the futurebuild® range

FUTUREBUILD® STRUCTURAL LVL hy ONE®
FUTUREBUILD® STRUCTURAL LVL hy SPAN®
FUTUREBUILD® LVL TRUSS CHORDS hy CHORD®
FUTUREBUILD® STRUCTURAL LVL BEAMS hy 90®
FUTUREBUILD® LVL BUILDING SYSTEMS hy FRAME®
FUTUREBUILD® LVL ENGINEERED I-JOISTS hy JOIST®
FUTUREBUILD® LVL SCAFFOLD PLANKS hy PLANK®
FUTUREBUILD® LVL FORMWORK BEAMS tru FORM®
FUTUREBUILD® LVL FORMWORK EDGE BOARDS edge FORM®

hyFRAME® DESIGN ASSUMPTIONS

hyFRAME® building systems are Laminated Veneer Lumber (LVL) portal frame solutions, developed to provide a single design solution for the most common environmental conditions in New Zealand. These solutions have been developed with a number of design assumptions to provide efficiencies through design, fabrication and quantities of scale. This Information Bulletin provides guidance on the design assumptions applied in the development of the hyFRAME 12, 15 and 18m span range. Design assumptions have been developed based on typical uses as rural and light commercial unlined buildings. hyFRAME is supplied as an untreated frame, designed to be unlined with no internal wall or floor framing.

hyFRAME® building systems use engineering design methodologies in accordance with New Zealand Building Code (NZBC) Verification Method B1/VM1, Clause 2.1 Structural Design Action Standards and Clause 6.0 Timber. The design assumptions below will be checked and confirmed by one of Futurebuild® LVL team of Structural Timber Engineers prior to acceptance of an order.

PERMANENT LOADS

hyFRAME systems have been developed based on a roof mass not exceeding 15 kg/m^2, excluding LVL support framing. This will typically allow for roof sheeting and sarking. Additional loads like linings and insulation are not included as part of the standard range but may be applicable depending on other loading parameters, like snow and earthquake. Contact Futurebuild for further information.

ROOF AND WALL SHEETING

hyFRAME building systems have been developed and priced based on roof sheeting spanning a maximum of 1400mm internal span, with framing to support end spans down to 1100mm. Wall framing is provided at 1400mm nominal centres, options for plywood claddings or similar are available subject to additional framing being added. Roof and wall claddings should be confirmed as appropriate for the site wind speed and purlin/girt spacing.

Standard hyFRAME solutions have been developed to be fully enclosed (with isolated openings), and at least two bays available for bracing. Standard pricing allows for strap bracing only.

Where building usage and opening requirements limit the amount of available bracing locations, LVL cross bracing or LVL bracing frames are available subject to additional cost. Contact Futurebuild LVL for further information.

SNOW LOADING

Ground snow loading of not more than 0.9 kPa has been included as part of the standard design parameters for the hyFRAME range. hyFRAME building systems, as designed, are suitable for altitudes detailed in Table 1 below.

Table 1: hyFRAME® Snow Region, Altitude and Ground Snow Load

Snow Region	Maximum Altitude (m)	Ground Snow Load (kPa)
N1	550	0.9
N2	415	0.9
N3	390	0.9
N4	100	0.9
N5	200	0.9

EARTHQUAKE LOADING

hyFRAME building systems have been designed to allow for a moderate level of earthquake resistance. Earthquake design actions are calculated in accordance with AS/NZS 1170.5 Structural Design Actions – Earthquake as a function of Hazard Factor, Soil Class, and Period.

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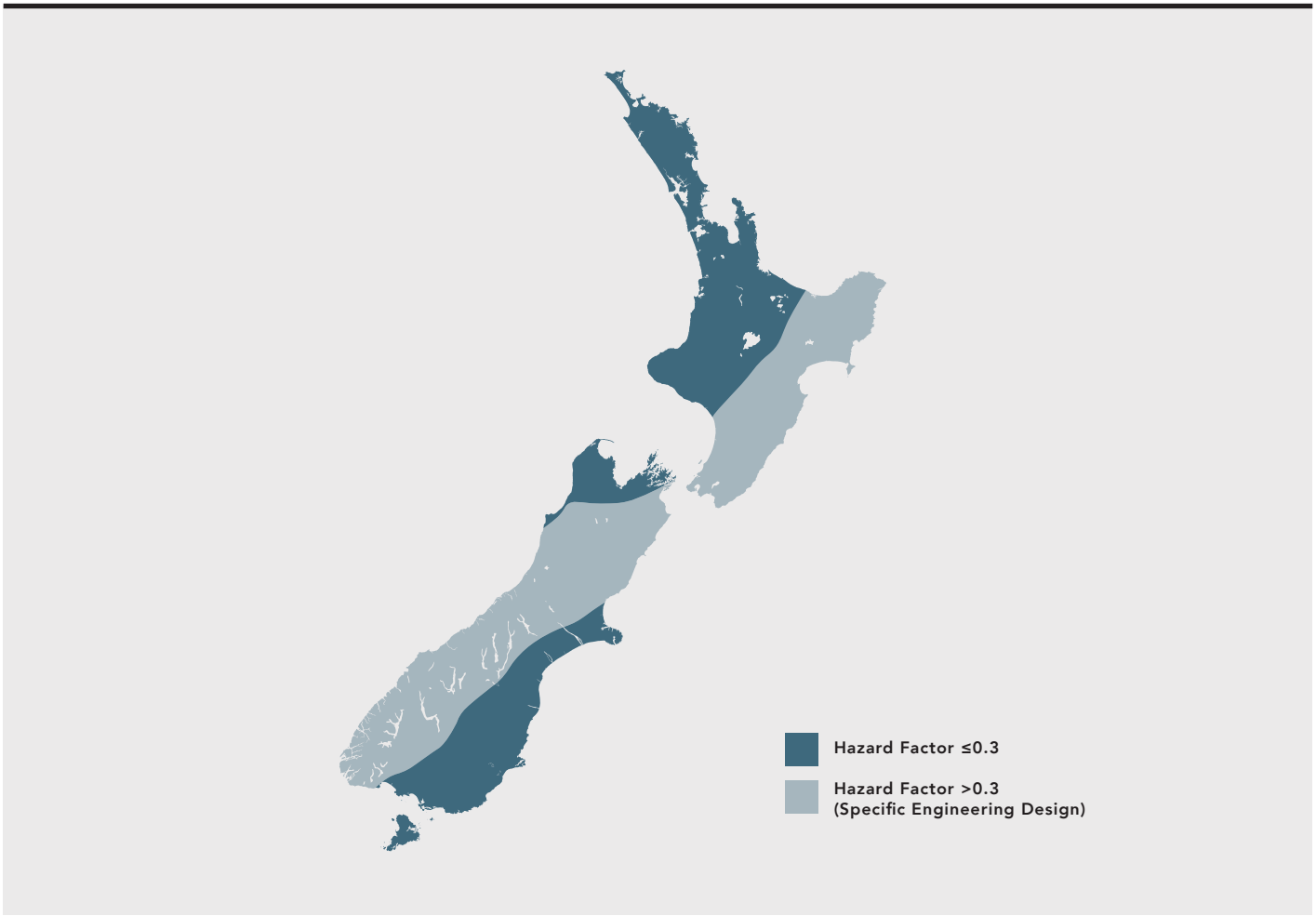
HAZARD FACTOR

hyFRAME® buildings are designed to cater for Hazard Factor of up to and including 0.3, which encompasses a large part of New Zealand including Auckland, Whangarei, Hamilton, Tauranga, New Plymouth and Hamilton. In the South Island, regions including Nelson, Christchurch,Timaru, Dunedin and Invercargill have hazard factors less than or equal to 0.3. Refer Figure 1 for regions covered by hyFRAME standard designs.

SOIL CLASS

Standard hyFRAME building systems are designed and priced assuming Soil Class C or better. AS/NZS 1170.5 defines Soil Class C as "shallow soil types", where Soil Class D is considered as "deep or soft soil types" and should be confirmed by the Regulatory Authority or a local engineer. hyFRAME buildings may cater for Soil Class D in some regions, subject to the inclusion of LVL roof and wall bracing. Additional costs are incurred for the use of LVL bracing - contact Futurebuild® for further information.

Figure 1: Hazard Factor Regions for hyFRAME® Building Systems



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PERIOD

hyFRAME® design applies a conservative approximation of period at 0.4 seconds.

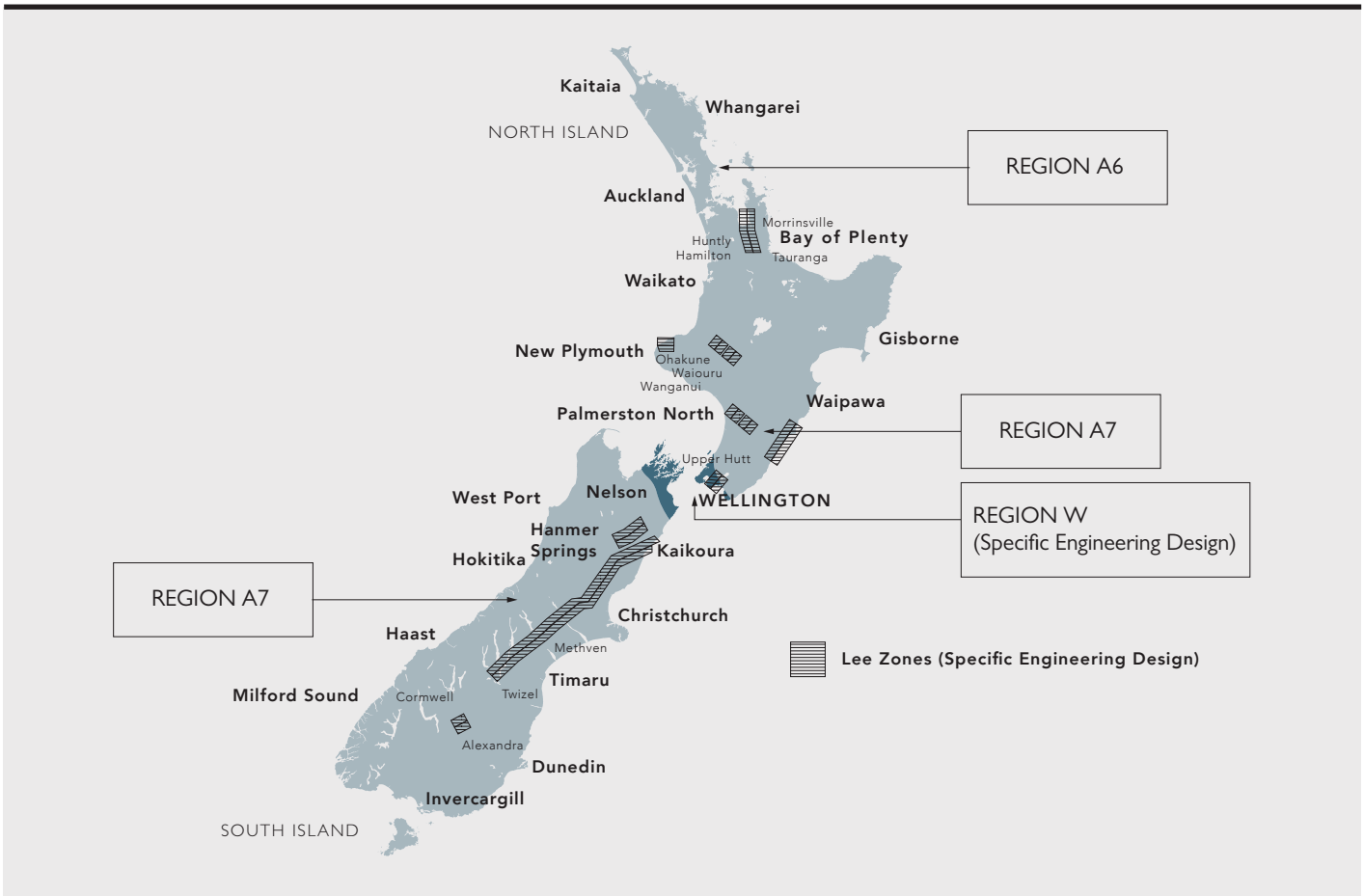
WIND LOADING

hyFRAME building systems are assessed differently for wind than a typical house, as they are considered outside the scope of NZS 3604. Wind loading has been developed in accordance with NZBC Verification (NZBC) Verification Method B1/VM1. Wind pressures for non-NZS 3604 buildings are primarily a function of Wind Region, Lee Multiplier and Terrain Category.

WIND REGION

Wind Region is relative to the geographical location of the site, the hyFRAME building systems are designed to cater for buildings within Wind Region A6 and A7 (refer Figure 2), which includes most of the country except region W which includes Wellington, Upper Hutt and areas north of Blenheim.

Figure 2: Wind Regions and Lee Zones



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LEE MULITPLIER

Lee Multiplier accounts for localised concentrated wind regions around hills, escarpments, mountain ranges, etc. hyFRAME® standard building designs have not taken into account the effects of Lee zones. Contact Futurebuild® for confirmation of hyFRAME suitability for Lee zone regions. Figure 2 also notes the proximity of Lee zones.

TERRAIN CATEGORY

Terrain Category defines the way wind flows towards a structure. The hyFRAME building systems have been designed to cater for structures in Terrain Categories 2 and above. AS/NZS 1170.2 defines Terrain Category 2 as "Open Terrain, including grassland, with well scattered obstructions having heights generally from 1.5m to 5.0m, with no more than two obstructions per hectare, e.g farmland and cleared subdivisions with isolated trees and uncut grass". Figure 3 illustrates a typical Terrain Category 2 area.

Figure 3: Typical Category 2 - Open Terrain

SLAB AND FOOTING DESIGN

hyFRAME building systems have standardised footing systems based on the abovementioned loading parameters, and the building site having 'good' ground as defined in NZS 3604, with an ultimate bearing capacity of 300 kPa. For ground conditions other than 'good' ground, Specific Engineering Design (SED) by a local engineer may be required.

The standard slab design for hyFRAME provides for 125mm reinforced slab supported on 'good' ground, allowing for 5.0 kPa loading including trucks with ratings up to 2.0 tonne. Alternate slab designs may be suitable subject to SED.

CONFIRMATION OF hyFRAME® SUITABILITY

The Futurebuild engineering team is available to discuss and confirm the above information relative to your specific location.

BUILDING SYSTEMS OUTSIDE THE SCOPE OF hyFRAME

Futurebuild can consider building types beyond the scope of the hyFRAME standard designs through the Preliminary Design Service. The obligation free* Preliminary Design Service is provided to Engineers, Developers and Contractors to explore the cost, programme and environmental advantages of LVL based systems in portal frame structures, commercial flooring systems, multi-storey buildings, and other large building systems.

* Subject to qualification of project type, size, scale, and status. Contact 0800 585 244 to determine if your project qualifies.