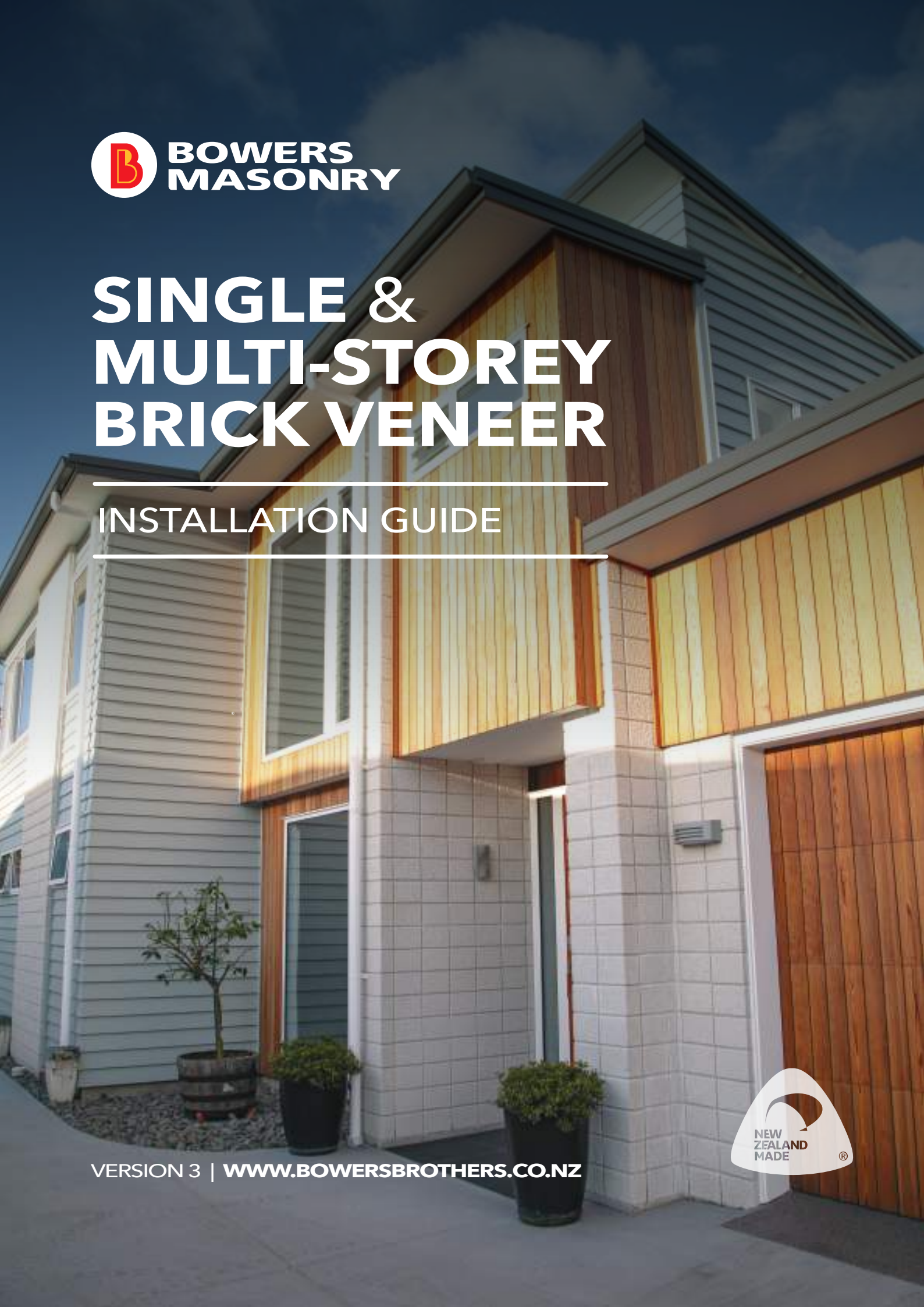
BOWERS MASONRY

SINGLE & MULTI-STOREY BRICK VENEER

INSTALLATION GUIDE



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INTRODUCTION

This document is a generic bricklaying specification used for the construction of running-bonded and stack-bonded brick veneers. This document has been designed for use in single, two and three storey building.

It is an 'Alternative Solution' to E2/AS1 applicable only when Bowers Brothers Concrete bricks, as mentioned in this document, are used in a masonry brick veneer. If any aspect of design has not been specifically addressed, then E2/AS1 Masonry and NZS 4210 will apply.

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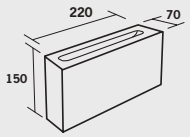
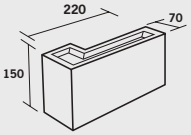
BRICK RANGE

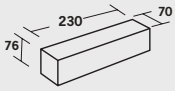
70 SERIES



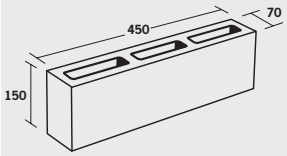
STANDARD BRICK
27 m²
336 per pallet



STANDARD CORNER BRICK
27 m²
280 per pallet

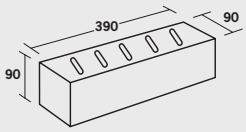


CLASSIC BRICK
48 m²
552 per pallet

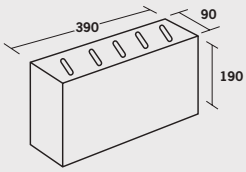


PLATEAU BRICK
13.6 m²
168 per pallet

90 SERIES



H10.01 BRICK
Standard Half High
25 m²
300 per pallet



CADRONA BRICK
12.5 m²
150 per pallet

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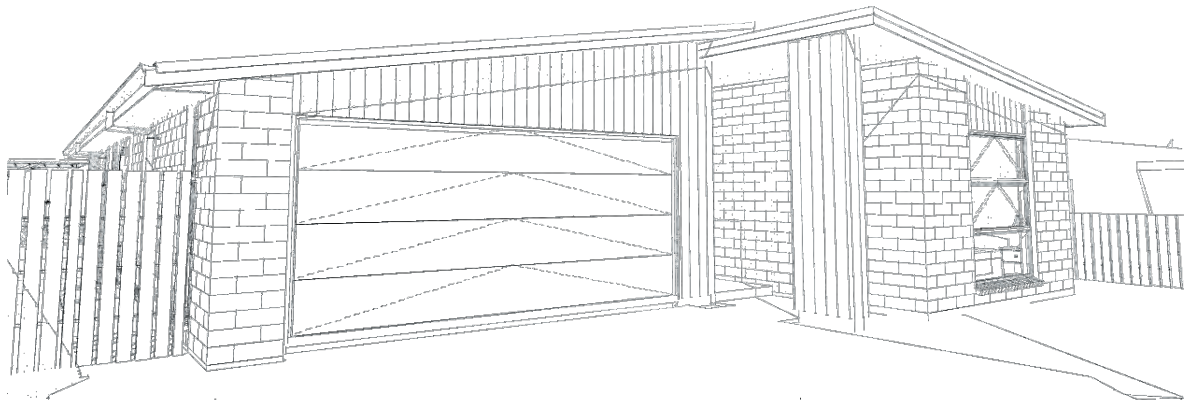
SINGLE STOREY RUNNING BONDED BRICK CLADDING SYSTEM

SPECIFICATION B1



GENERAL

The following is a specification used for the construction of single storey, running-bonded brick veneers.

- This document presents an 'Alternative Solution' to E2/AS1 applicable when Bowers concrete bricks, as mentioned in this document, are used as a masonry brick veneer.
- Unless otherwise noted then the requirements of E2/AS1 Masonry and NZS 4210 will apply.

This specification forms the basis of the following Bowers specifications:

- B2: Two-storey running bonded specification.
- B3: Three-storey running bonded specification.
- S1: Single-storey stack-bonded specification.
- S2: Two-storey stack-bonded specification.
- S3: Two-storey stack-bonded specification.

RELATED DOCUMENTS

Relevant NZ Standards shall apply for all items NOT covered by this 'Specific Design' including the following:

- NZS 3604 Timber-framed buildings
- NZS 4210 Materials and workmanship
- NZS 4229 Masonry buildings not requiring Specific Design
- SNZ HB 4236 All standards relating to masonry veneers – summary
- NASH Standard Part 1 and Part 2

Note that current revisions of reference documents at the time of design, consent and construction are applicable and relevant.

In addition to a Bowers brick veneer being installed in accordance with this specific design specification, the following provisions of the NZ Building Code must also be met.

- B1 Structure
- B2 Durability
- C3 Spread of Fire
- E2 External Moisture
- F2 Hazardous Building Materials

BOWERS MASONRY

SPECIFICATION **B1**

LIMITATIONS

The designer shall ensure that Bowers brick veneer detailing, as presented within the Building Consent Plans and Specifications, complies with all aspects of this 'General Specification'. Plans submitted for Building Consent must be clearly marked and identify the use of Bowers brick veneers as follows;

"Bowers Running Bonded Brick Cladding System – Specification B1 – no substitution"

The Bowers single storey brick veneer shall be subject to the following limitations:

- Single storey buildings of either residential or commercial use designed in accordance with AS/NZS1170 for up to an importance level of 2.
- The building shall have a concrete slab-on-ground construction, either specifically designed by an Engineer or in compliance with NZS 3604 minimum requirements.
- The supporting structure shall be timber framed construction in accordance with NZS 3604, concrete block/precast in accordance with NZS 4229 or light structural framing in accordance with NASH Standards part 1 and 2. Alternatively, a specific engineering designed supporting structure may be adopted as designed and detailed by a suitably qualified engineer.
- All aspects regarding the installation of the brick veneer shall conform to the requirements of NZS 3604, NZS 4229 and NZS 4210.
- The maximum height for a single storey veneer is limited to 4m from the foundation. At a gable wall or pier (see figure 1 below), the maximum height may extend to 5.5m.
- Bricks must be laid to a running-bonded pattern. Small areas of soldier courses and stack-bonding are permitted, but should not exceed 5% of the total surface of the veneer.
- Veneer brick selection, size, thickness and weight, excluding the allowance for the addition of up to a 10mm thick cement plaster coating if specified, shall not exceed that provided within Table 1 below.
- Buildings may be situated in all wind zones up to and including 'Extra High' wind zone in accordance with NZS 3604.
- Residential buildings are to be situated within earthquake zones 1-3 in accordance with NZS 3604, commercial buildings shall have an assessed period of not more than 1.5s in accordance to NZS 1170.

BRICKS

This specification is only applicable to the following brick types manufactured by Bowers:

Table 1 – Bowers bricks applicable to this specification

Bricks applicable to this specification				
Bowers Brick Product	Size (LxHxW)	No/m²	Weight (kg) Per brick	Weight (kg/m²)
Standard brick	220 x 150 x 70mm	27.2	4.4	130
Classic brick	230 x 76 x 70mm	48.0	2.2	125
Plateau brick	450 x 150 x 70mm	13.6	7.7	150
Cadrona	390 x 190 x 90mm	12.5	10.8	150
10 Series Half High	390 x 90 x 90mm	25.0	4.1	120

SPECIFICATION **B1**

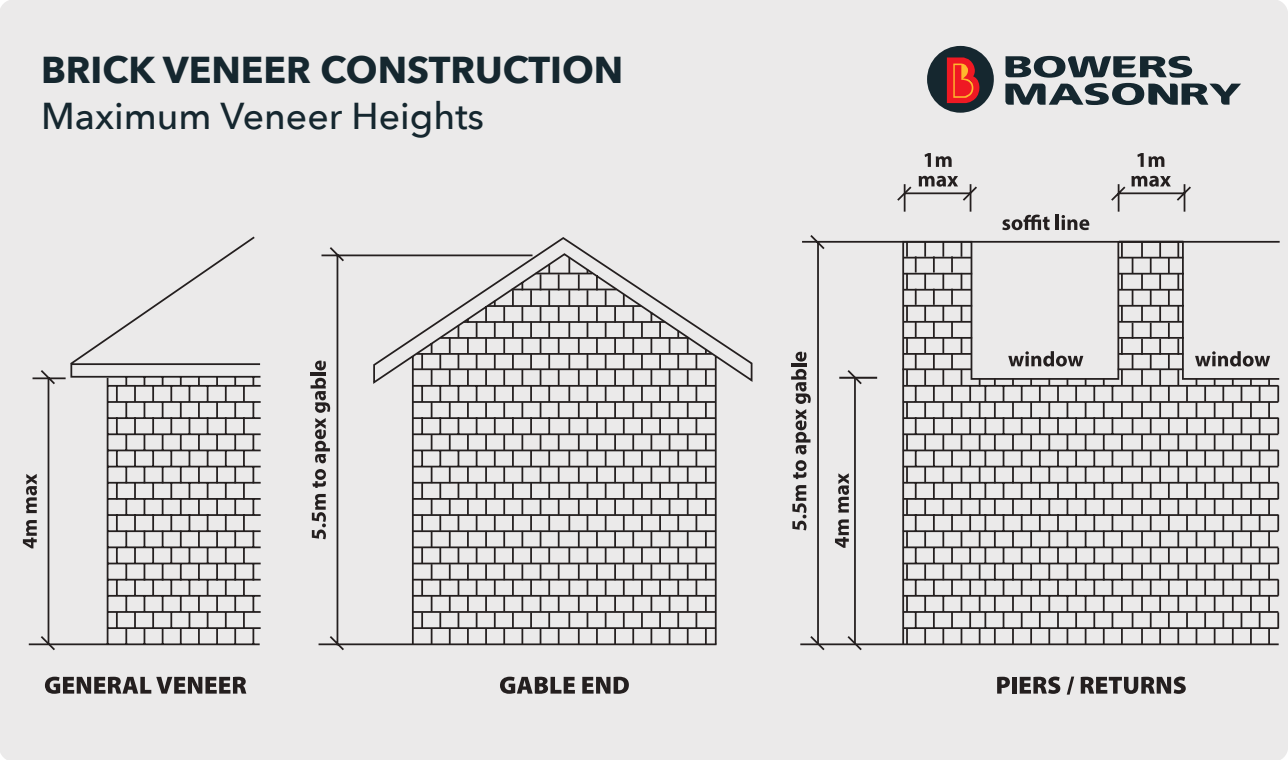


Figure 1 – Maximum veneer heights for single storey, running-bonded construction - diagram sourced from Brick & Paver Manufacturers association

Wall Panels

- Brick wall panels may be laid to a maximum height of 4.0m without the addition of shelf angles or slip joints.

Gable Ends and Piers

- Gable end wall panels may be laid to a maximum height of 5.5m.
- Brick piers, of maximum width not exceeding 1.0m in width and not supporting loads from lintel shelf angles are not to exceed 5.5m in total height.

SUPPORTING STRUCTURE

- The supporting structure shall be timber framed construction in accordance with NZS 3604, concrete block/precast in accordance with NZS 4229 or light structural framing in accordance with NASH Standards part 1 and 2. Alternatively, a specific engineering designed supporting structure may be adopted as designed and detailed by a suitably qualified engineer.

RIGID AIR BARRIER (RAB)

- Rigid air barriers may be placed either inside or outside of the timber framing in accordance with the manufacturer's installation recommendations.
- Where the RAB is placed on the outside of the supporting framing, the brick tie screw length shall increase to a minimum length of 40mm.
- A minimum 40mm cavity shall be maintained.

SPECIFICATION **B1**

BRACING

- Bracing requirements may be determined by using the prescribed tables in NZS 3604, NASH Standard or specifically calculated by a suitably qualified engineer.

CAVITIES

- The cavity between the masonry veneer and the exterior face of the supporting framing and/or rigid air board shall not be less than 40mm or more than 75mm wide.
- The cavity must be kept free of mortar droppings and any other obstruction.
- Washouts are to be installed every 10th brick and one on each corner.
- The cavity shall be ventilated to the outside by the provision of weep, or vent holes, at the base of the wall formed by removing mortar from the perpend joint at centres not exceeding 800mm to achieve a minimum of 1000mm² of weep/ vent hole per linear metre.
- Install similar vent holes at the top of the wall, in the second row of bricks from the top, to match the bottom of the veneer panel, or leave a 10mm gap at the top of the veneer and the soffit board for ventilation.
- Pipes and services shall not be placed in the cavity other than those passing directly through the cavity to the exterior.

MORTAR

The mortar used must conform with the following:

- Manufactured and bagged, or site mixed.
- Sand/cement ratio of 4:1. For sea spray zones and NZS 3604 corrosion zones 1 and 4, the ratio should be increased to 3:1 sand/cement.
- All requirements as set out in NZS 4210.
- The same mortar must be used throughout the entire veneer.
- A joint thickness of up to 20mm may be accepted on the bottom course to accommodate any slab level issues.
- Bowers recommends colour matching your mortar to your brick colour.

Using a dark colour mortar with a light colour brick or light colour mortar with a dark brick will cause the mortar to:

- Colour bleed into the brick & will highlight any imperfections in the veneer or the laying.
- Cause staining, giving the brick a patchy dirty look.

For example:

- Premium white mortar looks best with the Ice coloured bricks & a black mortar needs to be used with Midnight or Ironsands coloured bricks. We have Midnight oxide, mortar drop packs to give a colour match.
- The Bricklayer must regularly sponge off thoroughly with clean water to prevent the mortar staining the surface of the bricks.

MORTAR JOINTS

'Mortar joint' is the term for the space of mortar between bricks. According to NZS4210:2001 Section 2.7.1.3 the thickness of a mortar bed, cross or perpend joint should be 10mm +/- 3mm. In addition, mortar joints should conform to the following:

- Mortar joints shall be as close to 10mm as possible.
- Minimum permitted joint thickness of 7mm.
- Maximum permitted joint thickness of 16mm. ***A joint thickness of up to 20mm may be accepted on the bottom course to accommodate any slab level issues.***
- All mortar joints shall be within ±2mm of the specified thickness.
- Unless otherwise specified, all mortar joints are to be pointed to a depth of 4mm.
- The maximum permitted raked depth is 6mm.
- All bed and perpend joints are to contain a full spread of mortar.
- Any holes in the finished joints are to be minimal and filled on completion.

SPECIFICATION **B1**

CONTROL JOINTS

There are four options available for installing 'Control Joints'

- BB-52 Brick - Control Joint – Alternative slip joint design
- A vertical or zig-zag 10mm gap with a foam backing rod and flexible sealant.
- A vertical or zig-zag 10mm gap with a foam backing road and 20mm of mortar.

Location of Control Joints:

SNZ HB 4236, in accordance with NZS 4229, recommends control joints are installed at no greater than 6m centres.

It is recommended that, where control joints are deemed necessary, these are installed in the following locations of the veneer:

- At T joints, within 600mm of the joint on the intersecting wall
- Within 600mm of one side of L shaped corners. Alternatively, the spacing of control joints on both sides of the corner may be restricted to 3.2m maximum
- At changes in wall height exceeding 600mm
- Window openings less than 2.0m wide – Control Joint one side (may be omitted where the above maximum control joint spacing conditions are met).
- Window openings greater than 2.0m wide – Control Joint both sides (one side only where the above maximum control joint spacing conditions are met, and provided a control joint is provided with 3m maximum of the opposite side of the opening).
- Where no openings are present, no greater than 6m spacing, or 8.5m where the conditions outlined above are satisfied.

Control joint locations shall be specified by the architect/client adhering to the above requirements. Where control joints are not installed in accordance with this specification it will cause the veneer installation to become non compliant. Bowers will not be responsible for any issues/failures (for example, cracking) which may arise as a result of failure to install control joints.

BRICK TIE INSTALLATION

All proprietary brick ties used in conjunction with Bowers brick veneers must comply with the requirements of AS/NZS 2699.1. The following requirements apply to all brick ties on Bowers brick veneers:

- Galvanised steel brick ties and screws in accordance with AS/NZS 2699.1 shall be used unless the building is within 500m of the high-water mark of the sea (corrosion zone D), in which case stainless steel grade 316 or 316L products shall be adopted.
- Screws, as specified by the proprietary tie suppler, with a minimum length of 35mm shall be used. If fixing through rigid air board the screw length shall be increased to 40mm min. Proprietary specified screws are typically 12g type 17.
- Brick ties are to have a minimum embedment length (to the bed joint) of at least half the width of the veneer.
- Brick ties shall be placed with a slope of 5˚ degrees down from the framing towards the masonry.
- IBP ltd, EH Masons, MSL Ultimate brick ties or equivalent are to be used.
- If masonry block or pre-cast panels are being used to support the brick veneer, the tie fixings must be ICCONS Strike Mushroom Head 5mm x 38mm stainless steel (STMH05038SS) or equivalent. Alternative fixings may be designed by a suitably qualified engineer.
- Where bricks are laid on a shelf angle, ensure the first row of ties is not more than 300mm or 2 courses, whichever is smaller, from the shelf angle.
- At all sides of openings, or at unsupported edges, including under an opening sill or at the top edge of a panel, the first row of ties shall be located no more than 300mm from the unsupported edge or opening.

BOWERS MASONRY

SPECIFICATION **B1**

Tie spacing requirements

- Fixings to supporting structure; ties shall be fixed at the maximum spacings as per the following table:

Table 2 – Brick tie vertical spacing

Placement of Brick ties in Mortar Courses			
Bowers Brick Product	Height of Brick	Studs at 600mm crs.	Studs at 400mm crs.
Standard brick	150mm	Every 2nd course	Every 3rd course
Classic brick	76mm	Every 4th course	Every 5th course
Plateau brick	150mm	Every 2nd course	Every 3rd course
Cadrona	190mm	Every 2nd course	Every 3rd course
10 series Half High	90mm	Every 4th course	Every 5th course

NOTE: Where the brick ties are fixed to a precast concrete or masonry wall, horizontal spacing of 400 or 600mm are to be used in accordance with table 2.

MASONRY BRICK IN-JOINT REINFORCEMENT

In-joint reinforcement where required by specific engineering design shall be steel hot-dipped galvanised after fabrication or 316 stainless steel and shall be fully embedded within the mortar joint with a minimum side cover of 15mm.

OPENINGS

Window and Door sills

- It is recommended (unless detailed on the project plans otherwise) that the slope of sill bricks should be 15 degrees achieved with mortar packing as per SNZ HB 4236.
- It is recommended that bricks overhang the sills by 30-50mm with a +/- 5mm maximum tolerance.
- All window sills are to be consistent throughout the project.
- Provide flashing across the tops of all openings, installation as per the requirements of SNZ HB 4236.

Lintels

Openings with brick veneer above shall be spanned by mild steel angel lintels, protected against corrosion in accordance with SNZ HB 4236;

- For durability requirements 600g/m2 (85um average thickness) galvanised coating or 304 stainless steel can generally be adopted. For sea spray zones 316 or 316L stainless steel is to be adopted. An alternative of using hot-dip galvanized with an epoxy powder coating to NZS 3604 may also be considered within a sea spray zone. Specific protection is required for geothermal hot spots.
- Where holes are cut after steel has been galvanised, these are to be sprayed using 'cold galvanising' spray for protection.
- Lintels may be installed by the methods as described below:

SPECIFICATION **B1**

Seated lintels

- Lintels shall have at least 100mm of seating onto the veneer at each end of an opening for spans up to 2m, and 200mm at each end for spans greater than 2m.
- Steel lintels must be kept 20mm behind the front face of the brick veneer.

The following lintels may be used with this method:

Table 3 – Steel lintel sizes for the traditional method

Maximum lintel span (mm)	Thickness of veneer (mm)					
	70			90		
	Maximum height of veneer supported (mm)					
	350	700	2000	350	700	2000
800	60x60x6L	60x60x6L	60x60x6L	60x60x6L	60x60x6L	80x80x6L
2000	60x60x6L	60x60x6L	60x60x6L	60x60x6L	60x60x6L	80x80x6L
2500	60x60x6L	80x80x6L	80x80x6L	80x80x6L	80x80x6L	80x80x6L
3000	80x80x6L	80x80x6L	125x75x6L	80x80x6L	80x80x8L	90x90x10L
3500	80x80x6L	80x80x6L	125x75x6L	80x80x8L	90x90x10L	125x75x10L
4000	80x80x6L	125x75x6L	125x75x10L	80x80x10L	125x75x6L	150x90x10L
4500	125x75x6L	125x75x10L	-	125x75x6L	125x75x10L	-
4800	125x75x6L	125x75x10L	-	125x75x6L	125x75x10L	-

Note: Size of angle, minimum steel grade 250MPa, equivalent or greater sizes in stainless steel may be used where required. Table extracted from NZBC E2.

Shelf angle fixed to framing

Supporting lintel shall adhere to the following:

- The steel is kept completely free of the brick at each end (total length of the shelf angle is 10mm less than the width of the opening).
- The timber/steel lintel that the shelf angle is being fixed to has been sized in accordance with NZS 3604 or specifically designed by a suitably engineer for a heavy cladding.
- Where longer spans are required, torsion imparted on the lintel shall be considered in the design of both the lintel and it's fixings to the structure.

SPECIFICATION **B1**

SHELF ANGLES

Shelf angles are NOT lintels and must not be relied on to span over any opening.

- Shelf angles shall be direct-fixed to the supporting substructure or a timber/steel structural lintel.
- The maximum height of veneer above a shelf angle shall be limited to 4m.
- Shelf angles and their associated fixings are to be assessed by a suitably qualified engineer. Shelf angles are typically installed horizontally however they may be installed at up to a maximum slope of 60 degrees or less to the horizontal.
- Shelf angles may be a mild steel angle grade 250MPa or a alternative material or system as per the requirements of the engineer.
- The fixings back

The following table shall be used for the size of shelf angle:

Table 4 – Shelf angle sizing:

Shelf angle sizes (Galvanized)	
Cavity Width (mm):	Size of Angle (V x H x t), Min Grade 250MPa
40-55mm	75x100x6mm
60-75mm	75x125x6mm

Note: Equivalent or greater sizes in stainless steel may be used where required. The above angles are orientated with the 75mm leg vertically against the substructure with M10 fixings at no greater than 400mm centres. M10 coach bolts or M10x75mm coach screws shall be adopted to suit the substructure. Alternative fixing sizes and centres may be provided by a suitably qualified engineer, provided the maximum 400mm crs is adhered to.

- Where shelf angles are installed above a deck area, ensure there is a 35mm clearance under the angle.
- Bricks may be laid directly onto the angle. Where bricks have been cut (as in the case with a sloping angle), a 10mm mortar bed is recommended.

FLASHINGS

Flashings around all openings are to be designed and installed as per the standard details provided by Bowers Brothers. These files can be accessed using the following links:

ARCHITECT FILES - BRICK VENEERS

JAM FLASHING

ALUMINIUM WINDOW JAMB

SILL FLASHING

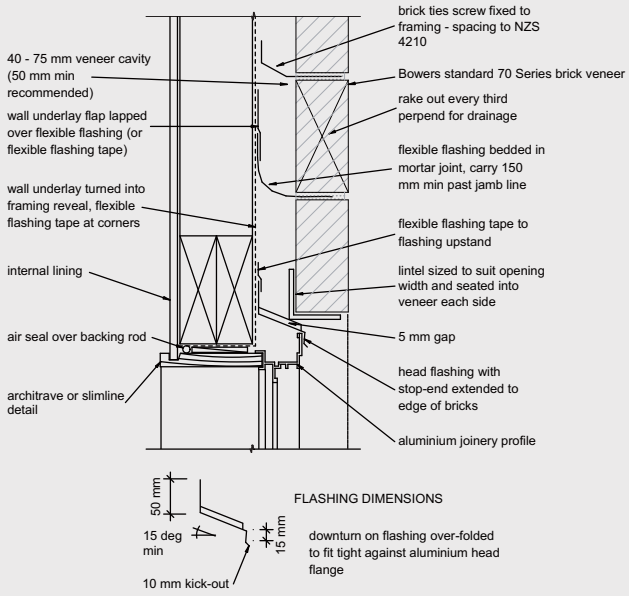
ALUMINIUM WINDOW SILL

HEAD FLASHING

ALUMINIUM WINDOW HEAD LINTEL

ALUMINIUM SLIDING DOOR HEAD LINTEL

SPECIFICATION **B1**



BOWERS BROTHERS MASONRY VENEER

Aluminium Window Head - Lintel Supported by Brick Alternative Solution

Dwg. No. BB-13 Dwg. Scale - 1:5

Bowers Technical Support:
technicalsupport@bowersbrothers.co.nz
www.bowersbrothers.co.nz

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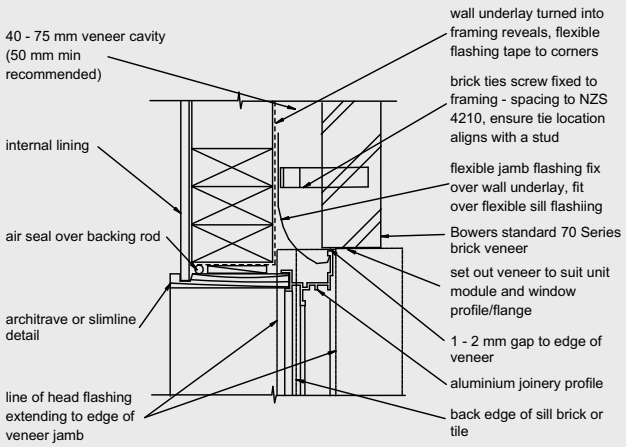

BOWERS BROTHERS MASONRY VENEER

Aluminium Window Jamb Alternative Solution

Dwg. No. BB-15 Dwg. Scale - 1:5

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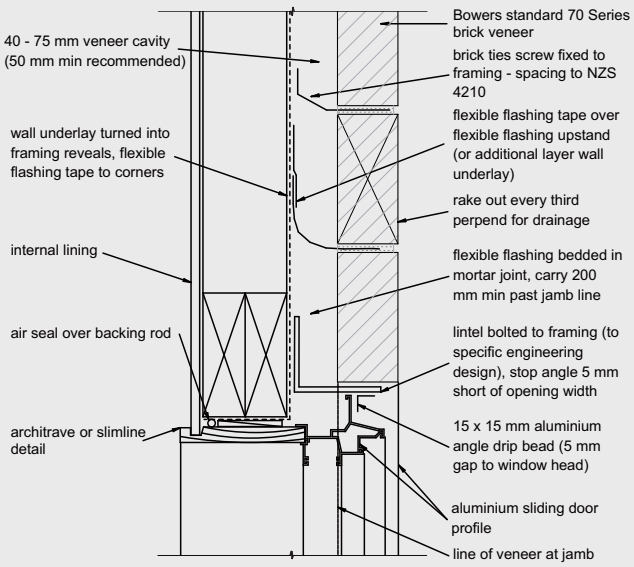
SPECIFICATION **B1**



BOWERS BROTHERS MASONRY VENEER

Aluminium Sliding Door Head - Lintel Supported by Framing Alternative Solution

Dwg. No. BB-16 Dwg. Scale - 1:5

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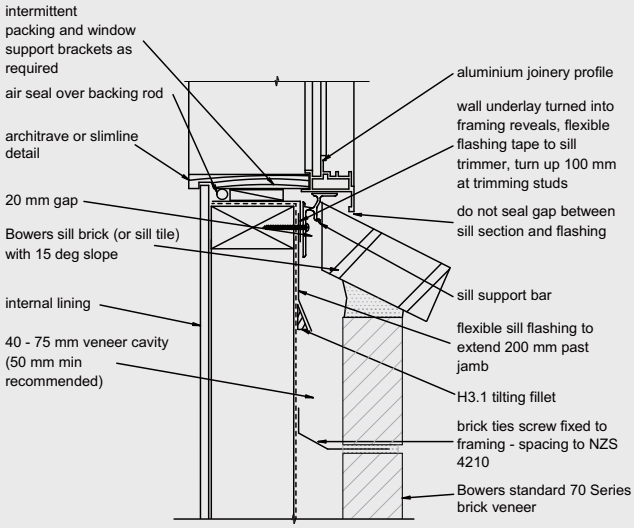

BOWERS BROTHERS MASONRY VENEER

Aluminium Window Sill Alternative Solution

Dwg. No. BB-14 Dwg. Scale - 1:5

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SPECIFICATION **B1**

BRICKLAYING REQUIREMENTS:

Brick veneer general information

As masonry brick veneers are manufactured using natural products, some variation in the shade/ colour, texture and size tolerations should be expected.

Texture can be open and porous looking to smooth and slick looking across the same batch. This is just a natural occurrence in the manufacturing process.

Unusual discolouration patterns can be limited by blending the bricks. Should there be any concern regarding significant colour variation laying should cease and the manufacturer contacted.

Bowers Midnight and Ironsands bricks should be dry cut by the bricklayer to avoid slurry staining from a wet cut.

These variations make up part of the inherent beauty of brick.

Brick veneers for each job should come out of the same batch and you should blend vertically from at least three pallets to blend colour and texture variations. The bricklayer should regularly step back and view the laid product from a distance of 6.1m, to check the blending is acceptable.

A "Batch" is deemed to be:

- From which plant it is manufactured, &
- The date of manufacture (this may be over consecutive days due to manufacturing limitations).

It is advised that you check the batch details on all pallets prior to commencing installation in case there has been a loading error from the yard or your supplier. It is easier to remedy any issues before the work has commenced.

It is also advised that you keep a copy of the batch details in case you run short of product.

During transportation bricks may rub together on the pallet. This can sometimes cause light rubbing on the face of the bricks. Excessively rubbed bricks should be discarded or used for cuts.

Be selective when laying the brick veneers - put damaged or chipped bricks to one side and do not lay them in highly visible areas i.e. near the front door.

Chips of varying sizes may be evident on the edges and corners of the bricks. Complete product breakage may also occur during cartage, especially on long distance haulage or during unloading. These are an unavoidable part of distributing and manufacturing any masonry product. Minor cracks and chips can occur but are not recognised as brick defects.

Due to the nature of bricks no two bricks are the same and no brick is perfect when examined close-up.

ASTMC90 has been adopted as the industry standard for viewing brickwork from an aesthetic standpoint – a workmanship quality standard is achieved if imperfections, including chips, are not visible when viewed from a distance, of not less than 6.1m under diffused light as per ASTM C90.

ASTM C216-04 specifies that bricks must contain less than 5% visible cracking when viewed from a distance of 6.1m.

SPECIFICATION **B1**

ASTM C216-15 for a general-purpose face brick (FBS textured) basically has the following requirements:

- Chips from the edge should not be deeper than 8mm
- Corner chips should not be deeper than 13mm.
-

When all the length of the chips is added up, that the total does not exceed 10% of the perimeter of the brick face (as an example, the accumulative lengths of the chips for a 230mm x 75mm brick shall not exceed 61mm).

It is important to discuss with the bricklayer the aesthetic look the client/architect is hoping to achieve with the brick veneer and, if possible, include the bricklayer in the product selection process.

We strongly advise that all parties involved in the construction process (builder, brick layer & client) are made aware of and have read the Brick & Block Layers Federation of New Zealand, Brick Veneer Best Practice Guide. This is available at the following link:

BRICK VENEER BEST PRACTICE GUIDE

A product laid is deemed to be a product accepted.

BRICK DELIVERY AND PROTECTION

The 'bricklayer' is responsible for checking that the correct bricks and quantity have been delivered to site, that the quality of product delivered is acceptable and to ensure that all product is derived from a single one batch number. Identification of potential issues, or quality of product regarding bricks supplied shall be raised immediately with the project manager and is to be taken up with the supplier prior to laying any bricks. Bowers do not accept responsibility for quality of brick once they have been laid.

All bricks supplied to site are to be suitably protected from adverse elements such as rain, dust and shall be protected from other damage, such as impact such as not to damage the veneer or any bricks. Any damaged veneer or bricks are to be replaced at the bricklayer's expense.

WORKMANSHIP

All bricklaying is to be undertaken by a licensed trade professional with appropriate LBP (Licensed Building Practitioner) or supervised by an LBP. The LBP will be responsible for the brick veneer, and for certifying that the veneer meets all the requirements of this document and/or E2/AS1 and NZS 4210. Bricklaying shall be in accordance with the design bond pattern.

INCLEMENT WEATHER

Laying of bricks shall not be undertaken in inclement weather conditions, this shall include, but not be limited to adverse rain events, high winds and or when the air temperature exceeds 25 degrees Celsius and/or hot drying winds are present. Newly laid brick veneer mortar must be properly cured for a minimum of the first 24 hours and recommended for several days duration. Curing shall be by adding moisture to the veneer in addition to protecting it from direct sunlight and drying winds.

SPECIFICATION **B1**

TOLERANCES

All bricks are to be laid within the tolerances given in table 2.2 of NZS 4210 (refer table 2.2 below).

Table 5 – Table 2.2 of NZS 4210; acceptable maximum tolerances for the brick veneer

BOWERS MASONRY

Table 2.2 - Maximum Tolerances	
Item	Tolerances
Deviation from the position shown on plan for a building more than one storey in height	15mm
Deviation from vertical within a storey	10mm per 3m of height
Deviation from vertical in total height of building	20mm
Relative vertical displacement between masonry courses (a) Nominated fair face (one side only) (b) Structural face	 3mm 5mm
Relative displacement between loadbearing walls in adjacent storeys intended to be in vertical alignment	5mm
Deviation from line in plan (a) In any length up to 10m (b) In any length over 10m	 5mm 10mm total
Deviation of bed joint from horizontal (a) In any length up to 10m (b) In any length over 10m	 5mm 10mm total
Average thickness of bed joint, cross joint, or perpend	± 3mm on thickness specified

NOTE -Tolerances shall not breach minimum cavity widths.

SPECIFICATION **B1**

BONDING OF BRICKS

- The bricks, unless otherwise specified, are to be laid running bond unless otherwise specified.
- All perpend joints are to be in vertical alignment (+/- 5mm).
- Stack bonding is not permitted in NZS 3604 and NZS 4229, any 'Stack-bonding' requires 'Specific Design', refer to Bowers specifications S1, S2, & S3 (as appropriate).

BLENDING OF BRICKS

- As is well known by Architects and Builders alike, the artistic, and aesthetic qualities of brick wall panels are best achieved and enhanced by paying attention to blending of bricks. This may be achieved by selecting bricks into a wheelbarrow at random along a heap of bricks, thus "mixing" the bricks. To achieve maximum blending effect in your wall panels, you should work with 5 or 6 pallets packs at the same time, taking from each pack in turn.
- Laying of bricks is to stop immediately if it becomes apparent that these will run out before completion. This will allow new bricks, which may be from a different batch, to be blended in properly.

POST CONSTRUCTION MAINTENANCE

- As best practice, throughout its life exterior concrete masonry will require:
- Annual exterior washing down – when washing down use a low-pressure wash with natural detergent added to the water and soft brush.
- **DO NOT** Clean using a high-pressure water blaster.
- Removal of organic growths – lichens and mosses are cleaned by applying a proprietary moss remover.

From time-to-time unforeseen spillages and staining can make its way onto your brickwork. The removal of stains is not always easy, however by following the guidelines outlined below, keeping your brickwork clean need not be a problem:

STEP 1: Identify the type of stain;

STEP 2: Select the correct cleaning method;

STEP 3: Follow the recommended procedures.

Follow the written instructions as well as those shown on the labels of any proprietary cleaners used.

A good tip is to clean a small test area first to ensure the cleaning method has worked to your satisfaction.

SPECIFICATION **B1**

EFFLORESCENCE (SALTING)*

Efflorescence is generally a "whitening" look on the surface of the brick veneer. It can vary in appearance from a thin hazy layer which is sometimes confused as surface fading to a thick, calcified white crust. It is a common phenomenon experienced in a variety of degrees by all forms of product that has cement and should be anticipated on any job.

Efflorescence occurs where excessive amounts of water enters a veneer that has soluble salts present. When the water evaporates, the salts are then deposited on the surface of the veneer. Soluble salts can enter the veneer from various sources:

- Mortar components, particularly cement.
- Soil or fill in contact with the wall.
- Sea spray in coastal areas.

Bowers Brothers recommend that Veneer walls should be protected or covered from inclement weather during the construction process to avoid the walls being saturated as this will promote efflorescence.

Persistent efflorescence may act as a warning sign that water is entering the wall through faulty copings, flashings or pipes.

Why do we get Efflorescence?

When the cement reacts with water Calcium Hydroxide is formed. The Calcium Hydroxide migrates to the surface of the brick through capillary action and forms Calcium Carbonate when it encounters Carbon Dioxide. The in-soluble Calcium Carbonate is essentially limestone.

Cleaning Efflorescence

The initial appearance of efflorescence (Primary) can be scrubbed off with a stiff plastic brush and some detergent whilst it is still in its powdered form.

An alternative dry method is to brush the efflorescence loose and vacuum the deposit off and out of the pores.

If efflorescence is left on the wall for a period of time and is allowed to calcify (Secondary), it is extremely difficult to remove.

To remove Secondary efflorescence, will require an acid wash or acid alternative (such as GuardIt G.A.R.) and should be done by a professional following the supplier's recommendations.

Some extracts from this section have been taken from www.bbfnz.co.nz "Brick Veneer Best Practice Guide".

BOWERS MASONRY

SPECIFICATION **B1**

SEALING THE VENEER

As with all Masonry products, to enhance the life and durability of the product, Bowers Brothers recommend the use of a suitable exterior clear sealer.

Midnight and Ironsands bricks MUST be sealed to prevent fading, reduce the chance of efflorescence, and enhance the appearance. The use of a tinted sealer will give an even greater depth of colour to black bricks.

Seal brickwork as soon as possible as per supplier's recommendations.

Any Efflorescence should be removed before sealing.

Refer to the Technical Information Page in the Resources section of our website, for application details, click the link below:

TECHNICAL INFORMATION

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 the appropriate times as the job progresses along with a final inspection upon completion.
- The veneer is to be 'Certified' in the Record of Works, held by the appropriate building authority, as compliant with the specification: B1 (Specific Design), upon completion by a Licenced Building Practitioner for Bricklaying.

PLASTERING BOWERS VENEERS

Plastering should be done by a professional following the plaster supplier's recommendations. Bowers Brothers Concrete does not Warranty any secondary propriety system(s) being used over our Veneer System.

TECHNICAL SUPPORT

Should you require any technical support on the Bowers Brick Veneer System, please contact Bowers on:

0800 207 374

technicalsupport@bowersbrothers.co.nz

www.bowersbrothers.co.nz

SPECIFICATION **B1**

Building Code Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

ISSUE: C

(Guidance on use of Producer Statements is available at www.engineeringnz.org)

ISSUED BY: **KIRK ROBERTS Consulting Ltd.** (Design Firm) **PROJECT NO: 2020758**

TO: **Bowers Brothers Concrete Ltd** (Owner/Developer)

TO BE SUPPLIED TO: **Relevant Territorial Authority** (Building Consent Authority)

IN RESPECT OF: **Single storey running bonded brick veneer specification as per the attached documentation 'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B1'** (Description of Building Work)

AT: **Locations throughout New Zealand** (Address)

We have been engaged by the owner/developer referred to above to provide **Structural Engineering Design** services in respect of the requirements of Clause(s) **B1/VM1** of the Building Code for
All ☐ or Part only ☒ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1/VM1** or (verification method / acceptable solution)

☐ Alternative solution as per the attached schedule: _____

The proposed building work covered by this producer statement is described on the attached specification titled **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B1 revB'** and dated **31st March 2021**

On behalf of the Design Firm, and subject to:

(i) All proprietary products meeting their performance specification requirements.
(ii) Up to **'Extra High'** wind zone in accordance with NZS3604: 2011.
(iii) Maximum site site hazard factor **Z = 0.4** in accordance with NZS1170.5: 2004.
(iv) Structural design loads are based on a **50 year design life** and **Importance Level 2** structure (normal structures and structures not in other importance levels) as defined in AS/NZS 1170.0 2004 clause 3.3.
(v) Unless specifically noted, all structural elements must comply with the relevant New Zealand design code such as **NZS 3604, NZS 4229, NZS 2699, NZS 4210, and NZS HB 4236.**
These elements include, but are not limited to: **brick ties, mortar strength, brick strength, and bond between the brick and mortar.**
(vi) Bowers Brothers brick products shall be manufactured to the requirements of **NZS 4455.**
(vii) **This certificate does not cover weather-tightness, nor the stability, suitability or potential liquefaction of the site.**
(viii) **This Producer Statement is valid for a building consent issued within 1 year from the date of issue.**
(ix) **Inspections of the building are to be undertaken by the Building Consent Authority (council).**

I **believe on reasonable grounds** that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. ~~I also recommend the following level of construction monitoring/observation:~~ (Refer note above)
~~☐CM1 ☐CM2 ☒CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)~~

I, **Craig Allan Manssen** am: ☒CPEng **161576 #**
(Name of Design Professional)
☐Reg Arch ..... .#

I am a Member of: ☒ Engineering New Zealand ☐NZIA and hold the following qualifications: **B.E.(Hons), CMEngNZ, CPEng**
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☒

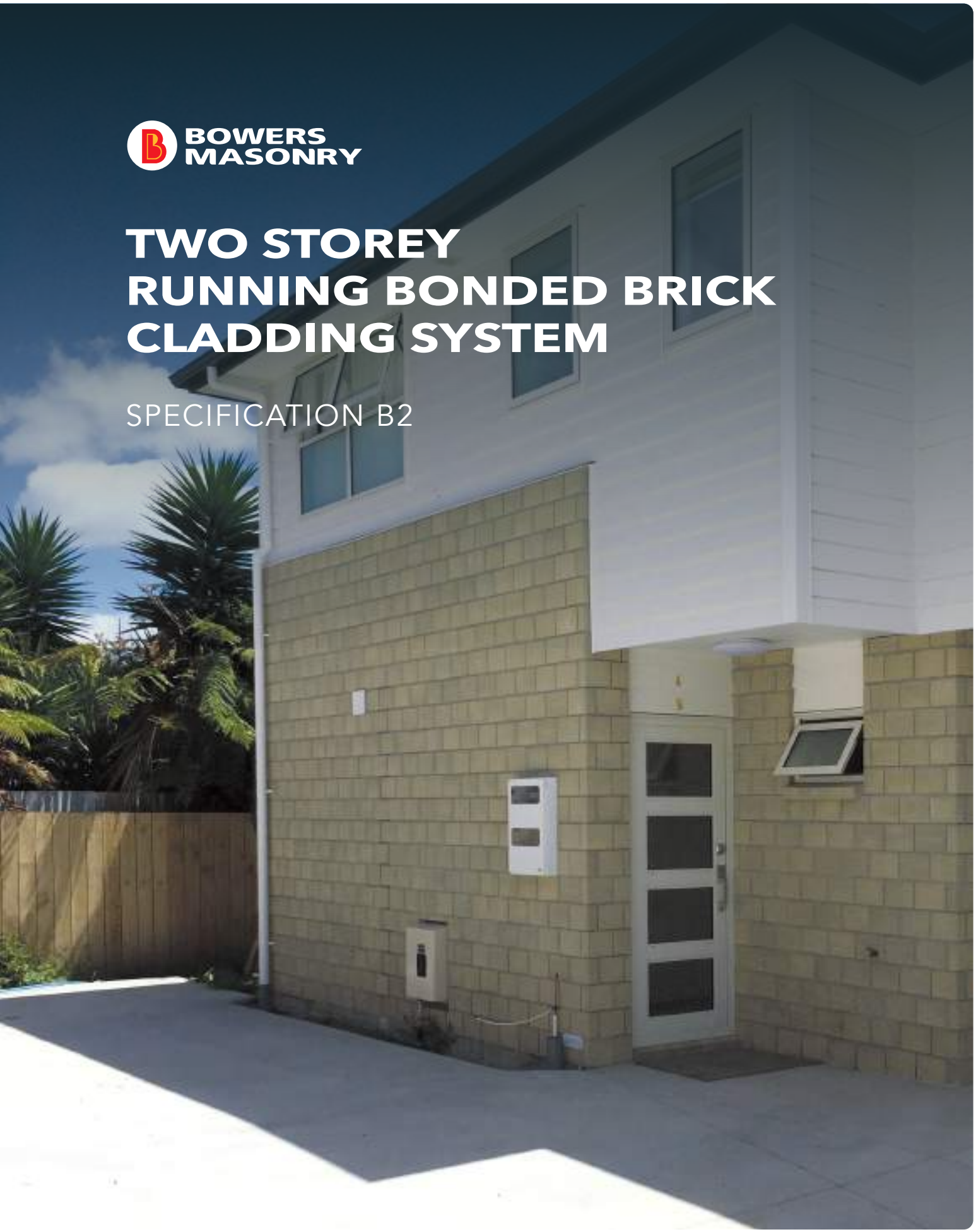
SIGNED BY **Craig Allan Manssen** ON BEHALF OF **Kirk Roberts Consulting Engineers Ltd.** (Design Firm)

Date: **1st April 2023** (signature).....

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

BOWERS MASONRY



BOWERS MASONRY

TWO STOREY RUNNING BONDED BRICK CLADDING SYSTEM

SPECIFICATION B2

GENERAL

The following is a specification used for the construction of two-storey, running-bonded brick veneers.

- This document presents an 'Alternative Solution' to E2/AS1 applicable when Bowers concrete bricks, as mentioned in this document, are used as a masonry brick veneer.
- This document is to be read in accordance with the prerequisite Bowers brick cladding system specification B1. Items not covered in this specification must comply with the specific design bricklaying specification for Bowers concrete bricks, Specification B1.

Should a requirement in this document conflict with B1, this specification, Specification – B2, is to apply.

DESIGN LIMITATIONS

The designer shall ensure that Bowers brick veneer detailing, as presented within the Building Consent Plans and Specifications, complies with all aspects of this 'Specific Design Specification'. Plans submitted for Building Consent must be clearly marked and identify the use of Bowers brick veneers as follows;

"Bowers Running Bonded Brick Cladding System – Specification B2 – no substitution"

- The Bowers two-storey running-bonded brick veneer shall be subject to the limitations outlined in Specification B1, with the following exceptions:
- Up to a 3kPa floor loading.
- A maximum of two-storey construction.
- Limited to a maximum calculated risk score of 20 in accordance with NZBC Acceptable Solution E2/AS1 Table 2.
- Where timber studs are used as the support structure, a maximum stud spacing of 400mm shall apply.
- Maximum veneer height of veneer above adjacent finished ground level of 7.5m for straight vertical panels and extended to 10.0m at the apex of a gable end or a pier of no more than 1.0m width.or a pier as defined in this document.

SPECIFICATION **B2**

BRICKS

This specification is only applicable to the following brick types manufactured by Bowers:

Table 1 – Bowers – Bricks applicable to this specification

Bricks applicable to this specification				
Bowers Brick Product	Size (LxHxW)	No/m²	Weight (kg) Per brick	Weight (kg/m²)
Standard brick	220 x 150 x 70mm	27.2	4.4	130
Classic brick	230 x 76 x 70mm	48.0	2.2	125
Plateau brick	450 x 150 x 70mm	13.6	7.7	150
Cadrona	390 x 190 x 90mm	12.5	10.8	150
10 series Half High	390 x 90 x 90mm	25.0	4.1	120

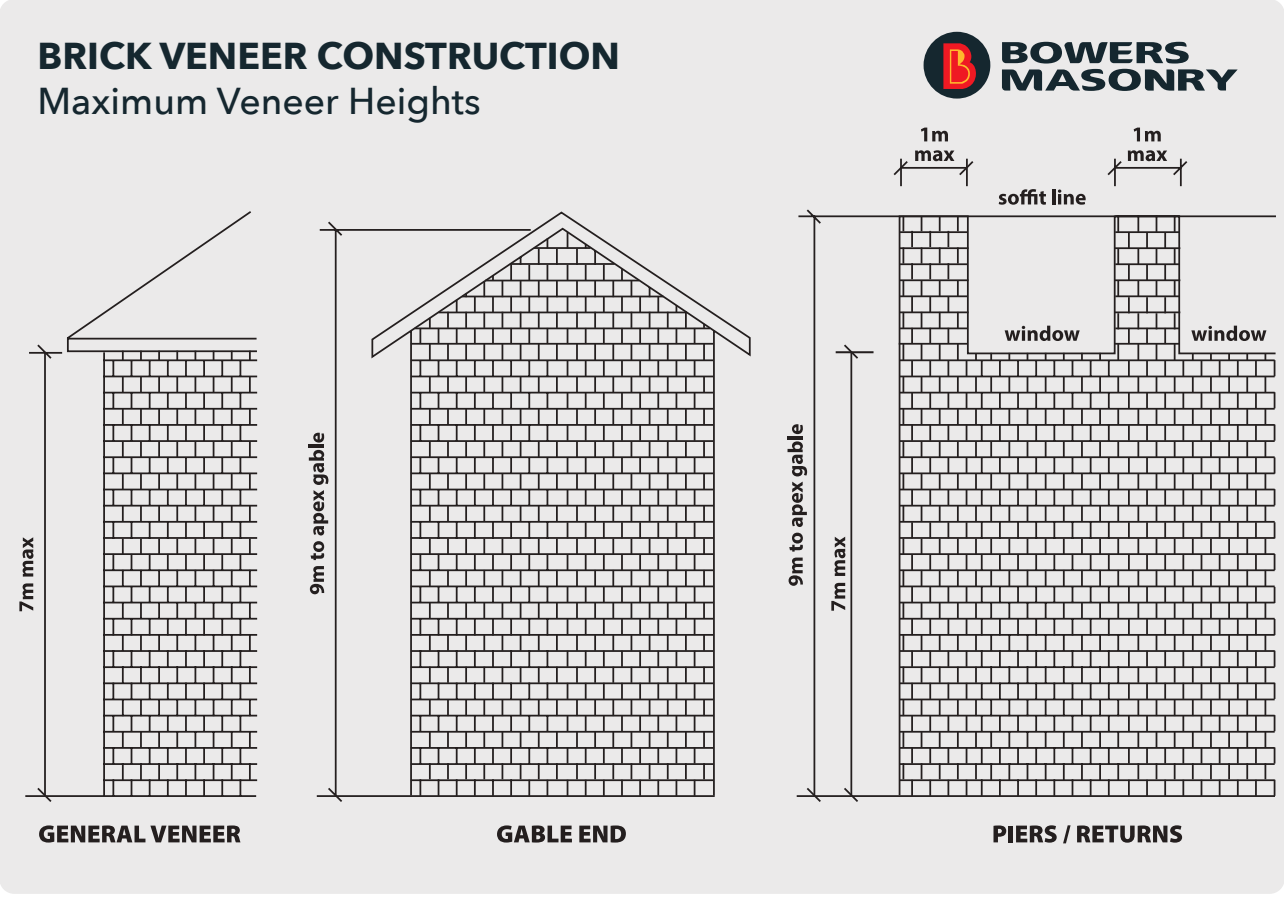


Figure 1 - Maximum Veneer Heights for two-storey half-bonded construction

Wall Panels

- Brick wall panels may be laid to a maximum height of 7.5m without the addition of shelf angles or slip joints.

Gable Ends and Piers

- Gable end wall panels may be laid to a maximum height of 10m.
- Brick piers, of maximum width not exceeding 1m in width and not supporting loads from lintel shelf angles are not to exceed 10m in total height.

SPECIFICATION **B2**

SUPPORTING STRUCTURE

The supporting structure shall be timber framed construction in accordance with NZS 3604, concrete block/ precast in accordance with NZS 4229 or light structural framing in accordance with NASH Standards part 1 and 2. Alternatively, or where support structure deviates from these codes a specific engineering designed supporting structure may be adopted. Supporting structure to be designed and detailed by a suitably qualified engineer.

BRICK CAVITY

The cavity shall comply with the requirements noted in Specification B1.

BRICK TIE INSTALLATION

Brick ties shall comply with the requirements noted in Specification B1, with the exception of the spacing requirements outlined below:

Brick tie spacing

Brick ties are to be fixed to supporting structure at a maximum horizontal spacing of 400mm, and vertically depending on the height of the brick as per table below. The upper most line of ties shall be installed at the first mortar bed joint below the top of the wall.

Table 2 – Brick ties spacing

Placement of Brick ties in Mortar Courses		
Bowers Brick Product	**Height of Brick**	**Studs at 400mm crs.**
Standard brick	150mm	Every 2nd course
Classic brick	76mm	Every 3rd course
Plateau brick	150mm	Every 2nd course
Cadrona	190mm	Every 2nd course
10 series Half High	90mm	Every 3rd course

JOINT REINFORCEMENT

- Install one row of bed joint reinforcement at 4m ± 100mm above the bottom course.
- Install further rows of bed joint reinforcement, spaced 800mm ± 100mm apart, above this level.
- Bed joint reinforcement is to be placed in mortar joints that do not contain brick ties.
- Bed joint reinforcement to be MASONS 4.0mm Bricklock STR and CNR galvanised or stainless-steel joint reinforcement or equivalent, as appropriate for the site exposure zone (refer NZS 3604).
- Where a gable exists on top of the veneer panel, install a further two rows of bed joint reinforcement, at the same spacing, into the gable.
- Bed joint reinforcement is not required within piers above the veneer panel.

SPECIFICATION **B2**

LINTELS

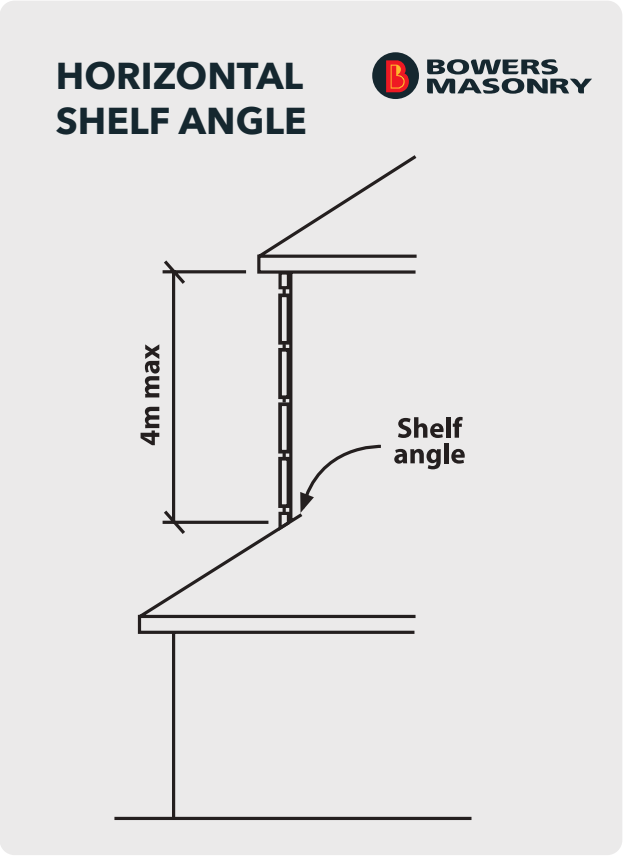
Lintels shall comply with the requirements noted in Specification B1, with the following exceptions:

- Seated lintels may only be used over openings in the upper level of a two-storey building.
- Seated lintels may not be used over a skirt roof (use of seated lintels over an opening above a skirt roof is permitted).

SHELF ANGLES

In addition to the requirements set out in Specification B1, shelf angles may be installed above skirt roofs.

- The architect/engineer is to ensure an adequate support structure for fixing of the shelf angle.
- The maximum veneer panel height above a shelf angle over a skirt roof is to be 4m, measured as shown in Figure 2 below.



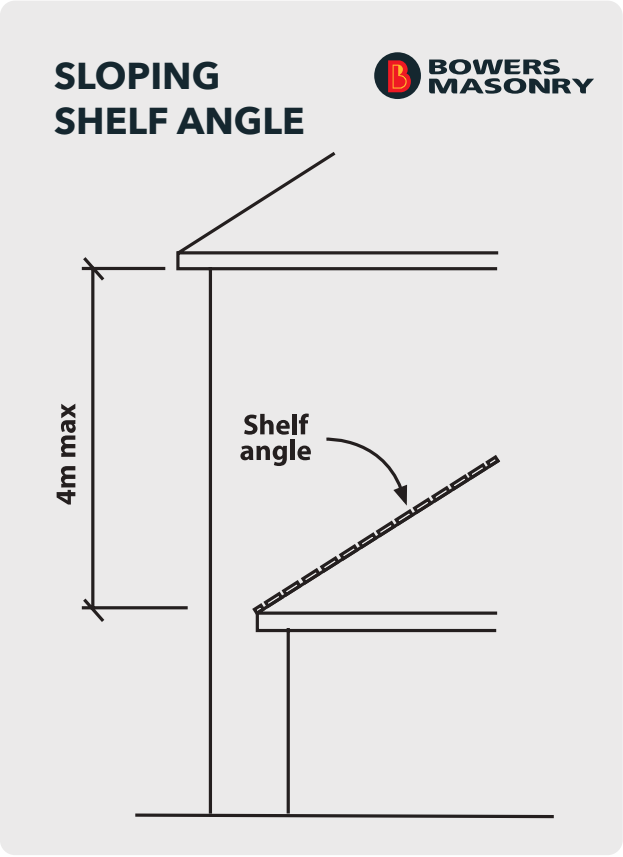


Figure 2 – Shelf Angles – diagram sourced from Brick & Paver Manufacturers association

TECHNICAL SUPPORT

Should you require any technical support on the Bowers Brick Veneer System, please contact Bowers on:

0800 207 374
technicalsupport@bowersbrothers.co.nz
www.bowersbrothers.co.nz

SPECIFICATION **B2**

Building Code Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

ISSUE: C

(Guidance on use of Producer Statements is available at www.engineeringnz.org)

ISSUED BY: **KIRK ROBERTS Consulting Ltd.** (Design Firm) **PROJECT NO: 2020758**

TO: **Bowers Brothers Concrete Ltd** (Owner/Developer)

TO BE SUPPLIED TO: **Relevant Territorial Authority** (Building Consent Authority)

IN RESPECT OF: **Two-storey running bonded brick veneer specification as per the attached documentation 'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B2'** (Description of Building Work)

AT: **Locations throughout New Zealand** (Address)

We have been engaged by the owner/developer referred to above to provide **Structural Engineering Design** services in respect of the requirements of Clause(s) **B1/VM1** of the Building Code for
All ☐ or Part only ☒ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1/VM1** or (verification method / acceptable solution)

☐ Alternative solution as per the attached schedule: _____

The proposed building work covered by this producer statement is described on the attached specification titled **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B2 revB'** and dated **31st March 2021**

On behalf of the Design Firm, and subject to:

(i) All proprietary products meeting their performance specification requirements.
(ii) Up to **'Extra High'** wind zone in accordance with NZS3604: 2011.
(iii) Maximum site site hazard factor **Z = 0.4** in accordance with NZS1170.5: 2004.
(iv) Structural design loads are based on a **50 year design life** and **Importance Level 2** structure (normal structures and structures not in other importance levels) as defined in AS/NZS 1170.0 2004 clause 3.3.
(v) Compliance with pre-requisite document **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B1'**
(vi) Unless specifically noted, all structural elements must comply with the relevant New Zealand design code such as **NZS 3604, NZS 4229, NZS 2699, NZS 4210, and NZS HB 4236.**
These elements include, but are not limited to: **brick ties, mortar strength, brick strength, and bond between the brick and mortar.**
(vii) Bowers Brothers brick products shall be manufactured to the requirements of **NZS 4455.**
(viii) **This certificate does not cover weather-tightness, nor the stability, suitability or potential liquefaction of the site.**
(ix) **This Producer Statement is valid for a building consent issued within 1 year from the date of issue.**
(x) **Inspections of the building are to be undertaken by the Building Consent Authority (council).**

I **believe on reasonable grounds** that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation: (Refer note above)
☐CM1 ☐CM2 ☒CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, **Craig Allan Manssen** am: ☒CPEng **161576** #
(Name of Design Professional)
☐Reg Arch ..... .#

I am a Member of: ☒ Engineering New Zealand ☐NZIA and hold the following qualifications: **B.E.(Hons), CMEngNZ, CPEng**
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☒

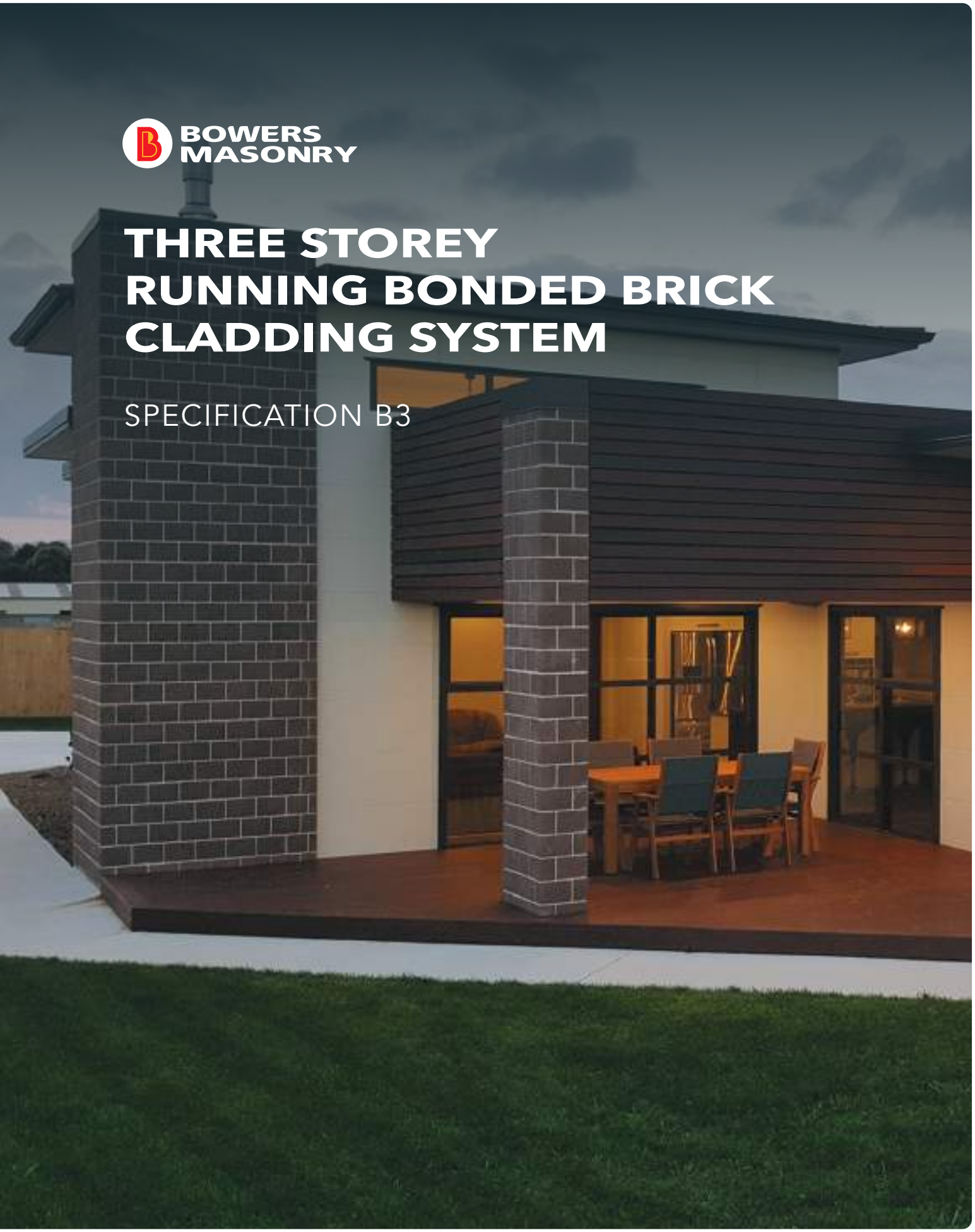
SIGNED BY **Craig Allan Manssen** ON BEHALF OF **Kirk Roberts Consulting Engineers Ltd.** (Design Firm)

Date: **1st April 2023** (signature).....

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

BOWERS MASONRY



BOWERS MASONRY

THREE STOREY RUNNING BONDED BRICK CLADDING SYSTEM

SPECIFICATION B3

GENERAL

- The following is a specification used for the construction of three-storey, running-bonded brick veneers.
- • This document presents an 'Alternative Solution' to E2/AS1 applicable when Bowers concrete bricks, as mentioned in this document, are used as a masonry brick veneer.
- • This document is to be read in accordance with the prerequisite Bowers brick cladding system specification B1 & B2. Items not covered in this specification must comply with the specific design bricklaying specification for Bowers concrete bricks, Specification B1.
- Should a requirement in this document conflict with either B1 or B2, this specification, Specification B3, is to apply.

LIMITATIONS

The designer shall ensure that Bowers brick veneer detailing, as presented within the Building Consent Plans and Specifications, complies with all aspects of this 'Specific Design Specification'. Plans submitted for Building Consent must be clearly marked and identify the use of Bowers brick veneers as follows;

"Bowers Running Bonded Brick Cladding System – Specification B3 – no substitution"

The Bowers three-storey running bonded brick veneer shall be subject to the limitations outlined in Specifications B1 and B2, with the following exceptions:

- Up to a 3kPa floor loading.
- A maximum of three-storey construction.
- Limited to a maximum calculated risk score of 20 in accordance with NZBC Acceptable Solution E2/AS1 Table 2.
- Where timber studs are used as the support structure, a maximum stud spacing of 400mm shall apply. Specific design of supporting structure for the upper level, beyond the limitations of NZS 3604 shall apply.
- Maximum veneer height of veneer above adjacent finished ground level of 10.0m for straight vertical panels and extended to 12.0m at the apex of a gable end or a pier of no more than 1.0m width.
- Installation of a mid-wall shelf angle at 6.0m, or at the structural floor level of the third storey floor (whichever is smaller), in accordance with Figure 2.
- Maximum veneer height of 10.0m for straight vertical panels and 12.0m to the apex of a gable or a pier as defined in this document, in accordance with Figure 1.

SPECIFICATION **B3**

BRICKS

This specification is only applicable to the following brick types manufactured by Bowers:

Table 1 – Bowers – Bricks applicable to this specification

Bricks applicable to this specification				
Bowers Brick Product	Size (LxHxW)	No/m²	Weight (kg) Per brick	Weight (kg/m²)
Standard brick	220 x 150 x 70mm	27.2	4.4	130
Classic brick	230 x 76 x 70mm	48.0	2.2	125
Plateau brick	450 x 150 x 70mm	13.6	7.7	150
Cadrona	390 x 190 x 90mm	12.5	10.8	150
10 series Half High	390 x 90 x 90mm	25.0	4.1	120

Note: Table 1 includes a 4% allowance for wastage in the number of bricks per m2, for ordering purposes

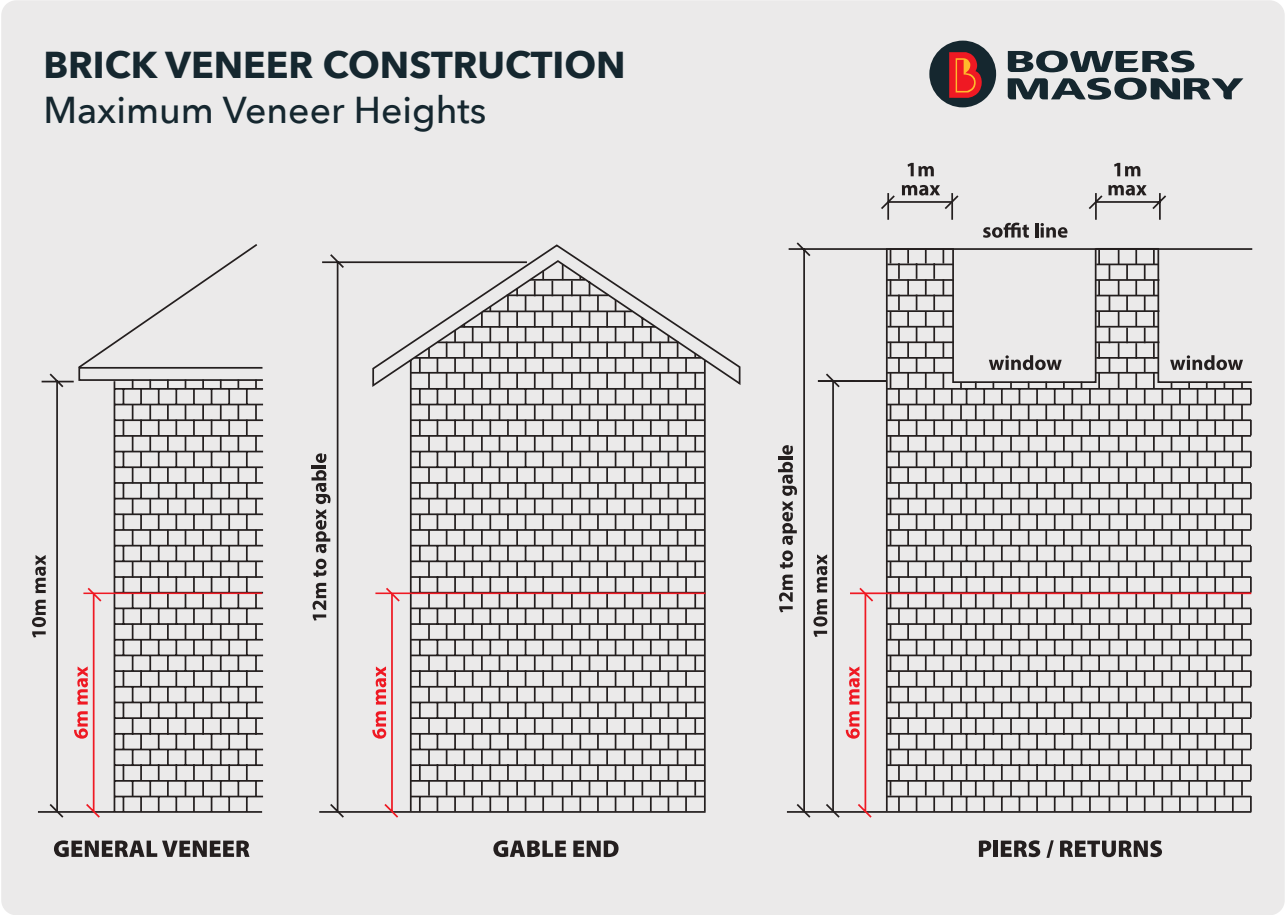


Figure 1 - Maximum Veneer Heights for three-storey running-bonded construction

SPECIFICATION **B3**

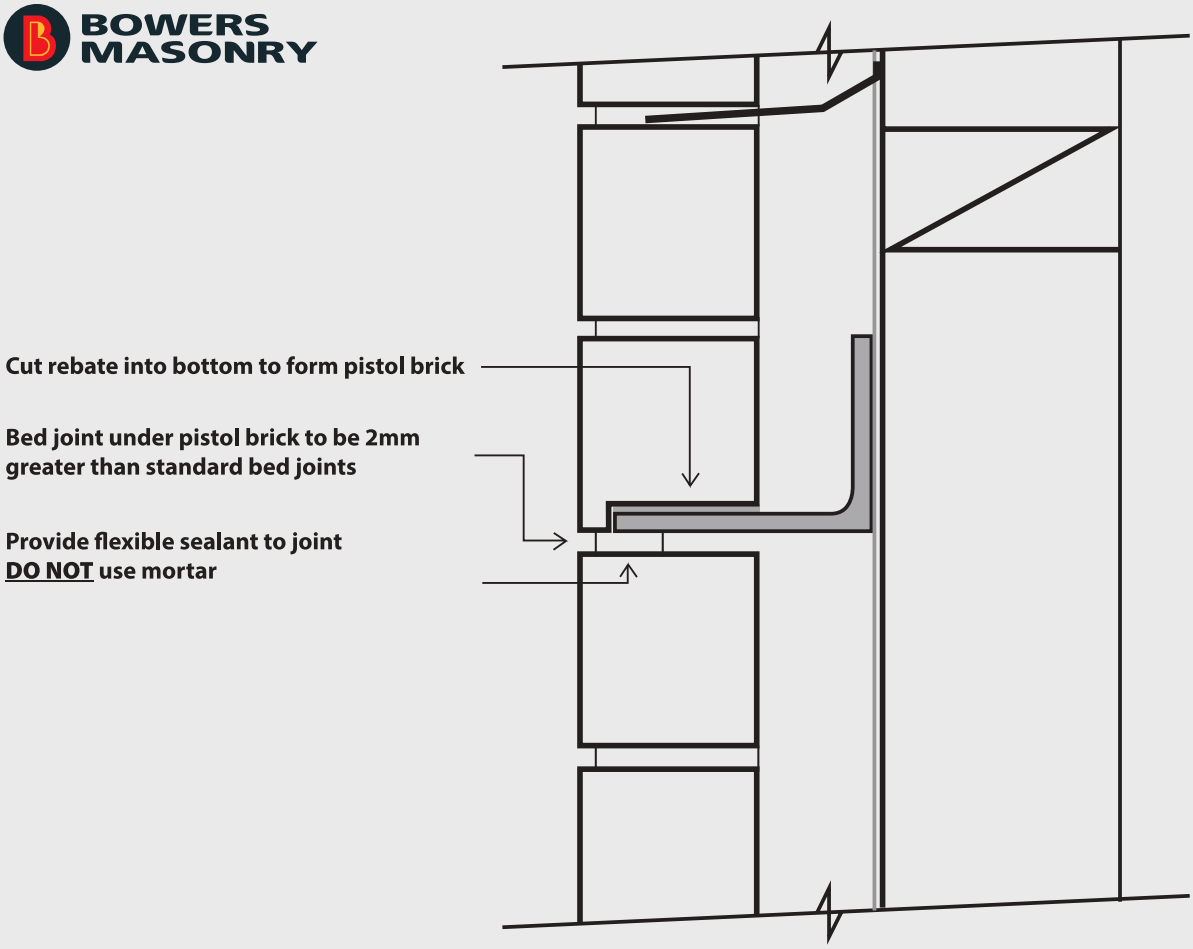


Figure 2 – Recommended hidden shelf angle detail

Wall Panels

- The bricks may be laid in one panel to a maximum height of 10m.
- Above 6m, or at the structural floor level of the third storey floor (whichever is the lesser), a mid-wall shelf angle is to be installed in accordance with detail 2.
- The shelf angle is to be installed at all areas where the veneer panel extends above 6.0m, except where this is a gable or pier in accordance with specification B2.
- The bed joint under the shelf angle is to be fill with a suitable flexible sealant, NOT mortar.
- The veneer panels below 6m are to be installed in accordance with specification B2.

Gable Ends and Piers

- The brick veneer can be laid to a maximum height of 12m with a gable end.
- A pier is defined as a brick panel not exceeding 1m in width and not supporting a brick steel lintel in any way. A pier must not exceed 12m in height.

SPECIFICATION **B3**

SUPPORTING STRUCTURE

- The supporting structure shall be timber framed construction in accordance with NZS 3604, concrete block/precast in accordance with NZS 4229 or light structural framing in accordance with NASH Standards part 1 and 2. Alternatively, or where support structure deviates from these codes a specific engineering designed supporting structure may be adopted. Supporting structure to be designed and detailed by a suitably qualified engineer.

BRACING

Bracing requirements of walls shall be calculated using the prescribed tables in NZS 3604, or where the building falls outside of the limitations of this code, by a suitably qualified engineer.

BRICK CAVITY

The cavity shall comply with the requirements noted in Specification B1.

BRICK TIE INSTALLATION

Brick ties shall comply with the requirements noted in Specification B1 with the exception of the spacing requirements outlined below:

Brick tie spacing

Brick ties are to be fixed horizontally to supporting structure at a maximum spacing of 400mm, and vertically depending on the height of the brick as per table below. The upper most line of ties shall be installed at the first mortar bed joint from the top of the wall.

Table 2 – Brick ties spacing

Placement of Brick ties in Mortar Courses		
Bowers Brick Product	**Height of Brick**	**Studs at 400mm crs.**
Standard brick	150mm	Every 3rd course
Classic brick	76mm	Every 2nd course
Plateau brick	150mm	Every 3rd course
Cadrona	190mm	Every 2nd course
10 series Half High	90mm	Every 3rd course

JOINT REINFORCEMENT

- Bed joint reinforcement below the mid wall shelf angle is to comply with the requirements set out in specification B2.
- Above the mid-wall shelf angle, install one row of bed joint reinforcement, in the bottom bed joint of the panel.
- Install further rows of bed joint reinforcement, spaced 800mm ± 100mm apart above this level, including into gables where required.
- Bed joint reinforcement is not required within piers above the veneer panel.
- Install a final row of bed joint reinforcement in the

SPECIFICATION **B3**

LINTELS

Lintels shall comply with the requirements noted in Specification B1, with the following exceptions:

- Seated lintels may only be used over openings in the second and third level of a three-storey building.
- Seated lintels may not be used over a skirt roof (use of seated lintels over an opening above a skirt roof is permitted).

SHELF ANGLES

In addition to the requirements set out in Specification B1, shelf angles may be installed above skirt roofs.

- The architect/engineer is to ensure an adequate support structure for fixing of the shelf angle.
- The maximum veneer panel height above a shelf angle over a skirt roof is to be 4m, measured as shown in figure 3 below:

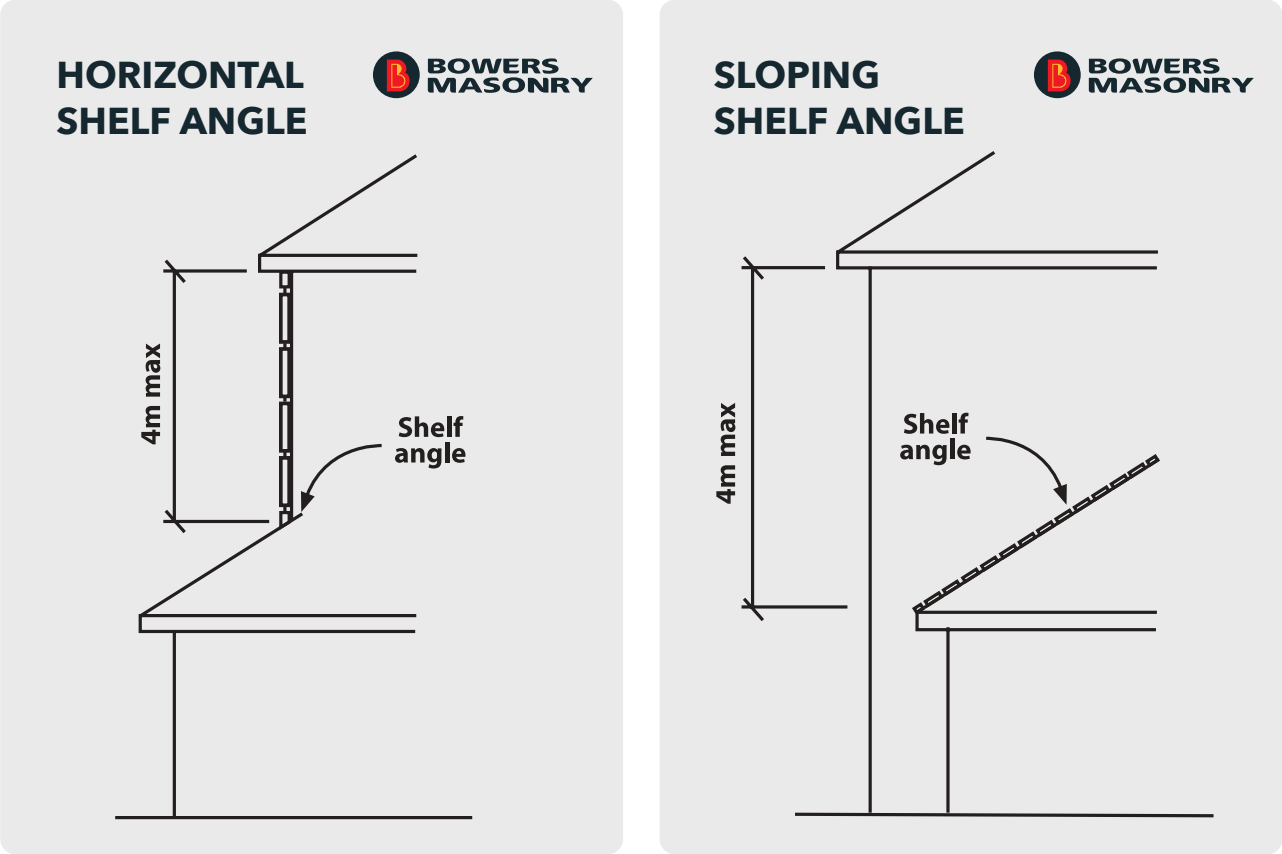


Figure 3 – Shelf Angles – diagram sourced from Brick & Paver Manufacturers association

TECHNICAL SUPPORT

Should you require any technical support on the Bowers Brick Veneer System, please contact Bowers on:

0800 207 374
technicalsupport@bowersbrothers.co.nz
www.bowersbrothers.co.nz

BOWERS MASONRY

SPECIFICATION **B3**

Building Code Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

ISSUE: C

(Guidance on use of Producer Statements is available at www.engineeringnz.org)

ISSUED BY: **KIRK ROBERTS Consulting Ltd.** (Design Firm) **PROJECT NO: 2020758**

TO: **Bowers Brothers Concrete Ltd** (Owner/Developer)

TO BE SUPPLIED TO: **Relevant Territorial Authority** (Building Consent Authority)

IN RESPECT OF: **Three-storey running bonded brick veneer specification as per the attached documentation 'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B3'** (Description of Building Work)

AT: **Locations throughout New Zealand** (Address)

We have been engaged by the owner/developer referred to above to provide **Structural Engineering Design** services in respect of the requirements of Clause(s) **B1/VM1** of the Building Code for
All ☐ or Part only ☒ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1/VM1** or (verification method / acceptable solution)

☐ Alternative solution as per the attached schedule: _____

The proposed building work covered by this producer statement is described on the attached specification titled **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B3 revB'** and dated **31st March 2021**

On behalf of the Design Firm, and subject to:

(i) All proprietary products meeting their performance specification requirements.
(ii) Up to **'Extra High'** wind zone in accordance with NZS3604: 2011.
(iii) Maximum site site hazard factor **Z = 0.4** in accordance with NZS1170.5: 2004.
(iv) Structural design loads are based on a **50 year design life** and **Importance Level 2** structure (normal structures and structures not in other importance levels) as defined in AS/NZS 1170.0 2004 clause 3.3.
(v) Compliance with pre-requisite documents **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B1, & B2'**
(vi) Unless specifically noted, all structural elements must comply with the relevant New Zealand design code such as **NZS 3604, NZS 4229, NZS 2699, NZS 4210, and NZS HB 4236.**
These elements include, but are not limited to: **brick ties, mortar strength, brick strength, and bond between the brick and mortar.**
(vii) Bowers Brothers brick products shall be manufactured to the requirements of **NZS 4455.**
(viii) **This certificate does not cover weather-tightness, nor the stability, suitability or potential liquefaction of the site.**
(ix) **This Producer Statement is valid for a building consent issued within 1 year from the date of issue.**
(x) **Inspections of the building are to be undertaken by the Building Consent Authority (council).**

I **believe on reasonable grounds** that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation: (Refer note above)
☐CM1 ☐CM2 ☒CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, **Craig Allan Manssen** am: ☒CPEng **161576 #**
(Name of Design Professional)
☐Reg Arch ..... .#

I am a Member of: ☒ Engineering New Zealand ☐NZIA and hold the following qualifications: **B.E.(Hons), CMEngNZ, CPEng**
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☒

SIGNED BY **Craig Allan Manssen** ON BEHALF OF **Kirk Roberts Consulting Engineers Ltd.** (Design Firm)

Date: **1st April 2023** (signature).....

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

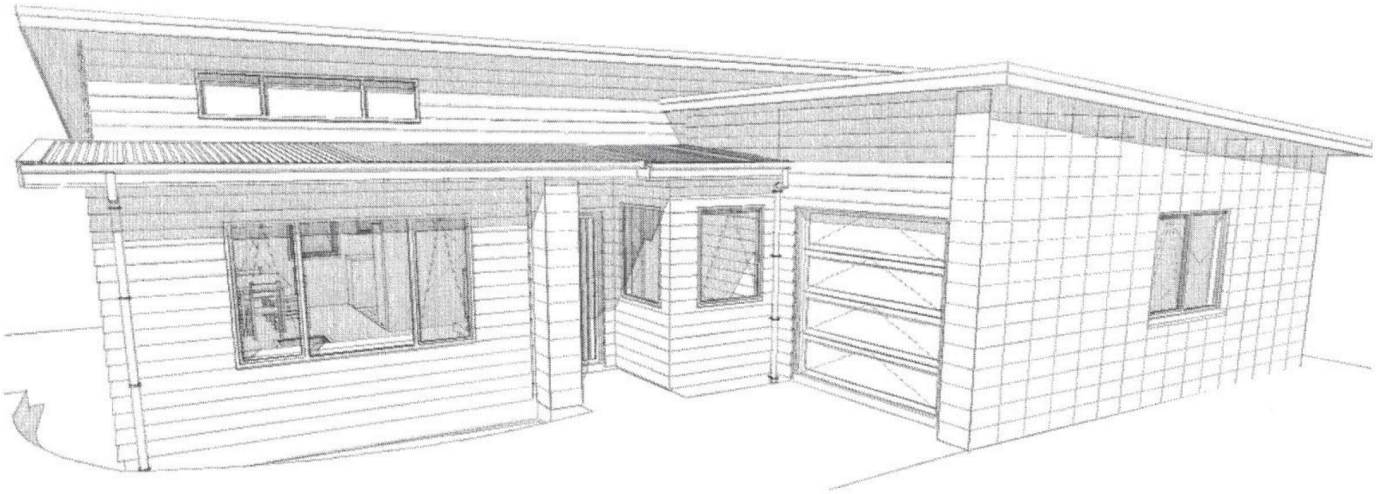
This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

BOWERS MASONRY

BOWERS MASONRY

SINGLE STOREY STACK BONDED BRICK CLADDING SYSTEM

SPECIFICATION S1



GENERAL

The following is a specification used for the construction of single-storey, stack-bonded brick veneers.

- This document presents an 'Alternative Solution' to E2/AS1 applicable when Bowers concrete bricks, as mentioned in this document, are used as a masonry brick veneer.
- This document is to be read in accordance with the prerequisite Bowers brick cladding system specification B1. Items not covered in this specification must comply with the specific design bricklaying specification for Bowers concrete bricks, Specification B1.

Should a requirement in this document conflict with B1, this specification, Specification S1, is to apply.

LIMITATIONS

The designer shall ensure that Bowers brick veneer detailing, as presented within the Building Consent Plans and Specifications, complies with all aspects of this 'Specific Design Specification'. Plans submitted for Building Consent must be clearly marked and identify the use of Bowers brick veneers as follows;

"Bowers Stack Bonded Brick Cladding System – Specification S1 – no substitution"

The Bowers single storey stack bonded brick veneer shall be subject to the limitations outlined in Specification B1, with the following exceptions:

- Bricks must be laid in a stack bond pattern.
- Where timber studs are used as the support structure, a maximum stud spacing of 400mm shall apply.

BRICKS

This specification is only applicable to the following brick types manufactured by Bowers:

Table 1 – Bowers bricks applicable to this specification

Bricks applicable to this specification				
Bowers Brick Product	**Size (LxHxW)**	**No/m²**	**Weight (kg) Per brick**	**Weight (kg/m²)**
Standard brick	220 x 150 x 70mm	27.2	4.4	130
Classic brick	230 x 76 x 70mm	48.0	2.2	125
Plateau brick	450 x 150 x 70mm	13.6	7.7	150
Cadrona	390 x 190 x 90mm	12.5	10.8	150
10 series Half High	390 x 90 x 90mm	25	4.1	120

Note: Table 1 includes a 4% allowance for wastage in the number of bricks per m2, for ordering purposes

SPECIFICATION **S1**

BRICK VENEER CONSTRUCTION

SUPPORTING STRUCTURE

- The supporting structure shall be timber framed construction in accordance with NZS 3604, concrete block/precast in accordance with NZS 4229 or light structural framing in accordance with NASH Standards part 1 and 2. Alternatively, or where support structure deviates from these codes a specific engineering designed supporting structure may be adopted. Supporting structure to be designed and detailed by a suitably qualified engineer.

BRICK CAVITY

The cavity shall comply with the requirements noted in Specification B1.

BRICK TIE INSTALLATION

Brick ties shall comply with the requirements noted in Specification B1, with the exception of the spacing requirements outlined below:

Brick tie spacing

Brick ties are to be fixed to supporting structure at a maximum horizontal spacing of 400mm, and vertically depending on the height of the brick as per table below. The upper most line of ties shall be installed at the first mortar bed joint below the top of the wall.

Table 2 – Brick ties spacing

Placement of Brick ties in Mortar Courses		
Bowers Brick Product	**Height of Brick**	**Studs at 400mm crs.**
Standard brick	150mm	Every 3rd course
Classic brick	76mm	Every 2nd course
Plateau brick	150mm	Every 3rd course
Cadrona	190mm	Every 2nd course
10 series Half High	90mm	Every 3rd course

JOINT REINFORCEMENT

- Bed joint reinforcement shall be installed in bed joints spaced at 800mm crs ± 100mm (depending on the brick height) over the height of the veneer.
- Bed joint reinforcement to be MASONS 4.0mm Bricklock STR and CNR galvanised or stainless-steel joint reinforcement, as appropriate for the site exposure zone (refer NZS 3604).
- Bed joint reinforcement is to be placed in mortar joints that do not contain brick ties.

SPECIFICATION **S1**

Due to the wide variety of designs, location of windows, panel widths, roof configurations etc., it is not practical to be more specific where consideration should be given to installing joint reinforcement. However, the following rules should be applied:

- Bed joint reinforcement to be installed within 350mm or the top and bottom of the panel.
- Bed joint reinforcement to be installed within 175mm of head and sill of window/door openings, extending minimum of 2 bricks into the adjacent brick panel.

SHELF ANGLES & LINTELS

All shelf angles/lintels used for single storey stack-bonded wall veneers are to comply with the relevant sections in Specification B1.

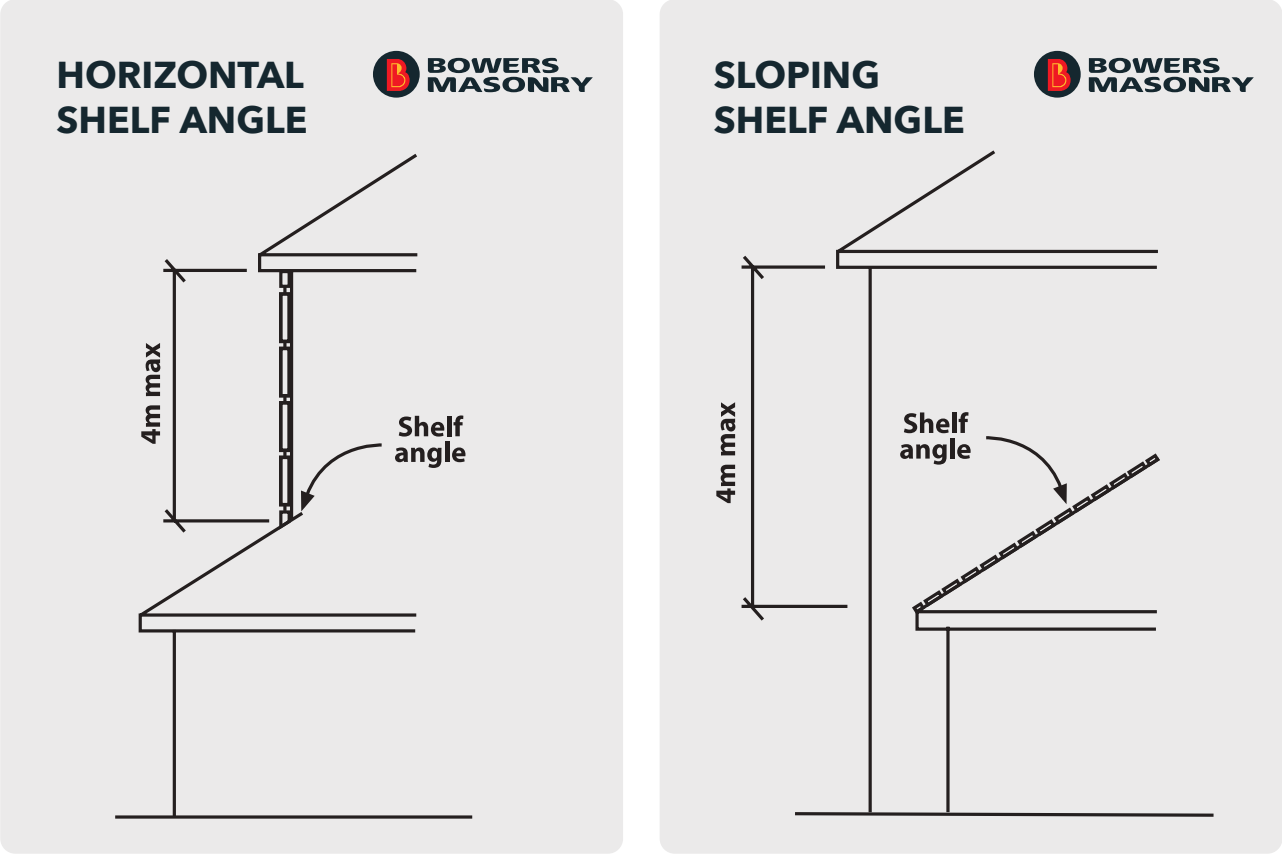


Figure 1 – Shelf Angles - diagram sourced from Brick & Paver Manufacturers association

TECHNICAL SUPPORT

Should you require any technical support on the Bowers Brick Veneer System, please contact Bowers on:

0800 207 374
technicalsupport@bowersbrothers.co.nz
www.bowersbrothers.co.nz

SPECIFICATION **S1**

Building Code Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

ISSUE: C

(Guidance on use of Producer Statements is available at www.engineeringnz.org)

ISSUED BY: **KIRK ROBERTS Consulting Ltd.** (Design Firm) **PROJECT NO: 2020758**

TO: **Bowers Brothers Concrete Ltd** (Owner/Developer)

TO BE SUPPLIED TO: **Relevant Territorial Authority** (Building Consent Authority)

IN RESPECT OF: **Single storey stack bonded brick veneer specification as per the attached documentation 'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION S1'** (Description of Building Work)

AT: **Locations throughout New Zealand** (Address)

We have been engaged by the owner/developer referred to above to provide **Structural Engineering Design** services in respect of the requirements of Clause(s) **B1/VM1** of the Building Code for
All ☐ or Part only ☒ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1/VM1** or (verification method / acceptable solution)

☐ Alternative solution as per the attached schedule: _____

The proposed building work covered by this producer statement is described on the attached specification titled **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION S1 revB'** and dated **31st March 2021**

On behalf of the Design Firm, and subject to:

(i) All proprietary products meeting their performance specification requirements.
(ii) Up to **'Extra High'** wind zone in accordance with NZS3604: 2011.
(iii) Maximum site site hazard factor **Z = 0.4** in accordance with NZS1170.5: 2004.
(iv) Structural design loads are based on a **50 year design life** and **Importance Level 2** structure (normal structures and structures not in other importance levels) as defined in AS/NZS 1170.0 2004 clause 3.3**.**
(v) Compliance with pre-requisite document **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B1'**
(vi) Unless specifically noted, all structural elements must comply with the relevant New Zealand design code such as **NZS 3604, NZS 4229, NZS 2699, NZS 4210, and NZS HB 4236.**
These elements include, but are not limited to: **brick ties, mortar strength, brick strength, and bond between the brick and mortar.**
(vii) Bowers Brothers brick products shall be manufactured to the requirements of **NZS 4455.**
(viii) **This certificate does not cover weather-tightness, nor the stability, suitability or potential liquefaction of the site.**
(ix) **This Producer Statement is valid for a building consent issued within 1 year from the date of issue.**
(x) **Inspections of the building are to be undertaken by the Building Consent Authority (council).**

I **believe on reasonable grounds** that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation: (Refer note above)
☐CM1 ☐CM2 ☒CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, **Craig Allan Manssen** am: ☒CPEng **161576** # (Name of Design Professional)
☐Reg Arch ..... .#

I am a Member of: ☒ Engineering New Zealand ☐NZIA and hold the following qualifications: **B.E.(Hons), CMEngNZ, CPEng**
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☒

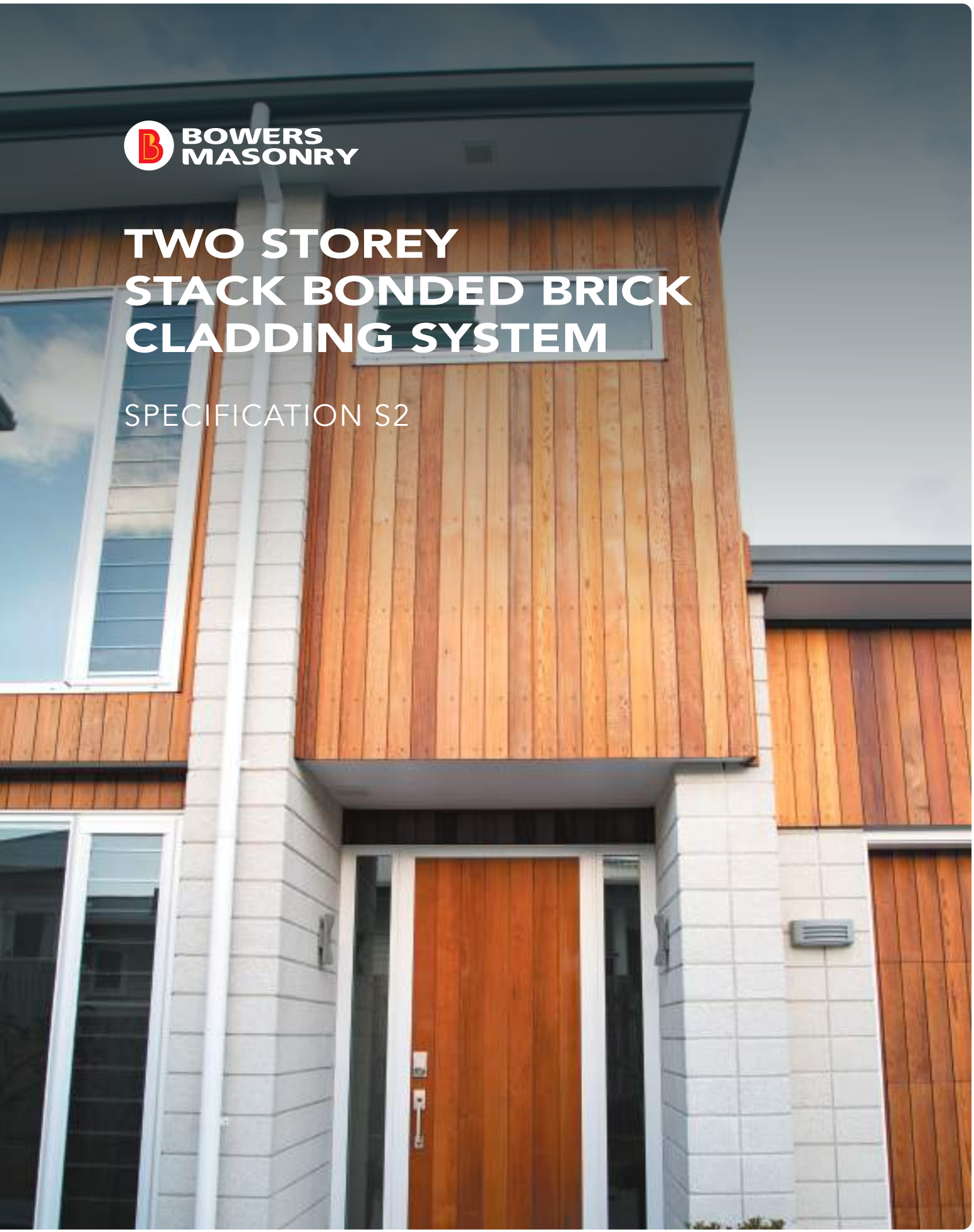
SIGNED BY **Craig Allan Manssen** ON BEHALF OF **Kirk Roberts Consulting Engineers Ltd.** (Design Firm)

Date: **1st April 2023** (signature).....

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

BOWERS MASONRY



BOWERS MASONRY

TWO STOREY STACK BONDED BRICK CLADDING SYSTEM

SPECIFICATION S2

GENERAL

The following is a specification used for the construction of two-storey, stack-bonded brick veneers.

- This document presents an 'Alternative Solution' to E2/AS1 applicable when Bowers concrete bricks, as mentioned in this document, are used as a masonry brick veneer.
- This document is to be read in accordance with the prerequisite Bowers brick cladding system specification B1. Items not covered in this specification must comply with the specific design bricklaying specification for Bowers concrete bricks, Specification B1.

Should a requirement in this document conflict with B1, this specification, Specification S2, is to apply.

LIMITATIONS

The designer shall ensure that Bowers brick veneer detailing, as presented within the Building Consent Plans and Specifications, complies with all aspects of this 'Specific Design Specification'. Plans submitted for Building Consent must be clearly marked and identify the use of Bowers brick veneers as follows;

"Bowers Stack Bonded Brick Cladding System – Specification S2 – no substitution"

The Bowers two-storey stack bonded brick veneer shall be subject to the limitations outlined in Specification B1, B2 and S1 with the following exceptions:

- Bricks must be laid in a stack bond pattern.
- Where timber studs are used as the support structure, a maximum stud spacing of 400mm shall apply.
- Up to a 3kPa floor loading.
- A maximum of two-storey construction.
- Limited to a maximum calculated risk score of 20 in accordance with NZBC Acceptable Solution E2/AS1 Table 2.

BOWERS MASONRY

SPECIFICATION **S2**

PRELIMINARY

This document is a bricklaying specification used for the construction of two-storey, stack-bonded brick veneers. It is an 'Alternative Solution' to E2/AS1 applicable only when Bowers concrete bricks, as mentioned in this document, are used in a two-storey stack bonded masonry brick veneer. This document is to be read in accordance with the prerequisite specification B1. Items not covered in this specification must comply with the general bricklaying specification for Bowers concrete bricks, Specification B1.

Should a requirement in this document conflict with B1, this specification, Specification S2, is to apply.

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'.

The designer must clearly mark on the plans submitted for Building Consent – *'Bowers Stack-Bonded Brick Cladding System – Specification S2' – no substitution.*

DESIGN LIMITATIONS

The Bowers two-storey stack-bonded brick veneer shall be subject to the limitations outlined in Specification B1, with the following exceptions:

- Bricks must be laid in a stack-bonded pattern
- Up to a 3kPa floor loading.
- A maximum of two-storey construction.
- The scope limitations of NZBC Acceptable solution E2/AS1 Paragraph 1.1 in terms of floor area.
- A risk score of 0 – 20, calculated in accordance with NZBC Acceptable Solution E2/AS1 Table 2.
- Where timber studs are used as the support structure, a maximum stud spacing of 400mm shall apply.
- Maximum veneer height of 7.0m for straight vertical panels and 9.0m to the apex of a gable or a pier as defined in this document.

BRICKS

This specification is only applicable to the following brick types manufactured by Bowers:

Table 1 – Bowers – Bricks applicable to this specification

Bricks applicable to this specification				
Bowers Brick Product	Size (LxHxW)	No/m^2	Weight (kg) Per brick	Weight (kg/m^2)
Standard brick	220 x 150 x 70mm	27.2	4.4	130
Classic brick	230 x 76 x 70mm	48.0	2.2	125
Plateau brick	450 x 150 x 70mm	13.6	7.7	150
Cadrona	390 x 190 x 90mm	12.5	10.8	150
10 series Half High	390 x 90 x 90mm	25.0	4.1	120

Note: Table 1 includes a 4% allowance for wastage in the number of bricks per m2, for ordering purposes

SPECIFICATION **S2**

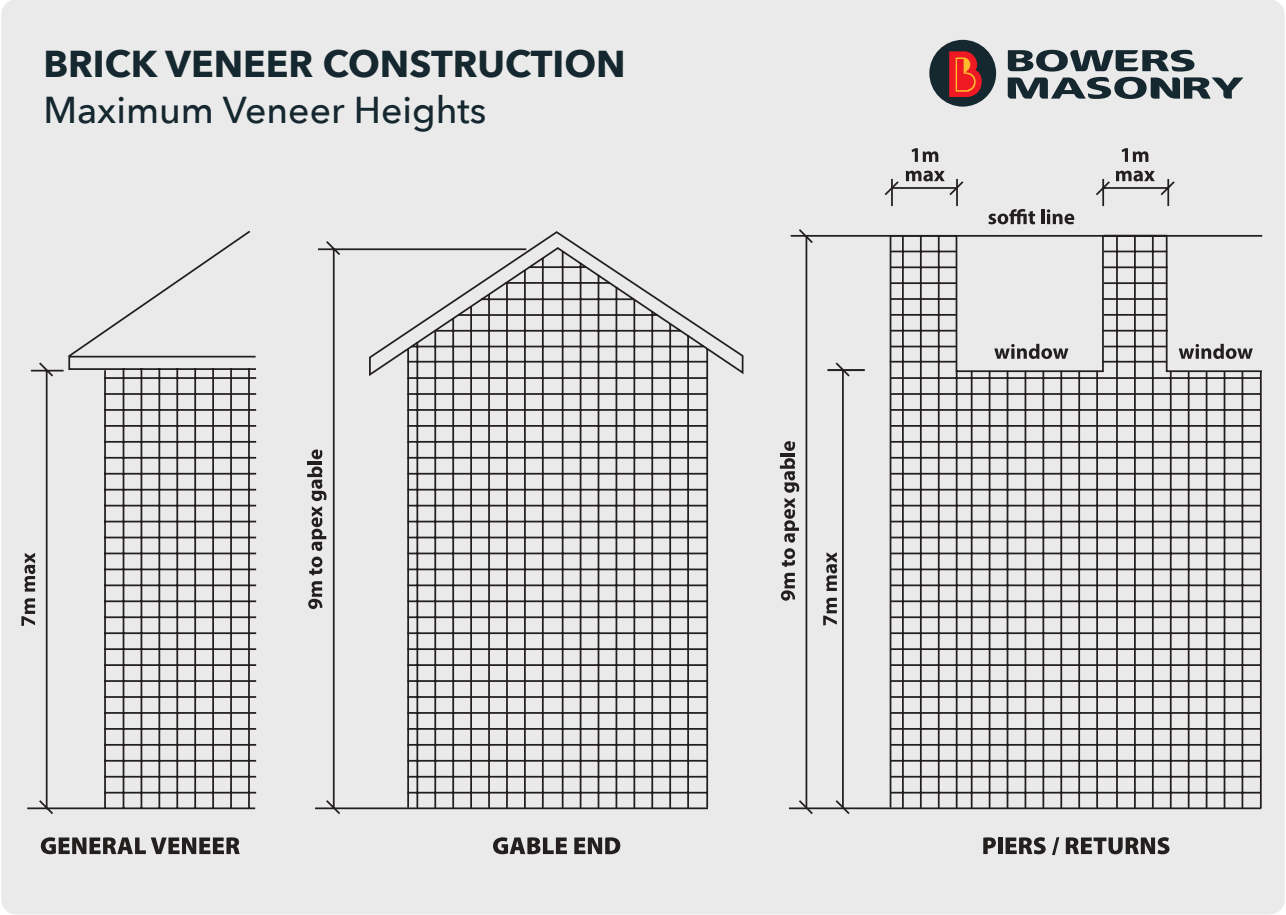


Figure 1 - Maximum Veneer Heights for two-storey stack-bonded construction

SPECIFICATION **S2**

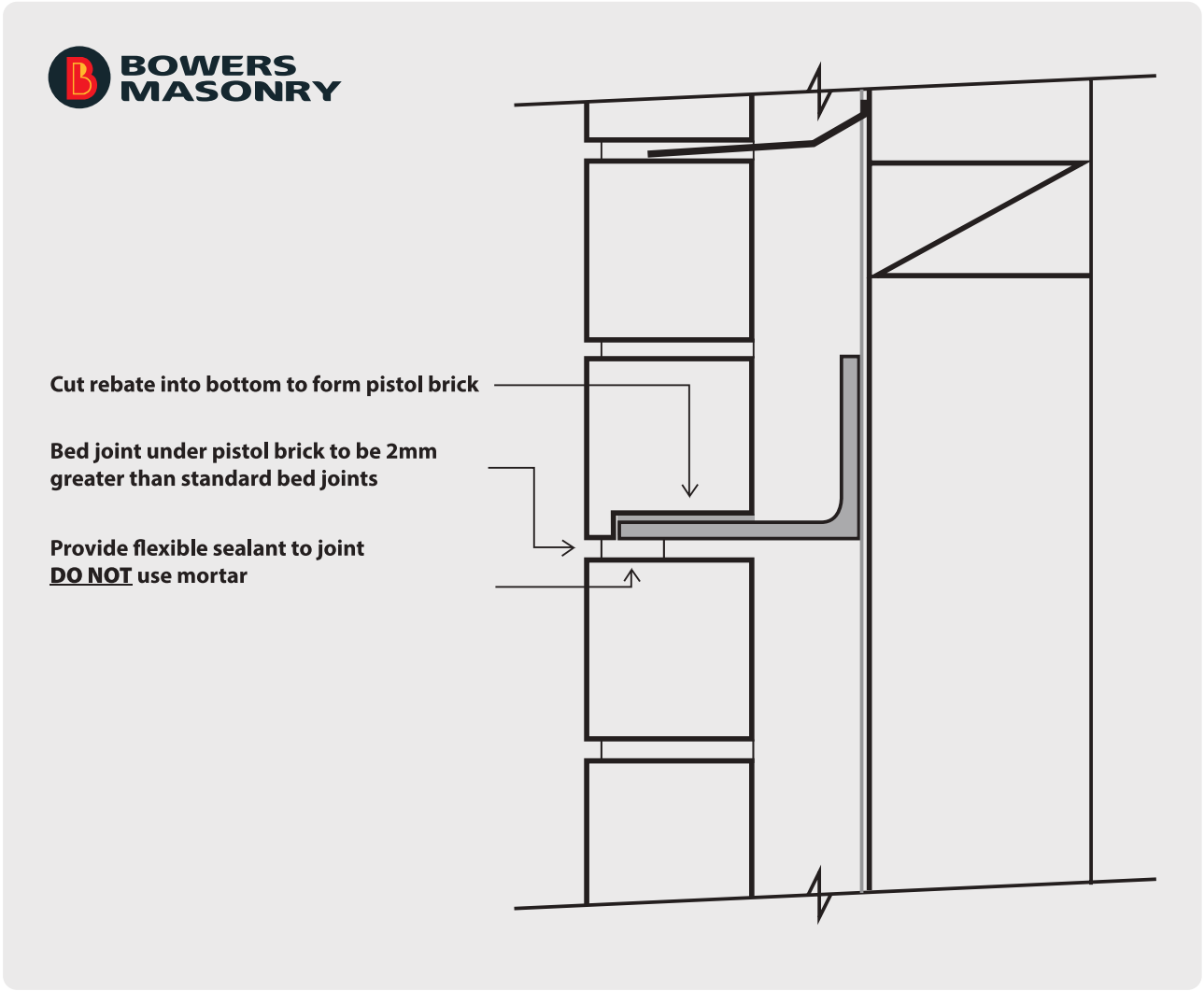


Figure 2 – Recommended hidden shelf angle detail

Wall Panels

- Brick wall panels may be laid to a maximum height of 7.5m without the addition of shelf angles or slip joints.

Gable Ends and Piers

- Gable end wall panels may be laid to a maximum height of 10m.
- Brick piers, of maximum width not exceeding 1.0m in width and not supporting loads from lintel shelf

SPECIFICATION **S2**

SUPPORTING STRUCTURE

- The supporting structure shall be timber framed construction in accordance with NZS 3604, concrete block/precast in accordance with NZS 4229 or light structural framing in accordance with NASH Standards part 1 and 2. Alternatively, or where support structure deviates from these codes a specific engineering designed supporting structure may be adopted. Supporting structure to be designed and detailed by a suitably qualified engineer.

BRICK CAVITY

The cavity shall comply with the requirements noted in Specification B1.

BRICK TIE INSTALLATION

Brick ties shall comply with the requirements noted in Specification B1, with the exception of the spacing requirements outlined below:

Table 2 – Brick ties spacing

Placement of Brick ties in Mortar Courses		
Bowers Brick Product	**Height of Brick**	**Studs at 400mm crs.**
Standard brick	150mm	Every 3rd course
Classic brick	76mm	Every 2nd course
Plateau brick	150mm	Every 3rd course
Cadrona	190mm	Every 2nd course
10 series Half High	90mm	Every 3rd course

JOINT REINFORCEMENT

- Install one row of bed joint reinforcement at 4m ± 100mm above the bottom course.
- Install further rows of bed joint reinforcement, spaced 800mm ± 100mm apart, above this level.
- Bed joint reinforcement is to be placed in mortar joints that do not contain brick ties.
- Bed joint reinforcement to be MASONS 4.0mm Bricklock STR and CNR galvanised or stainless-steel joint reinforcement or equivalent, as appropriate for the site exposure zone (refer NZS 3604).
- Where a gable exists on top of the veneer panel, install a further two rows of bed joint reinforcement, at the same spacing, into the gable.
- Bed joint reinforcement is not required within piers above the veneer panel.
- Bed joint reinforcement to be installed within 350mm of the top and bottom of the panel.
- Bed joint reinforcement to be installed within 175mm of head and sill of window/door openings, extending minimum of 2 bricks into the adjacent brick panel.

Due to the wide variety of designs, location of windows, panel widths, roof configurations etc., it is not practical to be more specific where consideration should be given to installing joint reinforcement.

SPECIFICATION **S2**

LINTELS

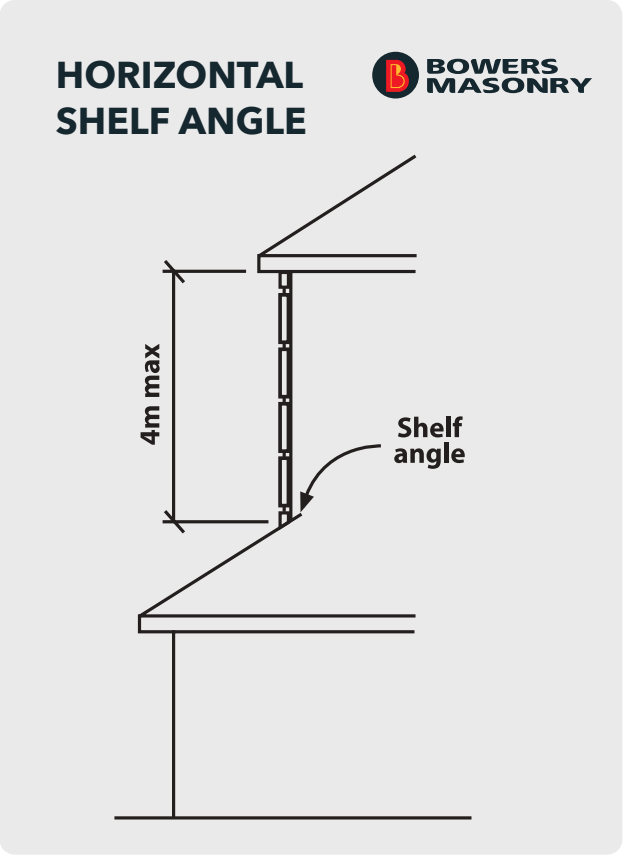
Lintels shall comply with the requirements noted in Specification B1, with the following exceptions:

- Seated lintels may only be used over openings in the upper level of a two-storey building.

Seated lintels may not be used over a skirt roof (use of seated lintels over an opening above a skirt roof is permitted).

SHELF ANGLES

- In addition to the requirements set out in Specification S1, shelf angles may be installed above skirt roofs.
- The architect/engineer is to ensure an adequate support structure for fixing of the shelf angle.
- The maximum veneer panel height above a shelf angle over a skirt roof is to be 4m, measured as shown in Figure 3 below.



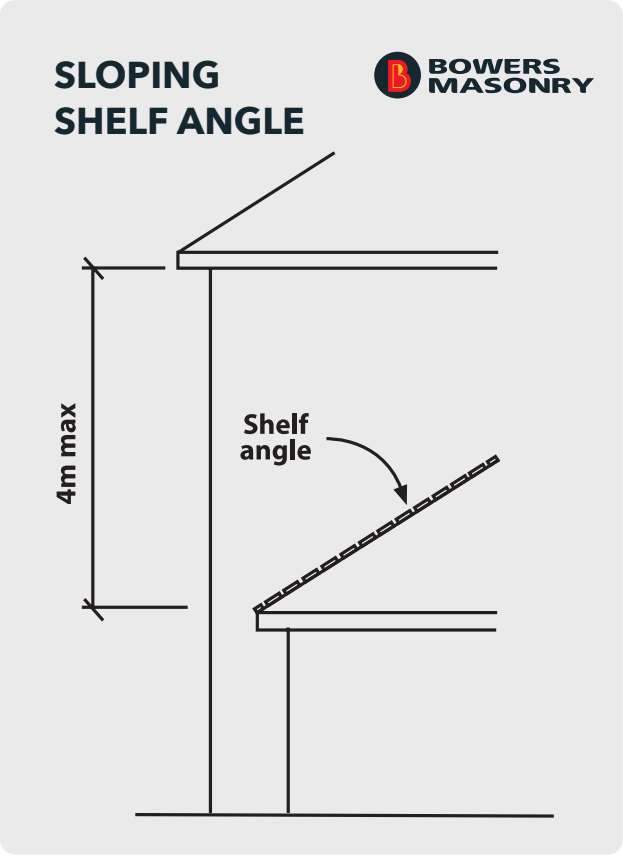


Figure 3 – Shelf Angles - diagram sourced from Brick & Paver Manufacturers association

TECHNICAL SUPPORT

Should you require any technical support on the Bowers Brick Veneer System, please contact Bowers on:

0800 207 374
technicalsupport@bowersbrothers.co.nz
www.bowersbrothers.co.nz

SPECIFICATION **S2**

Building Code Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

ISSUE: C

(Guidance on use of Producer Statements is available at www.engineeringnz.org)

ISSUED BY: **KIRK ROBERTS Consulting Ltd.** (Design Firm) **PROJECT NO: 2020758**

TO: **Bowers Brothers Concrete Ltd** (Owner/Developer)

TO BE SUPPLIED TO: **Relevant Territorial Authority** (Building Consent Authority)

IN RESPECT OF: **Two-storey stack bonded brick veneer specification as per the attached documentation 'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION S2'** (Description of Building Work)

AT: **Locations throughout New Zealand** (Address)

We have been engaged by the owner/developer referred to above to provide **Structural Engineering Design** services in respect of the requirements of Clause(s) **B1/VM1** of the Building Code for
All ☐ or Part only ☒ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1/VM1** or (verification method / acceptable solution)

☐ Alternative solution as per the attached schedule: _____

The proposed building work covered by this producer statement is described on the attached specification titled **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION S2 revB'** and dated **31st March 2021**

On behalf of the Design Firm, and subject to:

(i) All proprietary products meeting their performance specification requirements.
(ii) Up to **'Extra High'** wind zone in accordance with NZS3604: 2011.
(iii) Maximum site site hazard factor **Z = 0.4** in accordance with NZS1170.5: 2004.
(iv) Structural design loads are based on a **50 year design life** and **Importance Level 2** structure (normal structures and structures not in other importance levels) as defined in AS/NZS 1170.0 2004 clause 3.3.
(v) Compliance with pre-requisite documents **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B1, & S1'**
(vi) Unless specifically noted, all structural elements must comply with the relevant New Zealand design code such as **NZS 3604, NZS 4229, NZS 2699, NZS 4210, and NZS HB 4236.**
These elements include, but are not limited to: **brick ties, mortar strength, brick strength, and bond between the brick and mortar.**
(vii) Bowers Brothers brick products shall be manufactured to the requirements of **NZS 4455.**
(viii) **This certificate does not cover weather-tightness, nor the stability, suitability or potential liquefaction of the site.**
(ix) **This Producer Statement is valid for a building consent issued within 1 year from the date of issue.**
(x) **Inspections of the building are to be undertaken by the Building Consent Authority (council).**

I **believe on reasonable grounds** that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation: (Refer note above)
☐CM1 ☐CM2 ☒CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, **Craig Allan Manssen** am: ☒CPEng **161576** #
(Name of Design Professional)
☐Reg Arch ..... .#

I am a Member of: ☒ Engineering New Zealand ☐NZIA and hold the following qualifications: **B.E.(Hons), CMEngNZ, CPEng**
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☒

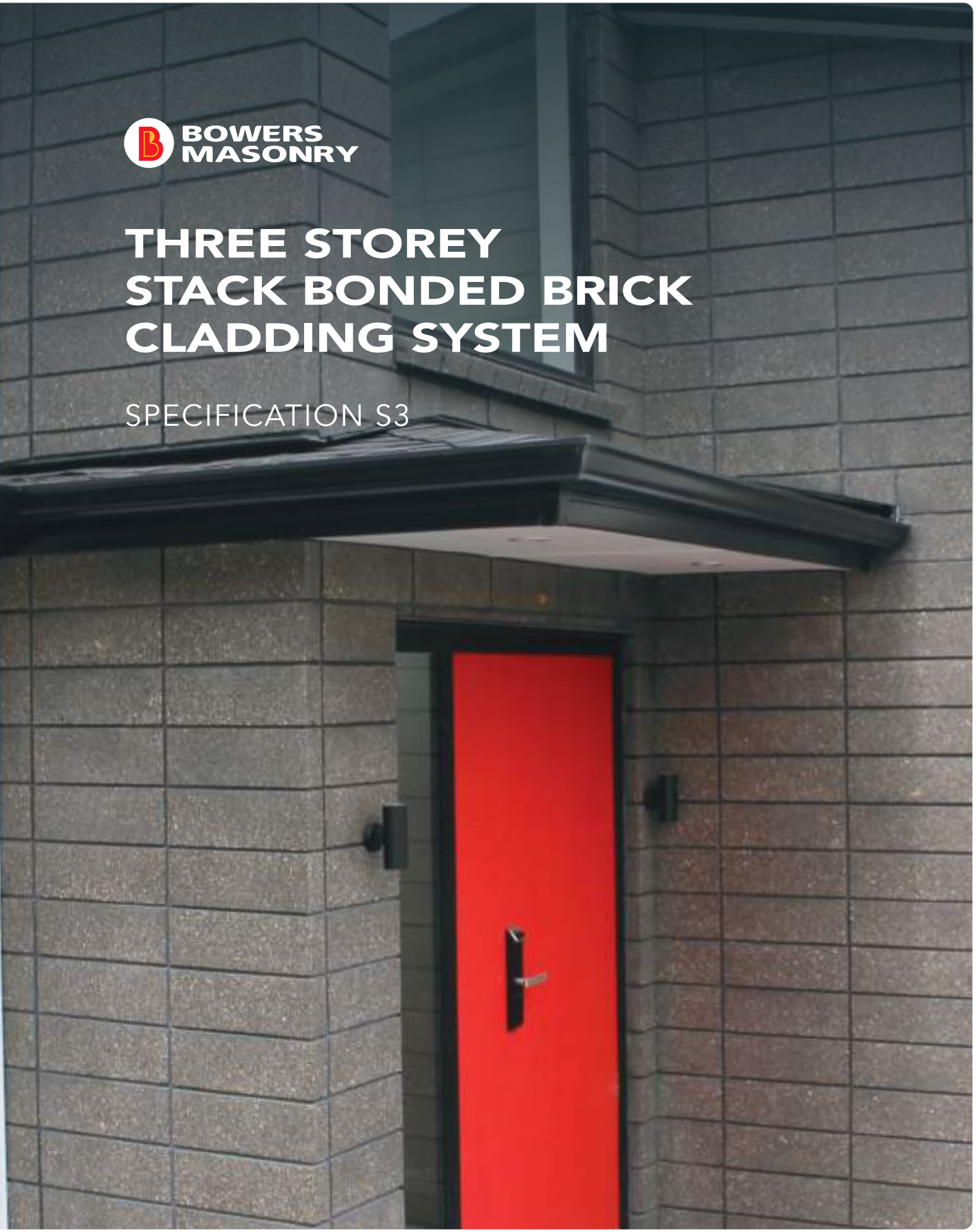
SIGNED BY **Craig Allan Manssen** ON BEHALF OF **Kirk Roberts Consulting Engineers Ltd.** (Design Firm)

Date: **1st April 2023** (signature).....

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

BOWERS MASONRY



BOWERS MASONRY

THREE STOREY STACK BONDED BRICK CLADDING SYSTEM

SPECIFICATION S3

GENERAL

The following is a specification used for the construction of three-storey, running-bonded brick veneers.

- This document presents an 'Alternative Solution' to E2/AS1 applicable when Bowers concrete bricks, as mentioned in this document, are used as a masonry brick veneer.
- This document is to be read in accordance with the prerequisite Bowers brick cladding system specification B1 & B2. Items not covered in this specification must comply with the specific design bricklaying specification for Bowers concrete bricks, Specification B1.

Should a requirement in this document conflict with either S1 or S2, this specification, Specification S3, is to apply.

LIMITATIONS

The designer shall ensure that Bowers brick veneer detailing, as presented within the Building Consent Plans and Specifications, complies with all aspects of this 'Specific Design Specification'. Plans submitted for Building Consent must be clearly marked and identify the use of Bowers brick veneers as follows;

"Bowers Stack Bonded Brick Cladding System – Specification S3 – no substitution"

The Bowers three-storey stack bonded brick veneer shall be subject to the limitations outlined in Specifications B1, S1, and S2 with the following exceptions:

- Brick must be laid in a stack bonded pattern.
- Up to a 3kPa floor loading.
- A maximum of three-storey construction.
- Limited to a maximum calculated risk score of 20 in accordance with NZBC Acceptable Solution E2/AS1 Table 2.
- Where timber studs are used as the support structure, a maximum stud spacing of 400mm shall apply. Specific design of supporting structure for the upper level, beyond the limitations of NZS 3604 shall apply.
- Maximum veneer height of veneer above adjacent finished ground level of 10.0m for straight vertical panels and extended to 12.0m at the apex of a gable end or a pier of no more than 1.0m width.
- Installation of a mid-wall shelf angle at 6.0m, or at the structural floor level of the third storey floor (whichever is smaller), in accordance with Figure 2.
- Maximum veneer height of 10.0m for straight vertical panels and 12.0m to the apex of a gable or a pier as defined in this document, in accordance with Figure 1.

SPECIFICATION **S3**

BRICKS

This specification is only applicable to the following brick types manufactured by Bowers:

Table 1 – Bowers – Bricks applicable to this specification

Bricks applicable to this specification				
Bowers Brick Product	Size (LxHxW)	No/m²	Weight (kg) Per brick	Weight (kg/m²)
Standard brick	220 x 150 x 70mm	27.2	4.4	130
Classic brick	230 x 76 x 70mm	48.0	2.2	125
Plateau brick	450 x 150 x 70mm	13.6	7.7	150
Cadrona	390 x 190 x 90mm	12.5	10.8	150
10 series Half High	390 x 90 x 90mm	25	4.1	120

Note: Table 1 includes a 4% allowance for wastage in the number of bricks per m², for ordering purposes

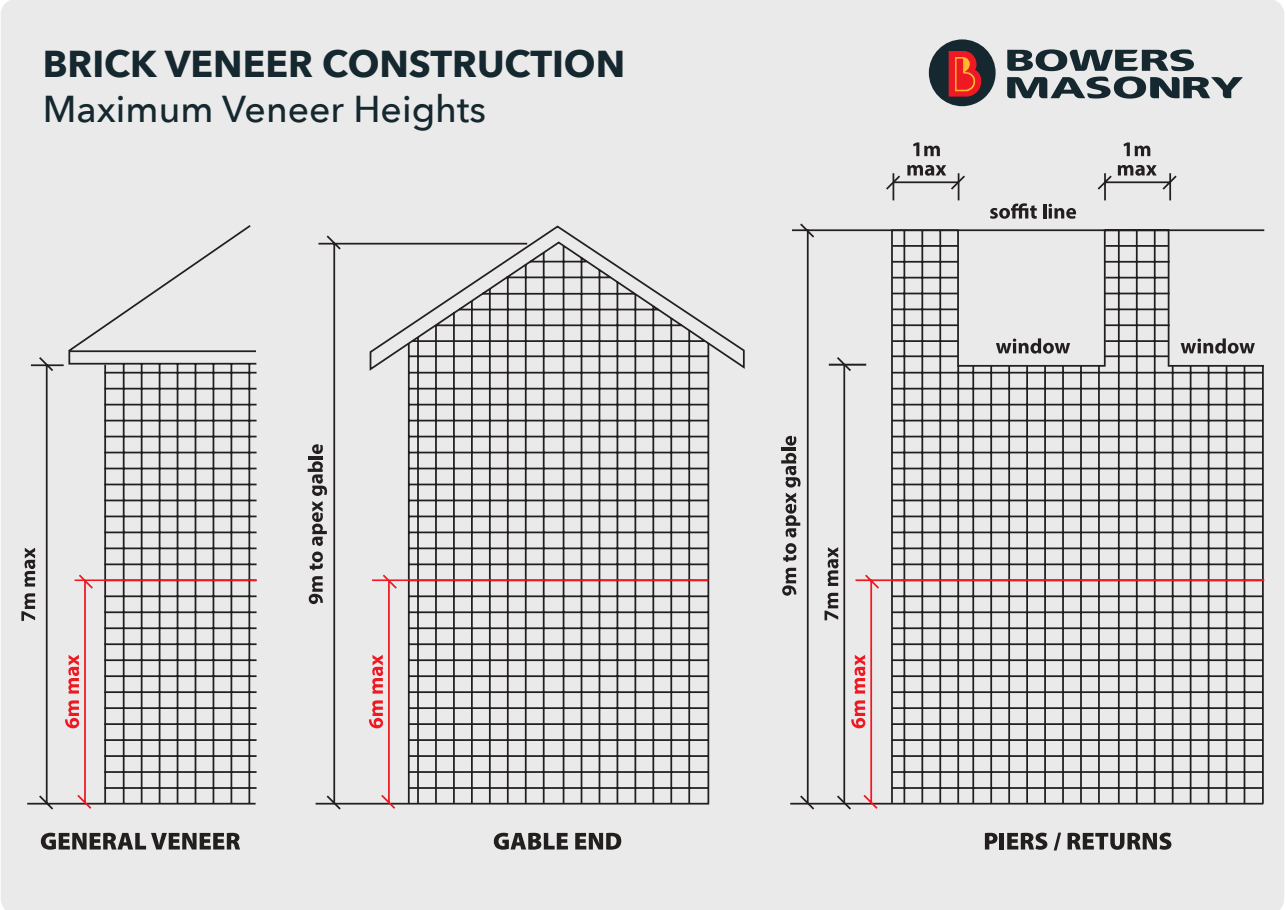


Figure 1 - Maximum Veneer Heights for three-storey stack-bonded construction

SPECIFICATION **S3**

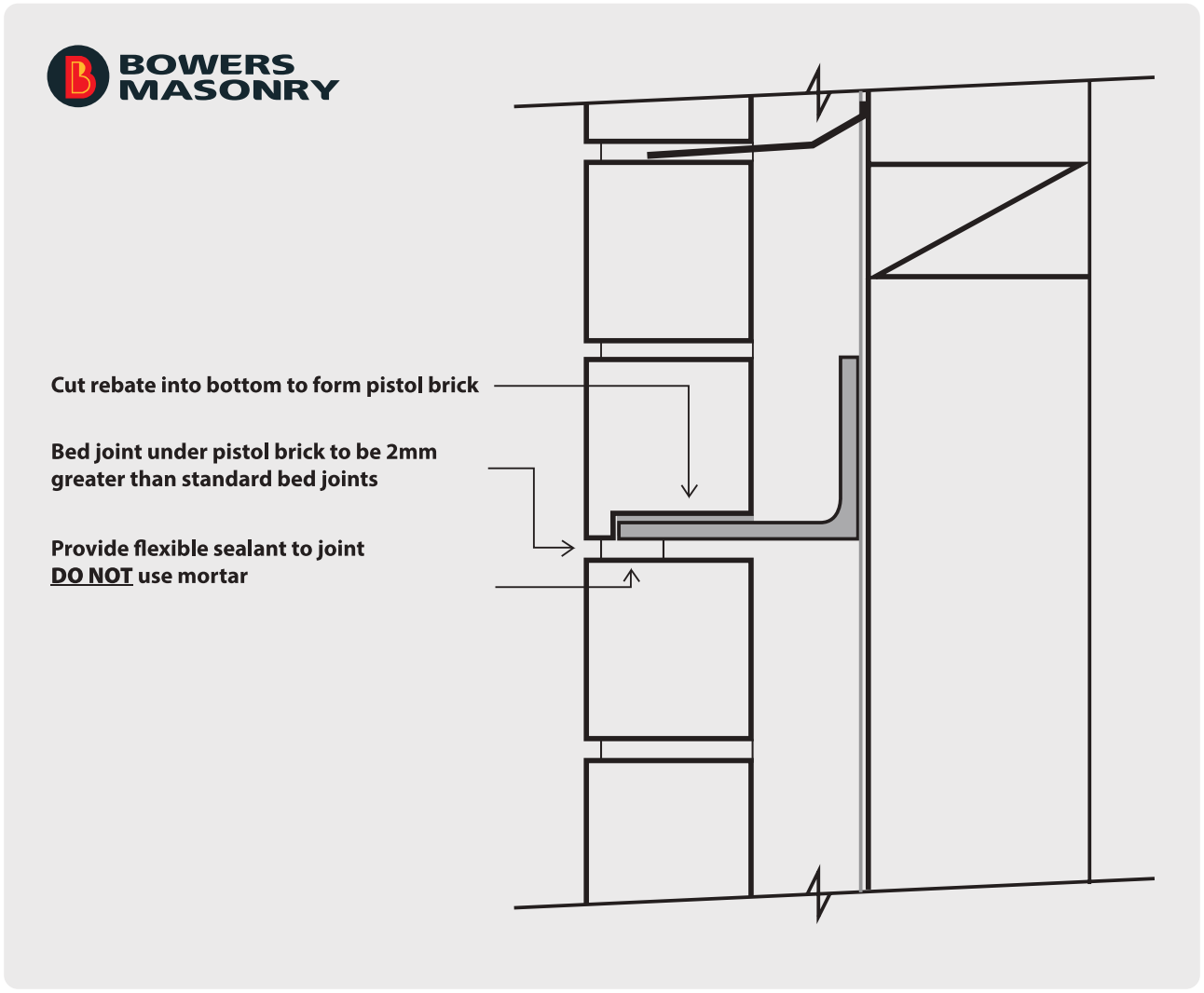


Figure 2 – Recommended hidden shelf angle detail

Wall Panels

- The bricks may be laid in one panel to a maximum height of 10m.
- Above 6m, or at the structural floor level of the third storey floor (whichever is the lesser), a mid-wall shelf angle is to be installed in accordance with detail 2.
- The shelf angle is to be installed at all areas where the veneer panel extends above 6m, except where this is a gable or pier in accordance with specification S2.
- The bed joint under the shelf angle is to be fill with a suitable flexible sealant, NOT mortar.
- The veneer panels below 6m are to be installed in accordance with specification S2.

Gable Ends and Piers

- The brick veneer can be laid to a maximum height of 12m with a gable end.
- A pier is defined as a brick panel not exceeding 1m in width and not supporting a brick steel lintel in any way. A pier must not exceed 12m in height.

SPECIFICATION **S3**

SUPPORTING STRUCTURE

- The supporting structure shall be timber framed construction in accordance with NZS 3604, concrete block/precast in accordance with NZS 4229 or light structural framing in accordance with NASH Standards part 1 and 2. Alternatively, or where support structure deviates from these codes a specific engineering designed supporting structure may be adopted. Supporting structure to be designed and detailed by a suitably qualified engineer.

BRACING

Bracing requirements of walls shall be calculated using the prescribed tables in NZS 3604, or where the building falls outside of the limitations of this code, by a suitably qualified engineer.

BRICK CAVITY

The cavity shall comply with the requirements noted in Specification S1.

BRICK TIE INSTALLATION

Brick ties shall comply with the requirements noted in Specification S1 with the exception of the spacing requirements outlined below:

Brick tie spacing

Brick ties are to be fixed horizontally to supporting structure at a maximum spacing of 400mm, and vertically depending on the height of the brick as per table below. The upper most line of ties shall be installed at the first mortar bed joint from the top of the wall.

Table 2 – Brick ties spacing

Placement of Brick ties in Mortar Courses		
Bowers Brick Product	**Height of Brick**	**Studs at 400mm crs.**
Standard brick	150mm	Every 3rd course
Classic brick	76mm	Every 2nd course
Plateau brick	150mm	Every 3rd course
Cadrona	190mm	Every 2nd course
10 series Half High	90mm	Every 3rd course

JOINT REINFORCEMENT

- Bed joint reinforcement across the brick veneer is to comply with the requirements set out in specification S2.

LINTELS

Lintels shall comply with the requirements noted in Specification S1, with the following exceptions:

- Seated lintels may only be used over openings in the second and third level of a three-storey building.
- Seated lintels may not be used over a skirt roof (use of seated lintels over an opening above a skirt roof is permitted).

SPECIFICATION **S3**

SHELF ANGLES

- In addition to the requirements set out in Specification S1, shelf angles may be installed above skirt roofs.
- The architect/engineer is to ensure an adequate support structure for fixing of the shelf angle.
- The maximum veneer panel height above a shelf angle over a skirt roof is to be 4m, measured as shown in Figure 3 below.

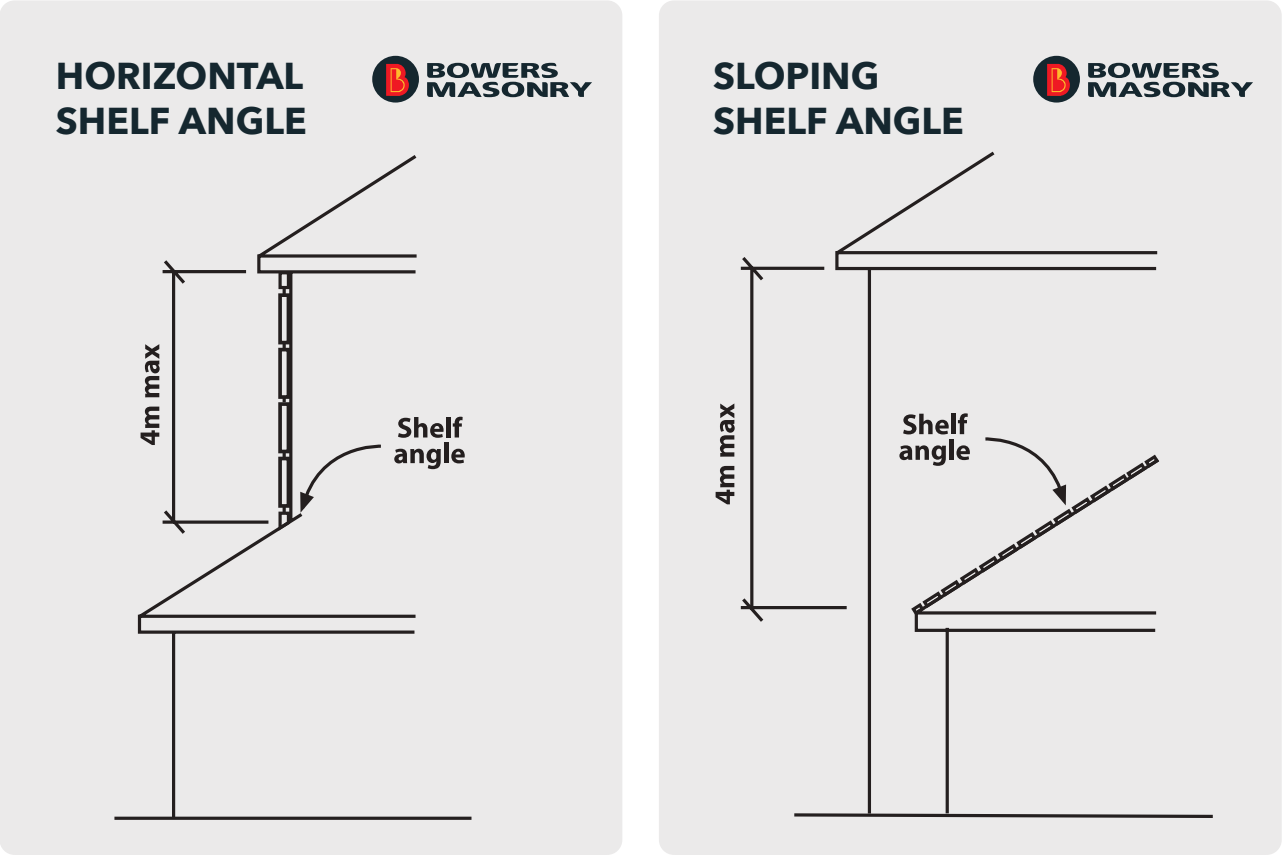


Figure 3 – Shelf Angles - diagram sourced from Brick & Paver Manufacturers association

TECHNICAL SUPPORT
Should you require any technical support on the Bowers Brick Veneer System, please contact Bowers on:

0800 207 374
technicalsupport@bowersbrothers.co.nz
www.bowersbrothers.co.nz

BOWERS MASONRY

SPECIFICATION **S3**

Building Code Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

ISSUE: C

(Guidance on use of Producer Statements is available at www.engineeringnz.org)

ISSUED BY: **KIRK ROBERTS Consulting Ltd.** (Design Firm) **PROJECT NO: 2020758**

TO: **Bowers Brothers Concrete Ltd** (Owner/Developer)

TO BE SUPPLIED TO: **Relevant Territorial Authority** (Building Consent Authority)

IN RESPECT OF: **Three-storey stack bonded brick veneer specification as per the attached documentation 'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION S3'** (Description of Building Work)

AT: **Locations throughout New Zealand** (Address)

We have been engaged by the owner/developer referred to above to provide **Structural Engineering Design** services in respect of the requirements of Clause(s) **B1/VM1** of the Building Code for
All ☐ or Part only ☒ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1/VM1** or (verification method / acceptable solution)

☐ Alternative solution as per the attached schedule: **E2/AS1 Masonry**

The proposed building work covered by this producer statement is described on the attached specification titled **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION S3 revB'** and dated **31st March 2021**

On behalf of the Design Firm, and subject to:

(i) All proprietary products meeting their performance specification requirements.
(ii) Up to **'Extra High'** wind zone in accordance with NZS3604: 2011.
(iii) Maximum site site hazard factor **Z = 0.4** in accordance with NZS1170.5: 2004.
(iv) Structural design loads are based on a **50 year design life** and Importance **Level 2 structure** (normal structures and structures not in other importance levels) as defined in AS/NZS 1170.0 2004 clause 3.3.
(v) Compliance with pre-requisite documents **'BOWERS BRICK CLADDING SYSTEM – SPECIFICATION B1, S1, & S2'**
(vi) Unless specifically noted, all structural elements must comply with the relevant New Zealand design code such as **NZS 3604, NZS 4229, NZS 2699, NZS 4210, and NZS HB 4236.**
These elements include, but are not limited to: **brick ties, mortar strength, brick strength, and bond between the brick and mortar.**
(vii) Bowers Brothers brick products shall be manufactured to the requirements of **NZS 4455.**
(viii) **This certificate does not cover weather-tightness, nor the stability, suitability or potential liquefaction of the site.**
(ix) **This Producer Statement is valid for a building consent issued within 1 year from the date of issue.**
(x) **Inspections of the building are to be undertaken by the Building Consent Authority (council).**

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☐CM1 ☐CM2 ☒CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, **Craig Allan Manssen** am: ☒CPEng **161576** #
(Name of Design Professional)
☐Reg Arch ..... .#

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The Design Firm is a member of ACENZ: ☒

SIGNED BY **Craig Allan Manssen** ON BEHALF OF **Kirk Roberts Consulting Engineers Ltd.** (Design Firm)

Date: **1st April 2023** (signature).....

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BOWERS MASONRY

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BOWERS BROTHERS CONCRETE LIMITED
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