

# SCOPE

NZ METAL ROOFING MANUFACTURERS INC.



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Below is a brief introduction to the 2021 executive  
of The Metal Roofing Manufacturers Inc. It is  
intended that Scope be representative of the Metal  
Roofing and Cladding Industry in both commercial  
and residential sectors. Your submission of  
material you consider is of interest is welcomed be  
it design, research, manufacture or construction.

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## HILLSIDE HABITAT

In a city environment the architecture of the New Zealand countryside has been created in a pair of inspiring, compact Wellington homes – the White House and its companion the Black House.

On a steep, bush-clad hillside in Aro Valley the two houses are “a bit like implement sheds”, says architect Geoff Fletcher, of Geoff Fletcher Architects “In other words incredibly simple constructions”.

Their execution was a little more difficult.

When the land was purchased by an overseas-based relative of Geoff’s, the site seemed almost unbuildable with no easy access and a steeply pitched slope.

The project was an exercise in simplicity and cost effective building techniques on a very tricky site, says Geoff. “It was indeed difficult but the sought after result was achieved and the learning curve on this build is probably the greatest satisfaction for us.”

Living overseas but wanting a Pied a terre in Wellington, the site owner agreed the design of the White House while architect Geoff bought the Black House from his relative meaning a “dual build” would be the most effective way of achieving the desired result.

Excavation for the build was all by hand. To access the two sites nearly all the steps had to be built to enable materials and all components of the build to be safely delivered to site. Both houses comprised largely a hand assembly of pre-fabricated parts, large components being lowered down the hill on timber runners with ropes.

Geoff became the main contractor and did much of the running around required which significantly reduced costs. When seen from a distance the pair of houses seem like Yin and Yang.

Up Construction (Tom Woodham) created the sub-structure for the pair of houses and made the pre-fabricated floors for both houses. Haarlem Build (Nick Robbers) built the Black House from the floor

up. The White House was built from the floor up by John Verstappen, a friend of Geoff and a talented builder and an architect himself. John’s input on detail was invaluable. He built the super-structure of the house using 150mm steel framing; with no flashings where the metal is bent around the corners and the corrugate profile is meticulously replicated with scalloping where the walls and the ceiling meet.

The lower White House is clad in Colorsteel®. It’s a bush retreat with a lot less light being captured so the design was intended to reflect the light around. It is clad both inside and out in Colorsteel®, a feature which appears simple, sleek and effective but was complex to construct for builder John Verstappen.

Says Geoff: “The form of the White House is also unusual with a lofty, monopitch roof matching the angle of the site at 38 degrees. Skylights inject light down into the double height space and an interior layout provides two bedrooms and all other necessary elements packed tightly into just 44 square metres.

“The floor is laid with a hardy, pale strandboard and at the centre of the home the bathroom is housed within a plywood box with the kitchen running along the edge and doubling as a hallway”.

Up the slope the Black House has wide spanning views across the harbour and towards the city. At 58 square metres the compact design features a clever floor plan allowing for kitchen, living and dining to be oriented to the view which is framed by sections of floor-to-ceiling windows. The three bedrooms are set back against the hillside for privacy. This house has exterior cladding in Colorsteel® Ebony as it had almost too much light and Geoff wanted it to “disappear” into the bush. Black is the predominant colour inside with black interior walls and furnishings and the ceiling also clad in Colorsteel® Ebony using a Steel & Tube medium rib profile.

The expansive use of corrugate was obvious to Geoff when applying the requirement for simplicity and cost effectiveness.





“The floor is laid with a hardy, pale strandboard and at the centre of the home the bathroom is housed within a plywood box with the kitchen running along the edge and doubling as a hallway”

“I’ve always loved corrugate and it goes beautifully with the architecture of the countryside – like it’s almost done by accident. Corrugate goes with that look – especially vertical corrugate. You look at farm buildings all around New Zealand and there’s still a lot around. They’re beautiful because they are so simple”.

### **Geoff Fletcher Architects**

Geoff Fletcher Architects (GFA) deliver affordable architecture to private, commercial and public clients. A highly experienced team provides innovative designs which lead to time, cost and energy efficient results.

Since the early 2000s, GFA have been working in close partnership with favoured contracting teams to achieve these outcomes. The firm specialize in a wide range of projects including solutions for steep hillsides and bespoke beach houses. In addition to mainstream practice we engage in architectural research, being particularly interested in pre-fabrication and technologies which enable more efficient ways to produce architecture.

GFA are NZIA national award winning architects and have won architectural competitions. Alongside Geoff on design and documentation the team is Allan Clayton, Joe McEwan and Yasan De Silva.

Email: [gfarchitects@gmail.com](mailto:gfarchitects@gmail.com)

### **Builders**

Haarlembuild Raumati  
Nick Robbers  
[nick@haarlembuild.co.nz](mailto:nick@haarlembuild.co.nz)  
Up Construction Napier  
Tom Woodham  
[tomced@live.com](mailto:tomced@live.com)

### **Roof Manufacturer**

Steel & Tube

### **Materials**

Black House Colorsteel Endura Ebony ST7 (ceiling and external cladding)

Custom Orb external walls

White House Colorsteel Endura Cloud Custom Orb – ceiling and walls internally and for the exterior roof and walls

### **Roofing Contractor**

Bullock Roofing







## TAMAHERE TRANSFORMATION



A substantial home at Tamahere overlooking the Waikato River has undergone a transformation, acquiring a new roof in 2020 involving a high degree of detail given the expansive roof area to be replaced.

Homeowner Brian Herman, a builder for the last 45 years, purchased the dream home in 2004 when it was five years old; however the issues with the asphalt shingle roof soon became apparent – it was leaking.

Late in 2020 Metrotile was contacted by Brian to discuss re-roofing options. For Brian the only disappointment about owning this magnificent home was that over time it became clear that the roof could not be repaired, evidenced by the soft and brittle plywood in places, damage to the trusses and cracks in some of the asphalt shingles.

Says Brian: “A roof inspection revealed the worst – the plywood substrate had been severely compromised and water ingress had impacted the shingles in some areas. The damage was so widespread that all the shingles had to be removed to inspect the ply and it was clear the home would need a major re-roof.

“What immediately appealed to me, having contacted Metrotile, was their concealed fastening (CF) profiles giving a seamless look to the roof while protecting the fasteners from the elements. We covered off the profiles most suited to the property and opted for Metrotile’s CF Shake profile in Charcoal Blend”.



The damage was so widespread that all the shingles had to be removed to inspect the ply and it was clear the home would need a major re-roof

What also influenced Brian's decision was the benefit of using a flexible system where the roof could be measured and then the existing roof removed with the replacement CF Shake profile already on site to make it work smoothly.

Open communication between Metrotile's roofing team and the homeowner was a feature of the contract, the owner being a builder so when issues arose during the re-roof, a plan could be found easily ensuring the job could move forward.

The re-roof was completed in stages – the crew focusing on removing a face and then replacing it quickly to limit exposure to the weather. The CF Shake provides a fully concealed fastening system and the deep ribs of the profile accentuate the

shadow lines of the roof. Given the scale of the home the re-roof could almost be treated as three separate houses.

Says Brian: "This was a massive job to carry out. I was living in the house while all the activities were undertaken. The Metrotile group was really good to deal with and they cleaned up their mess which is essential when you're doing a re-roof.

"At no stage did we feel vulnerable, even though the house was temporarily without a roof in places. They had tarp covers and back up plans for any eventuality during the re-roof".

The re-roof of the Tamahere home was completed in two weeks in late 2020.



# GREEN STEEL

## DREAM OR POSSIBILITY?

Is there such a thing? Isn't steel, in spite of the fact much of our construction and much else relies totally on it, full of carbon and dreadfully unsustainable? Can it ever be "green" – which today seems to mean "carbon zero" (another catchphrase)? Isn't use of steel always going to contribute to "climate change"?

Well there is a positive answer, and to look at it we need to dig into chemistry a bit. One of the first issues is the term "embodied carbon". This doesn't mean that the thing actually contains carbon. What it means is that carbon was emitted at some point in the process of making the thing, or may be emitted at some point during its life or end of life.

### **Building material alternatives.**

Steel is used very widely in constructing buildings world-wide and is the largest material manufacturing industry. In buildings, steel is used for the structure (steel beams, girders, piles), as reinforcing for concrete floors and beams (rebar), and (our industry) in actually very low relative weights, as roof and wall cladding (and fencing and rainwater goods). Making it using current methods generates carbon dioxide (CO<sub>2</sub>) a potent greenhouse gas which has been shown to contribute significantly to global warming and climate change.

### **Looking at the two main alternatives to steel for building;**

Timber contains a lot of carbon which has been removed from the atmosphere during the life of the tree in the process of growing the tree, from CO<sub>2</sub> and sunlight (photosynthesis) – and water - by turning it into O<sub>2</sub> (oxygen) and carbon compounds in the structure of the tree. While the tree is alive this wonderful process is what creates the oxygen in the atmosphere which keeps all the rest of life living. Once the tree is felled this process stops and the carbon is locked into the timber

and released only when the timber is allowed to rot (slash and site waste) or burned or buried, or at end of life of the building unless reused. The actual lumber contains locked in carbon – this is what I would call "embodied"; the proper term is "sequestered" meaning isolated or hidden, not removed. It does not absorb any more CO<sub>2</sub>.

Concrete is made using cement, one of the oldest manmade building materials. It is basically made by heating limestone (calcium carbonate) to high temperature in a furnace, which is often coal fired. This liberates CO<sub>2</sub> leaving calcium oxide which combines with the other chemicals in the mix to form cement. Cement then used in making concrete is one of the largest generators of CO<sub>2</sub> both from the chemical process and the use of coal to generate heat. The concrete industry globally is working on reduction of this embodied carbon with a variety of techniques, and success. Concrete in fact can absorb some CO<sub>2</sub> during its life in a degradation process.

So timber during its creation absorbs carbon, and contains it for the rest of its life. Steel and concrete on the other hand both generate CO<sub>2</sub> during the process of manufacture and do not contain very much carbon in the finished product. Whatever happens to the manufactured product, no CO<sub>2</sub> is liberated either during the life of the product made from the material or after.

Since we are manufacturers and users of products made from steel (yes and some aluminium) we can discuss steel only, why it is or isn't "green", how it contains virtually no carbon, but creates CO<sub>2</sub> during the current manufacturing process, and what we can do to make it "greener".

### **Steel manufacture.**

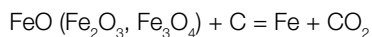
We have seen how concrete liberates CO<sub>2</sub> into the atmosphere during the manufacture of its key material, cement.

The manufacture of steel also creates CO<sub>2</sub> during the manufacture of its key ingredient, iron, from iron ore. Typically iron "ore" is found in the form of iron oxides or carbonate, but other forms exist as well in one of the Earth's most common elements in the upper layers of the planet. Again typically (but not

New Zealand Steel has a unique process for making steel which is probably more sustainable than any other

in New Zealand) this is in the form of rock located often far away from where it is to be used, even in a different country for much of the world's use, and so also has a transport element of the total carbon footprint.

This is then crushed and processed into a form suitable for conveying (pellets), mixed with coal (or indeed other carbon containing materials like coke or charcoal) and heated in a furnace. The chemical process is quite simple – iron oxide + carbon (coal) becomes iron + carbon dioxide – which is released to the atmosphere as a greenhouse gas, and so contributing to global warming.



The iron is subsequently converted to steel either in an electric arc furnace (EAF) or a basic oxygen furnace (BOF). An EAF typically uses a large proportion of scrap steel (or indeed 100%) to assist the melting process. This process removes the 5% odd carbon still left in the iron (as CO<sub>2</sub>) and reduces

it to less than 1% for most grades. EAF which is primarily melting already made steel requires much less energy than the BOF process.

As you can see the conversion from iron ore liberates much more CO<sub>2</sub> than just melting scrap, and most of the CO<sub>2</sub> from EAF is from power use (Scope 2)

**New Zealand Steel process**

New Zealand Steel has a unique process for making steel which is probably more sustainable than any other – apart from using BOF not EAF. Instead of using rock-bound and distant iron ore, its source of iron is “ironsand” a material generated by historic volcanic action and containing a high proportion of magnetite (Fe<sub>3</sub>O<sub>4</sub>) as well as significant quantities of vanadium and titanium (sometimes called titanomagnetite). The surface mine is close to the steel mill, and cleaned and partly concentrated ironsand is transported by underground slurry pipeline the 20 odd kilometres to the mill, not hundreds or thousands of kilometres by truck and/or sea.



An example provided to Sustainable Steel Council by Thinkstep suggests that carbon offset cost for a typical house with a 0.40 mm steel roof is of the order of \$35.

Here, it is, as with all current ironmaking, mixed with coal and heated in a rotary kiln to eventually produce molten iron. This is then processed into steel using a blown oxygen furnace, into slabs of steel. This is made into a range of items, including the hot and cold-rolled high tensile steel sheet and coil which is the base for the products that we use to make cladding materials.

So while our New Zealand production is comparatively sustainable, using local raw material with high concentrations of oxide, and electricity made (mostly) from hydro-power, and with a enviable water cleaning system, it still produces steel with high “embodied” carbon created by the release of CO<sub>2</sub> during the manufacturing process. NZ Steel remelts its own internal scrap during manufacture, but NZ’s “post-consumer recycle” – scrap steel after use in applications like cars, is now all processed overseas – and some of it may find its way back in products.

Globally the industry continues to create new iron from iron ore even though it is a more carbon and energy intensive process than recycling scrap for the simple reason that, partly because of ever increasing demand and partly because of the long life of most steel products before they become available for recycling, there is nothing like enough scrap available. About one-third of global production is remelted scrap.

#### **Mitigation of embodied carbon.**

There are a number of more or less significant methods to reduce the carbon footprint of NZ made and used steel. Listed by the industry are –

##### Minimising embodied carbon

- Recycling/reuse which extends the life, and of course steel waste during use is minimal and is all indefinitely recyclable.
- Operational efficiency improvements
- Sourcing energy from low carbon sources

- Carbon capture and storage/usage
- Improving subsequent steel processing

These minimising strategies are currently used in NZ and globally with varying degree of application and success, and can only go so far.

##### Removing embodied carbon

- Offsetting
- Finding an alternative reduction process

Only these two offer almost total reduction in the “embodied” carbon content of steel.

So, to looking at removing embodied carbon from steel. There are two routes currently possible; one is common to many industries and activities and the other is a new concept specific to steel.

#### **Offsetting**

This is not really removing the carbon content of your product, but buying some nominal relief. This process is in a way related to the Emissions Trading Scheme in that it does not physically remove carbon or prevent its generation, but seeks to buy offsetting – meaning to buy other carbon removing/reducing mechanisms to off-set the carbon you use or generate in your processor activity. You will be aware that when you buy an air ticket (which generates heaps of CO<sub>2</sub>) you can buy a carbon offset to overcome “flygskam” or flight shame. In New Zealand, Ekos (among others) offers carbon offsets by planting native timber. An example provided to Sustainable Steel Council by Thinkstep suggests that carbon offset cost for a typical house with a 0.40 mm steel roof is of the order of \$35.

While it may seem ironical that NZ has gone from cutting down trees to make dairy farms to now planting trees on farmland to provide a CO<sub>2</sub> sink. In order for this to last the trees should be mostly native, which are slower growing but much longer lived than pinus radiata.

So this is not really preventing CO<sub>2</sub> from being released by the steel making process, just compensating for it.

If we can really make steel with no carbon (not off-set into some trees, which will eventually get cut down), for such a large use globally, this would reduce global carbon emissions significantly.

### Alternative reductant method

The only real method. As we have seen, the whole carbon problem with steel (really with iron) is that the current process (and that used since the Iron Age began some 2800 years ago) uses carbon in some form as the method for removing oxygen from iron oxide – by creating carbon dioxide. So, can we use something else to remove oxygen and leave iron, without using and then releasing carbon? One of the commonest (and cleanest) materials on Earth is water, which is  $H_2O$ , a combination of oxygen and hydrogen (which just happens to be the commonest element in the Universe (but not found on its own on Earth unfortunately!). So can we use this and make the equation -

$FeO$  ( $Fe_2O_3$ ,  $Fe_3O_4$ ) +  $H = Fe + H_2O$  ? Well, yes we can, but the two devils are a) in the details and b) getting the hydrogen.

Hydrogen – there are currently three methods of producing this on the planet –

Grey hydrogen - derived from natural gas and fossil fuels, so available but releases lots of  $CO_2$ , so this is not a solution. Blue hydrogen uses the same process as grey but captures the  $CO_2$  and stores it separately. This is not really a solution either.

Green hydrogen is made by electrolysis of water, and uses renewable sources of energy such as hydro, wind and solar power, all available and used in NZ.

So, the environmental advantages of green hydrogen are what we need to make steel, but producing this clean energy source currently uses more energy, if cleanly.

So we want green hydrogen, and NZ is a good place to make it with non-carbon based energy sources.

Obviously this process is up there with fusion power as the Holy Grail of carbon reduction. If we can really make steel with no carbon (not off-set into

some trees, which will eventually get cut down), for such a large use globally, this would reduce global carbon emissions significantly.

### What is happening.

In New Zealand the Robinson Research Institute, at Victoria University of Wellington, in collaboration with NZ Steel, is working on development of a pilot plant to produce steel using hydrogen as reductant.

In Sweden, the SSAB Hybrit project is producing a small amount of high quality steel from Swedish ore, using green hydrogen made using hydroelectricity, at the Lulea plant.

So - watch this space – and in the meantime, buy some off-set.

Green Steel – when not if.

Some reading/listening –

[www.youtube.com/watch?v=\\_4ShQ9W3xAw](https://www.youtube.com/watch?v=_4ShQ9W3xAw)

[www.sustainablesteel.org.nz/](https://www.sustainablesteel.org.nz/)

[www.responsiblesteel.org](https://www.responsiblesteel.org)





## ONE CENTRAL BEDFORD

Attracting younger professionals and families to reside in the central city was a significant vision for the regeneration of central Christchurch following the earthquakes. A new, Fletcher Living residential precinct, designed by Architectus Christchurch, has delivered affordable living in a dynamic, people-focused environment close to the city's heart.

The award-winning development One Central Bedford Apartments & Terraces is testament to the importance of inner city living and the need to prioritise people and spaces ahead of cars and parking issues.

The Bedford precinct, the 2022 NZIA's winning Multi-Unit Home of the Year, is an Architectus project that forms part of the southern most part of the One Central master plan. Carsten Auer, Director Principal for Architectus Christchurch says their vision was to create a diverse and dynamic precinct



that appealed in particular to younger professionals and families, drawing on the 7,660m<sup>2</sup> site's industrial heritage.

Incumbent on this approach was to complement the Innovation Precinct to the south as well as the warehouse buildings housing the former entertainment district of Sol Square and the industrial heritage of the wider site. Predominant use of metal and brick cladding has reflected the importance of respecting the city's recent past while creating interesting communal spaces within the complex.

One Central Bedford comprises 94 apartments and town houses with a choice of one, two and three bedroom units centred around two private inner city courtyards and a laneway. The town houses have good access to daylight and views, a strategy to encourage interaction between residents and passers by. All homes are Homestar 6 certified and meet Lifemark 3 standard for safety and usability for people of all ages. A variety of homes and spaces are included, catering for a diverse mix of people and cultures in a people-focused environment with all car parking grouped on Bedford Row. This







The taller apartments provide a buffer and protect the wider precinct from the traffic and the prevailing, colder north-east winds

provision of car parks over to one side allowing central spaces to be dominated by pedestrians is a feature of the design response to prioritise

The industrial heritage of the site is represented in the metal and brick cladding, Dimond's Slate coloured, Corrugate ZinaCore .55 pays homage to the area's past pre-earthquake the street façade of the apartment buildings clad in corrugate with a concrete base. The same Dimond profile, Corrugate ZinaCore .55 was chosen for the roofing aspects of the development, all metal aspects of the project undertaken by Wayman Roofing Services Ltd.

The apartments consist of innovative pre-cast walls and shear plates grouped around three building cores. The size of the various buildings was carefully considered – much emphasis given to the complex of residential units creating a new community within the city.

The taller apartments provide a buffer and protect the wider precinct from the traffic and the prevailing, colder north-east winds. These factors influenced the design and layout of the development with all apartments having west-facing living and outdoor spaces.

Architectural and structural design teams at Architectus worked collaboratively to accommodate the structural requirements within the building organization and a regular façade design to maximise the value of this system.

This precinct of mixed residential accommodation may re-shape how many in Christchurch feel about inner-city living in positive ways – such developments contributing to the rejuvenation of the once smashed central city.

An architecture and urbanism practice, Architectus believes that architecture begins with a social agenda that nurtures and grows both communities and individuals – enhancing the areas they live and work in.

Director Principal, Carsten Auer has 20 years of experience working in Berlin, London and New Zealand, joining Architectus in 1999; he has been a Director since 2008 and from 2013 has lead the Christchurch office.



**Builder:**  
Fletcher Living

**Architect:**  
Architectus, Christchurch  
Level 1, 152 Oxford Terrace  
Christchurch  
03-377 7086

**Roofing & Cladding Manufacturer:**  
Dimond

**Material:**  
Corrugate ZinaCore .55  
Colour – Slate

**Roofing & Cladding Installer:**  
Wayman Roofing Services Ltd  
Christchurch



## PAPAMOA HOUSE

Durable materials were a must for this family home, to enable full enjoyment of the absolute beachfront location without the need for constant maintenance.

The views from this Papamoa home are uninterrupted and beautiful, with waves rolling in over the sparkling water, Motiti Island in the distance and sea birds soaring overhead. In fact, for roofing contractor Paul Fairweather from Ironclad Roofing, the view presented a slight challenge when the crew was installing the COLORSTEEL Altimate® Euroline® Battenlok folded tray roof. “This is a high end, visual roof so great care had to be taken on the flashings and details,” he says. “But maybe the greatest challenge was keeping the guys working because it was such a beautiful view!”

For architect Jeremy Brick of Studio Brick Architects, designing a home so close to the beach meant looking for materials that would withstand salt spray and weather. For the cladding, a combination of aluminum weatherboards and plastered lightweight concrete panels met this brief and created a pleasing juxtaposition between smooth and rough textures. “This home is right on the beach and the clients wanted a dark coloured house. Durability was a crucial consideration, along with the ability to withstand heat gain due to being dark,” says Jeremy. “For the roof we were also looking for something durable in the same colour palette. We went with COLORSTEEL Altimate® Ebony in a Steel & Tube Battenlok profile, which is a folded tray roof.” COLORSTEEL Altimate® combines a marine grade aluminium substrate with the proven paint technology of COLORSTEEL®, designed for superior corrosion protection. It’s the ideal solution for New Zealand’s extreme conditions.

On arrival at the home, the two garage doors either side of the entrance are visually minimized through integrated cladding. Flanked by these two masses, the entrance has a sense of grandeur, which is accentuated by the immediacy of the sea view inside. “The pedestrian entrance then runs continuously through the house to the seaside elevation,” says the architect. “We have designed a

timber batten wall which flows along the hallway - it blends the street elevation with its double doors through to the seaside elevation.”

Inside, the home is designed to allow for enjoyment of the outdoors at any time of the day and in any season, with an internal courtyard with a barbecue and outdoor fire providing a sheltered spot for outdoor dining. This links directly with the kitchen and dining, which flows through to the deck outside. Four bedrooms provide for a busy family, while a rumpus room, gym and games room mean there is always somewhere for everyone to work and play.

The home has been a win for homeowner Ben Graham, who enjoys some special features in the home, such as the wine cellar with a glazed roof, which can be walked on, and the hidden doors that access his ‘man cave’. For Ben, the aim was to create a lasting, functional home for his young family, and this led to the use of aluminium products. “Being in that seaspray zone we wanted something low maintenance and that would last a long time in that corrosive environment,” he says. “The aluminium grade COLORSTEEL® is a good choice because it’s so close to the sea.”

As a traditional standing seam product with a 17mm plywood substrate, Battenlok is easy to install and has a distinctive look that is in keeping with a contemporary home such as this one. Using Ebony, the darkest shade in the COLORSTEEL® range, helped set the tone for the whole home from the top down and the outside in. For the Graham family, their new home is one to enjoy in any weather - especially in summer when that inviting above-ground swimming pool beckons.



**Product:**

COLORSTEEL® Altimate®  
Colour: Ebony G10  
Roof profile: Euroline® Battenlok

**Designed by:**

Studio Brick Architects

**Installed by:**

Ironclad Roofing

**Builder:**

Venture Developments

**Photographer:**

Amanda Aitken





## TE PUNA KINDERGARTEN

When mod Architecture's Andrew Ward heard that his son's kindergarten would have to move, he offered to investigate options for a new building.

The move came about because Inspired Kindergartens' Te Puna Kindergarten, outside Tauranga, had its site acquired by NZTA for a major road redevelopment.

As Andrew explains, "There was some talk about moving the old building to a new site but it was a bit rundown and needed maintenance so I put my hand up and said I would look at a design and some building sites on a pro bono basis."

"Having a son there gave me some insight into how the kindy operated and how the staff ran the place so I could use that to come up with the right plans for them. The site that Inspired Kindergartens found and I evaluated was just down the road so I did some plans pro bono and some costings and they went with it."

He adds, "The brief from the staff was from a teaching perspective and they wanted something practical and not gimmicky or overly modern – something that fitted in with the landscape. They also wanted the interiors to be something of a blank canvas because they wanted the children's artwork to be the decoration."

That partnership obviously worked as the project was recently named Winner in the Education category at the Waikato/Bay of Plenty awards for the Te Kahui Whaihanga New Zealand Institute of Architects.

The award judges said, "This joyful kindergarten is made up of two strong building forms that provide a clear and confident entry from a busy car park. Its contemporary shed-like appearance gives a nod to its rural neighbours. Inside, generous, light-filled spaces comprise a sociable and welcoming learning environment that is easily navigated at play time and rush hour by small people, teachers, and







The two pavilions are also delineated by their materials, with darker cladding and roofing on the kindergarten building and lighter roofing and cladding on the mono-pitch pavilion.

caregivers. Te Puna Kindergarten is an asset to future generations, creating a practical and playful space for tamariki that delights and inspires.”

As it happened, the site that the kindergarten settled on neighboured that of the farmer who had donated the original site for the kindy.

Andrew says, “It borders on to rural land and the landowner there, as well as donating the original land for the kindergarten, has been heavily involved with the kindergarten for the past 20 years. So we ended up making a little gate through to his land so the kids can go into the orchard and enjoy tractor rides and things like that.”

He says the barn-like shape of the kindergarten building and its corrugate roofing and rough sawn timber helps it to sit comfortably in that rural setting. “The corrugated iron not only gives you that rural feel but also it’s easy to maintain and provides a design element.”

A central spine that acts as an entranceway separates this gabled building from a second pavilion, which comprises adult toilets, office space and a meeting room that can be used by community groups after hours.

The design means northern light can enter the southern, mono-pitch pavilion while also providing a clear delineation between the areas for the children and the adults.

The two pavilions are also delineated by their materials, with darker cladding and roofing on the kindergarten building and lighter roofing and cladding on the mono-pitch pavilion.

The layout of the open plan kindergarten has a kitchen at the western end where kids do baking, a main activity area sits centrally, and at the eastern end is an arts area, with the child toilets off to one side.

“The toilets were a tricky one,” says Andrew, “because you have to give the children privacy but the teachers need to be able to monitor them.” The kindergarten sits on a highly insulated concrete raft slab thermal mass that stores heat gained from the northern aspect with the roofline creating optimal absorption of sunlight in winter and shade in summer.

A pergola on the northern side creates a room without walls and sense of space, and slatting could be added to it to create shading if there was too much solar gain from that side of the building. The north-facing roof plane was pre-wired for solar panel installation, and this was installed at a later date. Ventilating skylights allow heat to escape in summer and let in light. End-to-end opening windows and doors allow for natural ventilation.

The plasterboard walls and fire-safe plywood ceilings have acoustic treatment to keep the noise levels of excited pre-schoolers down. “The plywood on the ceilings gives an exposed timber feel for that rural feeling, and I played with the





proportions and patterns of the lighting and acoustic tiles using blocks and stripes so that when you look at the whole ceiling it has a nice rhythm to it.”

Materials were carefully selected by Andrew for their non-toxic, chemical-free, low VOC (volatile organic compounds), sustainability and end of life properties to ensure the structure was as sustainable, safe and as chemical-free as possible.

The New Zealand plantation Douglas Fir heartwood Abodo timber cladding is naturally durable and contains no wood preservatives. A similar thought process applied to the decks with chemical-free, heat-treated plantation pine where children directly interact. This wood product carries Forest Stewardship Council Certification and does not contain arsenic, a common preservative for exterior timber.

An open gable at the western end provides a space where children can have lunch. Slating has been used on this end to stop afternoon sun entering and also as protection from rain for the outdoor seating.

Andrew had some fun decorating the slating, which has a pattern that can be seen from a distance and represents rolling countryside and sky.

The design presented Andrew with some challenges and personal investment.

“My older son had left by the time it was built but I had a younger son go there before he went off to school so it was quite nice to be involved with a project that I also used.”



## mod Architecture

Andrew Ward has over 20 years of experience both in New Zealand and abroad and has worked on all genres of architecture including residential, multi storey, mixed use, hospitality, education, office fit-out and government departments. In 2008 Andrew founded mod Architecture as a boutique architectural design company based in Tauranga.

As the company has grown it has begun specialising in contemporary, modern, bespoke residential architecture. A key focus on the old adage ‘form follows function’ is evident in its designs.

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The firm follows these principles: design for the client and the landscape, produce timeless design that comes from simplicity and proportion, and be innovative – architecturally, structurally and functionally

[www.modarchitecture.co.nz](http://www.modarchitecture.co.nz)

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## SAVING THE KEA

Dimond Roofing has partnered with the Kea Conservation Trust (KCT) to protect one of the country's most beloved native birds – the kea.

As a not-for-profit organization, removal of the lead threat to the kea population is an expensive and time-consuming project for KCT which is where Dimond Roofing, as a leading supplier of quality roofing products, has stepped in as a partner to the programme.

Kea is the world's only alpine parrot, and only 7,000 are believed to remain in the wild which makes Dimond's role in the conservation efforts for kea in their native habitat in the mountains of the Southern Alps a major contribution to conservation and the environment.

Shane Pratt, National Marketing and Channel Manager for Dimond says the work is in KCT's lead reduction programme – removing lead flashings and nail heads from the roofs of buildings in areas where they are accessible to keas and replacing the offending lead items with safe, non-toxic alternatives.

Many items used on roofing in the past have lead components that are dangerous to kea who like to chew on these fixtures. Kea tend to live in more remote areas but dwellings around where humans reside prove very popular to explore but often contain significant quantities of lead components – think flashings and nail-heads.

Dimond Roofing's alliance with KCT is focused on existing buildings throughout the Queenstown and Lakes District of front country sites (around human habitation) which have proved to be hot spots for lead poisoning in the kea population. The removal and replacement programme is a free service to landowners.

As a not-for-profit organization, this is an expensive and time-consuming project for KCT which is where Dimond step in as a supporter, contributing to the material costs of the project.



Says Shane Pratt: "The seamless partnership with both KCT and Dimond makes it possible to play a key role in the kea conservation effort – partly due to the convergence of company values.

"We are all about roofing that benefits the environment rather than taking away from it", says Shane. "Dimond is working hard to grow our environmental accreditations and this includes Green Tag certification.

"KCT is about helping kea survive and thrive and they do this by promoting a greener environment which fits with our values."

Since announcing the partnership with KCT Dimond Roofing is pursuing other initiatives to celebrate the alliance – the goal being to spread awareness of the partnership both internally and externally to customers and the wide public via signage at Dimond's South Island branches and on company trucks.









Many items used on roofing in the past have lead components that are dangerous to kea who like to chew on these fixtures.

Sometimes called the 'clown of the mountains', kea is valued as one of the most intelligent bird species in the world. Curious, bold and highly social, kea like to check out skis, boots, snowboards and even cars – windscreen wipers in particular.

Lead poisoning is a serious issue for kea and their curiosity with lead items can cause serious illness and even death. All age groups of kea sampled near some of the older dwellings in the mountainous, remote regions of the Southern Alps have been found to have significantly higher blood lead levels.

Kea have been observed chewing lead fixtures and damage to lead-bearing buildings has been observed. Any level of lead exposure is considered unsafe as lead can have effects that compromise survival (depressed immune function, impaired development, decreased cognitive function) as well as causing illness and even death.

Peter Fraser, a founding member of KCT and the co-ordinator of the Jobs for Nature lead reduction programme, says the aim is to have 350 buildings de-lead by the end of 2023. The first buildings were completed last year when the partnership with Dimond Roofing was announced at the end of 2021.

"The scale of this exercise is huge but the process is quite detailed as we have to focus on what we know are hot spots", says Peter. "To identify these buildings - many of which are very old - keas need to be banded and a blood test taken to measure lead contamination."

Arthur's Pass has been an area of interest with approximately 100 properties - baches and houses in the village - where keas have tested positive for lead poisoning. Property owners have responded enthusiastically with KCT's kea conservation initiative. The first area of measured kea lead contamination was Mt Cook Village and that became ground zero for this campaign when replacement of lead details was first carried out.

The next target area is Takaka-Golden Bay where already 100 properties are identified for removal of lead detail, all with "Kea Safe" non-toxic alternatives supplied by Dimond.

Says Peter: "What is really interesting is that after 2023, when KCT aims to have completed all lead-contaminated huts and buildings, we should have removed the majority of the lead sources causing so much damage and endangering the lives of the precious and unique kea population. If a bird tests positive for lead poisoning we will have fewer sources to investigate".



## WINTON STREET

A former lecturer in politics at the University of Canterbury, Austin Mitchell wrote about New Zealand in his book “The Half Gallon Quarter Acre Pavlova Paradise” and this perception of residential space would certainly have been appropriate for Christchurch where dwellings are – until recently - commonly on land in excess of 1000m<sup>2</sup>

Not so today in the garden city, where urban intensification in the residential sector has seen large sites with single level dwellings now living alongside clusters of new town houses. In fact, urban housing intensification has become a hot topic in Christchurch – and elsewhere - as many feel the new rules threaten some of the city’s unique heritage dwellings.

A site in Winton Street, St Albans was the second collaboration by Woods with developer Andrew Mitchell following the successful development of eight townhouses in Manchester Street which replaced three existing houses resulting in a successful design that would form the template for the Winton Street, St Albans project.

Two modest single-storey houses occupied the 1350m<sup>2</sup> site and provided a prime opportunity for urban intensification. Three of the new homes are 190m<sup>2</sup> and the fourth a slightly larger 200m<sup>2</sup> – all new builds substantially larger than the existing homes.

The design featured four connected houses running north up the site from the south-east street boundary. Locating the driveway access on the east side of the site allowed the first three houses to have west-facing outdoor courtyards with direct access from living areas to optimize afternoon, outdoor living.









The three units have front doors facing the driveway opening to east-facing kitchens with morning sun and an open-plan dining/living area. A central stair provides central access to the four bedrooms and two bathrooms on the first floor.

### **Roof and wall cladding**

The steep-roofed main house forms are defined by the main cladding material comprising a mix of lightweight, white-plastered Integra panels, contrasting with the dark, vertical metal cladding on the secondary forms which feature Metalcraft Roofing Espan 470 – chosen for its clean lines and broad pan affording pleasing shadow lines. Espan 340 is also used for roofing on all four units – providing a strong shadow line due to the 50mm vertical fin and the wide flat tray which looks similar to the more expensive standing-seam profile.

The three front townhouses, while connected at the garages on the ground floor are stepped back in box-like cantilevered forms on the upper floor to provide high level windows to provide additional light and acoustic separation between adjoining bedroom units.

When it comes to the fourth unit at the rear of the site is slightly larger and features both west and north outdoor living. This home is wider across the site than the three front units. The front door and garage are visible from the drive and a first-floor bathroom above the garage has a high-level triangular window in the gable end which provides privacy to the bathroom with a high level of natural light.

Statistics New Zealand reports 8,556 residential dwellings consented in Canterbury for the year ending July 2022 – a 26% increase on the previous 12 months.





## VIEWS TO LAKE HAWEA ARE THE STARS OF THIS SCANDINAVIAN INFLUENCED HOME

A house should work as a home and be beautiful: when you walk into a space it should make you feel something. Such is the design philosophy of Wellington-based MJWarchitecture (MJW) principal Mark Warren, an approach that has had significant influence in designing The View House at Lake Hawea, Queenstown Lakes.

Architect Mark responded to the client's design brief for a holiday home to accommodate several families at once – for the house to become a multi-generational haven for the client's families to visit.

An absolute priority was to maximise the setting and location of the site with incredible and ever changing seasonal views of Lake Hawea. The view was to be the star of this 326sqm, four bedroom family home – every room afforded this vista as per the client's directive. The only parts of the house without the view are the entrance way, laundry and downstairs toilet and shower.

The View House has four bedrooms, a family bathroom with separate WC, media room, a downstairs WC with shower, laundry, master suite with ensuite and dressing, open plan kitchen, dining and lounge built around the internal courtyard plus a viewing deck with an office nook.

Early design work began in December 2018 starting with a single level dwelling in a V shape with a central courtyard but much tinkering followed with site plans, steps, different floor levels and material options, some of the many iterations to get what the client wanted.

By far the biggest challenge was the site itself. The clients are farmers on a sheep and beef property in Taihape. They have travelled extensively in the South Island for sheep dog trials and skiing trips and regularly stayed at the Hawea Hotel when they discovered the section over the road for sale. It would become theirs to establish a holiday home

and eventually their retirement home. An old building on the site had once been a DOC information centre and sat alongside a large pine tree.

The shape of the site was awkward, flanked by a busy Capel Avenue on one side and a public walkway on Crown Land on another. There was also a protected view shaft caveat passing through the north west corner of the site so not building was permitted there.

"These elements meant we had a very squeezed site, hence the shape of the house so we could fully utilize what land was available but still provide some semblance of privacy", says Mark. "It was very challenging but the best feature was that the site was flat."

Mark had to balance privacy with access to view making placement of The View House the single most important element of the project. To mirror the mountains across the lake, Mark included angled walls in the master suite and lounge which added another element of privacy.

To comfortably cater for family groups to be together the home features an internal covered courtyard with an openable louvre roof. Along with the kitchen, dining and lounge all are built around the courtyard responding to how the owners would cater for large family groups. The courtyard is where the large pine tree was removed.

Mark was known to the clients (parents of friends of his) having designed a major renovation of their 150 year-old homestead at Moawhango so it helped that Mark understood the couple's very different ends of the style spectrum. John wanted traditional schist and many timber elements while Robin sought a Scandinavian feel to the internal spaces - definitely no schist and no tiles anywhere in the home!

The building is low maintenance with material choices unifying the home with different features including input from a lighting designer for the linear lights in the halls and layers of light to suit the mood of the location and setting.









To comfortably cater for family groups to be together the home features an internal covered courtyard with an openable louvre roof.

Roofing and cladding was significant to the mix – governed by the fact that the lower roof could be viewed from upstairs. Dimond’s surface-fixed LT7 in Colorsteel Tidal Drift matte grey was specified for both horizontal and vertical surfaces providing a pristine, straight and angular finish facilitating the insertion of skylights. Colorsteel corrugate in Ebony is a feature of the courtyard chimney. There are no timber fascias – they are formed from folded Colorsteel with folded swages for rigidity. The windows are set back into the cladding creating a tight, thermal envelope to the home. Even with changes to H1 energy efficiency codes, this home features elements that far exceed the new requirements. Exterior cladding also included Nu-Wall aluminium E series (black) and Mono 200 series (black and white) profiles.

Adding to the Scandinavian design influence, Siberian larch has been used for the rusticated weatherboards on parts of the home’s cladding, a timber similar to cedar and which contains good amounts of natural oils which burn when they come to the surface creating an interesting texture which is very stable. Soffits have similarly been created from oiled Siberian larch.

The client Robyn was closely involved in the design and material choices for the kitchen featuring an island with no insertions of sink or appliances, opposite a long work bench at the back and a scullery – and no tiles anywhere so a smokey grey mirror splashback in the kitchen and Hardies InVibe wall linings in the showers.

### **MJWarchitecture**

Essex born, Mark worked in construction from the age of 18 – glazing East End schools to building movie sets in the US. He was a carpenter and builder but always hankered to become an architect having worked in Calgary, Los Angeles and Miami Beach before settling in New Zealand in 1998. When a back injury put paid to further carpentry work, Mark at age 42, and with the support of wife Sia Aston, committed to study at Victoria University and graduated in 2014 with a Masters in Architecture.

He served his time at several practices in Wellington including working under Gerald Parsonson (Parsonson Architects) - Mark’s dream job - until January 2020 when he established his own practice MJWArchitecture just before the Covid lockdown. His goal is to specialize in bespoke residential design and The View House is the first under his practice.

“Every project I undertake, if completed successfully, will give the clients the sense that they have something unique, something designed specifically for them to enhance and enrich their lives, whether that’s in their new home or reinventing an existing one.”

### **Architect**

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## BOWENTOWN BACH

A cost-effective build and ease of maintenance were a critical part of the brief when mod Architecture was commissioned to design a bach in the Bay of Plenty beachside community of Bowentown. mod Architecture Director Andrew Ward says his clients wanted a bach that was “essentially a box” for ease and economy of build and one that had robust materials so that maintenance wasn’t an issue.

Andrew says, “The clients would mainly be spending weekends there and would not be there much in winter so they wanted a bach that didn’t require a lot of looking after if they were using the place intermittently.”

They also wanted to make the most of the sea views so the two-storey home is designed with the main living areas upstairs.

Andrew says while the brief was for a boxy form that would be easy and cost-effective to build, he says he made it more dynamic by “wrapping it in dark ColorSteel and then cutting that out to reveal the timber elements”.

He says, “Doing it like this helps to break up the form, contrast the materials and create visual interest with what is essentially a box.”

He adds, “The ColorSteel fits the client brief really well because it doesn’t need a lot of maintenance or repainting for quite a long time and it gives the building some real grunt.”

The Hiland Tray cladding also has strong lines that contrast with the softer look of the timber, which is used to connect the dwelling to the beach and the colours of the driftwood on the foreshore.

The timber cladding used is an Abodo product, sustainable plantation pine that is heat-treated so it





The home has also been future-proofed against climate change and rising sea levels – designed so it can be removed from the site if necessary.

doesn't need any chemical treatment for longevity. The product is given a finish that resists the elements but will blonde off over time.

The home has also been future-proofed against climate change and rising sea levels – designed so it can be removed from the site if necessary.

"The site is located in an erosion zone that the council has mapped out over a 25-50-year period," says Andrew. "So you need to construct a building that can be detached from its foundations and put on a truck.

"It sits 600mm off the ground so there's enough room for a crawlspace and ventilation, and it's on a simple pile system and can be unscrewed from it and transported. We made sure the house was the right size so it could go on a truck and that there is adequate access through the neighbouring council reserve to move it. So there is that ability to remove it if it really becomes necessary."

The main aspect of the house is northeast – facing out to sea.

Andrew says, "It is a really nice aspect with the morning light, and means the house doesn't get hammered by the afternoon sun in summer."

Entry to the home is from the southwest, and this side of building has few windows plus a timber privacy screen over the window of the upstairs master bedroom en suite.

"There's a full window in the en suite so we used the fixed timber screen so there is no line of sight from down below."

The downstairs has three bedrooms, a bathroom and laundry, and a central lounge that opens to a deck spanning the entire seaward face of the house. The upstairs deck provides cover for this outdoor living space, which flows out to a lawn.

Upstairs there is a master bedroom and en suite that sits beside a large open plan kitchen, living and dining space that opens to another deck spanning the seaward side of the house. This deck is partially covered and has wide sea views.

Andrew says the design exemplifies mod Architecture's philosophy that good design can be achieved with clever detailing of simple materials. "Using the black steel as the building's 'skin' helps to emphasise the timber elements but it also gives the building a sense of structural integrity."



### mod Architecture

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[www.modarchitecture.co.nz](http://www.modarchitecture.co.nz)

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