GREEN HOME

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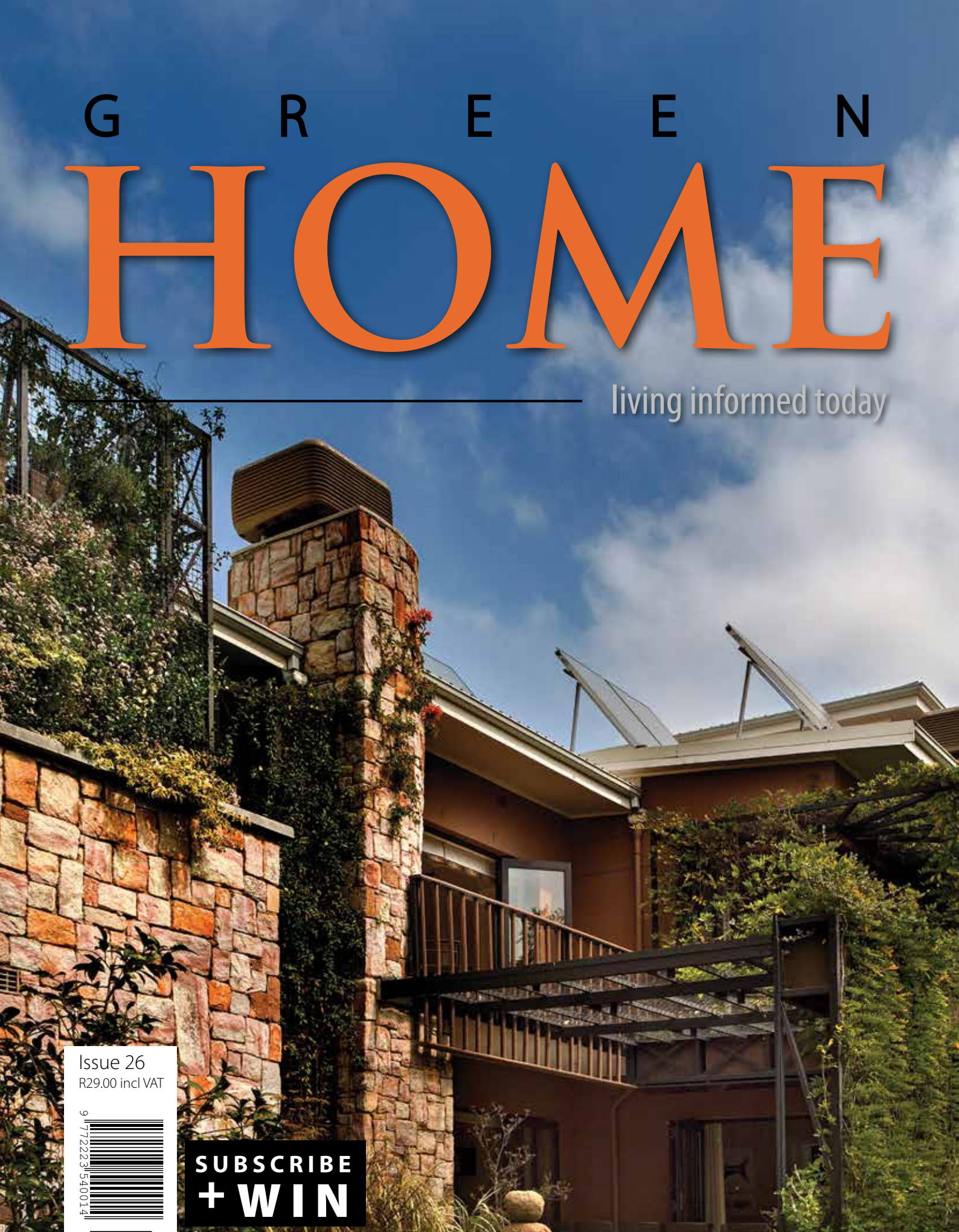

Issue 26
R29.00 incl VAT

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SPECTACULAR GREEN HOMES • ENVIRONMENTALLY FRIENDLY FLOORING • ENERGY EFFICIENT AIRCONS • GETTING YOUR POOL READY FOR SUMMER

House Rhino is owned by Brian van Niekerk, Managing Director of the Rhino Group of Companies who have been responsible for the systems design and integration into some of the building design. The Rhino Group of companies are Rhino Energy Solutions, Rhino Water, Rhino Greenbuilding, Rhino Living, Rhino AgriVantage, Ecola plastics and Rhino Plastics.

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House Rhino
PIONEER OF GREEN

Rooftop vegetable garden

Unique, like the animal its named after, and inspired by innovation, after being initially conceptualised in 2011, the launch of the completed House Rhino was the culmination of vision, passion, dedication & great innovation, to deliver what is believed to be a first on the African continent – a pioneering green house, off- grid from energy, water and effluent perspectives, utilising the very latest in technologies, materials and capabilities.

The House Rhino successfully integrates as many sustainable and green technology options as possible. It also serves as an industry example, dramatically changing the scene for homeowners and developers who are serious about sustainability.

The entirely off-grid 450m^2 home is built on a 1100m^2 stand and has been met with great acclaim from international experts and the local Kouga municipality who were extremely supportive in the planning stages.

While the design had to comply with the overarching architectural guidelines of the Crossway's development CMAI Architects managed the building design. Its success demonstrates that green technology can be applied to almost any home without restraining or sacrificing architectural design.

House Rhino has incorporated the Aruba building system into the construction. This product produces high insulation properties, R-values, acoustic dampening and offers a vastly accelerated speed of construction. This building product was specifically selected because of its inherent insulation properties. The use of this passive material is far more energy efficient than the use of a cavity wall built with standard stock bricks.

By insulating passive components of the building such as the walls, less energy is consumed to actively heat and cool the habitable space. Aruba blocks, as opposed to traditional brick offer not only vastly accelerated construction time, but also a threefold improvement in insulation value due to its' own insulation properties and thus reduces the need for on-going heating and cooling, this is aided by Enviro-Tuff roofing

Battery storage bay

Utility Room - Mains Distribution Box on left - Building Management System Control on right

insulation as well as double glazed doors and windows throughout the building.

The house has a bedroom and living space linked via the kitchen, which leads out onto a courtyard. The link between the two wings has a green roof with recycled plastic planting boxes for growing vegetables assisting with the insulation of this roof area passively and creating food security, water conservation and energy generation were central to the design. The roof garden, located above the kitchen will ultimately provide sufficient fresh vegetables to sustain up to four families. Access to the garden is by way of a ladder located on the eastern side of the lounge area. Situated on the roof garden is a specially designed thermal tower. This structure assists the stacking effect of warm air rising to the highest point, which in turn assists the building to cool down passively. On windless days unwanted warm air is removed via an automated extractor fan, and electrically actuated windows.

In line with recently promulgated regulations, House Rhino makes full use of every opportunity to harvest rain water. This vital natural resource is stored in tanks with a total capacity of 30 000 litres. After being treated with ozone and filtered through an ultra filter, the water is pumped back into the house for drinking and bathing.

Rooftop vegetable garden

Bio-digestor

Filtration System for Drinking Water Supply

Hot water is heated by way of two flat solar panels backed up by a heat pump and circulated via a ring man to all bathrooms. A heat pump will take care of all hot water requirements on all overcast days.

House Rhino, however, takes this concept further. Throughout the home water-based under floor heating and cooling is provided by means of over one and a half kilometers of specialized piping. The facility extends to all rooms and living area with the sole exception of the garage. On demand either hot or cold water can be passed through the pipes and so create an entirely comfortable living environment for each season. The water is heated via solar water heating panels, the fireplace and heat pump.

Assisting with the water cleansing process, water is filtered through a series of three water aqua gardens, which contain natural rocks, recycled bricks and additional media. Bacteria attaches itself to the surface of these materials as the water passes from one aqua garden to the next via natural gravity feed. The filtered water progresses through the system to the pool providing a natural system for this feature. The aqua-gardens all form a part of the swimming pool filtration providing a natural eco system and chemical free swimming pool that circulates 24 hours a day.

The driveway at house rhino comprised of pervious concrete system known as Hydromedia. The material offers an excellent flow rate that allows rain water from the rian

and driveway to drain through the surface. The water passes through the hydromedia, over the LDP underlay to the collection site and is then directed through a series of cleansing filters and on to the tanks located at the utility room.

A secondary filtration system has also been implemented, where all black water, along with organic kitchen and garden waste, is fed through an Agama biogas digester. The natural gas produced from this process is used for cooking and delivers enough gas for four hours' of cooking time per day. The grey water meets up with the black water after the bio-digester where it then all gets treated through a trickle filter and a further reed bed system and thereafter in the utility room goes through a number of filtering stages before being re-used for toilet flush back to the home, irrigation for the garden and top up for the aqua-gardens.

All taps and showerheads are water and energy efficient, thus lowering water consumption and energy. All towel rails are heated via the under floor s heating ystem.

With the exception of toilet bowls and pool tiles, House Rhino is devoid of all ceramic products. All baths and basins are constructed with concrete and then hand polished to a high gloss finish. Adding to the context of low maintenance, all floor surfaces of House rhino are constructed of self compacting concrete and polished. After the underfloor heating a cooling piping was laid and tested, the SCC core followed. Once set, the diamond bit floor polishing began and this resulted in a sparkling surface that will last a lifetime.

Recycled materials have been used extensively all throughout the construction of house Rhino. Over 205 square meters of decking surrounds the residence. The decking composed of reground plastic and timber is maintenance free and requires no more than the occasional brush or hose down. Natural rock salvaged from the building site has been incorporated into the creation of the front entrance wall, aqua garden and lower boundary walls.

In the bedrooms, counter tops and draws are constructed with shutterboard and skinned with stucco to create a pleasing rustic finish. In the lounge, the entertainment unit, also a shutterboard construction has been given the same treatment. The air purification system pumps clean, fresh air through to the sleeping areas of house rhino. This fan, located in the utility room, ensures that clean air circulates through the areas continuously.

In the bar room, the countertop and work surface areas are of hardwearing polished concrete, eliminating time-consuming maintenance concerns. The wine cooler is provided with cooling via cold water circulating through the cast concrete. A six and half thousand little salt water aquarium is located outside the western wall of the bar. Illumination of the tank is by way of a polycar skylight.

House Rhino is powered by roof-mounted solar photovoltaic panels with a bank of zero-maintenance batteries charged by inverters with all surplus energy feeding back into the grid. The building is energy positive and generates more energy than it consumes and is able to run off the batteries for up to 2 days. Further panels power the pool pump during daylight hours and active and passive energy saving is achieved through LED lighting and energy-saving taps and shower heads.

In the winter months the house is kept warm with under floor heating through solar heated and stored water, along with water heating from the fireplace and a dual purpose heat pump that heats the water for the under floor heating. At the same time it cools water that is stored and used to cool the wine fridge in the bar room coupled with running the air conditioner.

In summer, cooling of the house is achieved through a thermal tower that extracts warm air via the highest point passively, as well as through cross ventilation via doors and strategically placed windows. This is aided by the aqua-gardens providing cool humid air inflow as well as a high pressure fogging system providing atomized water droplets down to 10 microns around all the veranda areas creating evaporative cooling

Recycled materials have been used extensively throughout the house to ensure the house retains its sustainable feel. The materials have been included within the decking, natural rock features, cupboards and counters made from shutterboard, concrete baths, basins, polished concrete flooring and counter-tops.

House Rhino is an autonomous, functional and modern family home that not only applies sustainability at a whole new level but also successfully shows that building an entire environmentally friendly home, as opposed to with some sustainability solutions, is both possible and affordable.

Utility Room with Heat Exchanger Tank installed

Ozone and filtration system

Water Pumps and Heat-Exchanger Storage Tank