WITCHCLIFFE

ECOVILLAGE

Home Building Handbook

August 2020

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Introduction

The Ecovillage

The Witchcliffe Ecovillage is a unique sustainable housing development in Western Australia which aims to be 100% self-sufficient in renewable energy, water and organic fresh produce, and to feature highly sustainable, passive solar dwellings.

This handbook summarises the built form vision for the project including intended architectural character, design requirements, budget considerations, procurement options, and approvals.

The Residential Cluster

At the heart of the ecovillage concept is the idea that our physical environment plays a significant role in shaping our social interactions. As such, most ecovillages are laid out such that dwellings are clustered together and focus on a central open space or common building. This allows visual connection and the natural crossing of paths with other residents, fostering neighbour relationships and community life.

At the Withcliffe Ecovillage, the U-shaped cluster layouts are the basic organizing pattern of the entire development. They have been carefully designed to optimise solar access to all lots, manage the flow of stormwater via overland living streams to the community dams, and provide generous private and shared garden spaces that have good access to northern light.

Each residential cluster surrounds a community garden which includes exclusive use areas adjacent to each home for productive allotment style veggie gardens, shared netted fruit orchards and chicken run, a community building/shed, nature play area, an electric vehicle charger, and a visitor parking area. A network of garden paths connects the clusters and provides safe pedestrian and bike trails throughout the Ecovillage.

Lot Sizes

The Witchcliffe Ecovillage has been designed to encourage and celebrate social and cultural diversity. Affordable housing lots are included in every residential cluster, along with lots sized to suit singles, couples, small and large families, empty nesters, the elderly and disabled, and extended families.

Lifestyle Lots (1500-2200m2) - East-west oriented blocks along the western perimeter of the ecovillage not associated with a cluster. Plenty of room for sheds, workshops, and larger homes.

Family Lots (900-1200m2) - East-west oriented blocks that form the east and west sides of clusters and back onto the communal gardens. Typical dimensions are 20x50m. Designed for larger houses and families.

Cottage Lots (400-600m2) - North-south oriented blocks that form the southern edge of clusters and back onto communal gardens. Typical dimensions are 15x30m. Appropriate for smaller families, couples, and singles.

Groupie Lots (270-400m2) - North-south oriented blocks, associated with a cluster, served by a common driveway to the south. Typical dimensions are 12x30m. Dwellings on these blocks limited to 100m2 to maintain affordability. Interested purchasers will be subject to income / assets limits.

Aged + Dependent Lots (Size Varies) - Larger blocks located near the Village Centre to be designed as integrated developments catering to residents aged 55+ or those with a disability.

Lot and Building Orientation

While there are a variety of lot types offered as part of the Ecovillage, there are basically two orientations: east-west or north-south. When choosing a block, the orientation of the longest axis your block will play a large role in the optimal configuration of your house. In addition, the width of the block will constrain the layout options for your house plans (taking into consideration the boundary setbacks).

East-West Lots - Larger blocks with sufficient width (Family and Lifestyle Lots) can achieve good solar access in this orientation by setting the building closer to the south boundary and allowing for a large setback along the north side (required by the LDPs). This dictates a significant amount of glazing (windows) on the side of the house, even though the outdoor al fresco focus may be at the back near the Community Garden. This orientation suggests a longer extruded building form.

North-South Lots - Smaller blocks work well in this orientation, as the larger north setback is aligned with the traditional rear location of the primary garden (Cottage and Groupie Lots). This also allows alignment between north-facing glazing and the natural place for al fresco outdoor area adjacent to the community garden. Vehicle access is from the south so creates no conflict with the solar access. This orientation suggests a more compact building form.

Quality, Energy Efficient Housing

The intention is that the housing built at the Ecovillage will be well-designed, low-energy, carbon negative and durable. Considerable research has gone into informing our vision and building controls, which will deliver housing that has a light footprint on the earth but that is inexpensive to run and maintain.

At a master planning scale, the streets, clusters and lots have been meticulously designed to ensure unobstructed solar access to all dwellings to create an opportunity for excellent passive solar outcomes in homes. This entailed consideration of lot depth and width, orientation, side setbacks, building heights, and vehicle access location. These key parameters are enshrined in the subdivision layout and local development plans (LDPs).

Further, we have considered the most-efficient and affordable way to achieve highly energy-efficient passive solar buildings in the design and construction process. These principles are covered in detail in the Building Design Guidelines, including requirements and restrictions on building configurations and materials.

Finally, we have set an ambitious target that our buildings will be net carbon negative – meaning they sequester more carbon than they emit to the atmosphere either by avoiding emissions that otherwise would occur or that they literally lock away carbon in the fabric of the building. All houses will be fitted with minimum 6kW solar panel array that will be connected into the cluster micro-grid and shared battery. As the system is designed to produce more energy than the residents will likely use, power will be fed back into the public grid for use by others outside of the ecovillage, displacing power that otherwise would come from fossil fuel sources. Each house must also undertake a detailed life-cycle assessment on the chosen construction materials and meet a maximum carbon emissions target set in the Building Design Guidelines.

Housing will be encouraged to use natural, locally-sourced materials where possible, and design homes that fit with the local vernacular character of Witchcliffe. Encouraged materials include timber frame with hardwood cladding, strawbale with lime or clay render, or hempcrete with lime render, with additional thermal mass material used internally such as rammed earth, mudbrick, and recycled brick. All houses will use Zincalume corrugated roofing, a durable material that will bring cohesiveness to the project and help it blend with the surrounding rural character of Witchcliffe.

Designing Your House

Character

While the Ecovillage's "character of sustainability" is based on environmental objectives, it also meaningfully pays respect to the history and values of the Witchcliffe townsite and the south-west. In many ways the Ecovillage strives to return to the values that led to much of the Margaret River region's cherished character. The historical built form of the Witchcliffe area came in two waves, both of which were defined by ingenuity, resourcefulness, and the use of local materials.

The project's Building Design Guidelines will ensure that all homes in the ecovillage will be warm and cosy in winter, and cool and breezy in summer. They will be oriented to maximise winter solar gain to living areas, and be appropriately shaded to minimise solar gain in summer. Ventilation and sealing will be designed to maximise cooling breezes in summer, and minimise winter draughts. Thermal mass and insulation are important for buffering the extremes of both heat and cold. Outdoor living areas need protection from winter rain, summer sun, and both summer and winter prevailing winds. Correct house orientation and sensitive landscape design will ensure comfortable living spaces both inside and out, and minimise the need for additional heating and cooling.

Nelligen Hemp Studio, Designer: Nicole Martin

While the Witchcliffe Ecovillage's building design principles are strongly focused on sustainability, we also aim to create a village that is welcoming and beautiful, sits lightly and respectfully in the local environment, and reflects the history and rural character of the Witchcliffe townsite. Historic timber buildings contribute a strong presence in the Witchcliffe village centre: Druids Hall, the CWA building, the former Sundance Health Food Shop, and Darnell's General Store all contribute to its cherished "sense of place." Rammed earth, mud brick, reclaimed timber, weatherboards and other recycled elements are featured in homes along Shervington Avenue and Mammoth Road; and steeply pitched or skillion roof lines in corrugated iron add rustic character. Witchcliffe was part of the historic WA Group Settlement programme of the 1930's, and "groupie" houses still stand in the area today—simple jarrah weatherboard and iron houses, which, despite their tiny size, often housed large families.

Witchcliffe Ecovillage buildings should generally reflect the rustic aesthetic of a small South West village, without needing to replicate or mimic existing building forms. Attention should be given to simplicity of form, expression of natural materials, harmonious proportions, and careful rendering of details and finishes on building facades.

The following list should provide a starting place for your building's external expression and design:

- Simple geometric volumes and vertical elements
- A mixture of natural earth rendered and timber wall external elements

- Use of local, natural and sustainable materials wherever possible in construction and landscaping, such as plantation and recycled timber, straw bale and render, rammed earth, hempcrete, clay, recycled bricks, limestone and granite
- Zincalume metal sheeting for roofs and rainwater tanks
- Creative and artistic use of recycled and sustainable materials
- Predominantly steep (30°-45°) double pitch roofs with overhanging eaves at gable ends
- Skillion roofs with lower pitches, lean to elements and clerestory windows
- Loft spaces and dormer windows
- Deep overhangs of roof structures
- Larger building volumes broken up into parts using design elements
- Small punctured openings and double volume openings
- Recessed window and doors with proportionate frames
- Windows typically vertical or square rather than horizontal
- Balconies and verandahs to provide shade, shelter and legible entry statements
- Shutters, awnings, solar pergolas, and other seasonally adaptable shade elements
- Creative use of garden fencing, stone / rammed earth walls, and landscape features to complement buildings, gardens and streetscapes
- Attention to detail in materials, finishes and transitions
- Integration of sustainability features into building design, e.g., solar panels
- Consideration given to the presentation of all elevations of the home, not just the street façade
- Avoid overtly expressed period or regional styles (e.g., Federation, Balinese)

Passive Solar Design

Every Witchcliffe Ecovillage lot has been designed to ensure maximum solar exposure to living areas. Smaller lots are positioned on a north/south axis with loading to the south and living to the north, and larger blocks are positioned on an east/west axis, with Local Development Plans for each lot to ensure winter solar access is guaranteed to the living rooms of all homes. This means that every house in the Ecovillage can accommodate north facing living areas.

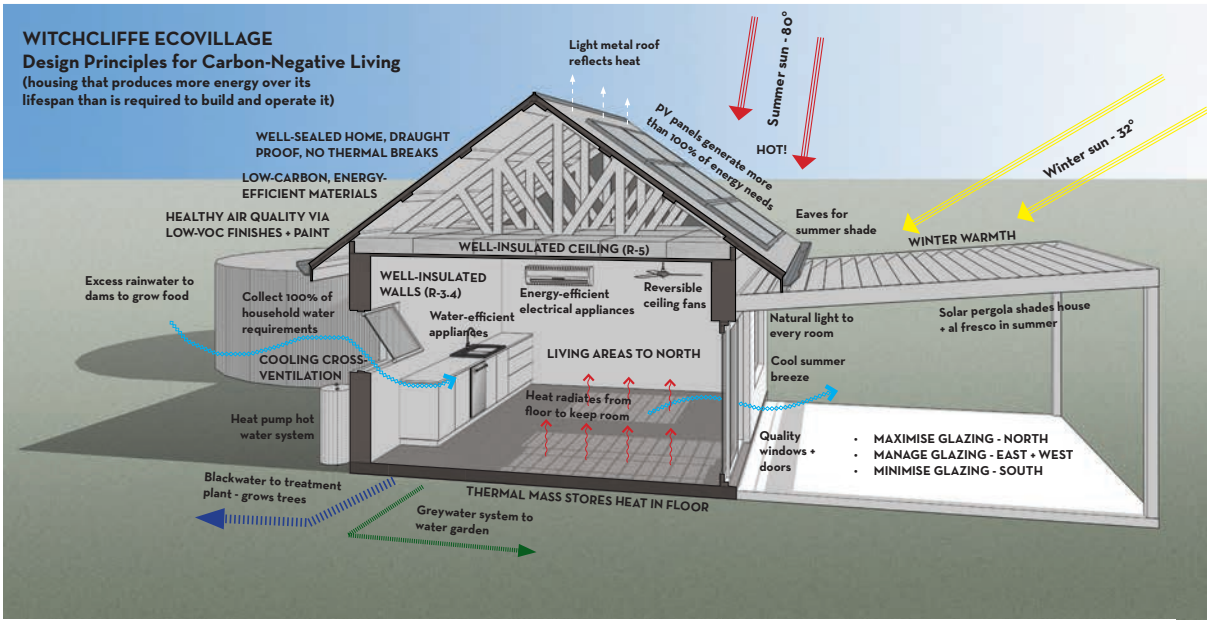
Good passive solar house design for buildings incorporates the following principles:

Solar Orientation + Shading - allowing winter sunshine to enter the home via glazing to warm up thermal surfaces, and shading the house from the infiltration of summer sun

Insulation – installing plentiful insulation in the building perimeter (including roof space) to buffer external temperature changes

Thermal Mass - using dense or phase change materials internally to buffer your home from changes in external temperatures

Ventilation - providing appropriate ventilation to make the most of summer breezes



Passive Solar Design Principles Diagram (Witchcliffe Ecovillage Design Team)

Sealing - sealing the house to exclude cold air in winter

Glazing - choosing appropriate glazing to minimise heat loss in winter and heat gain in summer

Heat Reflection - choosing reflective roofing materials to minimise heat gain

Heat naturally flows from warmer areas to cooler areas by conduction, convection and radiation. Insulation reduces the rate of heat transfer, keeping heat in the building when the outside temperature is lower than inside and keeping heat out of the building when the outside temperature is higher. To maintain a comfortable temperature inside the building envelope without heating or cooling, sufficient insulation of the walls, roof and slab is required.

Thermal mass is the ability of a material to absorb and store heat energy. A lot of heat energy is needed to change the temperature of high thermal mass materials such as concrete, rammed earth, bricks, and tiles. Lightweight construction materials such as timber have low thermal mass, and benefit from insulation. Thermal mass can be incorporated into the fabric of a building with good solar passive design to absorb heat from solar radiation during the day and emit it at night to moderate internal temperatures in winter, and to cool down overnight and allow for the circulation of cool air through the house in summer.

Optimising movement of air through the house to provide passive cooling in summer is an important consideration in south west WA. Narrow, open plan layouts provide the most efficient cross flow ventilation. Use larger windows on the down wind side of the house, smaller windows on the upwind side of the house to increase air pressure and channel air into the house. Small windows can be strategically placed on the south of the house for this purpose, however, keep overall southern glazing to a minimum.

Streetscape Diagram (Witchcliffe Ecovillage Design Team)

Creating a Design Brief

In order to set clear parameters to be achieved in the design process, you need to create a design brief for your house designer. This will help you end up with a sustainable and affordable house that suits your future needs and lifestyle.

- Based on your current (or planned future) household size, work out the number of bedrooms, bathrooms, and living spaces that you will require. How much storage and how many vehicles?
- Consider the interior and exterior relationships, and what types of outdoor spaces you want. Is there a central courtyard? How much garden do you want to maintain, and what type?
- Start collecting sample floor plans that you like. Take note of the total area of each home and also dimensions of key rooms. Measure the rooms of the home you are currently living in.
- Start collecting a scrapbook of images that show materials or configurations that you like. Alternatively, put one together digitally on Pinterest or similar website.
- Visit your mortgage broker or bank to understand what your realistic budget is, and make sure to set aside a contingency for blow-outs and/or splurge items.
- In your budget, make sure to allow for costs outside of the build itself such as consultants (designer, structural engineer), Shire application fees, solar panels and rainwater tanks, etc.

House Budget

A key consideration for most people wishing to buy a lot in the Ecovillage is how much is living here going to cost. Beyond the price of the lot itself, the total cost will depend on the size and specification of your home and surrounding garden. To assist you in budgeting, see the table below which provides rough cost estimates for different elements and configurations that you may be considering.

Element	Basic	Medium	High
House – 100m2 Single Storey	$220,000	$250,000	$300,000
House – 150m2 Single Storey	$300,000	$360,000	$400,000
House – 200m2 Single Storey	$420,000	$460,000	$500,000+
Garden Shed	$500	$1,000	$1,500
Workshop	$12,000	$35,000	$60,000
Fencing	$2,000	$5,000	$8,000
Garden (Plants + Irrigation)	$3,000	$10,000	$20,000
Greywater System	$1,500	$6,000	$12,000
Rainwater Tank	$4,000 (25kL)	$6,500 (55kL)	$8,500 (110kL)
Solar Panels 6kW + Inverter	$5,800	$5,800	$10,500
Design, Engineering, Approvals	$12,000	$20,000	$35,000

Note: *The above prices provide an indicative guide for budgeting purposes and do not constitute an offer. Accurate prices must be sought from suppliers and contractors once your precise requirements are known.*

Building Design Guidelines

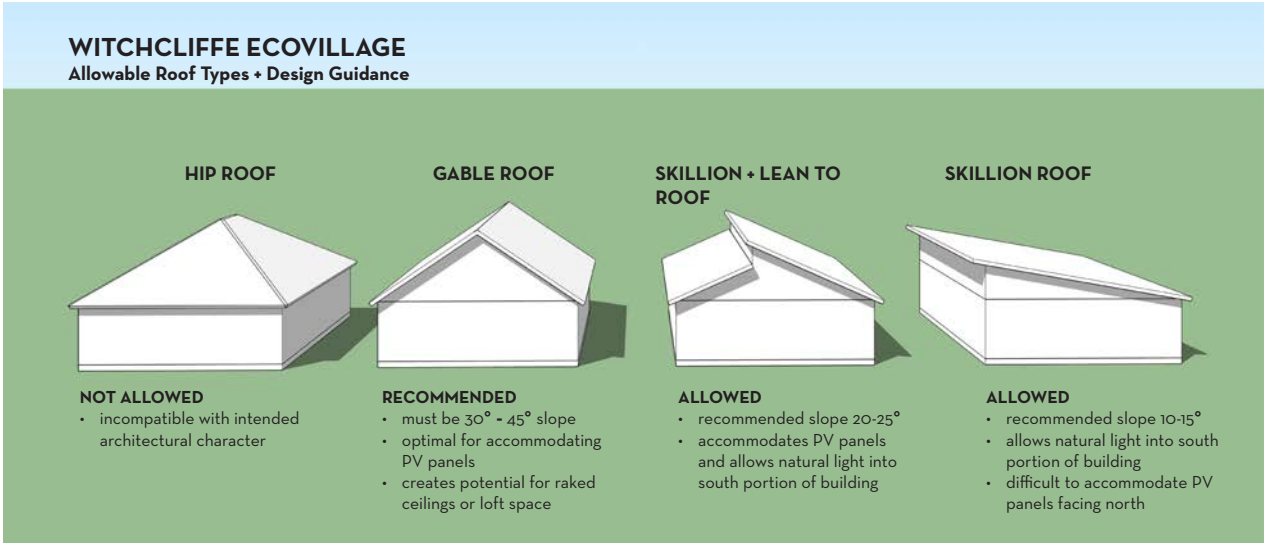
The purpose of the Witchcliffe Ecovillage Building Design Guidelines is to ensure that the built form and landscaping of the Ecovillage reflects the strong vision of sustainability and the clear character set for the development.

The Design Guidelines must be read in conjunction with the Augusta-Margaret River Shire's Local Planning Scheme 1 and State Planning Policy 7.3 R Codes. The AMR Shire has adopted Local Development Plans (LDPs) for all lots in the Witchcliffe Ecovillage, to allow variations to R-codes as required to achieve sustainability and local character objectives, and these LDP's will be provided to lot purchasers.

All buildings will be required to meet building license standards as required in the National Construction Code (NCC). This includes the requirement to achieve the minimum 6 star NatHERS rating. We have avoided applying an arbitrarily increased minimum NatHERS requirement, or any other green building star system, in these design guidelines. Given that every Witchcliffe Ecovillage lot can accommodate optimum orientation of living areas to north, and that all Witchcliffe Ecovillage buildings are required to collect rainwater, generate solar power, and utilise local and sustainable building materials, all homes will achieve strong sustainability outcomes in both the construction and ongoing use of the buildings.

The design guidelines cover a range of topics including:

- Sustainable design principles
- Architectural character
- Site planning
- Internal layout
- Building form
- Construction details
- Finishes
- Services and appliances
- Approvals
- Construction management



Acceptable Roof Types Diagram (Witchcliffe Ecovillage Design Team)

The design requirements (Sections 4-11) are structured into three elements:

- **Objective** states the outcome that we are seeking.
- **Guidance** provides non-mandatory suggestions to help residents achieve the highest possible sustainability outcomes in their building proposals.
- **Required** designates the mandatory or minimum building standards required for building plans to achieve endorsement from the Witchcliffe Ecovillage Design Team (WEDT) prior to submission to the local government planning department

While this document sets out the requirements for building in the Ecovillage, any aspect of these guidelines can be varied on a merit basis at the discretion of the Witchcliffe Ecovillage Design Team.

Local Development Plans

Local Development Plans (LDPs) can supplement or amend the development requirements within the Residential Design Codes (R-Codes), and are signed off by the Shire of Augusta-Margaret River. If a development proposal is consistent with the LDP standards, a proponent can avoid going through the Development Approval process and go straight to Building Permit, saving considerable time.

Key requirements that our LDPs cover are:

- boundary setbacks
- building height
- primary dwelling orientation
- locations for rainwater tanks
- crossover locations
- fencing and retaining walls
- bushfire requirements

LDPs must be adhered to and will override all other planning and design requirements. Please review the LDP for your specific lot, which are located on the WEV website.

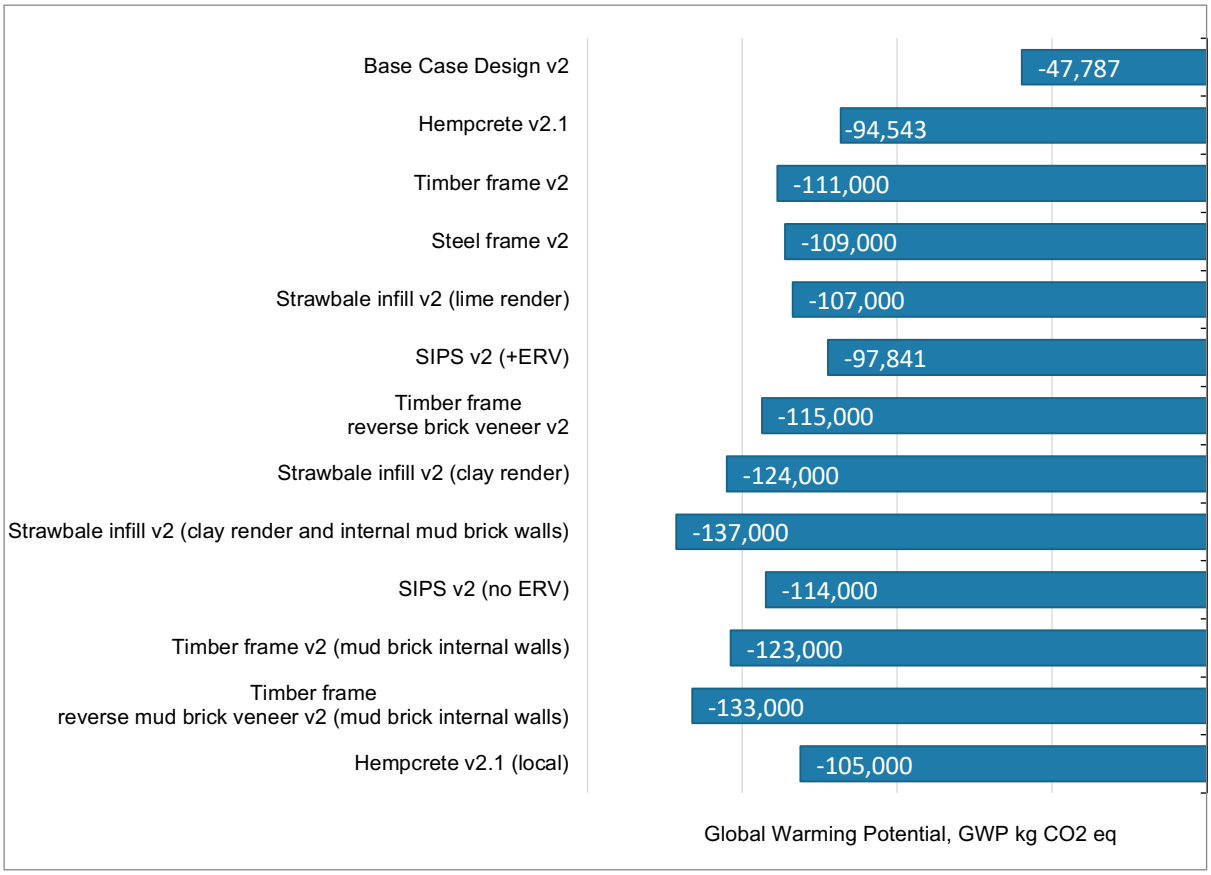
Lifecycle Assessment

Part of the project vision was to demonstrate how new development can minimize its impact on the natural environment, and in particular, how it can be done in a way that decarbonizes the atmosphere. As such, we are requiring that each building in the Ecovillage be net carbon negative – that it removes more carbon from the atmosphere than it emits via its construction and operation.

To guide this endeavor, we commissioned a life cycle consultant to assist us with understanding the carbon impacts of a variety of building materials. In this analysis, we designed a prototype home for a Cottage Lot and then ran a series of life cycle assessments based on assuming different material components. Life cycle analysis is very detailed and attempts to quantify the energy expended in the entire supply chain for each material – including extraction, refinement, processing, assembly, transport, construction, and eventually demolition and disposal. The testing included a variety of wall types such as timber frame, hempcrete, strawbale, reverse brick veneer, and SIPs panels among others (base case was double brick). It also reviewed window frames, insulation options, floor

coverings, and many other components. This study directly influenced the recommendations and requirements around building materials that now sit in the Building Design Guidelines.

Life Cycle Analysis: Wall Types



LCA Analysis for Wall Types (Andrew Moore of Lifecycle Logic)

With solar panels and battery system included, all homes were carbon negative over an assumed lifespan of 80 years.

To achieve carbon negative buildings, we have set maximum limits that each home can emit via the construction process, in the embodied energy of the materials chosen, and in the operation of the building over its lifetime. Once purchasers have completed the concept design and material selections for their new homes, they need to confirm that their home is meeting the set targets in the Building Design Guidelines. To support this effort, Sustainable Settlements has commissioned specialist software company eTool to design an easy-to-use app called TurboLCA, which will be intuitive to use and provide confirmation of your efforts.

Ancillary Dwellings

An Ancillary Dwelling, commonly known as a 'Granny Flat' is a second dwelling on the same lot. These can be occupied by members of the family, or rented out for long-term rental. All Cottage Lots, Family Lots and Lifestyle Lots will be allowed to build an Ancillary Dwelling in addition to the primary residence.

R+H Strawbale House, Sorensen Architects

Ancillary dwellings must comply with the Shire of Augusta-Margaret River's information sheet PS01-Ancillary Dwellings, which summarises the requirements out of the Residential Design Codes. The primary requirements are:

- Maximum footprint of 70m2 including external walls (not including carports or verandas)
- Aesthetically compatible with the primary dwelling on the site
- Subject to the Building Design Guidelines and approved Local Development Plan
- Provide a minimum of 1 car parking bay
- Provide a minimum of 100m2 of roof area for rainwater capture
- Provide extra rainwater storage of at least 37,500 liters

Ancillary Dwellings cannot be used for short-stay accommodation in any part of the Shire of Augusta-Margaret River (per provision AD1, Local Planning Policy 7 – Short Stay Accommodation).

Short Stay Accommodation

Later stages of the Ecovillage project will include Tourism lots, which allow short-stay accommodation by right. In addition, there is a site next to the Village Square nominated as a Backpackers Hotel. We anticipate that over time there will be significant demand for such accommodation in the development.

The Shire has a strict policy relating to short-stay accommodation in residential areas (see Local Planning Policy 7 and Local Planning Scheme 1 for definitions on the Shire's website).

Key points relating to the Ecovillage are:

- 'Ancillary Dwellings' cannot be used for short stay but can be long term rental
- 'Holiday Houses' (unhosted) are only allowed in certain locations, including within 50m of 'Village Centre' zoned land. Much of Witchcliffe townsite and the Commercial Precinct of the Ecovillage are zoned 'Village Centre' (see approved WEV Structure Plan map).
- 'Bed and Breakfast' (hosted) accommodation is allowed in any residential property, but must be part of the primary dwelling.
- The Shire has a periodic planning approval process that is subject to conditions and renewal

Building Your House

Approaches to Building

There are to separate pathways you can go down to build your new home, each with different opportunities, risks, and costs.

Pre-Designed House
The simplest approach is to select a design that has been prepared in advance to suit your chosen lot size and orientation, often offered for a fixed price by a builder or developer.

Benefits of this approach include:

- Certainty – you know what you'll be getting for the price, and that the price fits your budget
- Speed – as the design process is completed, you can jump straight to building
- Peace of mind – designs would be pre-certified as having met the Building Design Guidelines and Local Development Plan requirements
- Cost – design and engineering costs are absorbed into the overall building cost (so can be financed) and are spread out over multiple iterations of the same house

This is appropriate for those without the desire / need to modify their dwelling to accommodate unusual configurations, aesthetic tastes or individual physical needs (eg. disability).

Limitations to this approach include reduced variety of material selections options and fewer opportunities to modify the design to 'make it yours.'

Custom Designed House
If you have a grand vision that must be uniquely expressed in your house, you'll need to engage in the more complex, risky, but potentially more-rewarding process of designing your own house.

Benefits of this approach include:

- Self-expression – you are only limited by your imagination and your budget
- Tailored fit – design the spaces to precisely fit your household needs and lifestyle
- Choice – select unusual finishes or try experimental construction methods

Downsides to this approach include less cost-certainty - many people find it hard to say no to themselves – and more work / risk to confirm compliance with building design requirements. Those who go down this path also need to pay for design and engineering consultants out of pocket, so will require money up front.

Building Materials

Early research and decision making after you've selected your lot will likely focus on the structural system of the house. Below is a brief summary of some of the more popular approaches to building at the Ecovillage.

Timber Frame
Timber frame construction is likely to be the most popular and cost-effective method of construction at the Ecovillage. The timber sequesters carbon, it is easy to use and modify, it creates an easily accessible cavity for insulation and services, and there are plentiful local carpenters who will provide competitive pricing. It is a well-established system that works with many cladding options and internal finishes.

Margaret River House, Designer: Pam Forward

Hempcrete

An intriguing newcomer to the local sustainable building industry is hempcrete (though it has been used in France for decades). More an insulation and walling system than structure (it relies on a timber frame for vertical loads), hempcrete is a mixture of hemp 'hurd,' water, and lime that chemically reacts and hardens around the frame. Benefits of hemp include: good insulation values, impervious to pests and mould, regulates internal humidity, sequesters significant carbon, fire proof, and acoustic dampening between rooms. It is typically finished with a lime based external render.

Strawbale

Strawbale is a beloved method of construction among the eco-conscious because of its great insulation value (walls are typically 450mm thick), its carbon sequestration, and its low construction cost. Strawbale also relies on a timber frame for vertical loads and there are several methods for framing, some using standard sized framing timber and some a post-and-beam approach. This method is popular among owner-builders and relies upon significant no-cost labour to maintain its affordability. Load-bearing strawbale insulated panels are also available which can reduce building times as the panels are prepared off-site and erected very quickly.

Rammed Earth

Rammed earth is often associated with the Margaret River character, after a number of chalets and winery buildings that were built using this method in the 1980s and 90's. While rammed earth has the benefit of using local materials, a definite positive, it is a poor insulator and so is not effective on the perimeter of a house. As such it is not recommended as a primary construction material (plus it would not meet the insulation requirements in the Building Design Guidelines). However, it is very effective as thermal mass and is useful when placed inside of the building, particularly if directly exposed to the radiant heat of the sun.

Brick

Due to the large quantities of energy used in firing bricks, they have high embodied-energy / carbon. As such, we do not allow brick as a primary construction material. However, like rammed earth, brick is effective as thermal mass and is allowed to be used internally for that purpose. Recycled brick is particularly encouraged. A good option to consider is reverse brick veneer (insulated timber frame with single leaf brick wall inside), which is a very thermally efficient wall construction assembly, but more expensive than timber frame.

Contracting with a Builder

The Margaret River region boasts a large number of quality smaller builders. In addition, there are some larger production builders with offices in Margaret River or Busselton. Once you've selected your lot, the next step is to start considering who you'd like to build your home.

The land contract will be with Sustainable Settlements and the construction contract will be a separate contract with the builder of your choice. If financing your project, you'd present both contracts to the bank to secure your funding. The bank typically makes separate loans for the land purchase and the build, with the construction loan slowly increasing throughout the build as the funds are successively drawn down to fund building activities. At the end of the build, the bank normally rolls both loans into one consolidated mortgage facility.

We are supporting the following three delivery approaches:

Ecovillage Pre-Designed Homes

We have been working with several local builders to pre-design homes to suit all three cluster lot types (Family, Cottage, and Groupie). These will be offered via the WEV website with fixed pricing and specifications. In addition, Sustainable Settlements is preparing a set of in-house designs that will be priced by local builders and offered alongside the builder's designs.

Custom Design and Build

Sustainable Settlements has gone through a qualifying process to select the best local builders for its 'Builders Guild,' a group of quality builders who we can confidently recommend to lot purchasers. Profiles of these builders will be listed on the WEV website, and they will be available for quoting on custom designed homes. These builders have all been briefed on the project and understand the design requirements. In this scenario, lot purchasers would select their own architect or building designer, or request a referral from the selected builder.

Owner Builder

Some intrepid (and handy) types may decide to put on the hard-hat themselves and undertake an owner-build. This means there is no coordinating builder and the lot purchaser is responsible for overall delivery of the project and sourcing / coordinating all construction trades on site. This can result in significant cost savings but is also high risk. It should only be undertaken by those with the requisite skills and a fair bit of extra time on their hands. Please note that banks will often be more conservative in their lending criteria on owner-builder projects, so contact the bank prior to embarking on this journey to ensure that you can adequately fund the project.

Builder's Guild

The current WEV Builder's Guild comprises 9 local builders who have participated in a project briefing, been financially vetted by us, have submitted client testimonials and project examples, and

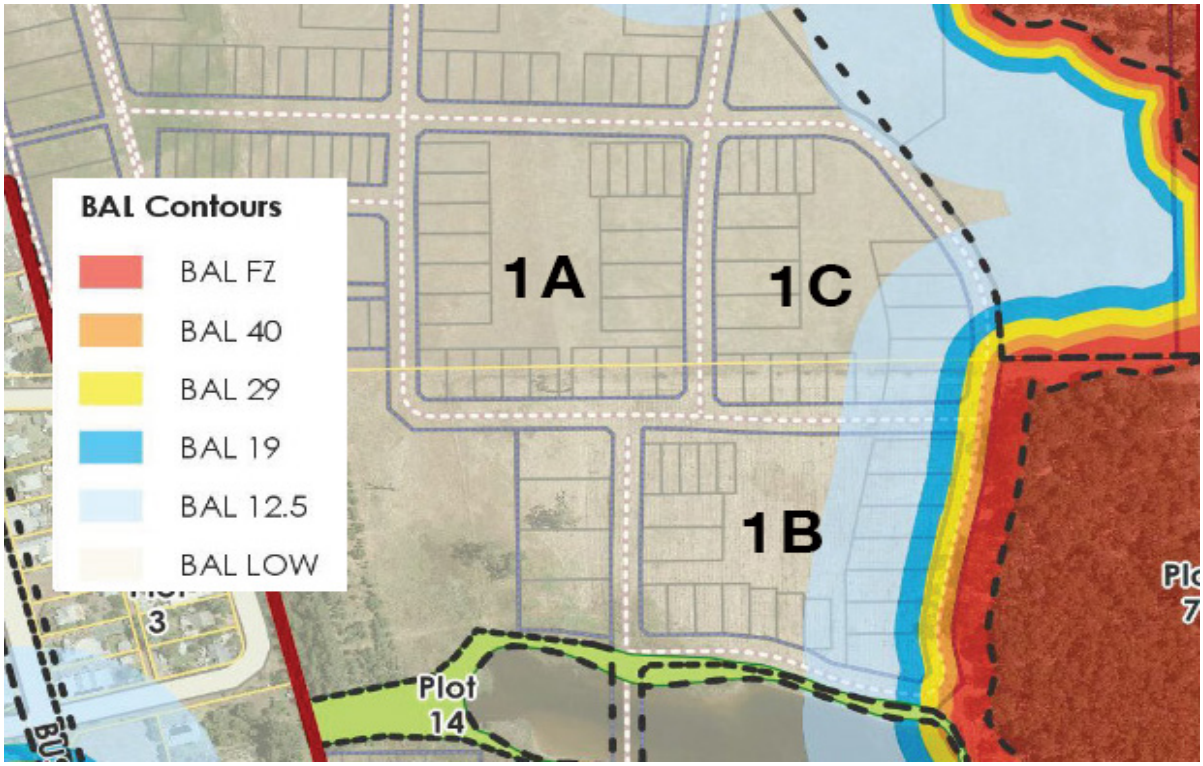
are familiar with the requirements of the Building Design Guidelines and Local Development Plans. We will be promoting these builders on our website, who are all available for custom builds. In addition, several of these builders have put forward their own designs (with pricing) to suit each of the three cluster-based lot types. These designs are pre-qualified as having met our Building Design Guidelines, Local Development Plans, and have achieved carbon-negative status as verified by a successful Life Cycle Analysis. These homes are offered in a range of sizes and construction types including timber frame, hemp, and strawbale.

Bushfire Risk

As part of the extensive structure planning process, a detailed Bushfire Management Plan was put together for the entire Ecovillage site. It concluded that all areas of habitable development on site were located in areas with low or moderate bushfire risk (up to BAL 19).

The Management Plan stipulated that, in addition to the 3 large dams on site, large rainwater tanks should be strategically placed around the village for use in the event of a bushfire. It also required that two means of egress (roads) will be available to all lots throughout the construction process and upon completion of the Ecovillage. In addition, a 3m firebreak will be maintained around the perimeter of the village.

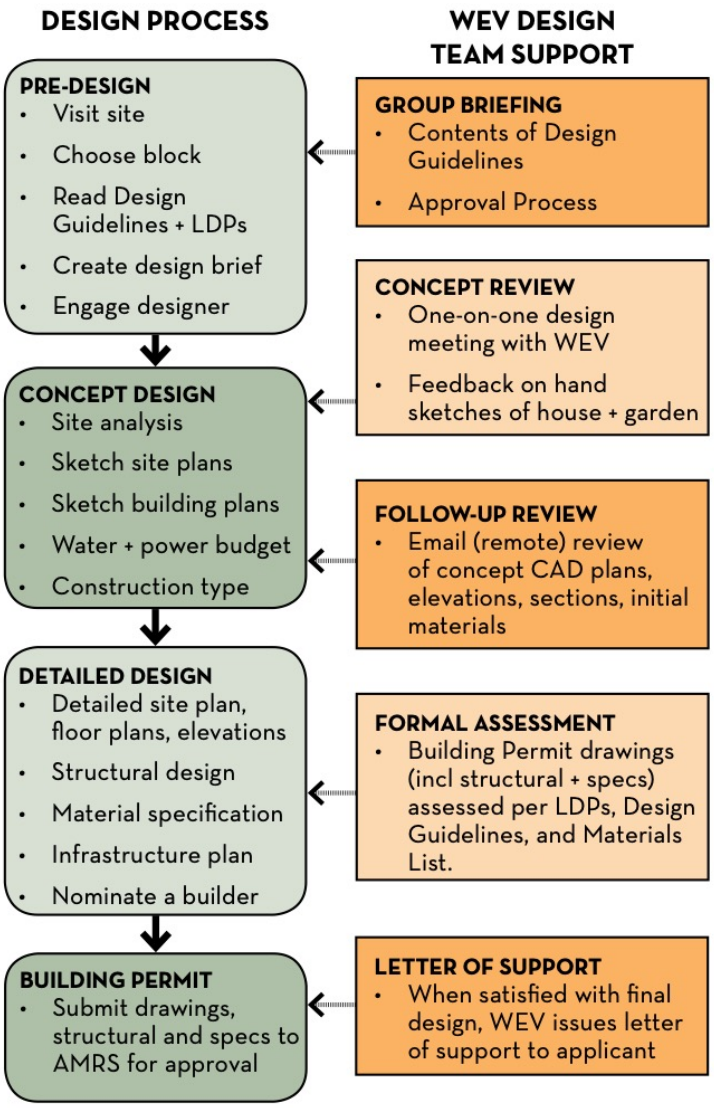
Some lots on the east and west edge of the village will require ongoing management of the Asset Protection Zone (APZ), which may include thinning of vegetation around their houses (refer to applicable Local Development Plan for more info). Some lots have additional construction requirements and limitations based on the assessed Bushfire Attack Level. Refer to applicable Local Development Plan and the Bushfire Management Plan Map (below) for more info. A general indication of the potential requirements on the design / construction of your home by BAL level is provided by the Shire of Busselton website (https://www.busselton.wa.gov.au/Building-Planning/Building-Services/Bushfire-Building-Requirements).



Existing BAL Contours for Stage 1 (currently under review to reduce impact on lots in future stages)

Design Assessment Process

In order to ensure that new homes in the Ecovillage are designed in accordance with our sustainability objectives, you (or your designer) designing a custom home must participate in a series of design reviews with the WEV Design Team during the process. If you have selected a pre-designed home, you can skip most of this process.



Group Briefing - WEV provides induction on design requirements, basic principles of passive solar design, approval process etc

Concept Review - one on one review of initial butter paper concept for house and garden with each purchaser

Follow-Up Review - email (remote) review of concept level CAD plans, elevations, sections, initial specifications

Formal Assessment - applicant submits final Building Permit documentation (including structural), detailed specification (prior to Shire or private certification), Infrastructure Plan, and Sustainable Building Requirements checklist (Appendix A) to confirm compliance. A compliant Life Cycle Assessment will also be required to confirm that the carbon-negative target is achieved. WEV reviews all documentation against LDPs and Design Guidelines and issues an approval letter or requirement for revisions.

If revisions are required, an additional Formal Assessment is required once the areas of non-compliance are addressed. This initial process is included in the price of your block. However, if a second round of assessment is required, we reserve the right to charge an additional fee to cover our costs.

Augusta-Margaret River Shire (AMRS) Building Permit - applicant submits final drawings and specifications along with WEV approval letter to Shire for assessment and approval (or just approval if applicant opts for private certification).

The above outlined process assumes that you do not require Development Approval from AMRS, which will be true in most cases for residential development that is in accordance with the relevant Local Development Plan.

Building Permit

A Building Permit is required for all structures (residential, commercial or industrial) including but not limited to new works, alterations, additions, swimming pools, spas (below and above ground), pool safety barriers / fence for pools & spas, patios, retaining walls and sheds.

A Building Permit must be obtained prior to the commencement of any building work. To obtain a Building Permit, a BA01 (certified) or BA02 (uncertified) application form together with one copy of all plans and specifications must be submitted to Augusta-Margaret River Shire Building Services. Submission requirements can be found on the Department of Commerce website (http://www.commerce.wa.gov.au/building-commission/building-approval-forms-0).

There are two types of applications:
1. Uncertified or Certified applications - Residential buildings (Class 1) and Outbuildings (Class 10)
2. Certified applications - Commercial/Industrial buildings (Classes 2 - 9)

See the following websites for details on building permitting fees:
1. Building Permit Fee
https://www.commerce.wa.gov.au/building-and-energy/building-act-fees-0
Certified - 0.19% of value of work
Uncertified - 0.32% value of work
2. Building Services Levy
https://www.commerce.wa.gov.au/building-and-energy/building-services-levy
Building Permit - 0.137% of value of work

Assessment Timeframes
To speed up the approval process, applicants can engage a private Building Surveyor to certify plans prior to lodging with the Shire for approval.

- Uncertified applications - approval timeframe 25 business days
- Certified applications - approval timeframe 10 business days