GUIDE TO PREPARING A SUSTAINABILITY MANAGEMENT PLAN ARMSTRONG CREEK TOWN CENTRE

PART 1

ARMSTRONG CREEK
TOWN CENTRE

CITY OF GREATER
GEELONG

Our Vision for Armstrong Creek Town Centre

The Armstrong Creek Town Centre will be developed into a world-class, integrated, environmentally sustainable community.

The City of Greater Geelong (CoGG) has developed an innovative planning framework for the new Armstrong Creek Town Centre. Amendment C267, which implements the Precinct Structure Plan (PSP) and associated Design Guidelines, has introduced new requirements and guidelines to drive better sustainability outcomes for the precinct.

Our approach is to work with developers and the community to assist them to implement the sustainability requirements and guidelines for Armstrong Creek Town Centre.

Our objective is to encourage sustainable design and development to minimise energy and resource use. Through improving the design of homes and buildings we can save water, decrease energy use, minimise waste and create healthier and more productive places, as well as minimising ongoing cost.

This Guide is designed to support both developers and the CoGG in coming to a common understanding of the requirements of the PSP, and assist the preparation and implementation a Sustainability Management Plans.

Whether you have already begun work using another ESD Tool such as Green Star, or not yet explored how the sustainability of your project may be improved, we are keen to work with you in partnership to complete a Sustainability Management Plan.

Why a Sustainability Management Plan?

A Sustainability Management Plan (SMP) is now a requirement for all significant development applications within the Armstrong Creek Town Centre. A SMP documents how the proposed development will respond to the objectives and guidelines detailed in the in the Armstrong Creek Town Centre Precinct Structure Plan.

The objectives and guidelines are based around the five principles shown to the right. Integrating sustainability into development will protect the community against energy and water cost increases, make it more resilient to future climate change impacts, and give greater control over resource needs. It will also help to make the Town Centre vibrant, comfortable and people oriented.

To drive this change, the City of Greater Geelong has created this practical guide for both developers and the community. Each guideline is numbered to reference the Precinct Structure Plan (and this number should be used in your Sustainability Management Plan – as shown in the sample templates).

Does it apply to my development?

The threshold or trigger relevant to the proposed development is detailed in the Greater Geelong Planning Scheme, Urban Growth Zone Schedule 5.

Multi-unit residential development comprising 10 or more dwellings, non-residential development comprising more than 500 square metres of gross floor area and any service stations must be accompanied by a Sustainability Management Plan.

A Sustainability Management Plan details what the relevant sustainability targets or performance measures are and how they will be achieved, in the context of precinct level objectives.

Zero Carbon

Zero Waste

Sustainable Transport

Sustainable Products & Materials

Sustainable Water

Why this is important

Sustainability Management Plans are increasingly required across Victoria to improve the sustainability of our built environment.

Sustainability is an inherent part of good design. Far from 'extra' or 'nice to have', sustainability can be a fundamental driver behind developing profitable and liveable buildings. Here's why.

1. **It's a differentiator.** Sustainability can be a really important part of delivering a product that stands out. For both commercial and residential buildings, customers are increasingly looking for low operating costs, high comfort and amenity, and the confidence that a building is designed to meet the needs of the future.
2. **It makes economic sense.** Smart approaches to sustainability integration can minimise upfront cost, increase revenues and reduce operating costs over the building's life.
3. **It's the future.** Armstrong Creek and City of Greater Geelong can lead the way with a design, development and construction industry that can deliver great buildings at great prices. Being ahead of the curve instead of behind it can open up more market opportunities, establish competitive advantage and result in long-term value for individual businesses and the whole region.

Purpose of this Guide

This guide will assist developers understand how to implement sustainability initiatives in their proposed developments, how to present this information in the correct form and how their applications will be assessed.

The guide will also assist CoGG planners to work with the Precinct Structure Plan and associated new requirements so that a consistent and clear system for reviewing and assessing applications is applied.

City of Greater Geelong Schedule 5 to the Urban Growth Zone
Armstrong Creek Town Centre Precinct Structure Plan

SUPPORTING DOCUMENTS

PART 1 Guide to preparing a Sustainability Management Plan for Armstrong Creek Town Centre	Review at the start of the project to understand the process and the guidelines/opportunities including sustainability requirements and case studies
PART 2 Reference Matrix	Review during the design to align with the Precinct Structure Plan requirements
APPENDICES Sample templates	Use these when preparing a planning/ development application

How to realise the sustainability benefits

This guide is designed to help developers capture the benefits of sustainability in their projects. The process outlined below provides a summary of the key steps along the way. These steps, when combined with more detailed guidance provided on each key sustainability theme, will ensure all projects in the Armstrong Creek Town Centre benefit from more sustainable approaches to development.

Effective engagement between all stakeholders, particularly the developer and CoGG, will be required from the pre-application stage and throughout the project to ensure understanding of the guidelines and application requirements. A high level of engagement will be critical for achieving the best sustainability outcomes for the Armstrong Creek Town Centre precinct.

Our approach in the Armstrong Creek Town Centre is one of collaboration, and we aim to assist all stakeholders in the process of integrating sustainability into their development, delivering a better product often without impacts on costs and timelines.

Note: The implementation of sustainability on a project is not limited to these guidelines. Developers are encouraged to pursue sustainability innovations beyond those provided by the Armstrong Creek Town Centre Precinct Structure Plan.

INFORM YOUR TEAM

Make sure your consultant team is aware of and understands the policy from the start.

Meet with Council early on to make sure expectations are clear about performance and documentation.

Ensure roles and responsibilities for sustainability within your consultant team are clear.

EMBED IN EARLY DESIGN

Consider sustainability outcomes as the development concept is created and evolves - explore a range of options along the way and evaluate each for its strategic, economic and environmental value to the project. Options should be responsive to the type and scale of the development.

Don't wait until the end to 'add' the sustainability. It will cost more and be less effective at that stage.

TEST ALTERNATIVES

Use tools to evaluate alternative master plans, building designs and infrastructure servicing approaches throughout the design process (e.g. NatHERS, IES, STEPS, SDS and Green Star).

As well as technical modelling, evaluate the business case for alternatives.

DOCUMENT YOUR INITIATIVES

Document your initiatives in the Sustainable Management Plan to articulate the proposed benefits of your chosen approach.

Ensure that evidence and analysis is provided and reasons are documented where design approaches or technologies have been deemed unsuitable to the type, nature or scale of the development.

Applying the Principles of Sustainability at Armstrong Creek Town Centre

The following pages outline what the Armstrong Creek Town Centre objectives and guidelines mean and how they can be implemented to generate great outcomes for both developers and the community. We have summarised some of the practical initiatives that can significantly improve the sustainability of different development types, and an indication of the costs and benefits, for each of the five principles of sustainability,

Every project is different. It is important that each site and proposed development is evaluated to find the best opportunities to deliver on the five principles of sustainability.

Each guideline is assigned a number that relates back to the reference system of the Precinct Structure Plan. These numbers should be referenced in the Sustainability Management Plan to facilitate cross-checking between a development's sustainability approach and the Precinct Structure Plan.

Further guidance on how to respond to all the guidelines is provided in Sustainability Guide Part 2 – Reference Matrix. Sample templates for preparing your Sustainability Management Plan are also available.

Zero Carbon (S1-01)

Vision

A Zero Carbon Armstrong Creek town centre means low energy bills, new local industry, comfortable homes and clean air. Achieving zero carbon emissions can't happen immediately, but big improvements can be made with little changes.

Practical steps to reduce emissions include reducing energy demands for heating, cooling, ventilation, lighting and small power, and generating energy from low carbon or renewable sources on or near site. Taking advantage of these opportunities provides value to all involved.

Zero Carbon means lower running costs and clean air...

Benefits

THE DEVELOPER	COMMUNITY / RESIDENTS / COMMERCIAL TENANT	ENVIRONMENT
- Smoother approvals process by ensuring that the application addresses the objectives and guidelines of the Precinct Structure Plan - Product differentiation, aiding increased rates of sale and increased sales values - A development that meets best practice standards and community expectations.	- Low running costs for residents - Potential health benefits - Future proofed building assets.	- Reduced emissions - Potentially increased planting / biodiversity – linked to reducing Urban Heat Island.

Guidelines

All development in Armstrong Creek Town Centre should:

S1-01.G1 Achieve a base target of National Construction Code (NCC) plus one star for residential development

S1-01.G2 Achieve a minimum of ½ star increase on average NABERS rating for new commercial developments, or equivalent, at the time of application

S1-01.G3 Include energy efficient street and public space lighting

S1-01.G4 Encourage low carbon on-site energy generation

S1-01.G5 Reduce urban heat island effects of car parks and buildings through design, landscaping, materials and colours

S1-01.G6 Ensure staging of development and infrastructure provision considers onsite energy generation capacity, and associated energy distribution networks, to allow for staged expansion where necessary

S1-01.G7 Ensure development does not restrict solar access to energy systems of adjoining buildings or sites

Case Study - Cape Paterson

Cape Paterson Ecovillage, currently being developed in South Gippsland, Victoria, will be one of Australia's leading examples of low carbon development. All homes built will achieve a minimum 7.5 star energy efficiency rating and have a 2.5 kW solar PV system.

Specific steps taken to reduce energy demands included careful subdivision design to optimise lot orientation, careful building orientation to maximise passive solar performance and use of eaves and shading devices

Modelling by an expert advisory group indicates that if the energy and water cost savings of these homes is used to pay off the mortgage faster, owners could reduce a 25 year mortgage by up to 5.5 years.

Image: South Gippsland Sentinel Times

What do the 'zero carbon' guidelines mean in practice?

	RESIDENTIAL	COMMERCIAL
THERMAL PERFORMANCE Reduce home running costs by up to $300 p.a. with no additional upfront cost	- considering building orientation - window size and placement - increased insulation in walls, roof and floor - improved glazing specification or adding fixed shading devices).	- careful siting and orientation - efficient base building – careful consideration of construction approach and insulation, thermal mass, glazing ratios and glazing type
ENERGY EFFICIENCY An energy efficient shop fit- out may cost slightly more upfront, however is likely to pay for itself within the first 2-3 years of operation.	While thermal efficiency is important, up to 60% of household energy use is related to appliances, lighting and other active systems such as water pumps. To reduce energy usage and the operational costs associated with these aspects of the home, developers should consider: - energy efficient lighting - variable speed drive pumps - efficient appliances (where provided)	- efficient heating, ventilation and air conditioning (HVAC) systems - energy efficient lighting and appliances
RENEWABLE ENERGY Solar PV can be installed for around $2-2.50 per watt. The payback years for this can be as little as 5-6 years.	Renewable energy is an important opportunity to decarbonise energy and save money. Developers should install solar PV and solar hot water panels wherever possible. Where there is a genuine reason for a system not being installed upfront, space should be safeguarded and any structural requirements should be considered upfront to allow future installation.	Commercial buildings with large roof areas represent a great opportunity for solar PV. This could be for exclusive use on-site or to feed back into the grid. A feasibility study including the energy profile of the building and the costs and benefits of different system designs would determine the most logical approach.

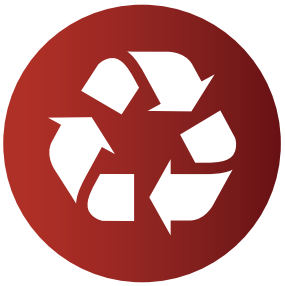
The table above summarises some of the practical initiatives that can significantly improve the sustainability of different development types, and an indication of the costs and benefits. Further guidance on how to respond to all the guidelines is provided in Sustainability Guide Part 2 – Reference Matrix.

Zero Waste (S1-02)

Vision

A Zero Waste Armstrong Creek town centre would mean reduced contribution to landfill waste, less transportation of waste out of the region and increased re-use and recycling of materials by businesses and residents. Creating a waste ecosystem that generates Zero Waste can't happen immediately, but big improvements can be made with little changes.

Practical steps to reduce waste include effective waste separation, re-use of waste generated during construction and recycling of organic waste.



Zero Waste means less landfill and raw material demand...

Benefits

THE DEVELOPER	COMMUNITY / RESIDENTS / COMMERCIAL TENANT	ENVIRONMENT
- Smoother approvals process by ensuring that the application addresses the objectives and guidelines of the Precinct Structure Plan - A development that meets best practice standards and community expectations - Lower waste disposal costs during construction and operation.	- Increased engagement and reduced costs through use of re-used and recycled materials - Opportunities to reuse organic waste for compost - Improved amenity through fewer truck movements - Increased manufacturing activity in re-use or recycling	- Reduced emissions from decomposing waste at landfills - Reduced land contamination at landfills - Reduced emissions from transportation of waste to landfills - Decreased demand for raw materials.

Guidelines

All development in Armstrong Creek Town Centre should:

S1-02.G1 Provide separated waste streams in public places, retail, commercial and residential developments

S1-02.G2 Ensure construction maximises re-use and recycling of construction materials

Case Study – Burbank Zero Waste Home

Residential housing construction contributes a significant proportion of Victoria's waste sent to landfill. Much of this waste results from inefficient practices on building sites, such as discarding of off-cut materials and over-delivery of materials by suppliers.

Burbank Homes and RMIT's Centre for Design addressed this by designing and constructing the first 'Zero Waste' home in Victoria. During the construction of the house, located in Melton South, the quantity of waste sent to landfill was reduced by 99% compared with current standard practices. This was achieved through reduction of material use, control of material dimensions during manufacture to reduce off-cuts and recycling of waste generated by the site.

What do the 'zero waste' guidelines mean in practice?

	RESIDENTIAL	COMMERCIAL
DEMOLITION AND CONSTRUCTION Material waste contributes on average 10% of a project's total cost of construction	- Produce a Waste Management Plan for the development site - Reduce the quantity of materials required through careful design - Optimise the manufacture of building materials to reduce off-cuts - Avoid oversupply of building materials - Recycle and re-use building materials either on-site or in the wider community - Engage a waste contractor with contractual commitments to diverting a high proportion (>80%) of their waste away from landfill	- Produce a Waste Management Plan for the development site - Utilise prefabricated or modular construction - Recycle and re-use waste on-site - Engage a waste contractor with contractual commitments to diverting a high proportion (>80%) of their waste away from landfill
RECYCLING Up to 40% of waste can be diverted from landfill by composting food and garden waste	- Produce a precinct Waste Management Plan - Waste management infrastructure for residents - Advanced organic waste treatment system for apartment buildings	- Produce a precinct Waste Management Plan - Waste management infrastructure for businesses and public spaces - Advanced organic waste treatment system - On-site resource recovery

The table above summarises some of the practical initiatives that can significantly improve the sustainability of different development types, and an indication of the costs and benefits. Further guidance on how to respond to all the guidelines is provided in Sustainability Guide Part 2 – Reference Matrix.

Sustainable Transport (S1-03)

Vision

Sustainable transport for the Armstrong Creek town centre would mean less reliance on emissions-intensive private vehicles. This would lead to better air quality, less congestion and a healthier population.

Sustainable transport means less congestion and a healthier population

Benefits

THE DEVELOPER	COMMUNITY / RESIDENTS / COMMERCIAL TENANT	ENVIRONMENT
- Smoother approvals process by ensuring that the application addresses the objectives and guidelines of the Precinct Structure Plan - A development that meets best practice standards and community expectations - Potential reduction in costs through reduced car parking provision	- Reduced congestion - Reduced travel times - Better physical health due to higher physical activity - Future-proofed transport network - Improved access to amenities	- Reduced transport-related emissions - Improved air quality - Reduced demand for new road infrastructure

Guidelines

All development in Armstrong Creek Town Centre should:

- Ensure the provision of movement and access networks are designed and planned based on the following priority: Pedestrian and mobility restricted; cycling; public transport; then private cars
- Ensure easy, direct and safe pedestrian access between complementary uses including the co-location of car parking where possible to reduce internalised vehicle trips
- Provide access all abilities pedestrian networks
- Provide centrally located and easily accessed bicycle storage with good connections to major destinations
- Prioritise bus movements over private vehicle movements
- Prioritise location of disabled, car-share and electric vehicle charging spaces
- Provide safe, well lit access after-hours to entry points to major destinations
- Provide well located 'rest stops', shelter and seating for pedestrians to encourage walking trips
- Limit the provision of car parking within the Ultimate Integrated Transport Hub
- Consider staged provision of car parking to limit excessive car parking development
- Consider the provision of electric vehicle (EV) shared infrastructure within large car parking areas
- Support real-time public transport information within large developments
- Encourage centrally located and easily accessed end-of-trip facilities with good connections to major destinations
- Encourage usage of car parking technologies to maximise efficiency of car parking

Case Study – Car Share

Car share companies are now operating across Australia. Car sharing is now a mainstream transport option for urban Australians, providing a cheap, green and easy alternative to car ownership. Hundreds of car share vehicles are now being operated across Melbourne.

Every 'Car Share' vehicle is estimated to take as many as 15 cars off the road in Australia and can also change travel behaviours and connect neighbourhood residents.

Developers can implement car share schemes in higher density and mixed-use areas to reduce car parking requirements and private vehicle use by local residents and businesses.

What do the 'sustainable transport' guidelines mean in practice?

	RESIDENTIAL	COMMERCIAL
TRANSPORT PLANNING Effective transport planning reduces ongoing economic costs due to congestion with little capital cost	- Link any internal movement and access routes to the broader network, prioritising active transport - Demonstrate use of principles such as Crime Prevention Through Environmental Design (CPTED) or Safety By Design - Reduce car parking rates where appropriate alternatives, such as active transport, public transport and car sharing, are supported	- Link any internal movement and access routes to the broader network, prioritising active transport - Demonstrate consideration of safety through design of entries and lighting specifications - Demonstrate use of principles such as CPTED or Safety By Design
ACTIVE TRANSPORT Connecting amenities with active transport routes increases the sense of community and improves public health	- High quality pedestrian crossings and signage - Provide internal and external bicycle storage for residents and visitors - Provide any publically accessible areas or internal movement routes with appropriate shelter and seating	- Provide end of trip facilities including showers, lockers and secure bike storage for workers - Prioritise access for active transport users, rather than providing this as an afterthought or via a 'back door' - Provide internal and external bicycle storage for visitors and workers in convenient and safe locations
LOW-EMISSIONS TRANSPORT Effective public transport infrastructure can enable higher density development	- Ensure lane design, intersection design and signal sequencing prioritises bus movements - Incorporate real time public transport information into in-home display, web portal or foyer display - Work with an electric vehicle charging provider to install charging points	- Reduce overall car parking numbers through centralised parking provision matching space needs to a balanced profile of different user groups - Ensure lane design, intersection design and signal sequencing prioritises bus movements - Incorporate real time public transport information at key building exits

The table above summarises some of the practical initiatives that can significantly improve the sustainability of different development types, and an indication of the costs and benefits. Further guidance on how to respond to all the guidelines is provided in Sustainability Guide Part 2 – Reference Matrix.

Sustainable Products and Materials (S1-04)

Vision

Use of sustainable products and materials will reduce Armstrong Creek town centre's environmental impact embodied in its construction. Residents and business will also be encouraged to consume goods sustainably, ranging from household products to food.

Practical steps to make products and materials more sustainable include sustainable sourcing and encouragement of local food sources.

Sustainable products and materials mean less embodied energy and material waste...

Benefits

THE DEVELOPER	COMMUNITY / RESIDENTS / COMMERCIAL TENANT	ENVIRONMENT
- Smoother approvals process by ensuring that the application addresses the objectives and guidelines of the Precinct Structure Plan - A development that meets best practice standards and community expectations - More efficient construction processes and reduced long-term maintenance - Long-term sustainability of material supplies	- Local jobs and industry growth - Increased resilience of infrastructure and products with lower ongoing maintenance - Long-term sustainability of materials supplies - Enhanced sense of community and local identity - Healthy, local food	- Reduced embodied emissions in the development - Reduced waste - Reduced transportation - Ongoing sustainable consumption through green leases and community engagement.

Guidelines

All development in Armstrong Creek Town Centre should:

S1-04.G1 Utilise construction materials and products that incorporate low-embodied energy, are robust and weather resilient, and are low maintenance to maximise their life-cycle

S1-04.G2 Incorporate materials re-use, and those from sustainable resources with low embodied energy e.g. Forest Stewardship Council certified timbers, fly-ash component in concrete

S1-04.G3 Encourage development that aligns with 'Design for Sustainability' principles including green procurement

S1-04.G4 Encourage alternative construction techniques that reduce waste and disposal

S1-04.G5 Encourage provision for on-site waste treatment

Image: Surf Coast Shire / Irwinconsult

Case Study – Surf Coast Shire Civic Building

The Surf Coast Shire Civic Building in Torquay, Victoria, utilised materials with a reduced environmental impact in their manufacture to minimise the building's embodied energy.

Recycled cementitious materials were used in the concrete mix to reduce the quantity of Portland cement used in the building's structure by more than a third. In addition, the majority of steel used in the building had a post-consumer recycled content of greater than 50%.

These initiatives utilised recovered recycled materials in order to reduce the project's raw materials consumption and environmental impact due to its construction. The Civic Building achieved a certified 5 Star Green Star Office v3 Design rating.

What do the 'sustainable products and materials' guidelines mean in practice?

	RESIDENTIAL	COMMERCIAL
CONSTRUCTION AND MATERIALS By reducing total materials, for example through exposed finishes, capital costs can be reduced while reducing embodied energy	- Demonstrate process for material selection evaluating various sustainability considerations - Demonstrate that the project has considered sustainability principles across its full life cycle and evaluated and incorporated design and material opportunities to improve outcomes at all project stages - Demonstrate use of tools and resources such as Life Cycle Assessment, Green Star and Ecospecifier in decision making - Use of prefabricated or modular construction approaches	- Instruct designers to consider use of standard material lengths and to dematerialise where possible - Demonstrate process for material selection evaluating various sustainability considerations - Demonstrate that the project has considered sustainability principles across its full life cycle and evaluated and incorporated design and material opportunities to improve outcomes at all project stages - Demonstrate use of tools and resources such as Life Cycle Assessment, Green Star and Ecospecifier in decision making
SUSTAINABLE CONSUMPTION Food consumption contributes 28% of Victoria's ecological footprint, which can be reduced through on-site food production to minimise transport and packaging	- Developing a Building Users Guide, which covers all aspects of sustainable building operation and sustainable living and has a focus on sustainable consumption. This includes shopping locally, use of shared resources (e.g. tool library) and maximising reuse and 'upcycling' - Implement and encourage on-site food growing or installed community gardens	- Green Leases, which provide an agreement between the lessor and lessee regarding how the tenancy will maximise the sustainability of its operations, can provide a tool to encourage sustainable consumption principles to be built into the operations of businesses in the activity centre - Businesses that focus on sourcing local produce, products and services could also use sustainable consumption principles to market the benefits to the Armstrong Creek community

The table above summarises some of the practical initiatives that can significantly improve the sustainability of different development types, and an indication of the costs and benefits. Further guidance on how to respond to all the guidelines is provided in Sustainability Guide Part 2 – Reference Matrix.

Sustainable Water (S1-05)

Vision

Sustainable Water for Armstrong Creek town centre would mean management of limited water sources to ensure that water demands for the area are met without compromising future water supplies.

Strategies for achieving sustainable water use include reduced water consumption of the development, maximised water efficiency of appliances and equipment, infrastructure for captured rainwater and recycled water, and water sensitive urban design.

Sustainable Water means preserving this resource for the future

Benefits

THE DEVELOPER	COMMUNITY / RESIDENTS / COMMERCIAL TENANT	ENVIRONMENT
- Smoother approvals process by ensuring that the application addresses the objectives and guidelines of the Precinct Structure Plan - A development that meets best practice standards and community expectations	- Future-proofed development that is resilient to both droughts and major storm events - Lower costs associated with water consumption - Careful water use supports urban greenery to improve amenity and reduce urban heat	- Long-term sustainability of potable water supplies - Reduced environmental damage from stormwater run-off during major storms - Potential biodiversity benefits through native, drought-resistant plants

Guidelines

All development in Armstrong Creek Town Centre should:

S1-05.G1 Minimise the percentage of non-permeable surfaces for mixed-use and commercial development, particularly where large areas of at-grade car parking are required

S1-05.G2 Demonstrate an integrated stormwater management approach inclusive of WSUD treatments and/or other stormwater capture initiatives

S1-05.G3 Minimise construction impacts on waterways

S1-05.G4 Source 100% of water for landscape irrigation from on-site rainwater collection or recycled water

S1-05.G5 Encourage WSUD initiatives within landscaped environments

S1-05.G6 Consider the use of underground tanks for water capture and storage to minimise the encumbrances on ground level land

S1-05.G7 Consider the use of rain-gardens and bio-retention systems, particularly within large areas of at-grade car parking

S1-05.G8 Provide visual demonstration of water conservation and re-use

S1-05.G9 Communicate innovative approaches to stormwater management in public areas

S1-05.G10 Provide drought tolerant/water-saving landscape plantings

Image credit: Urban Edge Landscape Architects

Case Study – Caroline Springs

The Urban Wetland is a series of artificial pools that were constructed as part of the Caroline Springs development in Victoria. The pools form part of a stormwater retention and treatment system that collects stormwater run-off from the Caroline Springs area and provides filtration before it flows into natural water bodies.

Wetland areas provide a natural filter to remove pollutants and nutrients from the stormwater. After filtration, the stormwater flows into Lake Caroline.

As well as removing pollutants from stormwater, the Urban Wetland retention pools also relieve stress on central stormwater infrastructure that could overflow during large storm events.

What do the 'sustainable water' guidelines mean in practice?

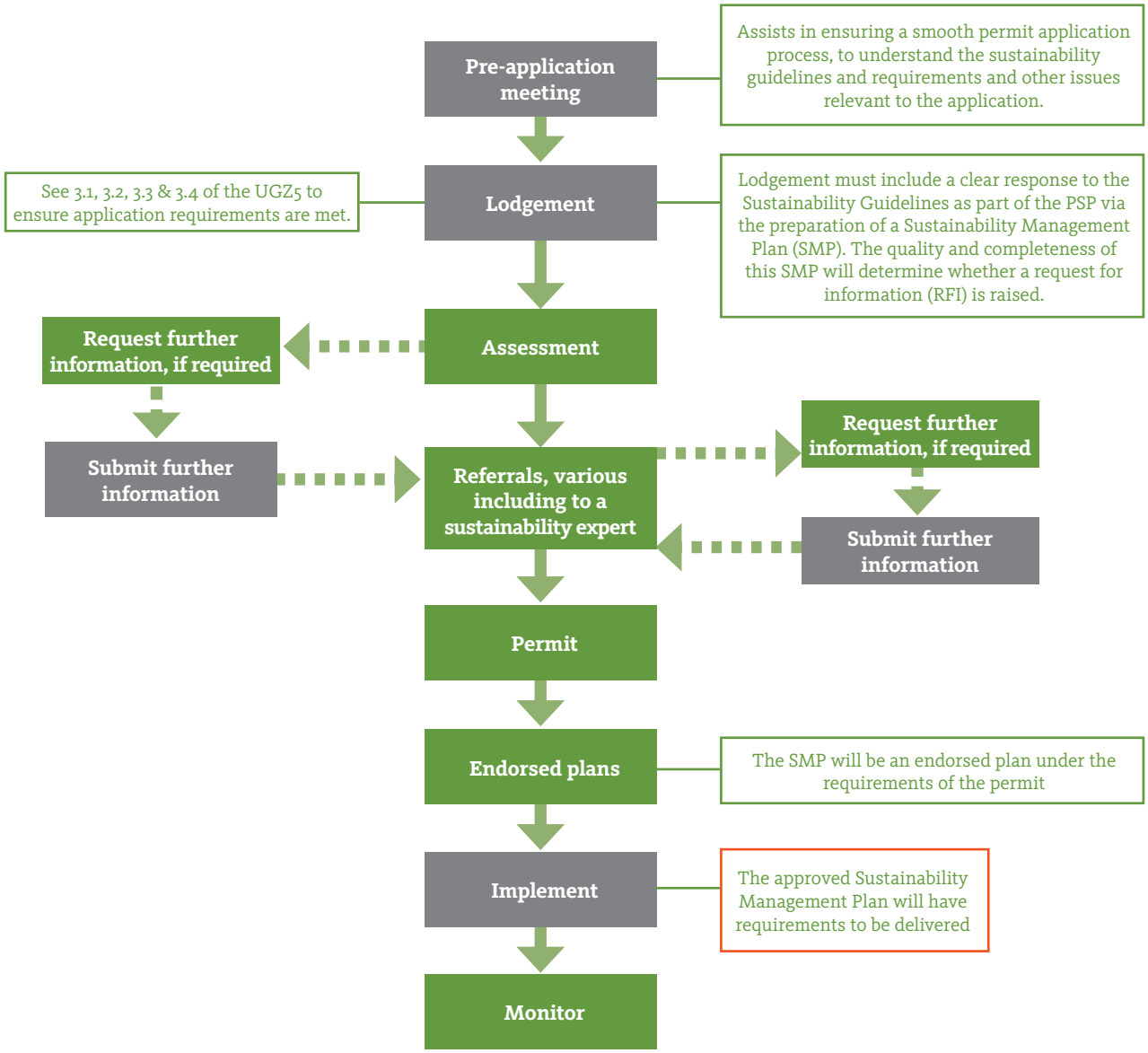
	RESIDENTIAL	COMMERCIAL
WATER EFFICIENCY Reduced running costs with no additional upfront costs	- Specify drought-tolerant landscape design and plant species - Where appliances such as dishwashers and washing machines are supplied (or offered) maximise water and energy efficiency. - Ensure all fittings and fixtures achieve the highest WELS rating possible	- Maximise water efficiency of HVAC system - Specify drought-tolerant landscape design and plant species - Maximise water efficiency of commercial kitchens - Ensure all fittings and fixtures achieve the highest WELS rating possible
RAINWATER AND RECYCLED WATER Recycled grey water can contribute up to 50 L per day for toilet flushing in a typical home	- Connect to the Third Pipe network for recycled water - New public spaces created as part of residential development could include a designed water feature showcasing the town centre's recycled water supply, while incorporating a functional irrigation element	- Connect to the Third Pipe network for recycled water - New public spaces created as part of commercial development could include a designed water feature showcasing the town centre's recycled water supply, potentially incorporating a functional irrigation element
WATER SENSITIVE URBAN DESIGN Effective management of stormwater reduces flood risk during storms	- Use tools such as STORM, MUSIC, Urban Developer tools, or Green Star - Utilise permeable pavements and other systems to maximise permeability.	- Minimise the percentage of non-permeable surfaces for mixed-use and commercial development, particularly where large areas of at-grade car parking are required - Consider the use of rain-gardens, and bio-retention systems, particularly within large areas of at-grade car parking - Use tools such as STORM, MUSIC, Urban Developer tools, or Green Star

The table above summarises some of the practical initiatives that can significantly improve the sustainability of different development types, and an indication of the costs and benefits. Further guidance on how to respond to all the guidelines is provided in Sustainability Guide Part 2 – Reference Matrix.

Sustainability Assessment Process for Applications

This assessment process has been developed to assist the CoGG Statutory Planning department with permit applications in the Armstrong Creek Town Centre. This process ensures that the assessment of responses to the sustainability guidelines is efficient and consistent. The flow chart below maps out the standard permit assessment process for Armstrong Creek Town Centre developments against the sustainability objectives of the Precinct Structure Plan.

Orange stages represent actions for CoGG, while grey boxes represent actions for the developer.



Resources and Support

City of Greater Geelong can provide support and resources to developers to assist with the implementation of sustainability and development of a Sustainability Management Plan.

The following tools and framework are available for developers.

TOOL	SUITABLE PROJECT TYPES	FURTHER INFORMATION
FirstRate thermal performance assessment	Residential buildings	www.fr5.com.au
NABERS Energy performance	Commercial buildings	www.nabers.gov.au
STEPS sustainability assessment	Small residential buildings	www.sustainablesteps.com.au
SDS sustainability assessment	Small non-residential buildings	www.sustainablesteps.com.au
Green Star Design and As Built	All building types	www.gbca.org.au
Green Star Communities	Mixed-use precincts	www.gbca.org.au
STORM stormwater assessment	Small sites, less than 1 hectare	storm.melbournewater.com.au
MUSIC stormwater assessment	Large sites, greater than 1 hectare	www.ewater.com.au/products/music

Glossary of terms

Co-generation The production of power and heating from the one energy source (e.g. gas) which harnesses the byproduct (waste heat) of the energy generation process for recirculation, i.e. for space heating

Embodied Energy Embodied energy is the energy consumed by all of the processes associated with the production of a building, from the mining and processing of natural resources to manufacturing, transport and product delivery. Embodied energy does not include the operation and disposal of the building material. This would be considered in a life cycle approach. Embodied energy is the 'upstream' or 'front-end' component of the life cycle impact of a home

ESD Ecological Sustainable Development

GHG Greenhouse Gas

GHG Coefficient This value determines how many GHGs are released by a certain power grid, fuel, etc

GTP Green Travel Plan – details the sustainable travel options for a development and seeks to develop a strategic approach to changing travel behaviour

IEQ Indoor Environment Quality – encompasses all aspects of the indoor setting including air quality, ventilation, thermal comfort, lighting and noise

Renewable Energy Renewable energy is power generated by means

RECs Renewable Energy Certificates; managed by the Office of the Renewable Energy Regulator www.orer.gov.au

SHW Solar Hot Water

Solar Electricity Generating electricity direct from the sun using Photovoltaic

Solar Thermal Generating heat from the sun. The heat can be either used direct for space heating or to generate steam, and produce electricity or heat water.

Sustainability Ecologically sustainable development

Tri-generation The production of power, heating and cooling from the one energy source (e.g. gas) which harnesses the byproduct (waste heat/cooling) of the energy generation process maximising resource use

WELS Water Efficiency Labelling and Standards www.waterrating.gov.au

WSUD Water Sensitive Urban Design - A sustainable water management approach that aims to provide water-quality treatment, flood management to reduce the pollution carried to our waterways and more sustainable urban landscapes.[1]

1 http://www.sustainability.mav.asn.au/content/upload/files/publications/MAV_Planning_for_Sustainable_Buildings_Guide.pdf