design process:

- planting does not significantly reduce noise, although it can help to reflect, absorb and deflect higher frequency noises to some degree
- plants with thick, fleshy leaves are generally most effective in reflecting, absorbing and deflecting noise
- a solid barrier such as an earth mound or concrete wall is required to create a significant impact by absorbing or deflecting noise
- soft materials such as Styrofoam and acoustic panels are methods for absorbing sound
- timber fencing is not as effective as solid materials
- for optimum impact, placement of barriers should be as close to the noise source as possible
- masking noises with white sounds such as trickling water can be an effective way of alleviating negative noises.

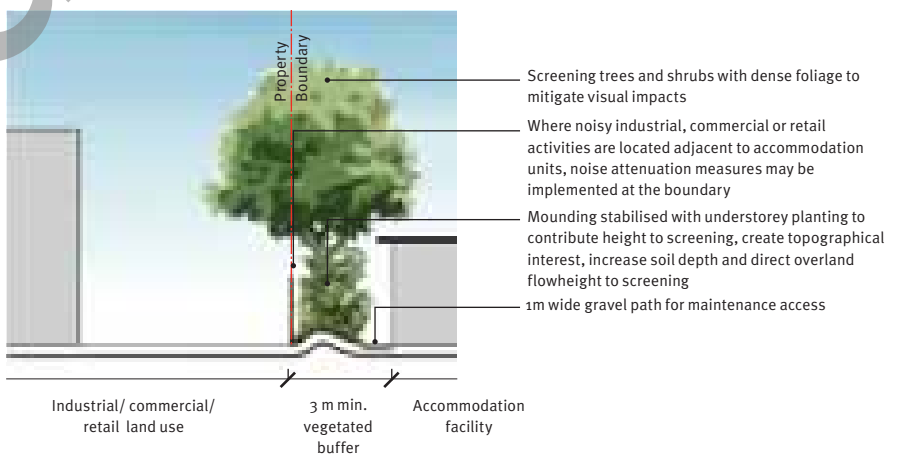
As noise mitigation can become costly, it may be appropriate to identify the areas along a boundary that are particularly impacted by noise and integrate noise attenuation measures only in those areas.

A combination of walls, mounding and planting beds will ensure noise impacts are minimised and visually appealing outcomes are achieved.



Integrated walls, fencing and planting for visual screening and acoustic mitigation purposes

Integrated walls, fencing and planting for visual screening and noise mitigation purposes



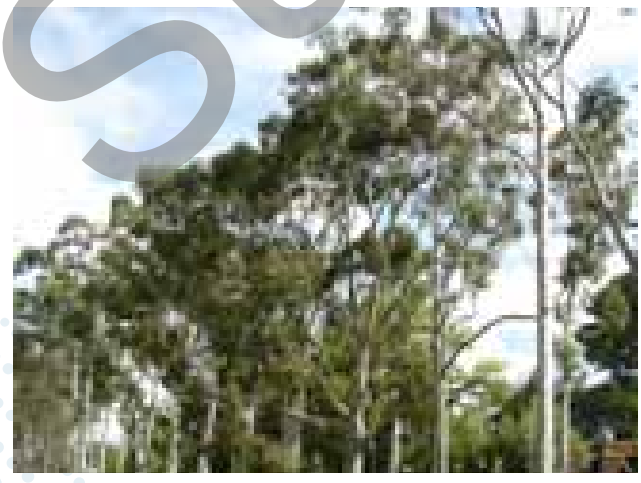
Indicative section depicting landscaping to boundary adjoining industrial, commercial/ retail use use

Superseded

Species suitable for Design benchmark 1-6: Considering adjoining non-residential uses

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Trees			
Soap tree	Alphitonia excelsa	ï	
Kurrajong	Brachychiton populneus	ï	ï
Yellow siamea	Cassia siamea	ï	
Pink bloodwood	Corymbia intermedia	ï	ï
Bangalay / Southern mahogany	Eucalyptus botryoides	ï	ï
Blackbutt	Eucalyptus pilularis	ï	ï
Poplar box	Eucalyptus populnea	ï	
Wallangarra white gum	Eucalyptus scoparia	ï	ï
Forest red gum	Eucalyptus tereticornis	ï	ï
Brush Box	Lophostemon confertus	ï	
Pink trumpet tree	Tabebuia palmeri	ï	
Shrubs			
Snowy river wattle	Acacia boormanii	ï	ï
Midgenberry	Austromyrtus dulcis	ï	
Swamp banksia	Banksia robur	ï	ï
Wallum bottlebrush	Callistemon pachyphyllus	ï	
Fine leaf cordyline	Cordyline stricta	ï	ï
Pinnate hop bush	Dodonea pinnata	ï	
Emu bush	Eremophila maculata	ï	ï
Seven dwarfs grevillea	Grevillea floribunda	ï	ï
Dwarf claret tops	Melaleuca linariifolia (dwarf)	ï	ï
Coastal rosemary	Westringia fruticosa	ï	ï
Groundcovers, Grasses and Vines			
Kangaroo paw	Anigozanthos Bush Ranger	ï	
Burr daisy	Calotis cuneifolia	ï	ï
Yellow buttons	Chrysocephalum apiculatum	ï	ï
Paroo lily	Dianella caerulea	ï	ï
Spreading flax lily	Dianella revoluta	ï	
Dietes	Dietes bicolor	ï	ï
Creeping goodenia	Goodenia rotundifolia	ï	ï
Bronze rambler	Grevillea Bronze Rambler	ï	ï
Spiny-headed mat-rush	Lomandra longifolia	ï	
Many-flowered mat-rush	Lomandra multiflora	ï	
Purple flag	Patersonia sp.	ï	ï

Superseded



Eucalyptus tereticornis

Dietes bicolor

Design benchmark 1-8

Planning for changing circumstances over time

Creating adaptable landscapes

By its nature, non-resident worker accommodation may be removed completely or partially when demand for accommodation declines. A site may be redeveloped or some buildings may be retained and used for another purpose.

Landscape is an important element in this context and consideration at the time of initial site planning can maximise the long term benefits for the site and surrounding areas. Landscape is also important after a site has been cleared and during the transition period if buildings are removed over an extended period.

Site planning

At the time of initial site planning, relevant landscape considerations include:

- placement of shade trees, particularly in car parks and along access ways to maximise their potential to be retained. This is likely to be best achieved if the site layout coincides with a potential layout for future public roads or any potential areas of public open space
- the design and location of on-site recreational spaces that may be suitable for another use or for use as public open space
- selection of fencing or planting along site boundaries that would be suitable to be retained for other potential uses of the site

During period of change

Boundary landscapes

If the boundary landscape has been planned and implemented to ameliorate the visual impact of the accommodation facility, it is appropriate to maintain boundary landscapes during any downsizing. The final outcome of boundary landscapes will be dependent on the future intended use of the site; however, maintaining the existing boundary landscapes has some advantages, such as:

- maintaining security through retention of fencing
- providing visual amenity
- protecting "green corridors".

Site entry features, outdoor furniture, signage, fencing or interpretive art may not be required as a result of changing circumstances. Rationalisation or complete removal of such elements may be applicable.

Internal landscapes

During any downsizing period, it may be appropriate to retain all existing internal landscapes for temporary general amenity, prior to any complete removal of the accommodation facility.

The internal road and footpath layout may lend itself to future access or adaptive reuse.

Existing landscapes associated with buildings identified to be retained or reused may also be suitable for retention. Similarly, trees across the site may be maintained for provision of shade, shelter and visual definition of spaces.

As unvegetated or unsealed areas can become barren and eroded where hard-standing areas are removed, they will need to be replaced with low maintenance and sustainable temporary landscapes. Seeding, using a native grass mix, is a viable option.

To ensure safe environments are maintained, CPTED principles continue to be relevant, particularly as natural surveillance may be reduced as a result of changing uses (see Design benchmark 2-5).

Native grasses for temporary landscapes

Superseded

Species suitable for Design Benchmark 1-8: Planning for changing circumstances over time (cleared sites)

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Native grass mix			
Barbed wire grass	Cymbopogon refractus	ï	ï
Wallaby grass	Danthonia sp.		ï
Blue flax lily	Dianella sp.	ï	ï
Bunch speargrass	Heteropogon contortus	ï	ï
Japanese blood grass	Imperata cylindrica	ï	
Mat rush	Lomandra longifolia	ï	ï
Water couch	Paspalum distichum		ï
Swamp foxtail grass	Pennisetum alopecuroides	ï	ï
Kangaroo grass	Themeda triandra	ï	ï

Note: Maximum use of locally occurring native species in landscaping is required under EDQ Guideline no. 14 Environment and natural resourses sustainability

Pennisetum alopecuriodes

Dianella species

Superseded

Design benchmark 1-11

Providing adequate physical infrastructure

Designing landscape infrastructure

Where practicable, Water Sensitive Urban Design (WSUD) principles may be implemented to alleviate potential development impacts on existing infrastructure networks.

As defined in WSUD Technical Design Guidelines for South East Queensland (2006):

"WSUD is a holistic approach to the planning and design of urban development that aims to influence negative impacts on the water cycle and protect the health of aquatic ecosystems"

The primary objectives of WSUD include:

- protecting natural features
- protecting ecological values
- conserving the natural hydraulic processes of catchments
- minimising demands on reticulated water supply system
- minimising sewage and toxins entering natural waterways
- improving visual amenity of landscape through integrating water.

WSUD includes, but is not limited to, systems such as swales and buffer strips, bioretention swales, sedimentation basins, bioretention basins, constructed wetlands and infiltration measures.

As the soil profiles across regional areas of central Queensland are predominately poorly draining, such as clay-loams, limitations associated with best management practices for WSUD will occur. Generally, systems that collect or transport stormwater are feasible in these areas, with appropriate soil conditioning and integration of filtration media such as gravel and sand. Typically, natural infiltration of stormwater in these areas will be challenging.

Subsequently, WSUD systems appropriate for these areas include:

- rock-lined or vegetated swales
- bioretention swales.

Vegetated swales are utilised to transport stormwater, either instead of, or with, underground pipe drainage systems.

Vegetated bioretention swale

Rock-lined and vegetated bioretention swale

Turf swale

Superseded

They can be used to filter and remove coarse and medium sediments from stormwater runoff, and also to slow the downstream movement of water.

Vegetated swales can be situated in open space areas, carparks, easements and adjacent to roads and footpaths. Suitable vegetation includes turf, sedges and tufted native grasses.

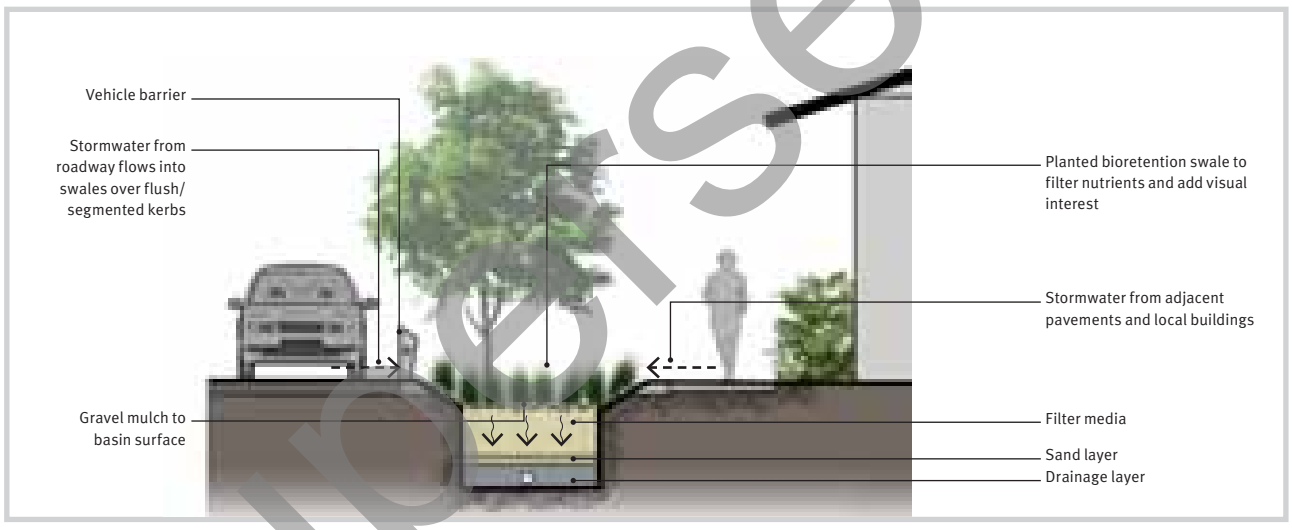
Bioretention swales are similar to vegetation swales in that they also convey stormwater. However, filtration is enhanced through integration of subsurface filter media. Bioretention swales can also be incorporated in landscapes for the purpose of water storage and reuse.

A subsurface bioretention trench can comprise three layers: filter media (sandy loam), a transition layer (coarse sand) and a drainage layer consisting of a perforated collection pipe surrounded by fine gravel.

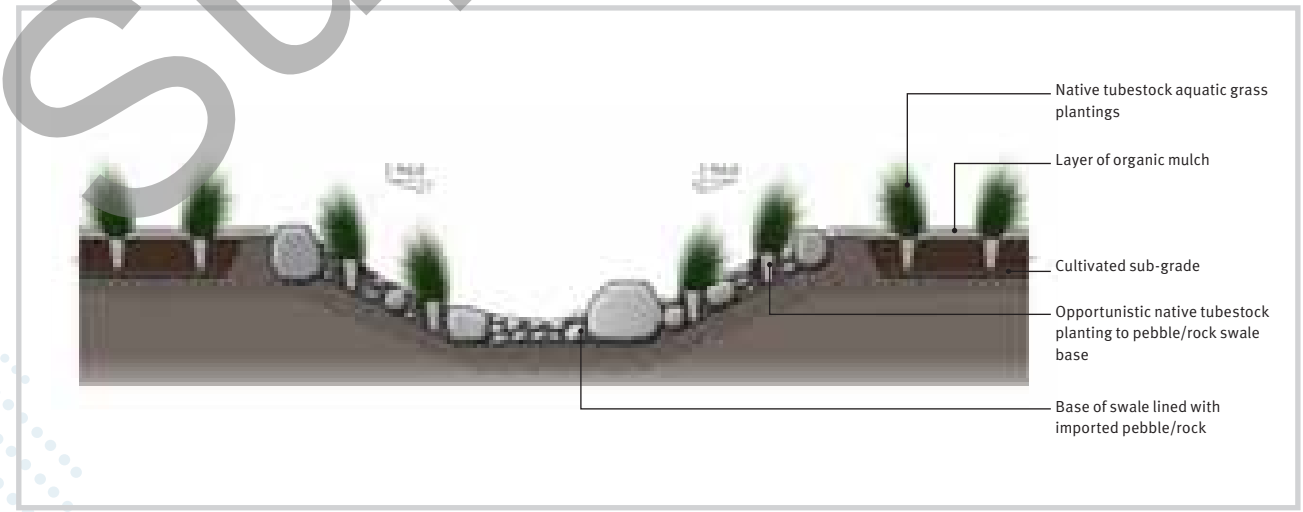
Additional treatment of existing soils may be required depending on soil conditions or properties. It is suggested that soil testing be undertaken before implementing WSUD systems.

Where trees are planted near swales it is important that root systems are not invasive, and that trees are planted in imported topsoil in a suitable tree pit.

Plants have a functional role in stormwater treatment and erosion protection. Species selection is critical for the long term functional performance and structural integrity of WSUD systems. Additionally, maintenance costs can be reduced through adopting suitable high plant densities and selecting suitable species.



Typical section of a vegetated bioretention swale adjacent to hard-standing areas



Typical section of rock-lined and vegetated swale

Superseded

Species suitable for Design benchmark 1-11: Providing adequate physical infrastructure (swales)

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Trees			
White bottlebrush	Callistemon salignus	ï	ï
Weeping bottlebrush	Callistemon viminalis	ï	ï
Forest red gum	Eucalyptus tereticornis		ï
Brush box	Lophostemon confertus	ï	
River tea tree	Melaleuca bracteata	ï	ï
Flax-leaf paperbark	Melaleuca linariifolia	ï	ï
Prickly-leaf paperbark	Melaleuca nodos	ï	ï
Broad-leafed paperbark	Melaleuca quinquenervia	ï	ï
Small-leaved paperbark	Melaleuca sieberi	ï	ï
Shrubs			
False coffee bush	Breynia oblongifolia	ï	ï
River bottlebrush	Callistemon sieberi	ï	ï
Purple coral pea	Hardenbergia violacea	ï	ï
Dogwood	Jacksonia scoparia	ï	ï
Wild may	Leptospermum polygalifolium	ï	ï
Crinkle bush	Lomatia silaifolia	ï	ï
Coastal boobialla	Myoporum acuminatum	ï	
Groundcovers, Grasses and Vines			
Blue trumpet	Brunoniella australis		ï
Tall sedge	Carex appressa		ï
Flecked flat-sedge	Cyperus gunnii	ï	ï
Lip ferns	Cheilanthes sp.	ï	
Blue flax-lily	Dianella caerulea	ï	
Pale flax-lily	Dianella longifolia	ï	ï
Dietes	Dietes bicolor	ï	ï
Rough saw-sedge	Gahnia aspera	ï	ï
Blady grass	Imperata cylindrica	ï	ï
Common rush	Juncus usitatus		ï
Spiny-headed Mat-rush	Lomandra longifolia	ï	ï
Rough silkpod	Parsonsia lanceolata		ï
Common bracken	Pteridium esculentum	ï	
Kangaroo grass	Themeda australis	ï	ï

Note: Maximum use of locally occurring native species in landscaping is required under PDA Guideline no. 14 Environment and natural resourses sustainability

Superseded

Callistemon viminalis

Melaleuca linarifolia

Hardenbergia violacea

Lomatia silaifolia

Gahnia aspera

Themeda species

Superseded

Design benchmark 2-2

Managing the impacts of climate

Creating comfortable external spaces i hot arid environments

Through careful planning and design, the duration and level of uncomfortable conditions can be minimised to increase the benefits of outdoor spaces. Climatic parameters that influence thermal comfort in hot arid environments include solar radiation, wind airflows and evaporation. Landscape design responses and strategies can be influenced through applying these parameters to the various micro-climates that occur across large development sites.

The following table identifies typical climatic zones which can influence micro-climate across development sites, and defines potential impacts associated with integrated landscape strategies.

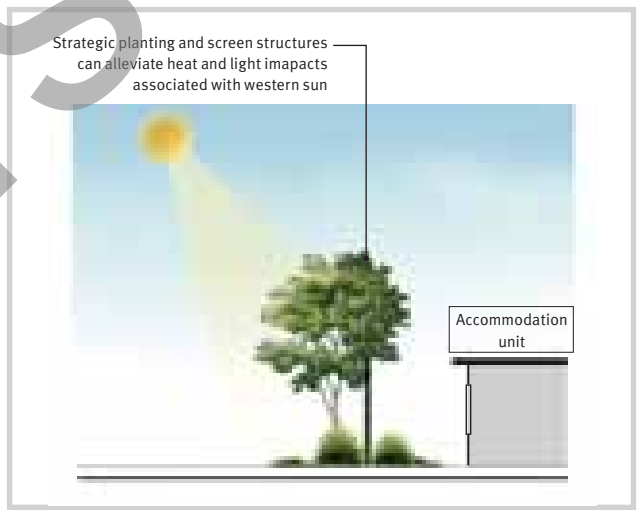
Micro-climate	Strategies to mitigate potential climatic conditions	Impacts on micro-climate
Shelter screening (particularly at boundaries)	» high barrier trees » soil stabilisation through planting and mulching	» reduce wind speed » minimise erosion » minimise event of dust storm
Internal landscaped areas	» large areas of green space » shading through large canopy trees and structures » integrating water elements/surfaces	» reduce direct solar radiation » reduce temperature » improve quality
Parking areas	» shading through large canopy trees and structures » integrating water elements/surfaces	» minimise solar intensity » reduce heat loading

The ephemeral nature of hot arid climates should also be considered when developing landscape strategies. This would typically include consideration of permanence of water and plants, potential for flash flooding, severity of inherent drought conditions and variations in seasonal climate.

The use of arid, local plant species with the ability to withstand extended periods of drought, hot drying winds and local soil conditions will ensure successful plant establishment.

Shade/shelter structures incorporated in landscapes may be designed and orientated to provide optimal protection. This could include design features such as battens on the western side to alleviate heat from the western sun or solid screening of the structure to provide shelter from high winds.

Preventing soil erosion is an important consideration in arid environments. To minimise erosion, slopes may be limited to the grades defined under Earth mounding in Design benchmark 1-3, and stabilised with vegetation. Slopes associated with longitudinal overland flow paths (including swales) should be limited to between 1 percent and 4 percent to avoid scouring.



Indicative section of screening to accommodation unit facing western sun

Superseded

Species suitable for Design benchmark 2-2: Managing the impact of climate (shade trees)

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Trees			
Soap tree	Alphitonia excelsa	ï	
Rusty gum	Angophora leiocarpa	ï	
Yellow siamea	Cassia siamea	ï	
Moreton Bay fig	Ficus macrophylla	ï	
Hills fig	Ficus microcarpa 'Hillii'	ï	
Crow's ash	Flindersia australis	ï	
Tulipwood	Harpullia pendula	ï	
Brush box	Lophostemon confertus	ï	
Yellow poinciana	Peltophorum pterocarpum	ï	
Brown pine	Podocarpus elatus		ï
Weeping lilly pilly	Waterhousia floribunda		ï

Note: Maximum use of locally occurring native species in landscaping is required under PDA Guideline no. 14 Environment and natural resourses sustainability

Ficus microcarpa 'Hillii'

Peltophorum pterocarpum

Superseded

Design benchmark 2-4

Providing for vehicle, pedestrian and cycle movement

Landscaping carparks

The following objectives apply to the landscape design of carparks:

- reducing the visual impact of carpark areas
- providing shade for cars and pedestrians
- ensuring the landscaping is an integral part of the carpark
- ensuring that landscaping does not interfere with functioning and manouverability within the carpark
- integrating sustainable design principles such as WSUD where feasible.

Planting around and throughout carparks can improve their visual appearance and provide shade for cars without obscuring visibility. Large canopy trees can also assist with reducing heat loading associated with these large hard standing areas.

Carparks may also integrate planting for the purpose of reducing the extent of the hard-standing area. This can be achieved through provision of softscape treatments in islands, medians and swales separating groups of parking bays.

Plant types that should be avoided in carparks include those that:

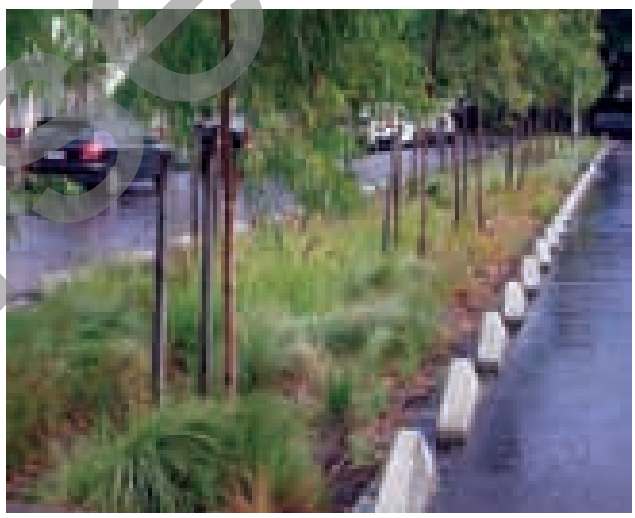
- drop branches, gum or fruit
- are deciduous
- have invasive root systems that may interfere with drainage .

The integration of intermittent vegetated drainage swales can aid in softening the visual impact of carparks.

Swales positioned longitudinally across the slope of the pavement and around the carpark perimeter can be implemented as an alternative to conventional drainage systems. This can be acheived through incorporating flush concrete edges with wheel stops, or slots in upstand kerbing to allow stormwater to fall from the carpark pavement into the adjacent swale.

Other stormwater control measures for collection and detention of water for localised drip irrigation purposes may be explored. This will aid in the sustainability and maintenance of the carpark, and reduce the level of stormwater entering the reticulated stormwater drainage systems.

Densely vegetated carpark providing shade and reducing heat loading



Swale within carpark median

Pedestrian access within carpark

Superseded

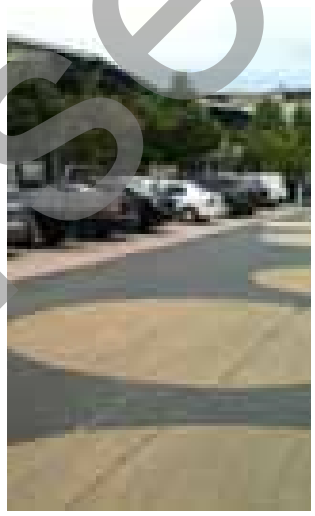
Carparks adjacent to a site entry should be visually separated through landscape elements such as walls, feature fencing and planting.

Pedestrian connections throughout and around carparks are integral for the functioning of a carpark, with pedestrian convenience and safety (particularly lighting) being essential design considerations.

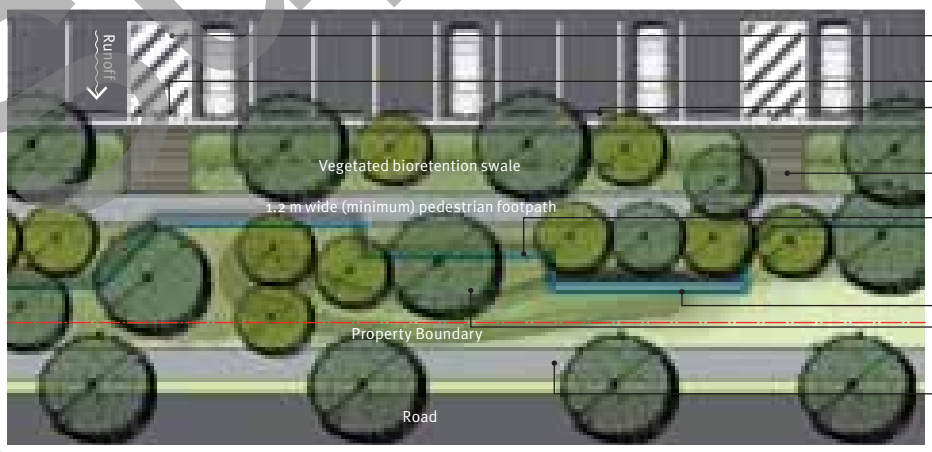
Noise mitigation measures such as walls, mounding and softscape may be considered along carpark edges adjoining residential uses or accommodation buildings. For further information regarding noise mitigation measures, refer to Design benchmark 1-6.

There are many options for carpark pavement surfaces ranging from compacted road base gravel to high end finishes such as coloured concrete and exposed aggregate.

Pedestrian access adjacent to carpark



Carpark surface materials:
painted asphalt (left), coloured concrete with exposed aggregate (right)



Pedestrian access from carpark to adjacent footpath
Bollards
Wheel stops to replace typical upstand kerb, allowing surface runoff into swale
Vegetated swale with tall shade trees and pedestrian bridges
Articulated fencing line with multiple hardscape screening treatments to create variety along extensive fencelines
Freestanding feature wall
Mounding and softscape screening on street side of fence, including tall trees and shrubs
Roadside treatment including 1.2m wide footpath and medium canopy trees in turf

*Fenceline colour for representative purposes only

Indicative plan of carpark with provision of shade trees, pedestrian access and integrated bioretention swale

Superseded

Species suitable for Design benchmark 2-4: Providing for vehicle, pedestrian and cycle movement (car parks)

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Trees			
Lightwood	Acacia implexa	ï	
Black she oak	Allocasuarina littoralis	ï	
Soap tree	Alphitonia excelsa	ï	
Bangalay / Southern mahogany	Eucalyptus botryoides	ï	ï
Blackbutt	Eucalyptus pilularis	ï	ï
Poplar box	Eucalyptus populnea	ï	
Wallangarra white gum	Eucalyptus scoparia	ï	ï
Forest red gum	Eucalyptus tereticornis	ï	ï
Wilga / Australian Willow	Geijera parviflora	ï	
Brush Box	Lophostemon confertus	ï	ï
Shrubs			
Snowy river wattle	Acacia boormanii	ï	ï
Midgenberry	Austromyrtus dulcis	ï	
Swamp banksia	Banksia robur	ï	ï
Wallum bottlebrush	Callistemon pachyphyllus	ï	
Fine leaf cordyline	Cordyline stricta	ï	ï
Pinnate hop bush	Dodonea pinnata	ï	
Emu bush	Eremophila maculata	ï	ï
Seven dwarfs grevillea	Grevillea floribunda	ï	ï
Dwarf claret tops	Melaleuca linariifolia (dwarf)	ï	ï
Coastal rosemary	Westringia fruticosa	ï	ï
Groundcovers, Grasses and Vines			
Kangaroo paw	Anigozanthos Bush Ranger	ï	
Burr daisy	Calotis cuneifolia	ï	ï
Yellow buttons	Chrysocephalum apiculatum	ï	ï
Paroo lily	Dianella caerulea	ï	ï
Spreading flax lily	Dianella revoluta	ï	
Dietes	Dietes bicolor	ï	ï
Creeping goodenia	Goodenia rotundifolia	ï	ï
Bronze rambler	Grevillea Bronze Rambler	ï	ï
Spiny-headed mat-rush	Lomandra longifolia	ï	
Many-flowered mat-rush	Lomandra multiflora	ï	

Note: Maximum use of locally occurring native species in landscaping is required under PDA Guideline no. 14 Environment and natural resourses sustainability

Acacia implexa

Banksia robur

Superseded

Design benchmark 2-5

Designing buildings, structures and facilities for internal amenity

Landscapting for internal amentiy

Landscaping between facing accommodation units

Landscaping in areas between facing front doors of accommodation can provide visual and functional amenity. These areas are often small in area requiring careful consideration.

The biggest restriction associated with landscaping in confined spaces is the size and height of plants. Generally, large plants tend to dominate small spaces, therefore it may be appropriate to integrate smaller plants with small leaves and flowers to create the illusion of a larger area.

When landscaping for confined spaces, extracting maximum impact from each element can draw attention away from the narrowness of the space. Landscape elements that may be suitable include feature plants, raised planter beds, feature pot plants, water features, and statues or interpretive art pieces.

While covered areas provide an optimal micro-climate for plant growth, drip irrigation may need to be considered. Additionally, to ensure humidity and heat is managed within these spaces, overhead structures should be light in colour to reflect solar radiation, and slotted to exhaust heat.

The use of natural materials for accommodation unit thresholds, such as hardwood timber (treated), will enhance the visual qualities of these spaces. Practical elements such as seats or benches (which can also provide storage) can be built into decking structures.

Screening of unattractive elements

When considering what elements within a site should be screened, it is important to understand that some elements (such as a hydrant booster) should remain visible for practical purposes.

For elements such as bin compounds, storage structures, water tanks and large electrical cabinets, landscape screening may be appropriate on those sides which are visible from adjoining properties, public streets or footpaths. However, it is important to consider access requirements associated with the element being screened.

Screening can comprise a combination of hardscape structures and softscape planting; for example, a timber or steel batten trellis with columnar planting on the visible side. The scale of screening should relate to the element being screened and adjacent landscape treatments. Similarly, the plant species and materials used may be similar to the surrounding landscape to ensure the element and associated screening blend in, rather than becoming a feature or focal point.

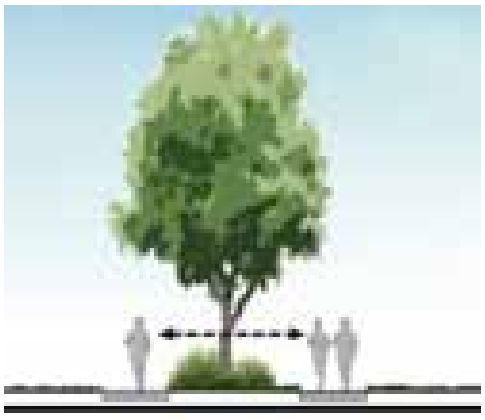
Refer to Design benchmark 1-3 for further guidelines on softscape screening.

Crime prevention through environmental design (CPTED)

CPTED should be considered and applied to landscapes across all development sites to reduce the opportunity for, and likelihood of, crime. CPTED principles include:

- accommodating passive surveillance
- ensuring the way through an area is clear and obvious
- clearly delineating private, semi-private, community-group and public spaces
- providing a sense of individual and community ownership for shared spaces
- regularly managing and maintaining spaces
- reducing risk of assault.

These principles and corresponding landscape approaches are further detailed in the *Crime Prevention through Environmental Design Guidelines for Queensland 2007* published by the Queensland Government.



Allowing for passive surveillance by maintaining sightlines

Landscaping depicting CPTED principle: accommodating passive surveillance

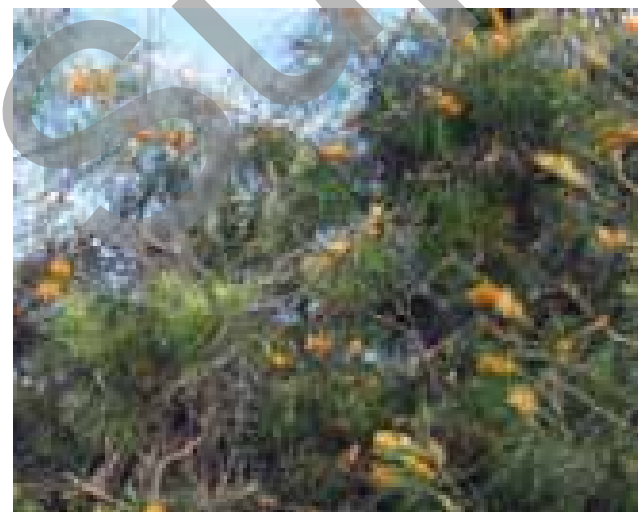
Superseded

Species suitable for Design benchmark 2-5: Designing buildings, structures and facilities for internal and external amenity (low level light tolerant species and screening species)

Common name	Botanical name	Suitable soil types	
		Well-drained	Poorly draining
Low level light species			
Maidenhair fern	Adiantum atroviride	ï	
Giant maidenhair fern	Adiantum silvaticum	ï	
Chinese evergreen	Aglaonemas spp.	ï	
Native ginger	Alpinia caerulea	ï	
Cast iron plant	Aspidistra elatior	ï	
Variegated greater brown sedge	Carex brunnea	ï	ï
Brown tamarind	Castanospora alphandii	ï	ï
Kangaroo vine	Cissus antarctica	ï	
Narrow-leaved palm lily	Cordyline stricta	ï	ï
Three-veined laurel	Cryptocarya triplinervis	ï	
Madagascar dragon tree	Dracaena marginata	ï	
Rainforest spinach	Elatostema reticulatum	ï	
Mat rush	Lomandra longifolia	ï	
Yellow-fruited mat rush	Lomandra spicata	ï	
Philodendron	Philodendron spp.	ï	
Five-leaved water vine	Pothos longipes	ï	ï
Mother-in-law's tongue	Sansevieria spp.	ï	ï
Screening species			
Spotted laurel	Aucuba japonica	ï	
Common box	Buxus sempervirens	ï	
Callistemon	Callistemon spp.	ï	ï
Mexican orange blossom	Choisya ternata	ï	
Golden dewdrop	Duranta repens	ï	
Grevillea	Grevillea spp.	ï	
Jungle geranium	Ixora coccinea	ï	
Mock orange	Murraya paniculata	ï	ï
Blue plumbago	Plumbago auriculata	ï	ï
Lilly pilly	Syzygium spp.	ï	ï

Note: Maximum use of locally occurring native species in landscaping is required under EDQ Guideline no. 14 Environment and natural resourses sustainability

Superseded



Grevillea spp.

Lomandra longifolia

Planting guidelines

Plant establishment

Planting

Intensive revegetation or screen planting can be done cost-effectively by using a mechanical tree planter. Preferably the planter should make a deep planting furrow for seedlings with a press wheel compacting the soil on either side of the planted seedling.

Where planting areas require both seeding and planting, the two operations can be conducted simultaneously with a mechanical tree planter. Seedlings are planted into a ripped furrow at the same time as seed is trickled onto the surface through a trailing hose fed by a rear-mounted seed box.

Hand planting is generally more appropriate in road frontages and entry areas where the emphasis is on focussed landscape enhancement rather than bulk planting for screening or revegetation. In these areas the seedling should be placed into loose topsoil so that the potting material is flush with the adjacent finished surface level. The topsoil can then be compacted firmly around the seedling to create a localised depression that captures surface moisture.

Fertiliser for each seedling may not be required if there is residual fertility in the soil or special planting soil is used. Irrigation of each seedling is recommended within three hours of planting to settle the plant within the soil and to carry the plant through the first critical days after planting. Irrigation may not be necessary if adequate rainfall occurs at the same time as planting.

Seeding

If seeding is suitable for the location, a diverse mix can be applied. This can produce a better coverage than planting alone, particularly if a natural appearance is preferred, because the understorey and mid to upper storey structure typically appear less 'artificial' than formal row planting. Also, seeding often establishes plants with better root development than planted stock.

Direct seeding should be weed free. This can be achieved by creating niches for hand thrown seed, or using machine seeders to rip the soil ahead of the seeding mechanism.

Seeding rates are best determined in consultation with local revegetation experts. All seed should be treated (e.g. scarified or smoked) before sowing to break dormancy. The seed can be mixed with a bulking agent (such as "brickies" sand) for better distribution across the sowing area.

Scheduling

The optimal time for planting and seeding is in early spring (August/September/October) when sufficient rain has fallen but also before the very high temperatures of summer begin. Alternatively, there is a secondary planting season in late summer/early autumn (February/March/April) when temperatures are dropping but rainfall is still adequate to support new planting/seeding areas.

In situations where seedlings are to be irrigated, planting time is not as critical. However, increased water usage will be required to successfully irrigate during dry periods.

Superseded

Plant selection

Suitable species are listed for each Design benchmark of this guide. They have been chosen with an emphasis on endemic vegetation wherever possible. However, where endemics could not achieve the desired outcomes, other suitable natives have been chosen. All plant listings include species that:

- present in a variety of forms, colour and strata
- are hardy and tolerant of the local site conditions
- provide habitat for a diversity of native fauna known to inhabit the area
- should establish without ongoing irrigation
- will require minimal ongoing maintenance.

Maintenance and monitoring

Careful consideration during the planning and design stages of landscape and revegetation works will reduce the need for ongoing maintenance in the years following initial seeding or planting. However, minimal maintenance regimes should include weed control, infill planting where plants have failed and firebreak maintenance. Furthermore, regular maintainenance of boundary fences will reduce potential impacts from pests such as rabbits or insects.

Regular monitoring will allow for progress checks and can identify maintenance needs and actions, typically carried out for a minimum 18 month period post construction completion.

Maintenance of revegetation and landscaping is discussed in the following pages of this guide.

Superseded

Maintenance

Maintenance of landscaped areas is essential for ensuring the survival of landscape treatments and high standards of presentation at all times. It is important to establish robust and durable management standards with a view to minimising ongoing long-term landscape maintenance. Partnerships with the local government and other stakeholders are important in ensuring that high standards of maintenance are delivered. Maintenance regimes will embrace both short-term intensive efforts on newly developed areas, as well as ongoing input for established landscaping.

Short-term maintenance

Over the first two to three years after installation, short-term maintenance follow up will be necessary for establishing the initial landscape and revegetation planting. This will cater for general maintenance, fencing, weed control, pest control, irrigation needs, fire prevention, and replacements to substantial plant loss.

Fencing

Frequent checks of fencing will ensure planted or seeded areas are maintained to a high level. Of particular concern are holes where animals may enter and potentially cause substantial damage, particularly within the first three to four years when plants are maturing. Similarly, restriction of human access is critical during this time to eliminate trampling of plants and creation of worn tracks.

Weed control

Weed control is a critical component of landscaping and revegetation. If weeds are not suppressed adequately before and after seeding or planting, the likelihood of reaching targets is significantly compromised.

For this purpose, seed released by weeds and grasses can be prevented in the period preceding new seeding/planting works by either grazing or application of a knock-down herbicide. Weed control is best undertaken over a long period of time, preferably up to two years post planting or seeding. The method should sufficiently check growth while leaving sufficient dead cover on the surface to protect against wind erosion of the underlying soil, especially through dry, windy months.

A further application of herbicide may be undertaken in the early stages after germination of weed and grass seeds, but must be before planting or seeding.

Rank weed growth can develop in the favourable conditions following planting or seeding. Fertiliser applied with seed or seedlings often stimulates weed growth due to improved soil fertility. If the problem is serious or the area is critical in terms of landscape amenity, slashing or application of a selective herbicide should be considered.

In any areas where planting only is proposed, a combination of a residual and a non-residual herbicide may be applied to achieve a more lasting result. Alternatively, scalping topsoil from planting rows may give the necessary control, provided this does not leave significant areas of bare ground exposed to wind erosion.

Weed control should be continued following landscaping and revegetation until plants are well established and able to compete adequately.

Slashing should be carried out amongst planted seedlings at least annually (preferably twice per year) if significant grass or weed regrowth is occurring. These plants will otherwise compete vigorously with the developing tree and shrub seedlings. They will also present a fire hazard if left as dry-standing vegetation. Particular attention should also be paid to a number of declared weeds and noxious weeds. Weed control must maintain regular checks for infestations in both planted and seeded areas plus any areas of buffer planting that may be disconnected from grazing or cropping practices.

Thorough assessment of the area for declared pest plants or weeds or fauna is highly recommended. See the website for the Department of Primary Industries and Fisheries for advice on management, monitoring, and treatment of pests which will adequately address methods for dealing with declared weed/pest species.

As planted trees and shrubs mature, the specimens should begin to out-compete weeds within the immediate vicinity. It is at this stage that seeding of selected endemic shrubs (as previously listed) may be considered, if a diverse understory is desired.

Superseded

Watering

Irrigation of planted areas is generally only necessary around the high level treatments applied to site entry areas. Irrigation needs can be reduced through careful species selection, the use of quality seedling stock and application of appropriate site preparation measures. This will enhance survival prospects for the first year of establishment. However, if conditions in the initial summer are severe, losses due to stress may still be substantial. The losses can be reduced by hand watering each plant with five to 10 litres every two to three weeks during the hottest months after planting. Such an operation is typically expensive and the cost must be weighted against the alternative need to replant any areas with high rates of loss.

Insects

Seedlings are typically damaged by insect attack during the early stages of growth. Spraying of insecticide may be warranted if there is a serious pest infestation within the first two to three years. Where grasshoppers are proving an issue, baiting maybe appropriate.

Replanting or reseeding

Within the first six to 12 months, all planted and seeded areas should be checked to determine whether any sites need infill planting or seeding.

Long-term maintenance

Over the long term, ongoing maintenance will need to include:

- slashing or mowing to control weed and grass growth along road frontages, in other public areas and between rows in landscape/screen plantations. Frequency of slashing will depend on the location and seasonal conditions. More regular slashing (perhaps three to six times per annum) may be required to maintain public road frontages, areas visible from public open spaces, site entries and more visible sections of service areas
- regular mowing of any irrigated turf areas
- trimming around trees and shrubs to complement slashing or mowing in areas of intensive landscaping or where presentation is more critical (e.g. site entries)
- re-establishing of firebreaks at least annually (by slashing, herbicide application or cultivation) between landscaped areas and vacant land, as well as around buffer vegetation
- periodic removal of dead or dying vegetation and pruning of any substantial dead branches that may be unsightly or which present a safety hazard
- cldearing rubbish along road frontages as needed (to coincide with mowing or slashing routines)
- maintaing reticulation in areas of irrigated landscaping, with routine checking on a monthly basis through dry periods
- controlling weeds as needed, including declared weeds consistent with Department of Primary Industries and Fisheries requirements.

Superseded

Appendix 3: Affordable Housing Contribution

For all non-resident worker accommodation facilities over 100 rooms, a contribution towards affordable housing is required. All facilities over 100 rooms will be required to make available 5 per cent of the rooms to eligible non-resource workers, at a rent they can afford for a period of 5 years from commencement of use of each stage.

Rent affordability is defined in PDA Guideline no. 16 - Housing. An equal amount of rooms should be made available at each of the three income bands set out in the Guideline.

Eligibility

Eligible households are defined as:

- not working in the resources sector
- earning a gross household income consistent with the incomes in the current version of the PDA Housing Guideline (See PDA Guideline no. 16 - Housing)
- living in the local government area or planning to live in the local government area within 3 months
- employed by a business or retired in the local government area
- do not own or rent a house in the local government area.

Management of the rooms

Proponents are encouraged to work with local housing companies to check eligibility and manage the tenancies. A quarterly report will be required to demonstrate compliance with the condition.

In Lieu Payments

Proponents can enter into an infrastructure agreement to make an in lieu payment for the rooms. A discount is available for early payment through negotiation with the MEDQ or its nominated representatives.

The in lieu payment is calculated as:

standard room rate - affordable rent x 5 years x number of rooms - discount = in lieu payment

For further information see PDA practice note no. 8 Calculation of monetary contribution in lieu of affordable housing product.

Superseded

References

To learn more about the resource sector and Western Queensland, refer to the following resources:

Queensland Treasury and Trade
http://www.treasury.qld.gov.au/

Queensland Office of Economic and Statistical Research - Bowen Basin Population Report 2012
http://www.oesr.qld.gov.au/products/publications/bowen-basin-pop-report/index.php

Queensland Department of State Development, Infrastructure and Planning - Coal Infrastructure
http://www.dsdip.qld.gov.au/infrastructure-planning-and-reform/coal-infrastructure.html

State Development Areas
http://www.dsdip.qld.gov.au/coordinator-general/state-development-areas.html

Central Queensland Regional Plan
http://www.dsdip.qld.gov.au/regional-planning/the-central-queensland-regional-plan.html

Maranoa-Balonne Regional Plan
http://www.dsdip.qld.gov.au/regional-planning/maranoa-balonne-regional-plan.html

Queensland Resources Council
http://www.qrc.org.au/

Central Highlands Regional Council
http://www.centralhighlands.qld.gov.au

Isaac Regional Council
http://www.isaac.qld.gov.au

University of Queensland - Centre for Social Responsibility in Mining (CSRM)
http://www.uq.edu.au/research/?page=68335&pid=0

Superseded

Glossary

In this guideline terms have the following meanings:

amenity is an attribute relating to the visual, noise, air and other sensory qualities of a place or a location.

by-laws are instruments that can be introduced under section 54 of the *Economic Development Act 2012*. Similar to local laws introduced by local government in accordance with the *Local Government Act 2009*.

co-located uses are retail, personal, entertainment or recreational services uses, in addition to accommodation and ancillary uses, provided on the site of an accommodation facility for the shared use of occupants and the external community. These uses require approval separate from the use for non-resident worker accommodation. Examples include a retail outlet, laundry, restaurant, gym or hairdresser.

design benchmarks - see part 4.

development application is an application to seek approval for a development proposal under the *Economic Development Act 2012*.

development scheme has the meaning given by the *Economic Development Act 2012*.

development proponent is an individual, group or business looking to make a development application.

hard-standing area is an area covered by a hard surface on which vehicles may be parked.

interim land use plan (ILUP) has the meaning given by *Economic Development Act 2012*.

modular or relocatable buildings are buildings that are designed using standardised dimensions for ease of assembly and repair, and flexibility in placement and arrangement.

microclimate relates to the small-scale climatic conditions of an area within a larger climate.

non-resident worker means a worker who resides in an area for extended periods when employed on projects directly associated with mining, major industry or major infrastructure, but has a permanent place of residence in another area. This includes a worker engaged in fly-in/fly-out or drive-in/drive-out arrangements.

non-resident worker accommodation Means the use of premises for accommodating non-resident workers. The use may include provision of dining facilities, kiosk, amenities and recreation facilities for the exclusive use of occupants and their visitors. The term does not include Short-term accommodation or Tourist park.

passive recreation is a low intensity and low impact form of recreation.

prevailing breezes is the direction from which breezes most frequently blow at a specific geographic location.

priority development area is an area established under the *Economic Development Act 2012* for which EDQ is responsible.

sensitive uses - see definition in develoment scheme.

social impact management plan is a plan prepared following a social impact assessment required for a project declared significant under the *State Development and Public Works Organisation Act 1971* and for projects requiring an environmental impact statement under the *Environmental Protection Act 1994*.

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Acknowledgements

Thank you to the people who have provided valuable assistance and advice in the preparation of this guideline.

Primary consultant

- Malcolm Holz - HOLZink

Government assistance

- Department of Local Government and Planning
- Local Government Association of Queensland

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- Billiton Mitsubishi Alliance (BMA)
- The MAC Services Group Limited (The MAC)
- Queensland Resources Council
- Attendees at the workshop on "Resource worker village accommodation in towns" held 5 February 2010, at the University of Queensland, Brisbane, particularly:
  - David Brereton - University of Queensland
  - Dan Gibson - Conics
  - Louise Thomas - Rio Tinto
  - Daemon Zirbel - Ausco Modular

Photography

- Malcolm Holz - HOLZink
- Ausco Modular Pty Ltd
- The MAC Services Group Limited

Graphic representation

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