ECO VILLA

MEGA IMPACT, MINI FOOTPRINT

What is an Eco-Villa?

Introduction

Eco-Villa housing is a new concept in low-cost, environmentally friendly housing design and construction. With a selection of popular house designs, we can also offer more personalised and custom designs, while not exceeding your budget.

The Eco-Villa is a sustainable housing concept incorporating a fully galvanised steel frame and foundations with no need for a concrete slab. The external cladding and internal fit-out can utilise a variety of materials, depending on local conditions and client specifications, allowing the product to be adaptable, in both materials used and labour required. This has allowed the Eco-Villa to be environmentally and community friendly., thereby providing a perfect solution for rapid aid housing.

During Eco-Villa construction, environmental impact and consumption of natural resources is significantly reduced due to the materials utilised, building methods and the compact shipping of framework and other materials. The steel frame packs down considerably when compared to standard wooden beams, thereby saving freight costs and reducing the impact on natural resources in terms of road wear, fuel consumption, vehicle costs and shipping etc.

The Eco-Villa can be erected simply in remote sites where roads or infrastructure do not exist, or are substandard. We have spent over a decade designing, engineering and building our structures, optimising the design and building methodology and suitability for global design challenges.

Why choose Eco-Villa?

Eco-Villas have met the relevant criteria for the development of sustainable low cost housing modules. Some of these have been listed below:

- A flexible yet affordable permanent housing option that optimises the livable space to footprint ratio, maximising the area to cost ratio and volume to surface area ratio reducing the need for heating and cooling;
- Designed to be sustainable within the context of the local environment, maximising the use of renewable and recyclable materials and minimising the impact of organic and non-organic waste material on the environment;
- Designed to suit a variety of environmental conditions without additional expensive machinery and/ or foundations or building materials;
- Suitable for the urban and rural environment and is easily transported to such locations;
- The module has the potential to be dismantled and re-erected or simply relocated with most components being able to be recycled with minimal waste;
- Long lasting and durable – resistant to termites and corrosion thereby requiring reduced maintenance;
- Potential exists for a variety of window and cladding treatments to suit local industry, skill levels and resources;
- Can be easily designed to withstand cyclones, high winds, snow loading and coastal environments with minimal additions;
- The sloping roof is ideal for mounting solar panels and the raised floor is perfect composting toilets and grey water systems; and
- The Eco-Villa is easily added to so that families and communities are able grow. Each Eco-Villa can be extended efficiently, economically, and aesthetically, utilising the maximum floor space to cladding ratio.

Why build with Steel?

Benefits of the Steel frame:

- Potential to be prefabricated and ready to install;
- Termite, corrosion and moisture resistant;
- Resistant to fire;
- No shrinking or warping;
- Considerable reduction of initial transport costs: one 6m container could hold frames for 10 units, rather than one conventional frame;
- Accessibility to areas lacking transport infrastructure such as roads, availability of transportation, appropriately skilled drivers and other labour;
- Eco-Villas can be used to rebuild complete communities affected by conflict, cyclones, earthquakes and other disasters in difficult locations without requiring expensive infrastructure costs;
- Tophats are easily loaded and unloaded manually, which reduces costs of craneage and the requirement of skilled operators;
- The frame is easily assembled by unskilled labour with a minimum of supervision. The system of joining the framework together guarantees construction integrity;

How to build an

Eco-Villa?

Mega Anchor footings are positioned and piers are driven into the ground. The Mega Anchor system is the key to strength and portability of the structure as well as reducing the environmental impact that is typical of excavation work or a concrete slab.

One or two string lines are set, the anchors positioned and jack hammered into the ground. 60mm post are used on corners and the buildings extremities and 40mm posts are used on internals and decks. Levels are checked.

Galvanised stirrups to secure the bearers are screwed in place and heights checked. Bearers are then screwed into the stirrups. These can be filled with concrete to increase rigidity and strength of the structure.

Joists are laid across bearers and screwed on, typically at 450mm centres and at spans of up 3.5m.

Thermocellular insulation is laid across the joists and appropriate flooring is laid above (e.g. yellow tongue, floor boards, bamboo mats or any other rigid material).

Square hollow section (SHS) are placed over the 60mm to add structural strength and rigidity to the frames, connecting the frames to the foundations. These are straightened and made ready for frame installation.

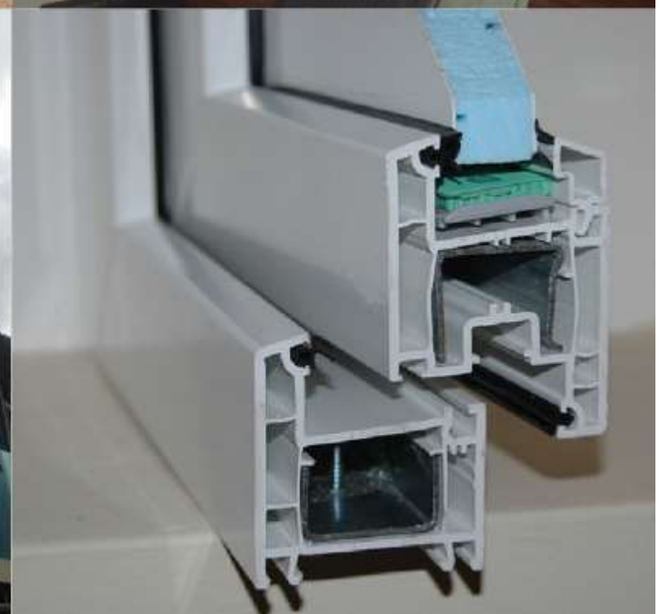
Wall frames and studs can be prefabricated or constructed on site. These can be easily transported in a 20’ shipping container.

Prefabricated wall frames are attached to the existing joists or support columns ready for the attachment of roof supports to be attached. Diagonal bracing straps are applied quickly and easily on-site.

Walls can be clad with locally sourced material at any time after construction, allowing flexibility in resource acquisition.

With the insulation and wall cladding installed, the unit is ready for internal fit-out and awaits furnishings appropriate for local conditions.

The foundations, structural framework and flooring are now complete and ready for insulation and external cladding. Rafters are placed across the top of the walls with top plate. Steel roof sheeting is laid on rafters and screw fixed.



How to build an Eco-Villa

Fit-Out

Eco-Villa design can be easily modified to suit cold to hot/tropical climates. Similarly fit-out can vary accordingly, with a variety of window and internal cladding treatments to suit local industry skill levels and resources. The kitchen, laundry and bathroom facilities are designed to be sustainable within the context of the local environment. Eco-Villas have been designed to meet the requirements of residents and local environments; many low cost housing projects fail to take into consideration the needs and personal element of the purpose of housing.

On request a list of recommended products can be forwarded to each client and by encouraging the use of local products we not only allow the client to source their own products for fitout but provide the flexibility that is often lacking with many other companies.

Flooring

Flooring can be adapted to suit local conditions and customer demands. Options include tongue and groove timber flooring, to yellow tongue flooring, native hardwoods, softwoods, tiles, metal or in some cases, the flooring could consist of local materials such as split bamboo.

Interior Walls

The flexible nature of the Eco-Villa is again reflected in the range of suitable materials available for interior wall cladding. Gyprock has been used in most areas of the Villa including the mezzanine and kitchen areas. The plasterboard will often have a painted finish as directed by client. Other materials include plywood, timber or fibro board. Alternatively in some areas of the Villa, the smoothness of the plasterboard finish can be contrasted with the texture of a rendered and painted finish, providing the definition of spaces in an otherwise open plan living space.

Glazing

As a standard, traditional double and single glazed aluminium windows can be installed in the Eco-Villa,

However, these can be upgraded to German supplied Rehau PVC windows that provide better thermal benefits. The installation of wooden or metal louvres will also improve the temperature control of the Eco-Villa by providing and controlling circulation, and preventing direct sublight from entering the villa. ‘Bradnams Windows’ are a popular choice, showcasing a variety of double and single glazed wood or aluminium windows.

Construction components

Overview

Eco-Villas are architecturally designed with comfort and practicality in mind to suit social, environmental and economic objectives.

Each Eco-Villa can be easily constructed and modified to suit a range of environmental conditions. Semi-skilled or unskilled local labour following some initial instruction, is all that is required to construct each Eco-Villa.

Units can be constructed from a variety of window and internal cladding treatments to suit local industry, skill levels and resources and are designed to be sustainable within the context of the local environment.

The galvanised frame is termite proof and corrosion resistant, and can be designed to resist cyclones, high winds, snow loads etc.

These and the following factors make an Eco-Villa unit suitable for developing countries or regions recovering from environmental disasters where access to quality building materials is limited. In these instances the walls may consist of local lightweight material cladding such as woven palm leaves, grass or louvres and lattice. The Eco-Villas built in Vanuatu consist of woven bamboo matting for the walls as is used in many other buildings in the area.

Construction Components

Foundations

Hot dipped galvanised steel Mega Anchors are selected as a universal low-cost and viable foundation support system. Mega Anchors require no excavation, minimal or no concrete re-enforcement (unless in serious earthquake and/or cyclone areas), and no skill or special equipment to install short of a jack-hammer and appropriate attachment. The Mega Anchor system is strong, versatile and eco-friendly.

They can be:

- Elevated from 200mm to 2.4m above the ground permitting storage underneath as well as low level flooding and water flow under the house almost unimpeded;
- Installed almost anywhere (drilled and chemset into rock); and
- Provide excellent resistance to settlement, pull out or wash out.

Utilising the tripod Mega Anchor, foundations can be installed almost anywhere as they provide adequate resistance to settlement, pull out or wash out, without substantially increasing resistance to actual flood waters, or damaging the ecology of the immediate area.

Testing indicated horizontal and vertical forces up to 2.7 tonnes in moderately reactive soils. The Mega Anchor has also been successfully used in swampy and sandy soils for metal Tophat and ground floor decks.

Construction Components

Tophats & Framework

The framework of the Eco-Villa utilises Greenspan Tophats, a by-product of the Corcon formwork system, which has won awards for design and engineering excellence, and created significant interest in the local, national and international building industries. Greenspan Tophats are made using locally produced galvanised steel. The machinery used to roll the steel was designed and built in Australia and operates in the A.C.T.

The unique design of the Tophats allow for the same product in varying sizes to be used for the complete construction of the frame ranging from base of building to walls, ceilings, and roof.

Galvanised bearers, joists and purlins:

- Ideal for residential flooring in single or multi storey buildings, roof purlins and decks
- Easy to fix with no rolling or twisting
- Warp resistant, corrosion resistant and termite resistant
- Long lasting and durable and can be left exposed for long periods of time
- Galvanised steel 1.15mm thick
- Cut to length
- Perfect for the owner builder

Tophat Profile	Bearer Span	Joist Span	Purlin Span
90mm Deep	2.0m	2.5m	4.0m
150mm Deep	2.5m	3.6m	6.0m
230mm Deep	3.2m	5.5m	8.0m

Construction Components

Cladding & Roofing

There are a variety of external cladding options available for an Eco-Villa. A popular choice is often corrugated sheeting, available with a range of colourbond or galvanised to select from. Weathertex, greenboard, blueboard or vinyl cladding is also available. Cladding can be matched to suit the surrounding environment and dwellings in both texture and finish.

The Eco-Villa has been developed so that various types of cladding can be used depending on individual preference, local conditions and availability and cost of materials.

We are happy for the clients to source their own cladding or for it to be transported in the rest of the package.

Corrugated rolled metal is often used for roofing. The material can be fitted to a radius of 10m allowing for a pleasant curve or wave shape. The steel roof is ideal for collecting fresh rainwater, and the Eco-Villa can be designed with a specific collection point to ensure minimum maintenance for pure, clean water.

Construction Components

Insulation

Australian made Green insulation and EcoTherm are the prime reflective insulation materials utilised. Utilising 15% recycled materials, it deals with 93% of heat entering buildings and complies Australian Standards and Building codes. Combined with high sound reductions it is also fire resistant.

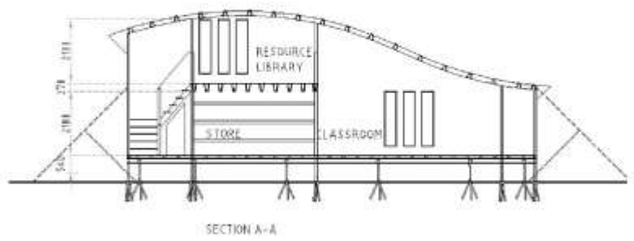
Reflecta Shield: 4.4mm thick R-Value 2.7 systems value

Reflecta Cell: 7.4mm thick R-Value 2.8 systems value

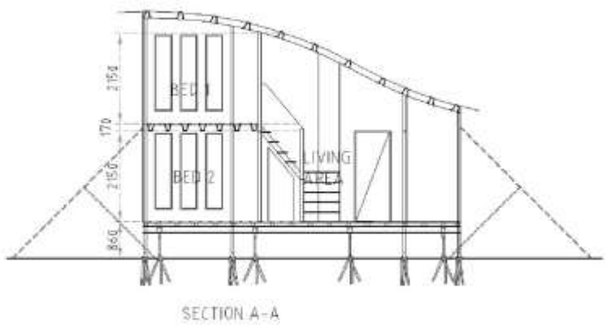
Reflecta Guard: 13.5mm thick R-Value 3.0 systems value

Green Insulation and EcoTherm are used as they have many advantages over traditional housing insulation, being lightweight, easy to transport with reduced bulk and easy to install. Another advantage of Thermal Break and Bubble Insulation, is that it does not absorb water (making it ideal for humid environments) and can withstand pedestrian traffic (being able to be used under flooring).

Earthwool R2 and R4 is used in conjunction with Green Insualtion and EcoTherm for enhanced insulation capabilities.



SECTION A-A



SECTION A-A

A id Projects

Vanuatu

The community benefits to be gained from an Eco-Villa are both short and long term. In many situations concerning aid projects, we encourage the community to build their own Eco-Villas (under supervision), thereby developing a sense of ownership and forming a connection with their project.

The benefits to be gained from such an exercise are numerous. Not only do the people that are immediately involved in the project gain new skills (more often than not to be used later), but a sense of satisfaction and community belonging is also obtained, which often reflects a sense of greater overall community participation and connection. Unlike many other projects, this provides the community with something they can be proud of and will ultimately respect resulting in a more successful outcome.

The Vanuatu Project

Steel framed and cyclone and earthquake resistant, the construction of the two two-storey Eco-Villas of one school and one dormitory “just mushroomed out of the jungle on the island of Malo in under six days,” as observed by local, Pastor William David.

Two container kits including all the foundations, steel frames, water tanks, roof sheeting tools, generators, welders, riveters and compressors weighing less than 14 tonnes were landed on a coral atoll, separated and then transported into the jungle in a total of 22 trips

Funded by the Canada Fund on behalf of the Vanuatu Rural Development and Training Centres’ Association DCI supplied a disaster response centre and a dormitory. Andy Stodulka, Decoin Managing Director, and his support George Scibeira and David McGrath, agreed that it was an amazing and rewarding experience for them working together with the communities of East Malo. The Eco-Villa and the Malo team scored 100% and proved that this new facility – workable in the jungle with no services, electricity or water – could be located almost anywhere in the world, and constructed with untrained labour to provide instant shelter. This fact was verified by correspondence in early 2008 and in 2015 following the cyclone which devastated Vanuatu

Another bonus for the Vaiduhu community was the installment of a stylish steel framed Vogue Pergola which provided both water run-off and shade. The Vogue Pergola was donated by DCI not only to provide shelter and water run-off to the future student boarders, but also to test the structure performance under extreme wind conditions.

A id Projects

D reams in the B ox

Design Construct Industries in conjunction with Eco Villa Australasia has had many years of hands on experience, working together with indigenous people in remote and largely inaccessible locations in the Northern Territory and overseas, as well as constructing Eco villas throughout Victoria, NSW, and ACT. "Dreams in the Box" is a direct result of this "journey of discovery" to develop a system that is even easier, simpler, and faster to construct, as well as being more versatile, flexible, functional, and multipurpose. The aim in terms of emergency housing, is to provide a permanent shelter in a collapsed box with all necessary tools and components (including water tanks etc.) in the order of 160 m2 of living space per 6m container.

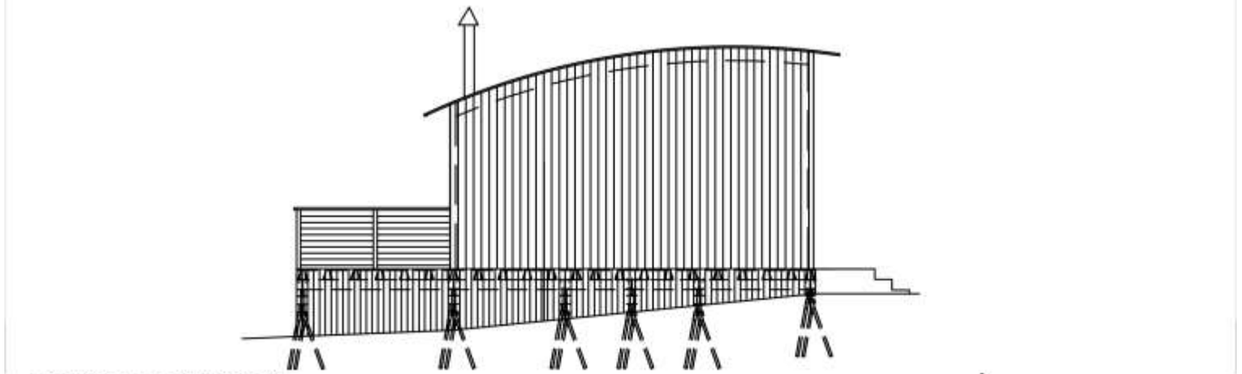
The final product is engineered to withstand earthquakes, cyclones, floods and termites. The foundation requires no concrete, excavation or special tools. Cladding can be supplied, or can utilize local materials. The steel framing is cleaned, sandblasted and then hot-dip galvanized for durability. All elements can be constructed by using basic tools with minimum training.

The objective is to provide a construction system and product that is:

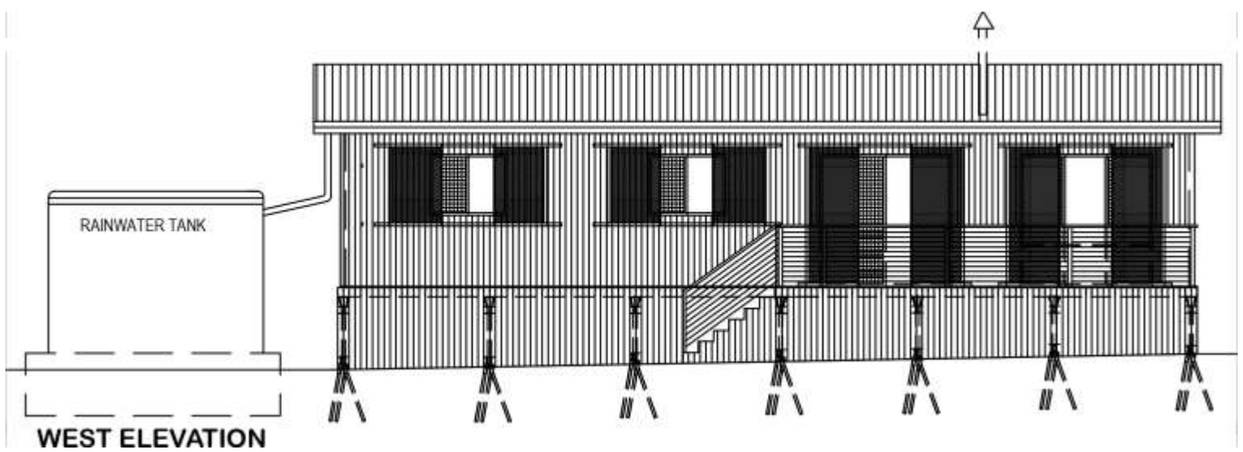
- Whole of life cost effective
- Pre-cut and constructible in a day
- Utilises Nuts and Bolts
- No Requirements for concrete or excavation
- Elevated out of the debris/mud minimum use of self tapping screws and cordless drills
- Is so simple that it can be constructed by disaster shocked communities (thereby boosting their morale)
- That can be easily dismantled or relocated
- Able to survive aftershocks, etc.
- Is Termite/Cyclone proof
- Insulated if required
- Expandable as required
- Able to collect rain water off the roof

Recent Projects

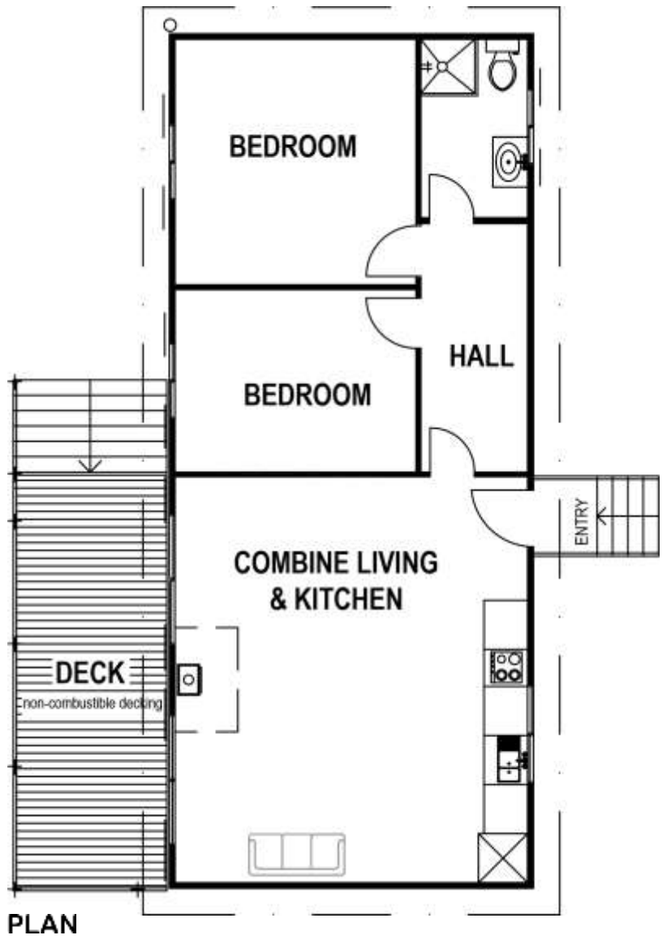
Flowerdale, Victoria



SOUTH ELEVATION



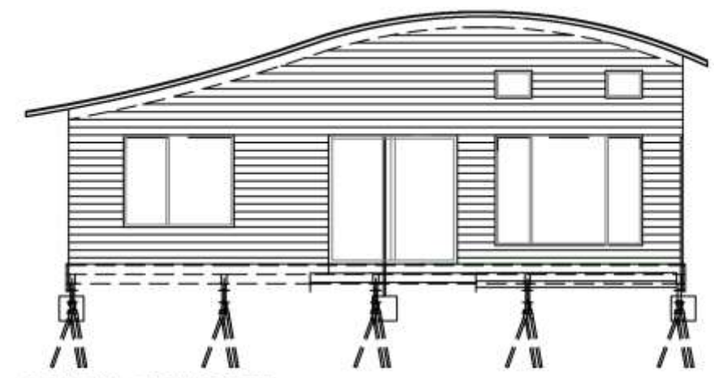
WEST ELEVATION



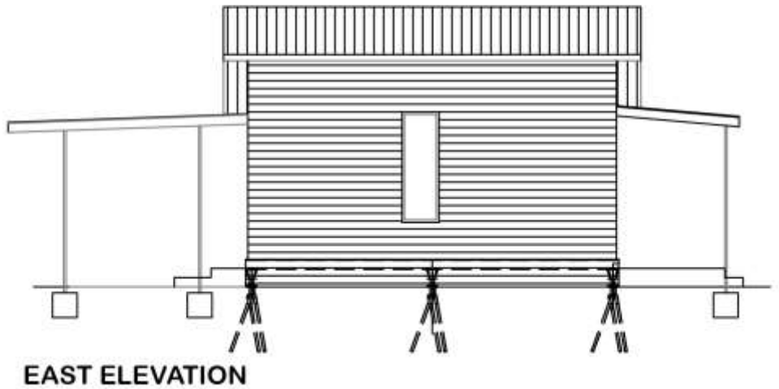
PLAN

Recent Projects

Maldon, Victoria



SOUTH ELEVATION



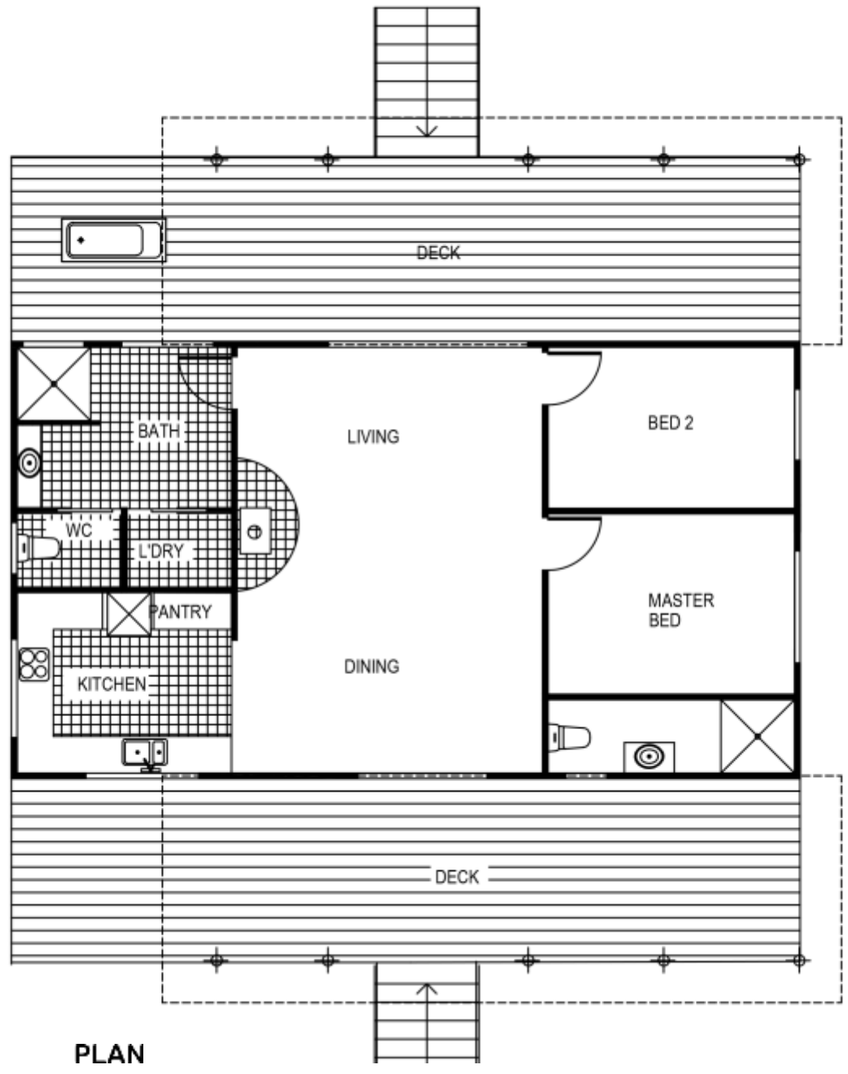
EAST ELEVATION

PLAN

Recent Projects

Bombala, NSW

EAST ELEVATION



PLAN

Recent Projects

Custom Designs

Our team of architects and engineers are willing to work with you to customise your design and develop a project that meets your personalised demands, as well as those of the surrounding environment.

By developing designs that fulfill triple bottom line requirements of social, environmental and economical factors we encourage sustainability and environmental awareness.

We strive to engage ourselves in your project and enjoy the challenges of each job.

Other Products

The Unitank

The UniTank is a galvanised steel tank with a capacity of approximately 2,000 litres. It can be packed with its supporting frame in a flat pack and can be easily transported and assembled. Assembly requires only a sledge hammer, riveting gun, a cordless drill and, if the mounting anchor has not been pre-cut to size, an angle grinder.

Even better, the structure uses no concrete and the ‘mega-anchor’ foundation (which can withstand a 2.7 tonne force) can be readily installed into most soils without the need for levelling, posthole digging or other foundations. The whole structure can be up to three metres high and is capable of resisting a cyclone or earthquake.

Key Features:

- 2000 litre tank and Includes lids/covers
- Available as a flat packed kit and is ideal for container transport
- Cheap
- Uses Mega-Anchor foundations
- Can be elevated to give gravity-fed water

Other Products

Vogue Pergolas

Vogue Pergolas is a market leader in the innovative design of shade structures and carports and a perfect addition to your Eco-Villa.

The success of our product is due to “meeting the unique challenges of our customers".
The maintenance-free, steel structures are custom designed and powder-coated, to clients' specifications. The waterproof, UV and fire resistant pergolas succeed in fully utilizing a homeowner's precious space, whilst being aesthetically and architecturally pleasing.

The arched structures allow privacy and retain views, as well as providing a feeling of space and well being. For example David of Lyons says "it suits my modern lifestyle and feels like resort style living". The team believes in being involved in the entire design and construction process. More specifically few companies can guarantee that the "sales manager" will also be the "on site supervisor", making sure the customer gets exactly what they pay for.

Vogue Pergola is the ultimate product to discover your outdoor potential, for information please refer to the website www.voguepergolas.com.au.

Other Products

Decking and Flooring

With its unique Mega Anchor footing system, Eco-Villa also offers great low cost alternatives for decks and sub flooring. EcoVilla sub flooring and decking frames are sturdy, light weight and can be installed easily with unskilled labour on uneven ground with no need for excavation.

EcoVilla can supply a range of different decking materials, such as merbau hardwood, Knotwood aluminium decking, Decowood aluminium decking or Modwood composite decking.

Knotwood aluminium decking is a low maintenance alternative to timber decking available in a range of different colours. It will not warp, splinter, crack, rot or swell like timber and there is no need for constant upkeep of paint, stain and oil. It is fire resistant and has a 20 year warranty.

Decowood aluminium decking is another low maintenance timber alternative. It is ideal for coastal properties and bushfire prone areas and comes with a 10 year warranty.

Modwood composite decking is available in a range of different colours and sizes. It is made from 90% recycled materials and is a long wearing, eco-friendly alternative to timber. The boards are durable and splinter free, and are covered by a 10 year warranty for domestic applications.

We are more than happy to assist with supplying sub flooring systems for existing building designs. Our sub floors are flexible and can be used with steel and timber framed building designs.

Other Products

Insulation

With increased incentives offered to install insulation, Eco-Villa can provide the necessary combination of product and installers to fit your house with insulation appropriate to your local climate.

Something that is rarely identified by consumers or regular installers is that a combination of insulation products often works better than either bulk insulation or a reflective foil, and either one or the other may work better in certain climate.

Reflective insulation works by reflecting heat, rather than absorbing it or letting it pass through. When installed in the ceiling, roof and floor of a house, it creates a barrier around the building, which minimizes heat gain in warmer climates. Bulk insulation is a very poor conductor of heat, meaning that it stops the flow of heat through the walls of a building. In cooler climates, this is good, because it keeps the warm air inside and the cool air outside. In warmer climates, it becomes effective at trapping any heat allowed to pass through the reflective insulation, therefore creating an effective building envelope.

Humidity, condensation, hot and cold, and roof design are all factors that must be taken into account when installing insulation in a building.

Previous Clients

Testomonials

Don’t just take our word for it, here is what just some happy clients have to say about Eco-Villa:

Rachael and Ashley – Merrijig, Victoria

I had the pleasure of working with Eco Villa to design and build our house in 2011. I can recommend Alex and his team highly and without reservation. Throughout the course of our project Alex was a consummate professional. He was accurate in his initial assessment of the scale and cost of our project. He was excellent at explaining the process and the options we had throughout and managed the sub-contractors extremely well. Our job was completed with care and precision. Alex is a gifted builder and the design and quality of our finished house is beautiful.

Murray – Collector, NSW

Eco-Villa's have a great team of highly skilled people in key development and operational areas. I presented Alex with a basic floor plan, he offered some improvements that still met my budget limitations. The building process using mega anchors and steel construction was efficient and professional. I would recommend Alex and his team if you are considering an environmentally responsible dwelling.

Adam – Wee Jasper, NSW

With the slope we were building on, we first engaged Alex and Ecovilla to construct our floor framing using his unique top hat framing and pier anchor system.

We were so impressed with Alex's work and his friendly and honest personality that we soon asked Alex and the Ecovilla team back to construct the rest of our house to lockup stage. At all times, we found their work to be of the highest standard but most importantly, we found Alex himself was always available to answer any questions and always returned phone calls within an hour or two. We were always fully informed of what was going on and what the costs were. Alex is one of those people who treats your job as if he were working on his own home and will always advise you if he sees an opportunity for a better or more economical way of doing things. Their workmanship was of the highest quality to ensure our house was built to a superb standard.

It was a pleasure to build with Alex and Ecovilla. If we ever have the opportunity to build again, we'll be picking up the phone straight away to call them.

Michael and Di – Bredbo, NSW

Having approached Design Construct Industries about 10 years ago to engineer the foundations of our house, we thought it would be logical to contact them again to discuss our proposed improvements and re-positioning of our sub-floor bracing. The business is still owned and operated by Andy Stodulka and his son Alex. As before, the service we received was prompt, and after a free site inspection over a weekend we developed a plan to optimise our subfloor space. The collaborative approach of the Eco-Villa and DCI team was excellent. We ended up with an excellent and cost-effective design, and the project was completed to a high standard in challenging circumstances. We look forward to engaging with them again for the next stage of our development.

Contact Us

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