GIB®

Bracing Supplement Document

Issue Date April 2025

SUPPLEMENT	ISSUE DATE
History of Plasterboard as a Structural Bracing Material in NZ	APR-25
Bracing Light Timber Frame Buildings Using Sheet Materials	APR-25
Distribution of Wall Bracing Elements	APR-25
GIB Ezybrace® Systems BU/m Ratings	APR-25
Small Openings in Bracing Elements	APR-25
Designing Bracing Upgrades	APR-25
GIB EzyBrace® Concrete Slab Information	APR-25
Multi Layer Bracing Systems	APR-25
Wings, Blocks and Diaphragms	APR-25
Stacked Bracing Elements	APR-25

GIB®

History of Plasterboard as a Structural Bracing Material in NZ

Issue Date April 2025

Plasterboard bracing systems play a significant role in the construction of residential buildings in New Zealand. The use of these systems has developed over time, changing the way homes are built, making the process faster, easier, and more affordable by incorporating existing plasterboard linings into the structural bracing of the building.

Plasterboard was first introduced in New Zealand in the early-20th century. At the time, it was considered a novel material that promised to simplify the building process. Early plasterboards were used as a covering for walls and ceilings, as an alternative to lath and plaster linings. It wasn't until the 1970's that the material's bracing properties were first investigated.

In the 1970's, engineers and builders in New Zealand realised that plasterboard could be used as a bracing material. At the time, research was also carried out to investigate the seismic performance of residential buildings, and included testing of then typical construction methods, such as timber framing with cut-in timber braces, without linings in place. The results did not line up with the observed performance of building in actual earthquakes. Light timber framed buildings had performed better than the results suggested. Further testing was carried out with linings in place, and it was concluded that plasterboard linings significantly contribute to bracing resistance.

This is no real surprise. Once all sheets are taped and stopped, the plasterboard lining system is strong and very stiff. During an earthquake, or high winds, the stiffest element will be subjected to lateral forces first, whether designed to resist them or not. If a bracing design relies on more flexible elements, the stiffer plasterboard system will still contribute, but can suffer damage before forces are transferred, resulting in cracked joints and possible sheet damage. As the wall is loaded it will deflect, only then allowing bracing elements like cut in timber bracing, or steel straps, to resist applied forces. The risk of damage is much reduced when the plasterboard lining system is designed to accept the imposed wind and earthquake forces. When correctly applied, plasterboard bracing systems will save on other bracing materials, and deliver a building less prone to movement cracks over its life.

The use of plasterboard bracing was included in the early developments of the non-specific design Standard NZS3604 – Timber Framed Buildings. Winstone Wallboards has continued to innovate and developed a range of plasterboard bracing systems with various levels of performance, as well as free design software to simplify the specification and consenting processes. Higher levels of performance mean that associated plasterboard characteristics need to be significantly better that the base minimum levels called for in Standard AS/NZS2588 – Gypsum Plasterboard.

The development of plasterboard for bracing applications was a significant breakthrough in the construction industry, as it meant that walls could be built faster and more easily, without the need for additional timber or steel braces. Plasterboard bracing systems are common in New Zealand, and widely used in residential construction today.

The continued use of plasterboard bracing in residential construction is a testament to its versatility and effectiveness.

GIB®

Bracing Light Timber Frame Buildings Using Sheet Materials

Issue Date April 2025

BRACING UNITS

Bracing Units (BUs) were introduced for use with NZS3604 in the late 1970's in recognition of the contribution sheet linings and claddings make to the bracing resistance of light timber framed structures. A 2.4m high by 2.4m long wall, with a cut-in metal angle brace and gypsum plasterboard on one face, was tested and achieved a bracing resistance of 5kN (approximately 500kg). This was designed as 100 BUs (or 42 BU/m).

Since then the bracing ratings (BU/m) for many proprietary systems have been established using the BRANZ P21 Wall Bracing Test and Evaluation Procedure. The approach adopted by NZS3604 aims to achieve bracing resistance by evenly distributing moderately rated bracing elements throughout the structure. The sum total of these BUs must exceed the design wind and earthquake forces (the demand).

DISTRIBUTION

The NZS3604 rules regarding bracing distribution have been tightened in 2011, but they are still minimum guidelines. It is the responsibility of the building designer to ensure even distribution of bracing and to seek professional engineering input in case of any doubt.

"Lop-sided" distribution can result in irregular response to wind and earthquake forces causing unpredictable damage.

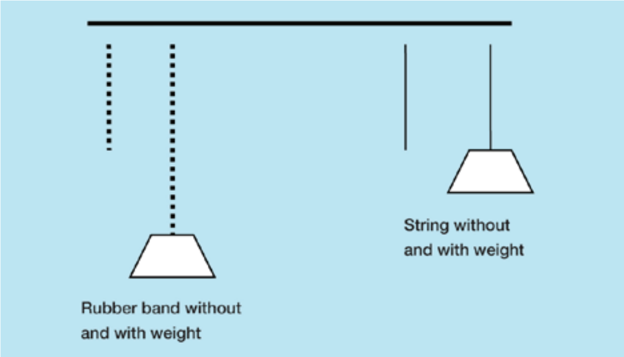
COMBINING DIFFERENT SHEET MATERIALS

Different sheet materials bring different attributes. Gypsum plasterboard is inevitably very stiff once sheets are interconnected, taped and stopped. However, gypsum plasterboard bracing is less ductile than structural plywood sheet bracing.

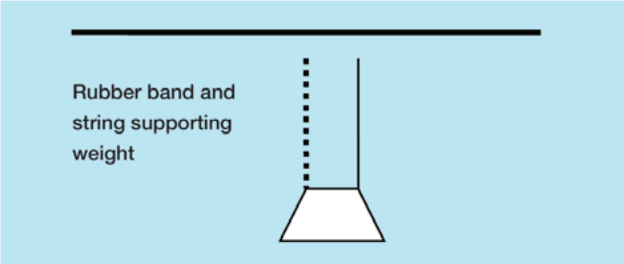
Structural plywood sheet bracing, installed on the outside of external framing, provides excellent ductility but offers less stiffness than plasterboard.

Whether we like it or not, the internal plasterboard linings will attract wind and earthquake forces first before they can be transmitted to other more flexible bracing systems. If we do not design plasterboard linings to accept these forces, then we can expect more damage than might otherwise be the case. The Canterbury earthquakes have shown plasterboard failures to be far more extensive when internal linings were poorly or not designed and installed to withstand earthquake forces.

To help illustrate this principle imagine a length of rubber band (ductile plywood bracing) and a similar length of string (stiff gypsum plasterboard bracing) both capable of supporting a certain weight (the bracing demand). The rubber band stretches considerably when the weight is applied. However, there is minimal stretch when the same weight is supported by the string.



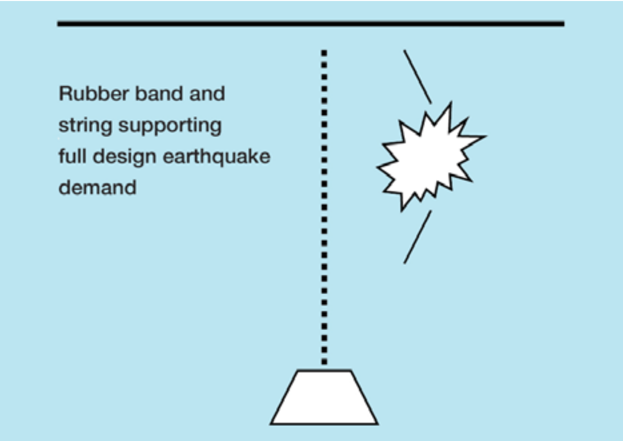
If we use the rubber band and string together to support the weight then the string does most of the work and needs to break before weight is transferred to the rubber band as illustrated below.



Now what happens when we apply these principles to buildings and do not design the stiffer element (gypsum plasterboard) to resist the full design wind and earthquake forces? In other words, what if the rubber band (plywood) has been designed to accept the bracing demand but the string (gypsum plasterboard) has only nominal fixings?

At frequent "serviceability" winds and small earthquake forces the string will perform as illustrated above.

However when forces approach “ultimate” design demand, the string will suffer damage or break before forces are transferred to the rubber band. So, although the plywood is likely to offer structural stability and protection from catastrophic failure well past design loads, the gypsum plasterboard lining system will suffer significant damage.



CONCLUSIONS

Sheet materials provide the most effective means of achieving bracing resistance in light timber framed structures such as houses.

The internal gypsum plasterboard lining system is the stiffest structural element in light timber framed structures and will attract design wind and earthquake forces first. Gypsum plasterboard linings must be designed and fixed to resist these forces regardless of whether supplementary bracing, such as structural plywood, is installed.

Discretionary use of high-performance sheet materials such as structural plywood provides added ductility to enhance protection of structures against catastrophic failure.

The combination of gypsum plasterboard and structural plywood provides early strength and stiffness at design level events and added ductility when structures are subjected to even greater wind or earthquake actions.

Using a more flexible bracing system alone, based on multiple individual sheets or discrete length panels, and not fixing internal gypsum plasterboard linings to withstand wind and earthquake forces, is likely to result in significantly greater internal lining damage during a design and even more frequent serviceability events.

The best bracing system relies on a combination of internal gypsum plasterboard linings and plywood sheet bracing. Plasterboard provides strength and stiffness, and plywood adds strength and ductility. To minimise damage during serviceability and ultimate design events, design plasterboard bracing to accept the full design demand and supplement with structural plywood for added strength and ductility as desired. Winstone Wallboards and Carter Holt Harvey publish combined GIB®/Ecoply® bracing systems where both the gypsum plasterboard and structural plywood are installed as a bracing element.

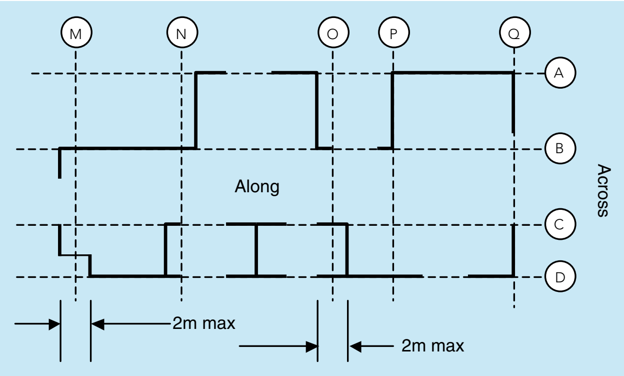
GIB®

Distribution of Wall Bracing Elements

Issue Date April 2025

Distribute bracing by drawing a grid pattern of bracing lines along and across the building. Bracing lines must coincide as much as possible with wall bracing elements.

Pairs of bracing elements may be counted on a single line provided they are no more than 2m apart as illustrated below. Locate wall bracing elements evenly throughout the building and as close as practical to corners of external walls.



Bracing lines must be spaced no more than;

- 6m for standard construction with any GIB® plasterboard ceiling,
- or 7.5m where dragon ties in accordance with NZS 3604:2011 have been installed to provide lateral strength to walls,
- or 12m with a GIB® plasterboard ceiling diaphragm, constructed in accordance with this publication (refer to the GIB® Ceiling Diaphragms technical note).

No bracing line shall have a capacity less than the greater of 100 bracing units or 50% of the total bracing demand (D) divided by the number of bracing lines (n) in the direction being considered (0.5 x D/n). For this purpose, bracing lines less than 1m apart shall be considered one line.

For example, if the bracing demand for the building shown in the diagram above is 2,500 BUs (Wind) and 2,000 BUs. (Earthquake) in the across direction (M, N, O, P, Q) each line must each have at least the maximum of

0.5 x 2,500 /5 = 250 BUs (Wind) and
0.5 x 2,000 /5 = 200 BUs (Earthquake).

In addition, external walls shall have a bracing capacity no less than 15 bracing units per metre of external wall length.

Wall bracing elements on timber floors shall not be rated higher than 120 BU/m. Wall bracing elements on concrete floors shall not be rated higher than 150 BU/m to minimise post-earthquake damage in commercial structures.

GIB

GIB Ezybrace® Systems BU/m Ratings

Issue Date April 2025

The BU/m ratings for GIB EzyBrace® Systems shown below are responsibly conservative and are provided to allow manual calculation, and for use in alternative proprietary software.

The GIB EzyBrace® software delivers more accurate demand calculations based on specific building parameters entered, and bracing resistance (BU/m) is often higher than the values presented below. Do not use this table to assess bracing substitutions.

Table 1: GIB® Standard Bracing Unit Ratings

Type	Minimum Length (m)	Lining	Other Requirements	BU/m	
				W	EQ
GS1-N	0.4	GIB® Standard plasterboard one side	N/A	50	55
	1.2			70	60
GS2-N	0.4	GIB® Standard plasterboard both sides	N/A	70	65
	1.2			95	85
GS2-NOM	0.4	GIB® Standard plasterboard both sides (standard GIB® Site Guide fastener pattern)	N/A	50	50
GSP-H	0.4	GIB® Standard plasterboard one side, structural plywood the other	Panel hold-down fixings	100	115
	1.2			150*	150*

Table 2: GIB Braceline® Bracing Unit Ratings

Type	Minimum Length (m)	Lining	Other Requirements	BU/m	
				W	EQ
BL1-H	0.4	GIB Braceline® one side	Panel hold-down fixings	90	100
	1.2			125*	105
BLG-H	0.4	GIB Braceline® one side, GIB® Standard plasterboard the other	Panel hold-down fixings	110	115
	1.2			150*	145*
BLP-H	0.4	GIB Braceline® one side, structural plywood the other	Panel hold-down fixings	120*	135*
	1.2			150*	150*

** Timber Floors – A limit of 120 BU/m for NZS 3604:2011 timber floors applies unless specific engineering ensures that uplift forces generated by elements rated higher than 120 BU/m can be resisted by floor framing.*

Table 3: GIB Weatherline® Bracing Unit Ratings

Type	Minimum Length (m)	Lining	Other Requirements	BU/m W	BU/m EQ
GSW-N	0.4	Interior lining: Any 10mm/13mm GIB® plasterboard Exterior sheathing: 10mm/13mm GIB Weatherline®	N/A	85	75
	1.2			95	85
GSW-H	0.4	Interior lining: Any 10mm/13mm GIB® plasterboard Exterior sheathing: 10mm/13mm GIB Weatherline®	Panel hold-down fixings	90	85
	1.2			130*	110
W-H	0.4	Interior lining: None Exterior sheathing: 10mm/13mm GIB Weatherline®	Panel hold-down fixings	105	100
	1.2			125*	105
BLW-H	0.4	Interior lining: 10mm/13mm GIB Braceline®/Noiseline® Exterior sheathing: 10mm/13mm GIB Weatherline®	Panel hold-down fixings	105	115
	1.2			150*	145*

** Timber Floors – A limit of 120 BU/m for NZS 3604:2011 timber floors applies unless specific engineering ensures that uplift forces generated by elements rated higher than 120 BU/m can be resisted by floor framing.*

WALL HEIGHTS OTHER THAN 2.4M

The published Bracing Unit ratings are based on a 2.4m height. For greater heights, the ratings must be multiplied by a factor f = 2.4 divided by the actual wall height. The Bracing Unit ratings for walls higher than 2.4m will reduce.

For example:

The Bracing Unit rating of a 2.7m high wall is obtained by multiplying the values in Tables 1, 2 and 3 by
f = 2.4/2.7 = 0.89

The Bracing Unit rating of a 3.6m high wall is obtained by multiplying the values in Tables 1, 2 and 3 by
f = 2.4/3.6 = 0.67

The height of walls with a sloping top plate can be taken as the average height.

Walls lower than 2.4m shall be rated as if they were 2.4m high.

For more information visit gib.co.nz/ezybrace or call the GIB® Helpline on 0800 100 442.

GIB®

Small Openings In Bracing Elements

Issue Date April 2025

Sheet linings in bracing elements often need to have penetrations such as light switches etc. through them. How many and their location make a difference as to how the bracing element performs.

RESERVE CAPACITY

When bracing element performance is tested, Winstone Wallboards uses a P21 test rig to put a physical specimen under pressure to simulate the effects of wind and earthquake. This pressure is increased until the point of failure is reached. This information is then published in the form of BU's/m (bracing units per metre) in GIB EzyBrace® literature and software. These BU/m figures include some built-in reserve capacity to allow for factors expected to be encountered on-site. Typical examples are but not limited to; a small number of overdriven screws, the necessity for part sheets within the element, and for the purpose of the information below; openings through the linings.

OPENINGS

Openings for power points, light switches, pipes for plumbing or just cables to run through all require different placement according to their purpose.

WHERE THE STRENGTH LIES

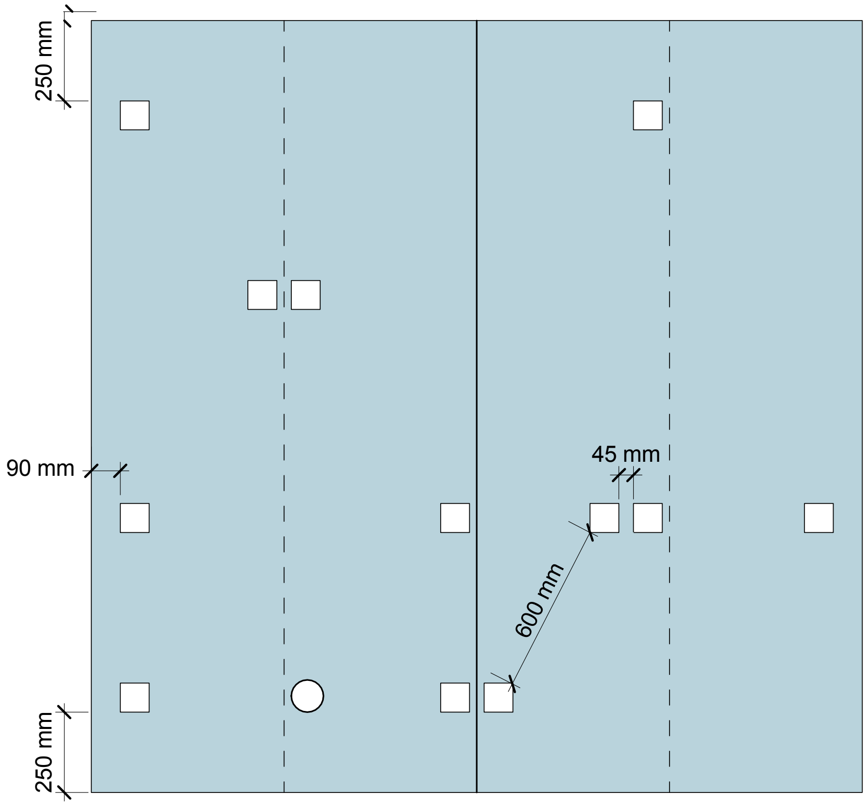
The highest performing part of the element is the perimeter where the unique fastener pattern is installed. No openings are permitted within 90mm of the bracing element perimeter. Openings can be placed within 90 mm of sheet joints within the element. Whilst the whole face of the linings contributes to the performance, the bottom 300mm of the element has the highest "demand" on it so the fewer openings in this area the better. Having multiple openings close together can tend to have a "perforation" effect so avoid too many openings in a group.

ROUND VS SQUARE

As aeroplane designers discovered early on with the window openings of a fuselage. "Forces" on sheet linings will flow around a curve looking for a weak point but not finding one, whereas a sharp corner provides a point for cracks to propagate from, much easier than a rounded off corner. With this in mind, the number of round holes can be greater than the number of "square" holes so the number of openings indicated below can change depending on the type and way they are cut, drilling with a holesaw being the optimal method.

In order to get the best out of your bracing element we have compiled some information and a diagram to help explain, whilst this information is designed to help it is not a complete set of "rules" to place restrictions on your design. If you require openings that fall outside this, please get in touch with our Technical Support team to provide further guidance and review.

When more than 1 small opening is required to be placed in the GIB® bracing element follow the below guidance. For additional technical guidance please contact the GIB® Helpline **0800 100 442.**



- No greater than 90 x 90mm or 100mm diameter.
- No closer than 250mm from the top and bottom of a bracing element, if closer use the steel reinforcing plate detail as shown on pg.20 of the GIB EzyBrace® Specification and Installation Manual.
- No closer than 90mm from the edge of a bracing element.
- Maximum 2 openings in a "group" and must have minimum 45mm gap with timber between.
- Minimum 600mm apart between "group" in a single stud bay.
- No more than 4 per stud bay.

GIB®

Designing Bracing Upgrades

Issue Date April 2025

As the New Zealand Building Code is based on a minimum requirement, customers may decide to specify above this level. The designers can upgrade bracing resistance using GIB EzyBrace®, for buildings that fall within the design scope of NZS 3604:2011.

PROBABILITY OF EXCEEDANCE AND BRACING RESISTANCE

The New Zealand Building Code requirements for Earthquake Bracing design are based on the probability that a certain design event is exceeded, as illustrated below.

Annual Probability of Exceedance	Return Period Factor for Specific Design[1]
Once in 500 years or 1/500	1.0
Once in 1000 years or 1/1000	1.3
Once in 2500 years or 1/2500	1.8

[1] Equivalent Static Method of NZS1170.5:2004 compared with the GIB EzyBrace® software

An earthquake with a probability of being exceeded once in 2500 years is much more severe than one with a 1/500 year probability of exceedance. Most residential buildings, such as those constructed in accordance with NZS 3604:2011, are required to meet a minimum 1/500 annual probability of exceedance, assuming a 50 year life expectancy. When a residential home is designed for a 100 year life expectancy, the required earthquake design period is 1/1000.

Multi-tenanted and public buildings such as hotels, apartments, offices, schools, medical centres, etc. can often be built to NZS 3604:2011 but commonly need to be designed for a different annual probability of exceedance ranging from 1/500 to 1/2500, depending on importance level and design working life.

To place some perspective, analysis of the information from the 22nd February 2011 Christchurch earthquake indicates that this event was close to the 1/2500 annual probability of exceedance.

UPGRADING BRACING RESISTANCE USING GIB EZYBRACE®

GIB EzyBrace® systems have been tested and appraised to meet the requirements of the New Zealand Building Code using New Zealand Standard NZS 3604:2011 and the default setting for earthquake design is an annual probability of exceedance of 1/500.

The GIB EzyBrace® software incorporates an easy way to design for increased bracing resistance by selecting an increased annual probability of exceedance level.

Simply select the annual probability of exceedance using the drop down box in the demand sheet. For a 1/1000 probability, the bracing requirement (demand) increases by 30% and for a 1/2500 probability, bracing demand increases by 80% when compared with the default 1/500 minimum annual probability of exceedance.

Wind Zone	High	Earthquake Zone	Soil Type
Select by Building Consent Authority Map		3 ▼	D&E (deep to very soft) ▼
or Preference	High ▼	Annual exceedance probability	
Wind region	Preference selected ▼	1/1000 (NZS3604:2011 x 1.3) ▼	
Lee Zone	Preference selected ▼	This design has been upgarded to resist an annual earthquake exceedance probability of 1/1000	
Ground Roughness	Preference selected ▼		
Site Exposure	Preference selected ▼		
Topographic Class	Preference selected ▼	** Options include the default setting of 1/500, or increased annual probabilities of exceedance of 1/1000 or 1/2500*	

When designing for increased bracing resistance a statement, similar to that below, should be highlighted on all bracing plans and associated information;

DESIGN ACROSS THE WHOLE BUILDING

As a general rule of thumb it is recommended to exceed the minimum bracing requirements by 10 to 20%. This means a target bracing resistance value of between 110 and 120%.

As is reflected in NZS 3604:2011 bracing should ideally be distributed evenly across the whole building and not just isolated to the external walls or building ends.

External walls generally only account for around 1/3 of the total bracing performance of a house. Therefore if bracing on the external walls is increased by say 30%, the actual improvement over the whole building is likely to be only 10% or less.

Also modifying plasterboard linings alone will often deliver limited improvement. To achieve a higher overall building performance, full bracing system specifications must be installed which often includes additional hardware such as panel hold-downs.

GIB EzyBrace® Concrete Slab Information

Issue Date April 2025

SLAB EDGE HOLD DOWN REQUIREMENTS

The addition of slab edge insulation can affect the achievable edge distance for hold downs. GIB Handibrac® requires a minimum edge distance of 35mm for RibRaft or formed slabs, this increases to 55mm when fixing to a standard concrete floor with masonry header blocks.

It is important to consider type of foundation, cladding, the thickness of the slab edge insulation, overhang if any, and framing dimension at an early design stage.

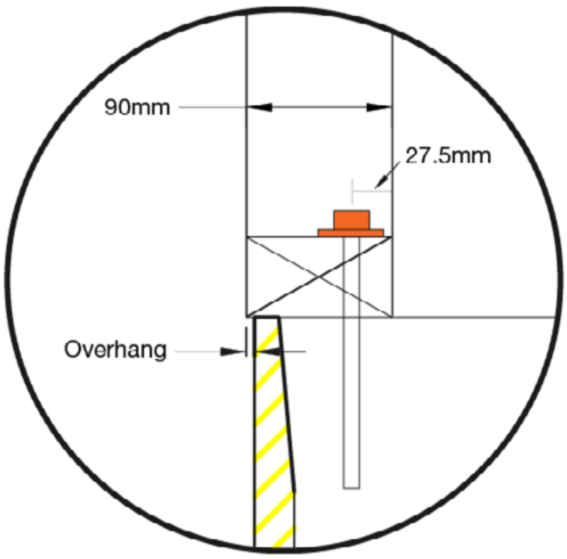
Also consider proprietary systems which have resolved this issue when 90mm framing is used. For example refer to the Firth HotEdge® Extra which is suitable with the GIB Handibrac®

www.firth.co.nz/concrete/foundations/ribraft-hotedge

BOTTOM PLATE POSITION

When 90mm framing is used in combination with HotEdge Extra, care is required to achieve the correct overhang of the bottom plate relative to the exterior face of the HotEdge Extra board. As the overhang increases, the edge distance of the hold down bolts decreases, as does the bearing area of the bottom plate.

Figure 1. Overhang Detail for 90mm framing with HotEdge Extra



As per E2/AS1 no overhang is required when the cladding is installed over a drained cavity.

Table 4: Overhang mm at hold down bolt or stud location with reference to Figure 1.

Overhang Details	
0 - 5mm	Target overhang, details as per this technical manual.
> 5 - 10mm	Over target, reduce hold down bolt spacing from 900mm ctr to 600mm ctr. If bracing (15kN) anchors required, duplicate anchor each side of stud. Where duplication not possible seek specific engineering advice.
> 10mm	Overhang outside scope of this manual, seek specific engineering advice.

Multi Layer Bracing Systems

Issue Date April 2025

In a two layer wall system such as GIB® Fire or Noise Control Systems, the plasterboard bracing element sheets can be either:

Applied directly to the framing, with fasteners set out as per the bracing instructions and a fastener length as per the system being installed. The inner layer can be left unstopped. Or, applied to the outer sheets with the outer layer fasteners being installed as per the bracing instructions and fastener length as per the system being installed.

The outer layer is to be tapped and stopped as per GIB® Site guide.

When a GIB® Bracing element has been designated for a section of wall, BU ratings cannot be increased by incorporating additional proprietary bracing elements within that same section of wall.

GIB®

Wings, Blocks and Diaphragms

Issue Date April 2025

We are often asked if separate bracing calculation is required for ‘wings’ or ‘blocks’.

NZS 3604:2011 paragraph 5.1.5 requires wings or blocks to ‘provide sufficient bracing individually’ if they extend more than 6 metres from main building. Note that this requirement refers to the provision of bracing, and that separate calculation is not mentioned as a requirement.

The intent of the clause is that provision of bracing is relative to floor area. In other words, if a wing represents 20% of the total building floor area, then at least 20% of the bracing demand must be provided in that wing.

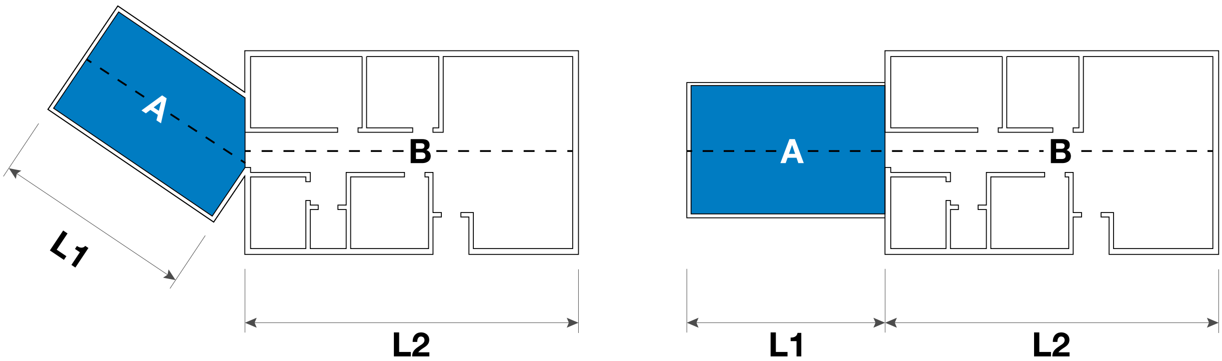
This can be achieved by separate calculation, but is often more readily achieved by treating the building as a single unit and simply ensuring bracing distribution is balanced and proportional to floor area.

Even when wings or blocks are at an angle to the main building, a single calculation can be carried out.

NZS3604:2011 paragraph 5.4.4 gives guidance for walls at angles to the bracing grid and is intended for single or few individual walls. Wings or blocks at an angle are better treated separately or by ‘stretching’ the building along the ridge line for calculation purposes and treating it as a single rectangular structure. The angle to bracing line function in the GIB EzyBrace® calculation sheet does not need to be applied in this situation.

Using a ‘stretched’ rectangular design will deliver the same outcome as doing two separate calculations. Again the important issue is to ensure that bracing provision and distribution is proportional to floor area.

Calculating A and B Separately Give the Same Bracing Demand as Treating Them as a Single ‘Stretched’ Building. Ensure That Bracing Provision is Proportional to Floor Area.



The other frequently encountered bracing question relates to ceiling diaphragms and when they are required.

We often see diaphragms specified where they are not needed.

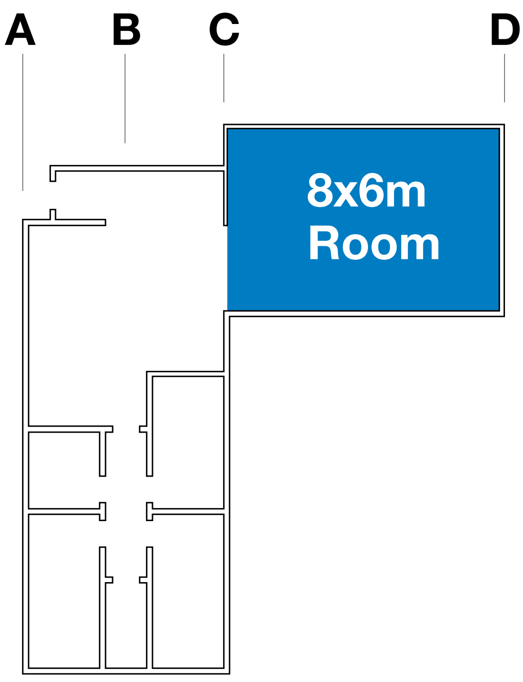
NZS3604:2011 paragraph 5.4.6 states that bracing lines 'shall not be at more than 6m centres provided that there need be no bracing lines within the area covered by a diaphragm …'. The need for a diaphragm is thus determined by the spacing of bracing lines and not by the dimensions of a particular room.

The illustrations below show two designs incorporating a 8 x 6m room.

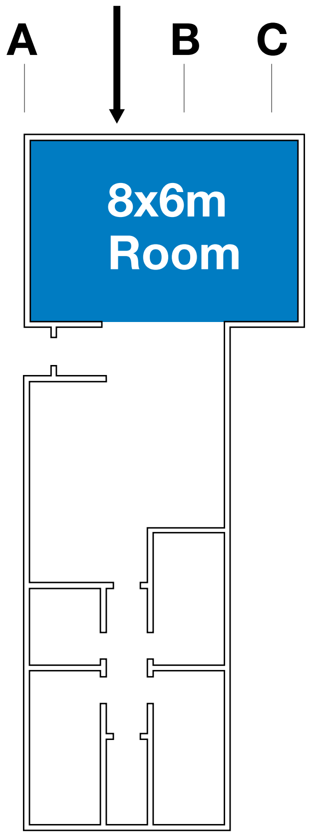
- Plan A NZS3604:2011 requires a ceiling diaphragm.
- Plan B does not because bracing lines dissecting the room are spaced at less than 6m.

A point to note is that the underlying NZS3604 assumption is that structural framing, such as trusses, rafters and their connections, provide support to the external wall (indicated by an arrow) back to the bracing grid. Use a ceiling diaphragm if there is any doubt whether such structural connections exist.

Plan A



Plan B



Stacked Bracing Elements

Issue Date April 2025

How do you determine the bracing capacity of GIB Ezybrace® systems to timber framed walls built on top of a reinforced concrete or reinforced concrete masonry walls.

Firstly the concrete or concrete masonry wall needs to comply with NZS 4229. Secondly check the bracing unit rating per metre of the concrete wall based on full width.

NZS3604:2011 Table 8.1 on the right can be applied to make this assessment. If the bracing unit rating per metre is less than the GIB Ezybrace® system, the lower rating of the two will dictate the Bracing capacity of the overall element. This follows the principle of NZS 3604:2011 clause 5.5.5 Stacked subfloor bracing systems.

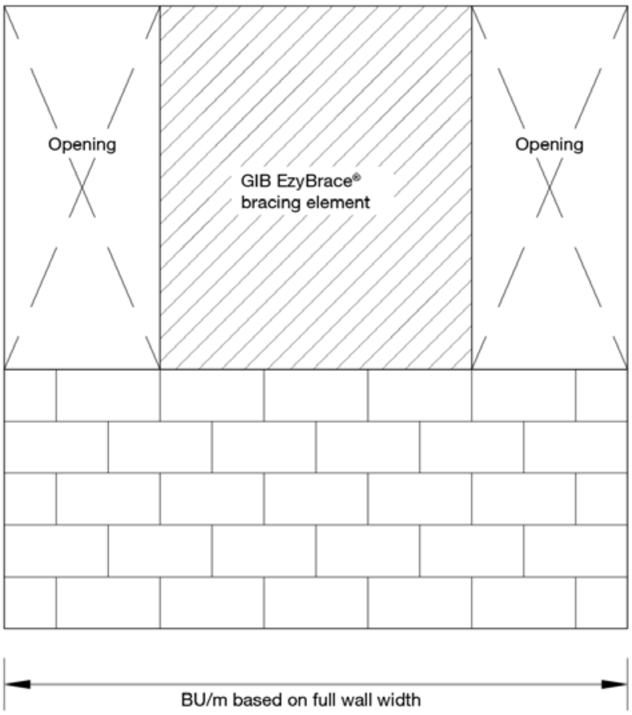


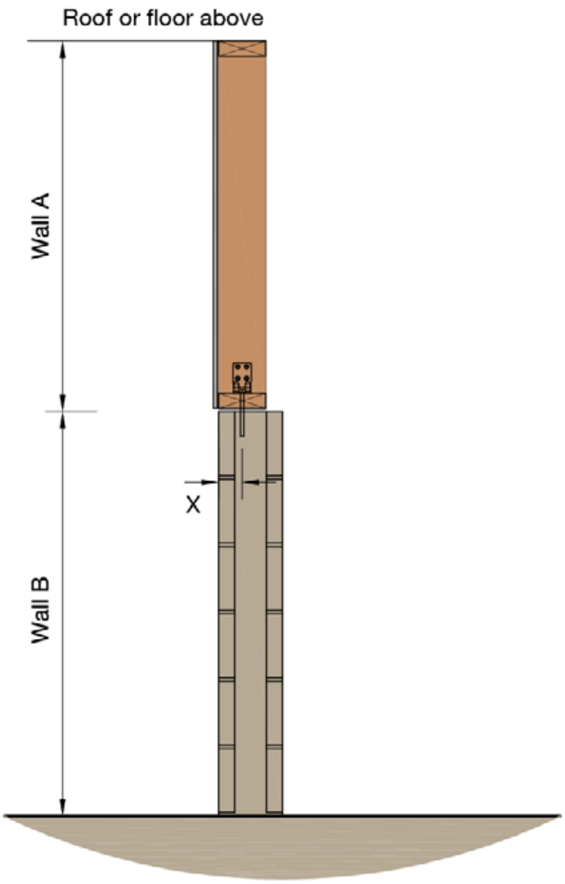
Table 8.1 - Ratings of 2.4m High Reinforced Concrete or Reinforced Concrete Masonry Wall Bracing Elements (see 8.3.2.1)

If Ratio $\frac{\text{Wall Length}}{\text{Average Wall Height}}$ is:	Rating in Bracing Units per Metre of Wall (BU/m)
▶ Less than 0.625	0
▶ More than 0.625 but less than 1.5	42
▶ More than 1.5 but less than 3.0	100
▶ More than 3.0 but less than 4.5	200
▶ More than 4.5	300

NOTE: Bracing units for walls relate to the ratio of wall length to the average wall height. Walls to be greater than 1.5m in length.

As per NZS 3604:2011 clause 8.3.1.4 (a) Elements less than 2.4m high shall be rated as if they were 2.4m high.

Then it is just a case of assigning the correct Bracing Unit Rating to the GIB Ezybrace® system as if it were a normal timber framed wall measuring the height of the GIB Ezybrace® system from the top of concrete wall.



WALL A

- GIB EzyBrace® element.
- Timber framing to NZBC B1/AS1.
- Minimum 600mm high.

WALL B

- Comply with NZS 4229.
- Bracing capacity per metre determined by full available width of wall.

DIMENSION X

- As required for specified hold-down, ensure any required hold-downs are into solid filled cores.