AMBIONSE

Product Manual

Strong. Solid. Simple.

Product Manual

The information contained within this Manual is solely intended to provide a general commentary and overview of the Ambionse block and not as specific advice to any particular recipient or person. The construction methods described within are based on best trade practice methods currently available in New Zealand. The focus of this information is residential construction. Notwithstanding the content of this Manual, construction using Ambionse should be undertaken in accordance with the New Zealand Building Code, all relevant statutory and regulatory requirements and all relevant NZ Standards. Any user of Ambionse should carry out their own investigations as to their specific requirements. The information provided in this Manual is believed to be correct at the time it was prepared but no warranty or representation, express or implied (other than as may be implied by law) is made by Styrobeck Plastics Ltd as to its accuracy, reliability or completeness. Styrobeck Plastics Ltd reserves the right to modify or update the information contained in this Manual. The onus remains on the user of Ambionse to obtain the most recent information available. The most recent version of the Ambionse Manual is available on the web site at www.ambionse.co.nz.

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1. INTRODUCTION

Insulated Concrete Forms

Today, homebuyers expect to get more from their new home. They want beauty that's more than skin deep and a home that fits their lifestyle of course.

But they also want a home with solid, high quality construction, greater comfort and security, lower energy bills, and lower maintenance. There is the demand for a home that's healthier to live in and easier on the environment.

It's becoming harder and harder to meet these new expectations with the conventional building technology, so more and more builders and homebuyers around the world are turning to something new. A modern adaptation of a centuries-old technology using the most proven building material on earth. Concrete.

Insulated concrete formwork (ICF) gives you all the benefits that have made concrete the material of choice for home building world-wide: Solid, lasting construction that resists the ravages of fire, wind, and time. But ICF's do plain concrete one better - or rather, two better - by giving you two built-in layers of insulation.

History

Insulating concrete formwork (ICF) is the term to describe proprietary formwork for concrete that is left in place to become part of the building and provide astonishing levels of insulation. The formwork contains the reinforced concrete core to provide the structural capacity of the wall.

ICF construction has been used for some 40 years in Europe, where concrete residential construction is quite common. And in North America it has really taken off in the last 10-15 years. ICF's have been available in New Zealand since 1982 and during that time they have been increasingly used for both commercial and residential construction.

Dramatic Growth

When we consider the North American experience, the potential for ICF's in New Zealand is huge. The use of ICF's in the US residential market increased 21% in 2001, and accounted for 2.7% of all homes[1]. In 2002 when last measured, approximately 65,000 homes were built in ICF's (there were less than 1,000 ICF homes built in 1992). There are now 89 different brands of ICF in North America and in some areas of Canada ICF's are used on over 50% of external residential walls. The increase is attributed to the solid construction, energy efficient properties and low maintenance offered by ICF's and homebuyers and designers realising that these options are now available.

[1] Ref: National Association of Home Builders (NAHB) and the Portland Cement Association

What is Ambionse?

Ambionse is the ICF manufactured by Styrobeck Plastics Ltd. The sides of the Ambionse block provide the completed wall with an R-value of R3.0. This layer of continuous insulation is also the substrate onto which linings and claddings can be fixed. The materials will never rot or decay and will provide total comfort for the occupier through inherent thermal and sound insulation qualities.

An Ambionse home has some sizeable advantages over a traditional New Zealand house. Greater energy efficiency. More peace & quiet. More day-to-day living comfort. All wrapped up in a solid, high-quality building package that gives an Ambionse home an utterly remarkable feel that really has to be experienced to be believed. As soon as you step inside, you can tell that an Ambionse home is not an ordinary house. It's not just beautiful, comfortable and quiet. You can feel that it's solid and built to last.

Ambionse Specification

There are four members of the Ambionse family: straight blocks, corner blocks, blank ends and sill blocks. The straight blocks are 1200mm long, and come in three widths: 190mm (190 Series), 250mm (250 Series) and 300mm (300 Series), all in 300mm high modules. The corner blocks are 600mm x 450mm in each direction respectively and 300mm high to match the straight blocks. The corner blocks are available in both left-hand and right-hand configurations. The 190 Series and 250 Series are available in both straight and corner blocks while the 300 Series is available only in the straight block.

The blank ends are used to finish off straight walls or at openings. These simply slide into the straight or corner blocks and suit all three Series. The sill block creates a rebate into which the windows can be fitted, and also creates a sloped sill. It is 250mm wide and can be trimmed to suit the width of the 190 Series wall.

Bridge holders are moulded into the 50mm thick sides of the Ambionse blocks. These holders serve two purposes - the first to provide a mechanical fixing point for internal linings and external finishings as required. The second is to strengthen the block in order to eliminate major concrete leakage. The polypropylene bridge (or spacer) between the two sides of the block fits into the holders creating a positive connection between the flanges on the outside to the concrete core of the wall.

Cost Comparison

Ambionse is a cost-effective choice for most residential construction applications. As concrete is a premium building material, the initial construction cost is likely to be higher, but the benefits of living in an Ambionse home will far outweigh any increase in cost. Plus due to the energy savings and low maintenance, an Ambionse home will have a much lower lifecycle cost compared to homes of other construction types.

Below is the summary of the costs ('paint to paint") developed from the Rawlinsons Construction Guide 2005. It is interesting to note where the square metre rate of Ambionse falls in relation to the perceived cheaper option of "Plastered Brick".

Construction Type	Price/m²
70mm Clay Bricks on Timber	$ 212.60
40mm Polystyrene with Texture Coating on Timber	$ 226.00
90mm Clay Bricks on Timber	$ 228.00
75mm Hebel Powerpanel on Timber	$ 239.50
60mm Polystyrene with Texture Coating on Timber	$ 245.00
190mm ICF Block Concrete Filled (Ambionse)	**$ 251.60**
4.5mm Fibre Cement Sheeting & Plaster on Timber	$ 254.50
70mm Clay Bricks & Plaster on Timber	$ 262.75
Hebel 200mm Thermoblock	$ 277.10
Conventional 20 Series Masonry Strapped & Lined	$ 282.92
Hotbloc 20 Series Blocks with Insulating Plaster	$ 302.40
Strapped & Lined 150mm Tilt Slab	$ 302.92
150x25 Rusticated Cedar Weatherboards on Timber	$ 306.75
180mm Nirvana Insulated Tilt-panel	$ 347.30
235mm Thermomass Insulated Tilt-panel	$ 372.30

Notes:

- Prices are based on national average rates from the Rawlinson NZ Construction Handbook 2005.
- The rates exclude GST and any freight to remote areas.
- The rates are for comparison purposes only and should not be used to form the basis of any quote.

Typical Applications

Ambionse has been used in many situations, but is most suited for retaining walls, particularly basements, general house construction, intertenancy walls and insulated swimming pools. It is a great option for a builder familiar only with timber who wants to build in concrete.

Block Properties 190 Series

Straight Block

Length	=	1200 mm
Height	=	300 mm
Width	=	190 mm
Unfilled Weight	=	750 g
Cavity width	=	90 mm
Concrete	=	0.038 m³ per block (26 blocks/m³) (0.11 m³ per m² of wall)
Installed	=	2.77 blocks/m²
Assembled volume	=	0.072 m³ per block
Volume unassembled	=	0.038 m³ per block

Corner Block

Length	=	600 mm x 450 mm
Height	=	300 mm
Width	=	190 mm
Unfilled Weight	=	0.600 kg
Cavity width	=	90 mm
Concrete	=	0.031 m³ per block

Block Properties 250 Series

Straight Block

Length	=	1200 mm
Height	=	300 mm
Width	=	250 mm
Unfilled Weight	=	800 g
Cavity width	=	150 mm
Concrete volume	=	0.056 m³ per block (17 blocks/m³) (0. 155 m³ per m² of wall)
Installed	=	2.77 blocks/m²
Assembled volume	=	0.092 m³ per block
Volume unassembled	=	0.038 m³ per block

Corner Block

Length	=	600 mm x 450 mm
Height	=	300 mm
Width	=	250 mm
Unfilled Weight	=	700 g
Cavity width	=	150 mm
Concrete volume	=	0.04 m³ per block

Block Properties 300 Series

Straight Block

Length	=	1200 mm
Height	=	300 mm
Width	=	300 mm
Unfilled Weight	=	850 g
Cavity width	=	200 mm
Concrete volume	=	0.074 m³ per block (13 blocks/m³) (0.21 m³ per m² of wall)
Installed	=	2.77 blocks/m²
Assembled volume	=	0.110 m³ per block
Volume unassembled	=	0.038 m³ per block

2. EASY TO DESIGN & BUILD

Design Simplicity

Ambionse blocks lend themselves to design flexibility. Any dimension can be catered for as the blocks can easily be cut with a knife or saw. So unlike masonry, there are no strict modules to design within. The bridges connecting the side panels are spaced horizontally at 150mm centres ensuring that there will always be a support, no matter what length. This gives you much greater freedom and flexibility.

Unlimited Creative Potential

Ambionse can easily create curved walls, and arches are simple to form, so let your imagination run wild and design what you have always been wanting to, but didn't have the construction material that was able to keep up with your dreams. In fact Ambionse makes it easier than precast panels to form curves and easier than masonry or timber to form arches

The structural aspects of the concrete core make Ambionse the ideal choice for resisting earthquake and wind forces. The solid reinforced concrete core of an Ambionse wall is stronger than timber, so you can design more load acting on the wall (larger roof spans, longer lintels etc).

Cladding Options

An Ambionse wall can be finished with an almost unlimited choice of claddings. Not only can you apply plaster, but conventional timber frame claddings such as weatherboards and brick veneer can easily be fixed directly to the blocks. The inherent thickness of an Ambionse wall allows deep reveals to suit the design characteristics or style. It has been said that timber framed buildings with monolithic claddings are attempts at creating the look of solid construction, but with Ambionse the walls truly are solid. Local Councils accept Ambionse walls the same way they have masonry for many years.

Basements

Ambionse is ideally suited for creating basement walls as the reinforced concrete provides all the strength and the Ambionse formwork provides all the insulation. Forget the cold dingy basements of the past, with Ambionse you can build underground and increase the comfortable liveable space in the home without increasing the plan footprint or encroaching on the height to boundary limits (great for that dedicated home theatre).

Labour Savings

In actual fact, Ambionse construction has big advantages for builders. Because of the simplicity of the work and the lightness of the blocks, the labour costs tend to be lower than those of conventional timber frame construction. (Note: these savings are usually only appreciated after the first couple of projects, when the builder has familiarised himself with the concepts).

Weather tends to be a big issue with other concrete construction. Not so with Ambionse. The blocks are not glued or mortared, allowing all weather construction. Because the Ambionse wall offers a barrier to water ingress, the cladding or finishing does not need to be installed prior to the interior work starting. This can also save time on the project.

Plumbing and electrical services can be placed in chase cuts within the sides of the Ambionse block after the concrete has been poured. This is a saving over masonry construction where ducts typically have to be installed prior to the blocks being filled requiring more visits by the subtrades.

3. COMFORT

Comfortable Environment

Concrete walls built with Ambionse effectively buffer a house's interior from the outdoors. The thick ICF sandwich of a massive material with a light insulating material sharply cuts temperature fluctuations, air infiltration, and noise. The sandwich keeps the inside of a house more comfortable and quiet than ordinary timber frame walls.

When planning a new house, consider the greater well being that could come from living with a more even temperature, sharply reduced drafts, and noticeably greater quiet. These things are available with concrete walls built with Ambionse.

ICF homeowners appreciate the quietness, comfort, solidity, and energy efficiency benefits more than they ever imagined. In a 1997 US survey to determine what new homeowners liked about their homes over 80% of the ICF owners mentioned the great comfort, compared with 22% of the timber frame owners. Over 60% of ICF homeowners mentioned the quietness of their houses, versus only 2 percent of the frame homeowners[1].

ICFs have been tested under extreme wind (tornado) conditions and have not sustained any significant damage. While tornadoes are not normally a major issue in New Zealand, this shows that by using Ambionse, you will protect your most valuable asset from the worst nature can throw at it, allowing you to sleep peacefully through any storm.

Greater Insulation

Energy savings and comfort are built into every Ambionse wall. There is no need to build the wall then add insulation, as the formwork is the insulation. This insulation provides the completed Ambionse wall with an R-value of R3.0 - more than three times the Code requirement.

The thermal mass benefits of the concrete core of the Ambionse wall also smooth out temperature fluctuations. The concrete acts as a buffer between the inside and outside temperatures. So the house does not tend to overheat in summer afternoons or get suddenly chilly in winter evenings.

In a timber frame house, thermal bridge spots are often evident by condensation patches on cold winter mornings. There can be up to 15% of a timber-framed wall without any insulation because the solid timber in the studs, plates and lintels create disruptions in the insulation. There is no thermal bridging in the walls of an Ambionse home.

[1] Ref: Insulated Concrete Formwork Association (ICFA)

Near Zero Infiltration

Drafts are avoided in an Ambionse home because the walls are exceptionally airtight. The continuous concrete core seals the wall. There are no joints in the wall and none between the floor and the wall so there aren't any opportunities for drafts.

Energy Savings

This combination of a high R-value, low air infiltration, and high thermal mass is believed to account for the amazing 25% to 50% energy savings because the home doesn't need to be heated or cooled the same. As an example of this savings, a large (500m²+) home in Auckland was constructed with underfloor heating installed, but the owners never turned the system on because the Ambionse walls provided a consistent temperature year-round

Peace & Quiet

Ambionse is significantly quieter than conventional residential construction materials. This is a big advantage when building on a busy road, near an airport or when buffeted by strong winds. New ICF homeowners almost always remark on how unbelievably quiet their new house is, compared to their previous house built with conventional materials.

Sound Transmission Class (STC) is a numbers representing the transmission loss of airborne sound through a material. It is used to measure the sound insulation properties of partitions between rooms or buildings. You will be aware that one of the most annoying transmitted sounds between dwelling units tends to be the bass coming from the neighbour's stereo or television. This is a part of the sound spectrum a long way removed from the voice range. The extra mass of an Ambionse wall is able to block these annoying sounds. The STC calculation is weighted in favour of the part of the sound spectrum that represents the human voice. The actual behaviour of two partitions with the same STC rating can be dramatically different because of the ability of the material to block different frequencies of sound.

Ambionse has been constructed as the intertenancy or party wall in a number of apartment/terraced housing developments. The noises from the adjoining dwelling are successfully prevented from passing through the solid wall, much to the delight of the owners.

4. HEALTHY

Healthy for You

The construction materials of an Ambionse wall are all non-toxic and because of the inherent durability, there's no need for chemical preservative treatment. One key benefit of the inert feature is that there is no off-gassing. This will become more and more important as we learn how the chemicals and toxins in our environment impact our health.

The continuous insulation reduces wall cold spots (that can occur in other walls at gaps in the insulation) and potential condensation buildup. By eliminating the conditions conducive to mould growth, the health problems associated with mould do not feature in an Ambionse home. Ambionse allows you to create a surprisingly airtight structure that minimises the ingress of dust and pollen - great for asthma sufferers.

Even in the event of a fire Ambionse is less toxic than other construction materials. The insulating material used in the Ambionse blocks is formulated so that it does not burn by itself. The Plastics Institute of NZ states that tests carried out in accordance with European Standard DIN 53436 show that the levels of dangerous gases are considerably less than those occurring when burning timber.

Healthy for the Environment

More and more people are turning to a sustainable way of building. This "Green Building" doesn't have to be an "all or nothing" endeavour. If you use materials that have little impact on the environment that is a good start. If you use less energy to run your home (e.g. heating), that also helps. We don't have to go to the extreme to make a difference because every little bit counts.

Concrete is a material that has little impact on the environment. In 1994 Canada's national wood products research institute, Forintek, conducted an environmental impact study on the extraction of resources needed for residential construction[1]. This report says, "concrete has a lower environmental impact than that of other construction materials ..." and "... resource depletion is not an issue for concrete and the impacts associated with extraction are greater for wood. "

Just like people don't buy drills because they want a drill, they want a hole, remember that people do not buy homes because they offer green features. They buy homes that offer a safe, secure, healthy, resource-efficient, and aesthetically pleasing environment.

[1] Assessing the Relative Ecological Carrying Capacity Impacts of Resource Extraction, by Wayne B. Trusty and Associates Ltd. in association with Environmental Policy Research, submitted to Forintek Canada Corp. for its Sustainable Materials Project, August 1994.

Reduced Energy Consumption

The embodied energy (energy consumed in the production) of concrete and Ambionse block is low. While some claim that there is a lot of energy to produce cement, there is only a very small proportion of cement in concrete with a lot of low energy filler.

It is the life-cycle energy use that is more critical, as studies show that only 1% of the energy used in a buildings life is used to manufacture the materials and build the home. The occupants of a house use the other 99% of the life cycle energy use (in heating and cooling).

Less energy is required to heat and cool an Ambionse home, compared to that required by a traditional timber framed house. With a lot of homes heated by gas or wood fires, this can reduce the amount of greenhouse gas emissions, as well as the smog (consider Christchurch in winter). Also with the reduction in heating required, the demand for electricity will also be is reduced. Just imagine how high the hydro-lake levels would be next winter if New Zealand homes had reduced heating requirements.

5. NEW ZEALAND BUILDING CODE

General

When constructed and maintained in accordance with this Manual, an Ambionse wall will satisfy the following provisions of the New Zealand Building Code (NZBC):

Clause B1:	STRUCTURE
Clause B2:	DURABILITY
Clause C1:	OUTBREAK OF FIRE
Clause C3:	SPREAD OF FIRE
Clause C4:	STRUCTURAL STABILITY DURING FIRE
Clause E2:	EXTERNAL MOISTURE
Clause E3:	INTERNAL MOISTURE
Clause F2:	HAZARDOUS BUILDING MATERIALS
Clause G6:	IMPACT AND AIRBORNE SOUND
Clause H1:	ENERGY EFFICIENCY

Structure & Durability

The reinforced concrete core of an Ambionse wall easily exceeds all the requirements for durability and the Ambionse block will meet the requirements providing the external claddings and internal linings are properly installed and maintained for the life of the structure.

A slight yellowing of the surface of the Ambionse block is normal when exposed to ultraviolet radiation for an extended length of time, but this can simply be brushed or washed off if necessary to apply plaster. When finishing with other claddings or linings, it doesn't need to be removed.

Fire

Because the structure of the finished wall is a reinforced concrete wall, the following fire resistant ratings apply:

190 Series	FRR	90 minutes
250 Series	FRR	180 minutes
300 Series	FRR	240 minutes

Ambionse blocks are made from fire retardant EPS raw material, which will not sustain a flame, it will simply melt away from it. Any type of Gib® plasterboard at least 10mm thick is a suitable material to provide a 10-minute flame barrier provided the sheets are screw-fixed at 300mm centres around the edges and along the sheet centreline (BRANZ Report FAR2268).

Moisture

The nature of concrete allows the creation of a virtually weathertight wall. Because Ambionse is simply formwork for reinforced concrete, the same benefits should be expected for a completed Ambionse wall. As with any concrete wall, full information on flashing and sealing of joinery should be sourced from the manufacturers of the cladding and windows used to complete the home to meet the requirements under the Building Code.

Hazardous Building Materials

No components of the Ambionse wall are hazardous to either the builder constructing the wall or the inhabitants of the Ambionse home. The concrete and the Ambionse block are both inert and produce no off-gassing.

Impact & Airborne Sound

There are no requirements for sound attenuation under the Building Code for unattached housing, but you will notice a significant improvement in the quietness with an Ambionse home, compared with a conventional timber framed house.

An intertenancy wall solution that complies with the NZBC has been developed with Ambionse. A field test was carried out to confirm a Field STC of FSTC 53 using the 250 Series Ambionse block. (The NZBC requires a Field STC minimum value of FSTC 50). Full specifications for this wall are available from Styrobeck Plastics on 0800 262 466 or www.ambionse.co.nz.

Energy Efficiency

NZS 4214:1977 sets out the procedure for determining the R-Value of building materials. The completed Ambionse wall has an R-value of at least R3.0. This is well in excess of the NZBC requirements of R0.6 for solid construction (concrete) and R1.5 for non-solid (timber framed) construction.

6. DESIGN & CONSTRUCTION

General

Dimensions

Any dimension can be catered for with Ambionse as the blocks can be cut or trimmed easily with a knife or saw. This means that you are not restricted to modules, but to limit wastage we suggest designing to height multiples of 300mm. For example, wall heights of 2.7m and lintel depths of 300 or 600mm.

Loadings

All loads in an Ambionse wall are transferred through the concrete core, and from an engineering point of view, the wall is considered to be a conventionally reinforced concrete wall/panel. The thin plastic bridges have negligible effect on its structural performance.

By ensuring that all the exterior walls of the structure are constructed with Ambionse, the 'strength' will be evenly distributed around the building, removing the risk of uneven torsional effects under bracing loads. Providing internal Ambionse walls will offer additional bracing benefits.

Thermal Mass

Concrete has the ability to absorb and store thermal energy. It is predominantly this feature that smoothes out the temperature swings. For design tips to maximise the thermal mass benefits, contact the Cement and Concrete Association of New Zealand (www.cca.org.nz or Ph: (04) 499 8820).

Fire Details

The concrete core of an Ambionse wall provides all the fire protection required for residential construction. The sides of the block will not provide an ignition source for the fire. They will simply melt away from the source and will stop once the source is removed. Lining with 10mm Gib plasterboard screw-fixed to the interior of the Ambionse wall will provide the necessary 15 minute Flame Barrier.

Construction Joints

The maximum recommended height that the Ambionse blocks can be stacked to without pouring is 3.3m. This may or may not have an effect on the design, as construction joints may be unavoidable when designing tall walls. A construction joint is formed between each separate concrete pour.

Bracing Values

The bracing values of a standard Ambionse wall shall be determined by Specific Engineering Design

Retaining and Basement Walls

Because Ambionse walls are simply cast insitu concrete walls, Ambionse can be used to form retaining walls. Footings and wall reinforcing requirements are subject to Specific Engineering Design.

Estimating Quantities

The following is to provide some assistance in calculating the required volume of Ambionse blocks for your project, but Styrobeck Plastics do provide a take-off service (0800 262 466).

For each storey (or wall height):

- Count the total number of corners.
- Determine the total perimeter length including openings in metres (= P).
- Multiply the number of corners by 1.05 and subtract this from the perimeter length (= P-C).
- Multiply this by the height of the wall - this provides the area of the wall ignoring openings (= A_s).
- Calculate the area of the openings (= O).
- To find the actual area of the wall (A_w), subtract the area of the openings from A_s.
- Multiply A_w by 2.77(blocks/m²) to determine the total number of straight blocks (we suggest adding 5-10% for wastage particularly if this is your first project).
- Divide the wall height by 300mm and round up to the nearest whole number - this provides the number of courses.
- Multiply the number of courses by the number of corners - this will give you the total number of corner blocks (half will be left hand and half will be right hand blocks).

Helpful Information:

Face Area of Straight Blocks = 0.36m²
Face Area of Corner Blocks = 0.315m²

The concrete volume can be calculated using the values below:

190 Series = 0.038m³ per block (26 blocks/m³)
250 Series = 0.058m³ per block (17 blocks/m³)
300 Series = 0.074m³ per block (13 blocks/m³)

Recommended Tools

Typically standard builders tools will be required, in particular the following should be on site:

Handsaw	Circular Saw	Table Saw	Bracing system
Knife	Level	Cordless Drill	Masonry Drill
Chalkline	Hot knife	Laser level	Cable/zip ties
Stringline	Screws	Scaffold planks	Adhesive Foam & gun
Boxing timber	Rebar bender/cutter		

Adhesive Expanding Foam

Expanding foam should be used for the following applications:

- Bottom course - to hold the alignment of the blocks during construction and seal the base of the wall during concrete placement.
- Service penetrations - to secure and seal service penetrations.
- Cut joints - to stop any movement of the blocks or parts of blocks where the blocks are cut and the tongues and grooves do not match.

Except for fixing the bottom course, sealing of all open joints and around openings should be delayed until near the end of the wall construction (at least a couple of hours before the concrete pour). This allows simplified correction of the wall alignment. Adhesive expanding foam suitable for use with Ambionse is available from Styrobeck Plastics.

Getting Started

It is easier to work from the inside of the walls (on the slab) rather than from the outside, so it is a good idea that all tools and materials are placed on the slab, clear of the intended wall location. Because the product is bulky, make sure you have left enough space to store the packages on site.

The straight blocks are delivered unassembled in bags of eight blocks (16 sides) with the bridges in a separate bag. One bag of bridges will be enough for one bag of blocks. The corner blocks are delivered unassembled in bags of two blocks (2 inner and 2 outer sides) with the correct number of bridges included. One person can easily handle these bags.

Care must be taken at all times when handling Ambionse blocks, with particular attention given to not damaging the tongues or grooves or corner blocks. In order to contain the concrete and concrete moisture when pouring, clean, snug fitting joints are required.

Do not allow solvents or hydrocarbon-based materials to come in contact with the Ambionse blocks, as they can cause permanent damage.

Assembling the Blocks

Moulded into the sides of the straight Ambionse blocks are eight bridge holders. These are the connection points for the bridges and the length of the bridge determines the width of the Ambionse block. The 90mm bridge produces the 190mm Series, the 150mm bridge creates the 250 Series block and the 200mm bridge creates the 300 Series (the side panels of all the series are the same). All bridge holders in the straight blocks must be filled with a bridge.

To assemble the blocks place a pair of block sides facing each other with the open end of the bridge holder upwards. Push the correct bridges, with the reinforcing scallops pointing up, into the holders. They need to be pushed all the way into both sides at the same time until distinct "clicks" are heard indicating a tight fit. Insert the bridges into the end holders first to make sure that the remaining holders line up correctly. It might be helpful to use a completed block as a jig to help when assembling a number of blocks.

For the corner blocks, follow the basic method described above but the 190 Series block requires five (5) bridges while the 250 Series block has four (4) bridges. The outside panel is interchangeable for both Series, but the inside panel is unique to each Series. There are no corner blocks available for the 300 Series.

Footings

Ambionse blocks can replace conventional masonry in foundations and footings. This can save time on site, as there is no waiting for another subtrade to carry out their tasks.

For best results, the top of the footing pad on to which the blocks are placed should to be a multiple of 300mm below the top of the slab (FFL).

Strip footings can be formed with Ambionse blocks and a header block can be made by trimming 100mm from the top of one of the sides of an Ambionse block. These header blocks should be 300mm high to ensure that the bridges are complete and are able to withstand the forces exerted by the concrete.

Footings need to be braced to maintain straightness, and it is recommended that a timber screed edge be used. This screed edge could also form the rebate in the slab.

Where the ground is sloping, the best approach is to step the footings in increments of 300mm, so the blocks can then be placed horizontally. It is not acceptable to place the blocks on an angle for the footing. Ensure that the top surface of the foundation concrete is smoothed off to avoid having to trim the blocks in order to get a level wall.

Cutting & Trimming

The blocks can be cut in any direction with a knife, handsaw, electric chain saw, or hot wire tool. If using a circular saw, it is recommended to reverse the saw blade as a safety tip to prevent the blade catching on the bridge of the block. When the specification requires the cutting of a lot of the blocks horizontally (such as non-modular height), a table saw can be used for a consistent cut. Wherever possible avoid cutting the corner blocks as the pressure from the concrete is greatest at the corners and these blocks need to be complete to contain the concrete.

On the outside of the blocks are vertical ridges to line up the vertical cuts. When a vertical cut is more than 75mm away from a flange, the block may need extra bracing or strapping to contain the concrete pressure. Wherever you need to cut the blocks, seal the joint to prevent the concrete from leaking.

As the wall builds up, try to maintain the same laying pattern. This way the cuts in all courses will be in the same general location, to help with fixing of the linings to the blocks. It will also allow you to brace the wall better as these cuts can be potential weak spots. Major changes in the location of the cuts as you are stacking could also cause the walls to go out of square and become uneven.

First Course

Before laying the blocks, it is a good idea to mark out on the slab the locations of the door, windows and other openings for future reference. This can be helpful when laying out the first course particularly in showing you where cuts are required.

Make sure the area where the walls are to be placed is clear of dirt and debris. Always start placing the blocks at a corner and cutting the straight blocks as necessary as each side meets. To construct a square and level wall, it is the first two courses that are the most important. Once those two courses are in place, level them up to the highest point in the slab, packing with wedges as appropriate. Ensure the blocks are straight and true (check with a level) and use the adhesive expanding foam to seal and fix to the footing/slab.

Reinforcing Steel

As with any structural concrete construction in New Zealand, reinforcing is necessary for shrinkage treatment and structural performance. The reinforcement requirements shall be determined by Specific Engineering Design.

Place all the required horizontal reinforcing steel as specified and tie at intersections or joints. Placing horizontal bar in the first course and tying it to the starter rods will ensure the wall base blocks are firmly held to the foundation. The horizontal reinforcing bars should be placed securely in the scallops within the polypropylene bridge. Confirm with the engineer, but vertical reinforcing steel can be placed once the blocks are stacked in place. All reinforcing steel should be placed in accordance with NZS 3109:1997.

Cable Ties

To assist in keeping the wall straight it is recommended to tie the corner blocks to the adjacent straight blocks. Use a plastic cable (or zip) tie to connect the bridges across the join between the blocks.

These ties can also be effective for intersecting walls, where there are short lengths of block, and for creating curves.

Curved Walls

Details on creating curves can be found in the CAD Drawings. All cuts should be evenly spaced along the block but avoiding the flanges and bridges where practical.

Since the block integrity is reduced by the cuts, the curves will require additional bracing to resist the concrete pressure during the pour. Ensure that the curve is fully sealed and braced before pouring the concrete

.

Blank Ends

Where the wall is required to finish with a vertical edge (such as opening or end of a wall), install blank ends to hold back the concrete. Extend the blocks past the blank end and install one more bridge. This will keep the blocks from expanding out at the end, forcing a bulge in the wall and possible concrete leakage. The extra can be trimmed off later after the concrete has cured.

Stacking the Blocks

To build the second and successive courses align the female groove on the bottom of the block onto the male tongue on the top of the block. The blocks should fit together snugly and do not require any adhesive. The groove on the bottom of the blocks should be clear of debris and not damaged because this could make joining the course difficult. Start at the same corner as in the first course by placing the opposite corner block on top. The blocks should be stacked up in a running bond pattern with vertical joints staggered by at least 150mm as allowed by the castellations in the tongue.

Corner blocks are provided in left and right handed configurations. Each course will have alternating left and right hand corner blocks to provide the correct offset between courses. These blocks allow for 90° corners. For corners greater than or less than 90°, simply cut the straight blocks to suit. Extra bracing is recommended to support these corners.

Push each course of the Ambionse blocks down snugly into the previous course. This will ensure that there is no creep in wall height causing delays to trim the top course. Routinely check the wall with a level to confirm it is square and true.

The wall should be built up to full height and the concrete poured in a number of lifts (usually two), with each lift being a maximum of 1500mm. The maximum recommended height an Ambionse wall can be built to before pouring is 3.3m (11 courses). Allow at least 30 minutes between lifts to allow the concrete to begin to set-up, reducing the pressure on the bottom courses. Typically once the first lift is poured around the entire job, there has been sufficient time to start on the next lift.

Some choose to stack the blocks up to 1500mm and pour the concrete, then complete the wall after the first stage has cured. This will create a horizontal construction joint that may or may not be critical to the design, so always check first. When using this method it is a good idea to finish the pour 100mm below the top of the blocks. This helps to allow a snug joint to the next course of blocks.

Intersecting Walls

Where two Ambionse walls intersect, the blocks should be stacked together and the continuous wall cut to allow the concrete to flow into the adjoining wall. The reinforcement should be placed as designed, as this is the key support. The outside of the junction also needs to be supported with a brace, as the pressure from the concrete typically is high at this point. The vertical joint should be sealed against concrete leakage. Tie the bridges of the blocks together across the join with cable ties.

Bracing

Once the concrete has cured, the wall cannot be adjusted or straightened, so it is crucial that bracing is in place prior to the concrete pour. Braces designed specifically for the Ambionse wall are available for hire. These braces have a strong vertical channel section that can attach to the wall at multiple locations, and an angled prop support. The brace also provides a scaffold bracket. The brace should be screw-fixed to the wall at every course and twice to the bottom course.

The braces should be installed after the third or fourth course of blocks. We suggest placing the braces at 900mm-1200mm centres along the wall, but this spacing should be reduced for long walls. Place the vertical channel against the wall and attach with screws into only the flanges. Because the blocks can settle during the concrete pour, place the screws in the top of the respective slots in the brace and do not over-tighten the screws. This will allow the wall to settle and not get stuck on the braces.

Securely fix the brace to the floor slab with concrete screws or anchors. When using anchor bolts to fix to the slab, drill the hole extra deep so that when removing the braces, the anchor bolt can be driven home leaving the surface flush. The prop is designed to allow for adjustment of the wall alignment once in place.

When building over 3m high we recommend installing a horizontal strongback along the top course prior to fixing the vertical supports. This helps keep the wall straight and the top in line with the bottom. Once again check the wall and make sure it is braced square.

When building a retaining or other wall not on top of a concrete slab, it may be easier to use timber in the same style described above to brace the wall.

Non 90°corners, short walls, corners within 1m of openings, cut blocks and steps in floor level require extra attention. These areas potentially can be problems and need to be braced well (i.e. at closer centres and/or using plywood).

Window & Door Openings

A rebated window opening has proven over time to be the most successful window detail for a concrete wall. The rebated opening in an Ambionse wall provides the surface against which the joinery can be fitted, in exactly the same manner as for conventional masonry buildings.

Use timber formwork to support the head and jambs and to create the rebate. Leave the sill open to allow access during the concrete pour. It may be necessary to provide extra support in the form of flanges to the formwork around the edges to prevent localised bulging of the wall. To prevent buckling of the lintels, use the braces at closer centres and/ or use additional timber to support the jamb and the head formwork.

Cut the blocks as the construction progresses and install the timber formwork. Cutting the opening out once the wall is ready for the concrete pour is best suited for smaller openings for services and the like.

The Sill block is used to form both the sloping sill and continue the rebate around the opening. This standard Sill block is available in lengths of 1200mm and a universal width of 250mm. For 190 Series walls, trim the Sill Block width to suit. For the 300 Series a small gap is acceptable between the Sill Block and the internal lining.

Simply cut the Sill Block to suit the length of the opening. After the concrete is poured, place the Sill Block in position and fix with adhesive expanding foam along both the front and back. Install timber blocks in the holes in the Sill Block and attach to the concrete with approved concrete fasteners. These blocks are to provide a structural connection between the joinery and the concrete core of the wall.

While there is a standard Sill Block, any profile can be custom cut to suit. Contact Styrobeck Plastics for details on 0800 262 466.

Detailed drawings showing how to form the openings can be found in the CAD Drawings. All timber to be permanently in contact with the concrete should be preservative treated.

Lintels

Lintels can be designed in the same manner as with conventional masonry blockwork with reinforcing steel at the top and bottom of the lintel and stirrups linking the top and bottom together. Openings less than 400mm normally do not require reinforcing above that in the rest of the wall, but Specific Engineering Design should be obtained for all lintels reinforcing design.

Lintels should be formed with a reinforcing cage as specified. The continuous reinforcing along the top of the wall can be considered to be the top lintel bar if it exceeds the size of the required top lintel bar.

Install the bottom bar with stirrups attached then place the top Ambionse block over. Tie the stirrups to the top reinforcing bar in order to locate the lintel cage. The reinforcing must extend a minimum of 400mm beyond the edge of the opening or as specified.

Arches

Arches can easily be formed using thin plywood or steel. Form a rectangular opening in the usual manner with the head level with the bottom of the start of the arch. Mark out and cut the Ambionse blocks to suit the curve of the arch and remove but do not discard the off-cuts. Place the steel or plywood at the top of the curve allowing for the rebate to continue across the curve and replace the crescent shape to support it. Support the head in the usual manner. Once the concrete has been cured, the plywood/steel can be removed leaving a perfect arch.

Services & Penetrations

In some instances electrical, plumbing, ventilation and other services are required to penetrate right through the wall. The maximum allowable non-specific dimension of such openings is 400mm x 400mm (should larger holes be required, refer to specific engineering design as reinforcing will be required). Holes should be cut into both sides of the block and a sleeve placed through prior to placing the concrete. This will create voids where services can be passed through at a later date. Seal around the opening with an adhesive expanding foam to prevent concrete leakage.

Electrical and other wiring along with piping for various services if under 40mm diameter can be notched out of the sides of the Ambionse block after the concrete has been poured and cured. This means that the exact services layout does not need to be finalised before construction begins as the builder can determine this on site. This can happen anytime up until the internal lining is placed.

All switchboxes should be installed flush with the surface of the block. If they are placed before the concrete is poured, ensure that there are no holes from which concrete could leak.

Service ducts can also be installed within the concrete core. Obviously this needs to be done before pouring the concrete. For maintenance reasons however, it is not wise to run plumbing pipes within the concrete core. Install these in chase cuts only.

Note: All electrical wiring intended to run in chase cuts should be compatible with EPS otherwise housed within conduits.

Future Proofing

Typically on solid concrete or masonry walls, retrofitting services is not normally an easy task, so they advise to "future-proof" the home by installing spare conduits. With Ambionse walls however, services can easily be placed at a later stage by creating a chase cut along the side of the Ambionse block. This means that if in the future the homeowner wants to change the layout of the light switches, for example, it is just as simple to do this with their Ambionse home as a timber framed building.

Gable Ends

To form a gable end, trim the edge of the Ambionse blocks to match the required slope and place a full row of Ambionse blocks on the top. Fix this course of blocks down with adhesive expanding foam and ensure that sufficient fixings to the braces are available. This top sloped course allows for continuous reinforcing along the top of the gable. Support the edge of the trimmed blocks with timber and install plywood where necessary to help hold the concrete in. Once the concrete has cured, the timber can be removed.

Structural Connections

It is recommended that structural connection, such as for mid-floor supports, be cast-in to the concrete core. When installing the stringer or ribbon plate, cut openings in the Ambionse blocks at the fixing locations of the stringer or ribbon plates. This allows for the installation of the concrete ties/bolts. Cut the opening in the blocks at a 45° angle inside to reduce the shear stress in the concrete. Use rag bolts and seal over the opening to allow the concrete to extend flush with the outside of the block. Install a moisture barrier such as DPC between the timber stringer and the concrete as per normal construction practice.

Concrete mid-floors should be placed on the top of the concrete core of lower floor walls. The seating requirement of the particular floor system should be adhered to, ignoring the width of the side of the Ambionse block. The reinforcing should be placed as specified.

Preparation for Pouring

Prior to pouring concrete check that the stacked blocks are even and tightly fit, perfectly plumb, straight and have no holes for concrete to escape during pouring. If continuing the wall above this pour height, attach the required stringer or ribbon plates connections etc before pouring. Apply tape to the top of the wall to protect the top of the Ambionse block from being covered in concrete. This creates a clean surface making it easy to begin the next level.

Any shavings or offcuts of the Ambionse blocks that have fallen into the cavity must be removed before the concrete pour as they can weaken the joint between the wall and the floor/footings.

Check that all bracing is fixed and aligned. Ensure that all supports around openings are lined up with the wall. Resist pouring the walls before you're really ready. If the job is large, consider adding one day to the date you think you'll be ready. It is better to spend an extra day to have everything completed straight and level than to be rushed around.

Pouring Concrete

We recommend a 20MPa, 10mm aggregate pump mix with a 120-150mm slump for an Ambionse wall. Do not add water to the concrete or attempt to pour concrete that is too wet or you will increase your chances of having a leakage.

The maximum recommended height an Ambionse wall can be built to before pouring is 3.3m (11 courses) and the concrete poured in a number of lifts (usually two), with each lift being a maximum of 1500mm. Allow at least 30 minutes between lifts to allow the concrete to begin to set-up, reducing the pressure on the bottom courses. Typically once the first lift is poured around the entire job, there has been sufficient time to start on the next lift.

Begin placing the concrete below window openings by placing the concrete through the sill until the concrete has filled the section under the window. Then pour on either side of the openings from the top of the wall, but not closer than 600mm to a corner. It's important to pour carefully to avoid any voids in the walls, so pay careful attention around window and door areas.

When pumping, the flow of concrete should be directed onto the horizontal steel thus reducing the pressure on the sides of the Ambionse blocks. The concrete should never be aimed directly into a corner. Slowly work your way around the wall in a consistent direction. Once the entire wall has been filled to the specified lift height, begin on the next pour, repeating the same steps as many times as necessary to fill the wall.

Do not use a vibrator to compact the concrete as this can damage the Ambionse blocks, causing a leakage. Concrete must only be worked by rodding and tapping.

After Pouring

A very important and often overlooked step is checking the alignment of the walls immediately after the pour. It is possible for the walls to move a little during the pour even with bracing. Make sure that the walls are not only vertical, but in line. Check that the top of the Ambionse wall is free from concrete debris.

If the wall is constructed in separate pours, the concrete should not be finished smooth. In fact, it is better to leave the top half of the top course unfilled in order to have the bridge partly exposed. This helps create a good bond between the successive lifts of concrete, and makes it easier to lay the most course of blocks.

When the wall is filled to its completed height, the concrete needs to be finished or smoothed off. For a retaining or other wall that is left exposed, the concrete can simply be finished flat. For house construction, normally a top plate is required to connect the floor or roof members to the wall.

This top plate is fixed into the concrete with standard details, typically with anchor bolts cast into the core or with concrete anchors drilled into the cured concrete. Refer to the Design for full connection details.

The bracing can be removed when the concrete has cured sufficiently (usually 3-4 days), and before returning the hired braces ensure that the threads on the braces are free of concrete. Check that the adjustment can easily move on the thread and make sure it is at its midpoint. Spray a lubricant on the thread to reduce the likelihood of rusting.

Retaining Walls

The waterproofing requirements should be considered to be the same as that for conventional concrete retaining walls, so a tanking or waterproofing membrane will be required for an Ambionse retaining wall. There are many suitable (non-solvent) products available for this application and full details and product information should be sourced from the manufacturer of the waterproofing material to be used. It is recommended that Formflow be used to protect the membrane from damage from the backfill. Formflow is available from Styrobeck Plastics.

Internal Linings

Gib® Plasterboard of at least 10mm should be mechanically fixed to the Ambionse flanges. Glue fixing alone is not suitable, however, adhesive can be used in conjunction with screw fixing to reduce the "drumminess" of the wall.

Please consult the manufacturers' information, should you wish to use a product other than plasterboard.

Non-Structural Connections

Timber framed infill or partition walls do not need a structural connection. Once the concrete has cured, simply cut out sections of the Ambionse block and install timber blocks securely fixed to the concrete. The framing can then be nailed to these blocks according to best building practice.

Heavy objects such as kitchen cabinets should not be hung directly from screws simply fixed through the plasterboard into the plastic flanges. This will put undue strain on a few flanges and create a potential hazard. Either use plywood in lieu of the plasterboard in those areas covered by the object, or install timber blocks as detailed above. All it takes is a little planning ahead.

For extreme cases, a sheet of 2-3mm steel installed under the plasterboard in the general area of the object to be fixed provides unlimited secure fastening locations.

External Finishings

The most common exterior finish is a modified acrylic plaster, basically the same as most EIFS coatings. For a more durable finish, it is recommended to use a coating of at least 10mm thick. Refer to the relevant manufacturer for full application information.

The Ambionse wall should be protected soon after installation otherwise a yellowish powder on the exposed surface tends to form due to ultraviolet radiation. However, this is only critical when applying adhesives or plaster coatings. Simple brushing or washing can remove this powder. When using mechanical fasteners (screw fixing), the powder doesn't have to be removed, as it has no detrimental effects on the claddings or linings.

Masonry, brick or stone veneers can be fixed to the Ambionse wall in two ways. The first method is to use concrete brick ties that are inserted through the sides of the block into the core prior to filling. The concrete will form around these securely fixing them in place. Care should be taken because the ties are unforgiving and stick out from the wall and can cause injuries. The other method is to screw fix ties into the flanges. Refer to the relevant manufacturers' instructions for the preferred approach.

Manufactured weatherboards, sheet claddings and the like can be fixed to the wall by screw fixing to the plastic flanges. Timber weatherboards should not be used due to the uneven movement that can be experienced. For proprietary products, refer to the manufacturer for full installation requirements.

7. CAD DRAWINGS

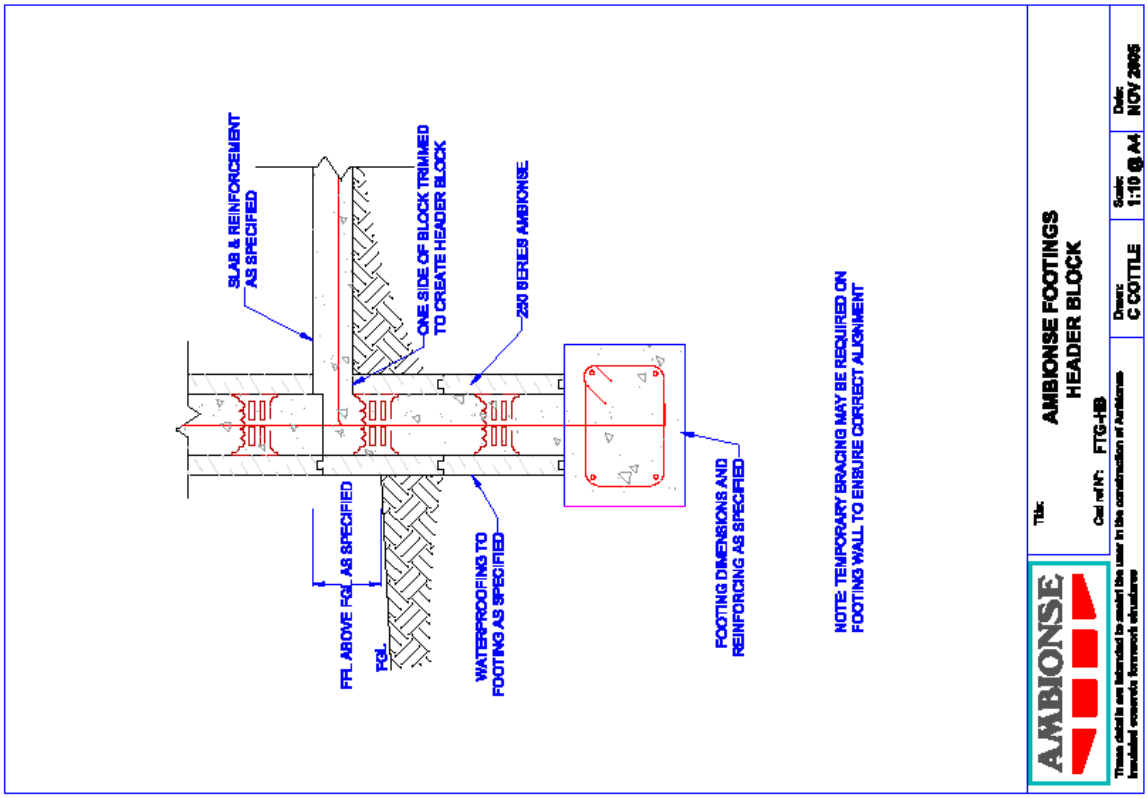
These drawings are intended to assist the user in the construction of Ambionse insulated concrete formwork structures. They can be downloaded as PDF's or DWG format files on www.ambionse.co.nz

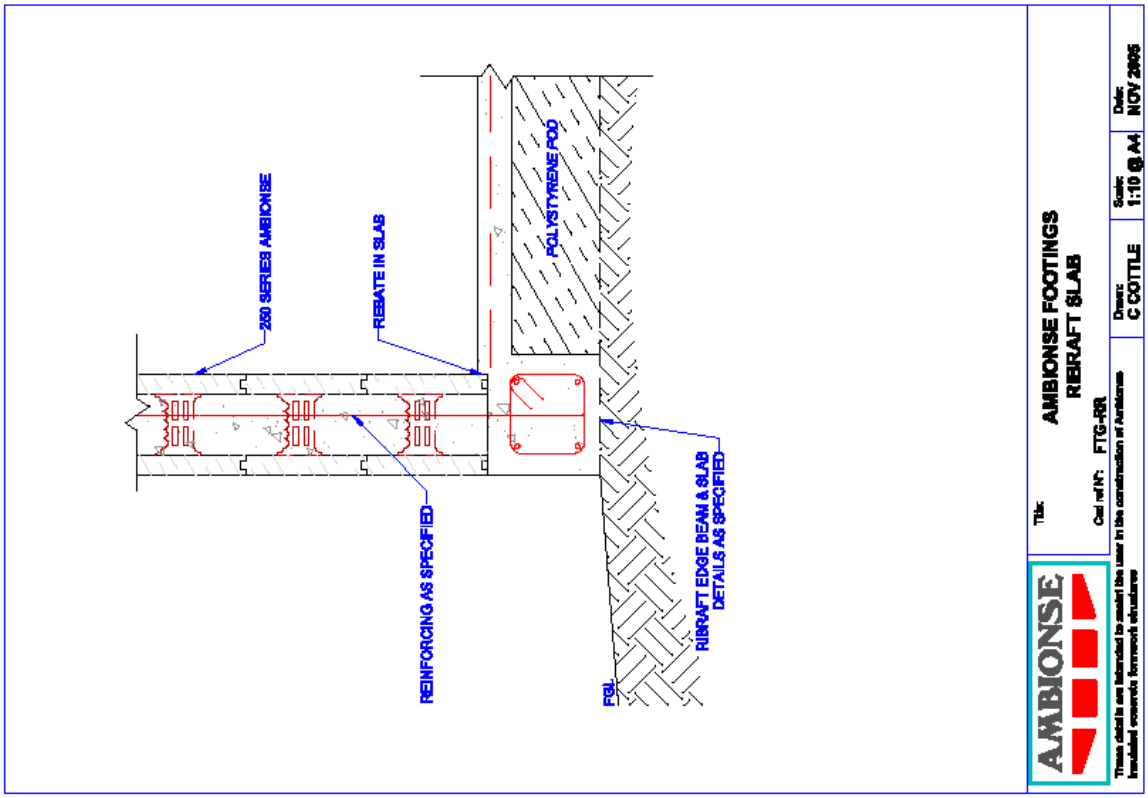
Ambionse Footings
Ambionse as a Header Block
RibRaft Footings
Stepped/Sloping Footings
Brick Veneer Footings

Connection to Other Structures
Concrete Suspended Floor Connection
Intersecting Walls
Timber Mid-floor Connection
Connection to Timber Truss

Constructing Openings
Forming Rebate
Head and Jamb Details
Sill Block Details
Arched Openings
Bracing Openings
Formed Opening

Miscellaneous
Waterproofing Retaining Walls
Typical Cross Section
Creating Curves


SLAB & REINFORCEMENT AS SPECIFIED
ONE SIDE OF BLOCK TRIMMED TO CREATE HEADER BLOCK
230 SERIES AMBIONSE
FFL ABOVE FGL AS SPECIFIED
FGL
WATERPROOFING TO FOOTING AS SPECIFIED
FOOTING DIMENSIONS AND REINFORCING AS SPECIFIED
NOTE: TEMPORARY BRACING MAY BE REQUIRED ON FOOTING WALL TO ENSURE CORRECT ALIGNMENT
AMBIONSE
Title: AMBIONSE FOOTINGS HEADER BLOCK
Cad ref'n: FTG-HB
Drawn: C COTTLE
Scale: 1:10 @ A4
Date: NOV 2005
These details are intended to assist the user in the construction of Ambionse Insulated concrete formwork structures


230 SERIES AMBIONSE
REBATE IN SLAB
POLYSTYRENE POD
REINFORCING AS SPECIFIED
RIBRAFT EDGE BEAM & SLAB DETAILS AS SPECIFIED
FGL
AMBIONSE
Title: AMBIONSE FOOTINGS RIBRAFT SLAB
Cad ref'n: FTG-RR
Drawn: C COTTLE
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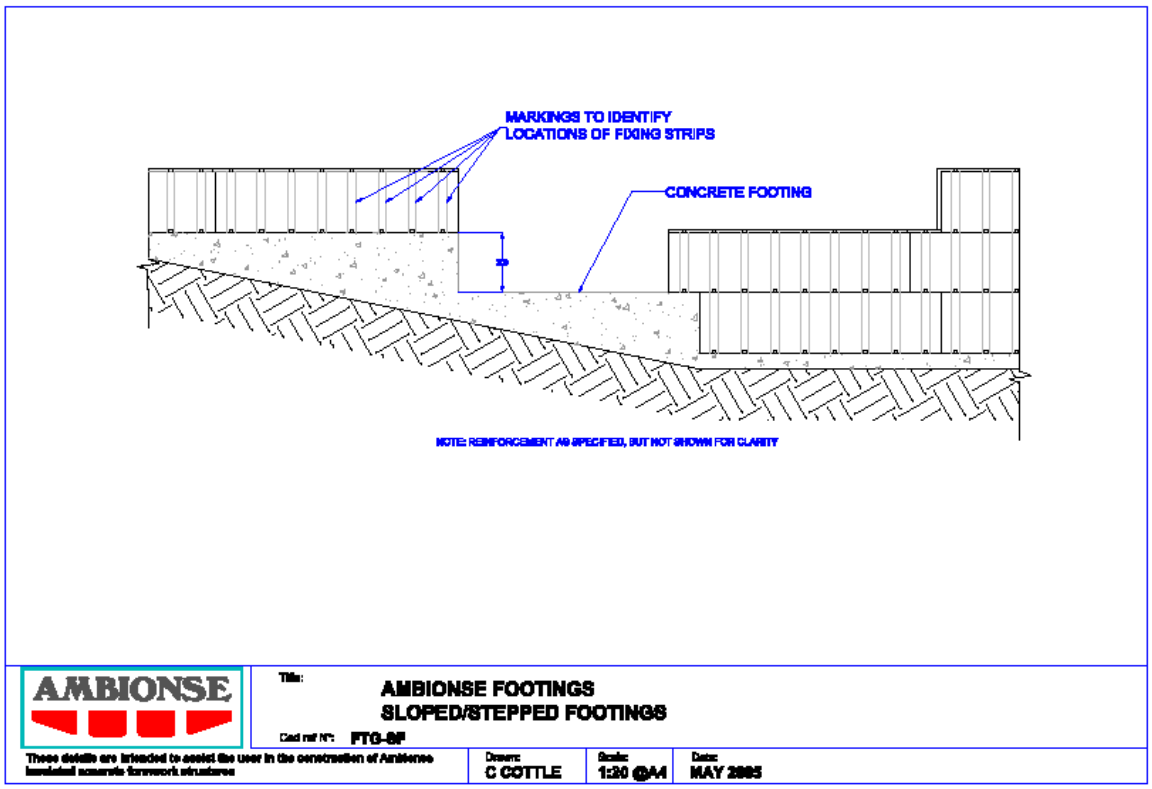
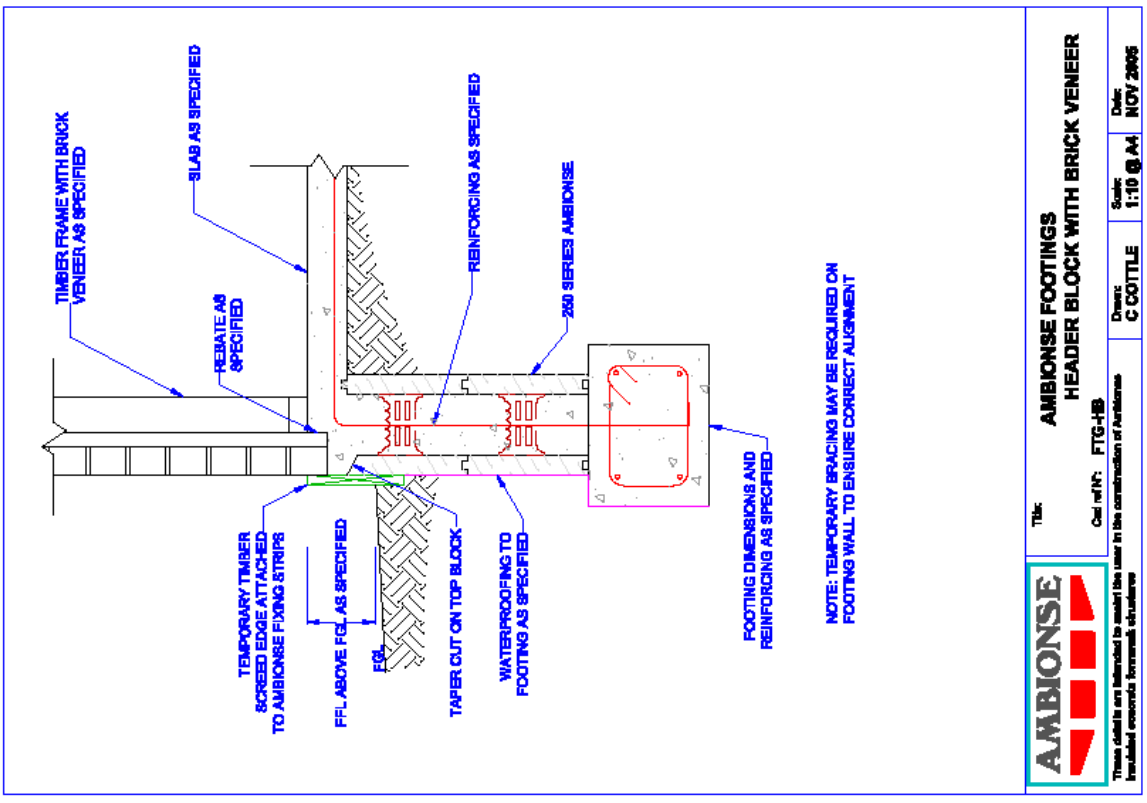
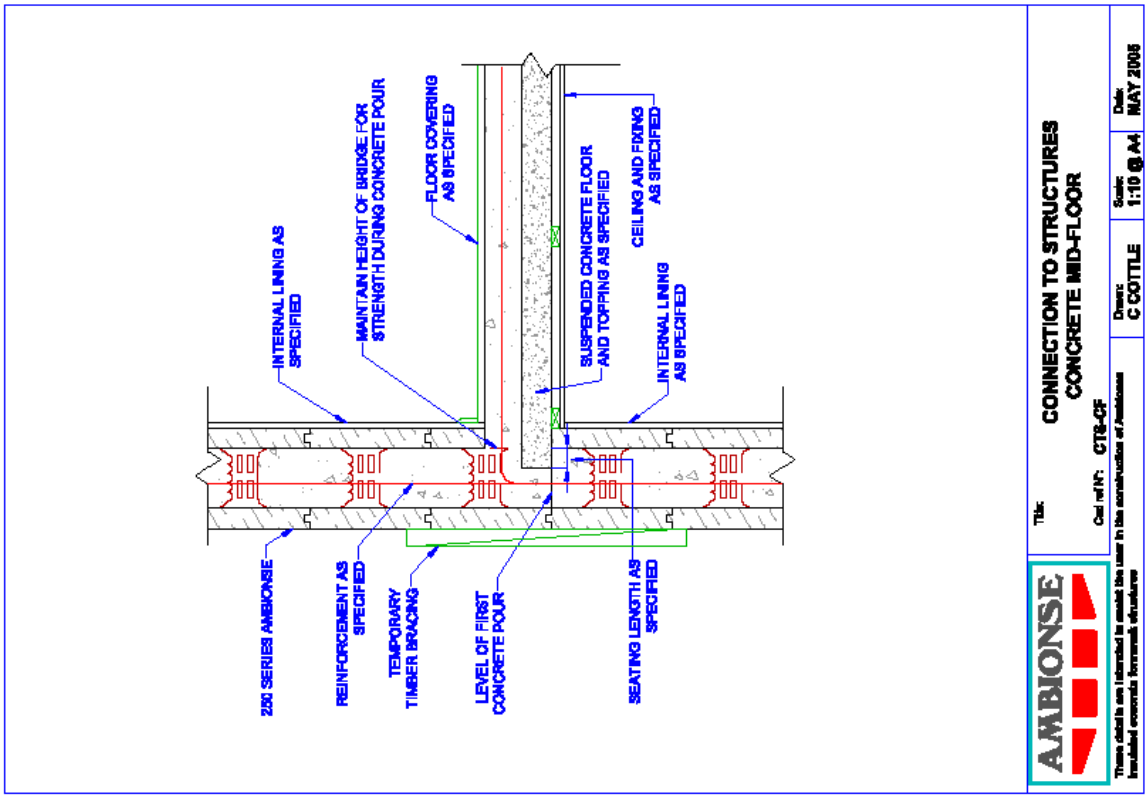
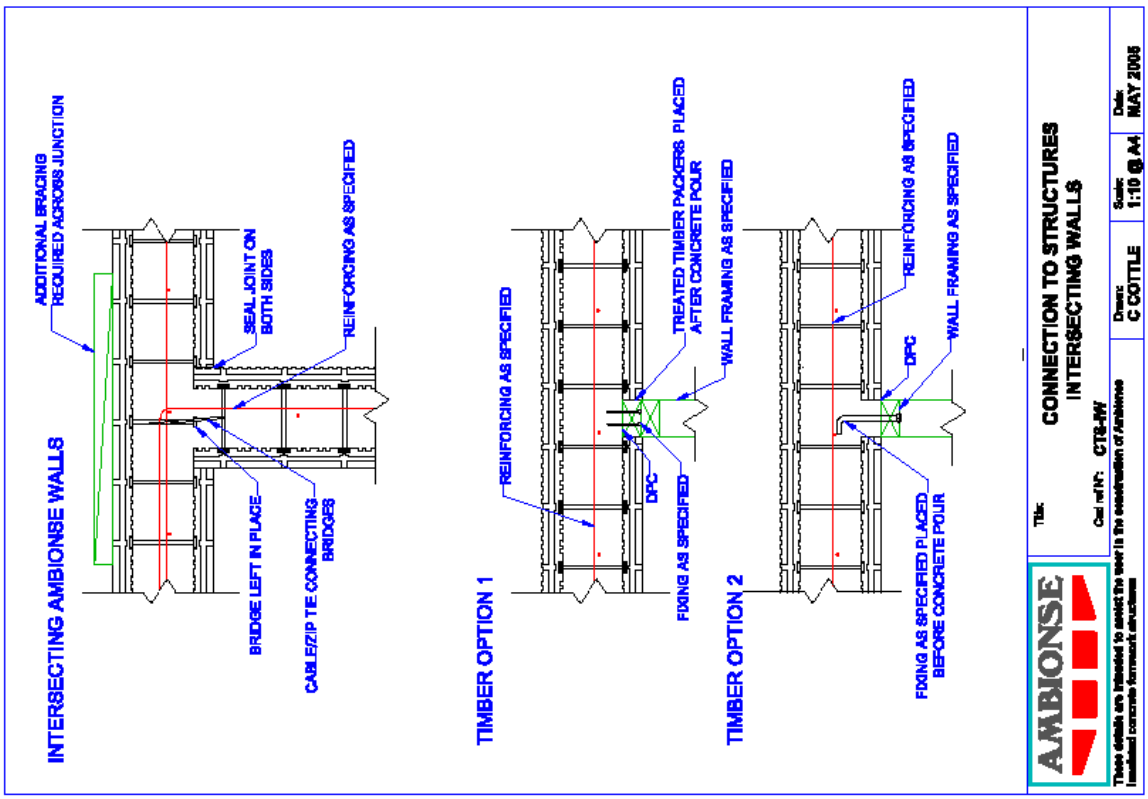
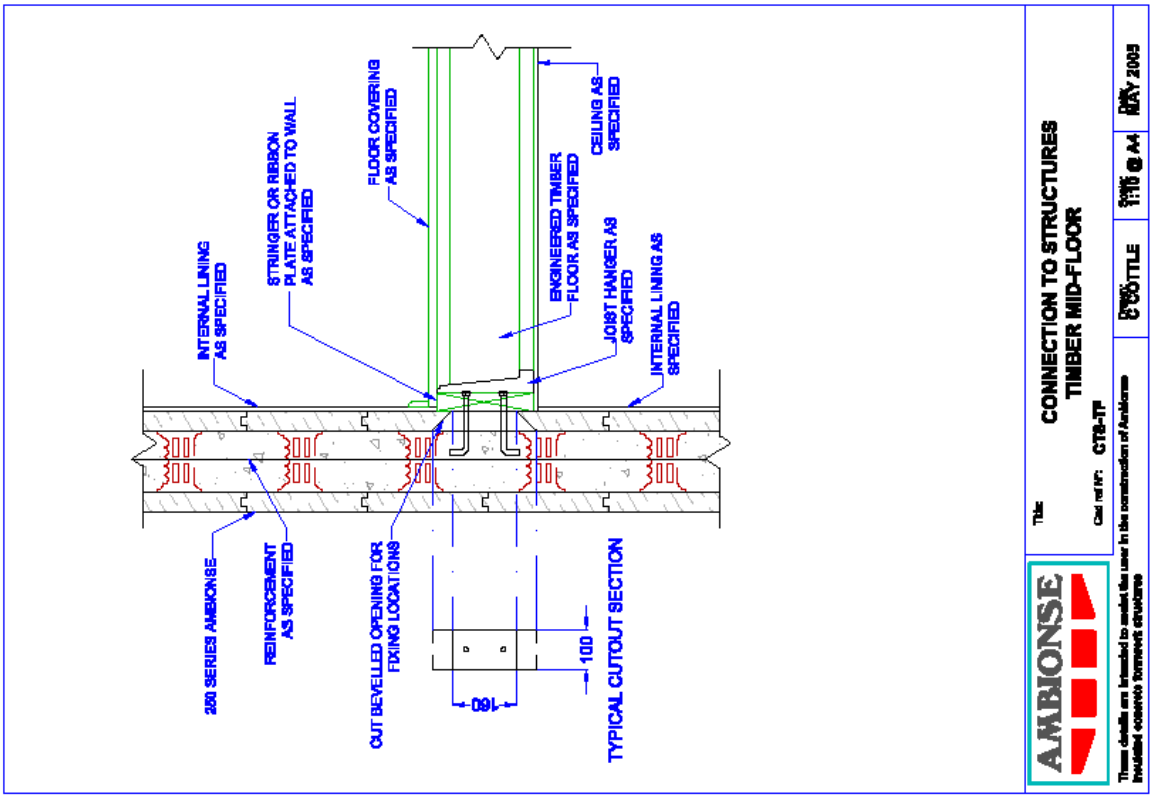
Date: NOV 2005
These details are intended to assist the user in the construction of Ambionse Insulated concrete formwork structures


MARKINGS TO IDENTIFY
LOCATIONS OF FIXING STRIPS
CONCRETE FOOTING
NOTE: REINFORCEMENT AS SPECIFIED, BUT NOT SHOWN FOR CLARITY
AMBIONSE
Title:
AMBIONSE FOOTINGS
SLOPED/STEPPED FOOTINGS
Cad ref N°: FTG-SF
These details are intended to assist the user in the construction of Ambionse
Insulated concrete formwork structures
Drawn:
C COTTLE
Scale:
1:20 @A4
Date:
MAY 2005


TIMBER FRAME WITH BRICK VENEER AS SPECIFIED
SLAB AS SPECIFIED
REBATE AS SPECIFIED
REINFORCING AS SPECIFIED
250 SERIES AMBIONSE
TEMPORARY TIMBER SCREED EDGE ATTACHED TO AMBIONSE FIXING STRIPS
FFL ABOVE FGL AS SPECIFIED
FGL
TAPER CUT ON TOP BLOCK
WATERPROOFING TO FOOTING AS SPECIFIED
FOOTING DIMENSIONS AND REINFORCING AS SPECIFIED
NOTE: TEMPORARY BRACING MAY BE REQUIRED ON FOOTING WALL TO ENSURE CORRECT ALIGNMENT
AMBIONSE
Title:
AMBIONSE FOOTINGS
HEADER BLOCK WITH BRICK VENEER
Cad ref N°: FTG-HB
These details are intended to assist the user in the construction of Ambionse
Insulated concrete formwork structures
Drawn:
C COTTLE
Scale:
1:10 @ A4
Date:
NOV 2005


INTERNAL LINING AS SPECIFIED
MAINTAIN HEIGHT OF BRIDGE FOR STRENGTH DURING CONCRETE POUR
FLOOR COVERING AS SPECIFIED
SUSPENDED CONCRETE FLOOR AND TOPPING AS SPECIFIED
CEILING AND FIXING AS SPECIFIED
INTERNAL LINING AS SPECIFIED
250 SERIES AMBIONSE
REINFORCEMENT AS SPECIFIED
TEMPORARY TIMBER BRACING
LEVEL OF FIRST CONCRETE POUR
SEATING LENGTH AS SPECIFIED
AMBIONSE
Title: CONNECTION TO STRUCTURES
CONCRETE MID-FLOOR
Cad ref'n: GT8-CF
Drawn: C COTTLE
Scale: 1:10 @ A4
Date: MAY 2006


INTERSECTING AMBIONSE WALLS
ADDITIONAL BRACING REQUIRED ACROSS JUNCTION
SEAL JOINT ON BOTH SIDES
REINFORCING AS SPECIFIED
BRIDGE LEFT IN PLACE
CABLE/ZIP TIE CONNECTING BRIDGES
TIMBER OPTION 1
REINFORCING AS SPECIFIED
TREATED TIMBER PACKERS PLACED AFTER CONCRETE POUR
WALL FRAMING AS SPECIFIED
DPC
FIXING AS SPECIFIED
TIMBER OPTION 2
REINFORCING AS SPECIFIED
DPC
WALL FRAMING AS SPECIFIED
FIXING AS SPECIFIED PLACED BEFORE CONCRETE POUR
AMBIONSE
Title: CONNECTION TO STRUCTURES
INTERSECTING WALLS
Cad ref'n: GT8-IW
Drawn: C COTTLE
Scale: 1:10 @ A4
Date: MAY 2006


INTERNAL LINING AS SPECIFIED
STRINGER OR RIBBON PLATE ATTACHED TO WALL AS SPECIFIED
FLOOR COVERING AS SPECIFIED
CEILING AS SPECIFIED
ENGINEERED TIMBER FLOOR AS SPECIFIED
JOIST HANGER AS SPECIFIED
INTERNAL LINING AS SPECIFIED
250 SERIES AMBIONSE
REINFORCEMENT AS SPECIFIED
CUT BEVELLED OPENING FOR FIXING LOCATIONS
160
100
TYPICAL CUTOUT SECTION
AMBIONSE
Title: CONNECTION TO STRUCTURES
TIMBER MID-FLOOR
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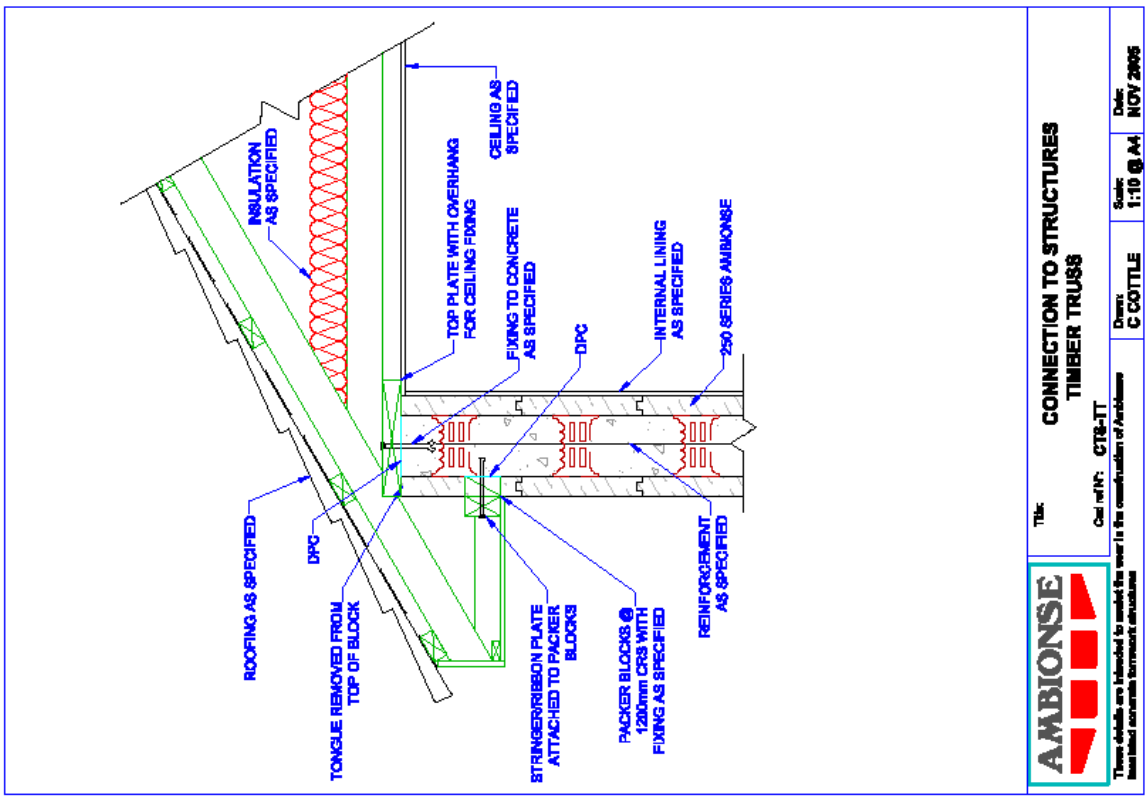
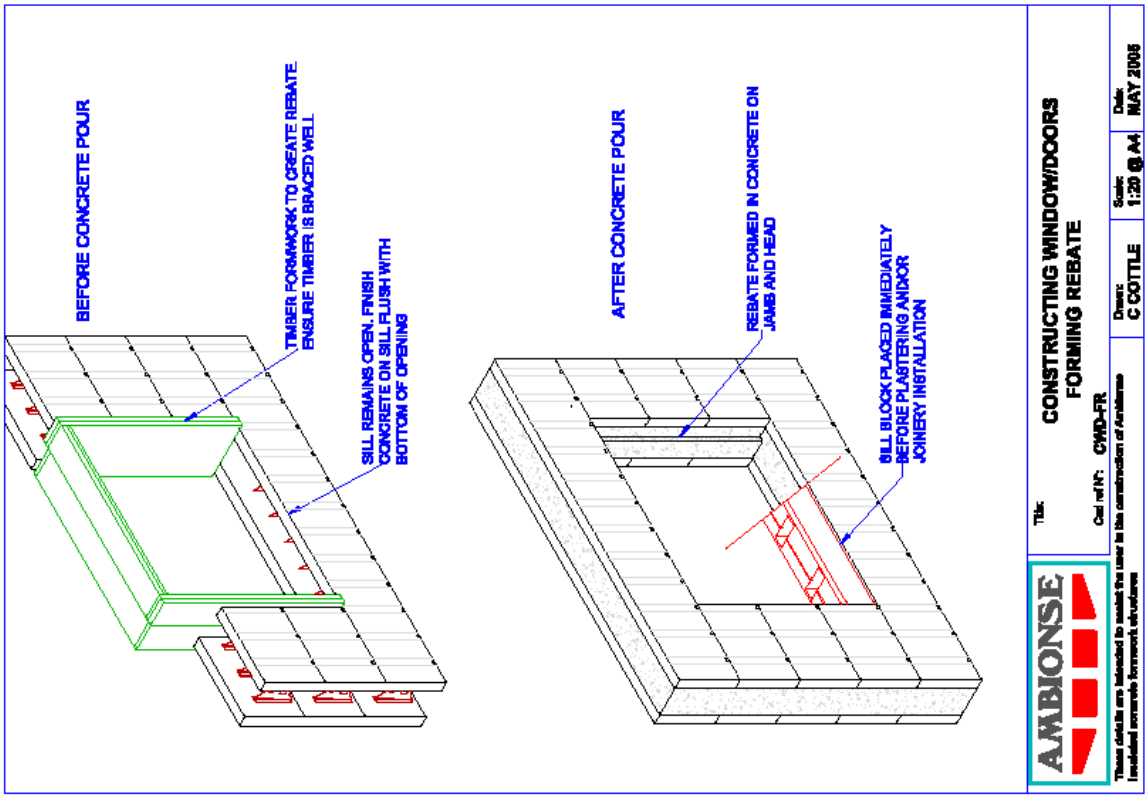
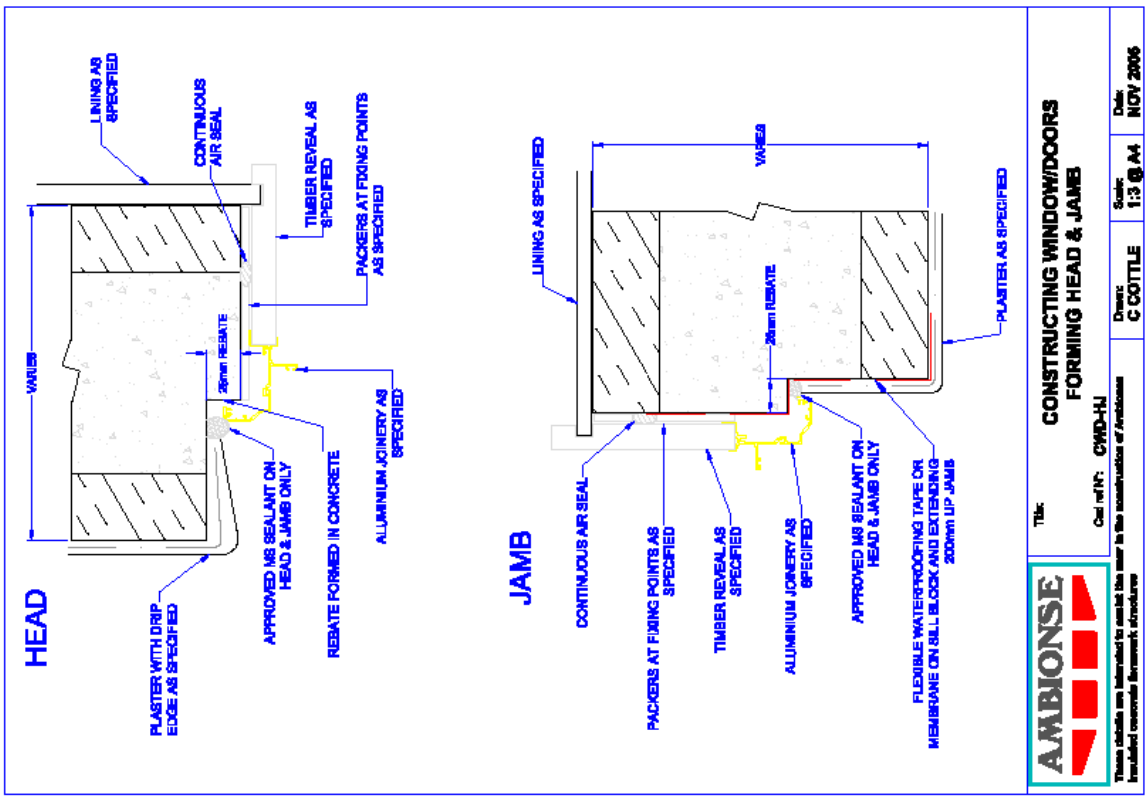
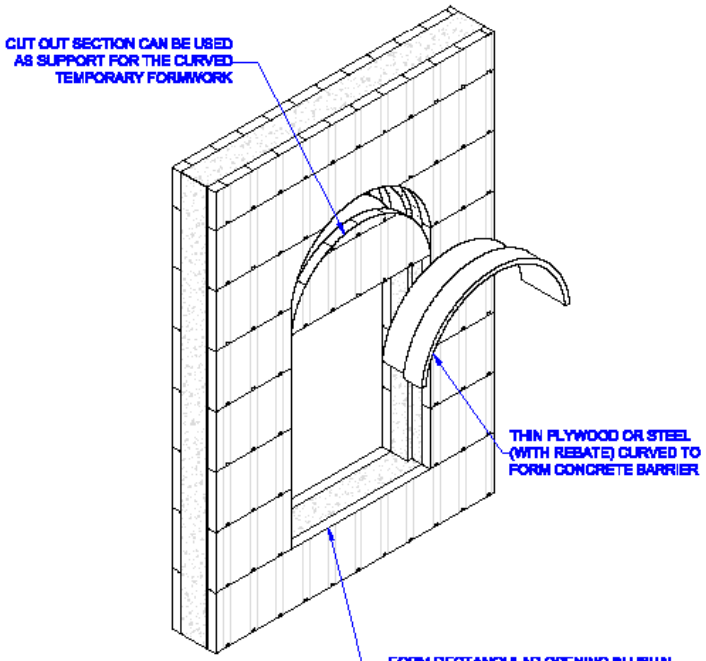
Scale: 1:10 @ A4
Date: MAY 2005


INSULATION AS SPECIFIED
CEILING AS SPECIFIED
TOP PLATE WITH OVERHANG FOR CEILING FIXING
FIXING TO CONCRETE AS SPECIFIED
DPC
INTERNAL LINING AS SPECIFIED
250 SERIES AMBIONSE
ROOFING AS SPECIFIED
DPC
TONGUE REMOVED FROM TOP OF BLOCK
STRINGER/RIBBON PLATE ATTACHED TO PACKER BLOCKS
PACKER BLOCKS @ 1200mm CRS WITH FIXING AS SPECIFIED
REINFORCEMENT AS SPECIFIED
AMBIONSE
Title: CONNECTION TO STRUCTURES
TIMBER TRUSS
Cad ref N°: CT8-TT
Drawn: C COTTLE
Scale: 1:10 @ A4
Date: NOV 2005


BEFORE CONCRETE POUR
TIMBER FORMWORK TO CREATE REBATE ENSURE TIMBER IS BRACED WELL
SILL REMAINS OPEN, FINISH CONCRETE ON SILL FLUSH WITH BOTTOM OF OPENING
AFTER CONCRETE POUR
REBATE FORMED IN CONCRETE ON JAMB AND HEAD
SILL BLOCK PLACED IMMEDIATELY BEFORE PLASTERING AND/OR JOINERY INSTALLATION
AMBIONSE
Title: CONSTRUCTING WINDOW/DOORS FORMING REBATE
Cad ref N°: CWD-FR
Drawn: C COTTLE
Scale: 1:20 @ A4
Date: MAY 2006


HEAD
LINING AS SPECIFIED
CONTINUOUS AIR SEAL
TIMBER REVEAL AS SPECIFIED
PACKERS AT FIXING POINTS AS SPECIFIED
VARIES
25mm REBATE
PLASTER WITH DRIP EDGE AS SPECIFIED
APPROVED M8 SEALANT ON HEAD & JAMB ONLY
REBATE FORMED IN CONCRETE
ALUMINIUM JOINERY AS SPECIFIED
JAMB
LINING AS SPECIFIED
VARIES
25mm REBATE
PLASTER AS SPECIFIED
CONTINUOUS AIR SEAL
PACKERS AT FIXING POINTS AS SPECIFIED
TIMBER REVEAL AS SPECIFIED
ALUMINIUM JOINERY AS SPECIFIED
APPROVED M8 SEALANT ON HEAD & JAMB ONLY
FLEXIBLE WATERPROOFING TAPE OR MEMBRANE ON SILL BLOCK AND EXTENDING 200mm UP JAMB
AMBIONSE
Title: CONSTRUCTING WINDOW/DOORS FORMING HEAD & JAMB
Cad ref N°: CWD-HJ
Drawn: C COTTLE
Scale: 1:3 @ A4
Date: NOV 2006



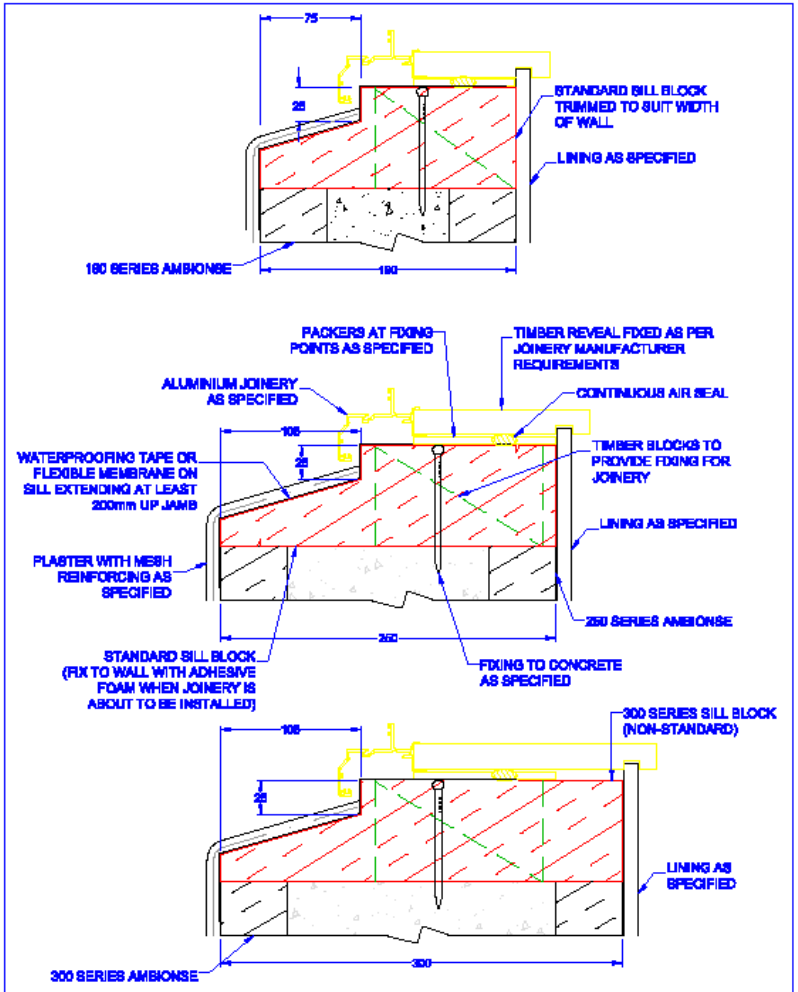
AMBIONSE

Title: **CONSTRUCTING WINDOW/DOORS**
ARCHED OPENINGS

Cad ref N°: CWD-AO

These details are intended to assist the user in the construction of Ambionse insulated concrete formwork structures

Drawn: C COTTLE | Scale: 1:20 @ A4 | Date: NOV 2005



Note: ADDITIONAL PROPRIETARY FLASHINGS MAY BE REQUIRED - CONFIRM WITH JOINERY MANUFACTURER

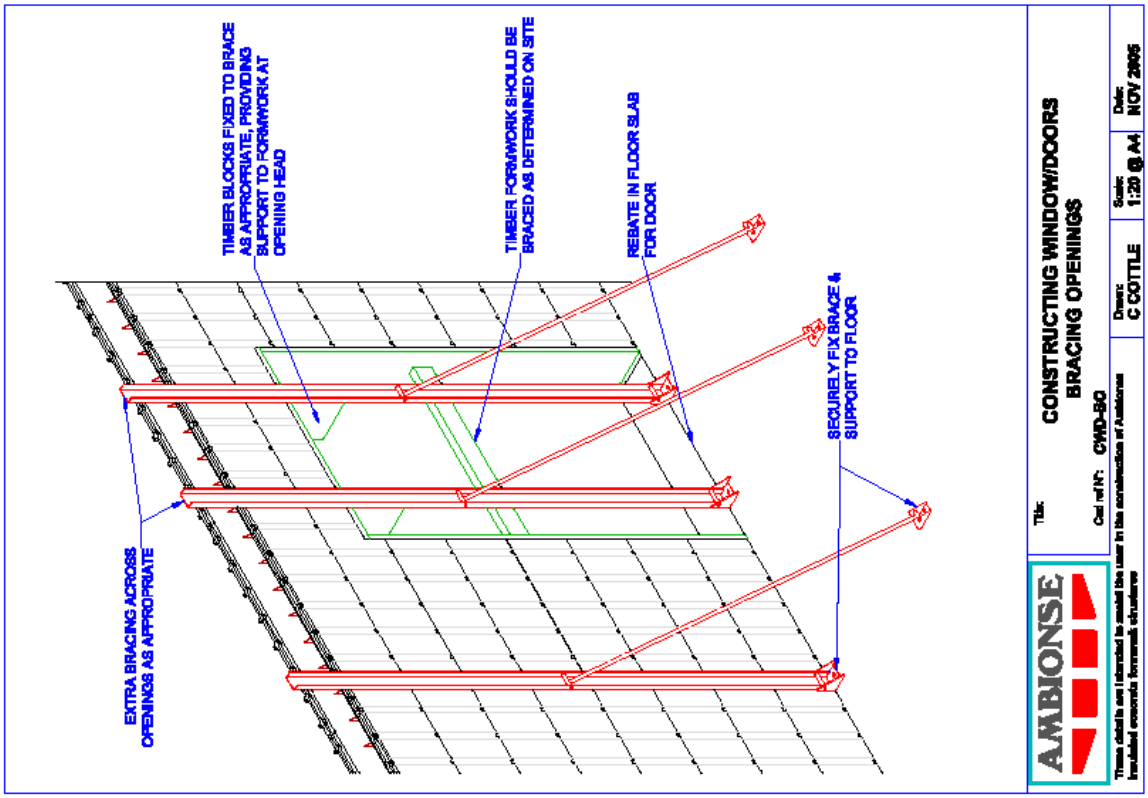
AMBIONSE

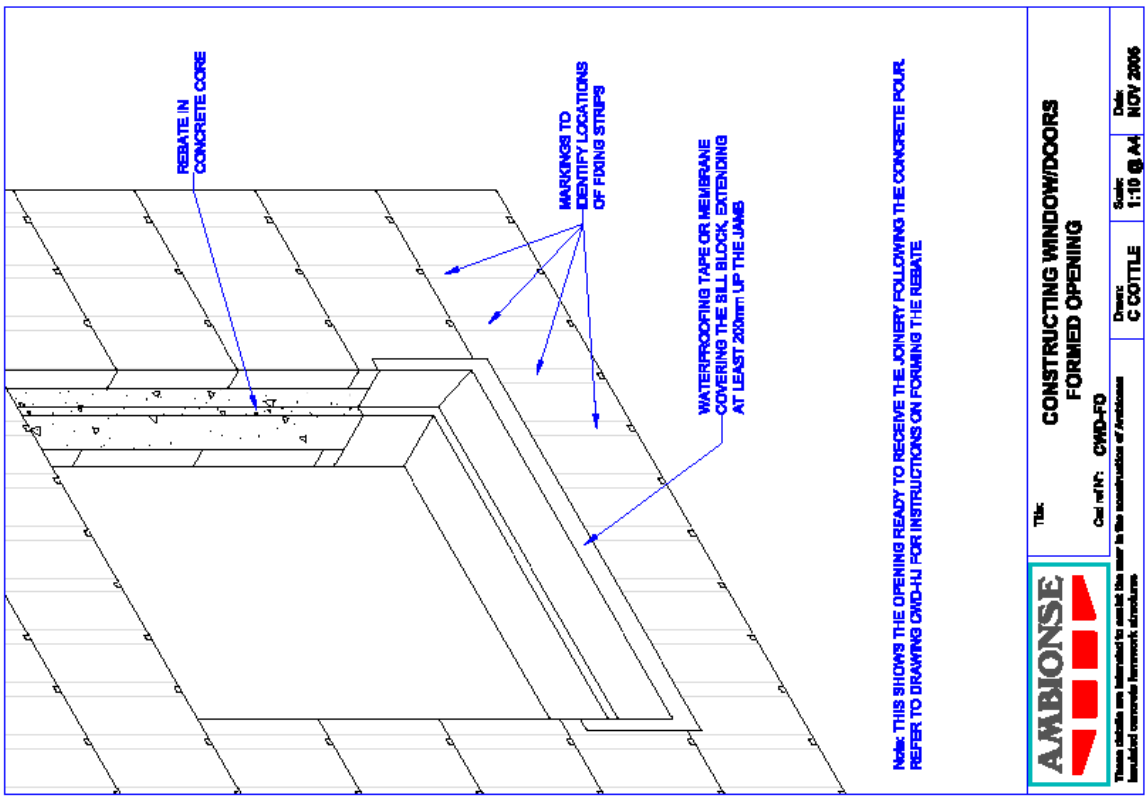
Title: **CONSTRUCTING WINDOW/DOORS**
SILL BLOCK DETAILS

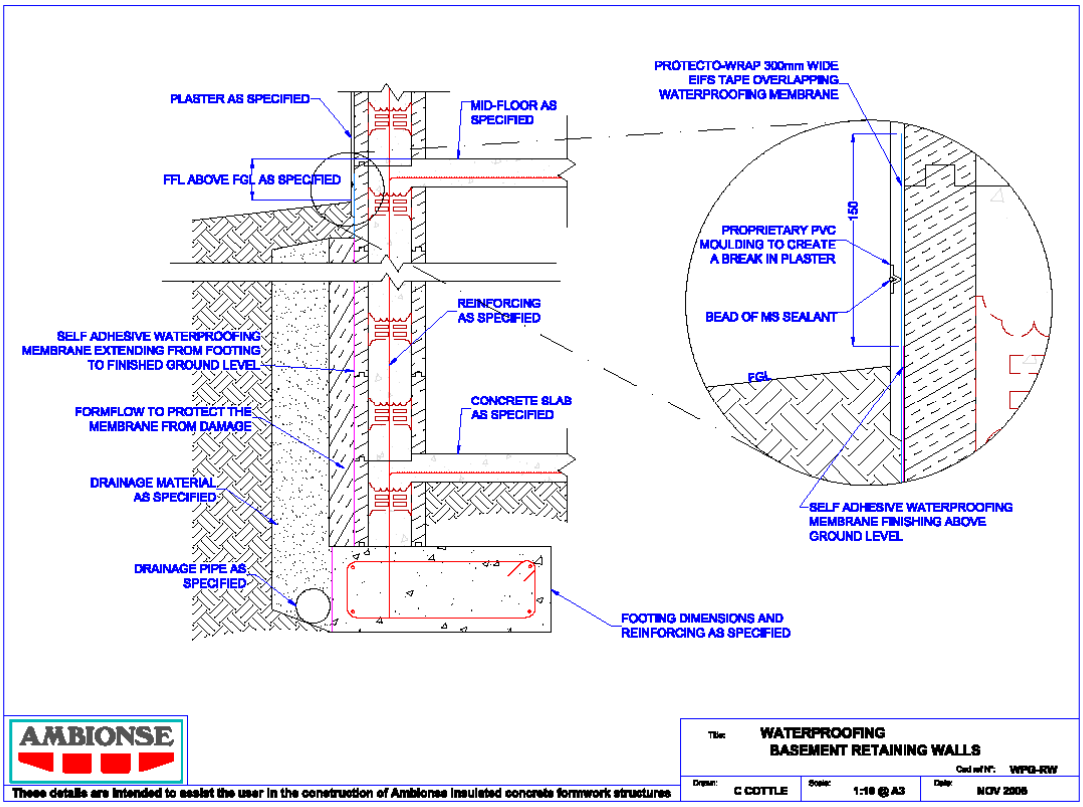
Cad ref N°: CWD-SB

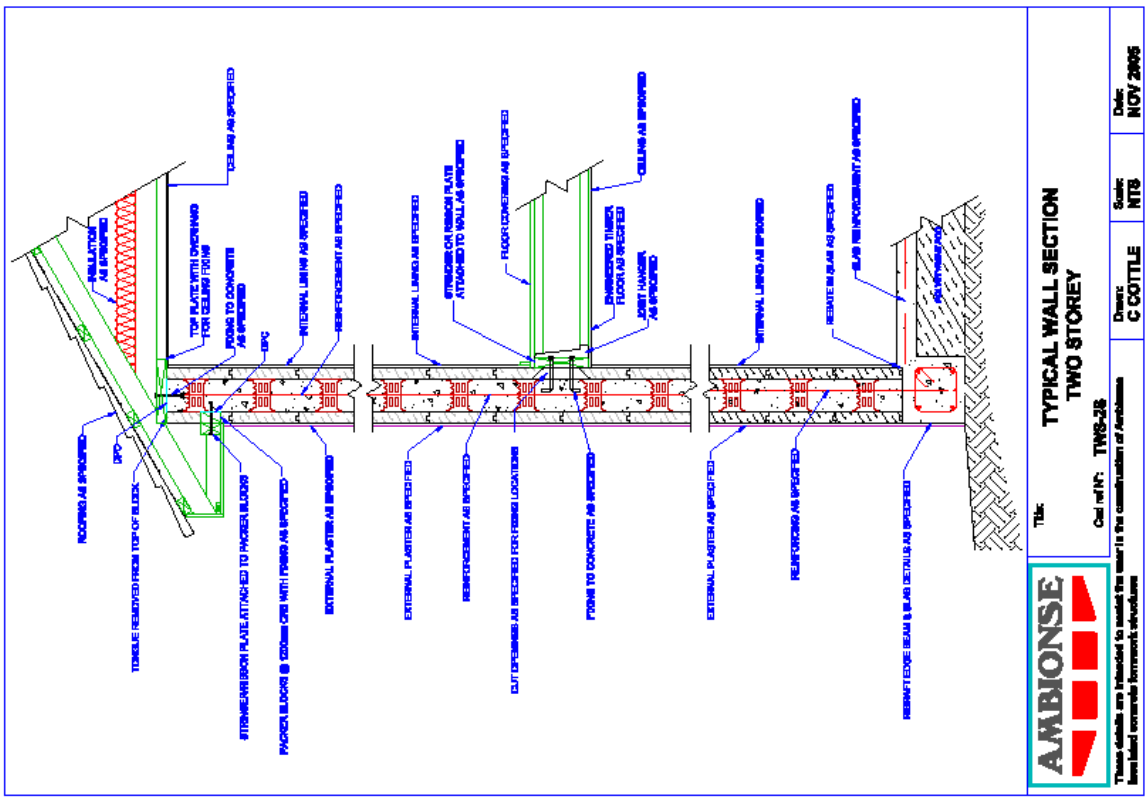
These details are intended to assist the user in the construction of Ambionse insulated concrete formwork structures

Drawn: C COTTLE | Scale: 1:3 @ A4 | Date: NOV 2005

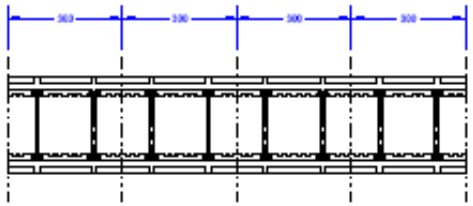

TIMBER BLOCKS FIXED TO BRACE AS APPROPRIATE, PROVIDING SUPPORT TO FORMWORK AT OPENING HEAD
TIMBER FORMWORK SHOULD BE BRACED AS DETERMINED ON SITE
REBATE IN FLOOR SLAB FOR DOOR
SECURELY FIX BRACE & SUPPORT TO FLOOR
EXTRA BRACING ACROSS OPENINGS AS APPROPRIATE
AMBIONSE
Title: CONSTRUCTING WINDOW/DOORS
BRACING OPENINGS
Cad ref N°: CWD-BO
Drawn: C COTTLE
Scale: 1:20 @ A4
Date: NOV 2005


REBATE IN CONCRETE CORE
MARKINGS TO IDENTIFY LOCATIONS OF FIXING STRIPS
WATERPROOFING TAPE OR MEMBRANE COVERING THE SILL BLOCK, EXTENDING AT LEAST 200mm UP THE JAMB
Note: THIS SHOWS THE OPENING READY TO RECEIVE THE JOINERY FOLLOWING THE CONCRETE POUR. REFER TO DRAWING CWD-HJ FOR INSTRUCTIONS ON FORMING THE REBATE
AMBIONSE
Title: CONSTRUCTING WINDOW/DOORS
FORMED OPENING
Cad ref N°: CWD-FO
Drawn: C COTTLE
Scale: 1:10 @ A4
Date: NOV 2005

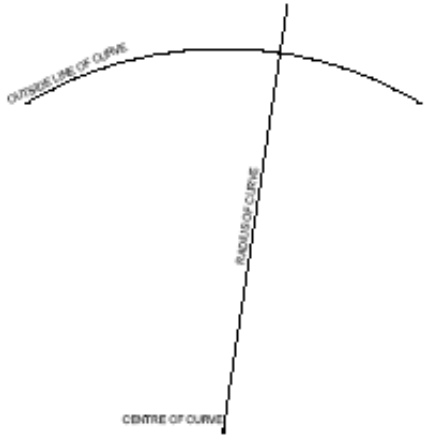

PLASTER AS SPECIFIED
MID-FLOOR AS SPECIFIED
FFL ABOVE FGL AS SPECIFIED
PROTECTO-WRAP 300mm WIDE EIFS TAPE OVERLAPPING WATERPROOFING MEMBRANE
PROPRIETARY PVC MOULDING TO CREATE A BREAK IN PLASTER
150
BEAD OF MS SEALANT
FGL
REINFORCING AS SPECIFIED
SELF ADHESIVE WATERPROOFING MEMBRANE EXTENDING FROM FOOTING TO FINISHED GROUND LEVEL
CONCRETE SLAB AS SPECIFIED
FORMFLOW TO PROTECT THE MEMBRANE FROM DAMAGE
DRAINAGE MATERIAL AS SPECIFIED
SELF ADHESIVE WATERPROOFING MEMBRANE FINISHING ABOVE GROUND LEVEL
DRAINAGE PIPE AS SPECIFIED
FOOTING DIMENSIONS AND REINFORCING AS SPECIFIED
AMBIONSE
Title: WATERPROOFING BASEMENT RETAINING WALLS
Cad ref N°: WPG-RW
Drawn: C COTTLE
Scale: 1:10 @ A3
Date: NOV 2005
These details are intended to assist the user in the construction of Ambionse insulated concrete formwork structures


TYPICAL WALL SECTION TWO STOREY
Cad ref N°: TW6-2S
Drawn: C COTTLE
Scale: NTS
Date: NOV 2005
AMBIONSE

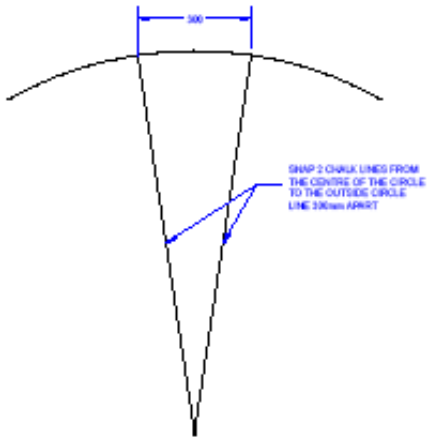
STEP 1 Cut the straight blocks into 300mm sections, keeping the bridges centred in the sections



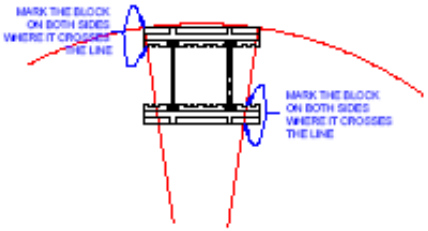
STEP 2 Mark the outside of the radius on the footing or slab and snap a chalk line extending beyond the mark for the outside radius



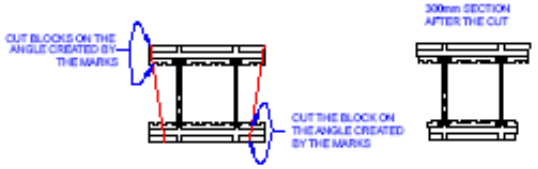
STEP 3 From the intersection of the two lines, measure 300mm and snap a chalk line to this point from the centre of the circle.



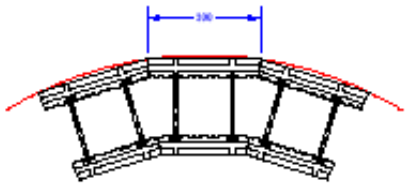
STEP 4 Place one of the 300mm sections on the outside curve line, making sure the outside corners of the block are at the locations of the chalk lines with the curve line



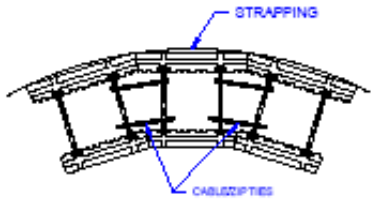
STEP 5 Cut the blocks on the marks, following the angle created by the marks.



STEP 6 Repeat Steps 4 & 5 until the proper number of blocks have been cut to form the curve.



STEP 7 Use cable/zip ties to secure the blocks together. Additional reinforcing such as flexible plywood, or strapping should be used to prevent the blocks opening up during the concrete pour



CAD DRAWINGS