

Sustainable Industries

SUSTAINABLE DEVELOPMENT

Urban development & built environment

Sustainable design principles for improved residential developments

Fact sheet
Sustainable design
principles for improved
residential developments



Why is sustainable urban development so important?

Sustainable development is development that meets our current needs while ensuring future generations will be able to meet their needs.

Urban areas in Queensland are under increasing pressure to meet the housing and infrastructure needs of a rapidly growing population.

Urban developments and the built environment have environmental, social and economic impacts during their construction, and throughout their functioning life.

They place demands on our natural resources — air, water, vegetation, soil, and non-renewable energy sources — and our communities.

As a result, it is important for governments, business and the community to plan and act sustainably when shaping our future cities and suburbs.

Informed Australians are now choosing homes, communities and lifestyles that incorporate sustainable design principles. This growing trend offers innovative developers a significant opportunity to increase market share by integrating sustainability into all aspects of their projects.

These initiatives are designed to reduce the environmental impact of new communities while offering a healthy, natural environment for their residents.

Governments are also encouraging sustainable urban development through a range of incentives such as:

- density or floor area bonuses;
- reduced infrastructure costs;
- land tax and stamp duty relief for nature refuges; and
- rebates.

The information provided here will assist urban developers, builders and other interested parties integrate sustainable design principles into residential and commercial developments.

These principles should be applied in the context of the natural characteristics of the site and the type of development proposed.

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Principles of Sustainable Residential Developments

For subdivisions:

1. Minimise disturbance of the natural environment throughout the life of the development.

- Where feasible, choose a site that does not need extensive preparation so that existing ecosystems, natural drainage, waterways and wetlands can be retained.
- Work with the natural topography to reduce the need for “cut and fill”.
- Integrate water-sensitive urban design options, such as dual reticulation to supplement water supply and stormwater ponds, and grassed swales or sand filters to “clean” stormwater before it flows into local waterways.
- Retain existing native flora and fauna, especially any significant species, and their habitat requirements.
- Rehabilitate degraded areas with local native plant species and seed stock.
- Maintain, rehabilitate, enhance and/or establish wildlife corridors.
- Preserve green spaces through formal measures such as nature refuges, statutory covenants or dedicated natural areas as a condition of planning approval.
- Consider long-term management requirements such as fire regimes, habitat regeneration, adjacent land uses, and incorporate appropriate measures at the planning and design stage.
- Plan and manage construction work to ensure erosion, sediment and dust control measures operate effectively in a range of weather conditions.
- Minimise impervious surfaces within the development, and use porous materials for hard areas such as car parks.
- Conserve topsoil and reuse it and other excavated material on site.
- Manage domestic pet impacts on the local environment by applying a covenant excluding certain types or restricting their numbers and movements.

- Investigate legal instruments such as covenants, community title and body corporate mechanisms to ensure ongoing sustainable performance.



2. Minimise energy and potable (drinking) water use within the development.

- Apply passive design principles to lot and building orientation.
- Use renewable energy sources, especially solar and other ‘green power’ sources.
- Provide water treatment systems and collect rainwater for reuse.
- Identify opportunities for establishing stormwater ponds and reusing collected stormwater for irrigation.
- Reduce vehicle dependency, energy use and greenhouse gas emissions by:
 - providing accessible paths and bikeways;
 - concentrating housing around public transport facilities;
 - encouraging inclusion of employment opportunities; and
 - establishing local shopping and child-care services.
- Use mulch on gardens and plant local native species to reduce water requirements.
- Select low-maintenance, recycled and durable landscaping materials such as crushed concrete and recycled timber.
- Reduce lawn areas and choose appropriate grass species for the soil type to limit water demands.
- Through a building covenant, mandate sustainably designed buildings that integrate resource conservation principles.

Refer **For buildings** section.

3. Create a sense of community.

- Hold meetings to discuss the development proposal with the existing community to determine the preferred design option, identify community needs, and decide how they can be addressed. This will encourage local residents to actively participate in the project, help avoid the potential for future objections and ensure the community is committed to sustainable outcomes.
- Create a sense of place by designating and beautifying areas for social interaction, sport and entertainment.
- Establish community gardens that incorporate activities such as permaculture, vermiculture (worm farming), composting and recycling.
- Include community arts projects to provide unique character and focal points within the development.
- Ensure land uses are connected with well-lit pathways to encourage people to walk and meet in safety.
- Provide local shops and facilities within close proximity of dwellings.
- Ensure safe and convenient local access via bikeways and footpaths.
- Make roadways and traffic less prominent within the streetscapes.
- Improve security by creating open spaces between roads and buildings, and by designing houses so that outdoor living areas and large windows allow informal surveillance.
- Provide information to community members about the benefits of the development’s sustainability measures.
- Offer a variety of housing types – houses, townhouses and units – for a diverse community.
- In consultation with the local council, incorporate bus routes and stops into the development.



Principles of Sustainable Residential Developments

For buildings:

1. Minimise the use of building materials from scarce or environmentally sensitive resources.

- Use durable, low-maintenance materials to conserve resources and minimise ongoing costs.
- Choose recycled, reusable and environmentally preferred materials.
- Choose building materials made and sold locally, with low embodied energy (energy used to collect raw materials and manufacture and transport the final product).
- Use environmentally friendly paints and coatings with low volatile organic compounds (VOCs).

2. Establish energy-efficient buildings.

- Apply passive design principles to provide natural comfort:
 - orientate lots and buildings to optimise passive solar design;
 - maximise cross-ventilation and incorporate ventilation in roofs and eaves;
 - ensure houses and buildings have adequate roof eaves and window awnings for shading;
 - insulate walls and roof;
 - ensure an appropriate balance of lightweight construction and thermal mass for the climate zone;
 - install skylights and light-tubes, casement windows, louvres and tinted window glazing where appropriate; and
 - select light-coloured roofs and walls to reflect heat.
- Allow space around buildings for landscaping to provide future shading and character.
- Fit energy-efficient lighting and appliances such as fluorescent light globes and five-star energy-rated whitegoods.
- Position kitchens, bathrooms and laundries close to hot water systems to save on energy costs.

3. Establish water efficient buildings and gardens.

- Minimise the use of potable (drinking) water by installing:
 - rainwater tanks;
 - at least 3 star WELS rated or AAA rated showerheads and tap fittings;
 - water-efficient appliances and whitegoods; and
 - dual-flush or waterless toilet cisterns.
- Use mulch, compost and vermicast materials to reduce water needs of gardens.

4. Establish buildings that are healthy, safe and comfortable for occupants and visitors of all ages and physical abilities.

- Design buildings according to universal design principles so they suit the needs of all occupants, and an ageing population.
- Design buildings with high visibility and security measures to reduce crime.
- Install thermostatic mixers in taps to prevent hot water scalding.
- Choose non-toxic materials such as linoleum for hard surfaces, breathe-easy paints and water-based timber floor sealants, and avoid materials that contain VOCs.

Note: The Smart Housing initiative developed by Department of Housing in conjunction with industry and other Government agencies addresses many of the issues of sustainable housing design. For further information visit: www.smarthousing.qld.gov.au



Our role

The EPA's Sustainable Industries Division assists Queensland industry invest, compete and profit sustainably.

Urban development and the built environment are priority sectors, and the Division works with market leaders, local government and the community to raise awareness and improve understanding of the importance of sustainable urban development.

Technical information and pre-lodgement planning advice about sustainable urban development is available from the EPA (see 'Government References').



References and further information sources

Industry and community

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Government

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