NATIONAL HOME BUILDERS
NHBRC
REGISTRATION COUNCIL

Eric Molobi
Housing
Innovation Hub

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1. Background on Eric Molobi Housing Innovation Hub

The Eric Molobi Housing Innovation Hub is a response to the challenges faced by the housing sector. Namely, to better the lives of the most vulnerable by providing affordable and quality homes, and contribute to better housing delivery.

Activities at the Hub reflect the interrelationship of functions that contribute to enhancing the quality of the standard of building work. One part comprises the houses built with innovative building technologies (IBT), while the other part consists of the Construction Testing Laboratory and Training Centre. The IBT houses allow for displaying innovation and monitoring performance. In order to assist the public and private sector to promote quality, the houses are complemented by a Training Centre, where dialogue and training can occur, as well as the Construction Testing Laboratory, where material testing and related skills development can take place.

> “The IBT houses allow for displaying innovation and monitoring performance.”

This introduction is followed by providing background to the naming of the Hub, the objectives of the different functions and a description accompanied by images of the different innovative housing systems.

1.1 Eric Marooi Molobi (05 June 1947 – 04 June 2006)

1947

The late Eric Molobi was born on 5 June 1947 in the Alexander Township. He was the second of five children born to Mr Enoch Rampofeng Molobi and Mrs Welhemina Majoele Molobi.

1969

Eric married Martha Maleshoane Moleleki and was blessed with two daughters; Lele and Tiisetso.

1974

His political activities in the liberation struggle against apartheid led to his imprisonment at Robben Island.

1990

Eric’s interest in development began when he joined the Kagiso Charitable Trust as Chief Executive Officer, where he was the key negotiator for the South Africa Partners in the European Union’s Special Union. In his capacity he was responsible for raising funds from foreign government agencies to channel into education and community development projects in South Africa.

1994

He initiated the establishment of Kagiso Trust Investments (KTI) as an investment arm to support the work of Kagiso Trust.

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1996

Government established the first housing parastatal, where Eric was the first Chair to promote innovation in housing finance. The National Housing Finance Corporation supported and facilitated the establishment of the Social Housing Foundation. The foundation created a viable affordable rental model in the housing sector for the first time. The establishment of the Rural Housing Loan Fund was established by focusing on the low and medium income households based in rural areas.

2004

As a board member of the Johannesburg Housing Company, Eric helped launch housing innovations in partnership with the Gauteng Government where he provided funding for the Brickfields Housing Project in Johannesburg and the Bertrams Housing Project. Both projects were recipients of the 2006 UN Habitat Award for innovative and sustainable housing solutions.

2007

The Hub was launched by the then Minister of Housing, the Honourable Dr LN Sisulu, and named after Eric Molobi. The idea for the Hub came about in honour of the contribution made by Eric in supporting the Department of Sustainable Human Settlements and is reminiscent of his vision and creativity.

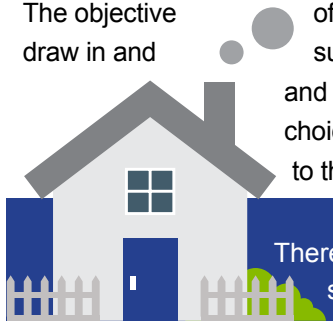
Eric played a critical role in the housing arena where he ensured that the poor were represented. He was also a Chairperson of the National Housing Forum where he guided the development of the new housing environment which changed the government housing policy to include the needs of the poor. As a result of his involvement, the capital housing subsidy was introduced and became the founding basis of 2.4 million houses since the inception of democracy. Between 1990 and 2003, Eric was awarded numerous awards for work done in education, promoting development, people management and business excellence.

2. Objectives of IBT Houses, Construction Testing Centre and Training Centre

2.1 NHBRC and ABSA Housing Innovation Competition

The Housing Innovation Project was established at the end of 2005 at Thorntree View (Soshanguve A) in the Tshwane Metropolitan Municipality in Gauteng. The project was initiated by the then Minister of Housing, the Honourable Dr LN Sisulu, who had tasked the National Home Builders Registration Council (NHBRC) and ABSA with completing the project.

The objective of the Housing Innovation Competition was to identify, draw in and support innovative housing systems developed locally and internationally. The ultimate aim is to showcase a wider choice of quality, aesthetically pleasing and affordable homes to the poorest of the poor and other end users.



There are currently **23** different types of innovative housing systems constructed by local and international developers.

2.2 The Martha Molobi Training Centre

Martha Molobi Training Centre is located in the Hub and serves as a multi-functional facility where complementary and main functions of the **NHBRC** are to be held.

This centre provides stakeholders with first class facilities that promote the vision of enhancing the quality of the standard of building work. The centre is also utilised to:

- Conduct and facilitate construction related training.
- Conduct training sessions on general NHBRC product knowledge and generic training for internal staff.
- Facilitate seminars and conferences for the NHBRC and any other interested parties.
- Provide other training on life skills, counselling, entrepreneurship and exit opportunities in Ministerial Projects.
- Provide administrative facilities for training staff.

> "The objective of the Housing Innovation Competition was to identify, draw in and support innovative housing systems developed locally and internationally."

2.3 Construction Testing Laboratory

The main purpose of the Construction Testing Laboratory is to provide facilities that will enable the improvement of structural quality and technical standards through the physical testing of building materials and products as well as to support the development of home builders. In the broader perspective, the laboratory is used to:

- Test suspect materials and/or products identified by NHBRC inspectors during their routine inspection of houses.
- Support Agrément Board and other relevant organisations in the approval of innovative housing systems. This includes conducting structural tests of the housing systems and other relevant tests.
- Support the training of historically disadvantaged home builders in trades including: brick and masonry laying, concrete properties, concrete mix designs, plastering etc.
- Support the development of technical standards relevant to the home building industry.
- Support provincial Departments of Human Settlements and municipalities in geotechnical investigations to facilitate quicker turnaround times in the enrolment processes.

3. Images and descriptions of Innovative Building Technology Houses, Martha Molobi Training Centre and Construction Testing Laboratory:

3.1 IKHAYA

General Description

The **walls** consist of prefabricated light modular panels. The core wall panels are made of 80mm expanded polystyrene (EPS) blocks sandwiched between two sheets of galvanised wire-mesh. The wire-mesh is electro welded to galvanised wire ties passing through the expanded polystyrene core. The panels are finished off with structural plaster on both sides of the wall to give the house a smooth finish.

A reinforced concrete ring beam is cast at eaves level to all external eaves and gable walls. External corner and T-wall junctions are reinforced with U-shaped reinforcing bars at 250mm centres, passing through the EPS core with the legs on either side of the junction wall.

Internal wall junctions are reinforced with L-shaped strips of weldmesh wire tied to the wall panel weldmesh.

The **foundations** and surface beds are engineer designed where soil conditions are problematic.

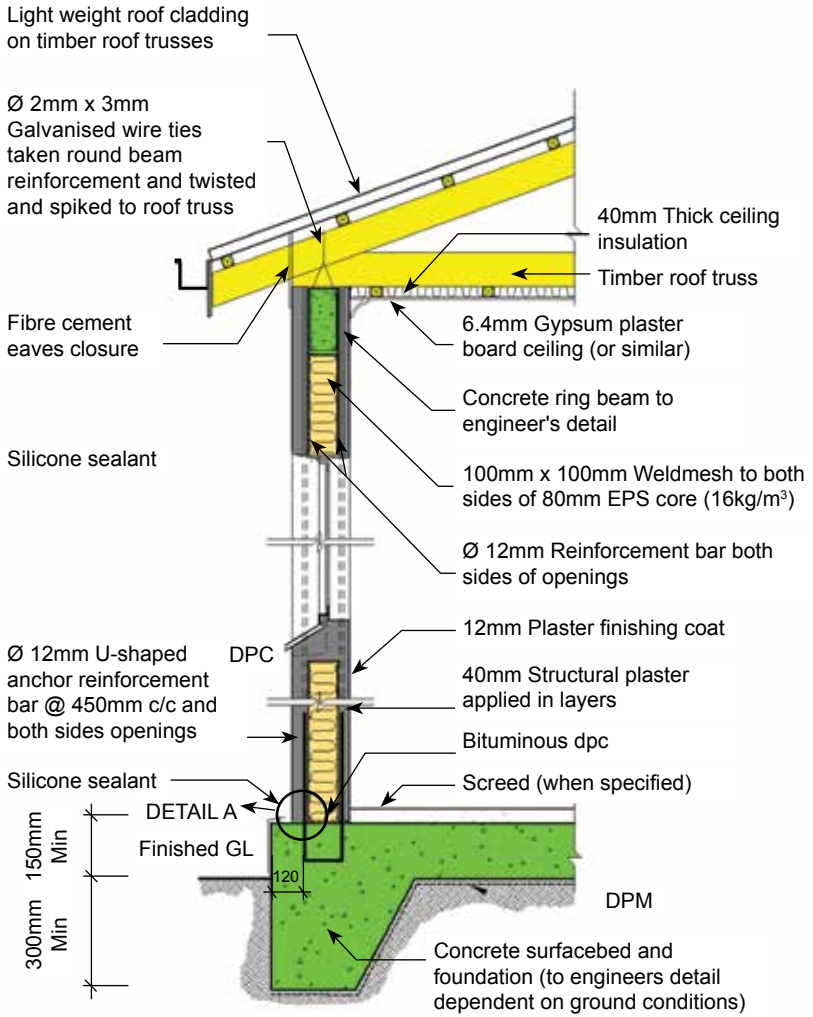
The **roof** construction is conventional timber trusses with light weight cladding (12kg/m^2). Insulated ceilings are always installed.

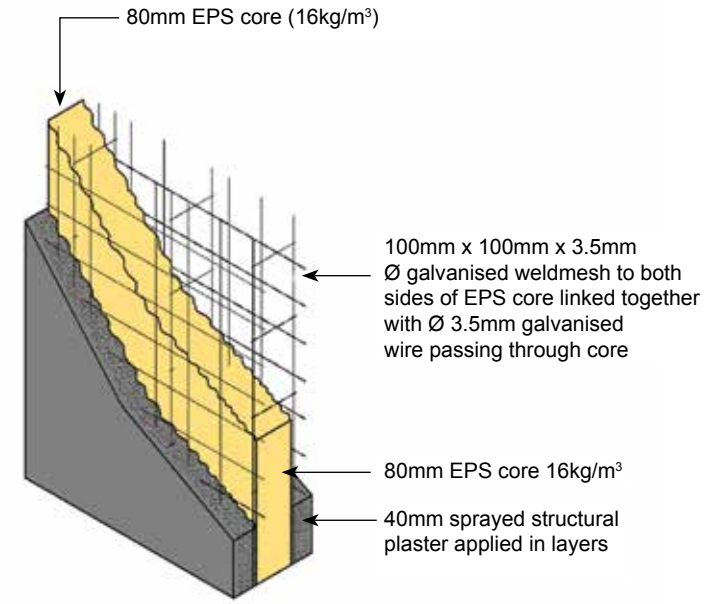
Windows, doors and services are conventional.

This system is Agrèment Certified

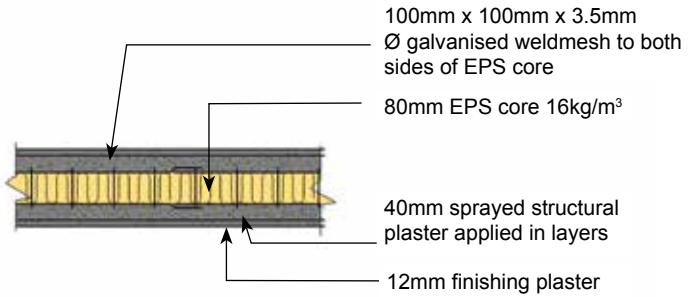
IKHAYA
ERF **256 - 75m^2**
Ground Floor Scale 1:100

Sections & Details





Isometric view



Typical in-line joint

Ikhaya external wall section

Ikhaya wall panel detail

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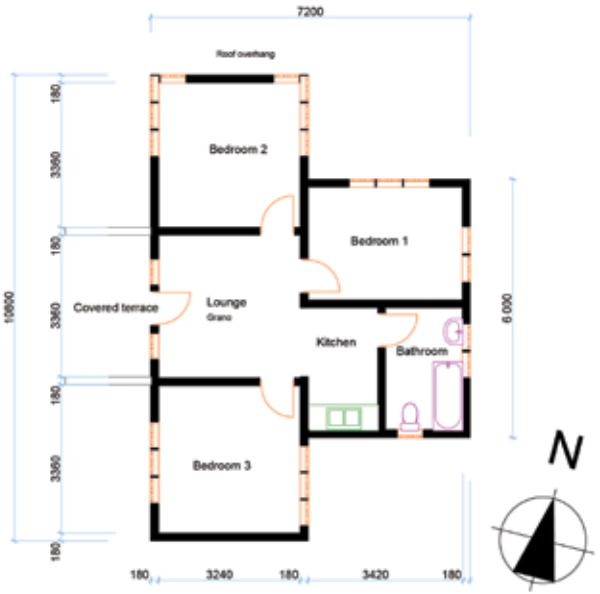
3.2 STYROX



General Description

The Styrox **walls** consist of interlocking hollow expanded polystyrene (EPS) building blocks. These blocks act as permanent insulation and shuttering and are filled with cementitious material. The final strength of the concrete is between 15MPa and 22MPa, which make the walls stronger than the traditional brick and mortar methods. The walls incorporate vertical reinforcement, precast lintels over openings, ring beams and roof holding down anchors. All walls are finished with 18mm thick plaster. The plaster is custom-made “Styroguard”, which is finished off with another layer of normal sand and cement plaster to give a smooth finish.

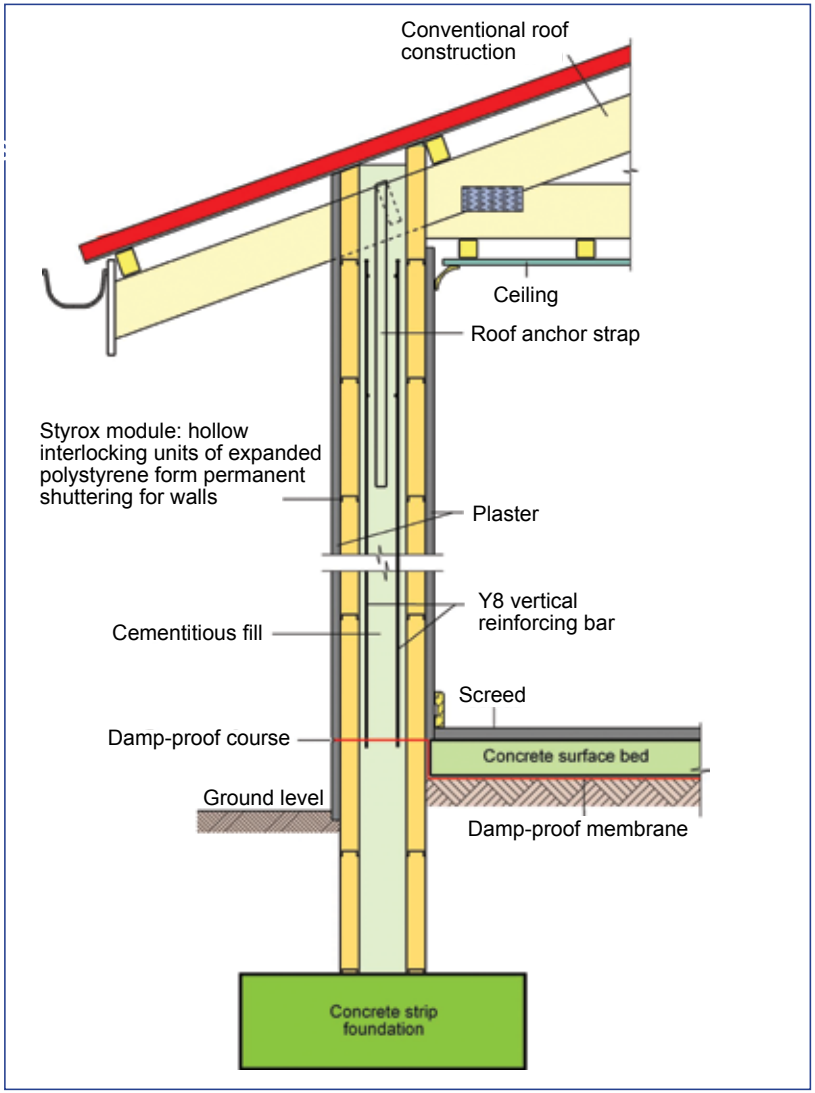
The **foundations** are either conventional cast in-situ concrete strip footings for perimeter and internal walls or strip footings for perimeter and thickened surface beds for internal walls or concrete raft foundations.

Roofs may either be of conventional truss construction where trusses span between eaves walls or of purlin rafter construction where purlins are required to span between gables and, if applicable, internal walls.

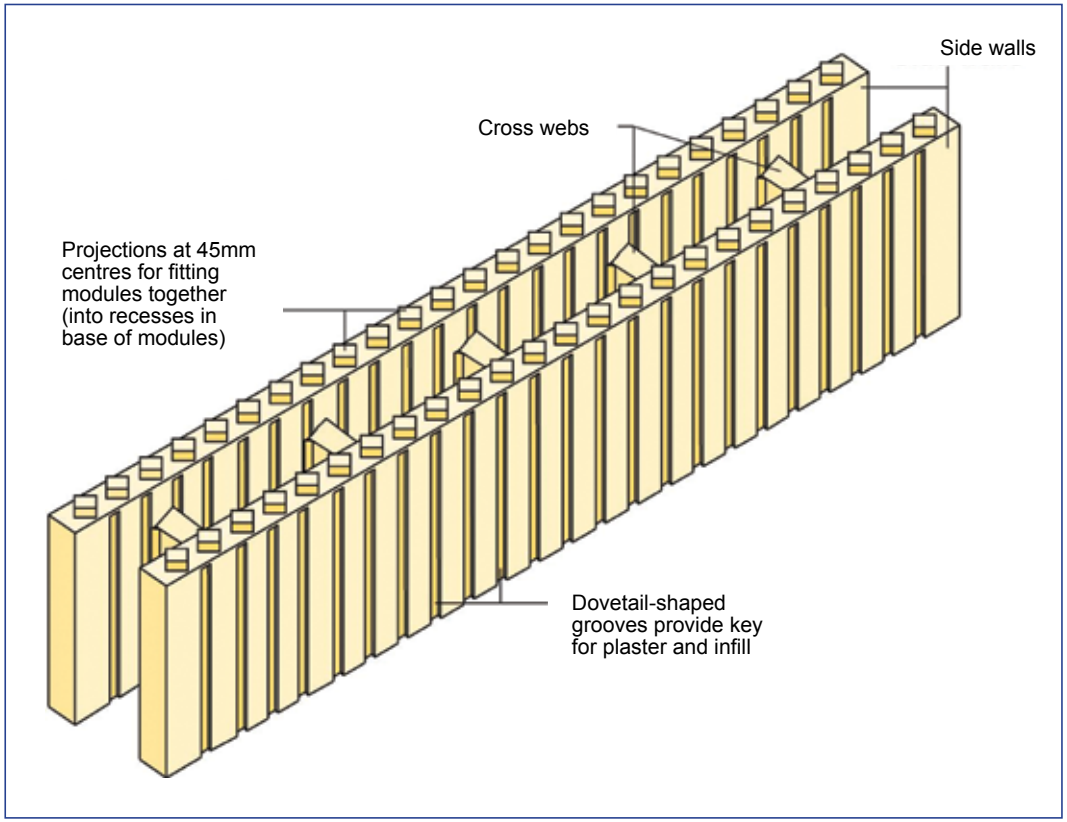
This system is Agrèment Certified

STYROX
ERF **252 - 65m²**
Ground Floor Scale 1:100

Sections & Details



Styrox external wall section



Styrox EPS wall detail

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3.3 LEPA

General Description

The external **walls** consist of 150mm - 180mm thick tongue and groove interlocking expanded polystyrene (EPS) panels with beaded concrete with a dry density of 650 kg/m3. These EPS panels are encapsulated on both sides with 4.5mm calcium silicate boards. Internal walls are 120mm thick and comprise of the same material.

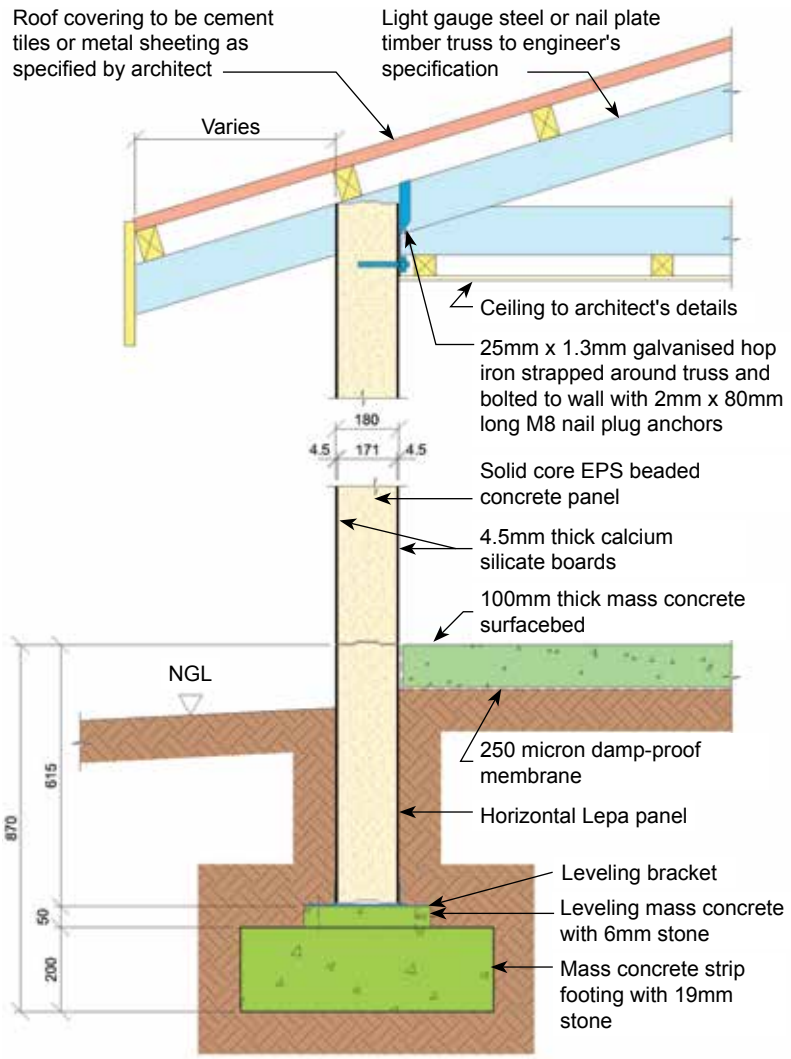
The **foundations** comprise an in-situ cast concrete surface bed and thickened edge beams cast on a damp proof membrane to the engineer's specifications.

The **roof** consists of light gauge, structural steel trusses and clad with lightweight cladding. Insulated ceilings must always be installed and can be gypsum plasterboard, fibre cement, Isofoam or 30mm thick Lambda board. Windows and all other services are conventional.

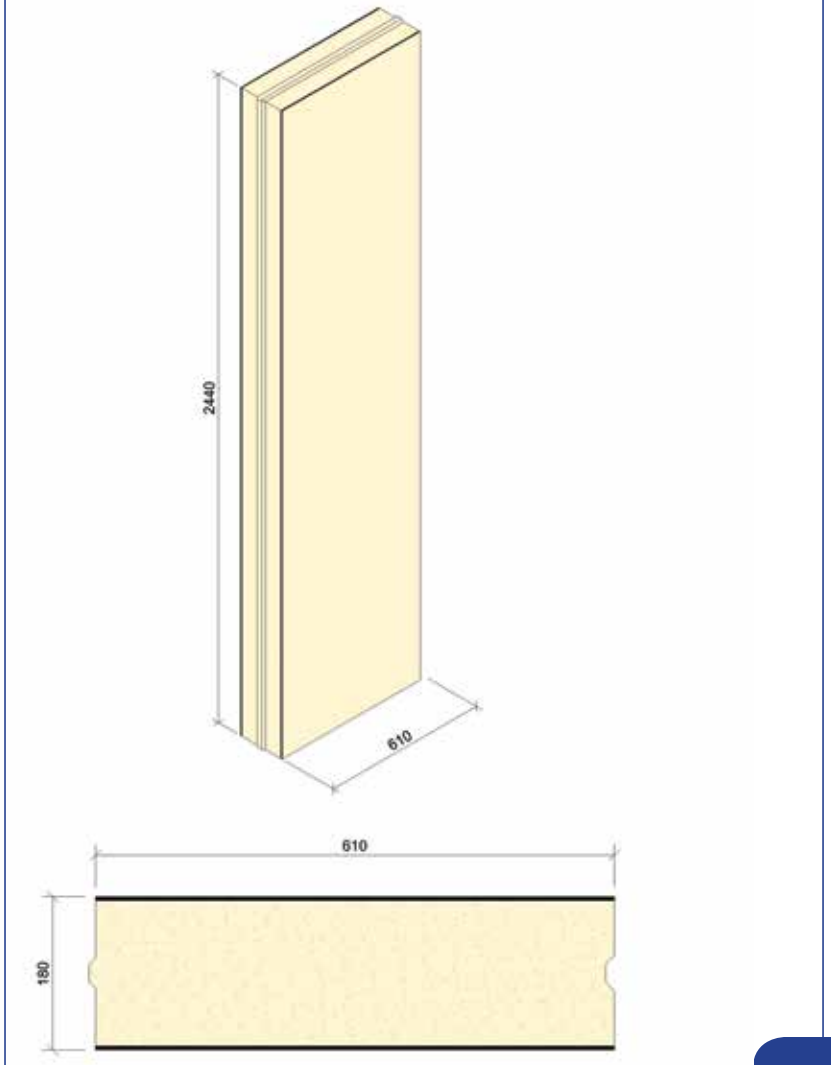
This system is Agrèment Certified

LEPA
ERF **259 - 57m²**
Ground Floor Scale 1:100

Sections & Details



Lepa external wall section



Lepa wall panel detail

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3.4 ROBUST

General Description

Robust **wall** panels are manufactured from 0.4mm mild steel sheeting, which are punched, expanded and formed into a zig-zag profile. Panels are stiffened transversely with 2.5mm wires spot welded to each face at 200mm centres. Mortar is applied to panels either by hand or using mechanical packing. Mechanically applied mortar may be applied wet (pumped) or dry (gunited), with hand-packed mortar and mechanically applied wet mixes. Both faces of core are plastered. In non-corrosive environments plaster will have a 28 day compressive strength of 10MPa, however, in severely corrosive environments higher characteristic strengths may be specified.

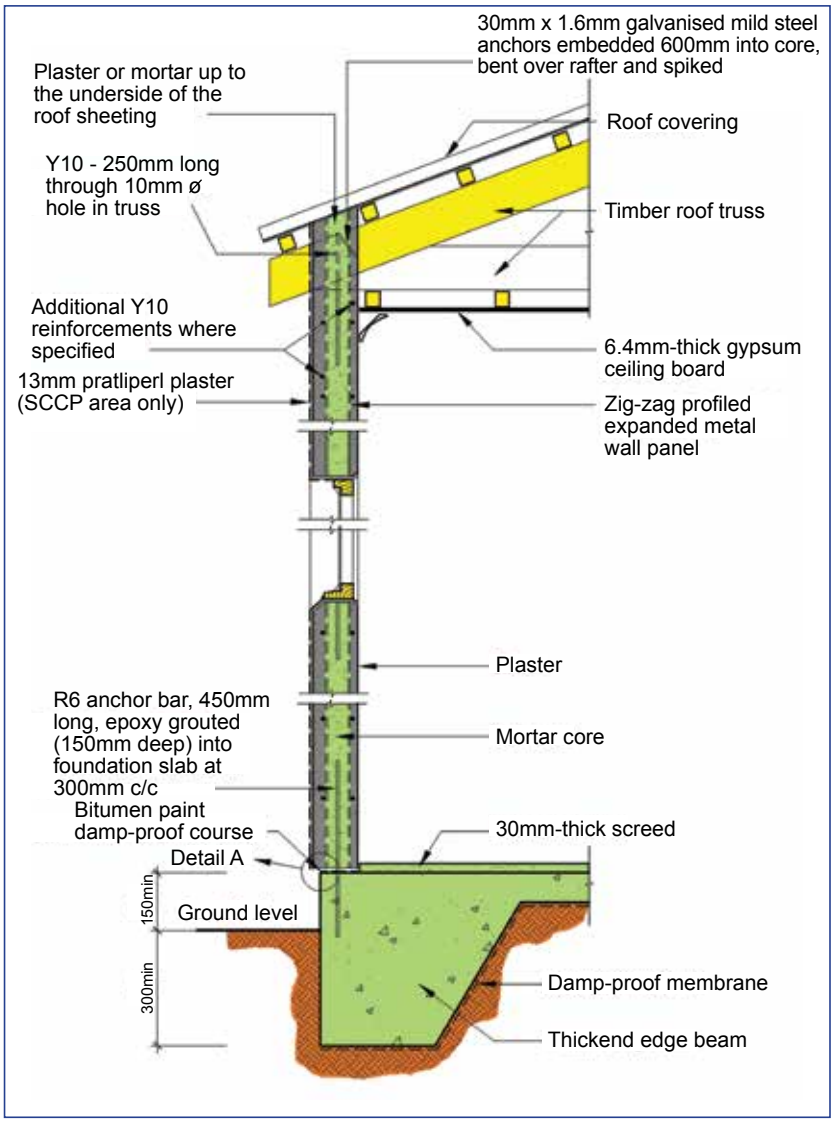
Where the Robust System is to be used in the Southern Coastal Condensation Problem Area, insulated ceilings are installed in all cases and outer walls are given an additional external finish of Pratliperl plaster. The walls must be 130mm thick, excluding 13mm thick additional plaster on the outside.

For the **foundation** and floor system, conventional cast in-situ concrete surface beds are used with thickened edge beams and thickening under internal walls.

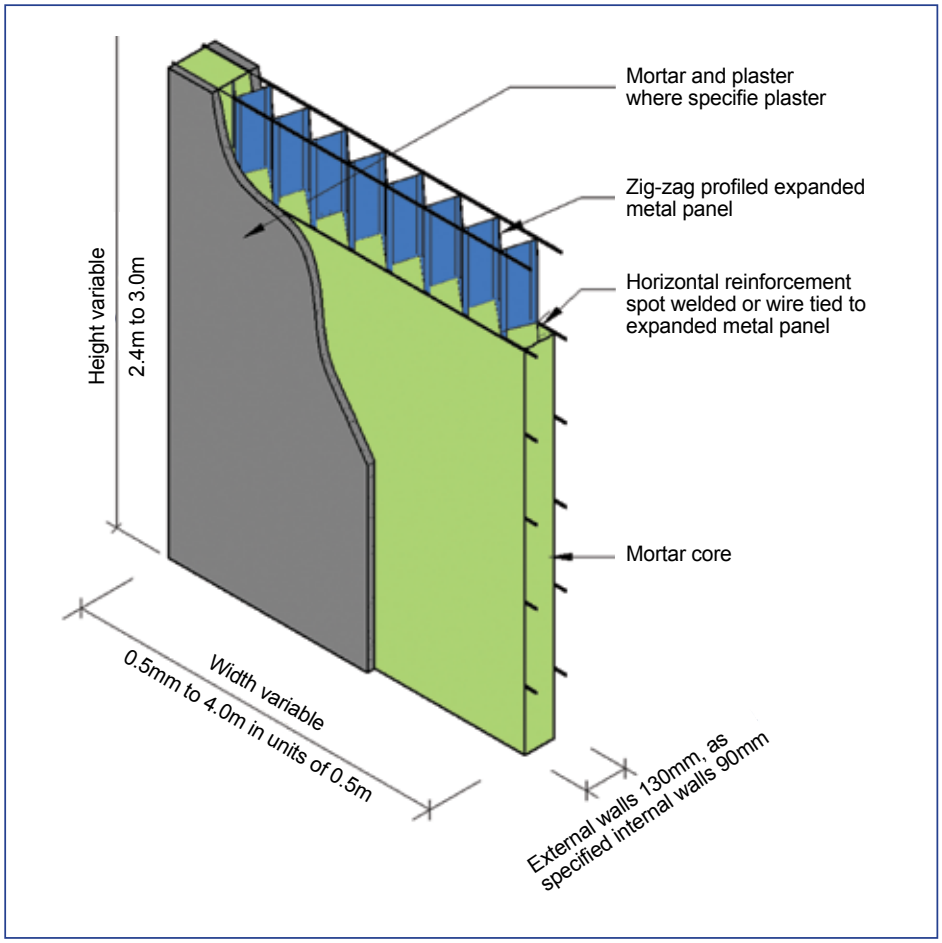
Similarly, conventional **roof** construction and roof coverings are used.

This system is Agrèment Certified

ROBUST
ERF **254 - 110m²**
Ground Floor Scale 1:100



Robust external wall section



Robust wall panel detail

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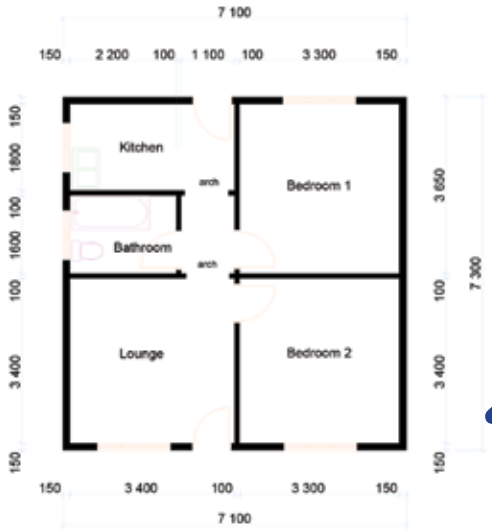
3.5 MOLADI



MOLADI
ERF **227 - 52m²**
Ground Floor Scale 1:100

General Description

The **walls** are comprised of an in-situ cast, reinforced 100mm thick walling system consisting of “No. 133” reinforced mesh and aerated mortar. This mortar comprises a mixture of graded river sand, cement, water and a chemical called “Moladi Chem”. A lightweight plastic injection mould formwork system is used, branded as Moladi, to cast the wall. The reinforcing of the walls of the superstructure will need to be designed and certified by a structural engineer.

The external and internal wall thickness is 100mm - 150mm. No beam filling is required as block outs are used to create the cavities to position purlins and trusses accurately. Steel windows and doors are cast into position. All electrical and water piping is positioned into the formwork prior to the positioning on site.

This system is approved by the bureau of standards and has a NHBRC rational design.

This system is Agrèment Certified

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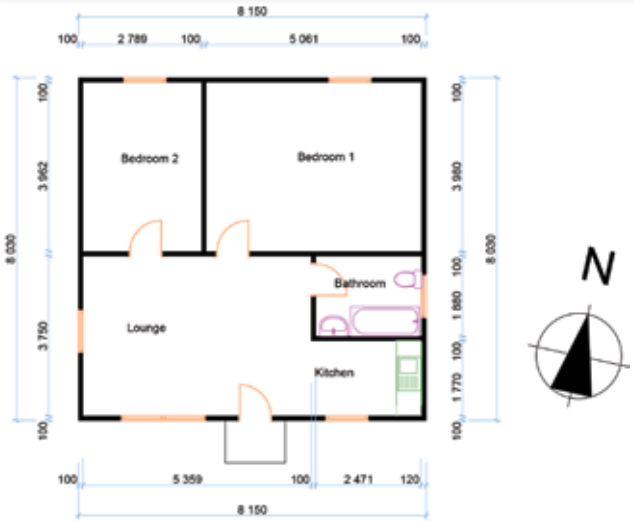
Sections & Details

Moladi lightweight plastic formwork

Moladi lightweight plastic formwork

3.6 IPOZI / HOESCH BAUSYSTEME



General Description

The **walls** are comprised of 2400mm x1000mm x 60mm wall panels fabricated from two sheets of pre-coated galvanised sheet steel, encapsulating an expanded polyurethane core. Galvanised steel ridge beams span between and are anchored to the external eaves. External walls have an oven baked polyester coating to both sides and are internally clad with X-rated gypsum plasterboard 15mm thick. Vertical joints are tongue-and-groove and wall panels are anchored to a galvanised sheet steel angle, which in turn is secured to the foundation slab with expansion bolts. Internal wall panels are the same as external wall panels, clad both sides with gypsum plasterboard (the same as external wall panels). Ceiling panels are the same as wall panels (without gypsum plasterboard cladding). Window and door frames are manufactured from unplasticised polyvinyl chloride (uPVC).

The design of the **foundation** slab and thickened beams is the responsibility of a professional engineer.

The **roof** is specially designed comprising an I-shaped ridge beam of 560mm deep and fabricated from 2mm thick galvanised sheet steel. Roof sheeting is 1.25mm profiled galvanised sheet steel spanning from eaves to ridge beam, secured at every ridge with 5.5mm stainless steel self-tapping screws.

The system makes use of conventional services.

This system is Agrèment Certified

IPOZI / HOESCH BAUSYSTEME
ERF **232 - 65m²**
Ground Floor Scale 1:100

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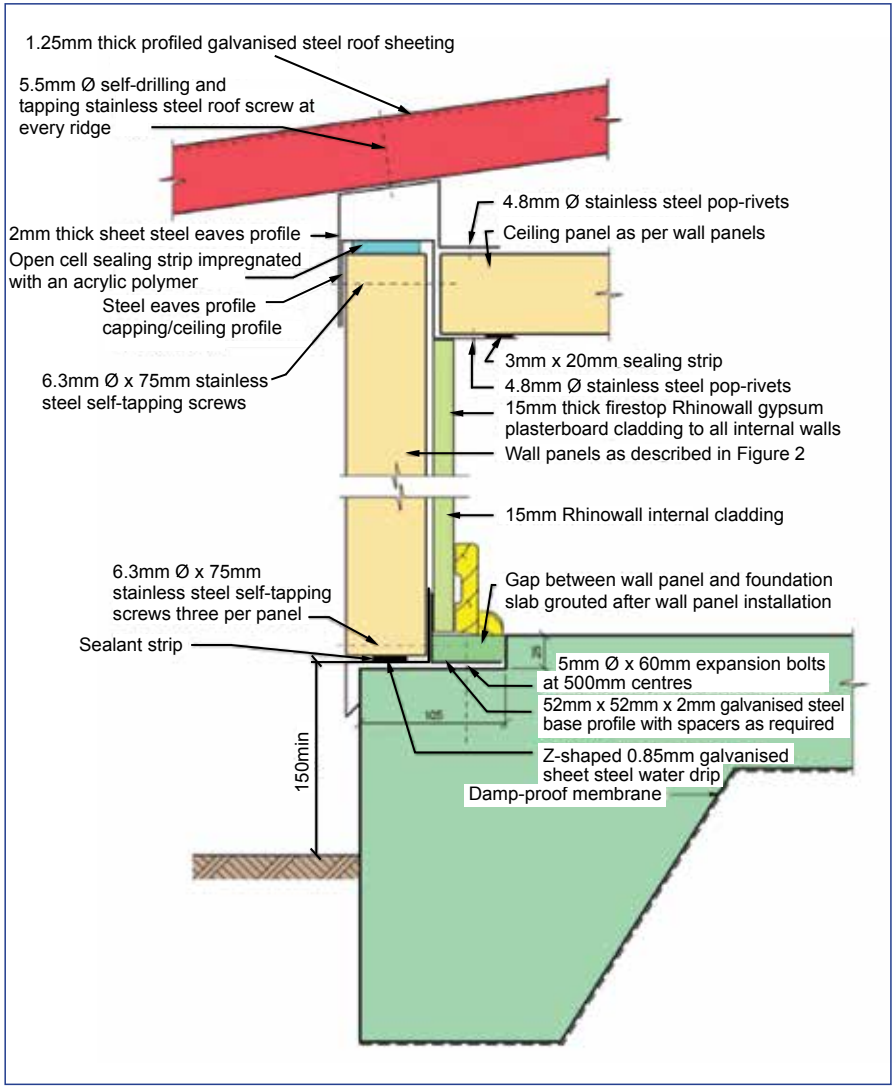
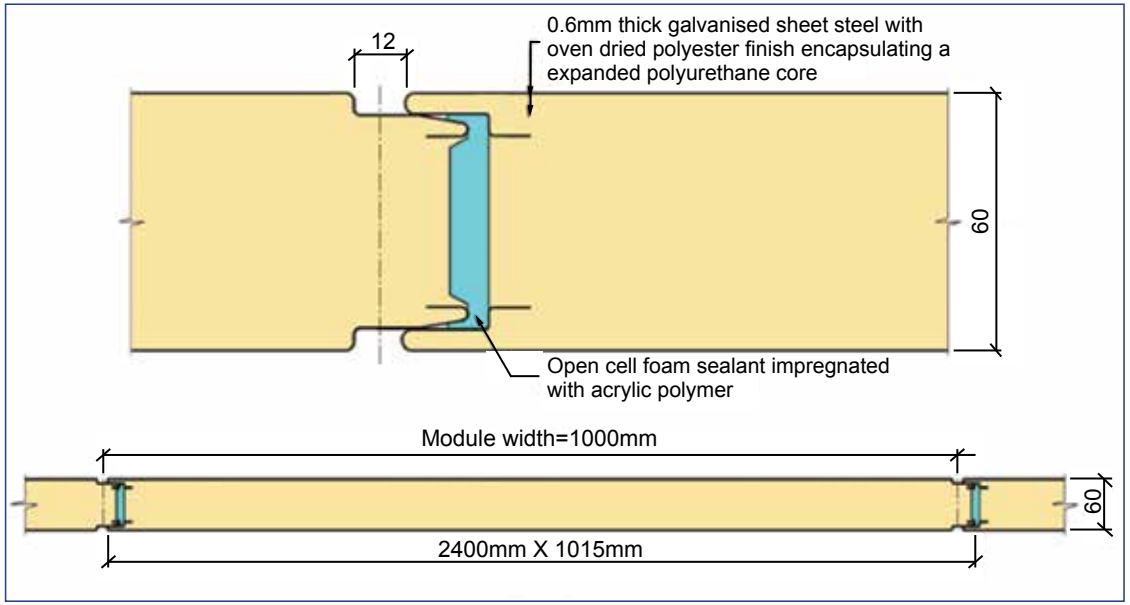
Sections & Details



Ipozi external wall section



Ipozi wall panel detail

Building System

3.7 ECO BEAM

General Description

This building system is comprised of a timber frame structure, consisting of timber lattice beams (Eco-Beam) as vertical and horizontal studs and wall plates with sandbag infills. The **walls** are finished by securing steel wire mesh on both sides of the frame structure and plastering with conventional cement-sand plaster 25mm thick.

The Eco-beams are fabricated from two 38 mm square treated timber sections (SANS 10005) and connected by a continuous galvanised steel strap which zig-zag between the timbers to form a lattice beam 220mm deep.

The **foundation** is generally a concrete strip footing, or as specified by an engineer.

The **roof** is constructed of eco-beams, timber rafters, or conventional timber trusses and light or heavy weight cladding. Window and door frames are incorporated as in timber frame structures and are conventional.

This system is Agrèment Certified

ECO BEAM
ERF **245 - 46m²**
Ground Floor Scale 1:100

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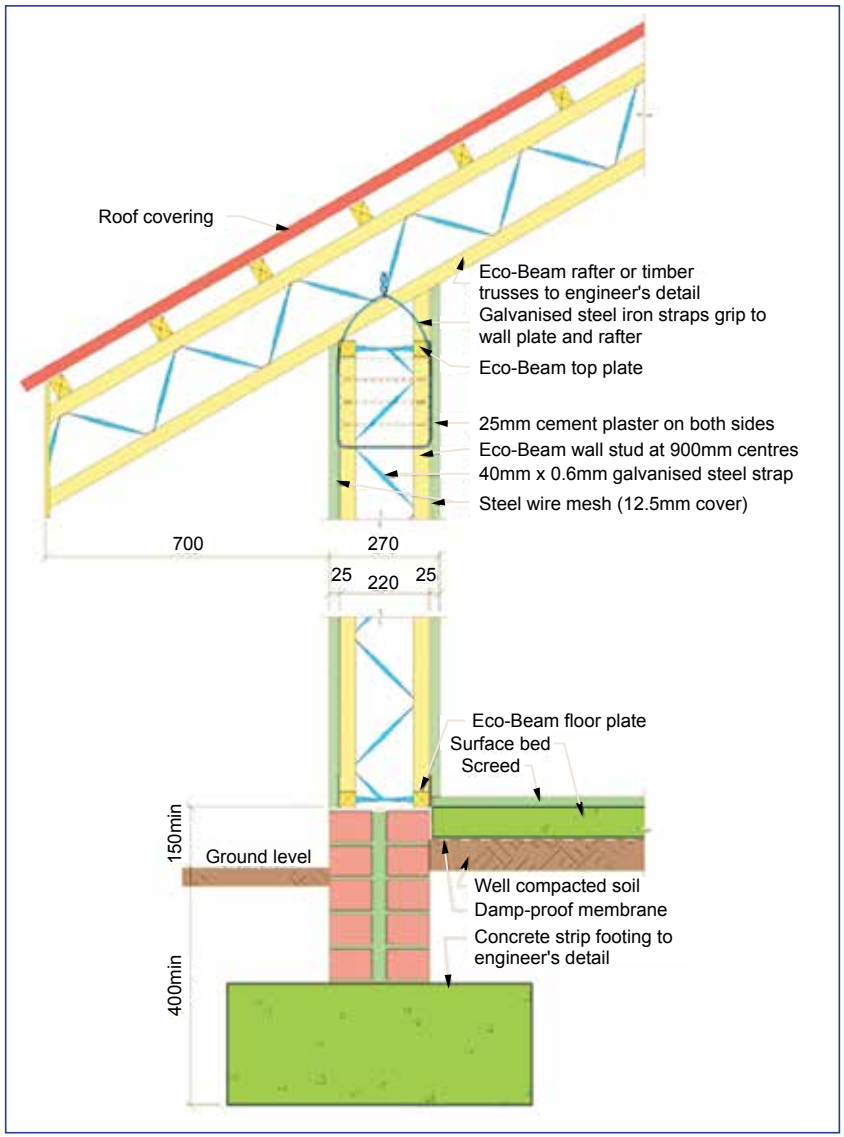
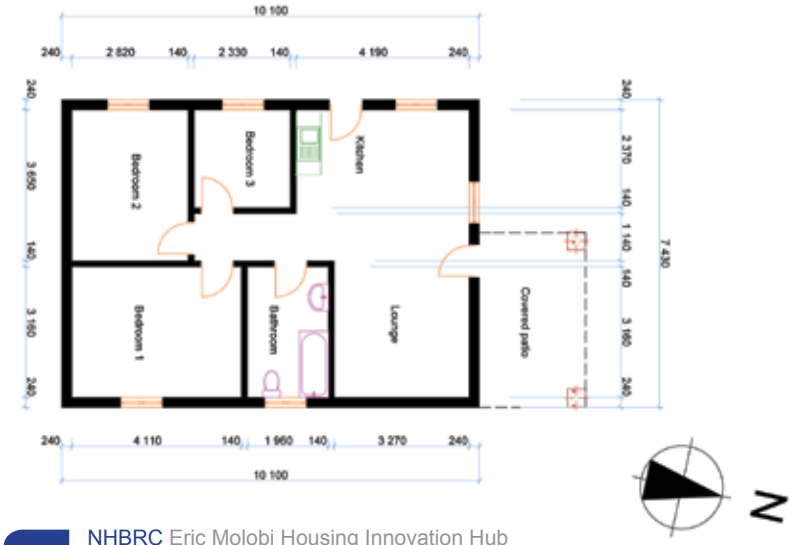


Eco beam external wall section

Ecobeam external wall and sandbag infills

3.8 PROFICA/VELA



PROFICA/VELA
ERF **234 - 73m²**
Ground Floor Scale 1:100

General Description

The Vela Steel Building System is based on Structural Insulated Panels (SIP) incorporating a steel frame which enhances the structural integrity of the system. The steel frame is designed in accordance with the requirements of SANS 517. The composite **wall** panels are comprised of 10mm autoclaved magnesium oxide, or 9mm Nutek cellulose fibre cement boards, encapsulating polyurethane core and polystyrene blanks between panel cavities. The walls are finished with armour coat waterproof paint. Where required, the panels are delivered on site with factory fitted window and door frames.

The **foundation** and floor slab are conventional and are always the responsibility of a competent person.

The **roof** is constructed of standard lightweight steel trusses clad with metal sheeting, concrete roof tiles or Agrément approved cladding.

Services such as plumbing and electrical conduits are prefixed into the composite panels.

This system is Agrèment Certified

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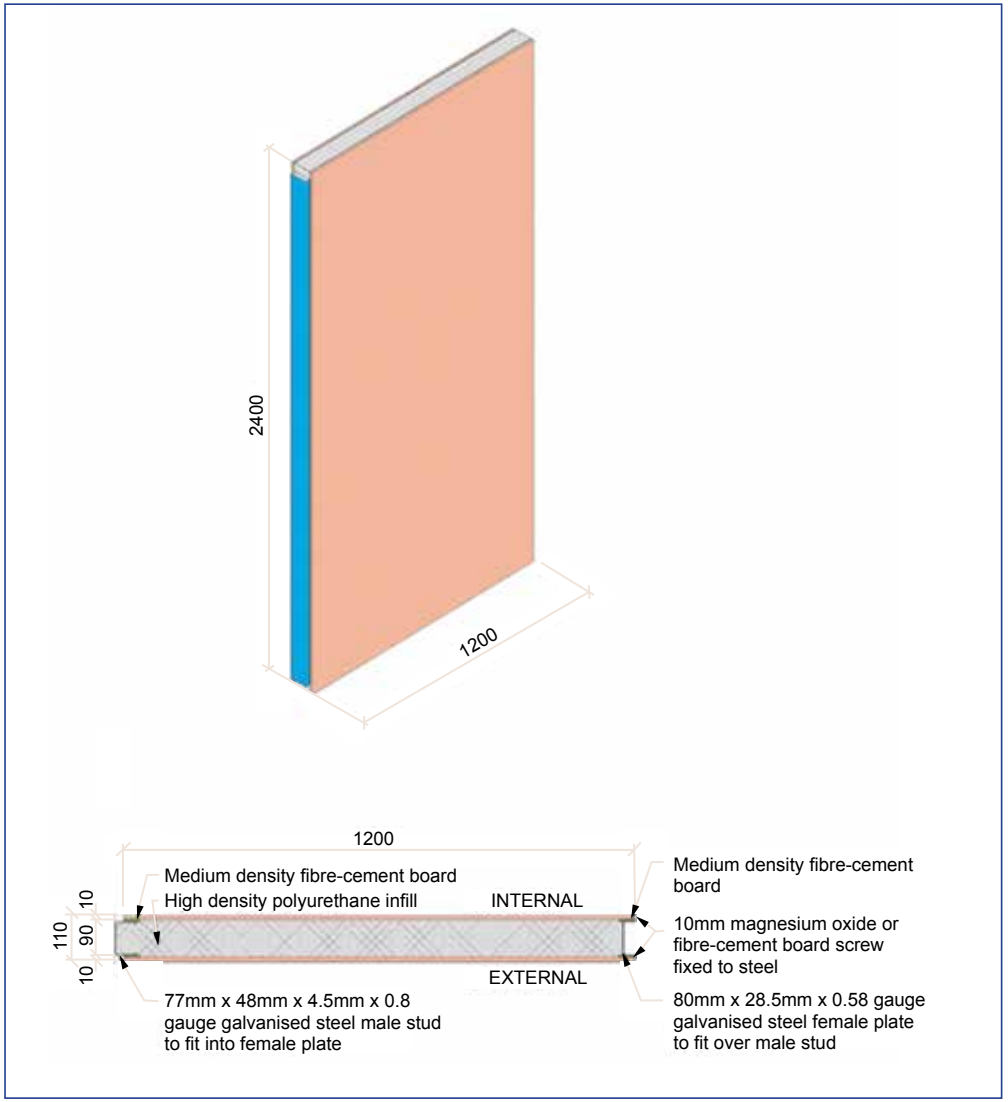
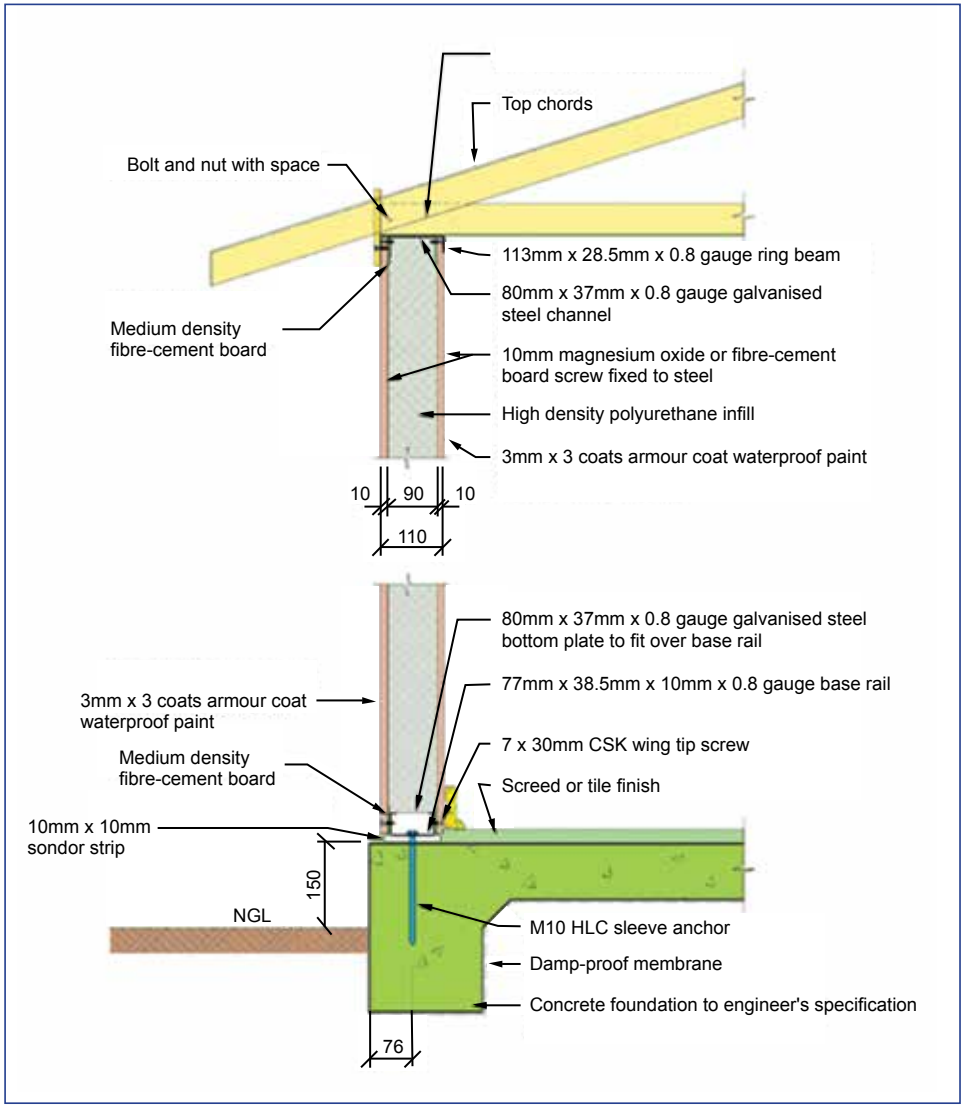


Profica/Vela panel detail



Profica/Vela external wall section

3.9 FINNBUILDER

General Description

For the **walls**, a Finnbuilder moving shuttering system is used to make 20MPa concrete blocks according to a quality management system. Concrete stone, concrete sand, plaster, cement and water are used in different proportions to SABS standards. Mixing is done in a powered 300litre concrete mixer. Hand mixing is permissible only for mixing in the case of floating or plastering of walls. The external walls are 220mm and internal walls 50mm thick. Firm hand compaction is carried out in three stages. Instead of brickforce, two bars of 5.6 HTS are required to be used horizontally on alternative rows below window height and above 2.1m heights. Vertical reinforcing bars are placed both sides of window and door openings. Ring beams of 50mm deep of 30MPa are built above window level. Walls are cured keeping them wet for seven days. Blocks are built with wet joints or other methods used for dry surfaces. Strong cement slurry is used on 15mm plaster applied to both sides of the walls.

Foundation trenches, slabs and beams are to the engineer's design.

A conventional **roof** structure is used that is secured with tie-in wires or straps and a 6mm gypsum board ceiling is required with 40mm Isolite insulation.

This system has a NHBRC rational design approval

FINNBUILDER
ERF **177 - 72m²**
Ground Floor Scale 1:100

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Finnbuilder moving shuttering system

Finnbuilder walls built with wet joints

3.10 SHIEBROOK

General Description

The **walls** consist of 3D panels consisting of three-dimensional welded wire mesh and a built-in expanded polystyrene insulation core. The panels are erected over steel reinforcing bars embedded in concrete foundations, then fastened to one another with wire splice mesh. Concrete is sprayed onto both sides of the panels to achieve the desired thickness (40mm - 70mm). This gives the wall a total thickness of typically 150mm with various types of finishes. The result is a homogenous structure with excellent thermal and acoustic properties. The concrete cover serves as a durable, waterproof exterior and provides interior thermal mass. The entire structure works effectively to distribute loads and has a high strength-to-weight ratio.

The construction system is used as a total construction system - walls, floors and roofs, but it can also be included in other construction systems as a component.

This system has a NHBRC rational design approval

SHIEBROOK
ERF **246 - 50m²**
ERF **253 - 60m²**
Ground Floor Scale 1:100

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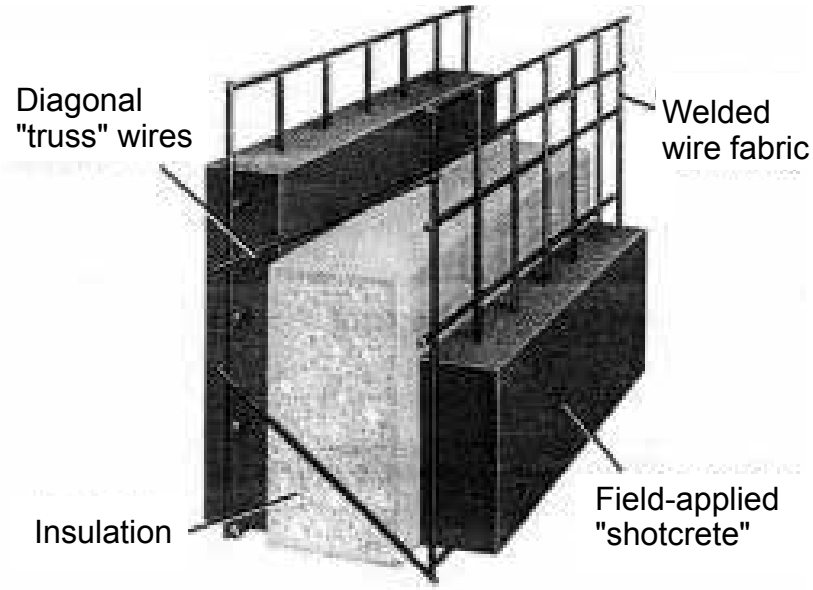
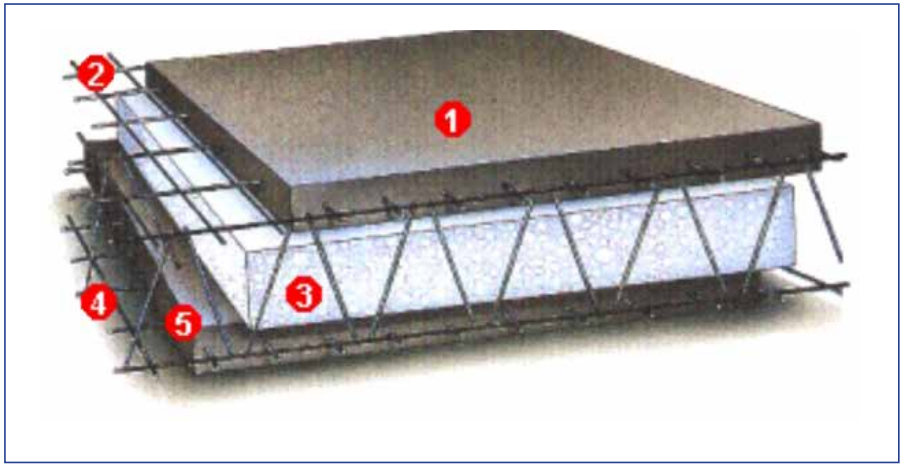
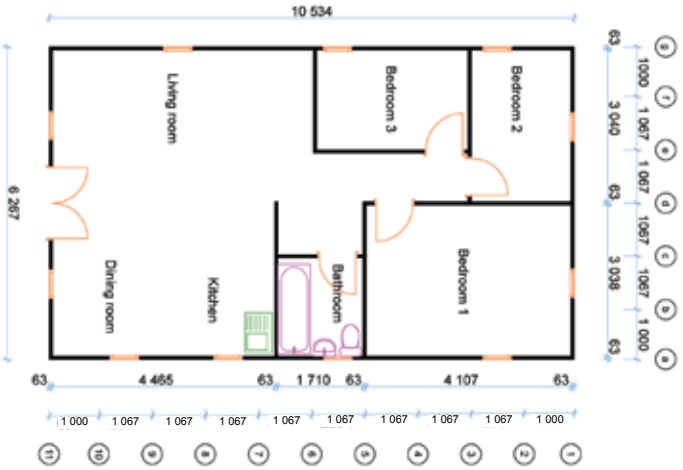


Shiebrook wall panel detail



Shiebrook wall panel detail

3.11 EEZYBUILT



General Description

The EezyBuilt system uses Structural Insulated Panels (SIPs) for the **wall**, ceiling and **roof** components of the home. SIPs provide a low-maintenance textured finish to both the interior and exterior of the home. The panel's outer two sheets comprise 0.5mm chromadek steel cladding and a polyurethane core. The greatest advantage of this system is its speed of construction, saving time and money without compromising quality. The EezyBuilt home is also available in conventional form with face brick exterior walls and a plaster and paint finish on the inside. When erecting the EezyBuilt Housing System, the builder is required only to assemble the pre-cut panels and mount them on the concrete slab. The finished dwelling is airtight and sound proof.

This system has a NHBRC rational design approval

EEZYBUILT
ERF **258 - 66m²**
Ground Floor Scale 1:100

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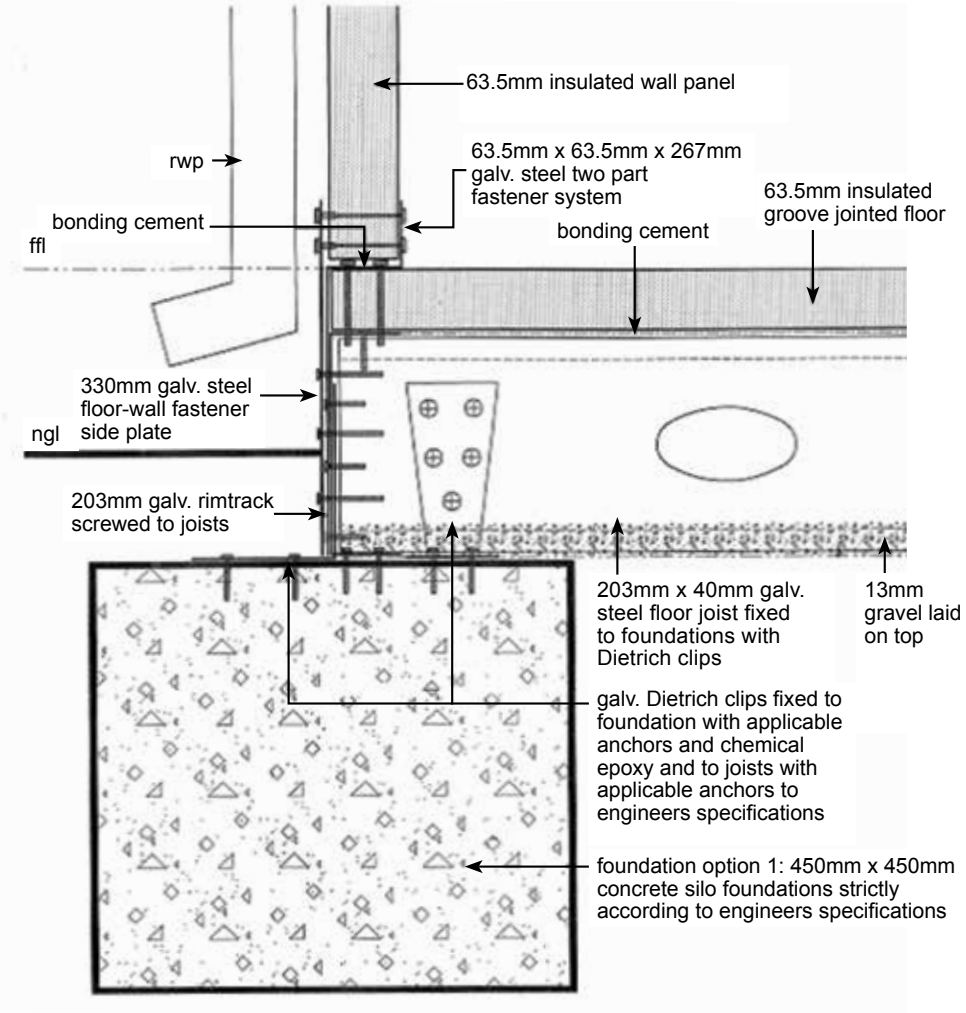
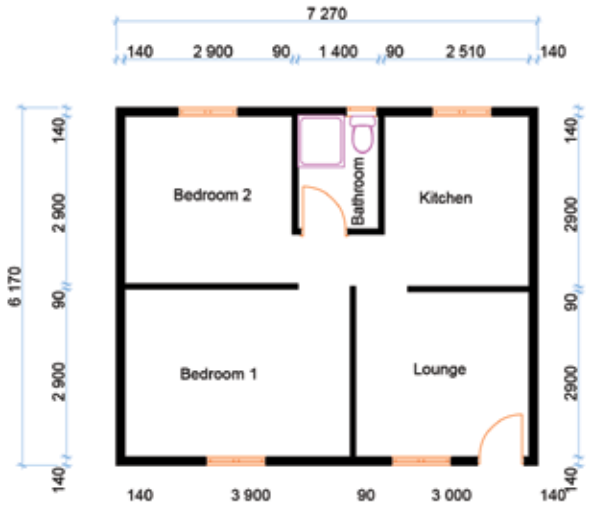


EezyBuilt external wall and foundation section

EezyBuilt wall panel detail

3.12 INTERCON



N

NHBRC Eric Molobi Housing Innovation Hub

General Description

The **walls** consist of pre-manufactured Polycon cement blocks. The Polycon cement block consists of aggregates comprising sand, cement and expanded polystyrene beads. The expanded polystyrene material is a closed cell material and cannot absorb water. The external walls are finished off with 15mm plaster and internal walls have a brush plaster which are painted with PVA.

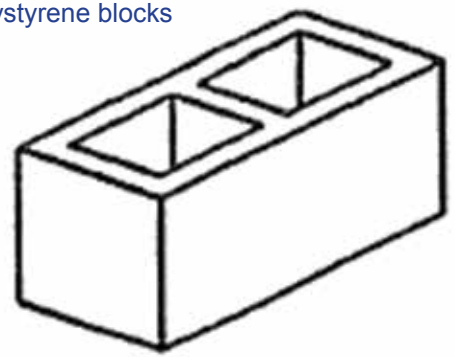
The **roof** covering comprises of corrugated metal sheeting or timber rafters laid to a slope of 21 deg. While the roof covering is conventional, it acts as a horizontal bracing element for the walls, thus achieving the stability inherent in a closed box. The horizontal stiffening is achieved by adding lateral bracing elements.

INTERCON
ERF **231 - 45m²**
Ground Floor Scale 1:100

Contact:
Barlow Govender
+27 31 309 5561
intercom@iafrica.com

Sections & Details

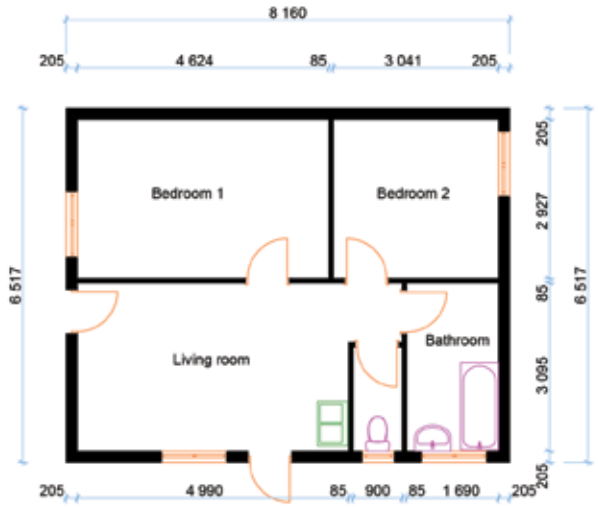
Sand, cement and polystyrene blocks



Intercon Polycon cement block

Intercon external wall using Polycon cement block

3.13 UBOMI



N

General Description

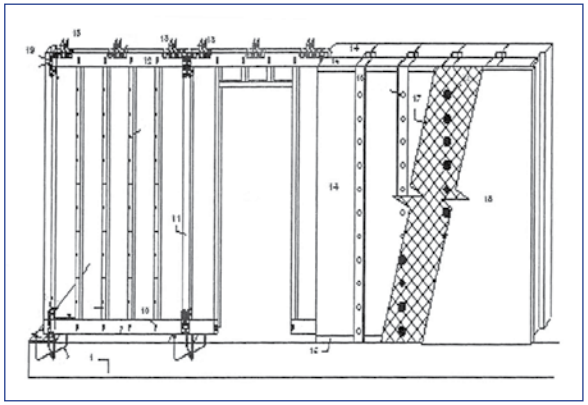
The **walls** consist of an integrated light steel frame structure with interlocking pre-formed expanded polystyrene panels (EPS) that are fixed on both sides of the frames. The EPS wall panels are covered with studded wire mesh. A 40mm layer of mortar plaster is applied to the exterior and interior of the expanded polystyrene. Any other finish can be applied to the walls. Support pillars of 76mm steel square tubes are used at 1500mm intervals, which add to the longevity and rigidity of the wall.

Light steel **roof** trusses are used with conventional roof covering.

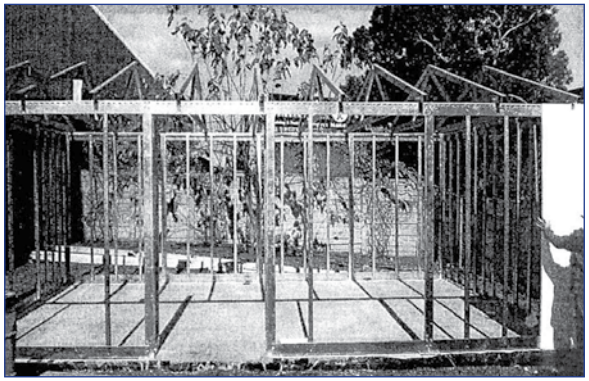
UBOMI
ERF **248 - 55m²**
Ground Floor Scale 1:100

Contact:
Ola Masupye
+27 72 318 7192
ola@ubomi.co.za

Sections & Details

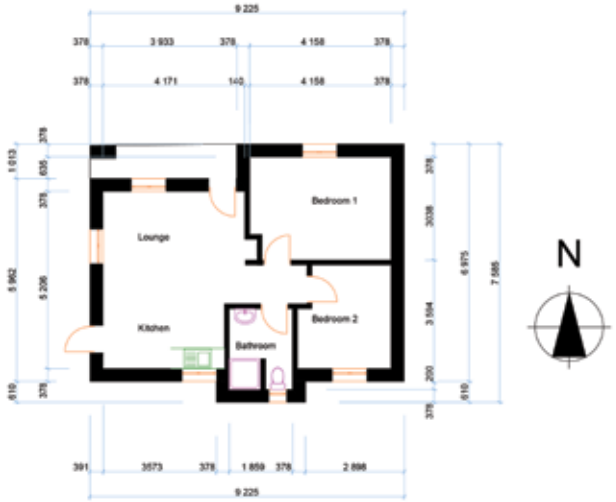


Ubomi external wall section



Ubomi steel frame structure

3.14 POWERWALL



General Description

The **walls** are comprised of a lightweight steel frame cladded with dry stack brick on both sides with a cavity in between. The mortar laying process is eliminated by replacing it with mortar slurry poured into cavities formed by the profile of the building blocks resulting in a brick and mortar wall solution. Galvanised steel rods are applied to every fifth row of blocks as brickforce. Reinforced bars are applied to all corners and joints to increase the structural strength of the construction. The interlocking building blocks are manufactured using a block-making machine on, or close, to the building site. Plastering is an option, but not a necessity.

The **foundation** and wall structure are applied according to the engineer's designs for the specific soil conditions.

Steel frame trusses for the **roof** will also be designed by an engineer.

This system has a NHBRC rational design approval

POWERWALL
ERF **235 - 65m²**
ERF **250 - 55m²**
Ground Floor Scale 1:100

Contact:
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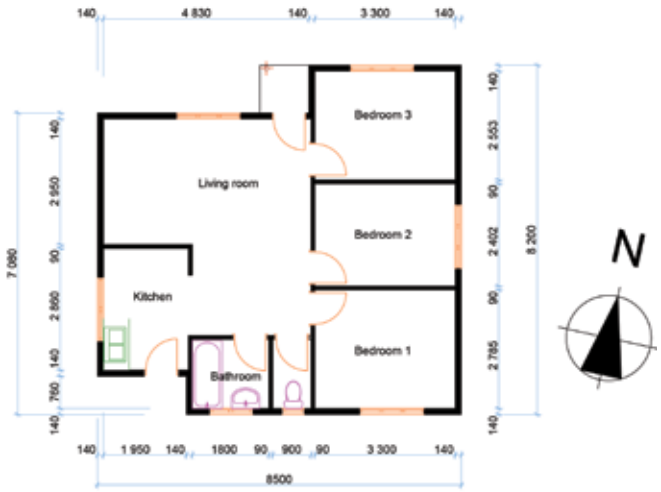
letterbox@pwparchitects.co.za

Powerwall external wall detail

Powerwall main lightweight steel frame

3.15 A&D HOLDINGS



NHBRC Eric Molobi Housing Innovation Hub

General Description

The **walls** consist of specially designed interlocking blocks using a Fibre Reinforced Polymer (FRP), replacing mortar with a tensile strength of 3.8MPa. The joining of the interlocking blocks is achieved with a mixture of one part (by volume) of FRP adhesive to one part (by volume) of river sand. The mixture is fed into a "Caulking Gun" duly calibrated to dispense one millilitre of mixture per shot. The jointing between two consecutive blocks, in the same course, is made with one stitch of adhesive. The jointing of blocks occurs in consecutive courses: each block in the bottom course receives six stitches, one stitch on each of the four corners of the block and two stitches, one in each recess in the middle of the block.

Conventional **foundations** (unless soil conditions require a rational design by an engineer) and roofs are used for this system. Anchoring of roof trusses is specific to the interlocking blocks.

This system has a NHBRC rational design approval

A & D HOLDINGS
ERF **251 - 64m²**
Ground Floor Scale 1:100

Contact:
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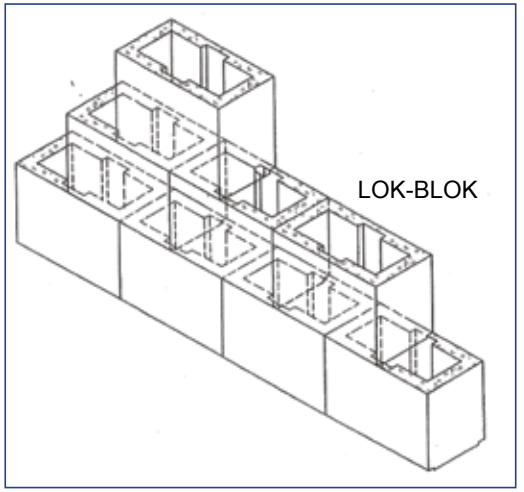
pbs2002@mweb.co.za

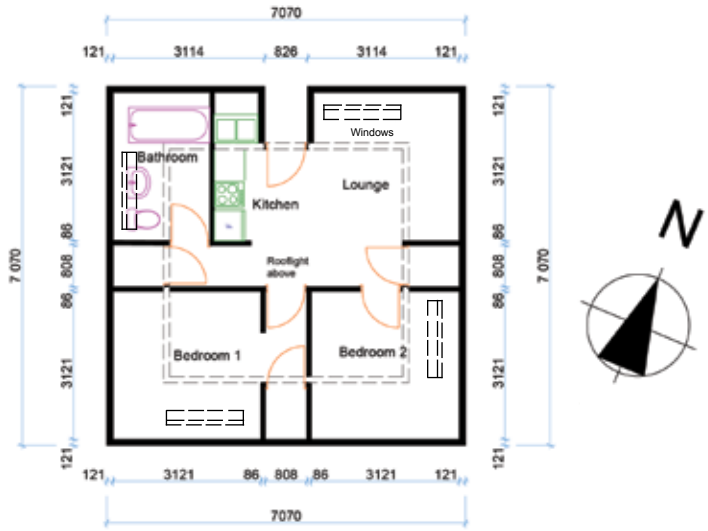
Sections & Details



A & D Holdings external wall interlocking blocks detail

A & D Holdings external wall interlocking blocks

3.16 ECO INNOVATION



General Description

The **top structure** consists of precast concrete panels for the walls and the roof that is produced in a precast concrete factory plant under controlled conditions (plant is transportable to sites). The precast concrete panels are built in the form of a pyramid which ensures long-term durability of the structure and improves the acoustical and insulation properties. The joints of the panels need to be sealed and maintained every 10 years. All external panels are finished off with a sealer coat.

An in-situ raft foundation will work in most conditions.

Sections & Details

1. Roof light
2. Reinforced precast concrete roof panels, sloped. All as per engineer
3. Reinforce precast concrete wall panels, sloped. All as per engineer
4. All concrete panels externally painted with sealer coat
5. All joint between panel sealed and waterproof
6. Cupboard with shelving
7. Cast in-situ reinforced concrete float foundation as per engineer on damp proof membrane on compacted soil

Eco Innovations section

ECO INNOVATIONS
ERF **222 - 50m²**
Ground Floor Scale 1:100

Contact:
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+27 12 348 2368
deoplan@mweb.co.za

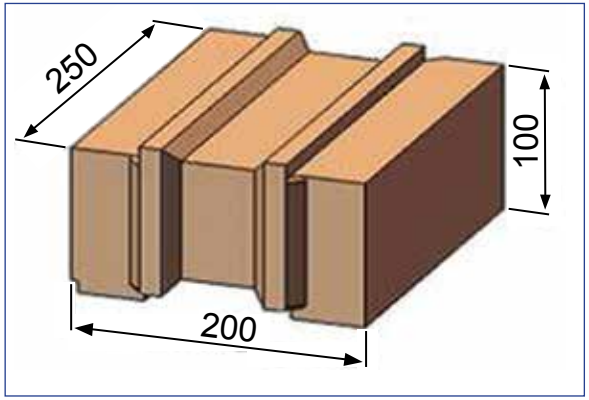
Building System

3.17 SOLBIC

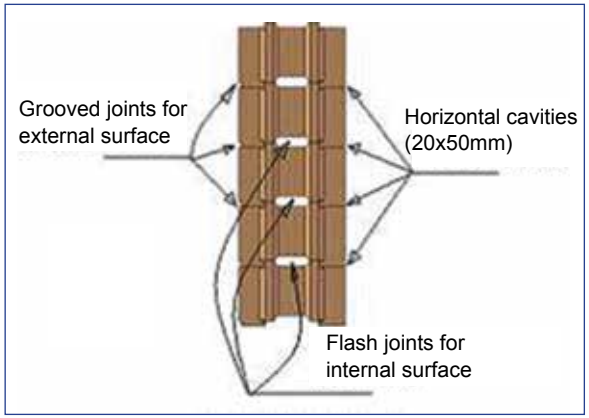
General Description

The **walls** are comprised of dry joint walling consisting of cement brick and interlocking faces on the top, bottom and on the end. The average compressive strength of the cement bricks is about 8MPa. The bricks are stacked closely together to allow interlocking of units after which the horizontal and vertical joints are filled with grout. The grout mix is one coat cement and two parts of clean plaster sand. Once the wall is finished, the surface must be watered for curing purposes.

Sections & Details



Solbric interlocking cement brick detail

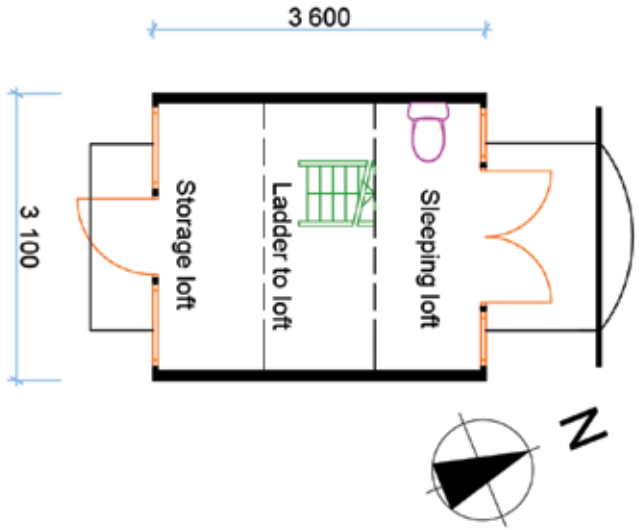


Solbric external wall section

SOLBRIC
ERF **185 - 56m²**
Ground Floor Scale 1:100

Contact:
Irma Come
+27 82 309 3677
solbric@global.co.za

3.18 ABŌD



ABŌD
ERF **257 - 15m²**
Ground Floor Scale 1:100

General Description

The Abōd **structures** are made up of arched steel tubing frames of standard dimensions covered in standard corrugated sheeting. The front and back facades consist of fibre cement boards, wooden doors and plastic sheeting. IBR sheeting was used for the upstairs platforms.

Although the BSB Design Abōd-series provide a wide range of design options for lowest cost homes, this system at Eric Molobi is a temporary structure. These temporary structures can be connected together in various shapes to create a larger structure.

These structures require only a simple, moveable **foundation** system. There are extensions to the corner arches that lock the structure into the ground.

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+27 82 410 4187
jacques@abod.co.za

Sections & Details

Abōd steel tubing frames

Abōd view of structure

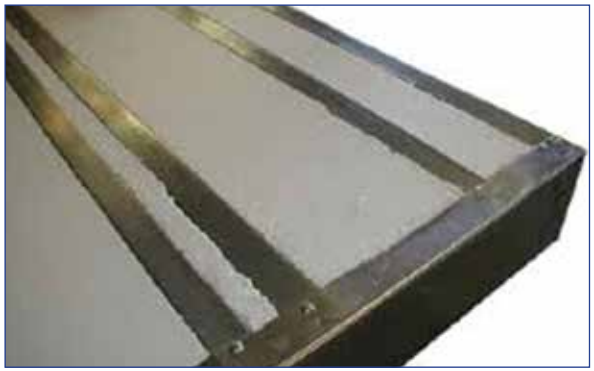
3.19 ECODWELL

General Description

Ecodwell is classified as a SIP (structurally insulated panel) building system. The system is a fully engineered “load bearing” panelised **wall** and **roof** system. It utilises expanded polystyrene (EPS) core panels and light gauge steel framing elements. Steel tubing is placed flat into channels at 400mm centres on both interior and exterior panel sides. Steel studs create a 63.5mm separation between the interior and exterior frame elements. Panel thicknesses are 89mm for interior walls, 140mm for exterior walls and 305mm for roof panels. Vertical panel edges are ship lapped to improve thermal performance at the joints. Typically for steel framing, all connections are made with self-tapping screws placed at 305 centres. Panels sit on a galvanised steel ‘U’ track which is anchored to the concrete slab. Exterior and interior corners are enforced with 38mm galvanised angle stock. The interior is finished with Rhino board, plaster and paint, whereas, the exterior is finished with Rhino board and a flexible waterproof concrete based coating.

The **foundation** is generally some type of conventional concrete slab and foundation.

Sections & Details



Ecodwell SIPs panel

Ecodwell panel walls showing EPS core and lightweight steel framing

ECODWELL
ERF **249 - 30m²**
Ground Floor Scale 1:100

Contact:
Willie van der Westhuizen
+27 82 551 6622
willievdw1@hotmail.com

Building System

3.20 EPS BYGG

General Description

The **walls** are comprised of 150mm thick expanded polystyrene (EPS), plastered on both sides with 20mm structural plaster. The plaster is reinforced with chicken wire. The walls are covered with mesh prior to construction and when erected, are tied together with mesh. The windows and doors are cut out and the mesh is folded through the openings. An EPS roof beam is mounted after it is covered with mesh and plastered with two 10mm plaster layers.

The **roof** is tied down with 2,5mm - 3mm galvanised steel wire. The roof sheeting is supported by four bigger steel cold formed lip channel purlins and three smaller cold formed lip channel purlins. The four bigger purlins are “fixed” to the walls with a piece of wire that is passed through the EPS about 300mm below each purlin.

This system uses a raft **foundation** designed by an engineer.

EPS BYGG
ERF **255 - 58m²**
Ground Floor Scale 1:100

Contact:
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+47 90 100580
sifoss@online.no

Sections & Details

EPS Bygg external walls reinforced with chicken wire

EPS Bygg external walls covered with mesh and plaster

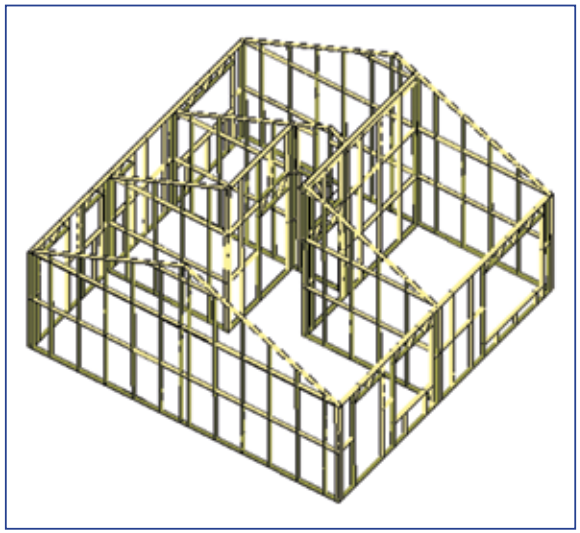
3.21 HOMECREST

HOMECREST
ERF **257 - 45m²**
Ground Floor Scale 1:100

General Description

The **wall** and **roof** system consists of a Homecrest steel frame structure. Painted Vistaboards are fixed externally and unpainted Rhinoboard are fixed to the frame internally. For the roof, 0.5mm Widedek Zincalume Colorbond roof sheeting is fixed on 25mm thick Isofoam insulation ceiling boards.

Sections & Details



Homecrest steel frame structure

Contact:
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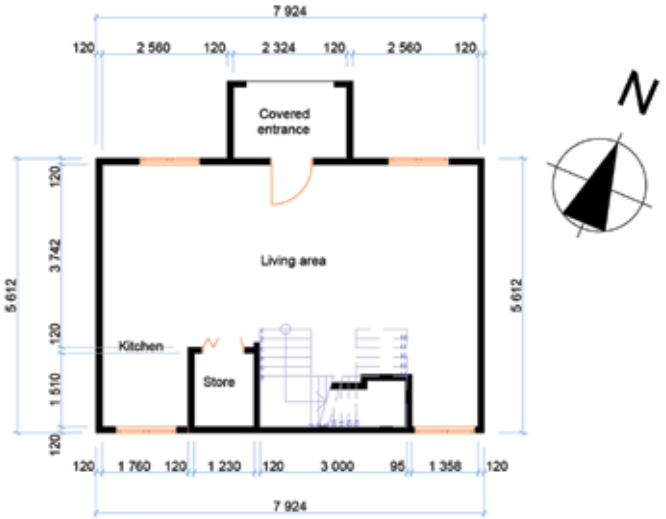
+27 44 874 7787
+27 82 934 9458
Adrian@homecrestbuilding.co.za
or markhutchings@iafrica.com

3.22 SA STEEL

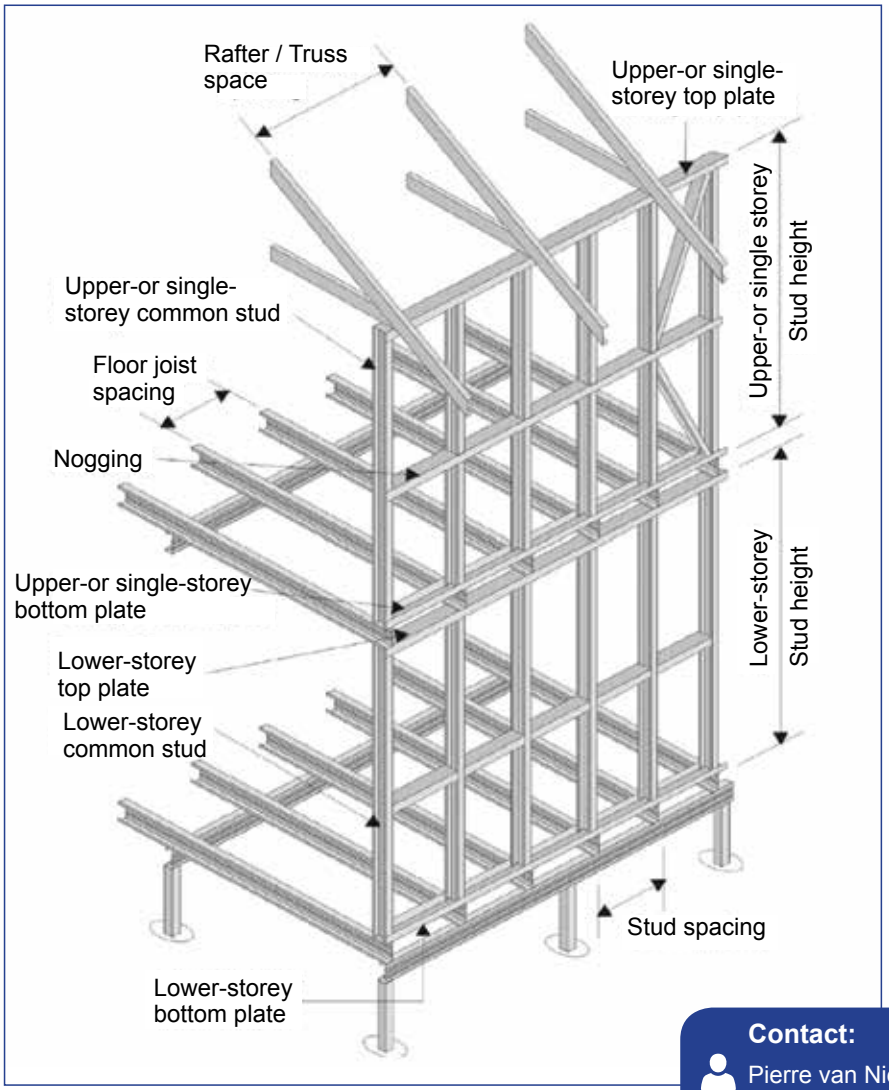


General Description

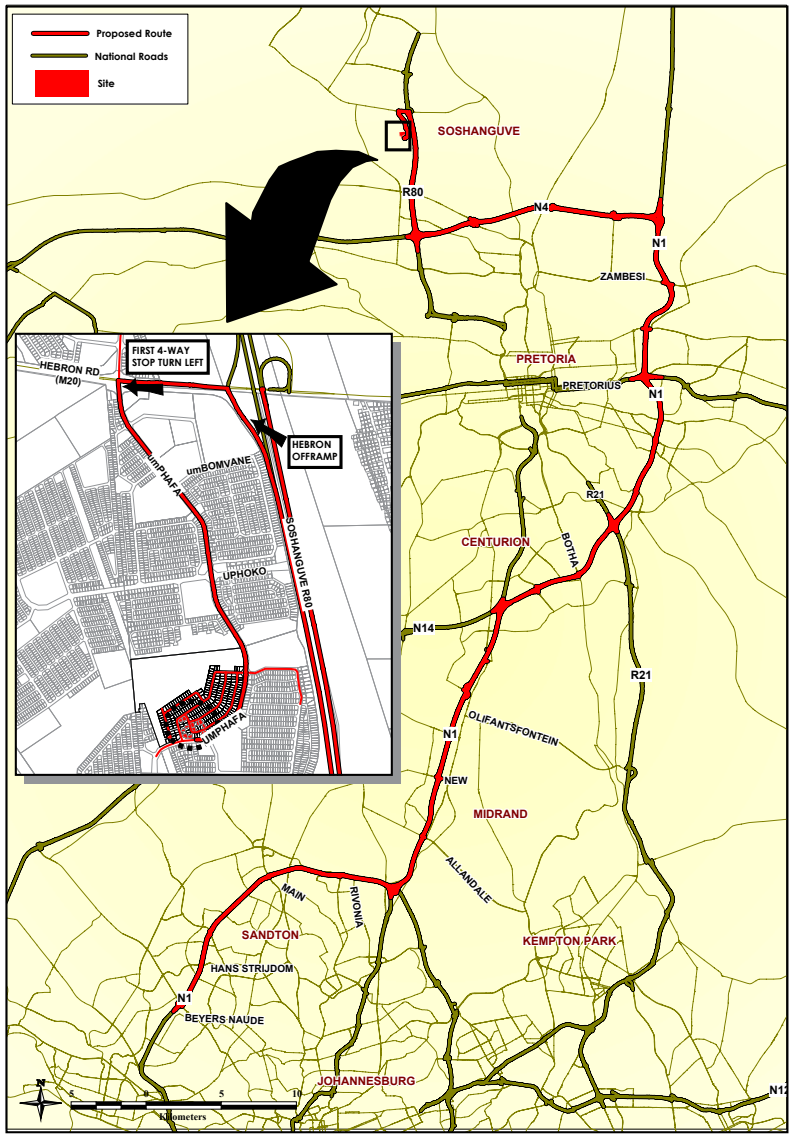
The SA Steel integrated system consists of a high quality load steel framework comprised of base rails, lipped channels, studs, noggins, bracing and top rails to which wall panels, ceiling panels and roof structures are fixed. The **wall** panels are clad externally with 12mm thick medium density fibre cement boards and internally with15mm thick gypsum plasterboard. Ceilings are formed either by fixing 12mm gypsum plasterboard to the underside of the galvanised steel roof panels or are comprised of formed steel lipped channel rafters and noggins.

SA STEEL
ERF **180 - 93m²**
Ground Floor Scale 1:100

Sections & Details



SA Steel integrated steel frame system



Eric Molobi Housing Innovation Hub Siteplan

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Pierre van Niekerk
+27 12 667 4755
+27 82 220 8386
pierre@dieregesondheid.co.za

3.23 THE MARTHA MOLOBI TRAINING CENTRE

Accommodation

The Martha Molobi Training Centre accommodates the following:

- The conference hall can seat approximately 120 trainees/ delegates.
- Training rooms can accommodate approximately 75 trainees.
- The offices can accommodate approximately eight training staff.
- The canteen can cater for 100 people.

Training Programmes

NHBRC is currently providing three main training programmes:

- NHBRC is accredited to offer a qualification called Construction Contractor which is a management course that deals with the following modules:
  - Construction contracting
  - Financial planning
  - Tendering for construction contract
  - Health and Safety
  - Quality Principles and others, in total there are 195 credits from a total of 35 modules (unit standards)
- A Basic Construction Skills programme is provided for the following trades:
  - Bricklaying
  - Plastering
  - Painting
  - Plumbing
  - Roofing
- A comprehensive course is provided inhouse for NHBRC inspectors and once accredited will be provided for external parties.

3.24 CONSTRUCTION TESTING LABORATORY

Accommodation

The Construction Testing Laboratory accommodates the following:

- The test lab can accommodate small scale testing equipment for testing material standards.
- The test lab can accommodate large scale testing equipment for structural components to the size of a house.
- The offices can accommodate approximately nine laboratory staff.

Test Types

The NHBRC carries out tests for the following products according to SANS standards:

- Concrete Masonry Units:
  - Compressive strength
  - Drying shrinkage and expansion on re-wetting
  - Soundness (test for pop-outs)
  - Flexural strength
  - Density test
- Burnt Clay Masonry Units:
  - Compressive strength
  - Irreversible moisture expansion
  - Efflorescence
  - Soundness
  - Water absorption
  - Warpage
- Burnt Clay Pavers:
  - Modulus of rupture
  - Irreversible moisture expansion
  - Warpage
- Hardened Concrete:
  - Core strength
  - Cube strength
- Fine Aggregate:
  - Sieve analysis
  - Dust content
  - Fineness modulus
  - Organic impurities
  - Methylene blue indicator test
  - Bulk density
- Re-bar:
  - Tensile strength
- Other:
  - Hard body impact
  - Field density (Troxler test)
  - Flexural strength of timber
  - Tests on innovative building materials

NHBRC Provincial Office Contact Details:

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WESTERN CAPE
CAPE TOWN

Ground Floor, Barinor Vinyard South,
Vinyard Office Estate, 99 Jip de Jager
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WESTERN CAPE
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George East, 6529
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NORTHERN CAPE
KIMBERLEY

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Fax 053-832-6850

EASTERN CAPE
PORT ELIZABETH

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Port Elizabeth
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EASTERN CAPE
EAST LONDON *Contact Centre*

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Docex 21, East London
Tel 043-721-1377
Fax 0866-325-966

KWAZULU NATAL
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Marine Building, 5th Floor, Dorothy
Nyembw Street, Durban
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KWAZULU NATAL
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KWAZULU NATAL
SHELLY BEACH *Contact Centre*

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MPUMALANGA
NELSPRUIT

Unit 4, Hydro Park, 98 Kellner Street,
Westdene, Bloemfontein
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MPUMALANGA
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Business Park, No. 9 Corridor Crescent
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NORTH WEST
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Fax 018-384-2668

LIMPOPO
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Polokwane
Tel 015-297-7519

LIMPOPO
BELA BELA *Contact Centre*

18 Sutter Ave Bela Bela
Docex 6 Bela Bela
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LIMPOPO
TZANEEN *Contact Centre*

61 F Bertbooysen Street, Tzaneen
Postal Box 4098, Tzaneen, 0850
Docex 7, Tzaneen
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Fax 015-307-6017

LIMPOPO
THULAMELA *Contact Centre*

Municipality Room 105, 1st Floor Old
Agriven Building, Civic Centre
Tel 015-962-7500 / 7799
Fax 015-962-4020

FREE STATE
BLOEMFONTEIN

Unit 4, Hydro Park, 98 Kellner Street,
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FREE STATE
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NATIONAL HOME BUILDERS
NHBRC
REGISTRATION COUNCIL

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