FORMANCE

FORMANCE
Ready Guide

V 1.0

CONTENTS

About this guide

Formance Ready is the next step in our mission of making NZ building environment to highest performance, **but also more affordable.**

High performance buildings improve quality of life for the occupants.

The Formance Ready Guide provides designers and building professionals with information and guidelines for the simplified use of panels and enable them to order from our list of products.

Welcome to the Formance Ready, we look forward to working with you.

Nick Hubbard – GM, Formance™

About the Formance Ready

The Formance Ready is identical to Formance SIP panel, but with adjusted thickness of core. Using Formance Ready Panel, and designing to special grid system, perfectly aligns with pre-defined standard panel sizes.

Formance Ready utilises also a "jumbo-panel" so there are less small panels required to build (up to 2.4m x 7m)

Application

Formance Ready system consists of wall and ceiling panel, with provision for trussed roof on top ceiling panels.

Designs are simple, beautiful and much more cost effective.

Components

- APA-approved Oriented Strand Board (OSB)
- AS/NZS 1366 compliant Expanded Polystyrene (EPS)
- Adhesive

Code Compliance

The Formance System has a CodeMark Certificate of Conformity which demonstrates compliance with the following clauses of the New Zealand Building Code:

1. B1.3.1, B1.3.2 and B1.3.3 (Excluding (d), (i) & (k))

2. B2.3.1 (a)

3. F2.3.1

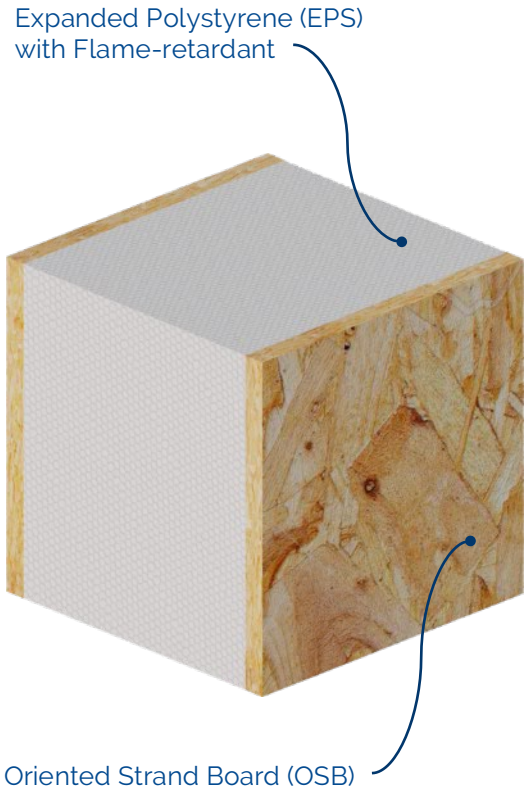
4. H1.3.1 (a) and (b)

Refer to building.govt website for more details on the Formance CodeMark Certificate.

Sizes and Spec

Formance Ready uses only one thickness of panel 150mm, for walls and ceilings, under timber trusses.

- 150mm SIP: 15.2 kg/m2: R3.8



Scope

The Formance Ready Guide V1.0 sets a minimum standard for the design and construction of Structural Insulated Panel (SIP) buildings within the scope of NZS 3604:2011 Timber Framed Buildings using the Formance Structural Insulated Panels system.

When applied by architects, designers, builders, engineers, apprentices, building consent authorities and building industry regulators, the Formance Ready Guide V1.0 provides these users with a cost effective means of compliance and practical guidance for designing and building to meet New Zealand Building Code requirements, without the need for specific engineering design.

The Formance Ready Guide V1.0 provides prescribed methods for the design and construction for Formance panel domestic dwellings, most other residential buildings, and some commercial buildings up to three storeys in height.

The use of Formance Ready Guide V1.0 during design and building provides consumers with assurance that their home has been built to meet the relevant part of the legislative requirements of the New Zealand Building Code as defined by CodeMark Certificate CM40043

Formance Ready Grid

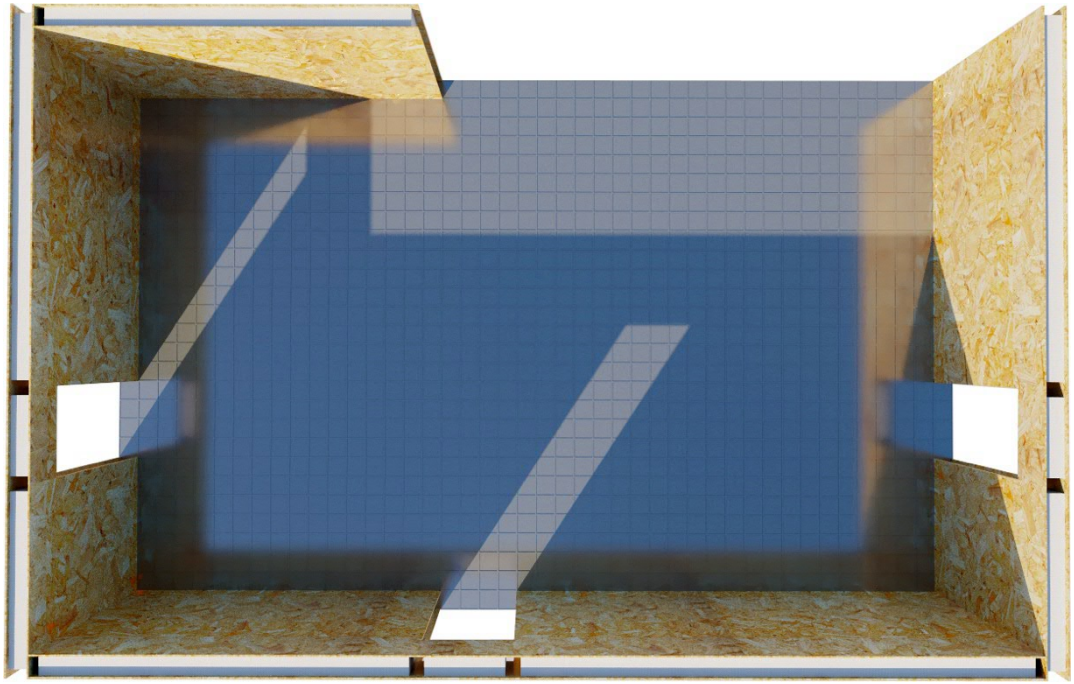
Floor Plan Grid

Most of designs start with the layout. This is where designers/architects set up their layout to 300x300mm grid and due to 150mm thick wall panels, turn on their drafting software to “snap-to-grid” at 150x150mm.

Ceiling Plan Grid

Ceiling panels will reflect the floor plan, with 600x600mm grid.

Select from the list of panel sizes and arrange the Formance Ready Ceiling Panels



Wall Elevation Grid

Now it is time to look at true elevations. This is where we can use 300x300mm grid, which reflects in pre-defined panel sizes, with the smallest panel 300mm x 300mm.

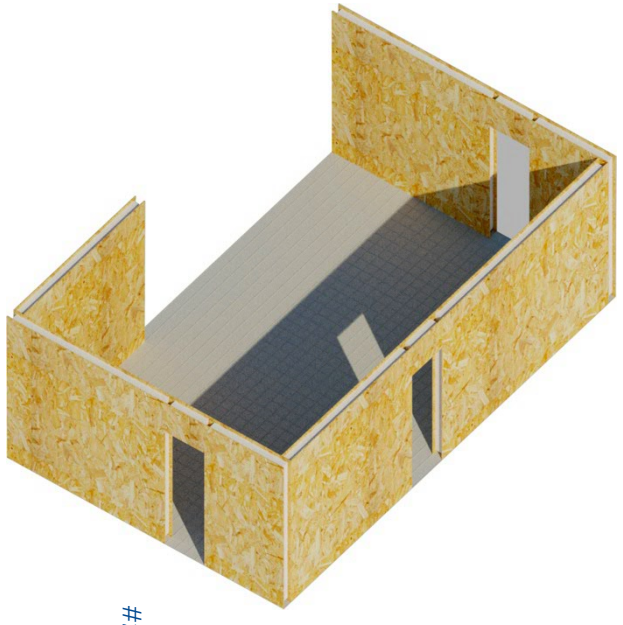
Formance Ready Wall Panel can be different height; 2.4m, 2.7m or 3m.

By adding 18mm SILL plate, ceiling height will allow for 2 rows of standard 1200mm plasterboard on wall panels and/or internal framed walls, standard 10mm plasterboard ceiling lining and 10mm gap at bottom plate.

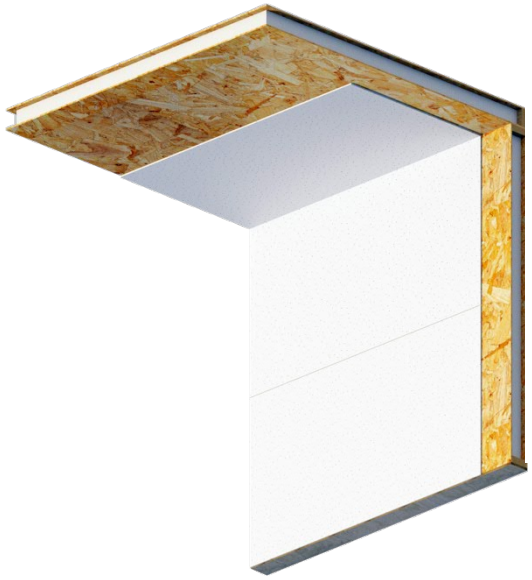
By adding a CAP plate and ceiling battens, the ceiling lining can drop down and create a services area, which will also enable use of recessed lights, that do not penetrate the insulated ceiling.

Opening heights can have a small panel as a sill and/or header panel, that can function as a lintel. For span of Formance Ready Wall Lintel, use Tables 7, 8, 9.

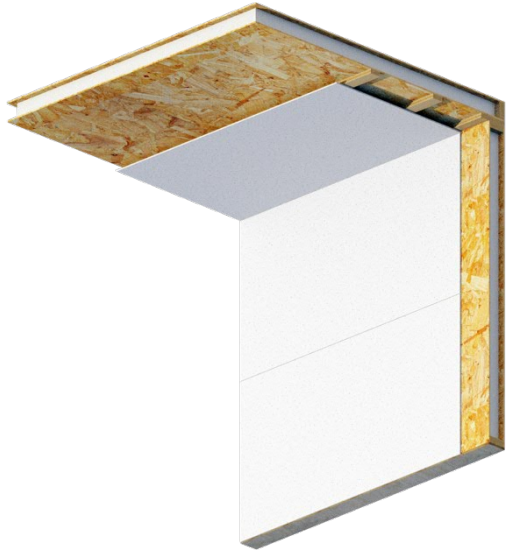
Select only panel sizes from the list of Formance Ready Panels. Using larger panels will results in lower cost of panels and less work required in jointing the panels on site.



#Panels distributed on standard grid



#2x Standard wall lining + ceiling lining



#Cap plate on top of walls / services cavity under ceiling panels

Compliance with NZBC

B1 Structure

The Formance Design Guide contains structural design tables and details for residential and light commercial buildings, built in accordance with the New Zealand Building Code (NZBC).

No Specific Engineering Design (SED) is required when designing strictly in accordance with the design parameters contained within this guide.

The Formance System may also be utilised in ways not established in this guide however anything outside of design parameters contained within this guide requires SED.

The design tables contained with this guide have been prepared by suitably qualified structural engineering professionals to comply with B1 of the NZBC. Project Designers can use the Formance Checklist to check if a design is within the scope of this guide or alternatively determine the areas requiring SED. Any project involving SED requires the project engineer to be listed and an Engineering producer statement (PS1) be supplied with the building consent application. In these cases the PS1 from engineer will cover compliance with B1 and B2 of the NZBC.

B2 Durability

Formance panels are engineered and manufactured to comply with B2.

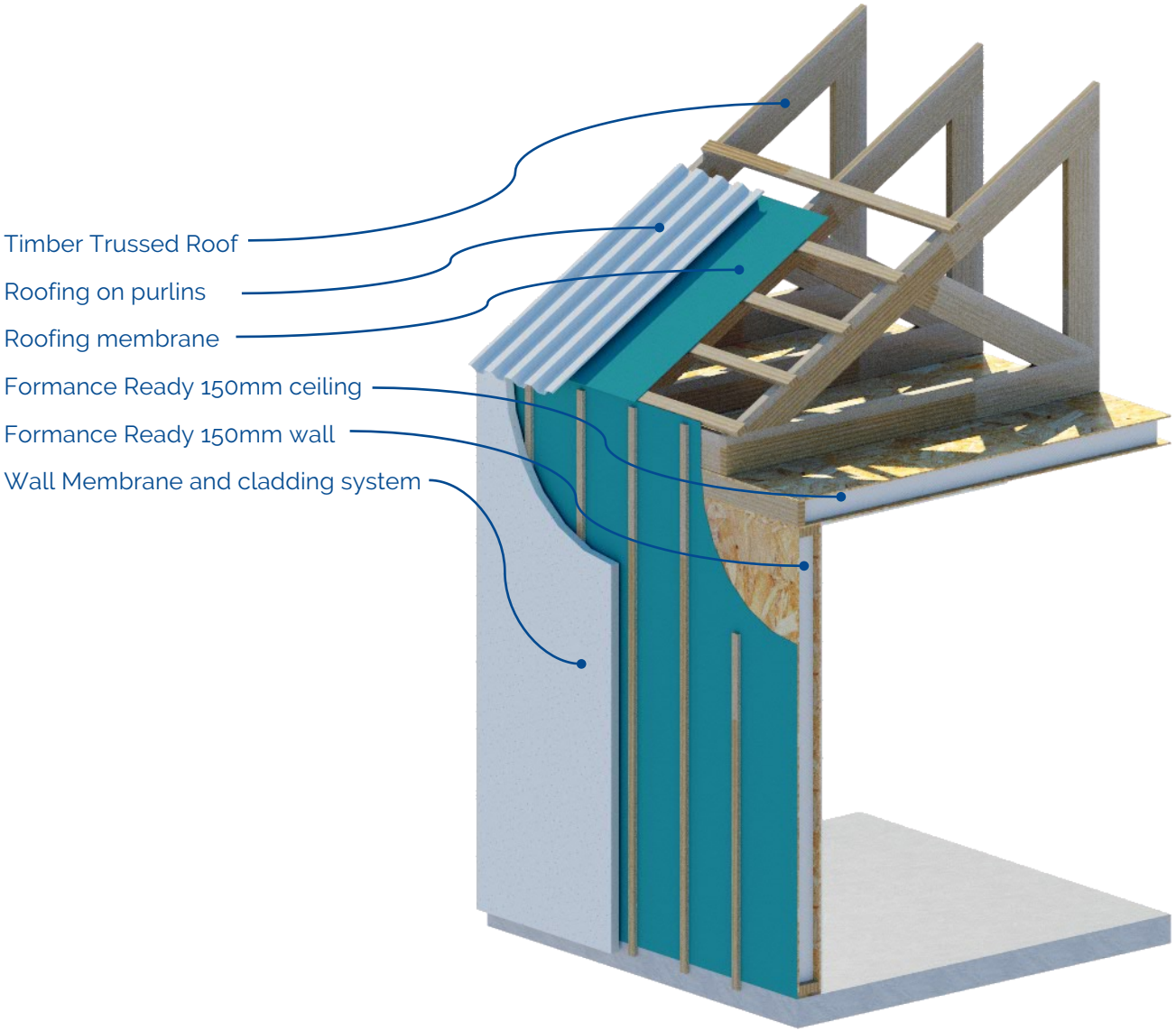
Thickness of Formance panels must be selected from the span tables in this Design Guide.

C Fire Protection

Formance panels meet generic criteria for Group3 timber, as specified in C/VM2 Appendix A.

OSB board density is 560kg/m^3
EPS core complies with AS1366.3 :1992 Table2 – Flame Propagation

Whenever a higher protection from fire is required, such as external residential wall closer than 1m to boundary, Formance wall panels must be further protected with a fire rated lining or cladding solution. For example, using Fire rated plasterboard, both sides of the wall panel, as described in detail in the appendix of this guide. For all other standard residential applications, Formance panels comply with NZBC.



#Roofing and Cladding Example

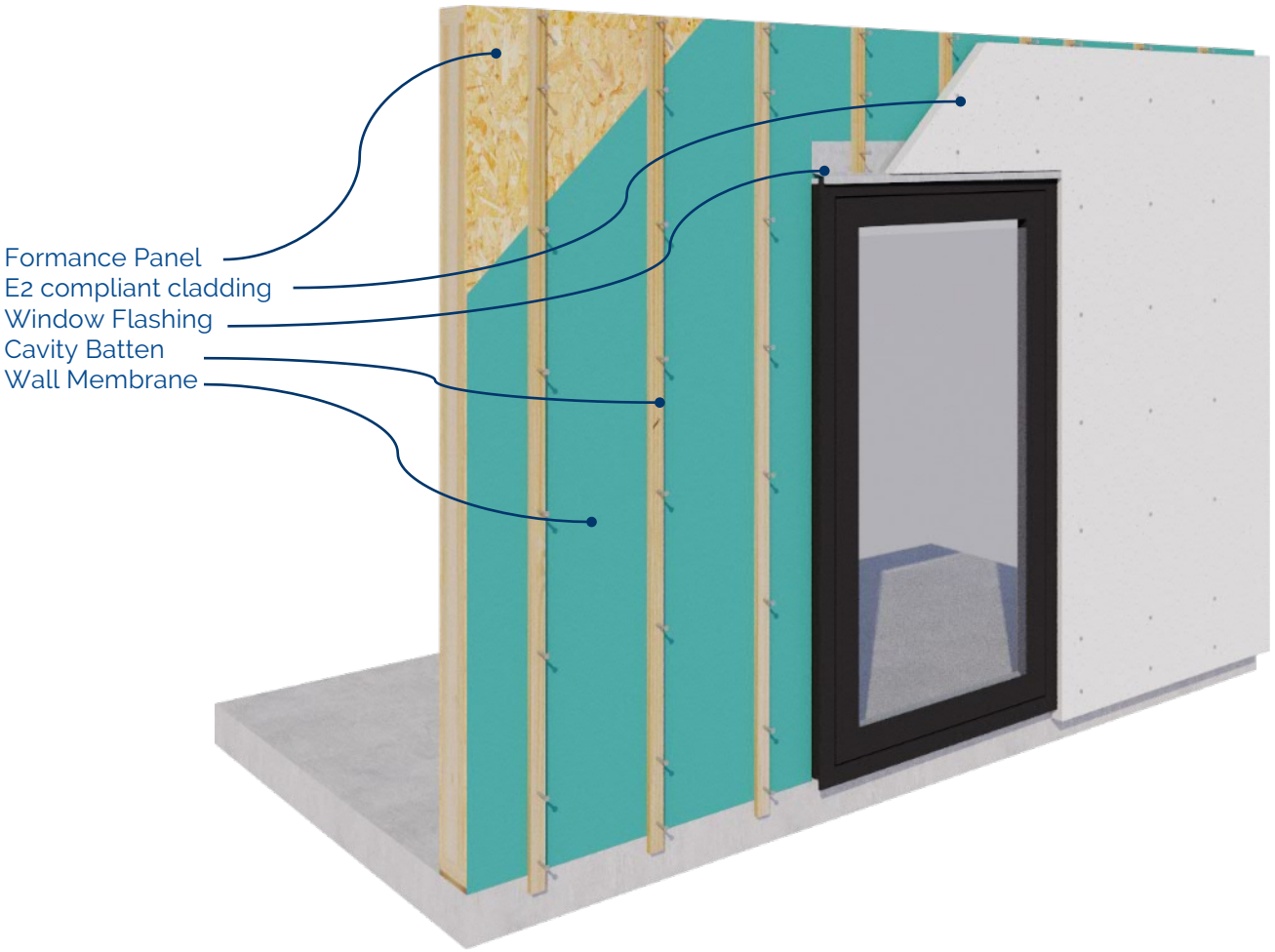
E2 External moisture

Weather tightness is a function of other building elements, such as but not limited to; wall cladding, roofing, flashings, cladding and roofing underlay. The Oriented Strand Board (OSB) facing board of Formance panels is treated equivalent to H1.2 treatment and is therefore required to be dry in use and protected from weather. All timber inserted in Formance panels is to be min. H1.2 treated.

Formance panels must be protected by a Cladding and Roofing system that fully complies with E2 of the NZBC. Minimum fixing crs. for cladding to Formance panels, can be determined using the Engineered Tables in this guide.

Window and door joinery and flashing system must comply with selected cladding system and NZBC. Timber trimmers are inserted in the EPS rebate, at openings in Formance panels. Window joinery, reveals and any flashings, are to be secured to this timber trimmer, through the OSB facing board or directly to the timber.

Detail on the left shows an example of Formance wall/ceiling panel in relation to timber trusses, cladding, roofing.



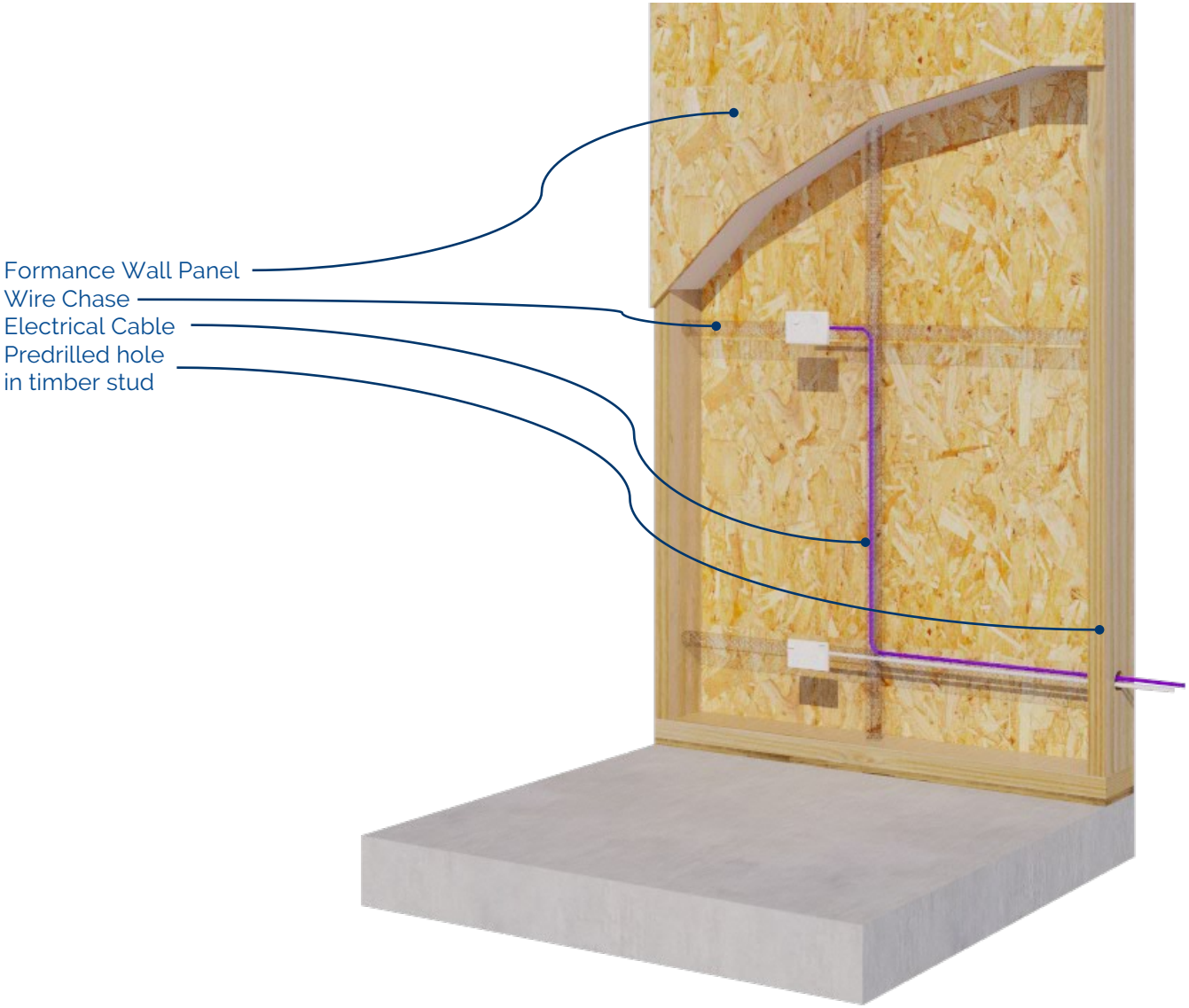
#Cladding Example

Flashings and cladding/roofing battens can be fixed to the outer OSB facing of Formance panels. Cladding fixing depends on the required batten spacing (according to the cladding manufacturers specification) and the tables are engineered to ensure appropriate fixing capacity. Fixing requirements, depending on weight and wind/eq zones, can be determined using the fixing tables contained in this Design Guide.

E3 Internal moisture

Formance panels should be protected from moisture in all wet areas, such as but not limited to; kitchen, laundry, bathroom. Formance panels can be protected by various internal wall linings, complying with NZBC E3, special plasterboard or various paint systems. Some paint system specifications are available on request, prepared by various paint manufacturers.

Indoor humidity should be kept at range between 25-65% and not above 70% for an extended period of time (1week) If it becomes a problem we recommend installation of a moisture management system.



#Electrical services in Formance Wire Chases

F2 Hazardous building mat.

Formance panels are constructed of non-hazardous building materials.

G Services and facilities

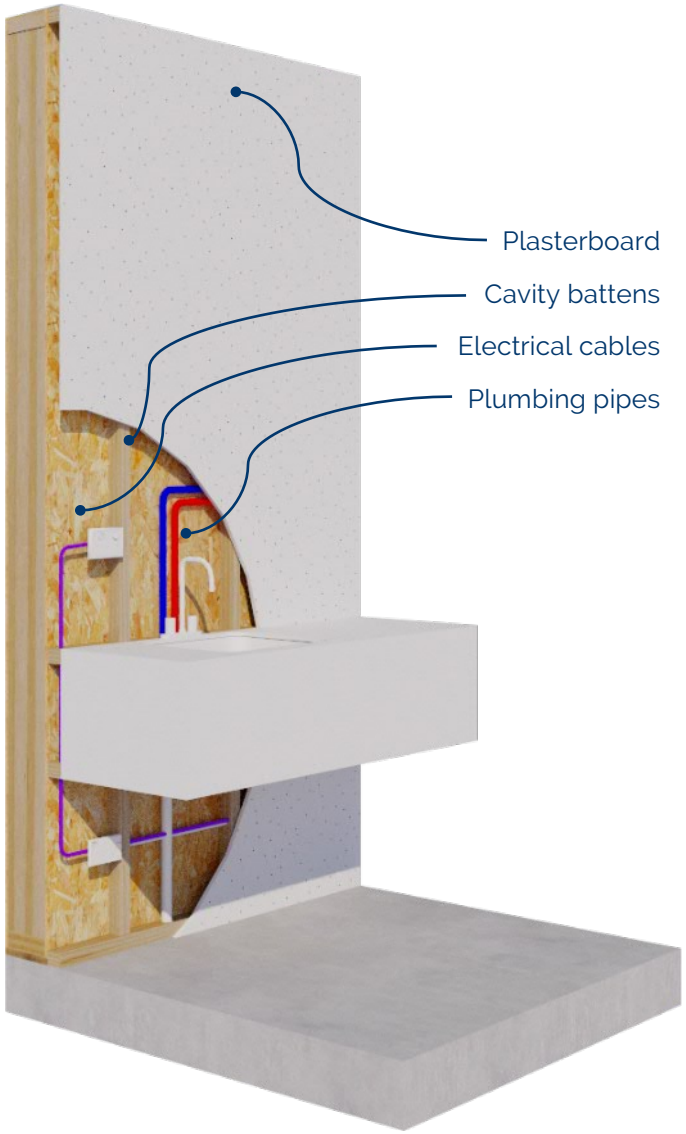
G clauses of NZBC, that are relevant to standard use of Formance panels, relate to installation of services.

Electricity

Typically, electrical wires are run through pre-cut channels inside the core of the panels called "chases". Formance panels have chases cut both horizontally and vertically during the fabrication process according to the requirements of the design.

Chases allow wires to be run inside Formance wall panels. Electricians can access chases by drilling a small access holes in the interior skin of the panel. Location of chases are clearly marked on Panel Layout Drawings, provided together with the panels. Typically the wall panels have one vertical chase in the middle of the panels, and two horizontal (250mm and 1050mm from ground up) chase.

Building contractors installing the Formance System must ensure these chases are continuous in panels by drilling holes in splines to allow wires to be pulled through.



#Plumbing services on surface of Formance Wall

Electric cables run inside the panel core that come in contact with EPS, must have a insulation sheathing made from plasticizer-migration-resistant material. If unsure consult your electrical contracting professional.

Alternatively, Electrical cables can also be run on the internal face of OSB board, inside the cavity, behind an internal wall lining. If this is the case, a standard electrical cable can be used.

Plumbing

Plumbing should never be run horizontally or vertically through a Formance™ panels wall. All plumbing services that are required to be in line with Formance panels must be fixed on the internal OSB facing of the panel and can then be hidden under the internal lining inside the cavity. An example of this detail is shown here.

Penetrations through Formance™ panel are permitted but must be well sealed to prevent air leakage and moisture penetration.

Heating Ventilation and Cooling (HVAC)

Formance™ buildings are extremely air-tight structures with much lower levels of air infiltration when compared to traditional timber structures. When working with an HVAC contractor, make sure their calculations take into account the low air infiltration and higher R-values of the Formance building. Proper HVAC sizing is critical because an oversized HVAC system will fail to reach the steady operating rate for which the equipment was designed. Short-cycling HVAC equipment will be less energy efficient and require more maintenance than properly sized HVAC equipment. Short-cycling HVAC equipment also leads to excessive humidity in structures during cooler seasons.

Formance construction typically requires mechanical ventilation. Ventilation systems bring fresh air into the building in controlled amounts and exhaust moisture laden and stale air outside. Ventilation systems can be designed to incorporate heat recovery ventilators (ERVs). These advanced systems

Table 1

FORMANCE PANEL	SOUND INSULATION LAYER	Rw VALUE
1	0	29
1	1/13mm plaster board lining on cavity with fiberglass insulation	39
1	2/16mm fire rated plasterboard lining direct fix one side 2/16mm fire rated plasterboard on cavity battens and sound clips.	51

Table 2

FORMANCE PANEL THICKNESS	CORE THICKNESS	R VALUE
150mm	128mm	3.8

harness heat being exhausted from the home and utilise it to heat the fresh air coming into the home for an even more efficient use of energy. Proper ventilation is crucial in structures with low air infiltration to prevent condensation that can lead to mould growth.

G6 Airborne and impact sound

Sound reduction (Rw value) of the Formance system is sufficient in most residential implications for compliance with NZBC. If higher values are required on specific projects, additional layers of sound insulation materials may be added to Formance panels, and should be designed by a suitably qualified acoustic engineer on a project specific basis. Some examples of possible solutions are shown on Table 1

For the actual acoustic performance of sound insulation layers and systems, refer to the supplier of these products.

H1 Energy efficiency

The R value of Formance panels increases with thickness of the panel, due to the thickness of the EPS core.

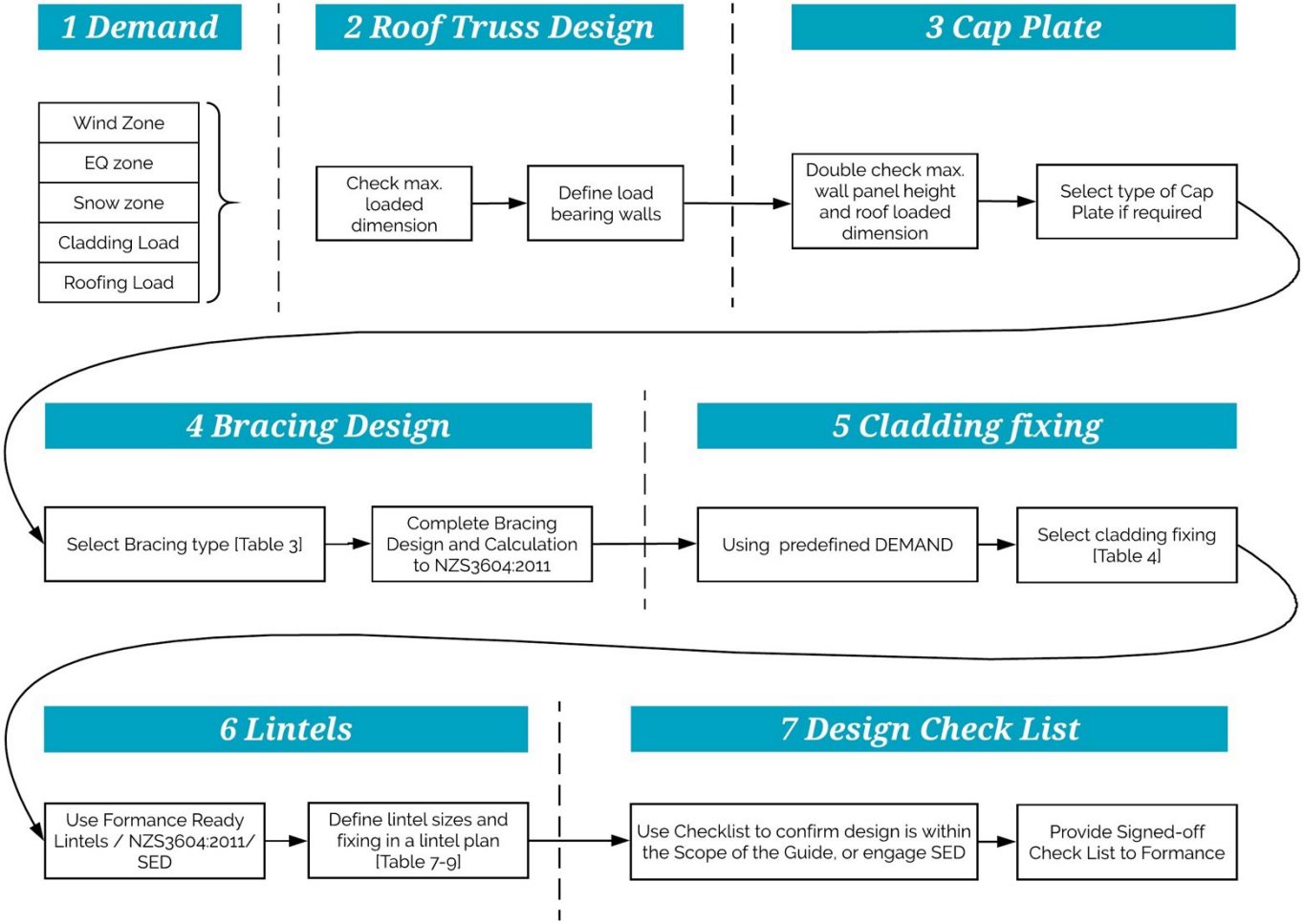
Building with Formance panels does not require any insulation to be installed on site. There is very little framing timber required to build a SIP home because SIPs provide the structure. In most cases Formance panels are connected with insulated splines (SIP spline or only strips of OSB)

Laboratory tests prove that SIPs maintain their full R-value in whole wall testing even when timber splines are used.

In cases where wall panels or roof panels need to be reinforced with timber splines this effectively creates small thermal bridges. This should be calculated in the overall thermal rating of the area of panel. Table 2 shows the R-value of Formance panels with continuous EPS core. Most projects use SIP splines for the connection of panel to panel therefore achieve these R values.

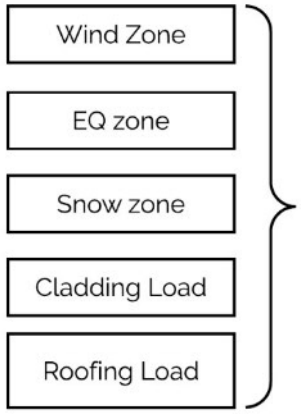
SIPs not only serve as a the framing and insulation material, but also as an air barrier. SIP homes have been routinely tested as two/three times more airtight than wood frame homes with fiberglass insulation.

7 Step Formance Ready Process



In this section the design process flow is explained. Following these steps in correct order, will ensure a smooth design process for each project.

1. Firstly determine the **demand** (loads on actual project).
2. Engage Truss Manufacturer to produce Truss Design. Checking Truss Design, determine the load bearing walls and loaded dimensions, to check **wall panel span is ok**.
3. Check if **cap plate** is required
4. **Bracing design** can be done to NZS3604:2011.
5. Specify **min. fixing for cladding.**
6. Specify **lintel** type and span.
7. Overall design process, may take some time. It is recommended the **Design Checklist** is referred to as a final review, to ensure all steps have been completed.



1. Demand

Determine demand for your final design, by using NZS3604:2011. All these parameters will be used in next steps selecting correct panel thickness, connection details and fixing.

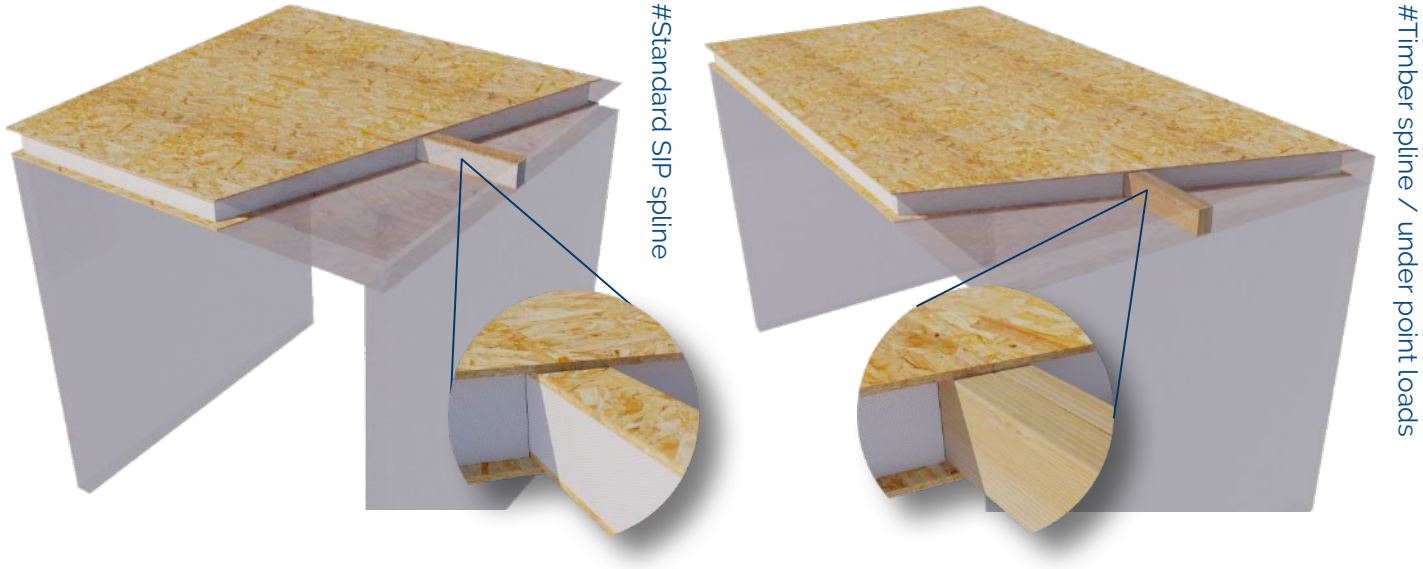
Project demand is driven by location of the build, exposure and includes determining wind zone, earthquake zone and snow zone.

Cladding and roofing loading depends on selection of actual product.

Max. demand for Formance Ready

Very High Wind Zone

1kPa snow load



2. Roof Truss Design

Roof Truss design is prepared by Truss Manufacturer. Trusses are put on top of Formance Ready Ceiling Panels.

Max. Loaded Dimension

Review the spans of trusses, determine load bearing walls and loaded dimension. Also review midfloor design and loads applied to lower walls in two story designs.

Formance Ready Walls

max roof loaded dimension is 6m,
max height of Formance Ready Wall is 3m,
max 1kPa snow load
max Very High Wind zone.

Max floor joist span bearing on lower of two story walls is 5.2m

NOTE:
No point loads on Formance Ready Walls (or directly supported by timber studs or other SED supporting member)
Any concentrated point loads from trusses need to be supported by a timber spline/blocking in the Formance Ready Ceiling Panel.

3. Cap Plate

The Cap Plate is a timber plate sitting on top of Formance wall panels, over the top plate. This plate has to be full width of Formance wall panel. The function of this plate is to equalise the load evenly throughout the area of Formance panel.

Another valuable function of the Cap plate is in building sequence. By overlapping the joints of top plate (plate inserted in the rebate on top of Formance panels) and joints of cap plate, builders can easily achieve "continuous top plate".

And by adding a Cap plate, the ceiling height can increase and same time function as ceiling batten. Depending on application, designers can use either of three options on the right side in case of upper floor cap plate.

Upper or single story

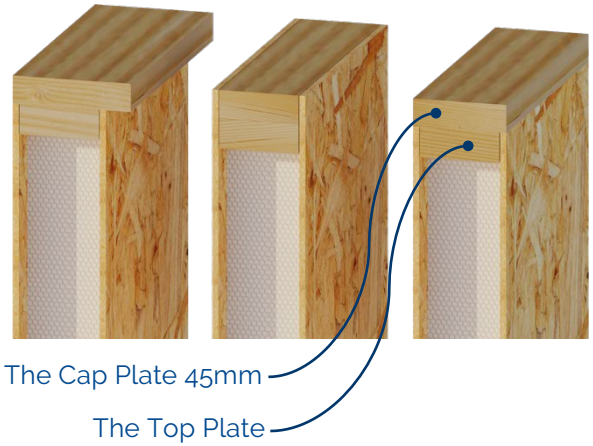
- ***45mm Cap plate required when LD > 4m AND Wind zone > High.***
- ***If any of above does not apply, than cap plate is not required.***
- ***FR Ceiling panels with continuous boundary plate in line with wall***

Lower of two story

45mm Cap plate always required

Formance Ceiling Panels with continuous boundary plate in line with wall, required on Upper or Single story walls.

For fixing requirement and all cap plate options refer details.



4. Bracing design

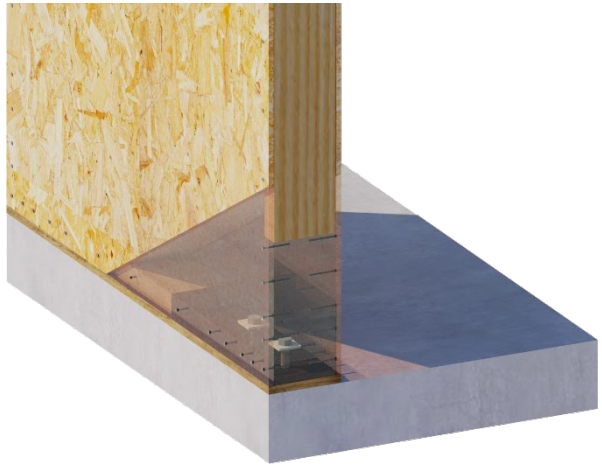
Bracing design, using Formance Panels, can be designed to NZS3604:2011 or SED. Values achieved by selected Formance Wall panel, depend on the thickness of the wall panel, their length and height and hold down fixing.

Corner Nailing Pattern

Corner nailing pattern at both ends of bracing wall. Nailing pattern: 50-50-50-75-75-150-150-

Types of Hold Down Fixing

There are various types of hold down possible, which contribute to different bracing capacity of the same Formance panel.

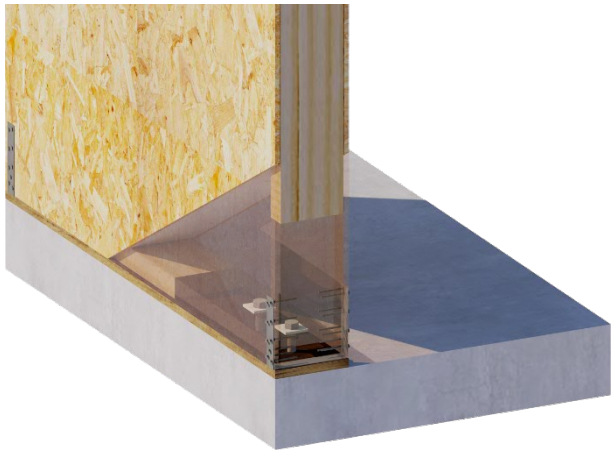


FBW-B / Corner Nailing Pattern + ONE steel strap, BOTH sides of Formance panels

For higher bracing capacity

One continuous strap under the bottom plate and up both sides of the panel

Concrete Slab/Foundation

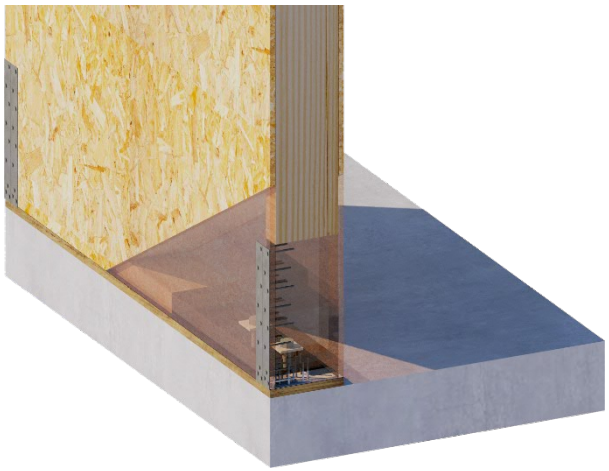


FBW-C / Corner Nailing Pattern + TWO steel straps to ONE side of Formance panels

If panels are to be left exposed for direct internal finishing it is desired to avoid visible steel straps on internal side of the panel.

Two steel straps on one side of external face of Formance panel, fixed to timber stud and under bottom plate.

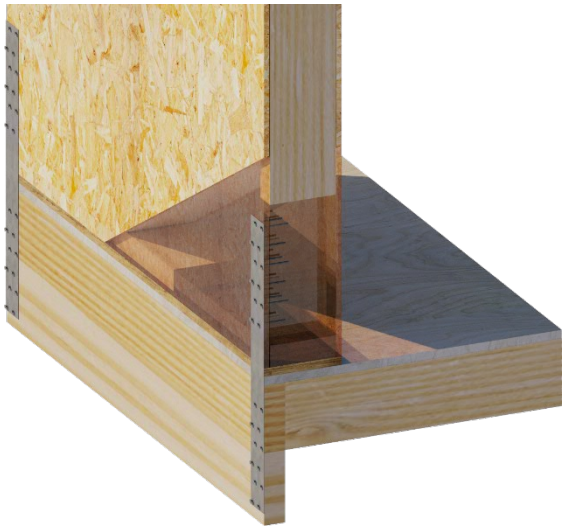
Concrete Slab/Foundation



FBW-D / Corner Nailing Pattern + TWO steel strap to ONE side of Formance panels

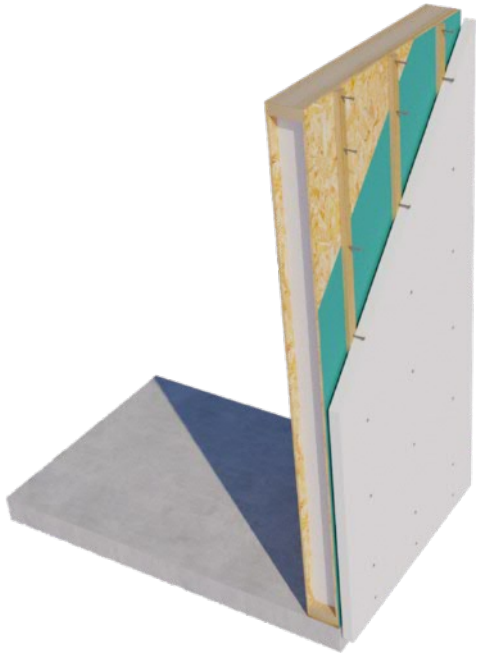
Two separate straps on external side of the panel and fixed to timber joist

Timber Floor Foundation



5. Cladding Fixing

Cladding is fixed against the facing board of Formance panel, 11mm of OSB. Although only 11mm thick, OSB is engineered for fixing withdrawal. Following the tables you can determine min. fixing required for your project specific loads.



Demand

Project demands were defined in first section of Formance Design Process. Use wall cladding load on one side of the tables and wind zone on the other side, to determine area of loading.

Take this code, select required spacing of battens to determine min. fixing spacing,

#Timber Lintel

#Formance Ready Lintel

#Ceiling Lintel

6. Formance Ready Lintels

Formance Ready Lintels

Formance Ready Wall lintels are formed using standard Formance Ready Wall Panel, reinforced with LVL13 timber on top&bottom edge and min. height of the panel, in order to achieve desired span.

Ceiling Lintels

Due to thickness of Formance Ready Ceiling panel (150mm) LVL13 timber lintel can be inserted inside the edge of ceiling panel. Single or double member can be utilised. Having lintel in the ceiling panel enables full height windows.

Lintels to NZS3604:2011 / SED

Alternatively, lintels can be designed using NZS3604:2011 or SED. Timber or Steel lintels can be designed to fit within the core of the Formance panels. Formance Ready panels can be cut to suit on site, by builder.

7. Formance Ready Checklist

When all the steps are completed, last thing to do is to review all considerations, using the Formance Ready Checklist. By answering the questions in the Checklist, the designer can confirm all decisions are within the scope of this Design Guide, or clearly list items that are outside the scope. The list of these items can then be used to engage a Structural Engineer and to scope requirements of Engineering Producer Statement (PS1).

We ask that a completed Checklist is provided to Formance, prior to applying for Building Consent.

Formance Ready Wall Panel

- Roof live load not exceed 25kg/m^2
- Max. heavy roofing (excluding Formance) shall not exceed 60kg/m^2
- Max. light roofing (excluding Formance) shall not exceed 20kg/m^2
- Snow load shall not exceed 100kg/m^2
- Deflection limit of SPAN/180 or 15mm
- Wind Zone up to Very High Wind Zone
- Max axial load eccentricity on face of panels so e=wall thickness/2
- Medium wall cladding (excluding Formance) shall not exceed 80kg/m^2
- The Upper or single story wall has been allowed as 3m high with medium weight cladding
- The Lower of two walls has been allowed as 3m high with medium weight cladding
- 6m max. loaded dimension for Formance ready walls
- Loaded dimension is roof loaded dimension, a 5.2m joist span is allowed for the floor load,
- A floor live load of 2kPa is allowed

Cap plate

SINGLE STORY OR UPPER OF TWO

- LD > 4m and Wind Zone > High 45mm SG8 CAP plate on Formance Ready Wall panels
- If one of the above does not apply, no cap plate is required.
- Applies for roof elements, such as trusses and rafters, spaced at no greater than 1200mm crs with a minimum of 45mm width and Formance Ceiling panels 150mm with min. 45mm SG8(min.) continuous boundary plate in line of wall.
- Fixing of Ceiling panels to Top plate is to be with 2/4.8mm Formance screws each side of truss and two at 300mm crs.

LOWER OF TWO STORY

- 45mm Cap plate required on all walls
- Floor joists at 600mm crs. Max. and min width of 45mm and boundary plate or full depth blocking.
- Fixing of Cap plate to top plate is to be 1 / 4.8 screws at 300mm crs.

ALWAYS APPLIES

- NZS3604 scope & terminology
- Fasteners of OSB facing board to top plate to be 2.87x65mm FH ring shank nails at **75mm**
- Max 1kPa snow load, Snow elevations as per NZS3604:2011 Fig 15.1
- No snow load shedding (NZS3604:2011 clause 15.3)
- Top&Cap plate to have continuity fixing to NZS3604:2011.
- Uniform loading and bearing of OSB facing is required.
- Durability, including treatment of fasteners, is to comply with NZBC
- Equilibrium Moisture content of SIP and all timber components is to be <18%
- All fixing to comply with NZS3604 or by SED
- Max. roof pitch is 45 deg

Formance Bracing

Formance Ready Bracing Wall - Table 3				
Min. length	Code	Hold Down Detail	WIND BU/m	EQ BU/m
600mm	FBW-C/D	2straps / one side	100	110
1200mm	FBW-C/D	2straps / one side	150*	140*
1200mm	FBW-B	1strap /both sides	150*	150*

- *limited to 120BU/m for timber substructure, 150BU/m for Concrete Substructure as per NZS3604:2011
- Mitek Sheet Brace Strap to be installed in accordance with Manufacturer's literature
- All requirements of NZS3604:2011 are to be fully complied with

Types of Hold Down Fixing

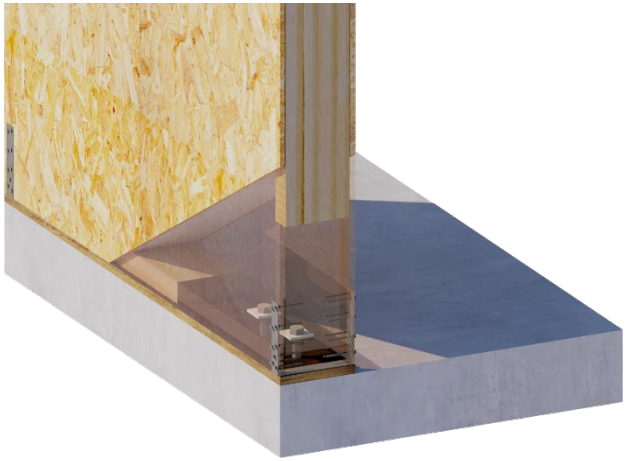
There are various types of hold down, that contribute to different bracing capacity of the same Formance panels.

FBW-B / Corner Nailing Pattern + ONE steel strap, BOTH sides of Formance panels

For higher bracing capacity

One continuous strap under the bottom plate and up both sides of the panel

Concrete Slab/Foundation

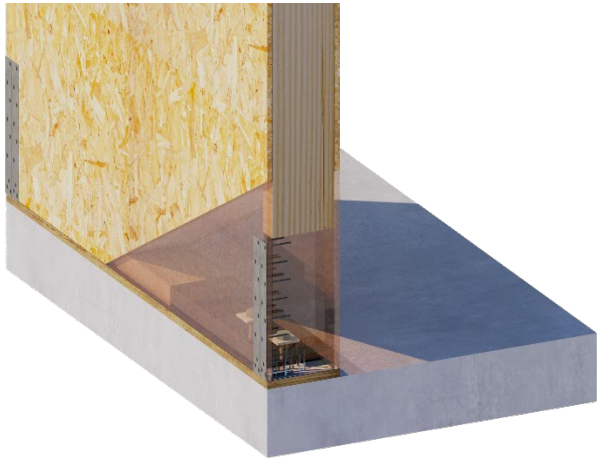


FBW-C / Corner Nailing Pattern + TWO steel straps to ONE side of Formance panels

If panels are to be left exposed for direct internal finishing it is desired to avoid visible steel straps on internal side of the panel.

Two steel straps only on one side of external face of Formance panel, fixed to timber stud and under bottom plate.

Concrete Slab/Foundation



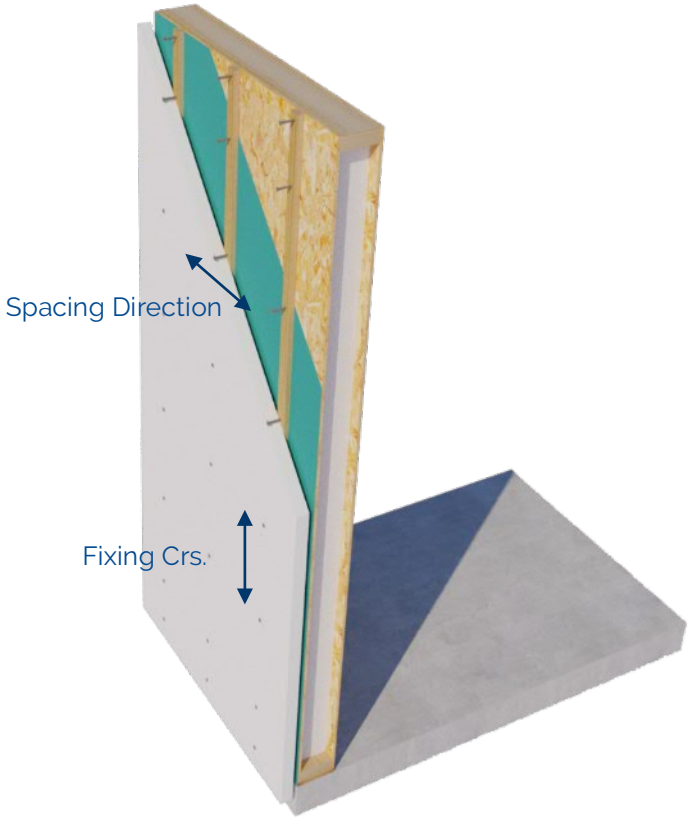
FBW-D / Corner Nailing Pattern + TWO steel strap to ONE side of Formance panels

Two separate straps on external side of the panel and fixed to timber joist

Timber Floor Foundation

Cladding Fixing

Wall Cladding Fixing - Table4					
WEIGHT	WIND	HIGH	VERY H	EXTRA H	
LIGHT		A	B	C	
MEDIUM		B	B	C	
HEAVY		D	D	D	
Spacing Direction					
M2	**900**	**600**	**450**	**300**	**Square**
A	287	430	574	861	508
B	222	333	444	667	447
C	184	275	367	551	407
D	154	232	309	463	373



- NZS3604 scope and terminology applies.
- Max EQ zone for Heavy cladding is 2, with cladding maximum 2.7m high.
- Equilibrium Moisture Content of SIP and all timber components is to be <18%
- R<1, where R=average height divided by smaller of width/length.
- Fixing to be 4mm dia. screw fixing (10 gauge) fully threaded and embedded.
- Durability including fasteners is to be to the requirements of the NZBC.
- External weathering system is to be to the requirements of the NZBC.

Nail fixing to OSB Facing Board - Table5

FIXING	N	KG
Ring Shank Nail (dia)		
2.31mm	**160**	**16**
2.39mm	**164**	**16**
2.46mm	**169**	**17**
2.87mm	**200**	**20**
3.05mm	**213**	**21**
3.25mm	**226**	**23**
3.43mm	**235**	**24**
3.76mm	**262**	**26**

Screw fixing to OSB Facing Board - Table6

FIXING	N	KG
Wood Screw (dia)		
3.51 / G6	**249**	**25**
3.84 / G7	**271**	**27**
4.17 / G8	**293**	**29**
4.5 / G9	**320**	**32**
4.8 / G10	**342**	**34**
5.49 / G12	**387**	**39**
6.15 / G14	**435**	**44**

These tables are intended for determining the min. fixing requirement, when applying fixtures or lining to internal face of Formance roof or wall.

Fixing only to internal facing board (11mm OSB) is expected in tables.

On every joint between the panels and at panel to roof/floor connection, there is a double layer of OSB available or timber insert. For exact location refer Formance details or project specific Panel Layout Drawings.

Formance Ready Lintel

Formance Ready Lintel - supporting roof only - Table7

	Loaded Dimension of Lintel	Ceiling Lintel			Wall Lintel		
		1/45 x125mm	2/45 x125mm	2/63 x125mm	300	600	900
Light Roof	2.0	1.8	2.1	2.6	4.2	6.6	7.2
	3.0	1.5	2.1	2.4	4.2	6.0	7.2
	4.0	1.5	1.8	2.1	3.9	5.7	7.2
	6.0	1.2	1.5	1.8	3.3	5.1	6.3
Heavy Roof	2.0	1.5	2.1	2.4	4.2	6.0	7.2
	3.0	1.5	1.8	2.1	3.9	5.7	6.9
	4.0	1.2	1.8	1.8	3.6	5.3	6.6
	6.0	1.2	1.5	1.8	3.0	4.8	6.0

- Eaves overhang was taken as 750mm max
- Assumed 50% of the bending and shear deflection should be taken for nail slip
- Roof live load shall not exceed 25kg/m2 refer section 1 of NZS3604
- Max heavy roof shall not exceed 75kg/m2
- Max light roof shall not exceed 35kg/m2
- Lintel deflection limit is span/300, with span/200 for wind case but never exceeding 12mm
- Formance Wall Lintel with 11mm thick OSB webs and LVL13 for the flanges
- Ceiling Lintel with LVL13 trimmed to 125mm, either 45mm or 63mm thick.
- Snow Load shall not exceed 100kg/m2
- Spans shown are for very high wind zone
- Spans shown are for 150mm Formance Ready Panel

Formance Ready Lintel - supporting roof, wall and floor - Table8

	Loaded Dimension of Lintel	Wall Lintel		
		300	600	900
Light Roof Light Wall	2.0	3.0	4.8	5.7
	3.0	3.0	4.5	5.7
	4.0	3.0	4.5	5.7
	6.0	2.7	4.5	5.4
Light Roof Medium Wall	2.0	2.7	4.5	5.4
	3.0	2.7	4.5	5.4
	4.0	2.7	4.2	5.4
	6.0	2.7	4.2	5.4
Heavy Roof Light Wall	2.0	2.7	4.5	5.4
	3.0	2.7	4.2	5.4
	4.0	2.7	4.2	5.1
	6.0	2.4	3.9	4.8
Heavy Roof Medium Wall	2.0	2.7	4.2	5.4
	3.0	2.4	4.2	5.1
	4.0	2.4	3.9	5.1
	6.0	2.4	3.9	4.8

- Eaves overhang was taken as 750mm max
- Assumed 50% of the bending and shear deflection should be taken for nail slip
- Roof live load shall not exceed 25kg/m2 refer section 1 of NZS3604
- Max heavy roof shall not exceed 75kg/m2
- Max light roof shall not exceed 35kg/m2
- Lintel deflection limit is span/300, with span/200 for wind case but never exceeding 12mm
- Formance Wall Lintel with 11mm thick OSB webs and LVL13 for the flanges
- Ceiling Lintel with LVL13 trimmed to 125mm, either 45mm or 63mm thick.
- Snow Load shall not exceed 100kg/m2
- Spans shown are for extra high wind zone
- Wall height above lintel was taken as 3m high
- Light wall cladding not exceeding 40kg/m2
- Medium wall cladding not exceeding 80kg/m2
- Medium wall cladding not exceeding 80kg/m2
- Floor spanning onto lintel was taken with a 5.2m span

Formance Ready Lintel - supporting roof, wall - Table9

	Loaded Dimension of Lintel	Wall Lintel		
		300	600	900
Light Roof Light Wall	2.0	3.9	6.0	7.2
	3.0	3.9	5.4	6.9
	4.0	3.6	5.1	6.6
	6.0	3.3	4.8	6.0
Light Roof Medium Wall	2.0	3.6	5.4	6.9
	3.0	3.6	5.1	6.6
	4.0	3.6	5.1	6.3
	6.0	3.0	4.8	6.0
Heavy Roof Light Wall	2.0	3.6	5.4	6.9
	3.0	3.6	5.1	6.6
	4.0	3.3	4.8	6.3
	6.0	3.0	4.5	5.4
Heavy Roof Medium Wall	2.0	3.3	5.1	6.3
	3.0	3.3	4.8	6.0
	4.0	3.0	4.8	5.4
	6.0	2.7	4.5	5.4

- Eaves overhang was taken as 750mm max
- Assumed 50% of the bending and shear deflection should be taken for nail slip
- Roof live load shall not exceed 25kg/m2 refer section 1 of NZS3604
- Max heavy roof shall not exceed 75kg/m2
- Max light roof shall not exceed 35kg/m2
- Lintel deflection limit is span/300, with span/200 for wind case but never exceeding 12mm
- Formance Wall Lintel with 11mm thick OSB webs and LVL13 for the flanges
- Ceiling Lintel with LVL13 trimmed to 125mm, either 45mm or 63mm thick.
- Snow Load shall not exceed 100kg/m2
- Spans shown are for very high wind zone
- Wall height above lintel was taken as 3m high
- Light wall cladding not exceeding 40kg/m2
- Medium wall cladding not exceeding 80kg/m2
- Medium wall cladding not exceeding 80kg/m2

FORMANCE READY CHECKLIST

PROJECT NAME	LOT NO.	DP NO.	ADDRESS
ITEM	YES	NO/SED	NOTES
General Specifications			
Demand correctly specified as per NZS3604 and NZBC			
Wind Zone is Very High or less			
Snow load is 1kPa or less			
Ceiling panels			
Truss Design completed by Truss Engineer			
Fixing of trusses to Formance Ready Wall/Ceiling specified by Truss Engineer			
Loaded dimension clearly identified on roof plan and is equal or less than 6m			
All roof loads are taken to load bearing external walls or specified internal load bearing walls with timber spline provided in ceiling panels, under all load bearding points			
All ceiling connections fully specified as per standard Formance Ready details			
Ceiling panels with min 45mm continuous boundary plate in line with wall			
Wall panels			
Max roof loaded dimension for all Formance ready walls is 6m			
Max floor joist span bearing on lower of two story walls is 5.2m			
Max 2kPa floor load			
Max height of Formance ready wall is 3m			
No point loads applied on Formance ready wall (such as but no limited to beams)			
All bearing wall loads are taken to beams / bearers			
All wall connections fully specified as per standard Formance details			

Cap plate			
45mm Cap plate due to LD > 4m AND Wind Zone > High, or			
No Cap plate on walls in upper or single story			
45mm Cap plate on all lower of the two story walls			
Standard Formance Ready Cap plate and fixing fully detailed and specified			
Bracing Design			
Bracing demand defined to NZS3604			
Bracing design fully complies with NZS3604			
Bracing values and hold-down specified as per Formance Ready Guide			
All standard details and fixing fully specified in the plans/specifications			
Cladding fixing			
Cladding fixing correctly specified following Fixing Tables			
Fixing type has been compared and aligned with Cladding Manufacturer's specifications			
All fixing noted in details and specifications			
Lintels			
All openings supported by NZS3604 or Formance Ready Lintels			
All Formance Ready Lintels specified as per Lintel Span Tables			
All lintel connections fully specified as per standard Formance details			
Formance lintels supporting roof with Max. roof overhang of 750mm			
Designer Checklist			
Designer Checklist completed and submitted to Formance			
DESIGNER/ARCHITECT NAME:	DATE	LBP	SIGNATURE
APPOINTED STRUCTURAL ENGINEER:			

Building Inspection Schedule

Example of building inspection schedule

1. Pre-pour Foundation
2. Pre-pour Floor
3. ***Bottom Plate Fixing Inspection***
4. Pre-Roof / ***Panel Inspection***
    a. ***Timber lintel sizes and fixing***
    b. ***Wall Panel fixing***
    c. ***Roof Panel fixing***
5. Building and Sill Wrap or Cavity Batten
6. Flashings
7. Cladding
8. Pre-Line including Plumbing
9. Pre-Stopping
10. Final Inspection

Building inspection Schedule will vary between councils. This guide outlines the standard inspections and which elements of Formance panels are to be inspected at each stage.

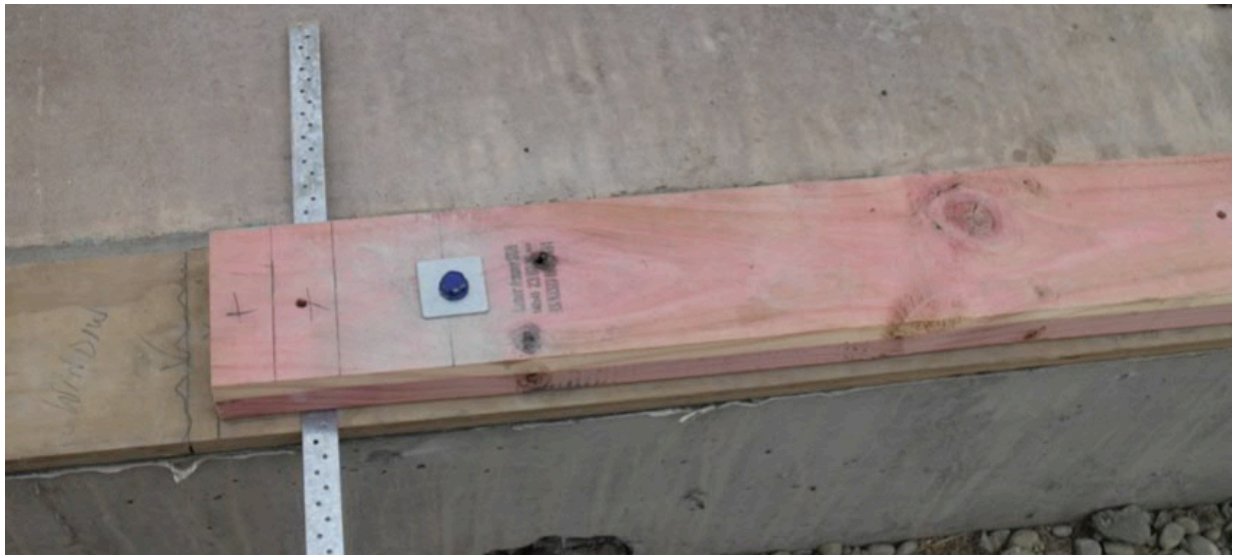
Example on the left is showing approximate building inspection schedule, assuming timber framed building.

Because Formance Panels are a solid element, that fully encapsulates the bottom plate when slotted over, the inspection of bottom plates has to occur prior to erection of Formance wall panels.

Bottom plates are fixed to foundation following NZS3604 requirements or to Specific Engineering Design (SED).

A similar approach needs to be considered with other enclosed elements, such as timber lintels and special beams. Wall panels can be erected and timber framed lintels can be left exposed before inspection. After these have been inspected, the panel enclosing timber lintel, can be installed.

If there are other SED structures in the build, these will need to be reviewed and the correct schedule of inspection will need to be prepared.



#Bottom Plate Fixing

Bottom Plate Inspection

Bottom plate must be installed and fixed in accordance to NZS3604:2011.

The location of bracing elements and studs for lintels and beams needs to be clearly marked on the bottom plate, prior to panel installation.

If there are Steel Straps designed for hold-down of bracing elements, these should now be correctly placed, before erecting Formance panels.

#Straps example

#Timber Lintel

#Long Formance Screws

Panel Inspection

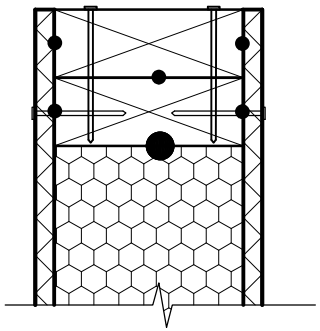
- Inspect sizes, fixing and locations of lintels. Leave Timber lintels exposed (do not install the header Formance panel, until inspection is completed).
- Inspect Formance lintel sizes and timber grade.
- Inspect nail spacing of standard panels.
- Inspect nail spacing of bracing panels.
- Inspect hold down straps of bracing panels and lintels.
- Inspect long Formance screws at wall corners.
- Inspect long Formance screws connection of ceiling panels to wall panels.
- Inspect connection of Formance walls to load bearing internal framed walls.

Formance Standard Details

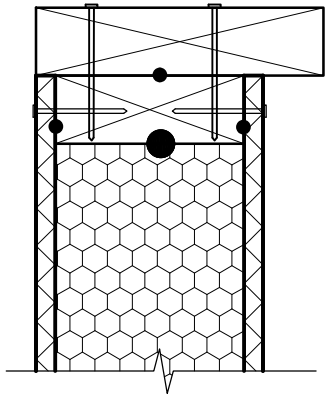
Wall Details

ALL THREE OPTIONS ARE ACCEPTABLE AS A CAP PLATE

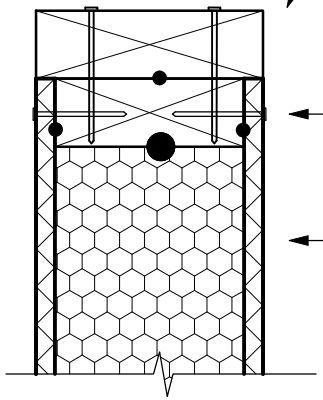
OPTION 1
UPPER OR SINGLE
STORY ONLY
Hidden Cap plate
Exposed OSB
Paint finish



OPTION 2
Cap plate overhang
For ceiling diaphragm



OPTION 1
Exposed Cap Plate
Higher ceiling
Internal wall linning



45mm CAP PLATE
PROVIDE OVERLAPPING WITH TOP PLATE
[at panel joints and corners]
fixed to top plate with
2/90 mm framing nails @ 300mm crs.

45mm TOP PLATE FIXED TO FORMANCE
PANEL WITH 60mm NAILS @ 75mm CRS.
EACH SIDE

FORMANCE READY
WALL PANEL

USE FORMANCE READY GUIDE V1
TO DETERMINE REQUIRED
CAP PLATE THICKNESS FOR
EVERY TYPE OF WALL

LEGEND
● EXPANDING FOAM
• ADHESIVE
NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
TOP PLATE and CAP PLATE

Scale: 1:5

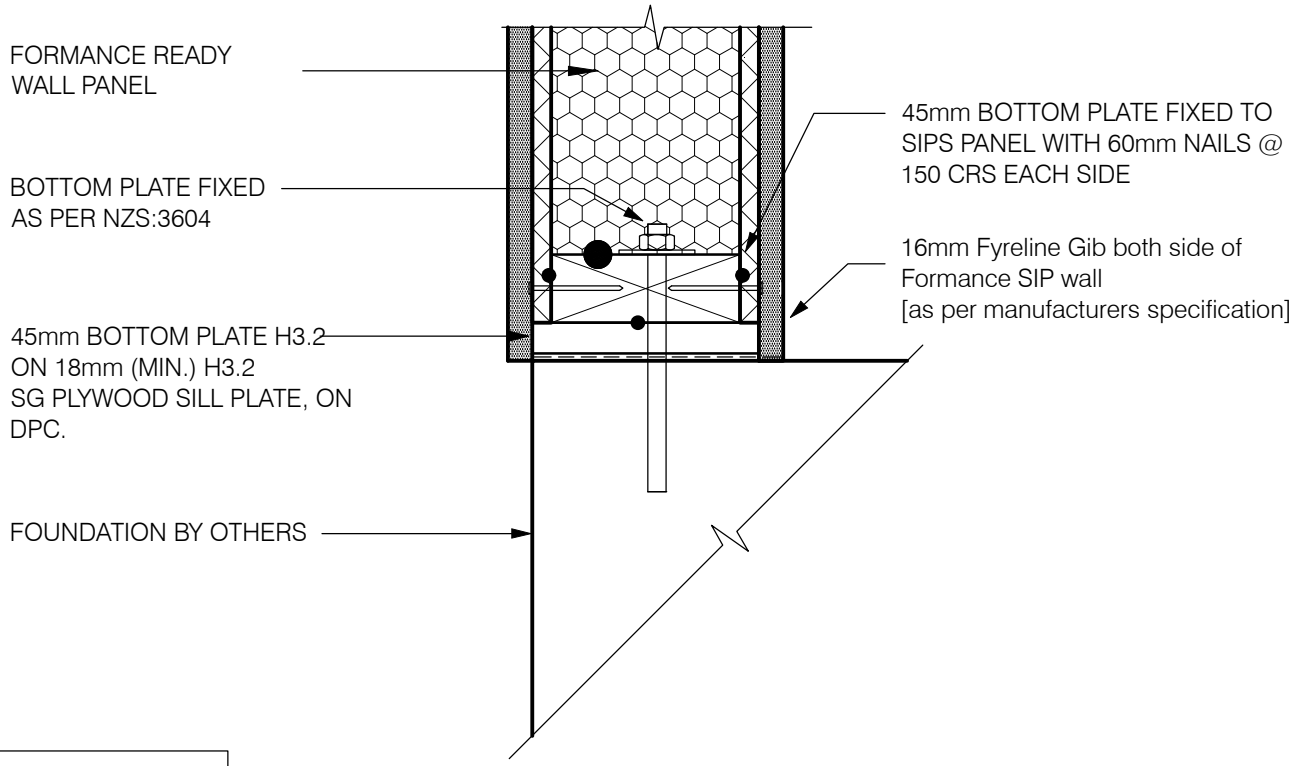
Date: 05/03/18

Drawing Number: FR-WA-

Version Number: 1

FORMANCE

FORMANCE READY



LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

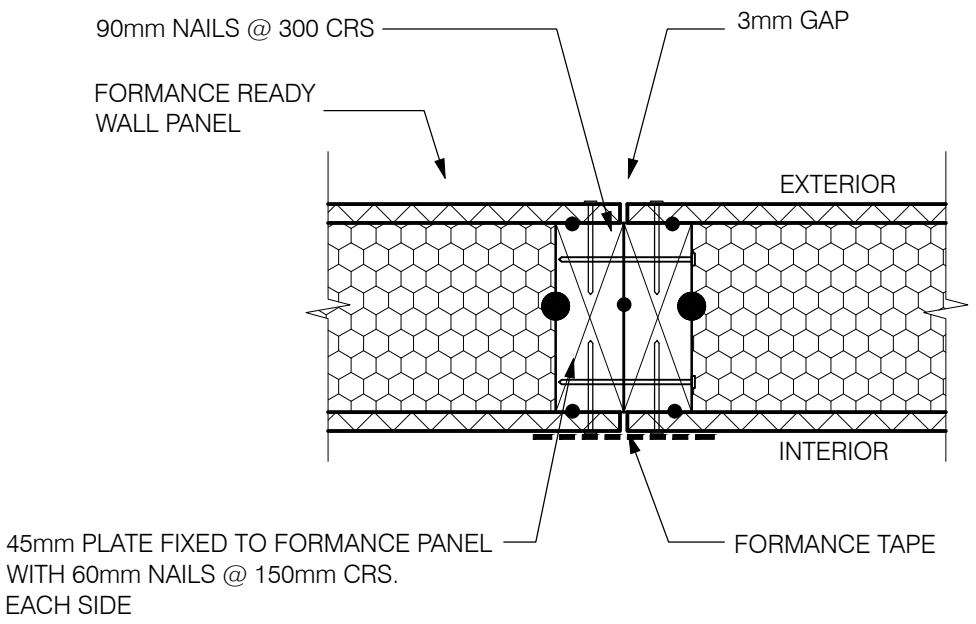
16mm Fyreline Gib is fixed vertically over Formance panels with sheet joints at the same location as the panel joints, using 41mm Gib Grabber HT drywall screws, at 300mm crs., along the edges and along the sheet center line.

All screws heads are stopped and all sheet joints taped and stopped in accordance with the Gib Site Guide, noting that no stopping is required under a cladding and drained cavity system.

TITLE:
FR / FORMANCE READY
FRR 30/30/30
FIRE WALL

Scale:	Date:	Drawing Number:	Version Number:
1:5	21/02/18	FR-WA-	2

FORMANCE
FORMANCE READY



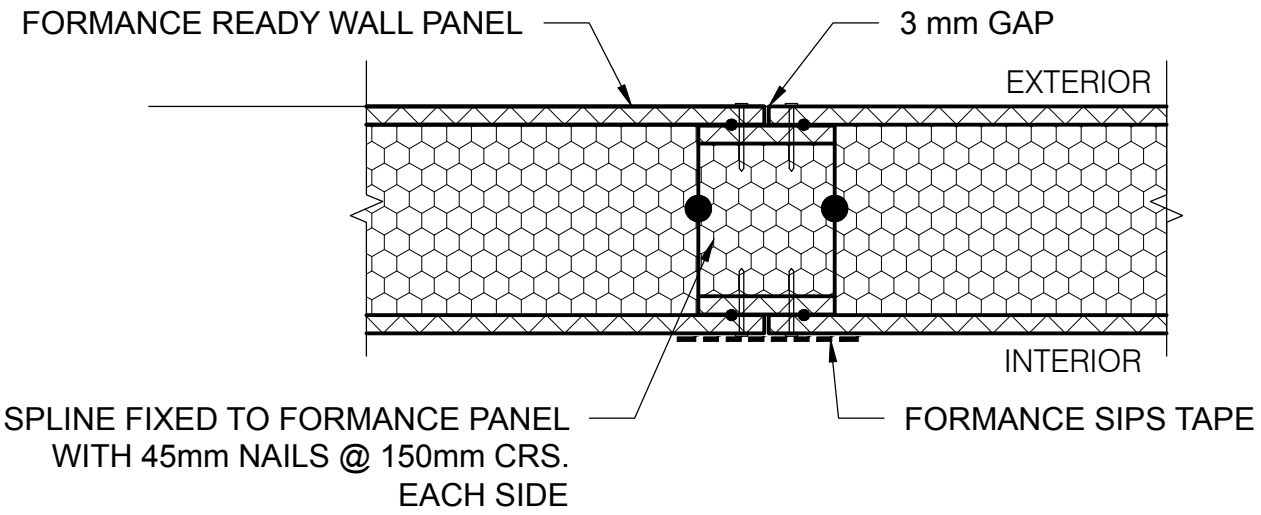
LEGEND
● EXPANDING FOAM
• ADHESIVE
NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
TIMBER SPLINE

Scale:	Date:	Drawing Number:	Version Number:
1:5	21/02/18	FR–WA–WA	1

FORMANCE

FORMANCE READY

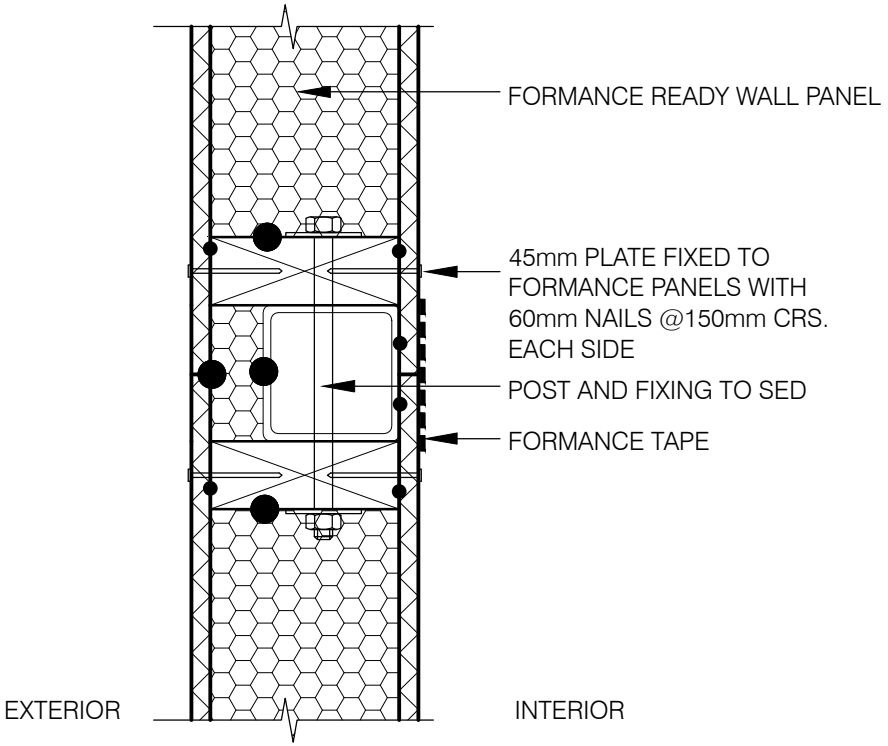


LEGEND
● EXPANDING FOAM
• ADHESIVE
NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
INSULATED SPLINE

Scale:	Date:	Drawing Number:	Version Number:
1:5	21/02/18	FR–WA–WA	2

FORMANCE



LEGEND
● EXPANDING FOAM
• ADHESIVE

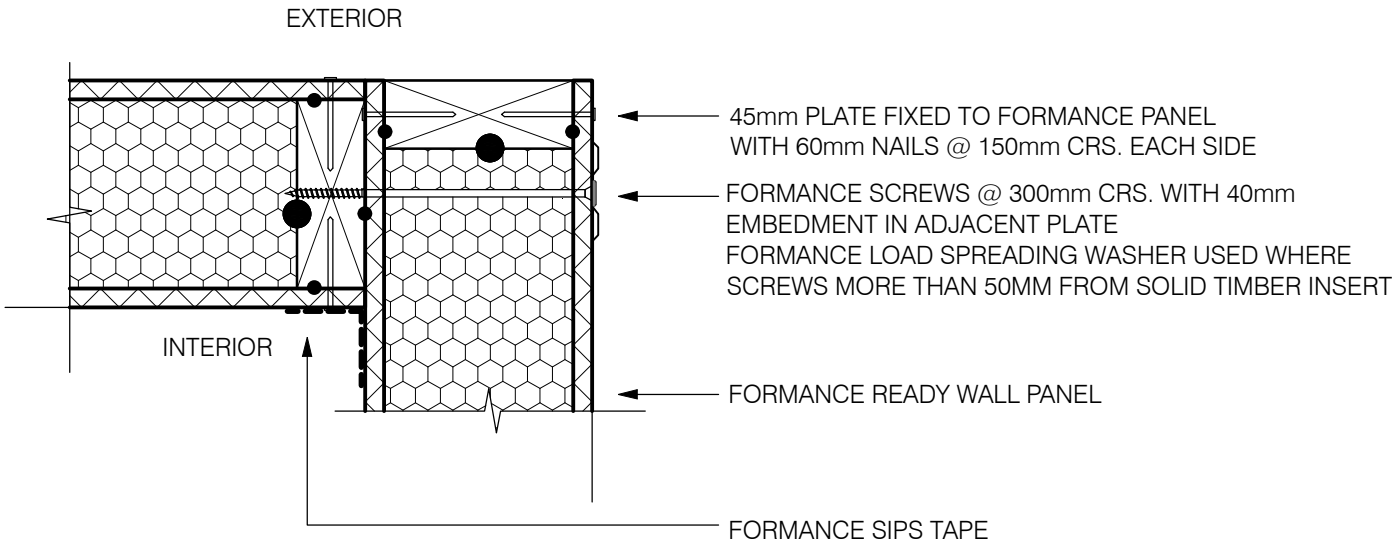
NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY STEEL POST TO WALL PANEL

Scale:	Date:	Drawing Number:	Version Number:
1:5	21/02/18	FR–WA–WA	3

FORMANCE

FORMANCE READY



LEGEND
● EXPANDING FOAM
• ADHESIVE

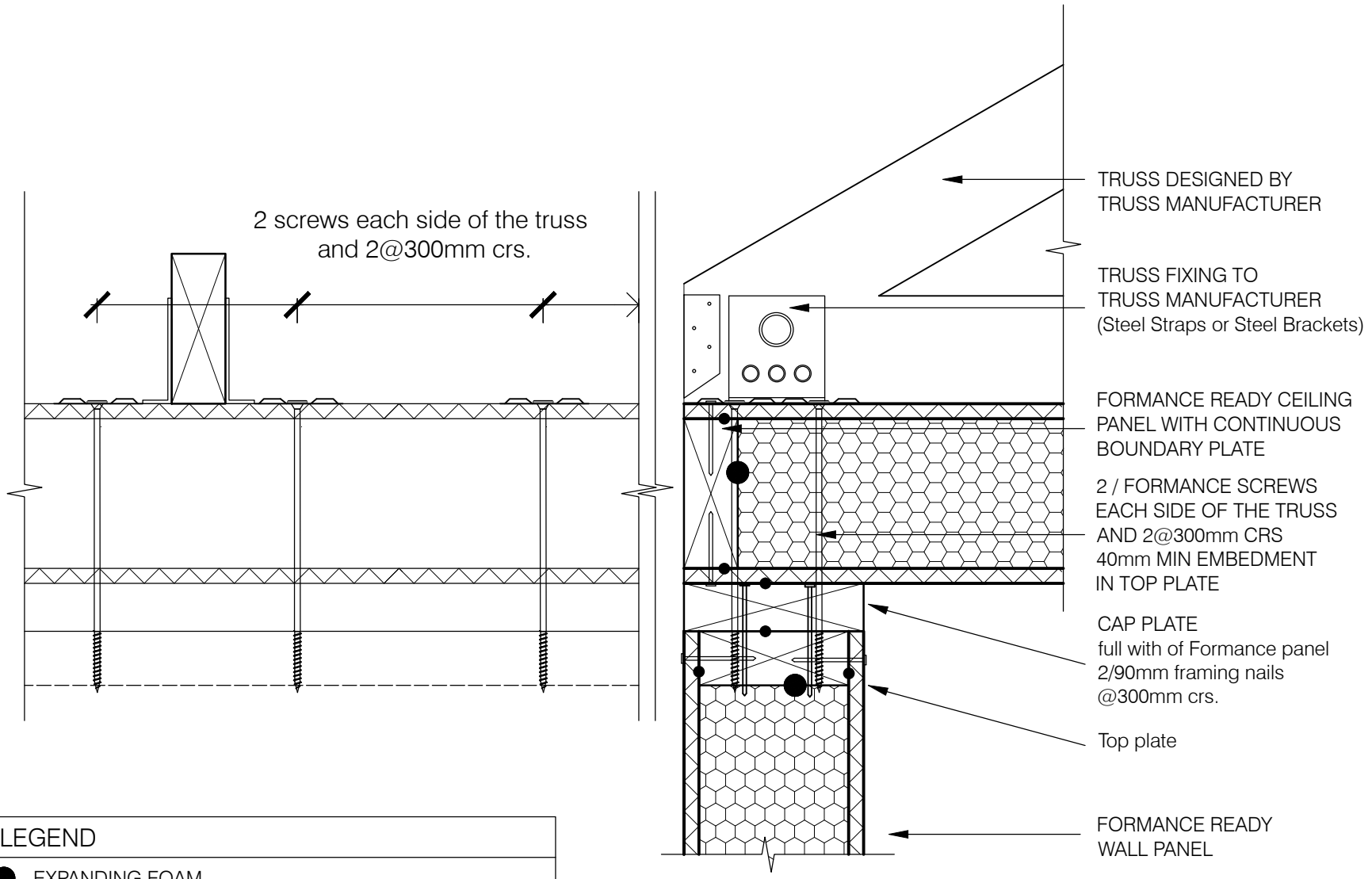
NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
EXTERNAL CORNER

Scale:	Date:	Drawing Number:	Version Number:
1:5	21/02/18	FR-WA-WA	4

FORMANCE
FORMANCE READY

Ceiling Details



LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY DETAILS
TRUSSES TO FR CEILING PANEL

Scale: 1:5

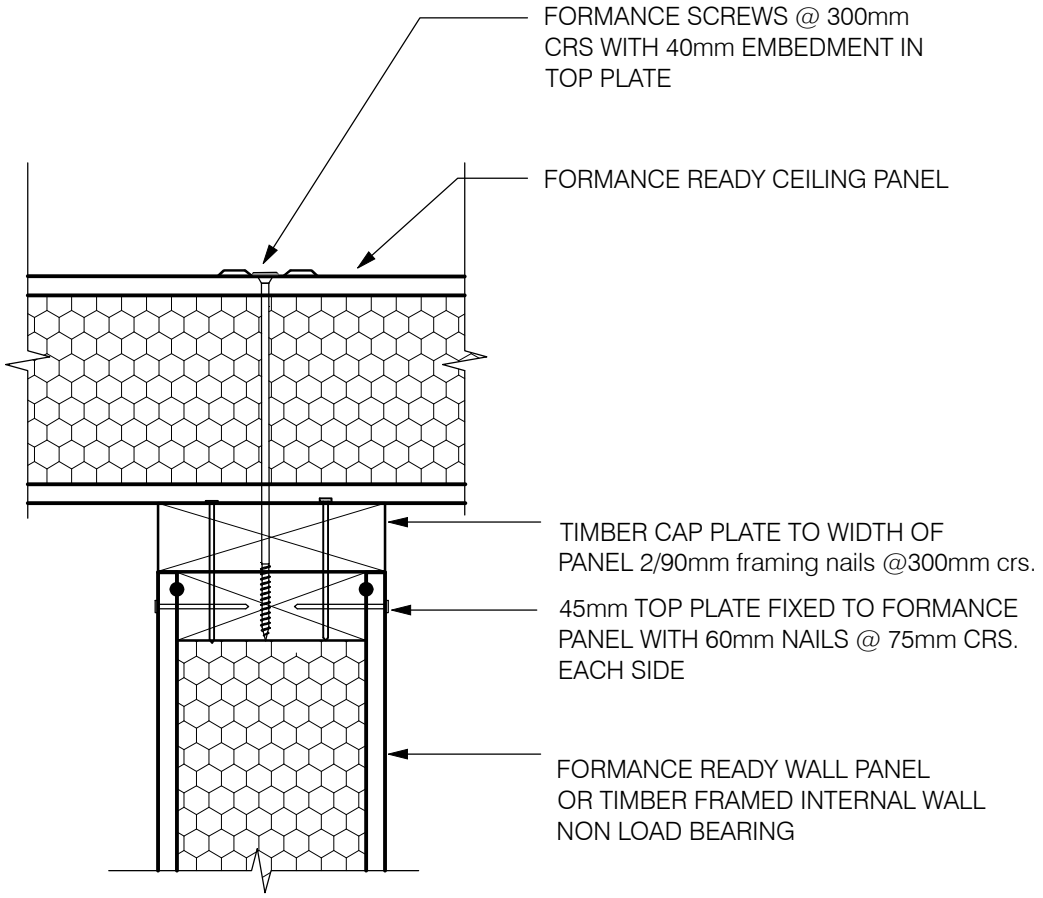
Date: 20/04/18

Drawing Number: FR-CE-WA

Version Number: 1

FORMANCE

FORMANCE READY



LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
CEILING TO INTERNAL WALL
NON LOAD BEARING

Scale: 1:5

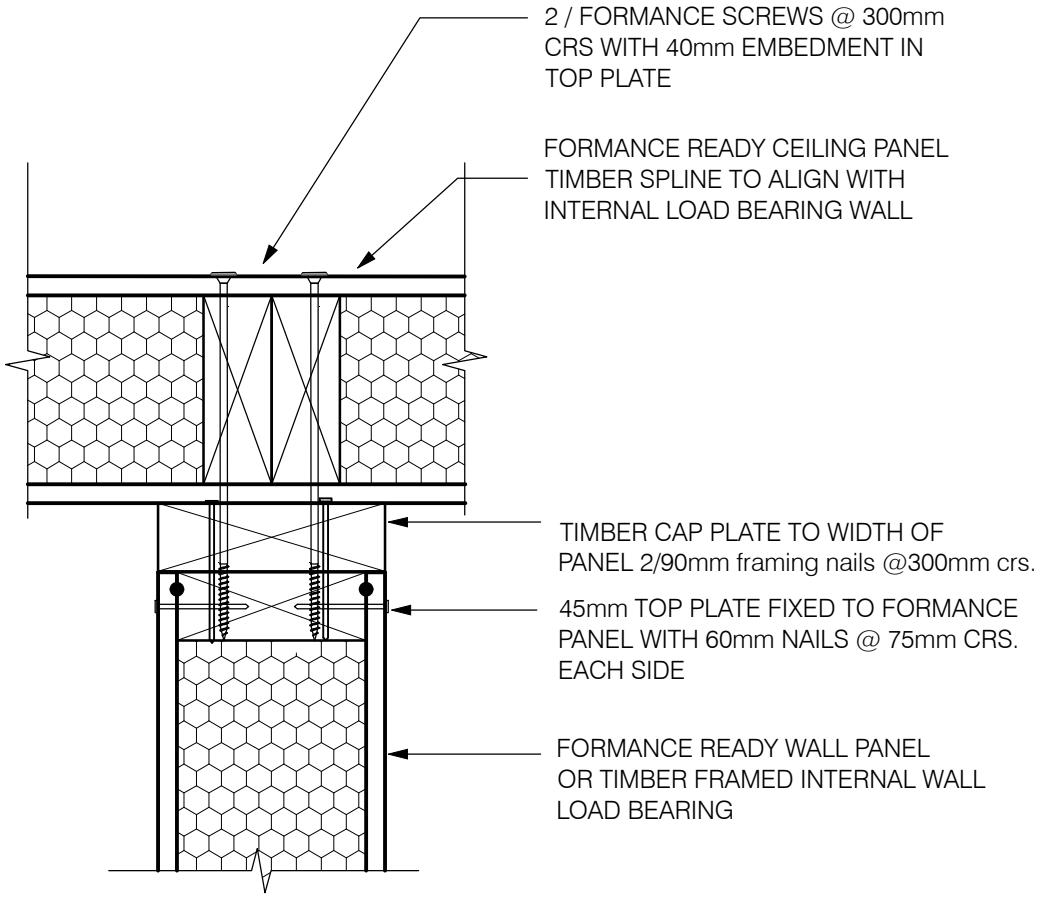
Date: 20/04/18

Drawing Number: FR-CE-WA

Version Number: 2

FORMANCE

FORMANCE READY



LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

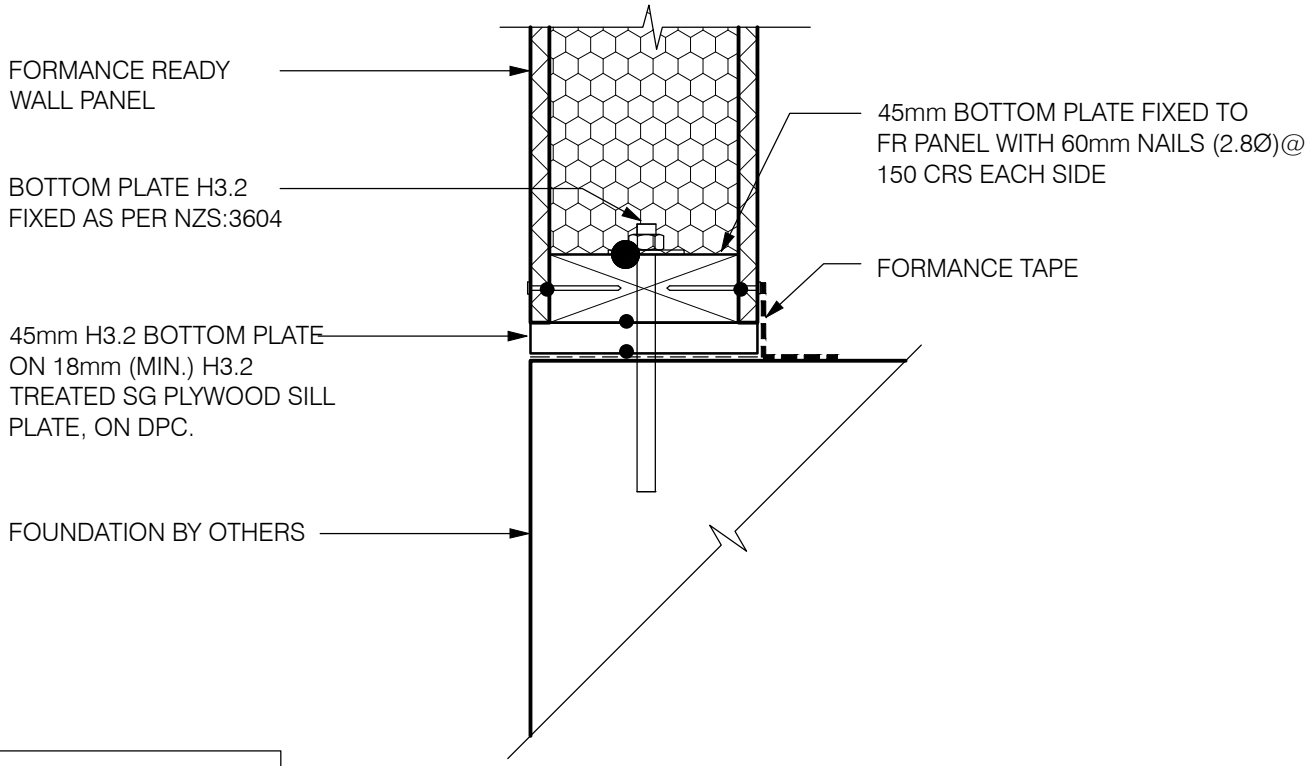
TITLE:
FR / FORMANCE READY
CEILING TO INTERNAL WALL
LOAD BEARING

Scale:	Date:	Drawing Number:	Version Number:
1:5	20/04/18	FR-CE-WA	3

FORMANCE

FORMANCE READY

Foundation Details



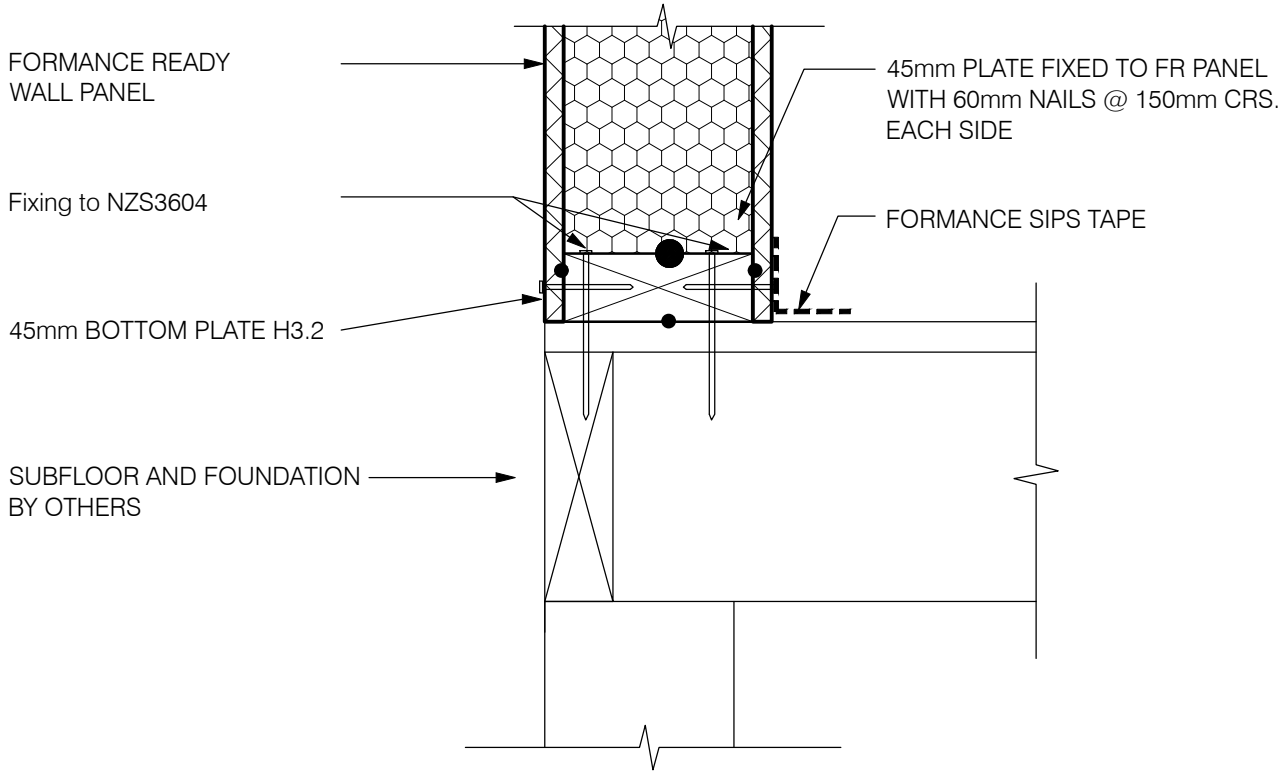
LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
Wall to concrete edge detail

Scale:	Date:	Drawing Number:	Version Number:
1:5	22/02/18	FR-WA-FO	1

FORMANCE
FORMANCE READY



LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
Wall to Timber Pile foundation/floor

Scale:	Date:	Drawing Number:	Version Number:
1:5	22/02/18	FR-WA-F0	2

FORMANCE
OSB

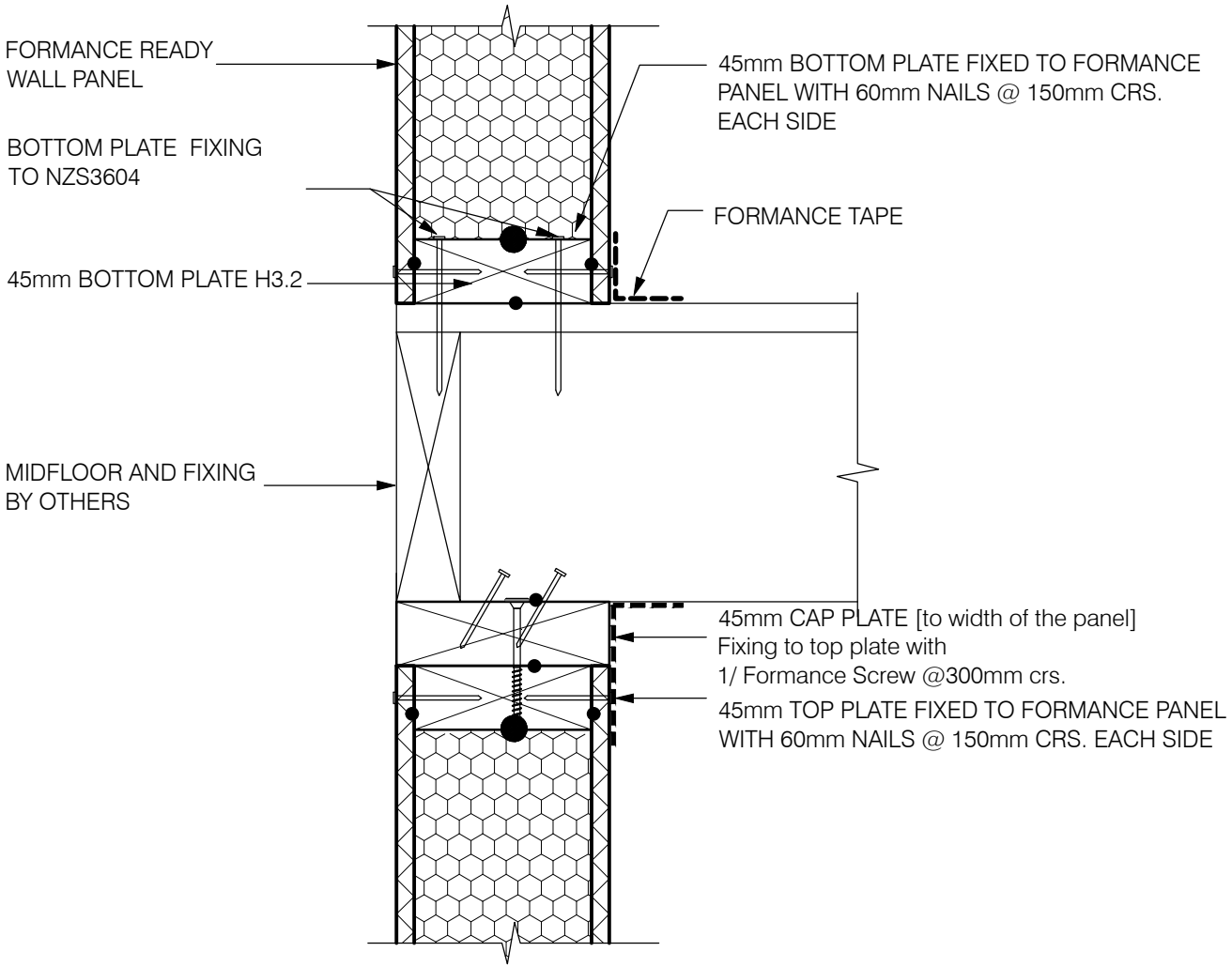
Floor Details

LEGEND

- EXPANDING FOAM
- ADHESIVE

NOTES

1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY



TITLE: FR / FORMANCE READY Wall to midfloor detail

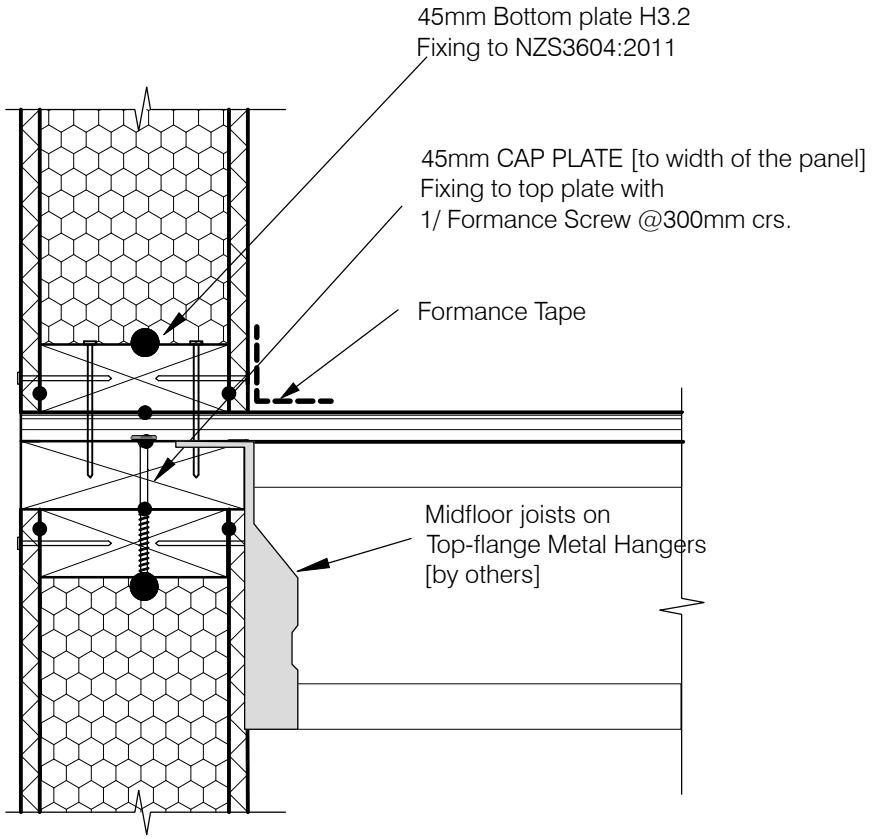
Scale:	Date:	Drawing Number:	Version Number:
1:5	22/02/18	FR-WA-FL	1

FORMANCE

FORMANCE READY

LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY



TITLE:
FR / FORMANCE READY
WALL TO MIDFLOOR DETAIL

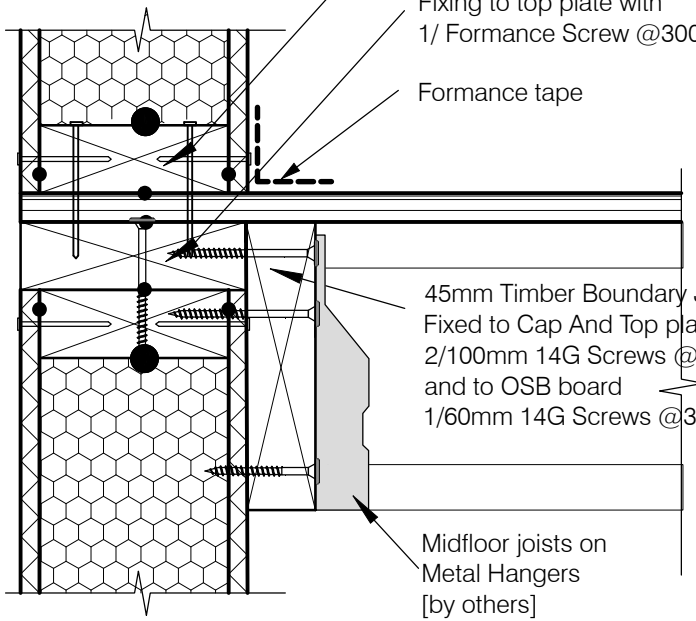
Scale:	Date:	Drawing Number:	Version Number:
1:5	22/02/18	FR-WA-FL	2

FORMANCE

FORMANCE READY

LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY



TITLE:
FR / FORMANCE READY
WALL TO MIDFLOOR DETAIL

Scale: 1:5

Date: 21/02/18

Drawing Number: FR-WA-FL

Version Number: 3

FORMANCE

FORMANCE READY

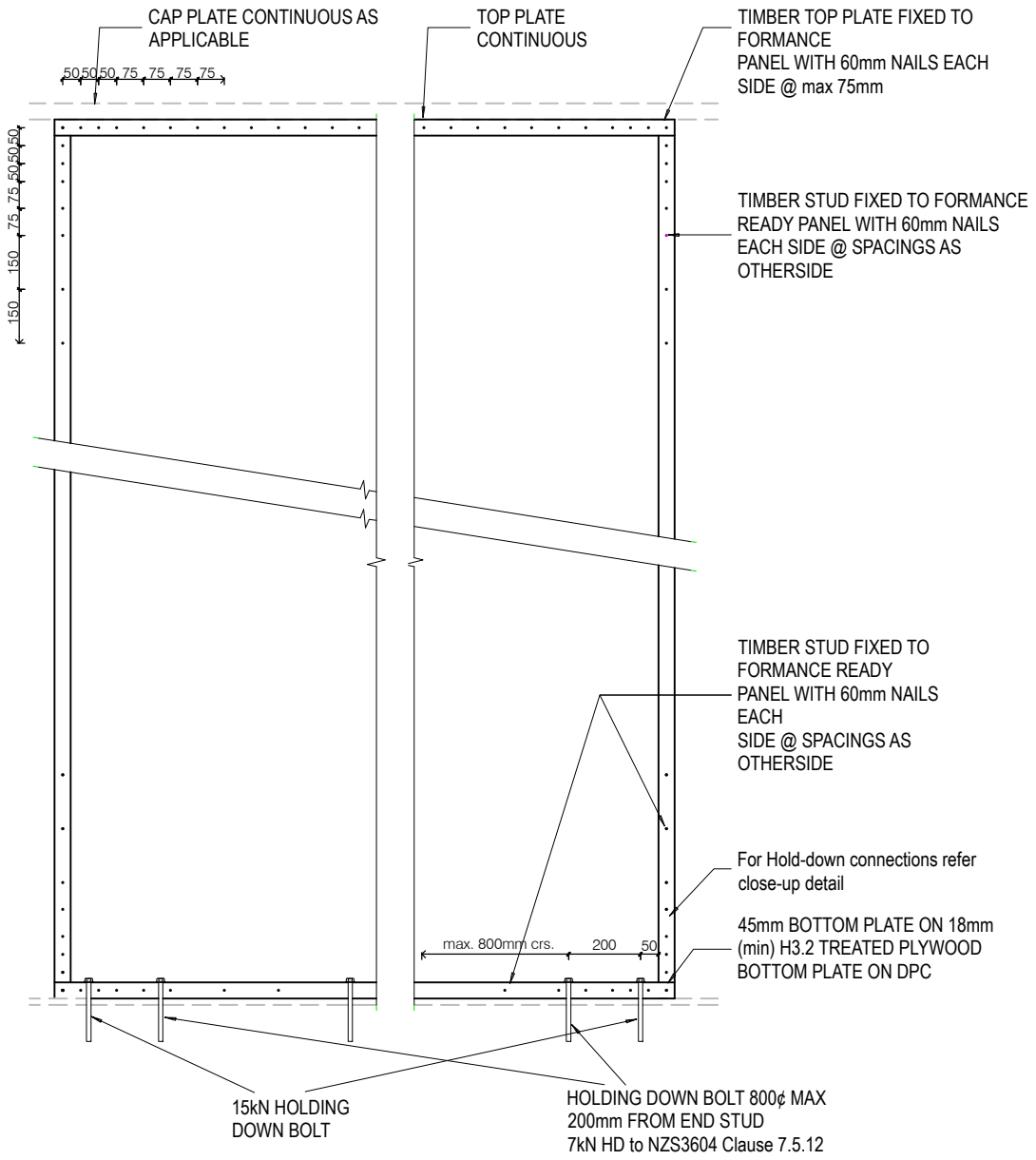
Bracing Details

LEGEND

- EXPANDING FOAM
- ADHESIVE

NOTES

1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY



TITLE: FR / FORMANCE READY CORNER NAILING ARRANGEMENT FBW

Scale:	Date:	Drawing Number:	Version Number:
1:20	20/04/18	FR-FBW	1

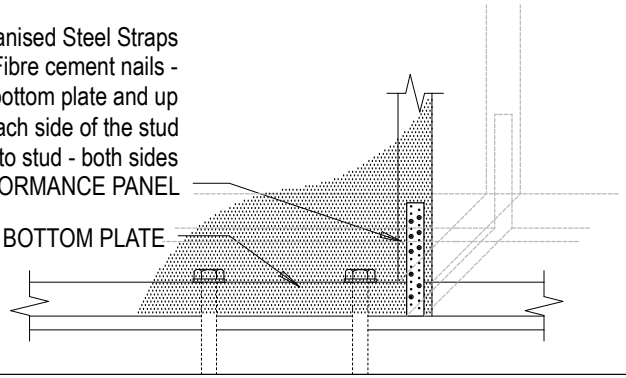
FORMANCE

FORMANCE READY

FBW-B

600 x 25 x 1mm Galvanised Steel Straps
using 50x2.80mm flat head Galv Fibre cement nails -
strap centered to stud, taken under the bottom plate and up
150mm each side of the stud
3 nails each side bottom plate & 6 nails to stud - both sides
STRAP FIXED OVER FORMANCE PANEL

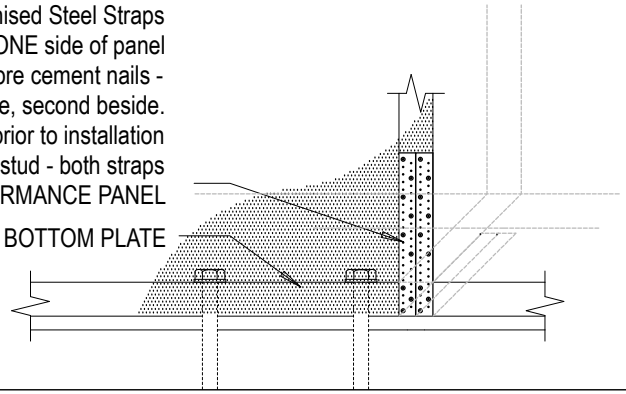
CONTINUOUS BOTTOM PLATE



FBW-C

2 / 200 x 25 x 1mm Galvanised Steel Straps
on ONE side of panel
using 50x2.80mm flat head Galv Fibre cement nails -
1st strap right at edge, second beside.
6 nails to underside of bottom plate prior to installation
3 nails to bottom plate & 6 nails to stud - both straps
STRAPS FIXED OVER FORMANCE PANEL

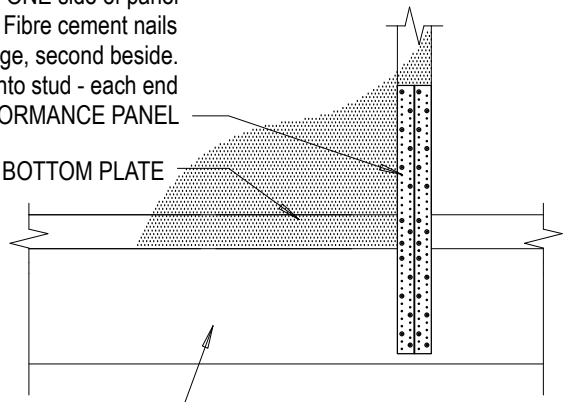
CONTINUOUS BOTTOM PLATE



FBW-D

2 / 400mm x 25mm x 1mm Galvanised Steel Strap
on ONE side of panel
using 50x2.80mm flat head Galv Fibre cement nails
1st strap right at edge, second beside.
3 nails bottom plate & 6 nails into stud - each end
STRAPS FIXED OVER FORMANCE PANEL

CONTINUOUS BOTTOM PLATE



BOUNDARY JOIST IN
TIMBER SUB FLOOR
(by others)

Apply this hold-down detail at each end of bracing unit.

Bracing capacities vary with hold-down detail.

For bracing capacities of each configuration refer to latest Formance Ready Guide

TITLE:
FR / FORMANCE READY
HOLD DOWN DETAILS

Scale: 1:10

Date: 20/04/18

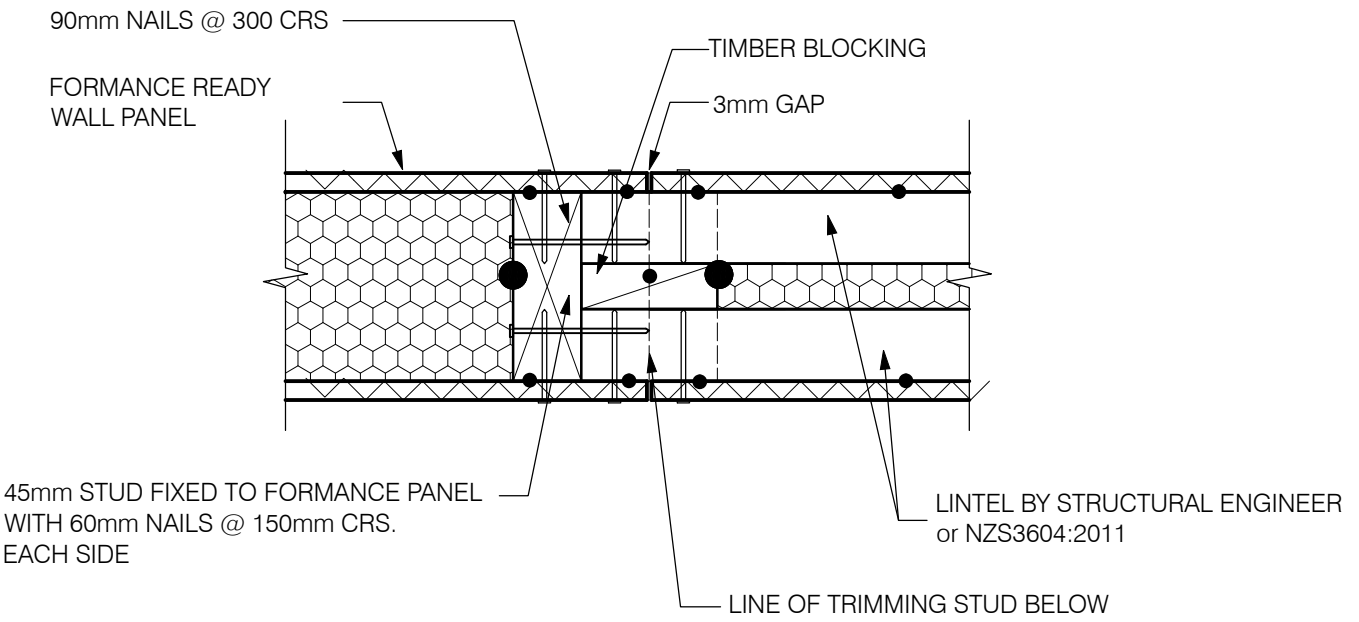
Drawing Number: FR-FBW

Version Number: 2

FORMANCE

FORMANCE READY

Lintel Details



LEGEND
● EXPANDING FOAM
• ADHESIVE

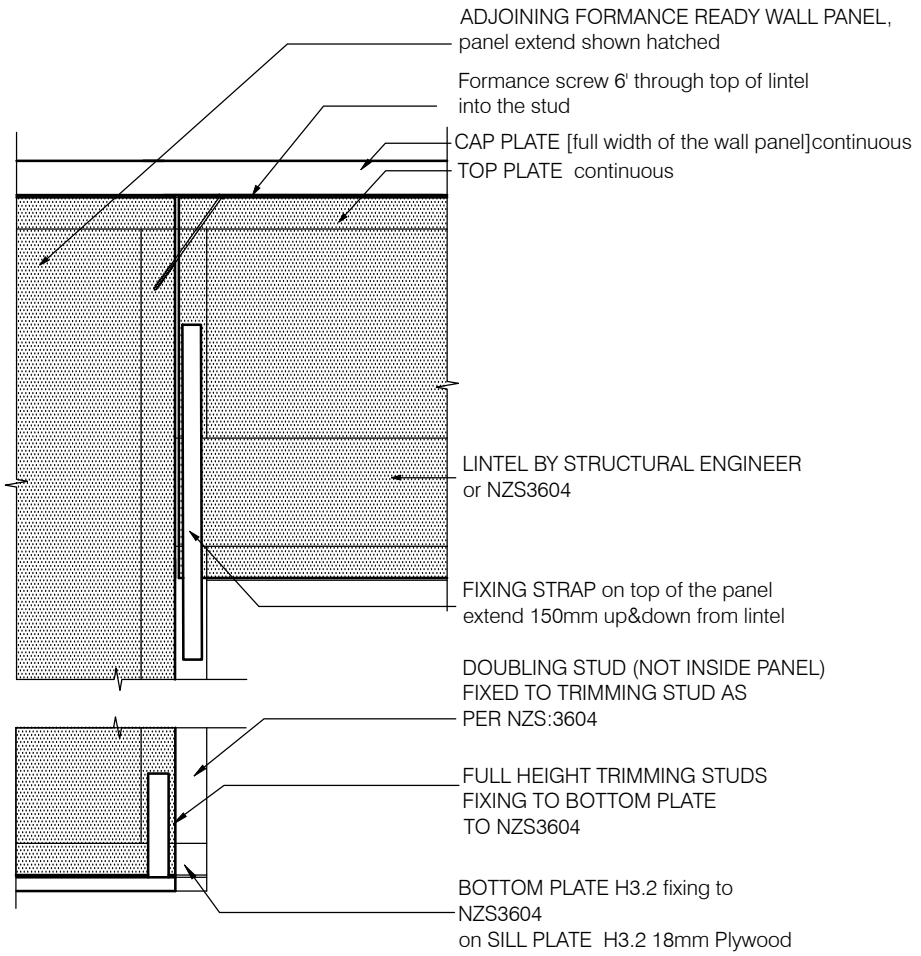
NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
NZS3604:2011 or SED
TIMBER LINTEL

Scale:	Date:	Drawing Number:	Version Number:
1:5	21/02/18	OSB-WA-LI	1

FORMANCE

FORMANCE READY



LEGEND
● EXPANDING FOAM
• ADHESIVE

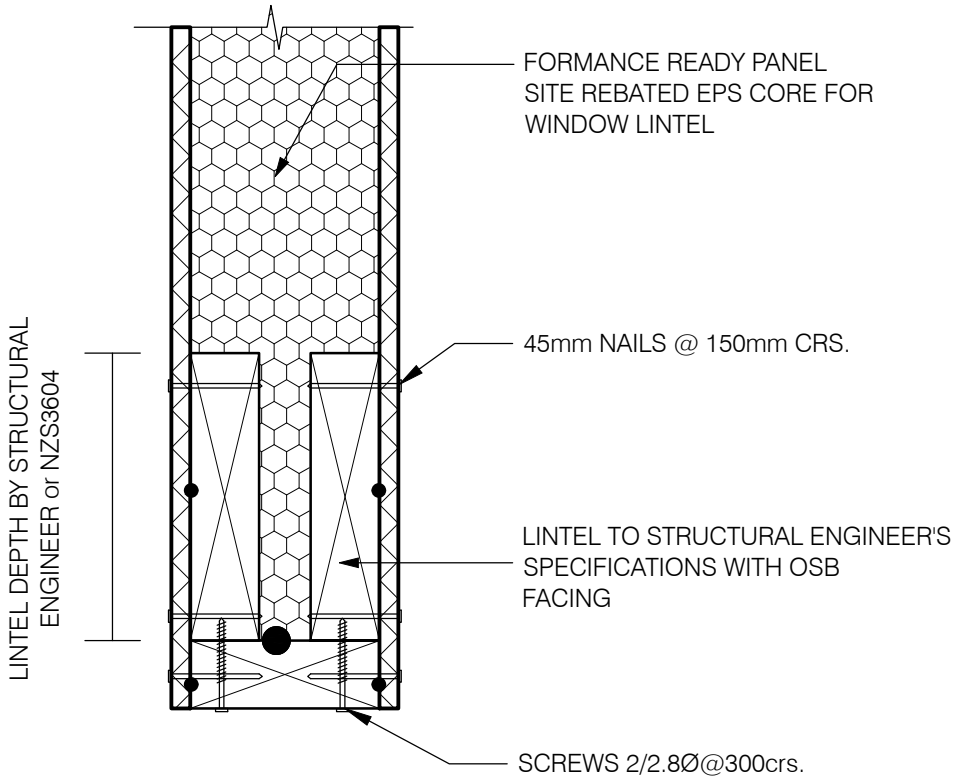
NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
NZS3604 or SED
TIMBER LINTEL

Scale:	Date:	Drawing Number:	Version Number:
1:10	21/02/18	OSB-WA-LI	2

FORMANCE

FORMANCE READY



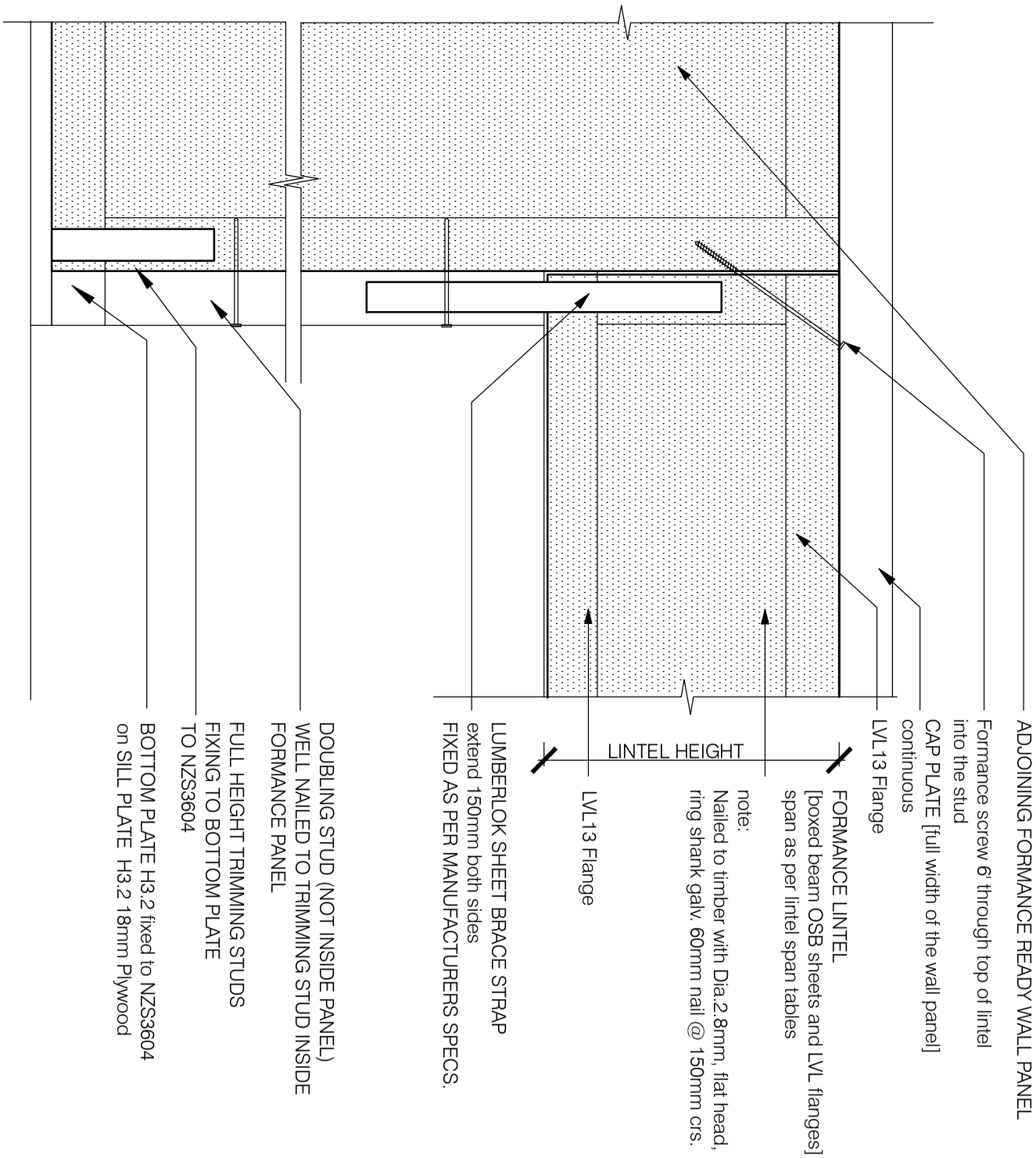
LEGEND
● EXPANDING FOAM
• ADHESIVE

NOTES
1. ALL TIMBER FRAMING MIN H1.2 TR SG8 GRADE
2. CAVITY FIXED CLADDING NOT SHOWN FOR CLARITY
3. INTERNAL LINING NOT SHOWN FOR CLARITY

TITLE:
FR / FORMANCE READY
NZS3604 or SED
TIMBER LINTEL

Scale:	Date:	Drawing Number:	Version Number:
1:5	21/02/18	OSB–WA–LI	3

FORMANCE
FORMANCE READY



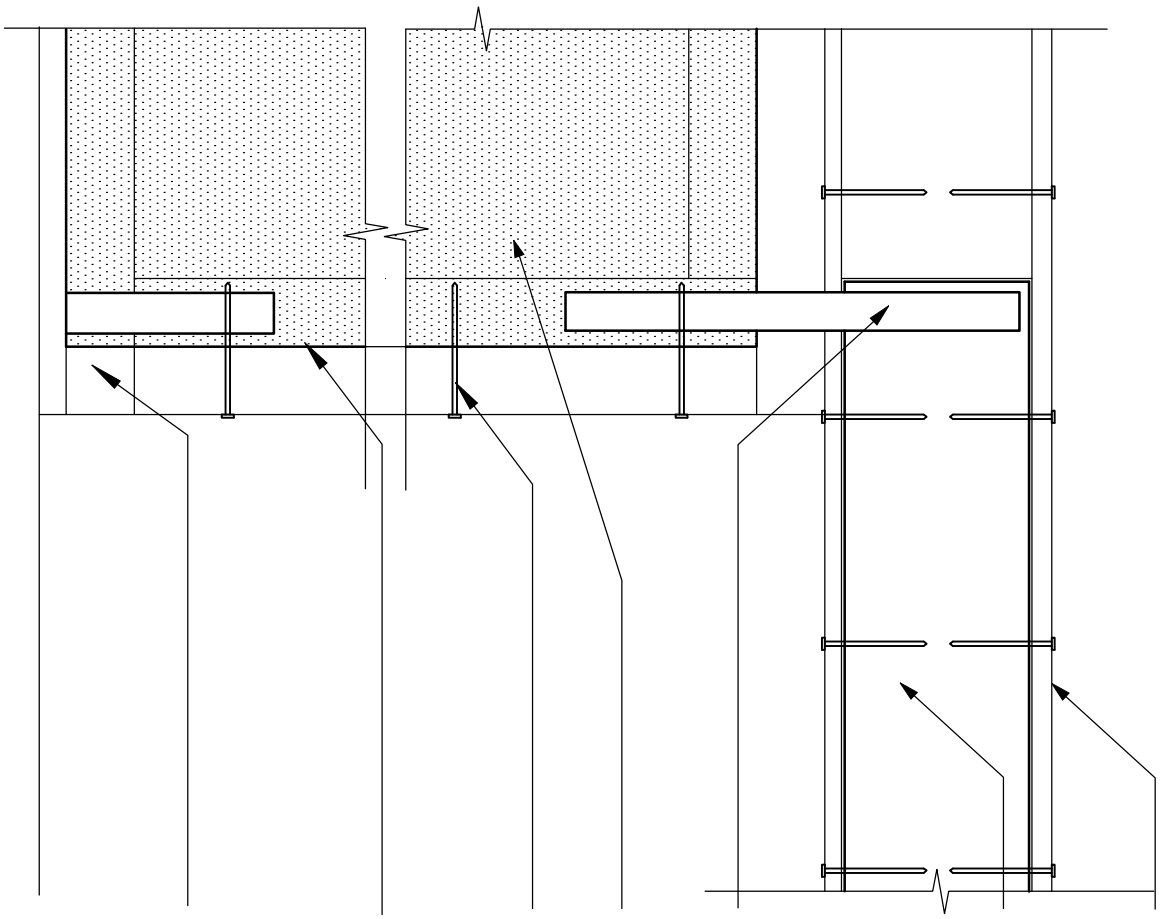
FORMANCE

FORMANCE READY

TITLE:

FR / FORMANCE READY FORMANCE WALL LINTEL

Scale:	Date:	Drawing Number:	Version Number:
1:5	28/02/18	FR–WA–LI	4



FORMANCE

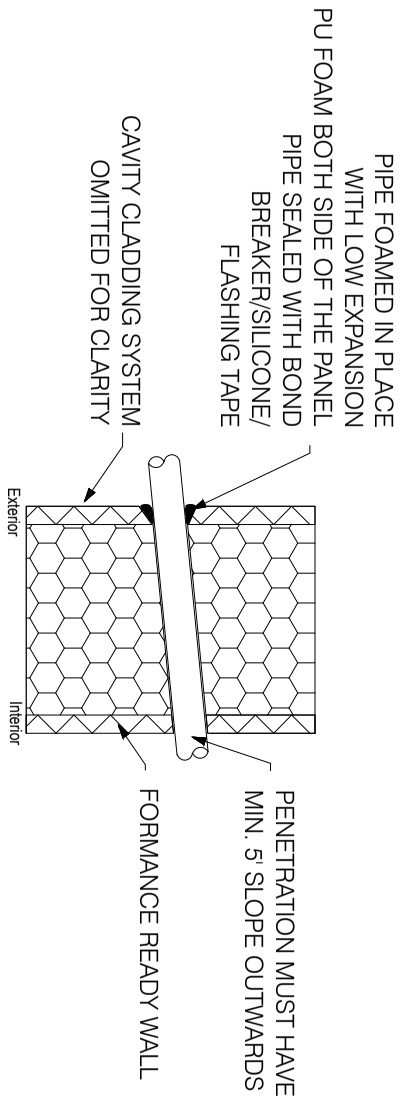
FORMANCE READY

TITLE:

FR / FORMANCE READY FORMANCE CEILING LINTEL

Scale:	Date:	Drawing Number:	Version Number:
1:5	28/03/18	FR–WA–LI	5

Penetration and Services Details



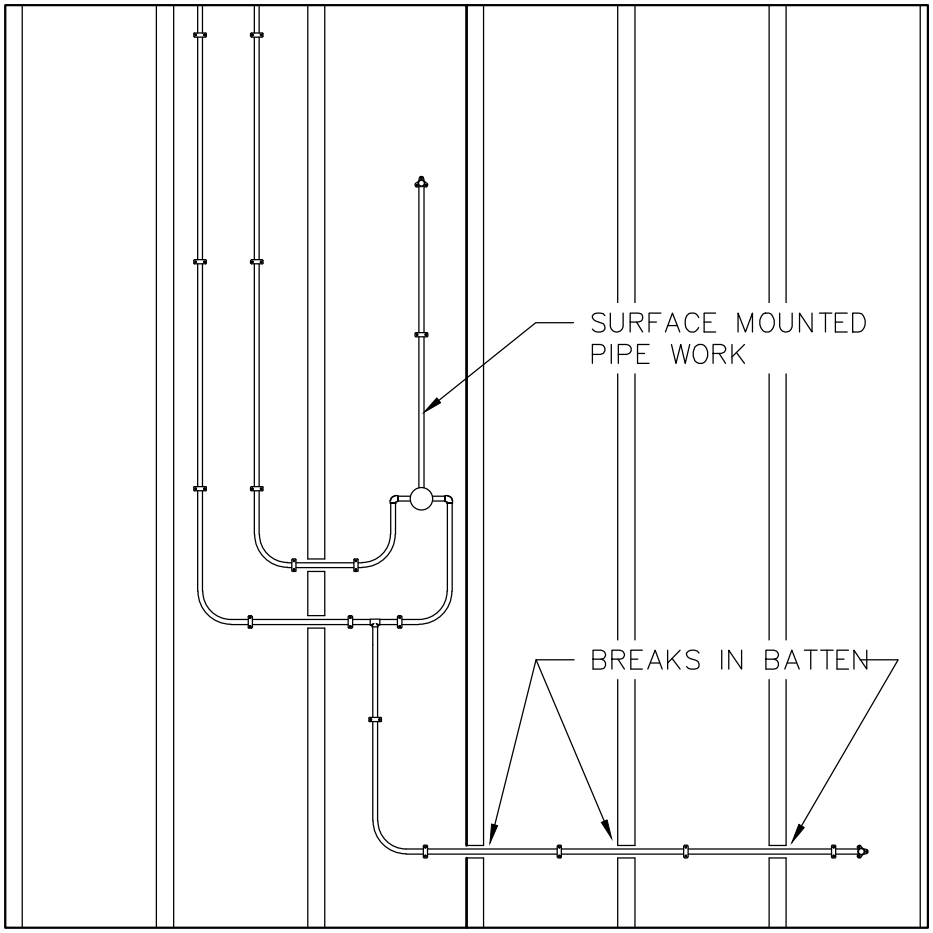
FORMANCE

FORMANCE READY

TITLE:

FR / FORMANCE READY
PIPE PENETRATION

Scale:	Date:	Drawing Number:	Version Number:
1:5	21/02/18	FR–WA–PE	1

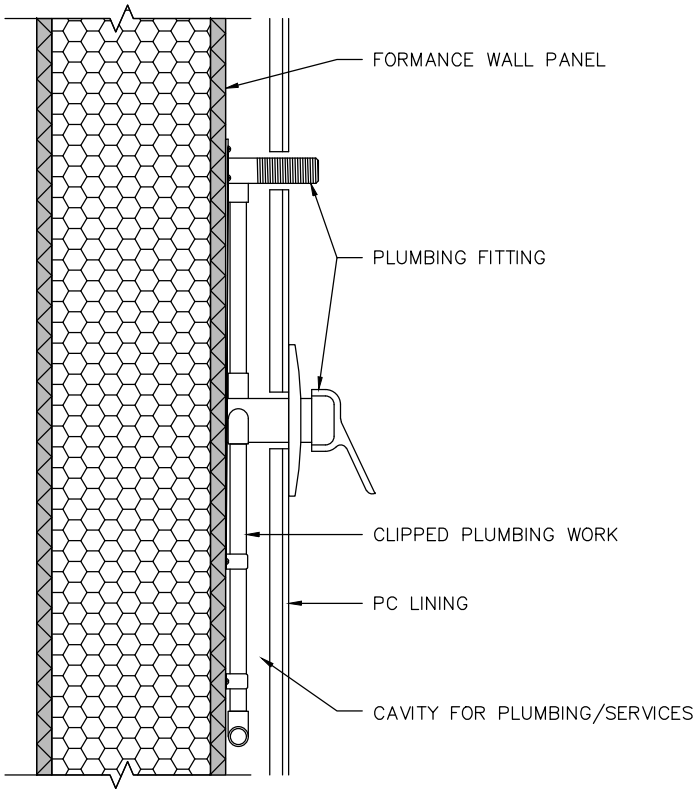


NOTES:
CONSIDER PLUMBING FITTING DIMENSIONS WHEN SELECTING BATTEN THICKNESS

BATTEN SPACING AS PER LINING RECOMMENDATION

FIXINGS AS PER FIXING SCHEDULE

THE SAME PRINCIPAL CAN BE USED FOR ELECTRICAL WIRING



TITLE:
FR / FORMANCE READY
SURFACE MOUNTED PLUMBING IN CAVITY

Scale: NTS
Date: 21-02-2018
Drawing Number: FR-WA-PL-01
Version Number: 1

FORMANCE
FORMANCE READY