ENVIRONMENTALLY SUSTAINABLE DESIGN (ESD) – SINGLE HOUSE AND GROUPED DWELLINGS

In our changing climate and increasingly resource-constrained world it has become imperative that building design incorporate elements to create more sustainable development and minimise negative impacts on society and the environment.

ESD is most cost effective to achieve when its principles are applied from the very beginning of a project. Major environmental performance benefits flow from considered orientation, layout and choice of construction materials. Getting these right at the beginning of the design phase will save time and money during construction as fewer expensive add-ons will be required to achieve performance targets.

When is a planning application required to demonstrate environmentally sustainable design?

The City's Policy No. 7.1.1 – Built Form (Built Form Policy) requires all applications for residential (including single houses, grouped dwellings and apartments), mixed use and commercial developments within the City of Vincent to achieve ESD by achieving certain objectives and environmental performance standards.

This information sheet relates to the requirements for **single houses and grouped dwellings.**

What is required?

Volume 1 of the Built Form Policy requires single house and grouped dwelling developments to demonstrate the following:

- Considers the whole of life environmental impact of the building/s and incorporates measures to reduce this impact;
- Optimises thermal performance of the building/s throughout the year through design elements and material selection;
- Incorporates the following:
    - Site planning principles that maximise solar passive design opportunities for both summer and winter;
    - Natural ventilation and daylight penetration to reduce energy consumption;
    - Daytime areas with north-facing glazing to allow passive solar heating during winter;
    - Openable windows and/or ceiling fans to habitable rooms or occupied spaces that allow natural and cross ventilation;
    - Recovery and re-use of rainwater, storm water, grey water and/or black water for non-potable water applications;
    - Shading devices to reduce unwanted solar gain in summer and increase passive solar gain in winter; and
    - Integration of renewable energy and energy storage systems to optimise energy consumption.
- Has a maximum solar absorptance rating of 0.4. for any flat roof structures that are not visible from the street or adjacent properties;
- Has a maximum solar absorptance rating of 0.5 for any pitched roof structures or roof structures that are visible from the street or adjacent properties; and
- Is capable of achieving the following performance standards (or an acceptable equivalent approved by the City) through a Target Setting Life Cycle Assessment (LCA) report:
    - 50% reduction in global warming potential when compared against the Perth statistical average for residences; and
    - 50% reduction in net fresh water use when compared against the Perth statistical average for residences.

How do I demonstrate that my development application achieves the City's ESD standards?

The City has an ESD template available on its website which can be completed and submitted as part of your development application. In this table you will need to explain how each of the design requirements has been achieved and reference any supporting materials (such as plans showing relevant design features and the life cycle assessment report, or acceptable alternative).

What is a Life Cycle Assessment?

A LCA measures the environmental performance of the building over its lifetime, to understand how the design contribute towards reduced environmental impacts.

The City requires an early design LCA report, which may be referred to as a 'Target Setting Report' or 'LCA light'. A full and detailed LCA is not possible until the working drawing stage, which follows development approval.

An LCA can be prepared by any person with the skills to apply LCA methodologies. For an LCA to be acceptable to the City it must demonstrate compliance with the standards set out in the table below.

Accepted Rating Framework	Specification / Compliance Requirements	Minimum Requirement to be Achieved	Evidence
Life Cycle Assessment in Accordance with EN15978- Sustainability of construction works – Assessment of environmental performance of buildings – Calculation method.	System Boundary must include all Life Cycle Modules (A1-2, B1-7, C1-4 and D) in addition to non-integrated energy (plug loads)	Global Warming Potential and Net Fresh Water Use Reduction of 50% compared against the Perth statistical average for residences.	Independently Reviewed EN15978 Compliant Target Setting LCA with a 20% factor of safety applied to improvement strategies

The LCA report must include the following:

- The lifetime savings for global warming potential and net fresh water use that the development is able to achieve;
- Description of the preferred strategies for achieving these targets (e.g. solar PV, solar hot water etc.);
- Quantification of the global warming and water impacts of the preferred strategies; and
- List of reserve strategies that will be employed to achieve the performance targets should any preferred strategies become unfeasible as the design is finalised.

The LCA Report must be accompanied by a signed statement from the Applicant confirming the Applicant's commitment to retain sufficient sustainability strategies and features to the working drawing stage to ensure that the final design is capable of achieving the global warming and water use benchmarks set out in the City's Built Form Policy.

I don't have the skills or knowledge to complete my own LCA - how do I find a life cycle assessor?

To assist applicants in addressing the LCA requirement, a list of the Life Cycle Assessors currently known to the City is provided below. This list should be treated as a directory only and may not be comprehensive or up to date. Should further assessors be available please contact the City to have these added to this directory.

Company	Contact Name	Contact Email
DIY option		
eTool		https://rapidlca.app/
Assessors		
eTool	Morgan Ledger	info@etoolglobal.com
Leading Energy ESD	Debbie Bute	debbie@leadingenergyesd.com.au
Leanhaus	Ben Caine	ben@leanhaus.com.au

Company	Contact Name	Contact Email
Stantec	Nathan Lawry	nathan.lawry@stantec.com
Stantec	Aida Leon	aida.leon@stantec.com
Streets of our Towns	Marc Drexel	marc@ourtowns.com.au
Lake Architects	Jonathan Lake	jonathan@lakearchitects.com.au
Emergen	Evan Logan	Evan.Logan@emergen.com.au
Sustainability WA	Nathan Peart	rate@s-wa.com.au

Please be advised that the City does not in any way endorse any of the above assessors and this list is provided to assist applicants to meet the City's development application requirements.

In addition to the above list, LCA assessors can be found by contacting the Australian Life Cycle Assessment Society (ALCAS). ALCAS is Australia's peak professional organisation for people involved in the use and development of LCA. Local LCA assessors can also be found using Google, but please ensure that the assessor you engage uses methodologies compliant with the standards specified in the table above.

If you have any difficulty producing a life cycle assessment, please contact the City to discuss an acceptable alternative. For example, in some instances an 8 star NatHERS rating may be considered as an alternative.

Environmentally Sustainable Design Guide for Developers

Outlined below are a number of design elements that can be incorporated in a proposal to produce a higher level of environmental sustainability:

Carbon emissions reduction:

Building materials

- Construction materials with renewable/recycled/recyclable content.
- Wood is certified as plantation grown and sustainable.
- Fitout materials require minimal maintenance, have long life-spans and can be recycled at end of life. Where possible, they are designed for disassembly and repair.
- Light coloured roof and external wall colours to reduce heat island effect.
- External shading/cladding to limit heat absorption.
- Low emissivity glass in windows to minimise unwanted heat loss/gain.
- Appropriate use of thermal mass to maximise winter heat gain and maximise summer cooling.

Building orientation and layout

- Indoor and outdoor living and entertainment areas facing north where possible, to maximise use of natural light and winter sun for passive heating.
- Internal atrium to provide northern light to units on south side of building and improved cross ventilation to all units.
- Rooms with lower heating and lighting requirements (laundries, bathrooms, bedrooms facing south.
- Living areas can be closed off from other areas to reduce the need for heating and cooling.
- Accessibility and adaptability are built in to minimise the need for remodelling and retrofitting to accommodate the diverse needs of occupants over time.
- Indoor or outdoor area/s provided for clothes drying.
- Landscaping integrated with the building design to maximise passive heating, cooling, natural light and cross ventilation; and minimise heat island effect.
- Roof space kept clear of plant and equipment to maximise space for solar PV.

Windows

- Most glazing facing north, limited glazing facing south, east and west.
- External shading devices to block summer sun entering the building.

Insulation
- Air tight building envelope.
- Thermal insulation in roof, walls and exposed floors.

Ventilation
- Openable windows located to allow natural cross-ventilation.
- Openable internal vents to allow air movement between rooms when doors are closed.
- Dual rotation ceiling fans in living areas and bedrooms.
- Specialised cabinetry designed to provide adequate ventilation for refrigerator to run at maximum efficiency.
- Dedicated kitchen exhaust hoods ducted to outside, with variable supply of make-up air.

Energy (efficiency and generation)
- Solar PV system to power common use items (lighting, pool pumps, elevators).
- Solar PV for individual properties within the development.
- Solar thermal or heat pump system for water heating or pre-heating.
- High efficiency motors and/or regenerative and variable speed drives on mechanical equipment (e.g. elevators, air conditioning, car park ventilation).
- HVAC systems use high efficiency refrigerant gases, air source heat pumps and/or ground source heating/cooling for improved energy efficiency.
- Air conditioning limited to living areas or zoned to allow individual room control.
- High efficiency ovens, cook tops and dishwashers.
- Energy monitoring to individual units, preferably with real-time data available to occupants via a user-friendly platform to allow occupants easy monitoring of their own energy use.
- Sub-metering of all significant base building energy uses (pumps, motors, common HVAC and lighting).
- Refrigerator space minimised to cater for the smallest refrigerator considered adequate for the maximum number of dwelling occupants.
- Energy efficient lighting (LED).
- Lighting controlled by timers, motion sensors or light sensors as appropriate, particularly in common use areas (car parks, entryways, stair wells).
- Underground car park ventilation engineered to maximise air flow efficiency and controlled by exhaust gas sensors.
- Provision of minimum parking spaces and design to encourage low emission vehicles, including electric vehicle recharge points.
- In commercial buildings, provision of generous cycling facilities including bike storage, change rooms, showers etc.

Water Savings:

Landscaping
- Waterwise plants.
- Waterwise irrigation system (drip irrigation, soil moisture sensor, automated controller).

Fit-for-purpose water use
- Rain water capture, storage and reuse (e.g. for toilet/laundry).
- Stormwater capture, storage and infiltration (e.g. via detention features such as rain gardens).
- Greywater/blackwater treatment and reuse for irrigation.

Plumbing
- Bathrooms, laundry and kitchen located close to the hot water system to minimise wastage of cold water from pipes.
- Hot water supply pipes are insulated.
- Where a single centralised hot water system supplies multiple units, an insulated pipe continuously circulates hot water to all apartments, or instantaneous gas boosters are provided to individual units.
- Water-efficient fixtures with the highest WELS rating available.

- Water monitoring to individual units, preferably with real-time data available to occupants via a user-friendly platform to allow occupants to easily monitor their own water consumption.
- Recovery and reuse of fire system test water.

Resource conservation:
Construction and demolition waste

- Preservation and incorporation of existing buildings on site (or parts thereof) in the new development.
- Recycling or reuse of waste generated during demolition and construction aim for 90% or more to be diverted from landfill (e.g. brick and concrete rubble reused in gabion walls onsite, other materials recycled through a documented pathway).

Do you have more questions?

The City is unable to confirm if a proposal will be supported in the absence of a formal development application. Urban Planners can provide general advice to applicants on a proposed development or land use and the information required to lodge a complete application.

A Duty Planner is available to talk to at the City's Administration Office Monday to Friday, 8.30am to 5.00pm, in person or on the phone.

Phone: 9273 6000

Email: mail@vincent.wa.gov.au

Address: Main Administration Building, 244 Vincent Street, Leederville 6007, WA

Disclaimer: *This information is produced by the City of Vincent in good faith and the City accepts no responsibility for any ramifications or repercussions for providing this information. Verification with the original Local Laws, planning schemes and other relevant documents is recommended for detailed references.*