SPECIFIC DESIGN

ALTERNATIVE SOLUTION TO E2/AS1 MASONRY

AAC – LITE BRICK VENEER

Prepared by

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BRICKLAYING SPECIFICATION
AAC LITE BRICK MASONRY BRICKS

DESIGNER

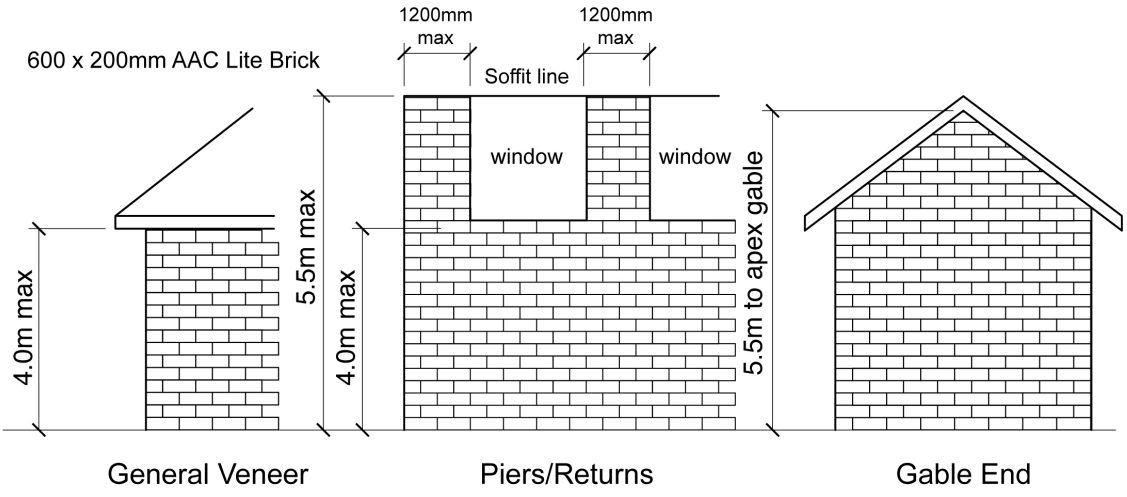
The 'Architectural Designer' is responsible for ensuring that the 'brick veneer', as detailed on the Building Consent Plans and Specification, complies with all aspects of this 'Specific Design' bricklaying specification, provided as an 'Alternative Solution' to E2/AS1 Masonry; applicable only when AAC Lite Brick, aerated concrete bricks are specified and used. If an aspect has not been specifically addressed in this specification and attached details, then E2/AS1 Masonry and NZS4210 will apply.

The 'Architectural Designer' is also to ensure that the details submitted to council for the building consent on any one particular dwelling, specifically relate to the methodology and veneer to be installed on that dwelling. Studs at 600mm crs are permitted.

The maximum height for a veneer in relation to this specification is 4.0m, 5.5m to the apex of a gable or 5.5m for a pier not exceeding 1.0m in width and not supporting a steel lintel.

Ensure WANZ support bars have been specified under all doors and windows.

Maximum Veneer Heights under Design Note LB 01



GENERAL

Bricklaying – Workmanship

The veneer is to be installed by a 'qualified' tradesman and 'supervised' by a Licenced Building Practitioner (if not the tradesman doing the laying) who will be responsible on completion of the brick veneer installation, certifying that the veneer meets all requirements of Design Note LB 01 – Specific Design Bricklaying Specification and/or E2/AS1 Masonry - NZS4210; in addition to any requirements on the 'Approved Plans' and Specification.
Important: This specification applies, and will be enforced, regardless of the specified wall finish, such as plastered or painted veneer. Laying **must be** to 'Face Brick' standard regardless.
Where the plans and specification deviate from what is being asked for on-site, the bricklayer must raise the issue with the main contractor prior to proceeding to ensure compliance – if plans need to be amended, establish a paper trail.

Related Documents

All relevant NZ Standards shall apply in their latest revisions for all items NOT covered by this 'Specific Design'. In particular, the following documents:

E2/AS1	Building Code, External Moisture, Masonry Veneer
NZS4210	Materials and Workmanship
NZS4229	Masonry Buildings not requiring Specific Design
NZSHB4236	All standards relating to masonry veneers – summary.

Building Wrap

Where studs exceed 450mm crs, and the 'building wrap' is not Eco-ply or similar, the building wrap is to be taped and fixed horizontally at 300mm crs up the height of the stud to comply with E2/AS1. The bricklayer is to check prior to laying any bricks and advise the Builder/Contracts Manager if this has not been done.

PRODUCTS

All materials shall be the best of their respective kinds, free from impurities, imperfections and other faults likely to impair the finished masonry veneer. In addition, all materials are to comply with any NZ Standards applicable to them.

Bricks

This specification is applicable only to the following concrete brick product manufactured for AAC Lite Brick (Manufactured by Ytong in China)

Table 1

PRODUCT	SIZE	NO/m²	WEIGHT	WEIGHT/m²
AAC LiteBrick	600x200x75mm	7.8	4.6kgs	36 kgs
AAC Lite Brick	600x200x100mm	7.8	6.2kgs	48 kgs

Please note: The polymer plaster system adds approx. 12.5 kgs/m²

The bricks specified on this contract are to be……..

Mortar

The mortar to be used on this contract is to be a pre-bagged factory manufactured 'Trade Mortar'. Alternatively, the mortar may be site mixed using a formula by volume, not exceeding 1 cement to 4 wash-mixed sand, clean water and any plasticizing agents. CEMIX Multibond liquid is to be added to each mortar mix in the ratio of 120mls/mix.
Note: The 'wash-mixed' sand is to have a maximum salt content of 0.04%.

Brick ties

Screw-fixed galvanised or stainless steel EH ties to be used complying with AS/NZS2699.1, having sufficient length to span the cavity and ensure a minimum 50% bedding in the mortar course. A minimum of 5 brick ties per square metre are to be installed.
Fixed to studs as per following table:

Table 2

Positioning of Brick Ties in Veneer	
Location	**Studs at either 400mm or 600mm crs.**
400mm Max. Vert.	Every 2nd course
Bottom tie	1st course
Top Course	In every perpend joint – 50mm from the top of brick
Top Course Alternative	Brick tie in the top bed joint plus expanding foam in gap between the soffit and top brick
Control Joints	Within 200mm of edge and 400mm vertically

Prior to commencing work ensure the 'durability' of the brick tie matches the zone.

Steel Lintels

All steel lintels are to be galvanised and sized as follows:

Traditionally Installed

Lintels that span from one side of the brick opening to the other, completely free of the structural frame, require no less than 100mm seating for up to 2.0m spans and 200mm for spans greater than 2.0m. Keep the bar set back 20mm behind the brick face.

Table 3

Max. Span	Size of Angle
3.0m	80x80x6mm
3.5m	100x100x6mm 125x75x6mm
4.5m	125x75x8mm
4.8m	125x75x10mm

Fixed to Framing

Galvanised steel lintels may be fixed directly to the timber lintels conditional upon the following being adhered to.

- The steel is kept completely free of the bricks.
- The total length of the steel angle is 10mm less than the width of opening.
- The angle is fixed to the timber lintel using 75x10 galv. Coach-screws at 400mm crs which may be installed not only in a lintel situation, but where bricks are laid above a roof line or deck.

- The fixing is positioned approx. one third down from the top of the vertical leg of the angle.

Remember to check the 'durability' zone particularly near coastal sites.

Flashings

Flashings around all openings are to be designed and installed using one of the following alternatives:

Head Flashing:

a. Metal flashing secured to the timber lintel, sloping a minimum of 5° across the cavity, then turned down 15mm, 6mm in front of the joinery. The ends of the flashing are to be turned up to help prevent water entering the cavity. Allow a minimum gap of 5mm between the top side of the flashing and the underside of the steel lintel.

b. 200mm wide Supercourse 500 polyethylene plastic, nailed to the studs and over-flashed with 3M All Weather Tape, taken across the cavity and tucked into the back of the vertical leg of the steel lintel (normally applies only to the traditional lintel). The flashing is to be extended 200mm each side of the opening. Sealant is to be applied between the underside of the steel lintel and the top of the joinery extrusion.

Jamb Flashings

Use 200mm wide Supercourse 500 polyethylene plastic, tucked into the joinery and the other side held off the building wrap using either a 20mm timber packer or 40mm galvanised clouts left 20mm proud of the frame. The flashing is to extend 200mm above and below the opening.

Sill Flashings

For window openings use 200mm wide Supercourse 500 polyethylene plastic, tucked into the joinery and the other side left hanging in the cavity and held off the building wrap using either a 20mm timber packer or 40mm galvanised clouts left 20mm proud of the frame. The flashing is to extend 200mm each side of the opening.
For door sills use a metal tray flashing as shown in E2/AS1 Masonry.

NOTE:
When you are required to seal a flashing between two different materials , such as polyethylene and building wrap, or a metal head flashing and building wrap, use 3M All Weather Tape

BRICKLAYING

Brick Delivery

The bricklayer is responsible for checking that the correct bricks and quantity have been delivered to site, and that the quality is acceptable on all pallets. Any issues regarding brick quality is to be raised immediately with the contracts manager and/or is to be taken up with the supplier prior to laying any of the AAC Lite Bricks. IMPORTANT: A brick laid by the bricklayer, is a brick accepted. Any bricks laid that have unacceptable surface defects, chips or cracks, as determined by the contracts manager or the individual who will be applying the plaster coating, are to be removed and replaced at the bricklayer's expense when considered appropriate.

Protection of Bricks

The top of all pallets and bricks stacked around the site ready for laying, are to be protected from becoming wet by covering with plastic when rain threatens, and at the end of each working day. The top of all unfinished veneer is to be treated likewise.
Important: Freshly laid brick veneer is to be protected from rain for a minimum of 6 hours after laying, by covering with polythene - protect overnight.

The brickwork is to be protected from damage and staining due to excessive mortar, paints and other chemicals at all times. Care must be taken with the handling of scaffold and planks so as not to impact on the brick veneer. Any damaged veneer is to be replaced at the bricklayer's cost where this specification has not been adhered to.

Hot Weather – Drying Winds

During the bricklaying process, when the air temperature is above 25ºC and/or hot drying winds are present, the newly laid brick veneer must be properly cured for at least the first 24 hours by adding moisture to the veneer and protecting it from direct sun and drying winds. It is critical that 'hydration' takes place and the mortar sets firmly. In the event that 'hydration' has not occurred, and the mortar is powdery, the veneer is to be removed and re-laid at the bricklayer's expense. The veneer mortar is to be checked prior to plastering.

Tolerances

All bricks are to be laid plumb and level, and bricks that are laid adjacent to each other, horizontally and vertically should be in alignment to a tolerance of 1mm. The overall alignment of the veneer, both vertically and horizontally are to be within the tolerances given in Table 2.2, NZS4210. In the event that this is not possible due to the alignment of the structural frame, the Construction Manager is to be advised immediately.

Bonding of Bricks

The bricks, unless otherwise specified, are to be laid half-bonded. This requires corner bricks to be cut to a length of 290mm for standard length 600mm bricks. All corners are to be bonded. It is important that all perpend joints throughout the height of the veneer are in vertical alignment (+/-10mm). Any 'Stack-bonding' should be completely unnecessary other than minor isolated areas where it may be unavoidable. In the event that stack-bonding and the area involved exceeds 1 sqm, then it requires 'Specific Design' and is outside this specification.
The laying of pieces of brick less than 100mm in width is to be avoided wherever possible.

Mortar Joints

It is important that the thickness of all mortar joints is consistent both horizontally and vertically, over the whole face of the veneer. The mortar joints are to be as close to 10mm as possible and within a +/- 2mm tolerance. The exceptions to this requirement are that the minimum permitted mortar joint thickness is 7mm and a maximum permitted thickness for the AAC Lite Brick product is 16mm. However, as stated, these are the exceptions and should not represent more than 5% of the joints on any one face of the veneer. Allow for a 5mm gap between the top of the bricks, and the soffit lining, top vent holes are not required.
Note: the 5mm gap may be filled with expanding foam.

Where the finished height of the veneer results in the need to cut bricks horizontally for the top course, consider the possibility of a soldier course on the top row in order to provide better tying of the AAC Lite Bricks.

All mortar joints are to be flush finished and are not required to be tooled smooth.

Important: All bed and perpend mortar joints are to contain a full spread of mortar; any holes in the finished veneer are to be minimal and filled on completion.

Mortar

All mortar to be mixed in accordance with NZS4210, using a mechanical mixer for 4 – 8 minutes. The sand, cement, water ratios of the mix need to be consistent for the whole project. The mix needs to be as wet as practically possible to ensure good bond strength in the veneer, and aid the 'hydration' process.

Discard any mortar that is older than 1.5 hours. Do not re-temper the mortar.

Brick Cavity

Unless specified otherwise, the brick cavity will be 40mm from the frame to the inside face of the veneer. If a plywood bracing panel is on the outside of the framing increase the cavity width accordingly.

Wash-outs are to be installed every 3m along the base of the veneer, and one at each corner. The cavity is to be thoroughly cleaned on a daily basis as the job progresses. Minimum cavity 40mm (clear) and maximum 75mm – where there is variation in the cavity width; adjust length of ties accordingly.

Brick Ties

The brick ties are to be installed in accordance with the positioning mentioned previously in this specification. In addition, brick ties are to be installed within 200mm of the perimeter of all openings, control joints, and the base of the veneer. At the top of the veneer, in each perpend joint.

The screw on the brick ties is to be installed hard against the framing with its full length into the stud or alternative acceptable framing timber such as lintels and floor joists.

Where sheet material is installed over the framing timber adjust the length of the screws accordingly.

The length of the brick ties needs to be such that the tie sits a minimum of 50% onto the brick. The minimum cover for the tie on the face side of the brick may be 10mm.

It is recommended that an H3.2 100x 25 whaling be nailed onto the face of the studs in the cavity at the top of the veneer in order that brick ties may be secured in the perpend joints, as required, to prevent cracking due to physical pressure during the plastering and painting processes. Alternatively, install an appropriate dwang between the studs at this level. The 'alternative' to doing this is to leave a 10mm gap between the top brick and the soffit and fill this gap with expanding foam to secure the top row of bricks in addition to the top mortar course containing brick ties.

Control Joints

Control joints are required in AAC Lite Brick concrete masonry veneers to manage shrinkage cracking which should be minimal. If control joints are not installed in the AAC Lite Brick concrete masonry veneers, as required and specified, any issues to do with the veneer, in particular cracking becomes the owner/builders responsibility and the veneer becomes non-compliant with this specification.

The Joint

A 'control joint' is simply a controlled crack, and as these veneers are covered by a plaster coating, the control joint does not need to match the normal mortar joints in appearance. The width of the control joint is therefore not critical and may vary between 5mm and 10mm . Brick ties are required each side of any control joints within 200mm of the edge of the joint, and not greater than 400mm vertically. Refer to Fig.3

Location:

Control Joints are to be installed in the following locations in the veneer.

- Generally, not greater than 6m apart.
- Where the height of the veneer changes by more than 20%.
- At the base of the veneer where it sits on the foundation.
- Where the AAC Lite Brick veneer abuts an alternative cladding. The designer must detail the junction to meet the requirements of the NZBC.

Joint Reinforcement

It is also suggested that consideration be given to installing MASONS 4.0mm Bricklock STR and CNR joint reinforcement to provide the veneer with additional strength to help prevent any cracking occurring in the veneer, for whatever reason.

Two rows of STR straight reinforcing positioned in the top half of the veneer spaced 800mm apart vertically. The CNR installed on all internal and external corners in the same row.
NOTE: Do not install in the same mortar joints that the brick ties are located.

Window and Door Sills

All window sills are to be consistent in appearance throughout the veneer. There is no set requirement on the slope or amount of overhang and unless detailed on the plans otherwise, the slope of the sill bricks should be 15°, +/-1°, door sills can be flat. It is recommended that bricks overhang the sills by 35mm +/- 5mm.

Weep and Vent Holes

Around the base of the veneer, install weep holes every 1200mm, 50mm high x 10mm wide, in the perpend joints. Where a panel may be less than 1200mm in width at the base, install one weep hole. The weep holes to be covered with aluminium vent plates if required by the owner.

Vent holes are not required in this waterproof veneer.

Cleaning

The AAC Lite Brick veneer is to be kept clean and free of dirty during the laying process to ensure that good adhesion of the plaster coatings is achieved. Excessive mortar is to be wiped off prior to setting.

Remove all debris associated with bricklaying, unused materials, and elements, from the site upon completion.

Efflorescence (Salting)

The term 'efflorescence' refers to the deposits of white calcium salts on the surface of the bricks. This can come from the mortar as well as from the bricks. Keeping the AAC Lite bricks and the brick veneer dry during the construction process is important in helping prevent the occurrence of salts on the surface.

Regardless of this statement, the proper curing of the mortar is without question the number one priority, and during hot weather, the light wetting of the bricks prior to being laid is an important step in the curing process.

Inspections and Completion

It is the bricklayer's responsibility to ensure that all flashings have been installed correctly, and inspected, prior to being covered by the brickwork. A half-height inspection is to be called for at appropriate times as the job progresses and with a final inspection upon completion. The veneer is to be 'Certified' in the Record of Works held by council as compliant with Design Note LB 01 (Specific Design), upon completion by a Licenced Building Practitioner – (Bricklaying or Builder). Any variations to this Specific Design require an 'Alternative Solution' to be submitted to council.

PLASTER COATING SYSTEM

IMPORTANT: The completed veneer is NOT to be plastered or painted for a minimum of 7 days.

In all cases, the AAC Lite Brick veneer installation is to be coated using the following system.

1. Primed using a breathable sealer, which will allow any moisture in the bricks to evaporate over time.
2. All joints between the bricks and joinery are to be sealed using an approved MS sealant.
3. A coat of Lite Brick render is then to be applied, which must incorporate a layer of fibre-glass mesh to achieve a flat finish for the final coats of plaster.
4. A final coat of Lite Brick sponge plaster is then to be applied to achieve a sponge type finish coating to the wall. A final coat of Lite Brick adobe could also be used to achieve an adobe finish look to the walls.
5. The finished plaster work is then to be coated with an acrylic lime sealer coat followed by two coats of high build acrylic membrane paint, coloured to the specification required.

The alternative to the above outlined plastering system, is to paint the veneer in which case items, 1, 2, and 5 would apply.

MAINTENANCE SCHEDULE

Plastered AAC Lite Brick veneer is a cladding, correctly installed, that requires little in the way of maintenance over a long period of time. However, if one adheres to the following simple procedures, the performance of the plastered veneer as a cladding and its appearance will ensure it meets all requirements for a long period of time.

Cleaning

The exterior of the cladding must be washed down at least once a year using a soapy water and soft scrubbing brush. It may be given a light water-blast to remove stubborn dirt particles.

Spray for spiders if necessary; check for and remove all spider webs at least twice a year.

Weep Holes

Check all weep holes around the bottom of the veneer annually to ensure they are not blocked up with dirt, grass, insects and other debris - clean where required.

Repainting

Generally, plastered brick veneers require repainting every 8 years using a good quality acrylic paint appropriate for the purpose such as Wattyl Solagard. The time frame may vary due to environmental conditions, and how well the exterior has been maintained.

All individuals involved in the design, building and laying of AAC Lite Brick concrete masonry veneers need to read this document prior to commencing a project and take ownership of their involvement. Should a situation develop that contravenes Design Note LB 01, stop and resolve the issue prior to proceeding.

Signed as read…….Date……..

Print name……

This document has been written and prepared by John Oliver, Building Consultant, Lifetime Promotions Ltd; specialist in brick veneer construction and author of John Oliver's BRICK BOOK

FIG.1 CONCRETE SLAB & FOUNDATION

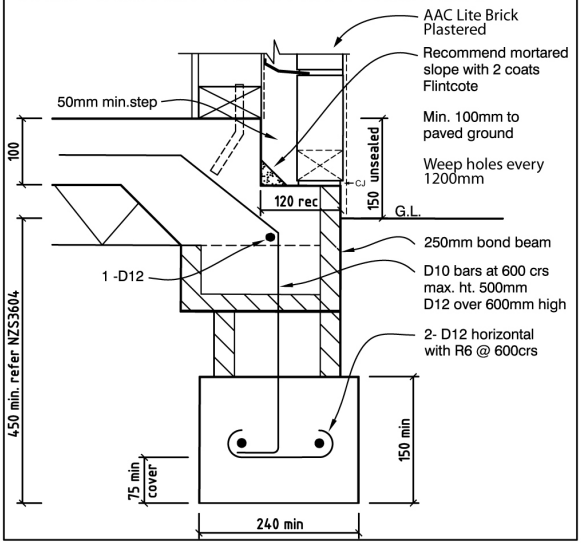


FIG.2 BRICK VENEER BELOW GROUND

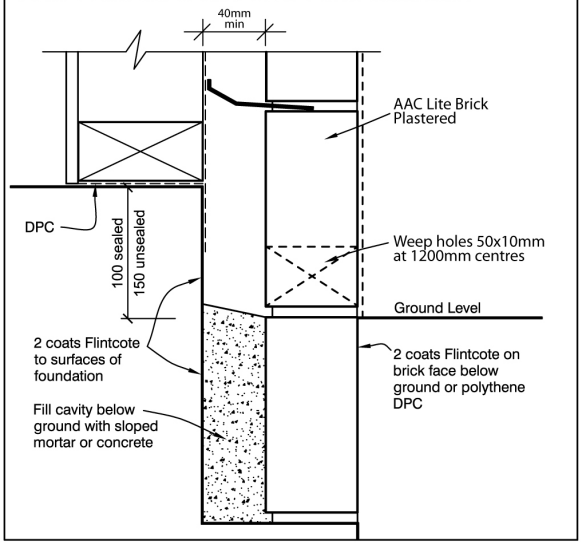


FIG.3 CONTROL JOINTS

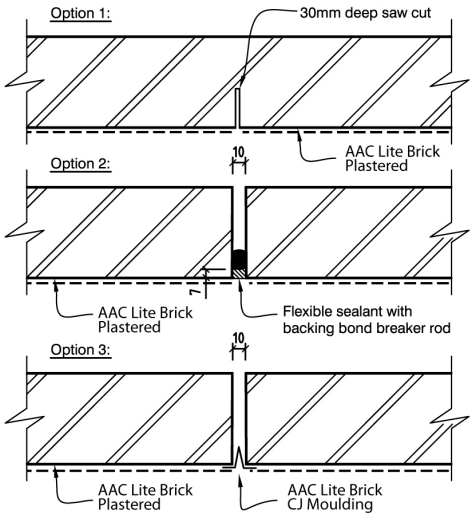


FIG.4 INTERNAL CORNER

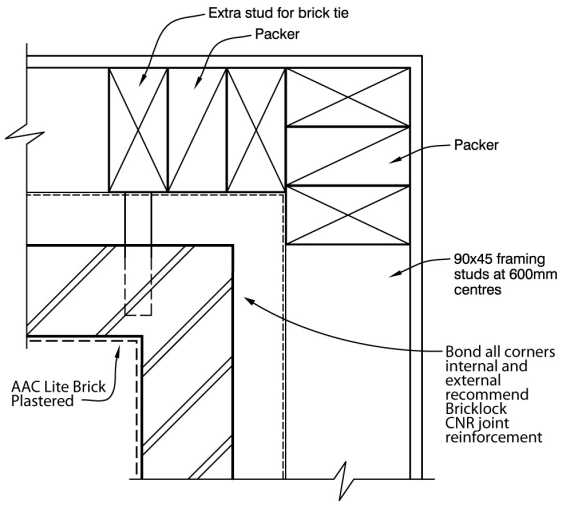


FIG.5 LINTEL BAR - FIXED TO FRAME

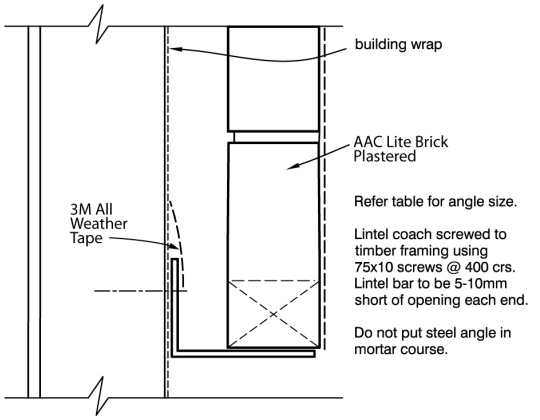


FIG.6 LINTEL BAR - TRADITIONAL

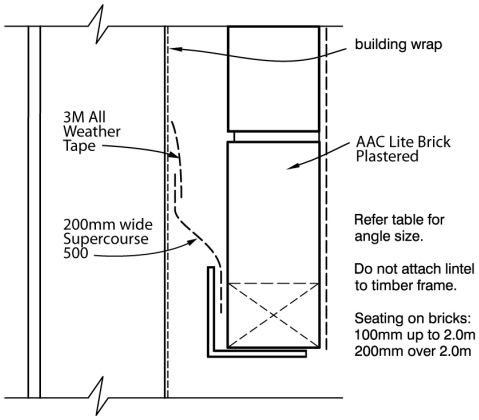
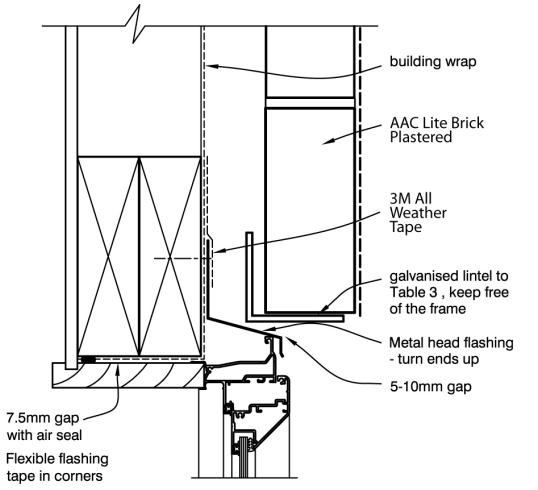


FIG.7 WINDOW HEAD - Aluminium



For alternative detail refer to specification

FIG.8 SOFFIT DETAIL

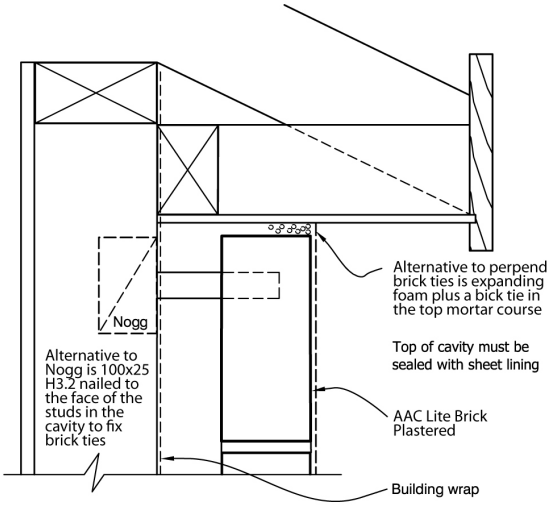


FIG.9 WINDOW JAMB - Aluminium

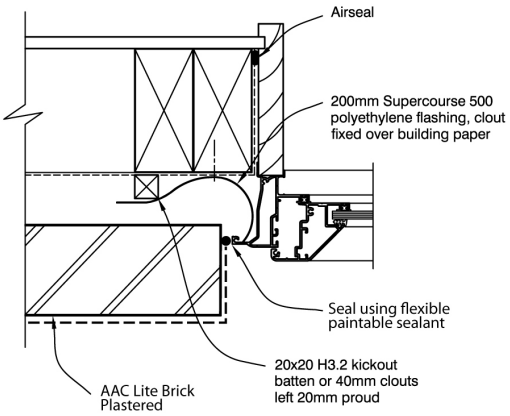
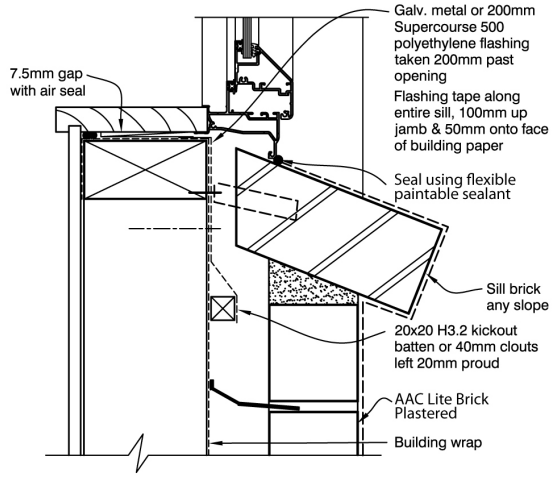
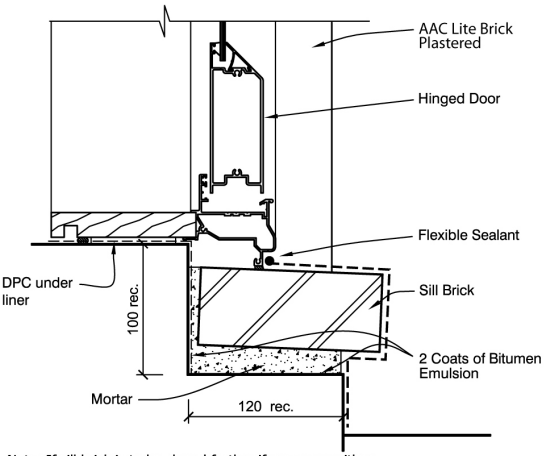


FIG.10 WINDOW SILL - Aluminium



WANZ 55mm aluminium support bar ommitted for clarity. Refer www.wanz.co.nz

FIG.11 DOOR SILL - Aluminium



Note: If sill brick is to be sloped further if necessary either increase the depth of the step or reduce the thickness of the brick. Coat with a water repellent sealer.

FIG.12 METER BOX