

Dwellings, Outbuildings, Swimming Pools and Other Works (Not Commercial)

Section 1 Statutory Forms

- **Inspection List – By Council**
- **Building Consent Form (Form 5) – By Council**
- **Code Compliance Application (Form 6) – By Council**
- **Installation & PS3 Forms – By Council**
- **Application Form**
- **LBP Design Certificates**
- **Record of Title or Sales & Purchase Agreement**
- **PIM, Resource Consent – By Council**

PLEASE NOTE

- Although your Consent documentation states 2-3 full working days' notice is required, it may not always be possible to carry out the inspection within the time frame you require.
- If an inspection of the building works is not carried out in accordance with the Inspection Schedule it could affect the issue of the Code Compliance Certificate.

**To book inspections ring WDC on
03 311 8906**

All inspections are subject to a separate charge.

All re-inspections will be charged and recorded separately even if other inspections are carried out on the same day.

Using engineers & other professionals

If an engineer has been engaged to carry out various site inspections you will need to provide copies of his/her site notices to us and a producer statement, a PS4 from the engineer confirming the building elements designed and inspected by the engineer were completed in accordance with the approved design.

Confirmation of installation of products

We require producer statements, warranties & installation certificates from various installers as a way of confirming products have been installed in accordance with the manufacturer's recommendations. These are commonly required for exterior claddings, wet area tanking, membrane roofing/decking and effluent fields. Energy certificates such as electrical and gas certificates need to be provided too. You will need to provide these to us prior to the issue of the Code Compliance Certificate.

Applying for a Code Compliance Certificate (CCC)

When you are satisfied your project is complete please book a final inspection. The owner or their agent is also required to complete a separate application for the Code Compliance Certificate (Form 6) as soon as possible after the building work is completed. The application form to apply can be downloaded via the link below or call 03 311 8906 for further information.

<https://www.waimakariri.govt.nz/consents-and-licences/forms-a-to-z#building>

You should have this form ready for when the building Inspector arrives on site to carry out the final inspection, or email it to ccc@wmk.govt.nz. Please note all outstanding monies must be paid prior to the issue of the CCC.

Grant or refuse a CCC

We are required to make a decision to grant or refuse a CCC if you do not formally apply for a CCC within two years of the granting of the building consent. The date your consent was granted is the date at the bottom of the building consent form. If you do not apply for a CCC or arrange an extension with us within the two year period we may carry out an inspection of the building work. An additional fee applies for this work.

Lapsing of your consent

Your building consent will lapse if building work has not commenced within 12 months after the date of issue of the building consent. The issue date is deemed to be the day you paid for the consent. In saying this we understand things don't always run smoothly so you can apply for a time extension which we may agree to. A fee applies for this.

Additional Site Inspection Sheet for Amendment

Application

Haydon G Baddock 272 Whites Road RD 2 Kaiapoi 7692	No.	BC230758.02
	Issue date	27 February 2024
	Overseer	Brenna Ogier

Project

Description	1100 New (& prebuilt) House, Unit, Bach, Crib, Town Houses BC - Amendments, Amendments, 01 Standard Building Consent(20 W Processing Days)
Intended Life	Indefinite (50+)
Intended Use	Residential
Estimated Value	\$0.00
Location	175 Townsend Road RANGIORA
Legal Description	LOT 115 DP 575822 0.060000 Ha
Valuation No.	2166000232

This inspection sheet and all the approved plans and specifications relating to this building consent are to be available on site during construction. If the documentation required for a particular inspection is not available, this will mean automatic failure of the building inspection and will necessitate re booking the inspection at the applicant's expense.

Work cannot proceed past each step until that step has been inspected and approved.

All inspections listed below are to be inspected by a WDC Building Inspector, an Engineer may also need to be engaged to inspect engineer requirements, this will be noted below.

**BC230758.02 AMENDMENT Rain water head added and bracing updated 175
TOWNSEND ROAD RANGIORA LOT 115 DP 575822**

Other - Amendment Inspection

Please give at least 2-3 full working days' notice for the next required inspection, please be advised that it may not always be possible to carry out the inspection within the time frame you require.

Form 5

Building consent

BC230758

Section 51, Building Act 2004

The building

Street address of building: 175 Townsend Road RANGIORA

Legal description of land where building is located: LOT 115 DP 575822 0.060000 Ha

Valuation number: 2166000232

Building name:

Location of building within site/block number:

Level/unit number: 1

The owner

Name of owner: Haydon G Baddock

Contact person:

Mailing address: 272 Whites Road RD 2 Kaiapoi 7692

Street address/registered office:

Phone number:

Daytime:

Landline: Mobile:

After hours:

Facsimile number:

Email address: hbaddock@hotmail.co.nz

Website:

First point of contact for communications with the council/building consent authority:

Haydon Gifford Baddock

Building work

The following building work is authorised by this building consent:

DWELLING WITH ATTACHED GARAGE

Primary Specified Intended Use: Housing - Detached dwellings

Description of Intended Use: Residential

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building).

This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

This building consent is subject to the following conditions:

- The Building Act 2004, Section 90, states that agents authorised by the building consent authority (the Council) for the purposes of this section are entitled, at all times during normal working hours or while building work is being done, to inspect:
 - (a) land on which building work is being or is proposed to be carried out; and
 - (b) building work that has been or is being carried out on or off the building site; and
 - (c) any building.

Compliance schedule

A Compliance Schedule is not required for this building.

Attachments

Copies of the following documents are attached to this building consent:

Consented Plans

Consented Specifications

Amended Inspection List

Amendments issued

Application ID	Issued	Description
BC230758.02	27/02/2024	AMENDMENT Rainwater head added and bracing updated



Shirley Cresswell
Building Unit Administrator Officer

On behalf of: Waimakariri District Council

Date: 27 February 2024

Advice notes

Building consent

BC230758

Advice Notes as at 27/02/2024

Project description

Street address of building: 175 Townsend Road RANGIORA
Legal description where work is located: LOT 115 DP 575822 0.060000 Ha
Description of consent: DWELLING WITH ATTACHED GARAGE

Amendments issued

Application ID	Issued	Description
BC230758.02	27/02/2024	AMENDMENT Rain water head added and bracing updated

Advice Notes

This building consent is issued with the following advice notes listed below. Please read and follow the guidance given. Failure to do so may create difficulties in obtaining a code compliance certificate.

All inspections listed must be requested and carried out in accordance with the attached schedule (list) of inspection types. It is advisable to request bookings at least 2-3 full working days' in advance, please be advised that it may not always be possible to carry out the inspection within the time frame you require. It is the owner's responsibility to ensure all necessary inspections are carried out. Please contact the building consent authority if you are unsure what requires inspection - do not cover or enclose any building work without prior inspection.
Please note that the consent fees allow for a single inspection of construction stages of the project as specified in the inspection schedule. Any extra inspections required will be invoiced and must be paid for before a code compliance certificate is issued.

All boundary survey pegs must be located by discovery or redefinition before work is commenced.

Critical Siting: The owner/applicant/agent will need to supply a Building Location Certificate for this Lot **two (2) working days prior to the Pre-Pour inspection**. The certificate shall confirm that the building is wholly contained within the Lot/s to which it relates and meets the Consent Notice for finished floor levels (FFL).

Comply with the endorsements on the plan.

The duplicate copy of the approved consent documents and inspection schedule must remain on site during construction.

Engineers site reports are to be kept on site for the review and collection by the building Inspector.

A PS4 construction review will be required from the engineer prior to the issue of a Code Compliance Certificate.

Please note that any material deviation from the approved documents will require a formal application for amendment. Amendments that are not of a material nature can be approved by a Building Officer or Building Inspector by way of the endorsement of the approved consent documentation.

WorkSafe New Zealand to be notified prior to any disturbance of asbestos or hazardous materials on site during demolition or construction.

The electrical certificate shall be provided to the building consent authority prior to issue of Code Compliance Certificate where the project involves electrical works.

Your consent is issued subject to manufacturers technical information about their products, installation and maintenance is to be as this technical information requires.

Licensed building practitioners records of work shall be provided to the Territorial Authority (TA) / Building Consent Authority (BCA) for foundations, carpentry / primary structure, roof cladding, wall cladding systems, brick & block laying as applicable at the conclusion of the relevant work.

A Building Consent lapses and is of no effect if the building work to which it relates does not commence within 12 months after the date of issue of the building consent or any further period that the Building Consent Authority may allow. (Time extensions to commence building work after 12 months must be submitted to the Building Consent Authority in writing stating the reason for the request, prior to the lapse date of the consent.

A Building Consent is not completed until it has been issued with a Code Compliance Certificate. The owner is required to complete a separate application for a Code Compliance Certificate as soon as practicable after the building work is completed. In any event no later than two (2) years after the granting of the Building Consent. Council is required to decide whether or not a Code Compliance Certificate can be issued. If your project will not be completed within two years you will need to apply for a time extension*. *fees apply

A "Statement of Thermal performance of Windows and doors" to be supplied by window manufacturer/supplier confirming the thermal performance of the windows and doors has met minimum R values required by the building consent being R0.5, prior to the issue of a Code Compliance Certificate

The certifying drainlayer's registration number shall be provided to the Building Consent Authority prior to issue of the Code Compliance Certificate.

The plumbing pressure test PS3 & plumbers registration number shall be provided to the Building Consent Authority prior to issue of the Code Compliance Certificate

The installer shall provide the building consent authority a PS3 for the installation of the AAC exterior cladding system prior to issue of Code Compliance Certificate

The installer shall provide the building consent authority a PS3 for the installation of the Internal wet area membrane prior to issue of Code Compliance Certificate.

BUILDING UNIT

Form 2 Application for a Project Information Memorandum and/or Building Consent

Dwellings, Outbuildings, Swimming Pools and Other Works e.g. Septic Tank, Bridge, Retaining Wall, Amendments and Exemptions

Under The Building Act 2004, Sections 33, 45 & Schedule 1, Part 1, Clause 2

BC No.:

1. The Building

Street address (street/road/township): (for structures that do not have a street address, state the nearest street intersection and the distance and direction from that intersection)

Legal description of the land where the building is located: (state legal description as at the date of application and, if the land is proposed to be subdivided, include details of relevant lot numbers and subdivision consent)

Lot: DP: Valuation Number: Resource Consent:

Building name: (if applicable)

Location of building within site/block number: (include nearest street access)

Number of levels: Unit/Level No.:

Area: (total floor area; indicate area affected by the building work if less than the total area)

Existing: New: Total:

Current lawfully established use: (include number of occupants per level and per use if more than 1)

Year building first constructed: (Approximate date is acceptable, eg 1920's)

2. The Owner - all details must be the legal owner's

Name of owner: (include preferred form of address, e.g. Mr, Mrs, Ms, Miss, Dr, if an individual)

Contact person: (not required if the owner is an individual. Must have a New Zealand address)

Mailing address:

Street address/Registered office: (if different than above)

Phone number:

Landline:

Mobile:

Daytime:

After hours:

Fax:

Email:

Website:

As the owner, where you have given authorisation for an Agent to act on your behalf, please confirm if you require a copy of Building Consent/PIM correspondence and associated Building Consent Inspection Notices following the formally received notification: Yes ☒ No

The following evidence of ownership is attached to this application:

Copy of Record of Title OR Council to provide (additional charge of \$15)

(Current within 1 month of being issued and must include a deposited plan [diagram]. Where the Record of Title is not current, Council will provide this [additional charge of \$15 applies]).

Signed copy of Sales and Purchase Agreement (If Record of Title is not issued)

3. Applicant - only required when the applicant is not the owner or the agent e.g. leasee/tenant

PLEASE NOTE - Authorisation is required from the owner of the property.

Name of applicant: (e.g. leasee/tenant)

Contact person: (not required if the applicant is an individual)

Mailing address:

Street address/Registered office: (if different than above)

Phone number:

Landline:

Mobile:

Daytime:

After hours:

Fax:

Email:

Website:

Relationship to owner: (state details of the authorisation from the owner to make the application on the owner's behalf)

4. Agent – only required when the application is being made on behalf of the owner

PLEASE NOTE - Authorisation is required from the owner of the property.

Name of agent:

Contact person: (not required if the applicant is an individual)

Mailing address:

Street address/Registered office: (if different than above)

Phone number:

Landline:

Mobile:

Daytime:

After hours:

Fax:

Email:

Website:

Relationship to owner: (state details of the authorisation from the owner to make the application on the owner's behalf)

PLEASE NOTE - The Agent will be the first point of contact for communications with the Council/Building Consent Authority regarding this application/building work

5. Application

I request that the following (please select one) be issued for the building work described in this Application:

Project Information Memorandum (PIM) only

Building Consent for PIM No:

Building Consent with PIM

Building Consent without PIM (Compliance Check applies)

Exemption from the need for B/C

Amendment to Building Consent

(Refer Building Act 2004 Schedule 1, Part 1, Clause 2)

Please Note: Amendments must be authorised by the owner

Building Consent for Above Ground Pool and/or Non-Exempt Small Heated Pool

I wish to receive my approved documentation in the following format:

PLEASE NOTE - If USB or hard copy, please confirm if you wish to pick it up from the Council or have it posted.

Electronically via Sharefile Transfer Portal (You must be set up and registered for this option)

USB: (this is an additional charge) Post OR Pick-up

Hard copy: (onsite - this is an additional charge) Post OR Pick-up

PLEASE NOTE - One set of "Onsite" hard copy consented documents must be available at all times for inspections.

All consent related invoices/refunds to be billed and sent to:

Owner Applicant Agent Or other (If other, please complete below)

Company name: (if applicable)

Contact person:

Mailing address:

Phone number:

Landline: Mobile: Daytime: After hours: Fax:

Email: Website:

PLEASE NOTE - Any refunds are to the receipted name unless written authorisation has been received from the receipted person or company.

Terms of trade

I/We understand that:

Building Consents shall be paid for when the consent is collected/uploaded or if the consent is not collected/uploaded within three months after the date of consent being granted, the work done to date portion i.e. admin and processing costs of the account will be due and payable. The balance of the invoice will be payable when the consent is collected/uploaded.

All other accounts shall be paid by the 20th day of the month following the month in which the invoice is issued.

I/We agree to pay according to these terms for any goods or services you supply to us. Failure to meet these Terms of Trade may result in any credit arrangement being withdrawn with any balance becoming payable within seven days. Should failure to meet the terms of trade result in debt recovery and/or legal proceedings, any costs whatsoever incurred in the collection of the debt including debt collector's fees and commissions and legal costs, charges and expenses on a solicitor and own client basis will be added to the account and will be payable by me/us.

Application authorisation

By entering your name in the box below you are giving your authority for this application to proceed under Sections 33 and 45 of the Building Act 2004.

Name: Date:

I am the: Owner Applicant on behalf of, and with the authority of the owner
Agent on behalf of, and with the authority of the owner

6. The Project

Description of work (e.g. dwelling, alteration/addition). If an amendment, please provide a complete description of the nature of the amendment.

Specify the intended use of the building: (e.g. detached dwelling, multi-unit dwelling, show home, sleepout or outbuilding - shed/garage etc.)

Will the building work result in a change of use of this building? Yes No

If Yes, provide details of the new use:

Will hazardous substances be stored in the building? Yes No

Intended life of the building:

Indefinite but not less than 50 years Or specified as years

Is this a staged consent? Yes No

If staged, provide details (e.g. Stage 1 of 3)

List Building Consents previously issued for this building (if any): (i.e. is this project being constructed in stages? Is this consent for a relocated or transportable building?)

Estimated value of the building work on which the building levy will be calculated (incl. GST): (state estimated value as defined in section 7 of the Building Act 2004)

\$

If this is an application to amend a building consent, advise the estimated value of amended building work (incl. GST) \$

Is this in addition to, or reduction from, what was stated with the original application?

Addition Reduction No change

7. Restricted building work

Will the building work include any restricted building work? Yes No

If Yes, provide the following details of all Licensed Building Practitioners who will be involved in carrying out or supervising the restricted building work (if these details are unknown at the time of the application, they must be supplied before the work begins).

Licence class	Name	Licensed building practitioner number (or registration number if treated as being licensed under section 291 of the Building Act 2004)
Foundations		
Carpentry		
Exterior Plasterer		
Bricklayer		
Blocklayer		
Roofer		

Key personnel**AMENDMENT ISSUED BC230758.02 27/02/2024 - Page 13 of 96****Builder**

Name:

Reg. No.:

Address:

Phone No.:

Email:

Designer(s)

Name:

Reg. No.:

Address:

Phone No.:

Email:

Certifying drainlayer

Name:

Reg. No.:

Address:

Phone No.:

Email:

Certifying plumber

Name:

Reg. No.:

Address:

Phone No.:

Email:

Certifying gasfitter

Name:

Reg. No.:

Address:

Phone No.:

Email:

Registered electrician

Name:

Reg. No.:

Address:

Phone No.:

Email:

Structural engineer

Name:

Reg. No.:

Address:

Phone No.:

Email:

8. Project Information Memorandum - this section is not applicable if this application is for a building consent only

The following matters are involved in the project:

- Subdivision
- Alterations to land contours
- New or altered connections to public utilities
- New or altered locations and/or external dimensions of buildings
- New or altered access for vehicles
- Building work over or adjacent to any road or public place
- Disposal of stormwater and wastewater
- Building work over any existing drains or sewers or in close proximity to wells or water mains
- Registered historic site or place, tick if applicable (only applies where a PIM has not previously been issued for the building work)
- Other matters known to the applicant that may require authorisations from the territorial authority:

Notes

Other notes or comments which you may wish to add, eg: Resource Consents

9. Building consent - this section is not applicable if this application is for a Project Information Memorandum only

The following plans and specifications are attached to this application, or refer to the Appendix section for plans and specifications provided.

The building work will comply with the Building Code as follows: (Note: if you are not sure what clauses are applicable, consult with your builder, designer or architect)

Clause (Tick relevant clause numbers of Building Code)	Means of compliance (Refer to the relevant compliance document(s) or detail of alternative solution in the plans and specifications)	Waiver/modification required (State nature of waiver or modification of building code required)
B1 Structure		
B2 Durability		
C1-C6 Protection from fire		
D1 Access routes		
D2 Mechanical installations for access		
E1 Surface water		
E2 External moisture		
E3 Internal moisture		
F1 Hazardous agents on site		
F2 Hazardous building materials		
F3 Hazardous substances and processes		
F4 Safety from falling		
F5 Construction and demolition hazards		
F6 Visibility in escape routes		
F7 Warning systems		
F8 Signs		
F9 Means of restricting access to residential pools		
G1 Personal hygiene		
G2 Laundering		
G3 Food preparation and prevention of contamination		
G4 Ventilation		
G5 Interior environment		
G6 Airborne and impact sound		
G7 Natural light		
G8 Artificial light		
G9 Electricity		
G10 Piped services		
G11 Gas as an energy source		
G12 Water supplies		
G13 Foul water		
G14 Industrial liquid waste		
G15 Solid waste		
H1 Energy efficiency		

10. Compliance Schedule - this section is not applicable if there are no specified systems or if the application is for a Project Information Memorandum

The specified systems for the building are as follows: *(specified systems are defined in regulations)*

The following specified systems are being altered, added to, or removed in the course of the building work:

There are no specified systems in the building

11. Attachments

The following documents are attached to this application:

Plans and specifications (list under section 9)

Memoranda from licensed building practitioner(s) who carried out or supervised any design work that is restricted building work

Project information memorandum

Development contribution notice

Certificate attached to project information memorandum

Completed relevant application checklist(s) – refer to Appendix

Please continue on the Appendix as follows for further information requested by the Waimakariri District Council.

National Environment Standard (NES)

This section relates to the [National Environmental Standard for Assessing & Managing Contaminants in Soil to Protect Human Health \(NES\)](#).

The NES includes regulations controlling **soil disturbance, change of use, subdivision, and removal/replacement of fuel storage systems** on properties which have been used either now or in the past for a hazardous activity or industry (known as HAIL) that may have resulted in contamination of the soil. The table below determines whether the NES applies to your proposal.

Yes No

Is the application site listed on Environment Canterbury's Listed Land Use Register (LLUR)? www.llur.ecan.govt.nz If **YES**, please include a copy of the LLUR statement with your application.

If the site is not listed on the LLUR, is an activity described on the Hazardous Substances and Industries List (HAIL) currently being undertaken on the piece of land to which this application relates, or is it more likely than not to have ever been undertaken on the land?

The HAIL list is available to view at [Hazardous Activities and Industries List \(HAIL\)](#)

Type of HAIL activity:

If the answer to either of the above questions is YES, then the NES will apply, depending on the type of activity. Please identify whether the application involves the activities below.

PLEASE NOTE - If the answer to both of the previous questions is No, you do not need to answer the remaining questions in this section.

Yes No

Has the property been recently subdivided?

Will the proposed activity involve the disturbance of more than 25m³ of soil (per 500m² of disturbed area)? Volume of soil disturbed:

Will the proposed activity involve the removal of more than 5m³ of soil (per 500m² of disturbed area) from the site? Volume of soil removal:

Does the application involve changing the use of the land to one which, because the land has been subject to a HAIL activity, is reasonably likely to harm human health? (e.g. orchard to a residence)

Does the application involve replacing or removing fuel storage systems or parts of it?

If the answer to any of the above activity questions is also YES, then the NES will apply and you will need to establish whether the proposed activity complies with the NES.

- Changing the land use will require resource consent if the permitted activity requirements of the NES are not complied with. These include provision of a Preliminary Site Investigation carried out by a suitably qualified and experienced practitioner.
- Soil disturbance or removal exceeding the specified volumes require resource consent.
- Removal or replacement of a fuel storage system will require consent if the permitted activity requirements of the NES are not complied with.

Does the proposed activity require resource consent under the NES?

If **YES**, a resource consent is required and with the application an assessment under the NES must be provided. A Detailed Site Investigation may be required.

Vehicle crossing

Is a new vehicle crossing required or an existing crossing altered for this project?

Yes No Resource consent applied for

If yes, please complete and submit the [Vehicle Crossing Application Form](#) and send to office@wmk.govt.nz

(One copy)

All sections fully completed as applicable to the project
Means of Compliance with NZBC - designer to complete
Provide the correct legal description (Council can help with this)
Provide one copy of the current Record of Title, or Sales and Purchase Agreement
- not more than one month old
Give name and contact numbers of contact person (if not the owner)
State the project location (street address or location details as near as possible if no address)
Application authorised and dated
Agent relationship to owner stated (where applicable)
Certificate/s of design work (LBP)

Bookmarks

PLEASE NOTE - Our current software does not enable us to maintain bookmarks within the consent documents during processing and granting. (This may be reviewed once a software solution becomes available.)

Project Information Memorandum (PIM)

This section must be completed if you are applying for a PIM. **DO NOT** complete this section if a PIM has already been issued. The following documents are attached to this application:

Site plan, Floor plans, Elevations for proposed building (electronic preferred or if hard-copy minimum size A3)
Record of Title, or Sales and Purchase Agreement if Record of Title is not issued. Current Record of Title required (current within one month of application)
Application fee (as per Council Fees and Charges Schedule)

Building consent

This section must be completed if you are applying for a building consent. **DO NOT** complete this section if the Application is for a Project Information Memorandum only.

The following documents are attached to this application:

1 copy - building plans (site plans, floor plans, elevation plans. All plans to be dimensioned, scaled and accurate electronic preferred or if hard-copy minimum size A3)
1 copy of each - specifications, producer statements, truss details (refer below)
1 copy - Record of Title or Sale and Purchase Agreement if Record of Title is not issued. Current Record of Title required (current within one month of application)
Restricted building work - see page 4
Key personnel - see page 5
Building work compliance with the Building Code - see page 7

PLEASE NOTE - Swimming Pool document checklist on the following page to be completed if applicable.

Swimming pools (as applicable)**Office
use only***These have
been provided:*

Site plan, showing location of pool and existing buildings, location of fence, boundaries and existing waterways

Fence construction. Show the height, gates, self-closing device, construction type etc (see "A Guide to Pool Fencing")

Also show how any doors or windows that form part of the fence will comply

Brand and model of pool:

Size of the pool:

Drainage plan. Show discharge point

Producer statement (where applicable)

Installation instructions/manual

Show filling point for pool (tap) and backflow protection

Design basis

(To be completed by the designer)

Please list the following basis for the building design:

Wind zone

Earthquake zone

Snow zone/altitude

Corrosion zone (if applicable)

Building is specifically engineer-designed

Complies with NZS 3604:2011

Both specific design and NZS 3604:2011

Design documents

(One copy)

Weather tightness risk matrix

Truss design layout and Producer Statement

Bracing calculations/plan

H1 Energy efficiency calculations

Site plan

(One copy, electronic preferred or if hard-copy minimum size A3)

Overview of site showing legal boundaries as per current Record of Title

Showing proposed and existing structures (including swimming pools)

Distances to boundaries

Proposed and existing site levels

North point

Utility infrastructure (sewer, water pipelines, septic tanks etc) where applicable

Water races, drains, topographic features

Drainage layout

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(One copy to scale usually 1:100 or 1:50, electronic preferred or if hard copy minimum size A3)

- Foul water - showing waste pipes, sizes, grades, venting
- Foul water to discharge point
- Storm water - pipe sizes, grades, downpipe locations
- Storm water drain to discharge point

Office use only

These have
been provided:

Foundation layout

(One copy to scale usually 1:100 or 1:50, electronic preferred or if hard copy minimum size A3)

- Full foundation layout plan
- For timber floors, show all pile layout, pile types and bracing location
- Slab thickenings, shrinkage control joints and reinforcing rebates

Floor plans

(One copy to scale usually 1:100 or 1:50, electronic preferred or if hard copy minimum size A3)

- Layout of all floors fully dimensioned. For alterations and/or additions provide both new and existing floor plans
- Doors and window positions and sizes
- Layout of amenity areas (laundry etc)
- Main structural beams that are not shown elsewhere
- Lintel sizes
- HWC location
- Roof space access
- Gas cylinder location
- Room names
- Location of smoke alarms
- Location of heating unit (if applicable)

Exterior elevations

(One copy to scale usually 1:100 or 1:50, electronic preferred or if hard copy minimum size A3)

- Elevations of all external walls showing claddings
- Doors and windows showing opening sections
- Show location of solar panels
- Accurate ground levels existing and proposed
- Subfloor ventilation for timber floors
- Show roof bracing on elevations if not shown elsewhere

Cross section and construction details

(One copy to scale usually 1:50 or 1:20 for sections and 1:10 for details - minimum scale, electronic preferred or if hard copy minimum size A3)

- Roof lines, overhangs, floor levels, ground levels
- Major vertical dimensions
- Foundation, wall and roof structure materials
- Upper level decks or balconies over lower level room must be fully detailed including the stormwater disposal and overflow precautions

Stairs, handrails and balustrade showing pitch and head clearances

Structural connections, posts to footings, beams to posts, trusses or beams to walls

Component fixing information is to be provided for all structural and framing components

Foundation and footing details and reinforcing. Show height from finished floor to ground level

Pile details for timber floors

Floor bracing details

Timber grade and treatment

Damp proof membranes, building papers and insulation systems/materials

Flashing details and documents

Roof penetrations

Shower floor details and wall to shower base junction detail

Sealing to wet area fixtures

Water splash prevention

All other building components that are not otherwise detailed or are unusual in any way

Specification

(One copy)

The specification must be for the project. We will not accept standard specifications unless they relate directly to the building and they cover the project accurately and fully. Multi-choice specifications will not be accepted. A brief accurate specification is usually best.

Provide a written specification to cover all of the trades involved in the project. All materials used in the project are fully specified including fixings of all materials and components

The specification can be written on the drawings as long as all materials are fully covered

Important things to include in your application

(One copy - where relevant)

The chartered professional engineer's Producer Statement

The engineer's monitoring schedule if the engineer chooses to do site monitoring

All structural calculations

Structural details showing connections and details of the components

Solar technical details and plumbing schematic

Log fire and flue installation instructions

If log fire secondhand, engineer's certification required

Current potable water test (current within 18 months)

Effluent disposal design & ECan's copy of the submitted application form or approval

Wastewater system designs when required to be done by a chartered professional engineer such as in a hazard zone

Supporting manufacturer's trade literature and appraisals / certificates included

Geotechnical report

Geotechnical report provided, if applicable. Record report number:

Further information required? Yes No

Date/time received:

Officer:

Date/time vetted/accepted:

Officer:

Office use only

Amount paid: \$

Date:

Officer:

Fee paid on application

Deposit invoice sent

Date payment processed:

Receipt:

Officer:

Important information

All the relevant information on this form is required to be provided under the *Building Act 2004* and/or *Resource Management Act 1991* for the Waimakariri District Council to assess your application. Under these Acts this information has to be made available to members of the public if requested. The information contained in this application may be made available to other units of the Council. You have the right to access the personal information held about you by the Council which can be readily retrieved. You can also request that the Council correct any personal information it holds about you.

Application information**a. Project Information Memorandum (PIM):**

A PIM will be issued within 20 working days provided all the required information is supplied with the application. Processing time is stopped whenever further information is required and starts again when the correct information is received.

It is not mandatory to apply for a PIM. Applicants can choose not to apply for a PIM when they consider that the information would not be relevant for their building project.

A fee is required to accompany your PIM application (as per Council's Fees and Charges Schedule).

b. Compliance Check:

Where a PIM is not sought, a Compliance Check will be undertaken to ensure your proposal complies with the District Plan.

c. Building Consent (BC):

A Building Consent will be processed within a maximum allowable time of 20 working days provided all the information required has been supplied. Processing time is stopped whenever further information is required and starts again when the correct information is received.

Once the Building Consent has been granted, you will receive notification, which will include an invoice for the fees payable.

Once the fees are paid in full, your Building Consent will be issued. Work must not start until the Building Consent is issued, and any Resource Consent requirements have been resolved.

A Building Consent lapses and is of no effect if the building work to which it relates does not commence within 12 months after the date of issue of the Building Consent or any further period that the Building Consent Authority may allow. You may request an extension which will need to be agreed to by Council (fees apply), refer to [building application forms and fact sheets](#).

d. Combined Project Information Memorandum & Building Consent Applications:

Applications for a combined PIM/BC will only be accepted when sufficient information is provided to permit the Building Consent to be processed.

If insufficient information is provided, then further information will be requested, or your application may be returned to you.

e. If the applicant does not own the land, they must provide written approval from the owner to submit this application.

Under the Building Act 2004 s53, s55 s402 Council are authorised to collect levies for the MBIE (*Building Levy Order 2005*) and BRANZ (*Building Research Levy Act 1969*). Levies are only payable on building works where the construction value exceeds a prescribed amount.

[Building Act 2004](#)

[Building Levy Order 2005](#)

[Building Research Levy Act 1969](#)

Fees

The application for a PIM and/or Building Consent must be accompanied by the fees as described in *Sections 33 and 45 of the Building Act 2004*. The work to process a PIM and/or Building Consent will be invoiced and needs to be paid in full before the PIM and/or Building Consent can be granted, refer to [building services fees and charges](#).

Inspections

During the process of construction, inspections will be necessary to confirm all work complies with your approved Building Consent documentation. Please phone the Council Building Unit on 03 311 8906 at least **48 hours in advance** of requiring an inspection. Bookings are subject to demand and the availability of Inspectors, **please be advised that it is not always possible to carry out an inspection within 48 hours**.

The inspections required will be set out in the Building Consent documentation issued by the Council. Failure to have a prescribed inspection carried out may put the issue of the Code Compliance Certificate at risk.

All inspections including re-inspections are subjected to a separate charge, even if carried out on the same day.

Resource consent

Your application will be assessed by the Planning Unit of the Council to determine whether your project complies with the relevant District Plan requirements.

If your application does not comply with District Plan requirements, you will need to either amend your proposal to comply or apply for a Resource Consent. A Certificate will be attached to your Project Information Memorandum to notify that a Resource Consent is required prior to building work commencing. It is recommended that you phone the Planning Unit on 0800 965 468 to discuss the process.

Code compliance certificate

A Building Consent is not completed until it has been issued with a Code Compliance Certificate. The owner is required to complete a separate application for a Code Compliance Certificate as soon as practicable after the building work is completed. In any event no later than two (2) years after the granting of the Building Consent, Council is required to decide whether or not a Code Compliance Certificate can be issued. If your project will not be completed within two years, you may request an extension which will need to be agreed to by Council (fees apply), refer to [building application forms and fact sheets](#).

Agency

The owner may authorise an agent to submit an application on their behalf.

The Agent will be the first point of contact for all communications with the Council/Building Consent Authority regarding this application under *Sections 33 and 45 of the Building Act 2004*. They will receive all correspondence and must be authorised by the Owner. All amendments require new authorisation.

The owner can elect to receive a copy of correspondence regarding this Building Consent/PIM and associated Building Consent Inspection Notices in "The owner" section of this application form, or by notifying Council during the Building Consent/PIM and/or Code Compliance Certificate process.

Section 2

Geotech, Engineer Reports & Conditions PS1 & 2s

- **Calculations**
- **A4 Details**

Section 3

Truss Details & Bracing Details

- Manufacturers bracing instruction and construction documentation
- Design IT Calcs
- Hyspan etc.

Demand Calculation Sheet

Job Details

Name: Baddock
 Street and Number: 175 Townsend Road
 Lot and DP Number: Lot 115 DP 575822
 City/Town/District: Rangiora
 Designer: AS
 Company:
 Date: 18/07/23

Building Specification

Number of Storeys 1
 Floor Loading 2 kPa
 Foundation Type Slab

Single

Cladding Weight Medium
 Roof Weight Light
 Room in Roof Space No
 Roof Pitch (degrees) 25
 Roof Height above Eaves (m) 2.35
 Building Height to Apex (m) 4.77
 Ground to Lower Floor (m) 0.2

Average Stud Height (m) 2.4
 Building Length (m) 20.70
 Building Width (m) 16.62
 Building Plan Area (m²) 204.9

Building Location

Wind Zone = High

Earthquake Zone 2

Soil Type

D & E (Deep to Very Soft)

Annual Prob. of Exceedance: 1 in 500 (NZS3604:2011 Default)

Bracing Units required for Wind

	Along	Across
Single Level	848	1023

Bracing Units required for Earthquake

	Along & Across
Single Level	912

WAIMAKARIRI DISTRICT COUNCIL
 AMENDED Plan and/or Specifications APPROVED
 BC230758.02 27/02/2024 brennao
 Rain water head added and bracing updated



Single Level Along Resistance Sheet

Building Consent BC230758.02
 Received 14/02/2024

Job Name: **Baddock**

									Wind	EQ
									Demand	
									848	912
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1414 167%	1507 165%
a	1	1.00		2.4	BBi 0.6	BBi	72	80		
	2	1.00		2.4	BBi 0.6	BBi	72	80		
	3	1.20		2.4	BBi 1.2	BBi	112	120		
	External Length = 10.50								256 OK	280 OK
b	1	1.20		2.4	BBi 1.2	BBi	112	120		
	2	1.00		2.4	BBi 0.6	BBi	72	80		
	External Length = 3.69								184 OK	200 OK
c	1	1.80		2.4	GS1-N	GIB®	124	108		
	2	1.20		2.4	BBi 1.2	BBi	112	120		
	3	0.40		2.4	BBi 0.4	BBi	22	23		
	External Length = 8.09								258 OK	251 OK
d	1	1.20		2.4	BBi 1.2	BBi	112	120		
	2	1.20		2.4	BBi 1.2	BBi	112	120		
	External Length = 4.60								223 OK	240 OK
e	1	1.20		2.4	BBi 1.2	BBi	112	120		
	External Length = 3.01								112 OK	120 OK
f	1	1.20		2.4	BBi 1.2	BBi	112	120		
	2	1.20		2.4	BBi 1.2	BBi	112	120		
	3	1.10		2.4	BBi 0.6	BBi	79	88		
	4	1.10		2.4	BBi 0.6	BBi	79	88		
	External Length = 16.49								382 OK	416 OK

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 Rain water head added and bracing updated



Single Level Across Resistance Sheet

Building Consent BC230758.02
 Received 14/02/2024

Job Name: **Baddock**

									Wind	EQ
									Demand	
									1023	912
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1480 145%	1495 164%
m	1	1.20		2.4	BBI 1.2	BBI	112	120		
	2	1.20		2.4	BBI 1.2	BBI	112	120		
	3	1.20		2.4	BBI 1.2	BBI	112	120		
	4	1.20		2.4	BBI 1.2	BBI	112	120		
	External Length = 8.90								446 OK	480 OK
n	1	1.80		2.4	GS1-N	GIB®	124	108		
	2	0.80		2.4	BBI 0.6	BBI	58	64		
	3	1.10		2.4	BBI 0.6	BBI	79	88		
	External Length = 6.52								261 OK	260 OK
o	1	1.80		2.4	GS1-N	GIB®	124	108		
	2	0.40		2.4	BBI 0.4	BBI	22	23		
	External Length = 0.49								147 OK	131 OK
p	1	1.80		2.4	GS1-N	GIB®	124	108		
	2	1.80		2.4	GS1-N	GIB®	124	108		
	3	1.20		2.4	BBI 1.2	BBI	112	120		
	4	0.60		2.4	BBI 0.6	BBI	43	48		
	External Length = 6.90								403 OK	384 OK
q	1	1.20		2.4	BBI 1.2	BBI	112	120		
	2	1.20		2.4	BBI 1.2	BBI	112	120		
	External Length = 5.94								223 OK	240 OK

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 Rain water head added and bracing updated

Custom Wall Elements

Building Consent BC230758.02
 Received 14/02/2024

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
BBI	BBI 0.4	0.4	56	58
BBI	BBI 0.6	0.6	72	80
BBI	BBI 1.2	1.2	93	100
NZS4299	Conc	1	581.25	581.25
Gamma	GBPF24	1	124	137
Gamma	GBF220/2.4	1	37	44
JH	JHD600	0.6	99	107
JH	JHD1200	1.2	154	140
JH	Vv	1.2	130	101
BBI	BBI 0.4	0.4	56	58
BBI	BBI 0.6	0.6	72	80
BBI	BBI 1.2	1.2	93	100
IBS RigidRAP	OSB2	0.4	70	79
IBS RigidRAP	OSB3	0.6	76	81
IBS RigidRAP	OSB4	1.2	131	107

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 Rain water head added and bracing updated



PlyBrace™ Plywood Technical Note

Version 1 July 2022

Endless possibilities.

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Rain water head added and bracing updated

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26	bbi® AraucoPly® DD F8 Structural Pine Plywood 7mm 1200mm Wall, Brackets
32	bbi® Redline® Poplar Core Plywood 9mm 1200mm Wall, Brackets
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44	bbi® Redline® Premium Hardwood Core Plywood 12mm 1200mm Wall, Brackets
50	bbi® Blondeline® Birch Poplar Core Plywood 9mm 1200mm Wall, Brackets
56	bbi® Blondeline® Birch Poplar Core Plywood 12mm 1200mm Wall, Brackets

GIB HandiBrac® is a registered trademark of Winstone Wallboards

AraucoPly® is a registered trademark of Maderas Arauco S.A.

Please check our website www.bbi.net.nz for any updates to this document.



bbi® PlyBrace™ Plywood Wall Bracing Specifications

Product	Min Wall Length	PlyBrace™ Thickness	Max Stud Spacing	Wind*	Earthquake**
	mm	mm	mm	BU/m	BU/m
bbi® AraucoPly® DD F8	200	7	600	41	49
bbi® AraucoPly® DD F8	400	7	600	56	58
bbi® AraucoPly® DD F8	600	7	600	72	80
bbi® AraucoPly® DD F8	1200	7	600	93	100
bbi® Redline® Poplar Core	1200	9	600	109	111
bbi® Redline® Poplar Core	1200	12	600	101	108
bbi® Redline® Premium Hardwood Core	1200	12	600	134	157
bbi® Blondeline® Birch Poplar Core	1200	9	600	102	114
bbi® Blondeline® Birch Poplar Core	1200	12	600	106	106

As limited by the serviceability load capacity.* As limited by the ultimate load capacity.**

Maximum hold down rating for NZS 3604:2011 timber floors is 120BU's/m.

Maximum hold down rating for NZS 3604:2011 concrete floors is 150BU's/m.

bbi® PlyBrace™ Plywood Wall Bracing Systems

bbi® has a range of wall bracing systems in 7 mm, 9 mm, and 12 mm thicknesses used to resist earthquake and wind loads on timber framed buildings.

These products have been manufactured and tested in accordance with NZS3604:2011.

Wall Framing

Wall framing must comply with the New Zealand building code requirements. Nogs are not required to achieve the above bracing unit loadings.

Sheet Fastenings

50 x 2.8 flat head galvanised nails at 150mm centres around the perimeter of the sheet with fixings at 300 centres on internal stud.



Endless possibilities.

Frame Connections

GIB Handibrac® with M12 hold down bolts, except 7mm DD F8 200mm wall which uses 1 M12 hold down bolt with 50 x 50 x 3 square washer centered in the frame.



Installation Requirements

bbi® AraucoPly® DD F8 can be installed prior to the building being fully enclosed if H3.2 treated. The building must be fully enclosed within 60 days of installation.

bbi® Redline® and **Blondeline®** must only be installed once the building has been fully enclosed and the moisture content of the supporting timber framing does not exceed 18%.

Finishing System

All visible surfaces, including edges must be finished with three coats of polyurethane or a paint system comprising of a primer/sealer, and two topcoats*.

* Excludes bbi® AraucoPly® DD F8

Durability

bbi® PlyBrace™ Wall Bracing Systems have a serviceable life of at least 50 years providing they remain dry.

Design Considerations

bbi® PlyBrace™ Wall Bracing Systems are for use in dry, internal, protected locations of thermally insulated buildings which are heated, intermittently heated and predominantly unheated in accordance with NZS 3602 Section 110, Table 1E and Section 205. The internal environment must be such that the moisture content of the supporting timber framing does not exceed 18%.

bbi® PlyBrace™ Wall Bracing Systems must be located within the building thermal envelope and must either be exposed to view or be in locations easily accessible for inspection. **bbi® PlyBrace™** Wall Bracing Systems must not be located in any high moisture environment or in areas subject to water splash. They must not be used in areas such as bathrooms, toilets, laundries or kitchens.

bbi® PlyBrace™ sheets must not be used in saunas or steam rooms. **bbi® PlyBrace™** Wall Bracing Systems must not be exposed to temperatures of 50°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.

Prevention of Fire Occurring

Separation or protection must be provided to **bbi® PlyBrace™** Wall Bracing Systems from heat sources such as stoves, heaters, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 to C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.



bbi® PlyBrace™ Wall Bracing Systems are designed to meet the requirements of the New Zealand Building Code and have been tested using the P21 method by Scion Research New Zealand as referenced in NZS3604:2011



P21 Test Reports

P21 Test Report

—

bbi® AraucoPly®

**DD F8 Structural Pine Plywood
7mm 200mm Wall, Brackets**



Te Papa Tipu Innovation Park
49 Sala Street
Private Bag 3020
Rotorua
New Zealand
Telephone: +64 7 343 5899
DDI: +64 7 343 5763
Facsimile: +64 7 348 0952
Email: douglas.gaunt@scionresearch.com

Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi AraucoPly DD F8 Structural Pine Plywood 7mm 200mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 200mm x 2.4m bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side Walls with Brackets.

1. BU wind = 8 (41 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 10 (49 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side,
90x45 H1.2 SG8 framing, studs at 200mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates,
No brackets used
One M12 hold down bolt with 50x50x3mm washer to centre of bottom plate
P21 Supplementary restraints used.

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Rain water head added and bracing updated

RISK AND LIMITATION OF LIABILITY: Scion's liability to the Client arising out of all claims for any loss or damage resulting from this work will not exceed in aggregate an amount equal to two times the Service Fees actually paid by the Client to Scion. Scion will not be liable in any event for loss of profits or any indirect, consequential or special loss or damage suffered or incurred by the Client as a result of any act or omission of Scion under this Agreement.

USE OF NAME: The Client will not use Scion's name in association with the sale and/or marketing of any goods or services

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New Zealand Forest Research Institute Limited – A Crown Research Institute of New Zealand

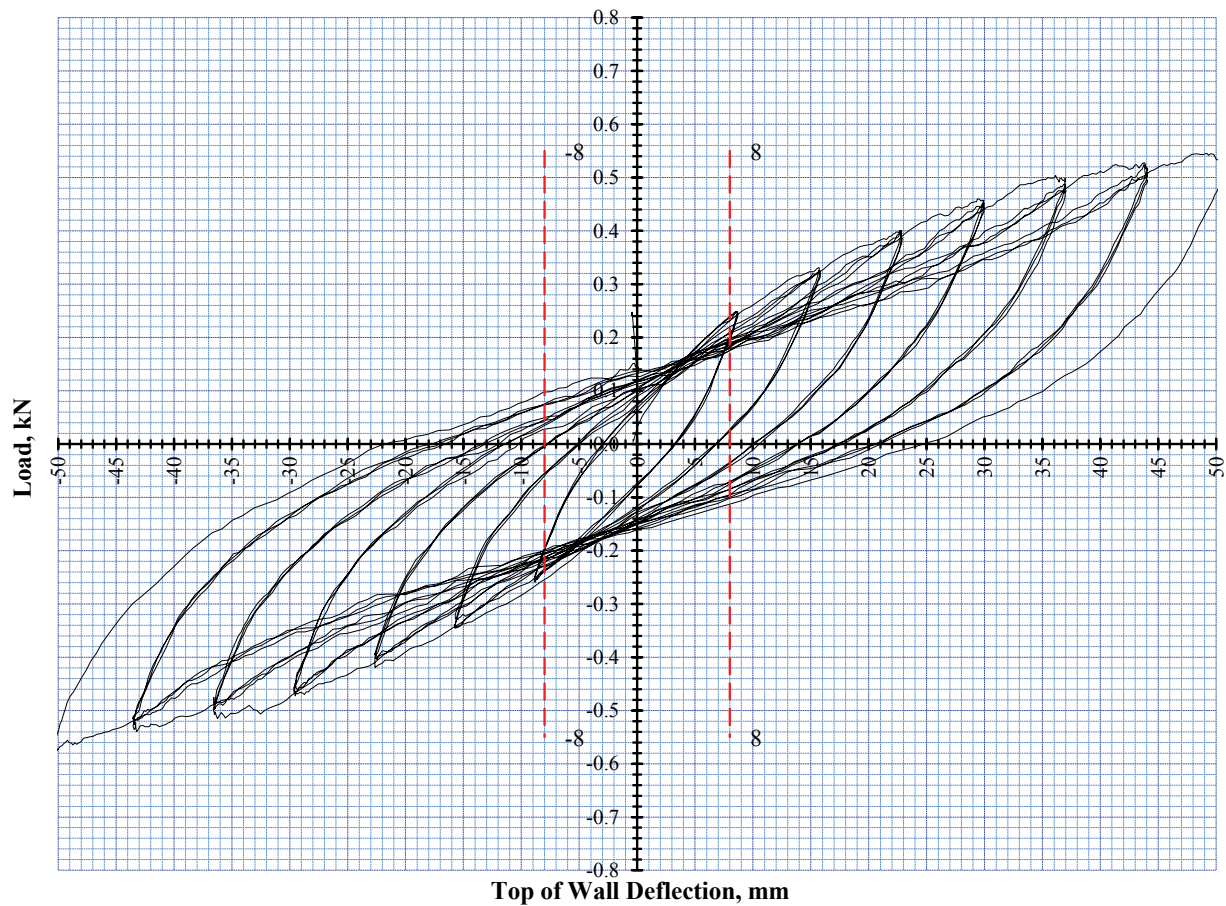


Figure 1: Wall 289145

Observations

No obvious signs of failure to framing or plywood

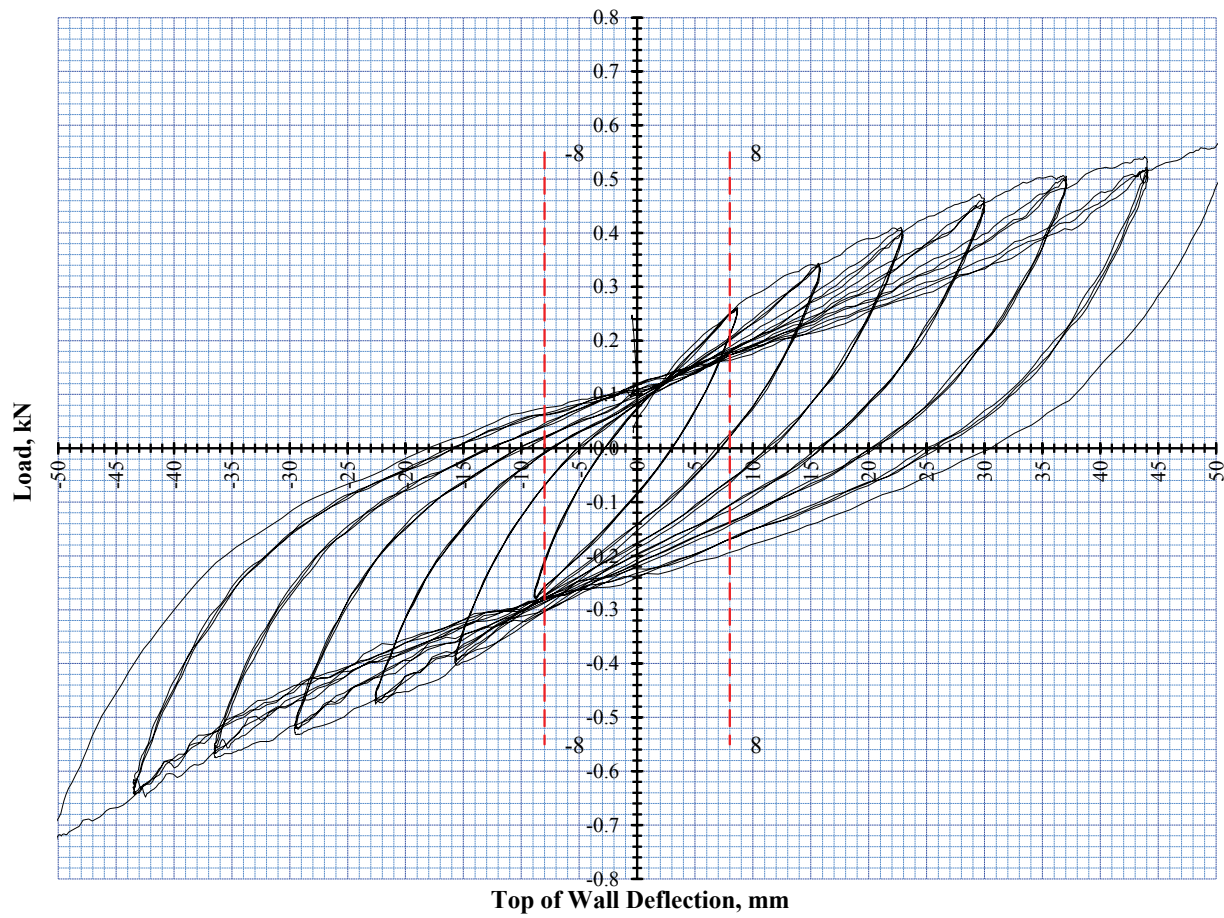
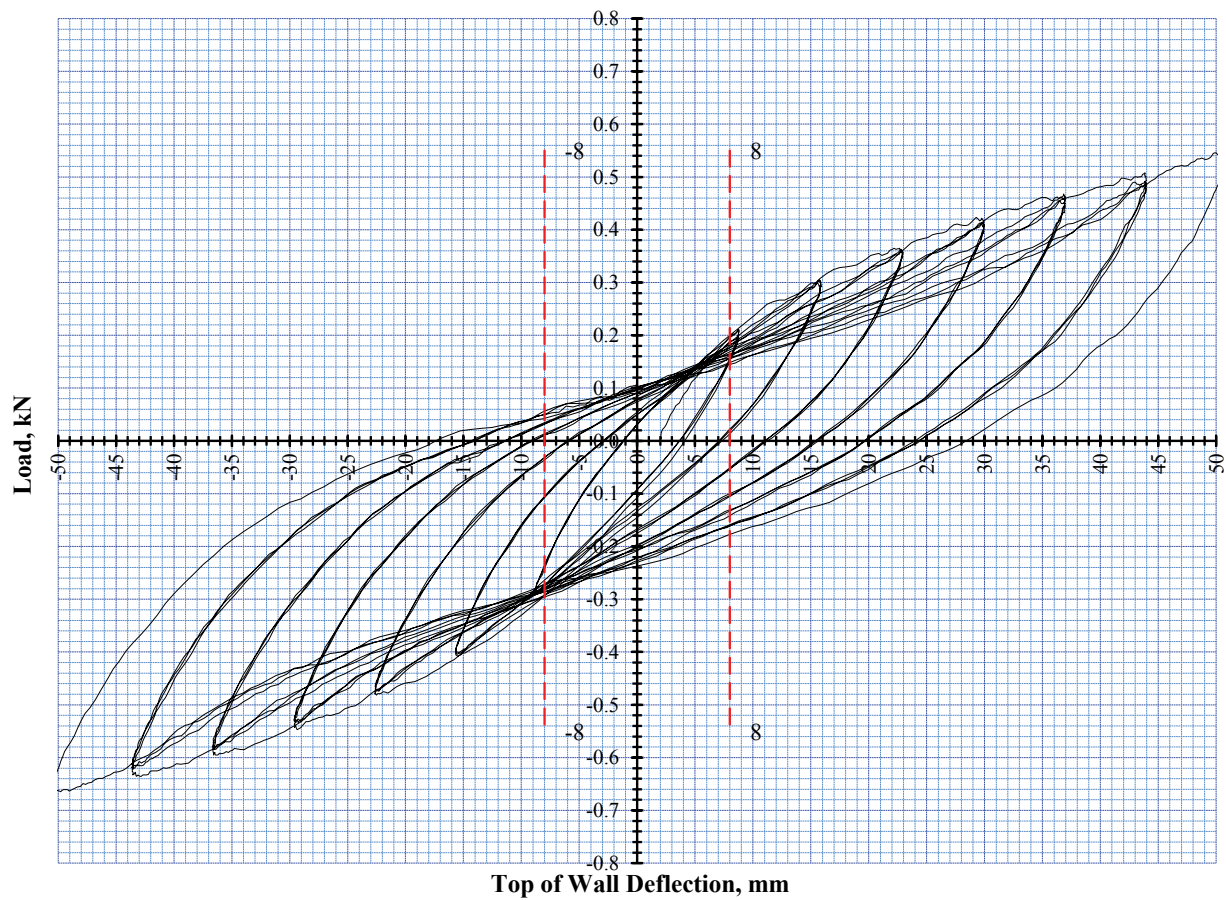


Figure 2: Wall 289146



Top of Wall Deflection, mm

Figure 3: Wall 289147

P21:2010 BRACING RACKING TEST RESULT EVALUATION									
Wall Construction									
200mm, bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side									
90x45 H1.2 SG8 framing, studs at 200mm centres, no nogs									
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres							Summary		
to plates and external studs							Earthquake	49 (U)	BU/m
7mm min edge distances all around.							Wind	41 (S)	BU/m
One M12 hold down bolt with 50x50x3mm washer to centre of bottom plate									
P21 Supplementary restraints used									
Date of test:-		25-May-22	Ship No. 3251		Tested by		John Lee		
Date of calc's:-		30-May-22	Job No. TE21-068		Analysed by		Doug Gaunt		
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.									
Serviceability Cycles									
Ultimate Cycles									
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement				Wall dimensions	
		8.0	X mm	y=(mm)			L(mm)	H(mm)	
		Loads	Residual	Maximum			200	2410	
		(P ₈)	Defln, C	Load	def @ P		d at P/2	4th, R	
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN	
289145	+	0.24	3.20	0.50	36.0	0.25	9.0	0.46	
	-	0.24	2.50	0.51	36.0			0.48	
289146	+	0.25	3.00	0.50	36.0	0.25	8.0	0.48	
	-	0.26	2.80	0.57	36.0			0.52	
289147	+	0.20	3.60	0.46	36.0	0.23	9.5	0.44	
	-	0.28	1.10	0.59	36.0			0.57	
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)	
Averages		0.24	2.70	0.52	36.00	0.24	8.83	0.49	
Coefficient of Variation %		9.97	29.32	8.50	0.00	3.97	7.06	8.56	
y = average failure deflection or peak deflection of the three tests.									
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)									
R = Residual load, P = Peak Load, S = Serviceability load									
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)									
Systems factor K2 = 1.2									
Average Structural Displacement Ductility factor									
u = y/d 4.08									
Ductility Modification factor									
K4 = 1.00									
DLW = Selected deflection limit for wind forces									
DLQ = Selected deflection limit for earthquake forces									
P21:2010 BR Calc's									
Lab Number		K1 (= 1.4 - C/X)	EQ ultimate BU's	EQ service BU's	Wind Ultimate BU's	Wind Service BU's			
289145	(BU)	1.00	9.5	10.4	10.1	8.1			
	(BU/m)		47	52	51	40			
289146	(BU)	1.00	10.0	11.1	10.7	8.6			
	(BU/m)		50	56	54	43			
289147	(BU)	1.00	10.1	10.5	10.5	8.1			
	(BU/m)		51	52	53	41			
		289145	-6% Ok result	-4% Ok result	-5% Ok result	-4% Ok result			
<20% Result Check		289146	2% Ok result	6% Ok result	4% Ok result	6% Ok result			
		289147	4% Ok result	-3% Ok result	1% Ok result	-3% Ok result			
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.									
Average Earthquake BR									
EQ (BU's)		20 x K4 x Ry = 10		(P8 x K1) x (K2/0.55) = 11		Serviceability			
		49 BU/m		Limited by		Ultimate limit state			
Average Wind BR									
Wind (BU's)		20 * P = 10		(P8 x K1) x (K2/0.71) = 8		Serviceability			
		41 BU/m		Limited by		Serviceability limit state			

Figure 4: P21:2010 calculations for 200mm x 2.40m bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side wall

Please feel free to contact me to discuss this information.

Doug Gaunt

P21 Test Report

—

bbi® AraucoPly®

**DD F8 Structural Pine Plywood
7mm 400mm Wall, Brackets**



Te Papa Tipu Innovation Park
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Rotorua
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DDI: +64 7 343 5763
Facsimile: +64 7 348 0952
Email: douglas.gaunt@scionresearch.com

Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi AraucoPly DD F8 Structural Pine Plywood 7mm 400mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 400mm x 2.4m bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side Walls with Brackets.

1. BU wind = 22 (56 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 23 (58 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side,
90x45 H1.2 SG8 framing, studs at 400mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates,
GIB Handibracs brackets used
M12 hold down bolts to bottom plate and brackets
P21 Supplementary restraints used.

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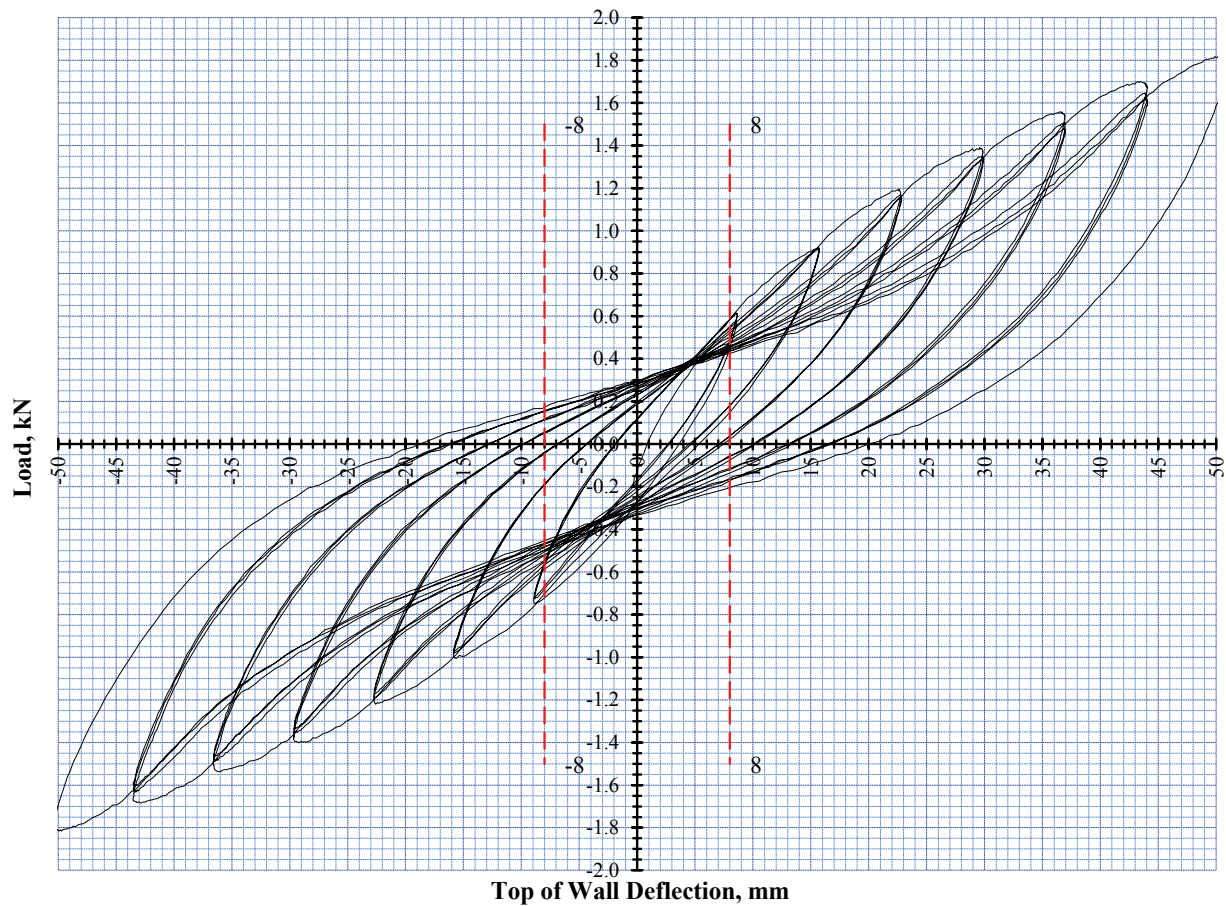


Figure 1: Wall 289142

Observations

No obvious signs of failure to framing or plywood

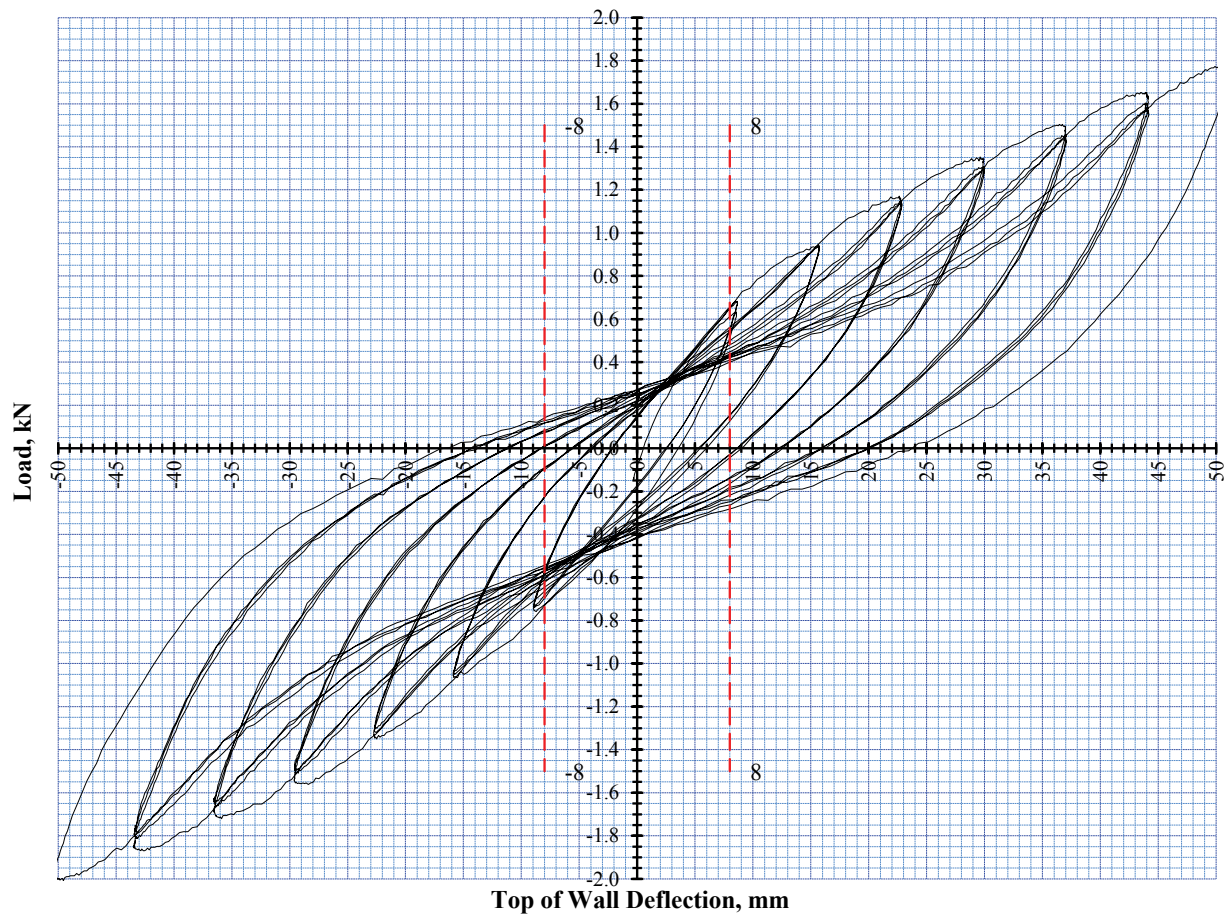


Figure 2: Wall 289143

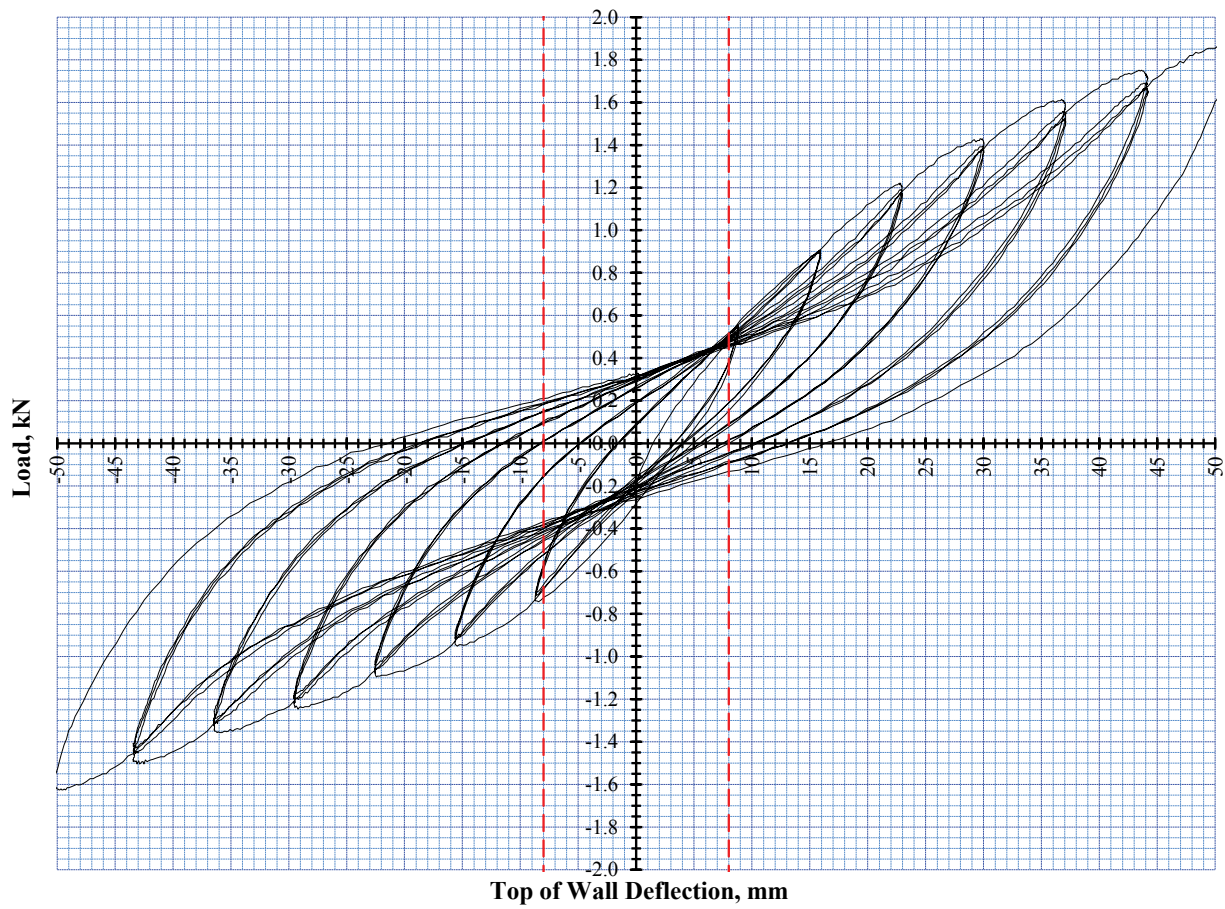


Figure 3: Wall 289144

P21:2010 BRACING RACKING TEST RESULT EVALUATION								
Wall Construction								
400mm, bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side								
90x45 H1.2 SG8 framing, studs at 400mm centres, no nogs								
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres							Summary	
to plates and external studs							Earthquake	58 (U) BU/m
7mm min edge distances all around. GIB Handibracs used each end							Wind	56 (S) BU/m
M12 hold down bolts to bottom plate & brackets								
P21 Supplementary restraints used								
Date of test:-		25-May-22	Ship No.	3251		Tested by	John Lee	
Date of calc's:-		30-May-22	Job No.	TE21-068		Analysed by	Doug Gaunt	
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.								
		Serviceability Cycles		Ultimate Cycles				
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement		Wall dimensions		
		8.0	X mm	y=(mm)			L(mm)	H(mm)
		Loads	Residual	Maximum			400	2410
		(P ₈)	Defln, C	Load	def @ P		d at P/2	4th, R
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN
289142	+	0.58	2.70	1.55	36.0	0.78	11.6	1.44
	-	0.73	1.80	1.53	36.0			1.45
289143	+	0.67	2.40	1.50	36.0	0.75	9.7	1.40
	-	0.73	2.00	1.72	36.0			1.65
289144	+	0.52	3.20	1.60	36.0	0.80	13.3	1.47
	-	0.72	1.60	1.35	36.0			1.27
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)
Averages		0.66	2.28	1.54	36.00	0.78	11.53	1.45
Coefficient of Variation %		12.32	24.04	7.20	0.00	2.63	12.75	7.75
y = average failure deflection or peak deflection of the three tests.								
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)								
R = Residual load, P = Peak Load, S = Serviceability load								
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)								
Systems factor K2 = 1.2								
Average Structural Displacement Ductility factor								
u = y/d 3.12								
Ductility Modification factor								
K4 = 0.80								
DLW = Selected deflection limit for wind forces				DLQ = Selected deflection limit for earthquake forces				
P21:2010 BR Calc's								
Lab Number		K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service		
		(= 1.4 - C/X)	BU's	BU's	BU's	BU's		
289142	(BU)	1.00	23.1	28.6	30.8	22.1		
	(BU/m)		58	71	77	55		
289143	(BU)	1.00	24.4	30.5	32.2	23.7		
	(BU/m)		61	76	81	59		
289144	(BU)	1.00	21.9	27.1	29.5	21.0		
	(BU/m)		55	68	74	52		
		289142	0% Ok result	-1% Ok result	0% Ok result	-1% Ok result		
<20% Result Check		289143	8% Ok result	9% Ok result	6% Ok result	9% Ok result		
		289144	-8% Ok result	-9% Ok result	-7% Ok result	-9% Ok result		
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.								
Average Earthquake BR			Ultimate		Serviceability			
EQ (BU's)		20 x K4 x Ry =	23	(P8 x K1) x (K2/0.55) =	29			
			58 BU/m		Limited by	Ultimate limit state		
Average Wind BR			Ultimate		Serviceability			
Wind (BU's)		20 * P =	31	(P8 x K1) x (K2/0.71) =	22			
			56 BU/m		Limited by	Serviceability limit state		

Figure 4: P21:2010 calculations for 400mm x 2.40m bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side wall

Please feel free to contact me to discuss this information.

Doug Gaunt



P21 Test Report

—

bbi® AraucoPly®

**DD F8 Structural Pine Plywood
7mm 600mm Wall, Brackets**



Te Papa Tipu Innovation Park
49 Sala Street
Private Bag 3020
Rotorua
New Zealand
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DDI: +64 7 343 5763
Facsimile: +64 7 348 0952
Email: douglas.gaunt@scionresearch.com

Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi AraucoPly DD F8 Structural Pine Plywood 7mm 600mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 600mm x 2.4m bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side Walls with Brackets.

1. BU wind = 43 (72 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 48 (80 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side,
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates,
GIB Handibracs brackets used
M12 hold down bolts to bottom plate and brackets
P21 Supplementary restraints used.

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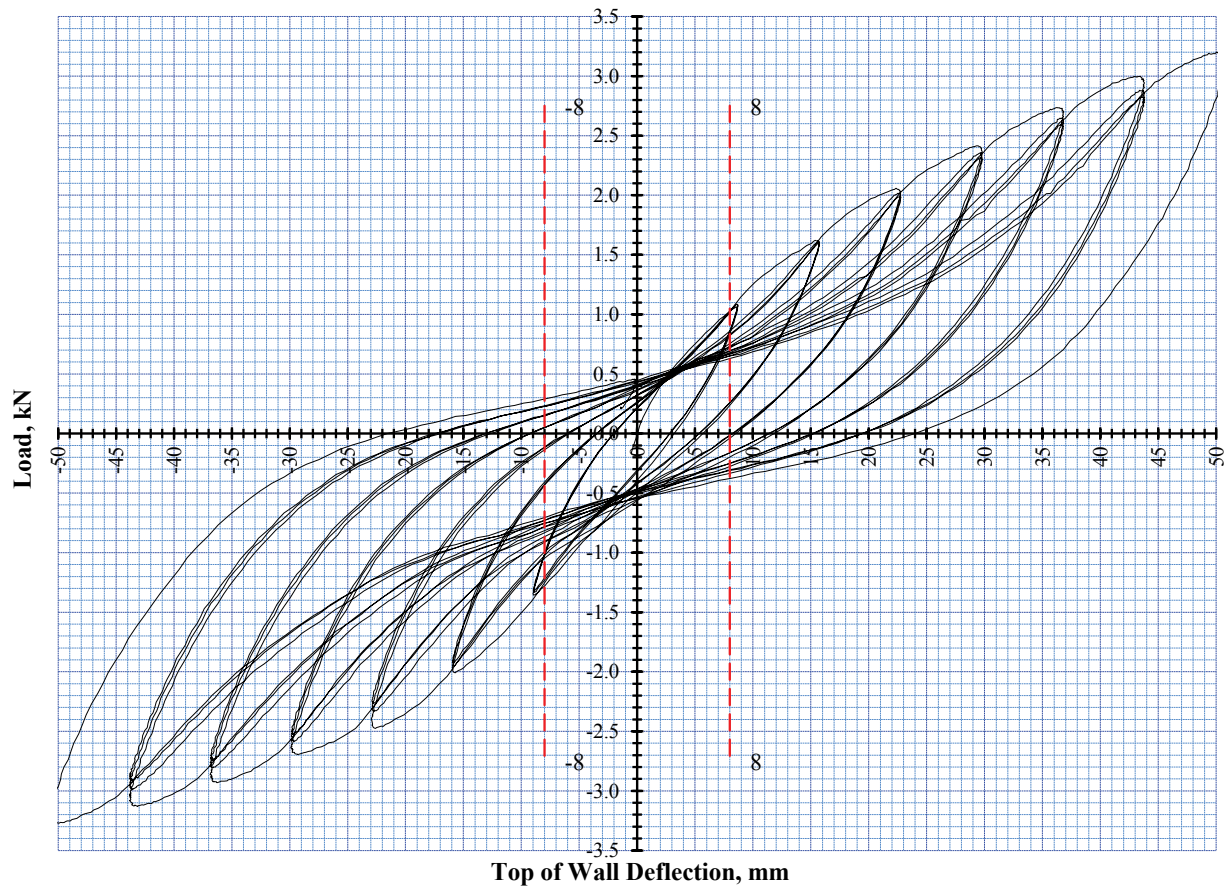


Figure 1: Wall 289139

Observations

No obvious signs of failure to framing or plywood

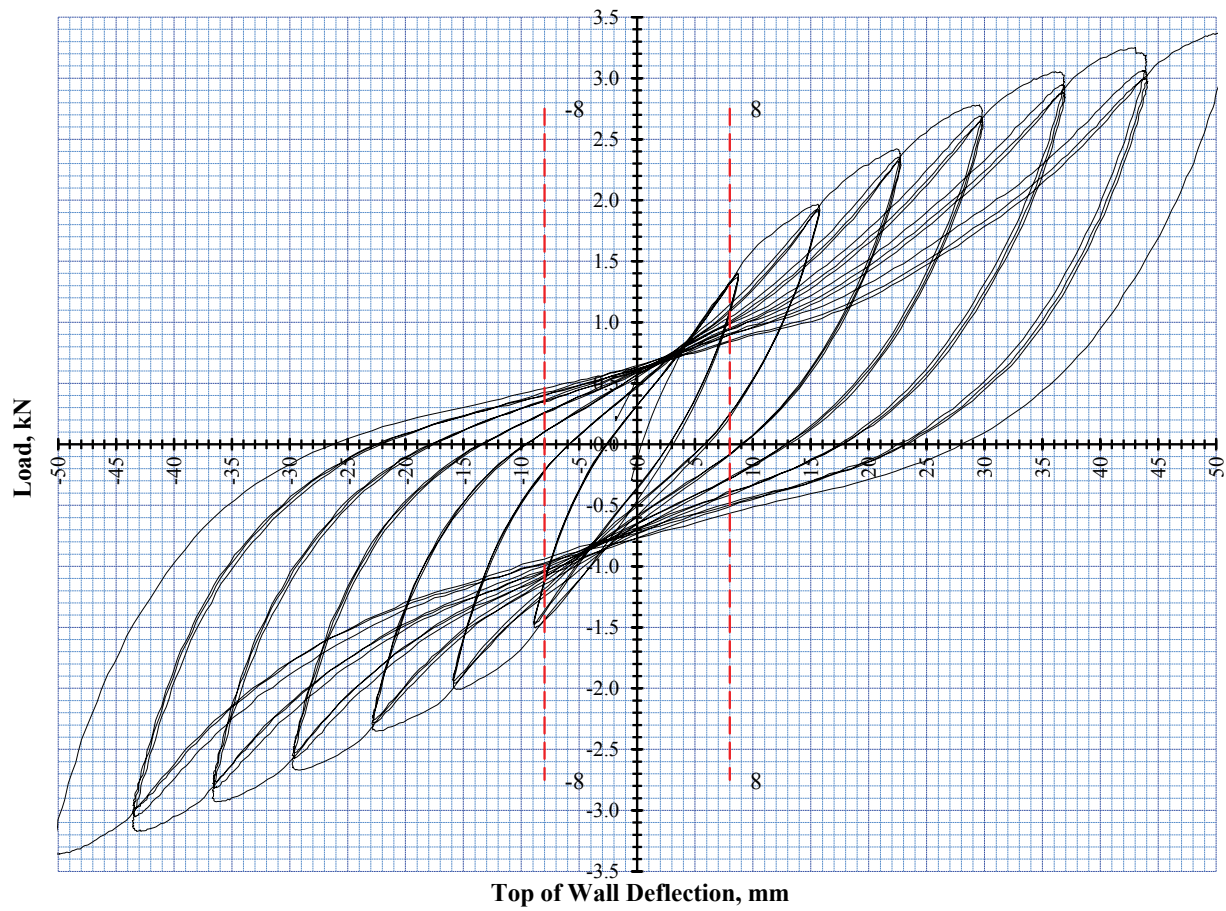


Figure 2: Wall 289140

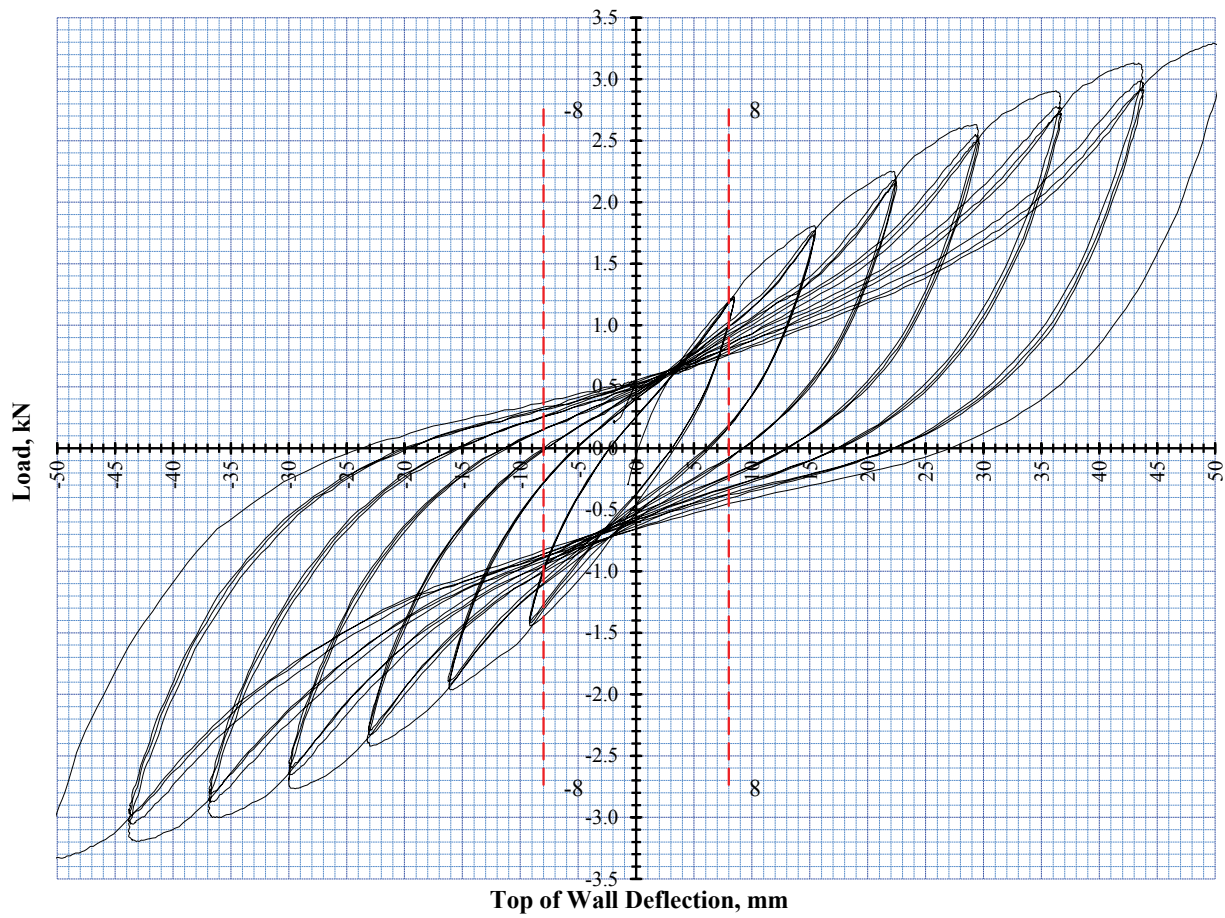


Figure 3: Wall 289141

AMENDMENT ISSUED BC230758.02 - 27/02/2024 - Page 54 of 96										Received 14/02/2024
P21:2010 BRACING RACKING TEST RESULT EVALUATION										
Wall Construction										
600mm, bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side										
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs										
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres							Summary			
to plates and external studs							Earthquake	80 (U)	BU/m	
7mm min edge distances all around. GIB Handibracs used each end							Wind	72 (S)	BU/m	
M12 hold down bolts to bottom plate & brackets										
P21 Supplementary restraints used										
Date of test:-		25-May-22	Ship No.		3251	Tested by		John Lee		
Date of calc's:-		30-May-22	Job No.		TE21-068	Analysed by		Doug Gaunt		
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.										
		Serviceability Cycles			Ultimate Cycles					
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement				Wall dimensions		
		8.0	X mm	y=(mm)				L(mm)	H(mm)	
		Loads	Residual	Maximum				600	2410	
		(P ₈)	Defln, C	Load	def @ P			d at P/2	4th, R	
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN		
289139	+	1.03	2.80	2.73	36.0	1.37	11.7	2.55		
	-	1.28	2.00	2.93	36.0			2.69		
289140	+	1.34	2.80	3.05	36.0	1.53	9.4	2.83		
	-	1.44	2.60	2.93	36.0			2.73		
289141	+	1.20	3.00	2.80	36.0	1.40	9.6	2.69		
	-	1.37	2.20	3.00	36.0			2.75		
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)		
Averages		1.28	2.57	2.91	36.00	1.43	10.23	2.71		
Coefficient of Variation %		10.42	13.81	3.79	0.00	4.80	10.17	3.12		
y = average failure deflection or peak deflection of the three tests.										
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)										
R = Residual load, P = Peak Load, S = Serviceability load										
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)						Systems factor K2 = 1.2				
Average Structural Displacement Ductility factor						u = y/d 3.52				
Ductility Modification factor						K4 = 0.88				
DLW = Selected deflection limit for wind forces					DLQ = Selected deflection limit for earthquake forces					
P21:2010 BR Calc's										
Lab Number		K1 (= 1.4 - C/X)	EQ ultimate BU's	EQ service BU's	Wind Ultimate BU's	Wind Service BU's				
289139	(BU)	1.00	46.2	50.4	56.6	39.0				
	(BU/m)		77	84	94	65				
289140	(BU)	1.00	49.0	60.7	59.8	47.0				
	(BU/m)		82	101	100	78				
289141	(BU)	1.00	48.0	56.1	58.0	43.4				
	(BU/m)		80	93	97	72				
		289139	-5% Ok result	-16% Ok result	-4% Ok result	-16% Ok result				
<20% Result Check		289140	4% Ok result	12% Ok result	4% Ok result	12% Ok result				
		289141	1% Ok result	1% Ok result	0% Ok result	1% Ok result				
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.										
Average Earthquake BR										
EQ (BU's)		20 x K4 x Ry =	Ultimate 48	(P8 x K1) x (K2/0.55) =		Serviceability 56				
			80 BU/m	Limited by		Ultimate limit state				
Average Wind BR										
Wind (BU's)		20 * P =	Ultimate 72 BU/m	(P8 x K1) x (K2/0.71) =		Serviceability 43				
				Limited by		Serviceability limit state				

P21 Test Report

—

bbi® AraucoPly®

DD F8 Structural Pine Plywood
7mm 1200mm Wall, Brackets



Te Papa Tipu Innovation Park
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Private Bag 3020
Rotorua
New Zealand
Telephone: +64 7 343 5899
DDI: +64 7 343 5763
Facsimile: +64 7 348 0952
Email: douglas.gaunt@scionresearch.com

Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi AraucoPly DD F8 Structural Pine Plywood 7mm 1200mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 1200mm x 2.4m bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side Walls with Brackets.

1. BU wind = 112 (93 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 120 (100 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side,
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates, 300mm centres
on internal stud
GIB Handibracs brackets used
M12 hold down bolts to bottom plate and brackets
P21 Supplementary restraints used.

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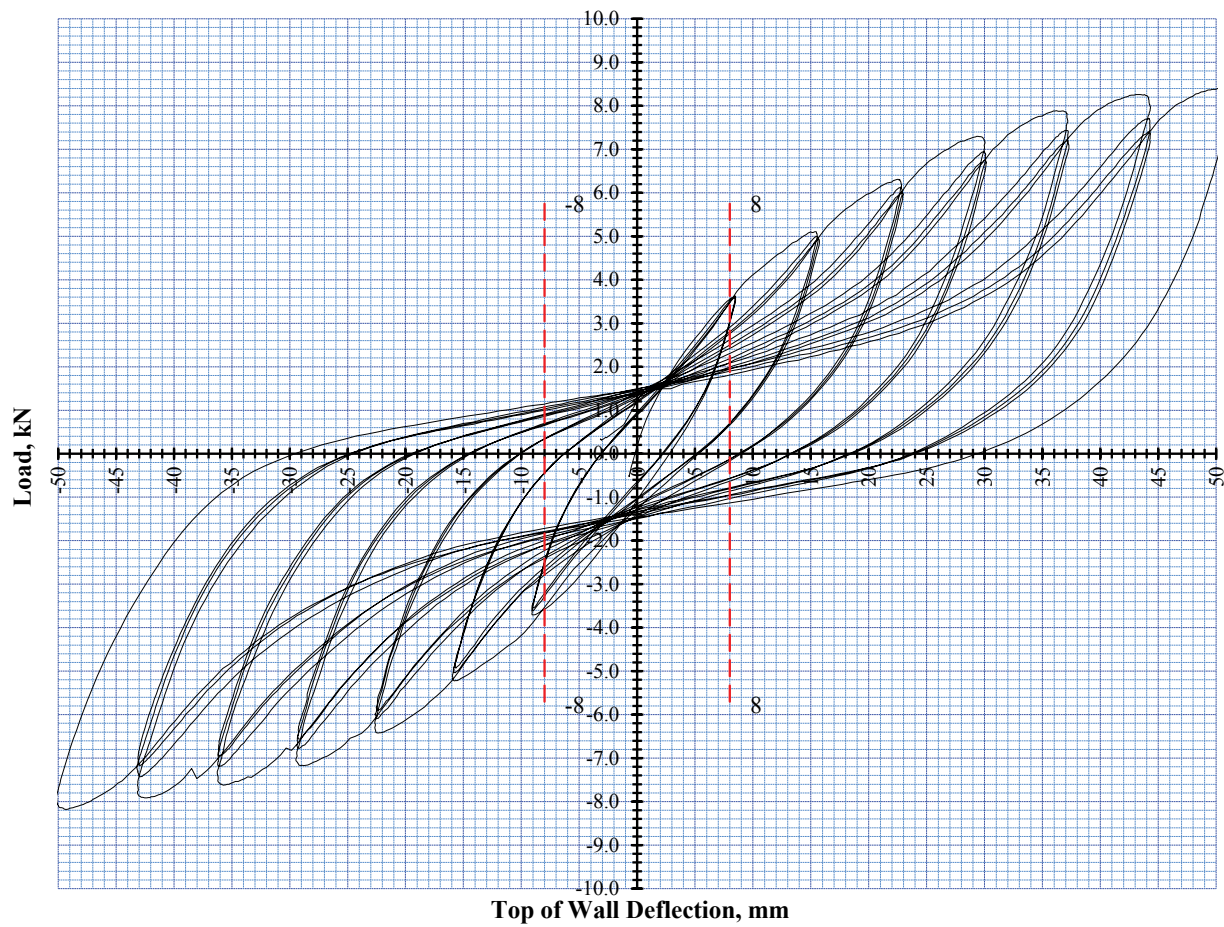
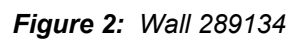


Figure 1: Wall 289133

Observations

No obvious signs of failure to framing or plywood
Plywood pulling on bottom plate nails.



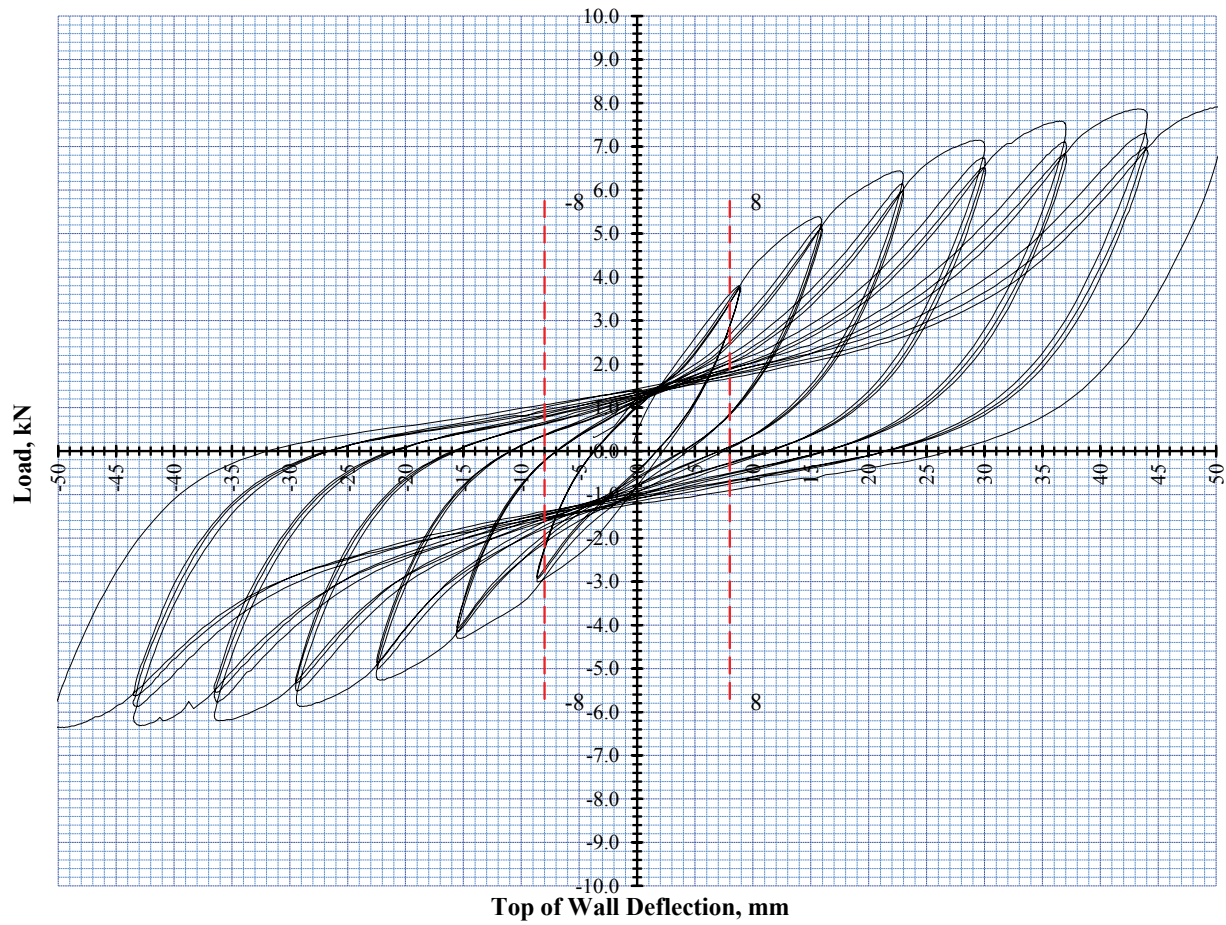


Figure 3: Wall 289135

AMENDMENT ISSUED BC230758.02 27/02/2024 - Page 60 of 96									
P21:2010 BRACING RACKING TEST RESULT EVALUATION									
Wall Construction									
1200mm, bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side									
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs									
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres							Summary		
to plates and external studs, 300mm to internal studs,							Earthquake	100 (U)	BU/m
7mm min edge distances all around. GIB Handibracs used each end							Wind	93 (S)	BU/m
M12 hold down bolts to bottom plate & brackets									
P21 Supplementary restraints used									
Date of test:-		25-May-22	Ship No.		3251	Tested by		John Lee	
Date of calc's:-		25-May-22	Job No.		TE21-068	Analysed by		Doug Gaunt	
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.									
		Serviceability Cycles		Ultimate Cycles					
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement		Wall dimensions			
		8.0	X mm	y=(mm)		L(mm) H(mm)			
		Loads	Residual	Maximum		1200 2410			
		(P ₈)	Defln, C	Load	def @ P	d at P/2 4th, R			
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN	
289133	+	3.55	2.10	7.87	36.0	3.94	9.5	6.80	
	-	3.58	3.10	7.80	36.0			6.95	
289134	+	3.12	1.70	7.30	36.0	3.65	9.7	6.22	
	-	3.04	3.10	6.96	36.0			6.18	
289135	+	3.62	1.60	7.55	36.0	3.78	9.0	6.50	
	-	2.93	3.60	6.19	36.0			5.35	
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)	
Averages		3.31	2.53	7.28	36.00	3.79	9.40	6.33	
Coefficient of Variation %		8.55	30.29	7.90	0.00	3.08	3.13	8.23	
y = average failure deflection or peak deflection of the three tests.									
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)									
R = Residual load, P = Peak Load, S = Serviceability load									
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)						Systems factor K2 = 1.2			
Average Structural Displacement Ductility factor						u = y/d 3.83			
Ductility Modification factor						K4 = 0.95			
DLW = Selected deflection limit for wind forces					DLQ = Selected deflection limit for earthquake forces				
P21:2010 BR Calc's									
Lab Number		K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service			
		(= 1.4 - C/X)	BU's	BU's	BU's	BU's			
289133	(BU)	1.00	130.1	155.6	156.7	120.5			
	(BU/m)		108	130	131	100			
289134	(BU)	1.00	117.3	134.4	142.6	104.1			
	(BU/m)		98	112	119	87			
289135	(BU)	1.00	112.1	142.9	137.4	110.7			
	(BU/m)		93	119	115	92			
		289133	12% Ok result	11% Ok result	11% Ok result	11% Ok result			
<20% Result Check		289134	-3% Ok result	-11% Ok result	-3% Ok result	-11% Ok result			
		289135	-10% Ok result	-1% Ok result	-9% Ok result	-1% Ok result			
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.									
Average Earthquake BR									
EQ (BU's)	20 x K4 x Ry =		Ultimate	(P8 x K1) x (K2/0.55) =		Serviceability			
	100		BU/m	Limited by		Ultimate limit state			
Average Wind BR									
Wind (BU's)	20 * P =		Ultimate	(P8 x K1) x (K2/0.71) =		Serviceability			
	93		BU/m	Limited by		Serviceability limit state			

Figure 4: P21:2010 calculations for 1200mm x 2.40m bbi AraucoPly DD F8 Structural Pine Plywood 7mm one side wall

Please feel free to contact me to discuss this information.

Doug Gaunt

P21 Test Report

—

bbi® Redline®

**Poplar Core Plywood 9mm
1200mm Wall, Brackets**



Te Papa Tipu Innovation Park
49 Sala Street
Private Bag 3020
Rotorua
New Zealand

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DDI: +64 7 343 5763

Facsimile: +64 7 348 0952

Email: douglas.gaunt@scionresearch.com

Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi RedLine Poplar Core Plywood 9mm 1200mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 1200mm x 2.4mm bbi RedLine Poplar Core Plywood 9mm one side Walls with Brackets.

1. BU wind = 130 (109 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 133 (111 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi RedLine Poplar Core Plywood 9mm one side,
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates, 300mm centres
on internal stud
GIB Handibracs brackets used
M12 hold down bolts to bottom plate and brackets
P21 Supplementary restraints used.

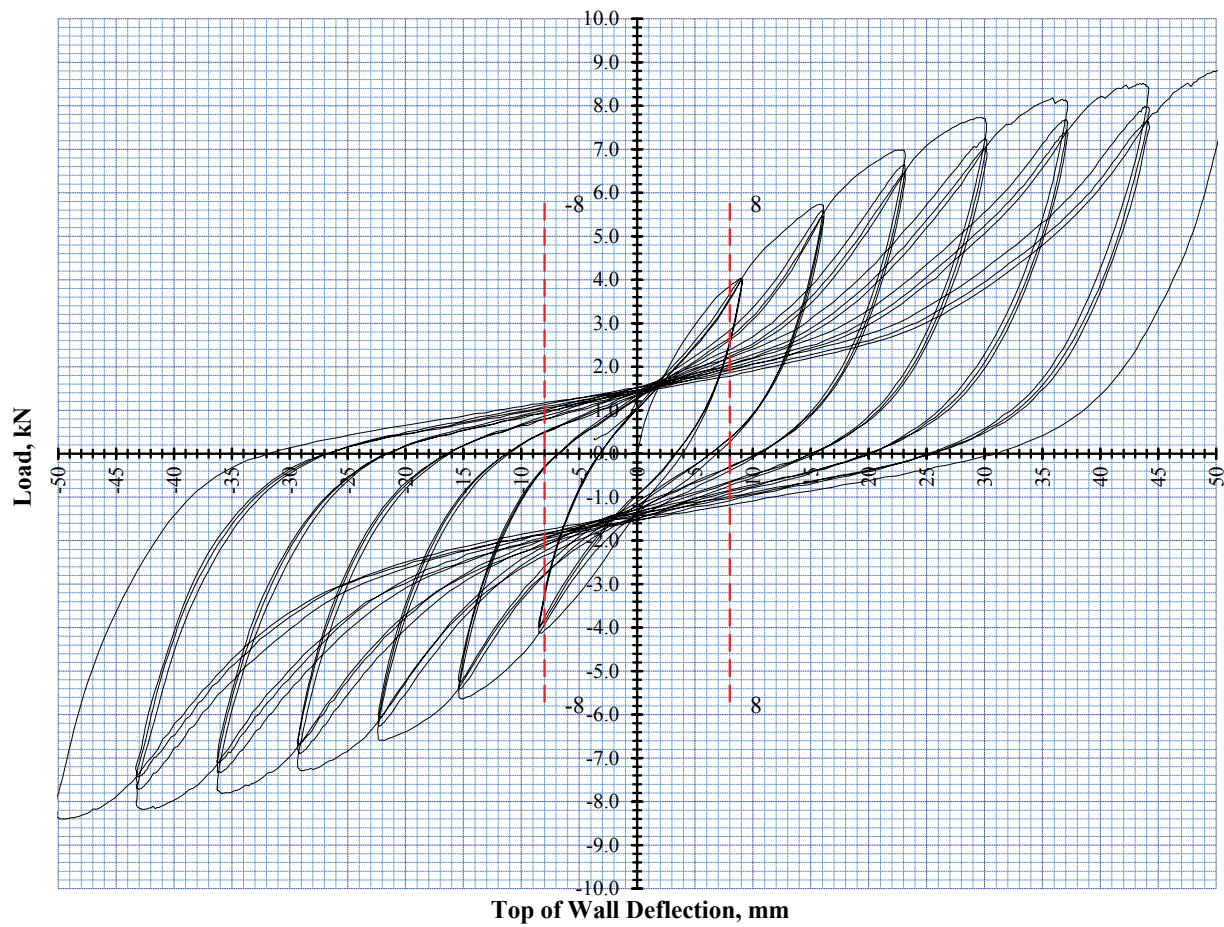
RISK AND LIMITATION OF LIABILITY: Scion's liability to the Client arising out of all claims for any loss or damage resulting from this work will not exceed in aggregate an amount equal to two times the Service Fees actually paid by the Client to Scion. Scion will not be liable in any event for loss of profits or any indirect, consequential or special loss or damage suffered or incurred by the Client as a result of any act or omission of Scion under this Agreement.

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Top of Wall Deflection, mm

Figure 1: Wall 289136

Observations

No obvious signs of failure to framing or plywood
Plywood pulling on bottom plate nails.

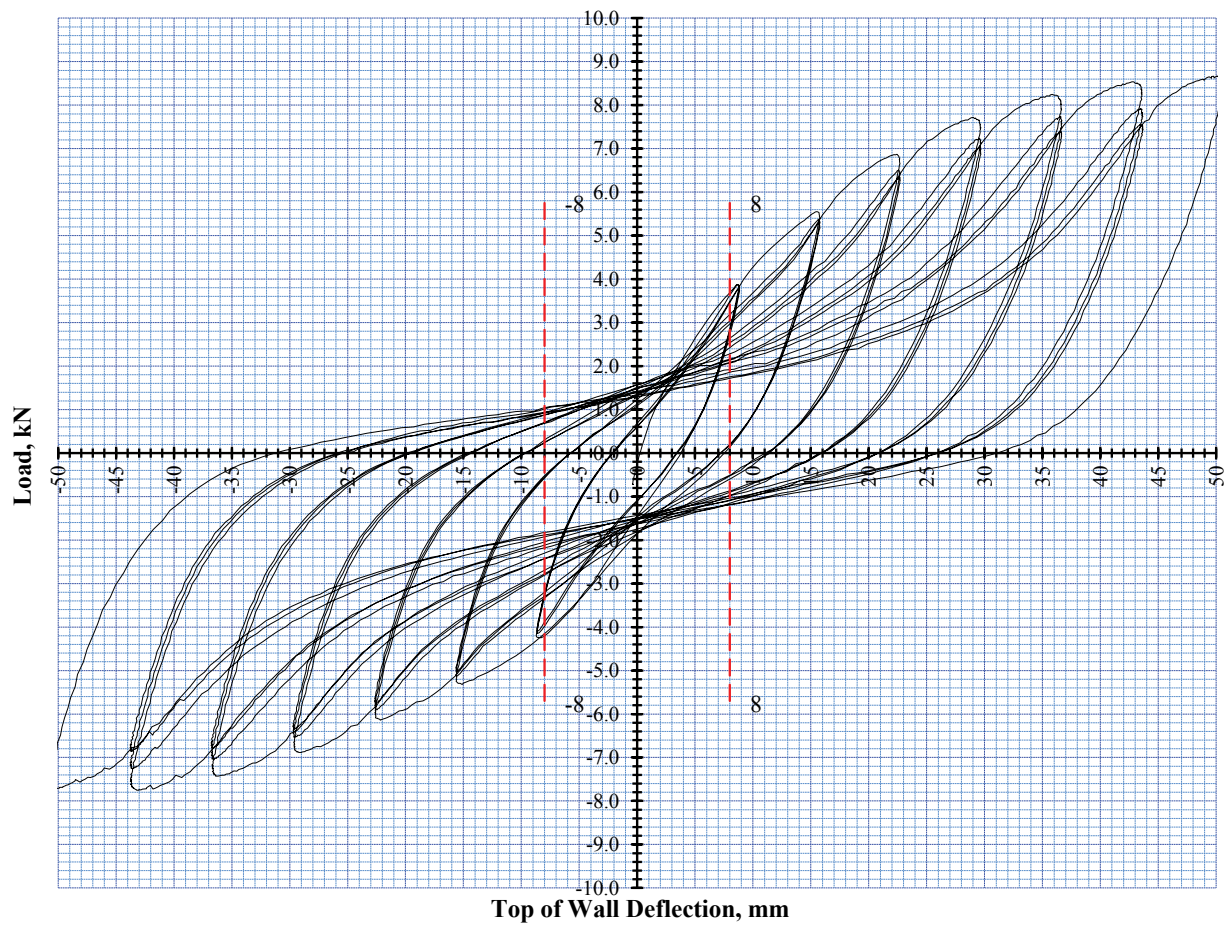


Figure 2: Wall 289137

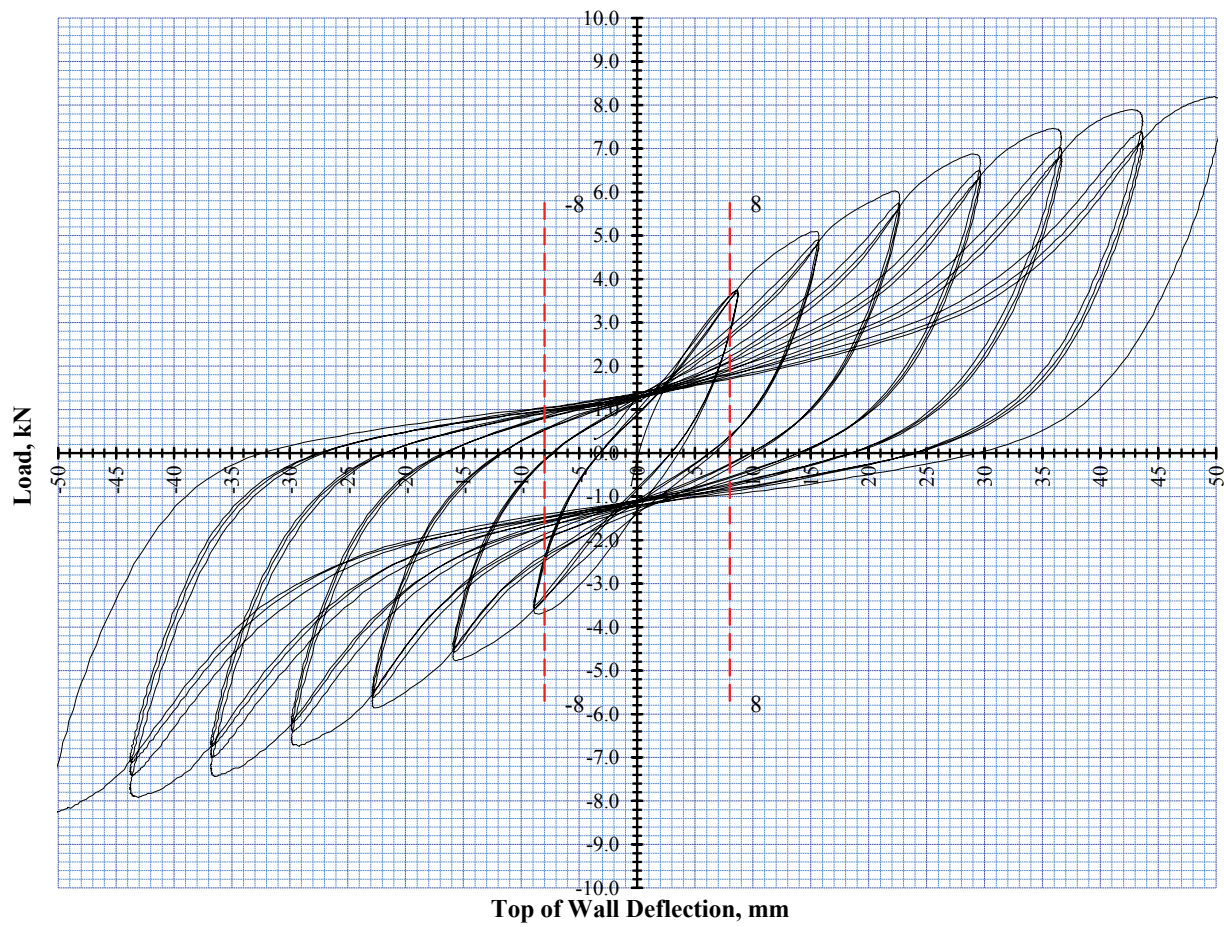


Figure 3: Wall 289138

AMENDMENT ISSUED BC230758.02 - 27/02/2024 - Page 66 of 96										Received 14/02/24
P21:2010 BRACING RACKING TEST RESULT EVALUATION										
Wall Construction										
1200mm, bbi RedLine Poplar Core Plywood 9mm one side										
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs										
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres							Summary			
to plates and external studs, 300mm to internal studs,							Earthquake	111 (U)	BU/m	
7mm min edge distances all around. GIB Handibracs used each end							Wind	109 (S)	BU/m	
M12 hold down bolts to bottom plate & brackets										
P21 Supplementary restraints used										
Date of test:-		25-May-22	Ship No.	3251			Tested by	John Lee		
Date of calc's:-		26-May-22	Job No.	TE21-068			Analysed by	Doug Gaunt		
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.										
		Serviceability Cycles		Ultimate Cycles						
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement		Wall dimensions				
		8.0	X mm	y=(mm)		L(mm) H(mm)				
		Loads	Residual	Maximum		1200 2410				
		(P ₈)	Defln, C	Load	def @ P	d at P/2 4th, R				
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN		
289136	+	3.83	3.30	8.10	36.0	4.05	9.1	6.97		
	-	4.07	3.20	7.80	36.0			7.00		
289137	+	3.85	2.90	8.22	36.0	4.11	9.5	7.20		
	-	4.08	2.50	7.41	36.0			6.60		
289138	+	3.65	2.80	7.45	36.0	3.73	8.5	6.62		
	-	3.67	3.10	7.40	36.0			6.45		
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(R _y)		
Averages		3.86	2.97	7.73	36.00	3.96	9.03	6.81		
Coefficient of Variation %		4.41	9.06	4.33	0.00	4.27	4.55	3.90		
y = average failure deflection or peak deflection of the three tests.										
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)										
R = Residual load, P = Peak Load, S = Serviceability load										
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)						Systems factor K2 = 1.2				
Average Structural Displacement Ductility factor						u = y/d 3.99				
Ductility Modification factor						K4 = 0.98				
DLW = Selected deflection limit for wind forces				DLQ = Selected deflection limit for earthquake forces						
P21:2010 BR Calc's										
Lab Number		K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service				
289136	(BU)	(= 1.4 - C/X)	BU's	BU's	BU's	BU's				
	(BU/m)	1.00	136.7	171.6	159.0	132.9				
289137	(BU)	1.00	114	143	133	111				
	(BU/m)	1.00	135.0	173.0	156.3	134.0				
289138	(BU)	1.00	113	144	130	112				
	(BU/m)	1.00	127.9	159.7	148.5	123.7				
			107	133	124	103				
<20% Result Check		289136	4% Ok result	3% Ok result	4% Ok result	3% Ok result				
		289137	2% Ok result	4% Ok result	2% Ok result	4% Ok result				
		289138	-6% Ok result	-8% Ok result	-6% Ok result	-8% Ok result				
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.										
Average Earthquake BR			Ultimate				Serviceability			
EQ (BU's)		20 x K4 x Ry =	133	(P8 x K1) x (K2/0.55) =		168				
		111	BU/m	Limited by		Ultimate limit state				
Average Wind BR			Ultimate				Serviceability			
Wind (BU's)		20 * P =	155	(P8 x K1) x (K2/0.71) =		130				
		109	BU/m	Limited by		Serviceability limit state				

P21 Test Report

—

bbi® Redline®

**Poplar Core Plywood 12mm
1200mm Wall, Brackets**



Te Papa Tipu Innovation Park
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Private Bag 3020
Rotorua
New Zealand

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Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi RedLine Poplar Core Plywood 12mm 1200mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 1200mm x 2.4m bbi RedLine Poplar Core Plywood 12mm one side Walls with Brackets.

1. BU wind = 121 (101 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 130 (108 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi RedLine Poplar Core Plywood 12mm one side,
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates, 300mm centres
on internal stud
GIB Handibracs brackets used
M12 hold down bolts to bottom plate and brackets
P21 Supplementary restraints used.

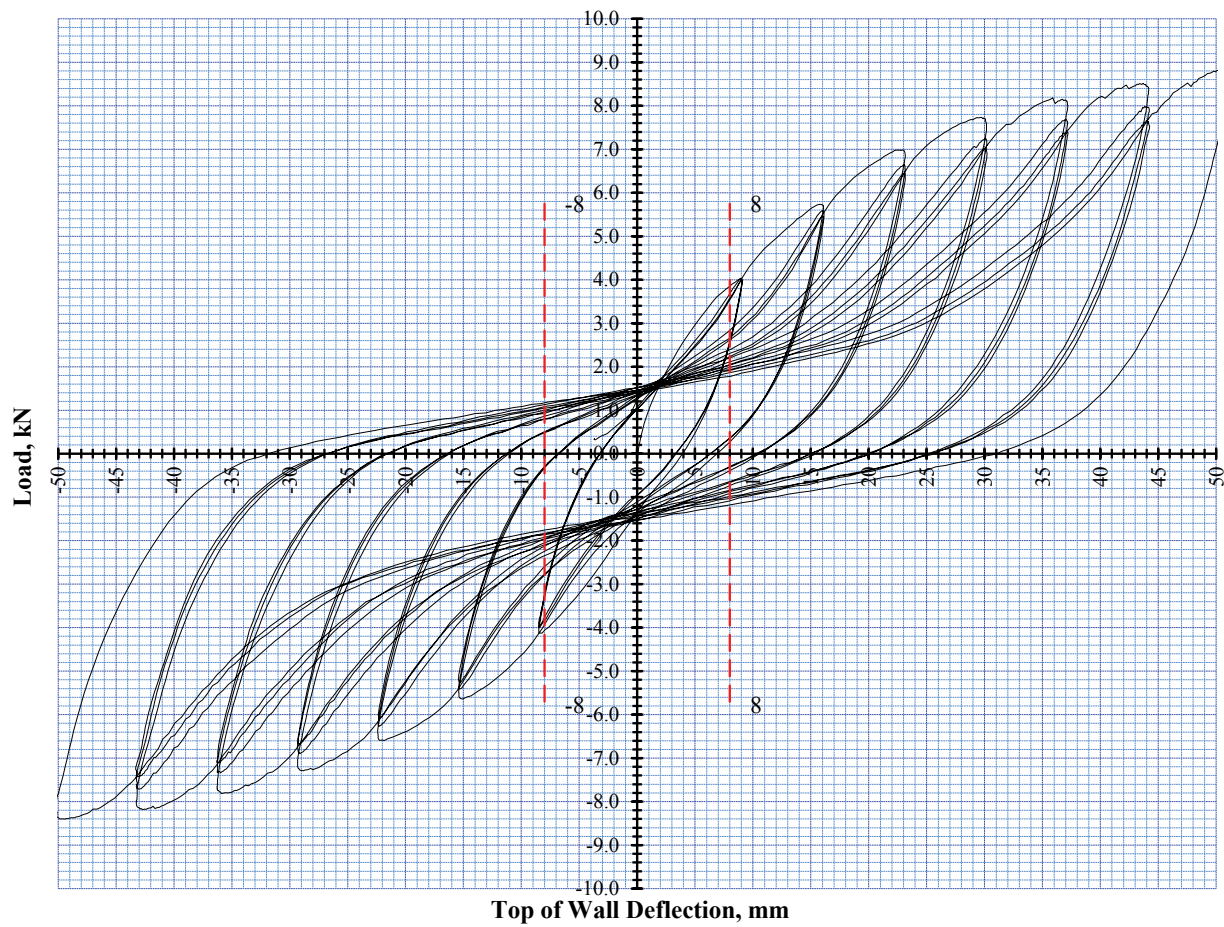
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Top of Wall Deflection, mm

Figure 1: Wall 289136

Observations

No obvious signs of failure to framing or plywood
Plywood pulling on bottom plate nails.

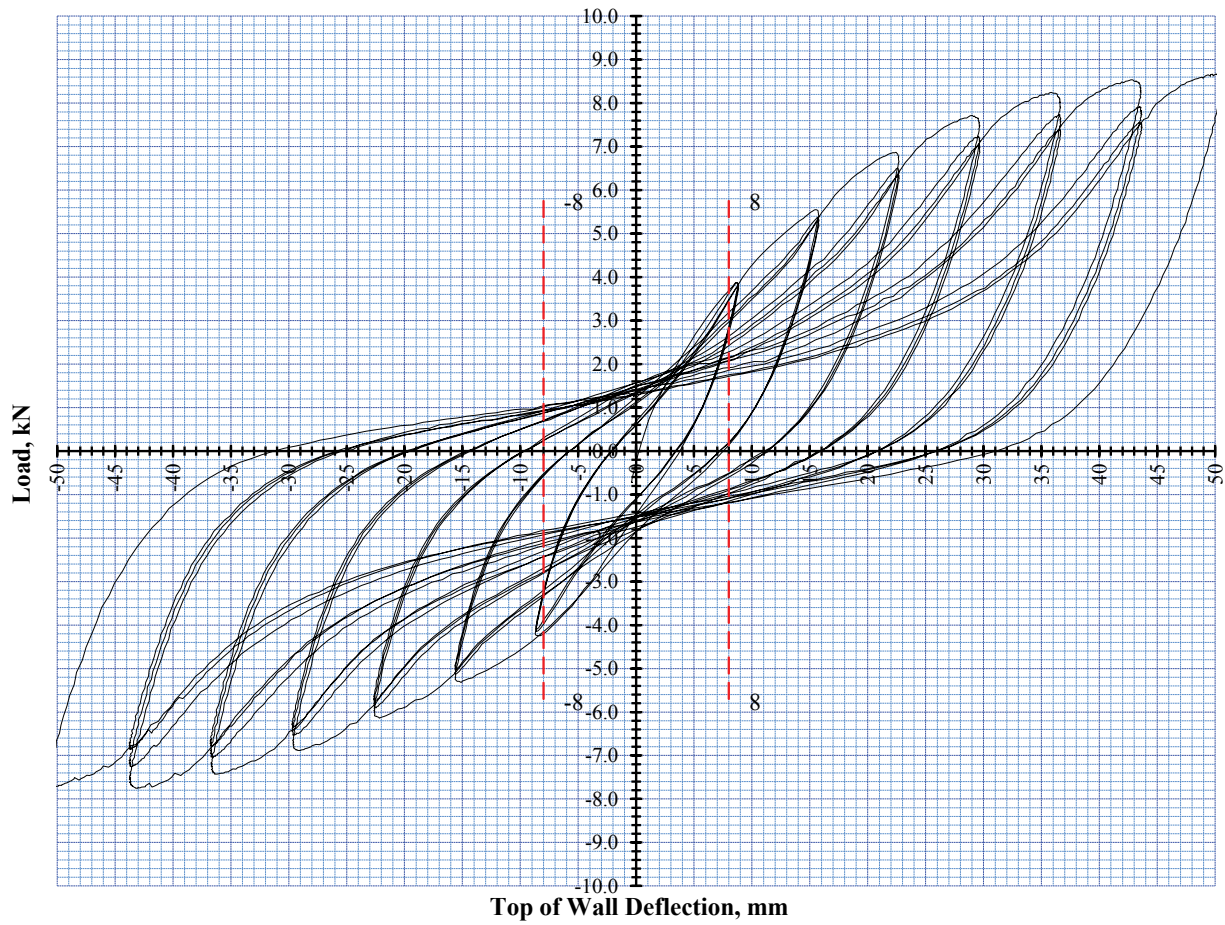


Figure 2: Wall 289137

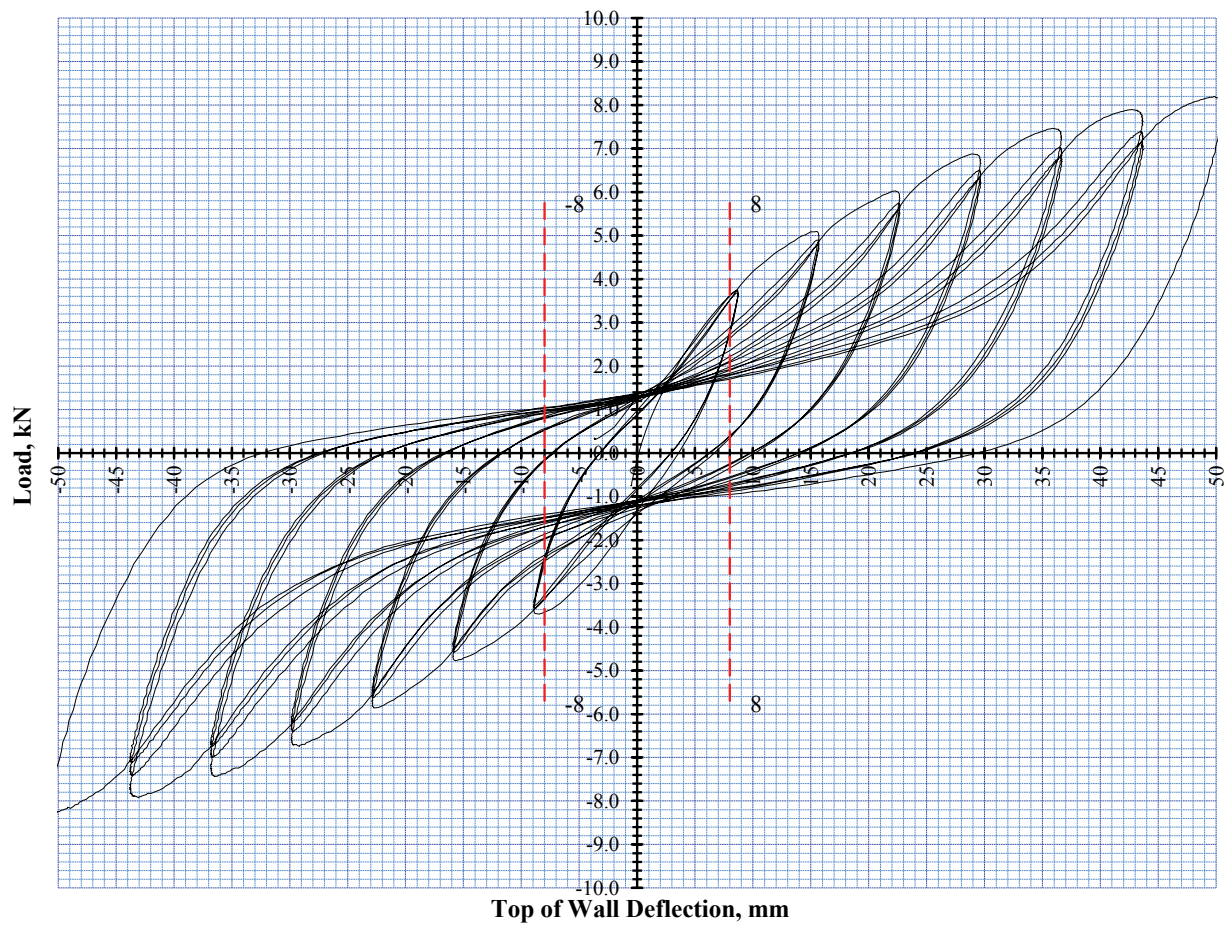


Figure 3: Wall 289138

AMENDMENT ISSUED BC230758.02 - 27/02/2024 - Page 72 of 96										Received 14/02/24
P21:2010 BRACING RACKING TEST RESULT EVALUATION										
Wall Construction										
1200mm, bbi RedLine Poplar Core Plywood 9mm one side										
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs										
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres								Summary		
to plates and external studs, 300mm to internal studs,								Earthquake	111 (U) BU/m	
7mm min edge distances all around. GIB Handibracs used each end								Wind	109 (S) BU/m	
M12 hold down bolts to bottom plate & brackets										
P21 Supplementary restraints used										
Date of test:-		25-May-22	Ship No.		3251	Tested by		John Lee		
Date of calc's:-		26-May-22	Job No.		TE21-068	Analysed by		Doug Gaunt		
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.										
		Serviceability Cycles			Ultimate Cycles					
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement				Wall dimensions		
		8.0	X mm	y=(mm)				L(mm)	H(mm)	
		Loads	Residual	Maximum				1200	2410	
		(P ₈)	Defln, C	Load	def @ P			d at P/2	4th, R	
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN		
289136	+	3.83	3.30	8.10	36.0	4.05	9.1	6.97		
	-	4.07	3.20	7.80	36.0			7.00		
289137	+	3.85	2.90	8.22	36.0	4.11	9.5	7.20		
	-	4.08	2.50	7.41	36.0			6.60		
289138	+	3.65	2.80	7.45	36.0	3.73	8.5	6.62		
	-	3.67	3.10	7.40	36.0			6.45		
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)		
Averages		3.86	2.97	7.73	36.00	3.96	9.03	6.81		
Coefficient of Variation %		4.41	9.06	4.33	0.00	4.27	4.55	3.90		
y = average failure deflection or peak deflection of the three tests.										
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)										
R = Residual load, P = Peak Load, S = Serviceability load										
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)						Systems factor K2 = 1.2				
Average Structural Displacement Ductility factor						u = y/d 3.99				
Ductility Modification factor						K4 = 0.98				
DLW = Selected deflection limit for wind forces					DLQ = Selected deflection limit for earthquake forces					
P21:2010 BR Calc's										
Lab Number		K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service				
289136	(BU)	(= 1.4 - C/X)	BU's	BU's	BU's	BU's				
	(BU/m)	1.00	136.7	171.6	159.0	132.9				
289137	(BU)	1.00	114	143	133	111				
	(BU/m)	1.00	135.0	173.0	156.3	134.0				
289138	(BU)	1.00	113	144	130	112				
	(BU/m)	1.00	127.9	159.7	148.5	123.7				
			107	133	124	103				
<20% Result Check		289136	4% Ok result	3% Ok result	4% Ok result	3% Ok result				
		289137	2% Ok result	4% Ok result	2% Ok result	4% Ok result				
		289138	-6% Ok result	-8% Ok result	-6% Ok result	-8% Ok result				
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.										
Average Earthquake BR										
EQ (BU's)	20 x K4 x Ry =		Ultimate			Serviceability				
	111		BU/m	(P8 x K1) x (K2/0.55) =		168				
Average Wind BR			Ultimate			Limited by	Ultimate limit state			
Wind (BU's)	20 * P =		155	(P8 x K1) x (K2/0.71) =		130	Serviceability			
	109		BU/m			Limited by	Serviceability limit state			

P21 Test Report

—

bbi® Redline®

Premium Hardwood Core
Plywood 12mm 1200mm
Wall, Brackets



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Email: douglas.gaunt@scionresearch.com

Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi RedLine Premium Hardwood Core Plywood 12mm1200mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 1200mm x 2.4m bbi RedLine Premium Hardwood Core Plywood 12mm one side Walls with Brackets.

1. BU wind = 134 (112 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 157 (131 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi RedLine Premium Hardwood Core Plywood 12mm one side,
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates, 300mm centres
on internal stud
GIB Handibracs brackets used
M12 hold down bolts to bottom plate and brackets
P21 Supplementary restraints used.

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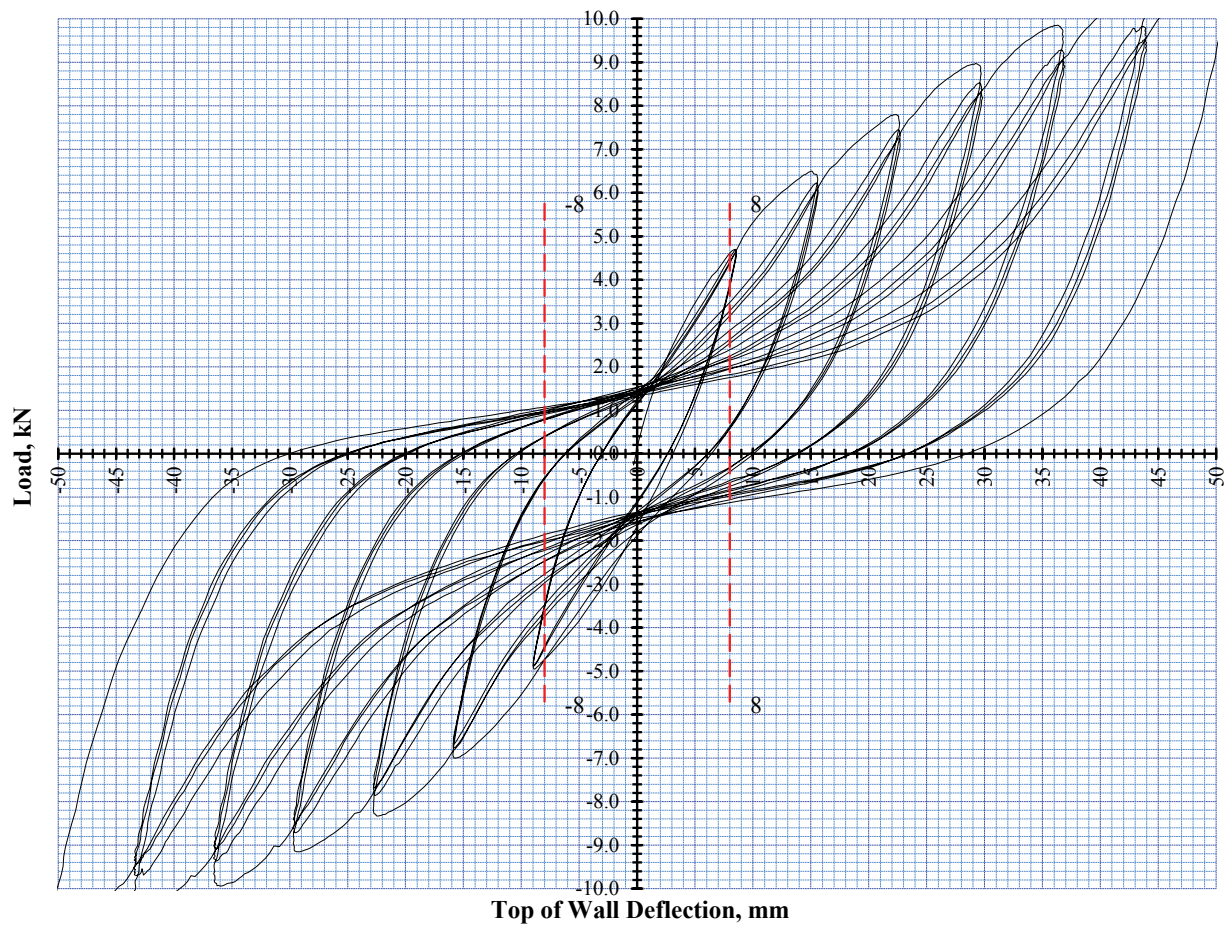


Figure 1: Wall 289124

Observations

No obvious signs of failure to framing or plywood
Plywood pulling on bottom plate nails.

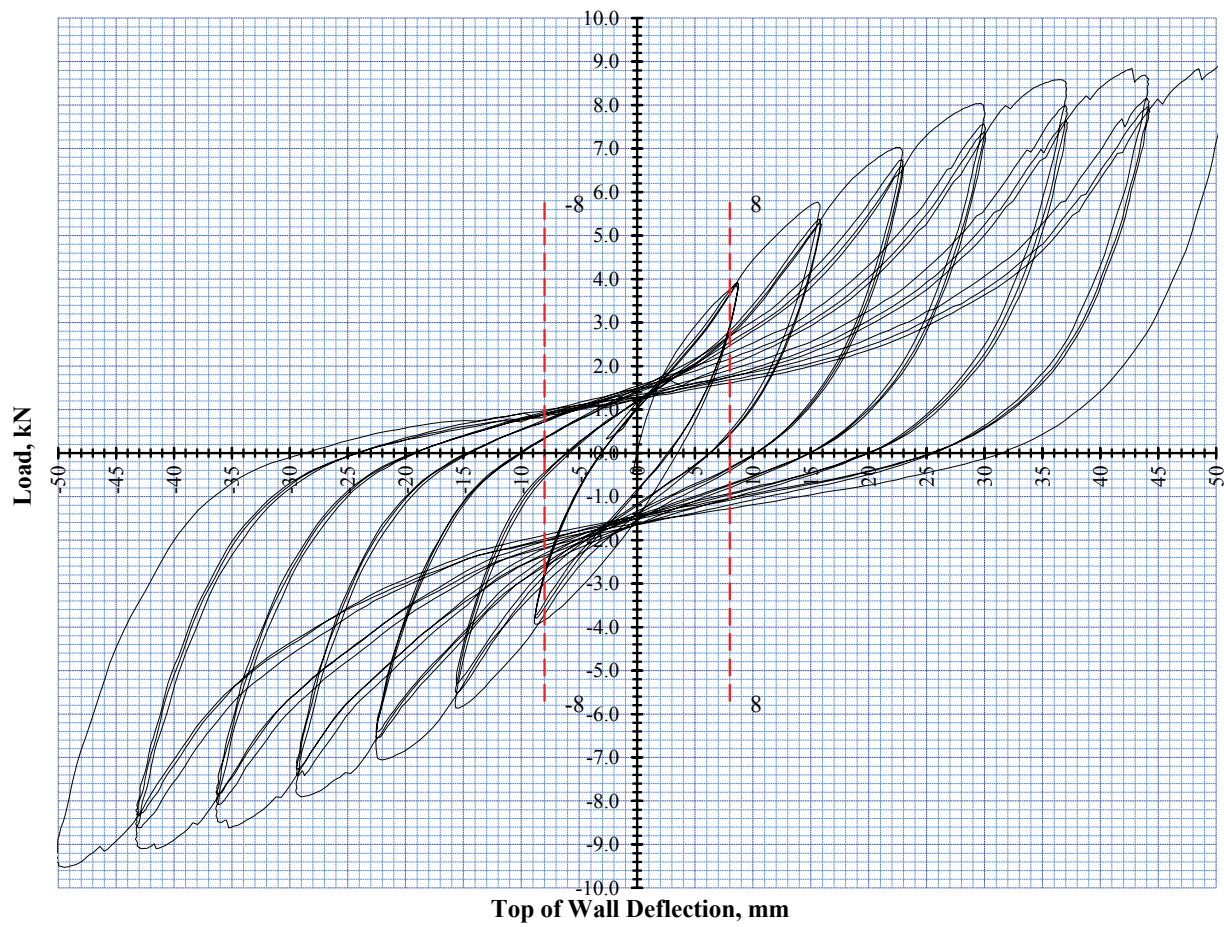


Figure 2: Wall 289125

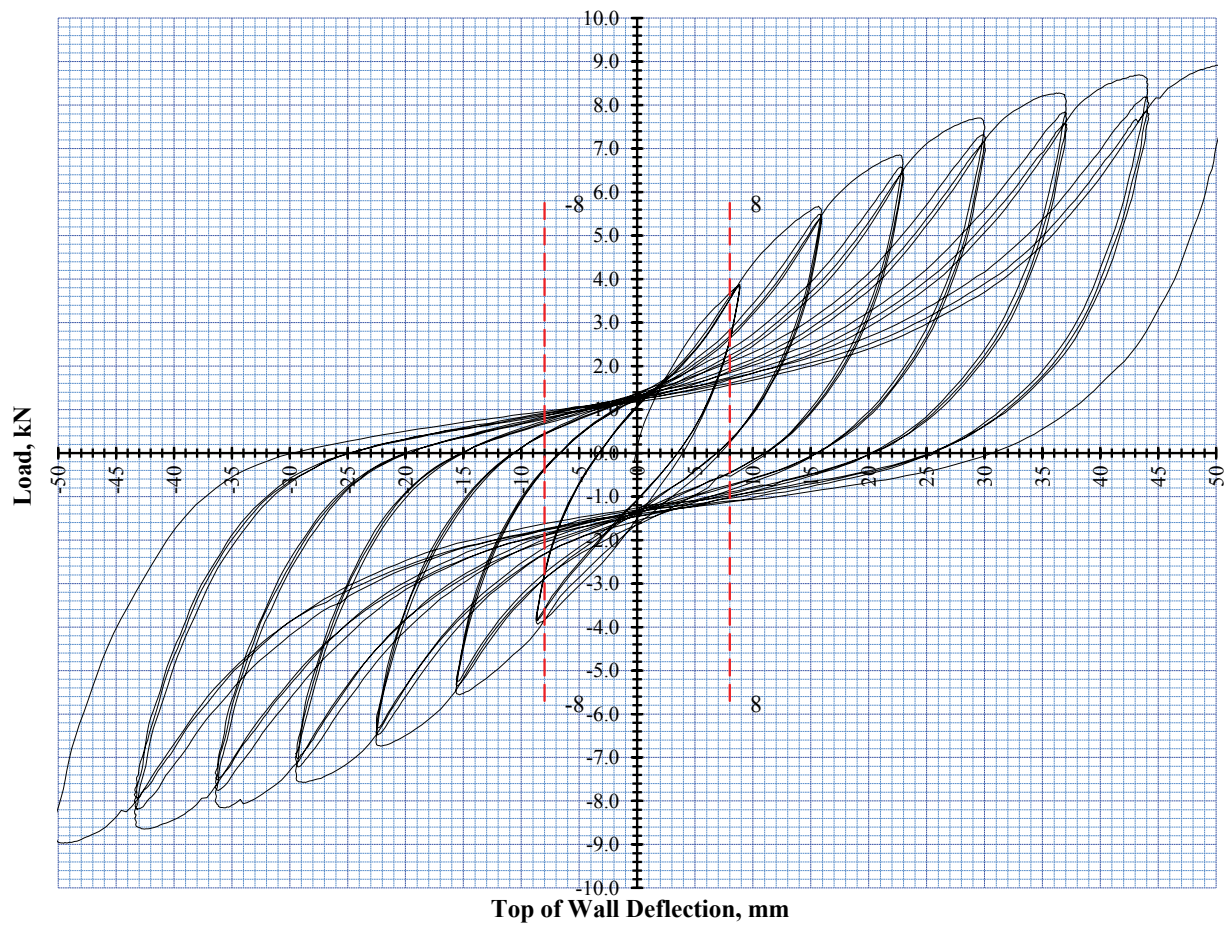


Figure 3: Wall 289126

AMENDMENT ISSUED BC230758.02 - 27/02/2024 - Page 78 of 98										Received 14/02/22
P21:2010 BRACING RACKING TEST RESULT EVALUATION										
Wall Construction										
1200mm, bbi RedLine Premium Hardwood Core Plywood 12mm one side										
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs										
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres							Summary			
to plates and external studs, 300mm to internal studs,							Earthquake	131 (U)	BU/m	
7mm min edge distances all around. GIB Handibracs used each end							Wind	112 (S)	BU/m	
M12 hold down bolts to bottom plate & brackets										
P21 Supplementary restraints used										
Date of test:-		24-May-22	Ship No.		3251	Tested by		John Lee		
Date of calc's:-		24-May-22	Job No.		TE21-068	Analysed by		Doug Gaunt		
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.										
		Serviceability Cycles			Ultimate Cycles					
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement			Wall dimensions			
		8.0	X mm	y=(mm)			L(mm)	H(mm)		
		Loads	Residual	Maximum			1200	2410		
		(P ₈)	Defln, C	Load	def @ P		d at P/2	4th, R		
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN		
289124	+	4.45	3.10	9.80	36.0	4.90	7.4	8.50		
	-	4.97	2.50	9.96	36.0			9.00		
289125	+	3.75	2.50	8.60	36.0	4.30	9.5	7.18		
	-	3.86	3.10	8.48	36.0			7.80		
289126	+	3.68	3.40	8.25	36.0	4.13	7.4	7.20		
	-	3.80	3.30	8.15	36.0			7.48		
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)		
Averages		4.09	2.98	8.87	36.00	4.44	8.10	7.86		
Coefficient of Variation %		11.50	11.99	8.21	0.00	7.47	12.22	8.62		
y = average failure deflection or peak deflection of the three tests.										
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)										
R = Residual load, P = Peak Load, S = Serviceability load										
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)						Systems factor K2 = 1.2				
Average Structural Displacement Ductility factor						u = y/d 4.44				
Ductility Modification factor						K4 = 1.00				
DLW = Selected deflection limit for wind forces					DLQ = Selected deflection limit for earthquake forces					
P21:2010 BR Calc's										
Lab Number		K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service				
		(= 1.4 - C/X)	BU's	BU's	BU's	BU's				
289124	(BU)	1.00	175.0	205.5	197.6	159.2				
	(BU/m)		146	171	165	133				
289125	(BU)	1.00	149.8	166.0	170.8	128.6				
	(BU/m)		125	138	142	107				
289126	(BU)	0.98	146.8	160.4	164.0	124.3				
	(BU/m)		122	134	137	104				
		289124	15% Ok result	192.5	15% Ok result	149.1				
<20% Result Check		289125	-7% Ok result	-10% Ok result	-6% Ok result	-10% Ok result				
		289126	-11% Ok result	-16% Ok result	-12% Ok result	-16% Ok result				
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.										
Average Earthquake BR										
EQ (BU's)		20 x K4 x Ry =	Ultimate	(P8 x K1) x (K2/0.55) =			Serviceability			
		131	BU/m	Limited by			Ultimate limit state			
Average Wind BR										
Wind (BU's)		20 * P =	Ultimate	(P8 x K1) x (K2/0.71) =			Serviceability			
		112	BU/m	Limited by			Serviceability limit state			

Figure 4: P21:2010 calculations for 1200mm x 2.40m bbi RedLine Premium Hardwood Core Plywood 12mm one side wall

Please feel free to contact me to discuss this information.

Doug Gaunt

P21 Test Report

—

bbi® Blondeline®

Birch Poplar Core Plywood
9mm 1200mm Wall, Brackets



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Facsimile: +64 7 348 0952
Email: douglas.gaunt@scionresearch.com

Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi BlondeLine Birch Poplar Core Plywood 9mm 1200mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 1200mm x 2.4m bbi BlondeLine Birch Poplar Core Plywood 9mm one side Walls with Brackets.

1. BU wind = 123 (102 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 137 (114 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi BlondeLine Birch Poplar Core Plywood 9mm one side,
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates, 300mm centres on internal stud
GIB Handibracs brackets used
M12 hold down bolts to bottom plate and brackets
P21 Supplementary restraints used.

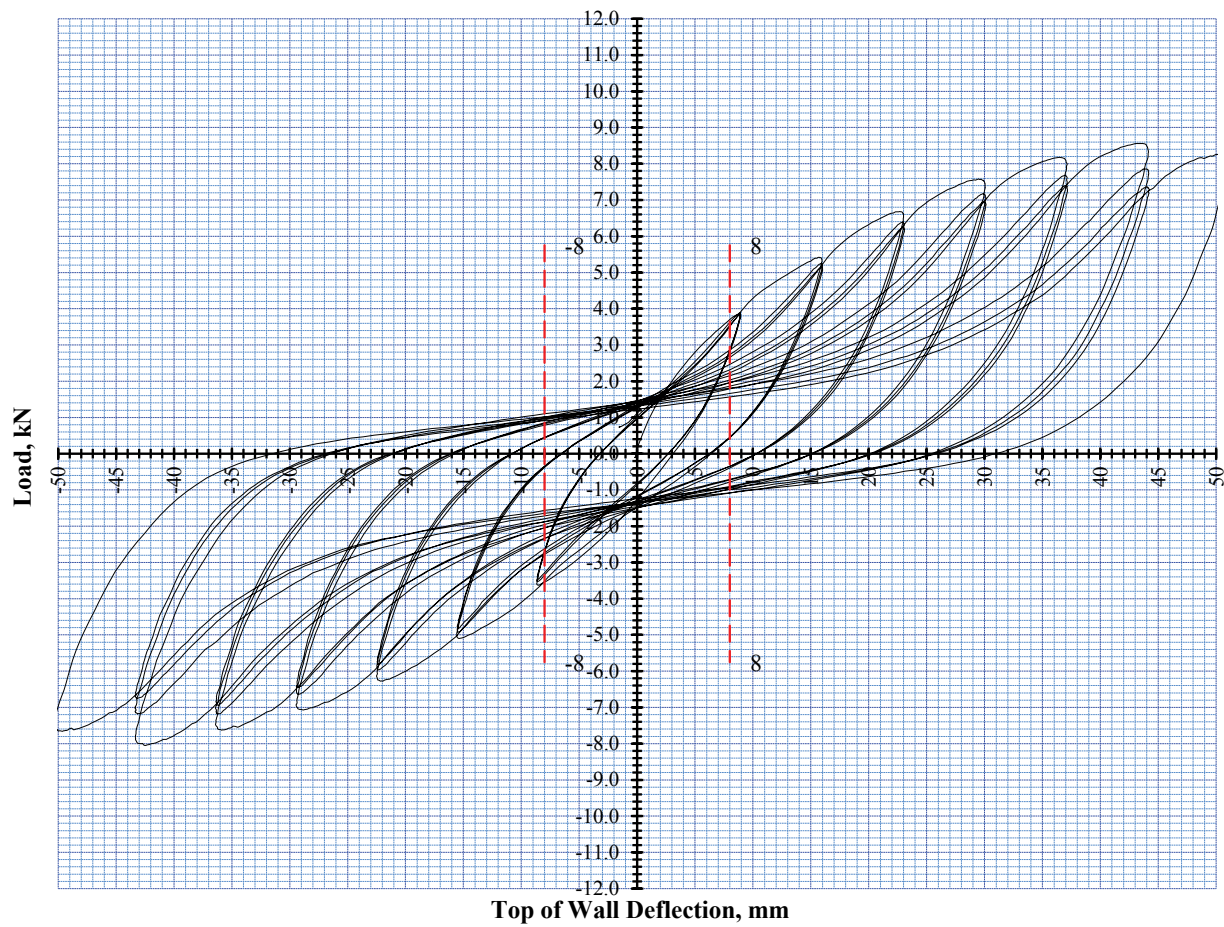
RISK AND LIMITATION OF LIABILITY: Scion's liability to the Client arising out of all claims for any loss or damage resulting from this work will not exceed in aggregate an amount equal to two times the Service Fees actually paid by the Client to Scion. Scion will not be liable in any event for loss of profits or any indirect, consequential or special loss or damage suffered or incurred by the Client as a result of any act or omission of Scion under this Agreement.

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Top of Wall Deflection, mm

Figure 1: Wall 289130

Observations

No obvious signs of failure to framing or plywood
Plywood pulling on bottom plate nails.

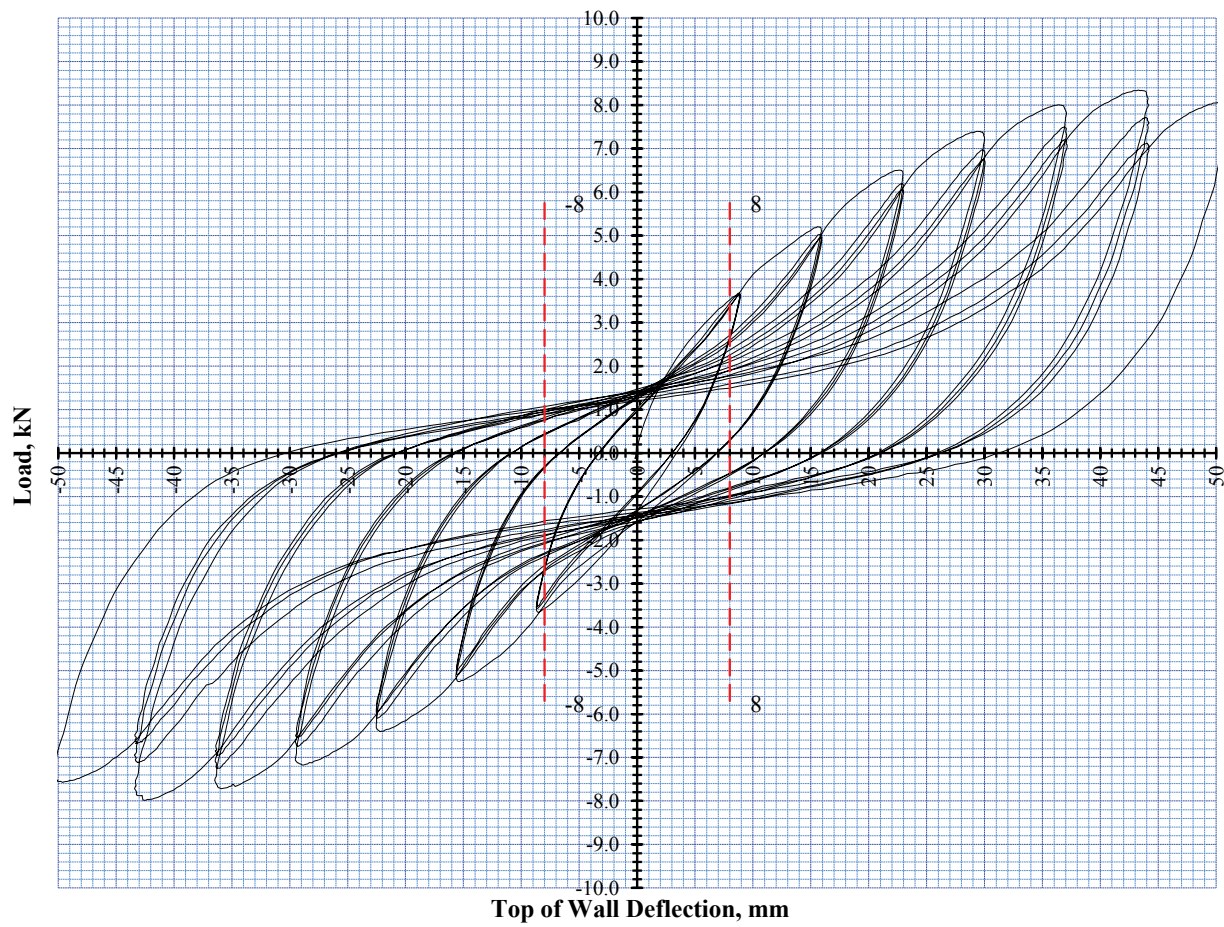


Figure 2: Wall 289131

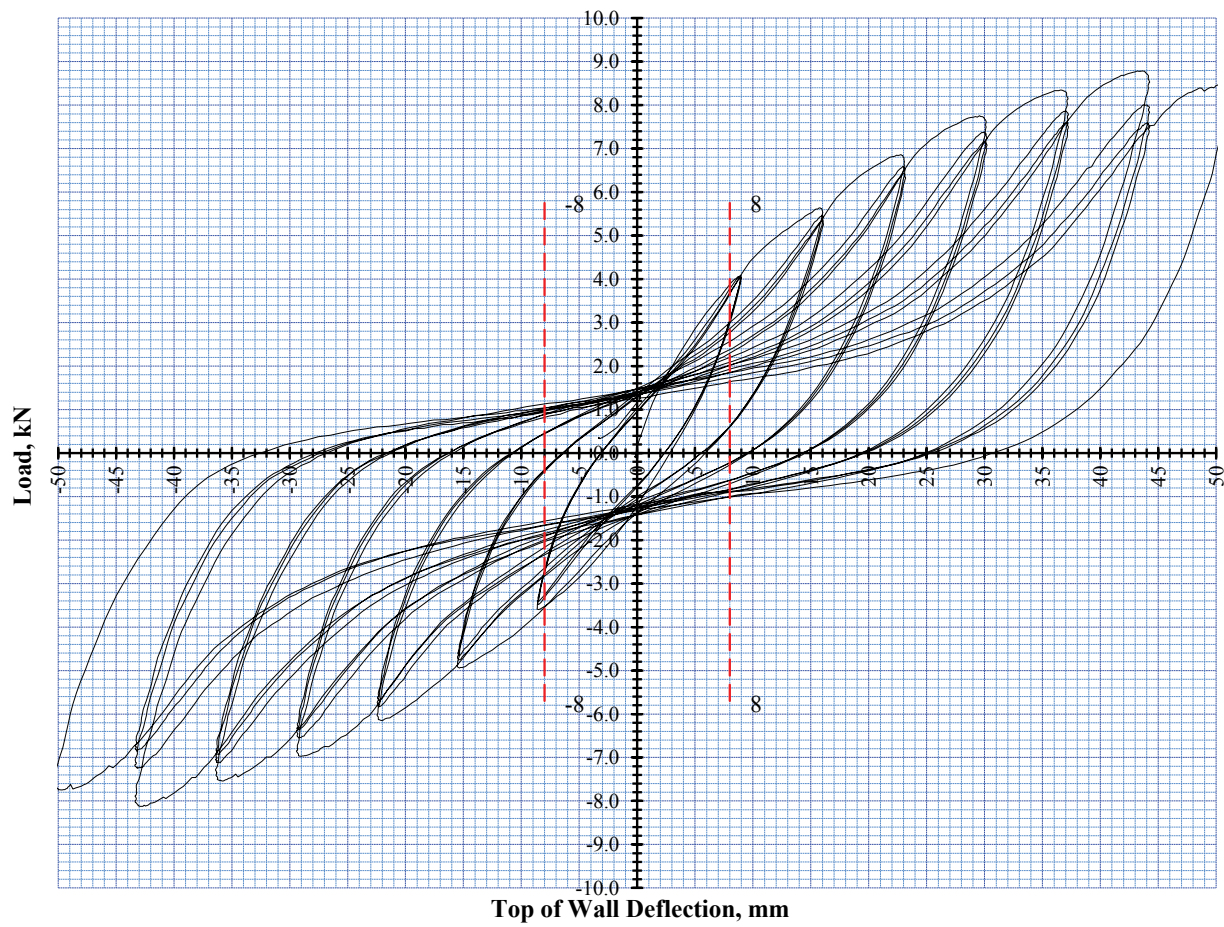


Figure 3: Wall 289132

AMENDMENT ISSUED BC230758.02 - 27/02/2024 - Page 84 of 96									Received 14/02/2024	
1200mm, bbi BlondeLine Birch Poplar Core Plywood 9mm one side										
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs										
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres to plates and external studs, 300mm to internal studs, 7mm min edge distances all around. GIB Handibracs used each end						Summary				
M12 hold down bolts to bottom plate & brackets						Earthquake	114 (U)	BU/m		
						Wind	102 (S)	BU/m		
P21 Supplementary restraints used										
Date of test:-		25-May-22	Ship No.	3251	Tested by		John Lee			
Date of calc's:-		25-May-22	Job No.	TE21-068	Analysed by		Doug Gaunt			
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.										
		Serviceability Cycles		Ultimate Cycles						
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement					Wall dimensions	
		8.0	X mm	y=(mm)					L(mm)	H(mm)
		Loads	Residual	Maximum					1200	2410
		(P ₈)	Defln, C	Load	def @ P				d at P/2	4th, R
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN		
289130	+	3.70	2.60	8.17	36.0	4.09	7.4	7.00		
	-	3.70	3.20	7.61	36.0			6.75		
289131	+	3.50	3.00	8.00	36.0	4.00	9.6	6.80		
	-	3.55	2.30	7.72	36.0			6.80		
289132	+	3.85	2.30	8.33	36.0	4.17	9.1	7.20		
	-	3.52	3.20	7.53	36.0			6.58		
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)		
Averages		3.64	2.77	7.89	36.00	4.08	8.70	6.86		
Coefficient of Variation %		3.43	13.95	3.73	0.00	1.65	10.82	2.87		
y = average failure deflection or peak deflection of the three tests.										
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)										
R = Residual load, P = Peak Load, S = Serviceability load										
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)					Systems factor K2 = 1.2					
Average Structural Displacement Ductility factor					u = y/d 4.14					
Ductility Modification factor					K4 = 1.00					
DLW = Selected deflection limit for wind forces				DLQ = Selected deflection limit for earthquake forces						
P21:2010 BR Calc's										
Lab Number		K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service				
		(= 1.4 - C/X)	BU's	BU's	BU's	BU's				
289130	(BU)	1.00	137.5	161.5	157.8	125.1				
	(BU/m)		115	135	132	104				
289131	(BU)	1.00	136.0	153.8	157.2	119.2				
	(BU/m)		113	128	131	99				
289132	(BU)	1.00	137.8	160.8	158.6	124.6				
	(BU/m)		115	134	132	104				
<20% Result Check		289130	0% Ok result	3% Ok result	0% Ok result	3% Ok result				
		289131	-1% Ok result	-5% Ok result	-1% Ok result	-5% Ok result				
		289132	1% Ok result	2% Ok result	1% Ok result	2% Ok result				
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.										
Average Earthquake BR		Ultimate				Serviceability				
EQ (BU's)	20 x K4 x Ry =	137	(P8 x K1) x (K2/0.55) =		159					
	114	BU/m	Limited by		Ultimate limit state					
Average Wind BR	Ultimate				Serviceability					
Wind (BU's)	20 * P =	158	(P8 x K1) x (K2/0.71) =		123					
	102	BU/m	Limited by		Serviceability limit state					

Figure 4: P21:2010 calculations for 1200mm x 2.40m bbi BlondeLine Birch Poplar Core Plywood 9mm one side wall

Please feel free to contact me to discuss this information.

Doug Gaunt

P21 Test Report

—

bbi® Blondeline®

**Birch Poplar Core Plywood
12mm 1200mm Wall, Brackets**



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Results

To:	Martin Wallace	From:	Doug Gaunt
Organisation:	bbi Wood Products	Subject:	P21:2010 bbi BlondeLine Birch Poplar Core Plywood 12mm 1200mm Wall, Brackets
Location:	Hastings	Date:	30 May 2022
Fax No.:	021 745783	No. of	5
Tel No.:	06 8715539	Pages:	

Martin

Please find below the P21 bracing results for your three 1200mm x 2.4m bbi BlondeLine Birch Poplar Core Plywood 12mm one side Walls with Brackets.

1. BU wind = 127 (106 BU/m) as limited by the serviceability load capacity.
2. BU Earthquake = 127 (106 BU/m) as limited by the ultimate load capacity.

Figures 1, 2 & 3 show the load deflection plots, Figure 4 shows the P21:2010 calculations.

Wall Construction

bbi BlondeLine Birch Poplar Core Plywood 12mm one side,
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs
Plywood fixed with 50x2.8mm Galv clouts at 150 centres to end studs and plates, 300mm centres on internal stud
GIB Handibracs brackets used
M12 hold down bolts to bottom plate and brackets
P21 Supplementary restraints used.

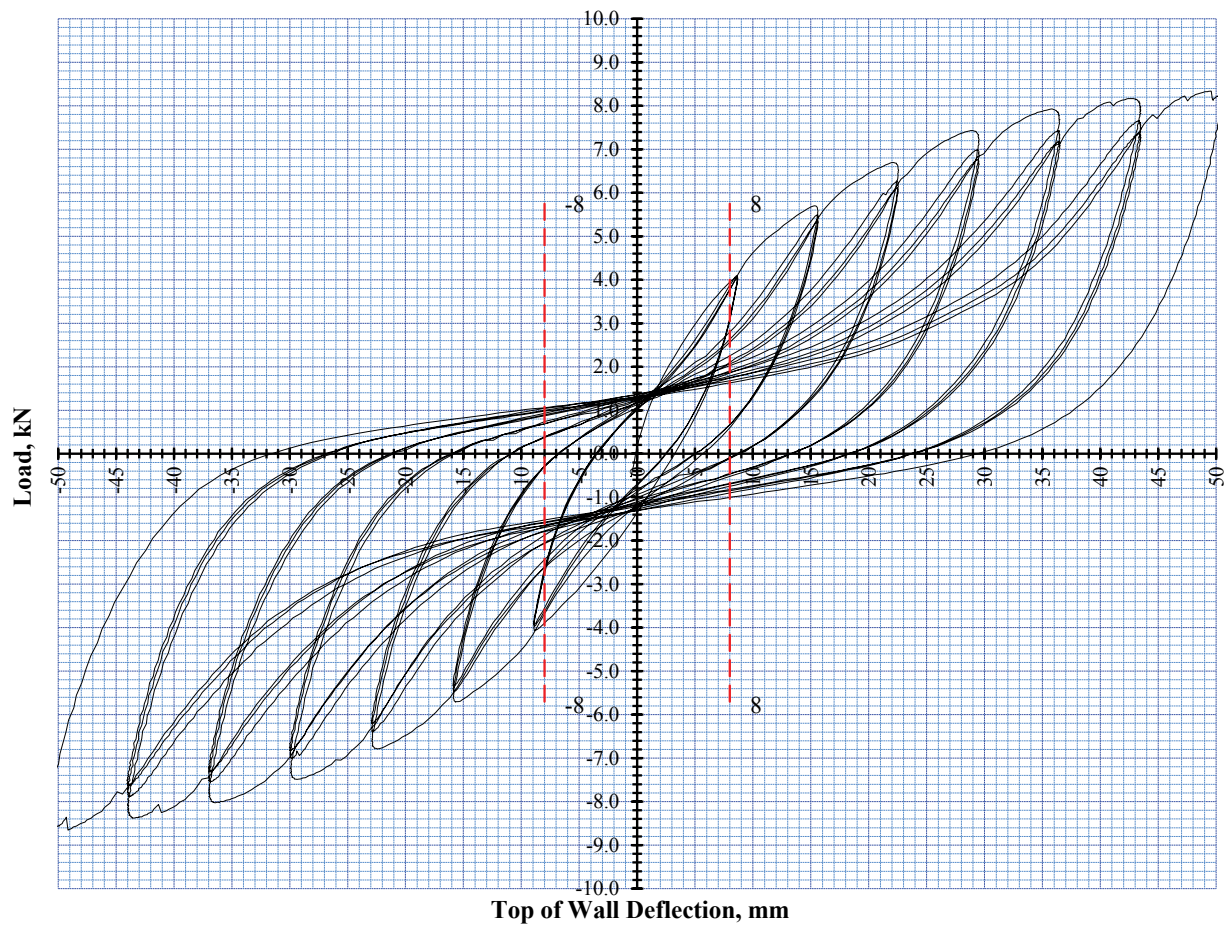
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Top of Wall Deflection, mm

Figure 1: Wall 289127

Observations

No obvious signs of failure to framing or plywood
Plywood pulling on bottom plate nails.

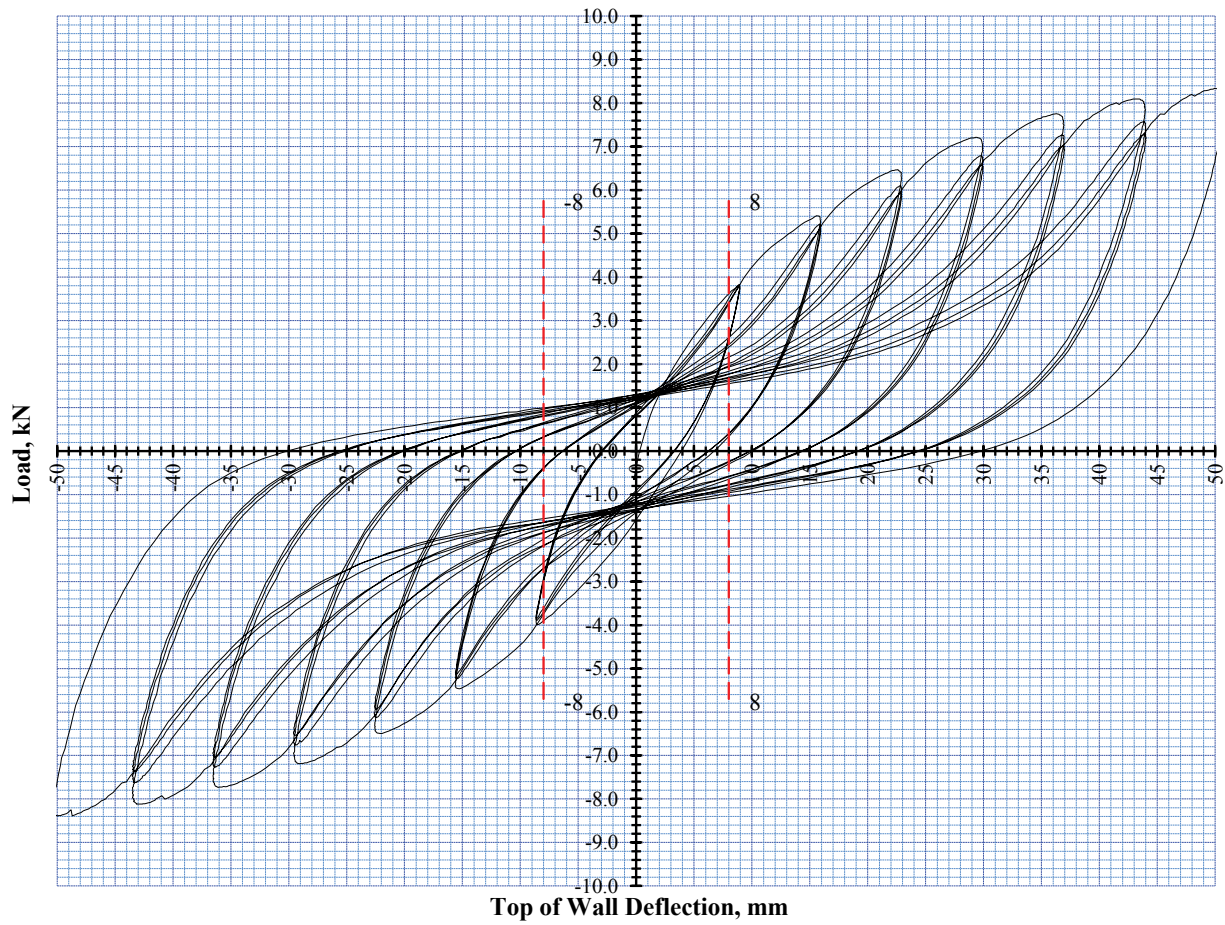


Figure 2: Wall 289128

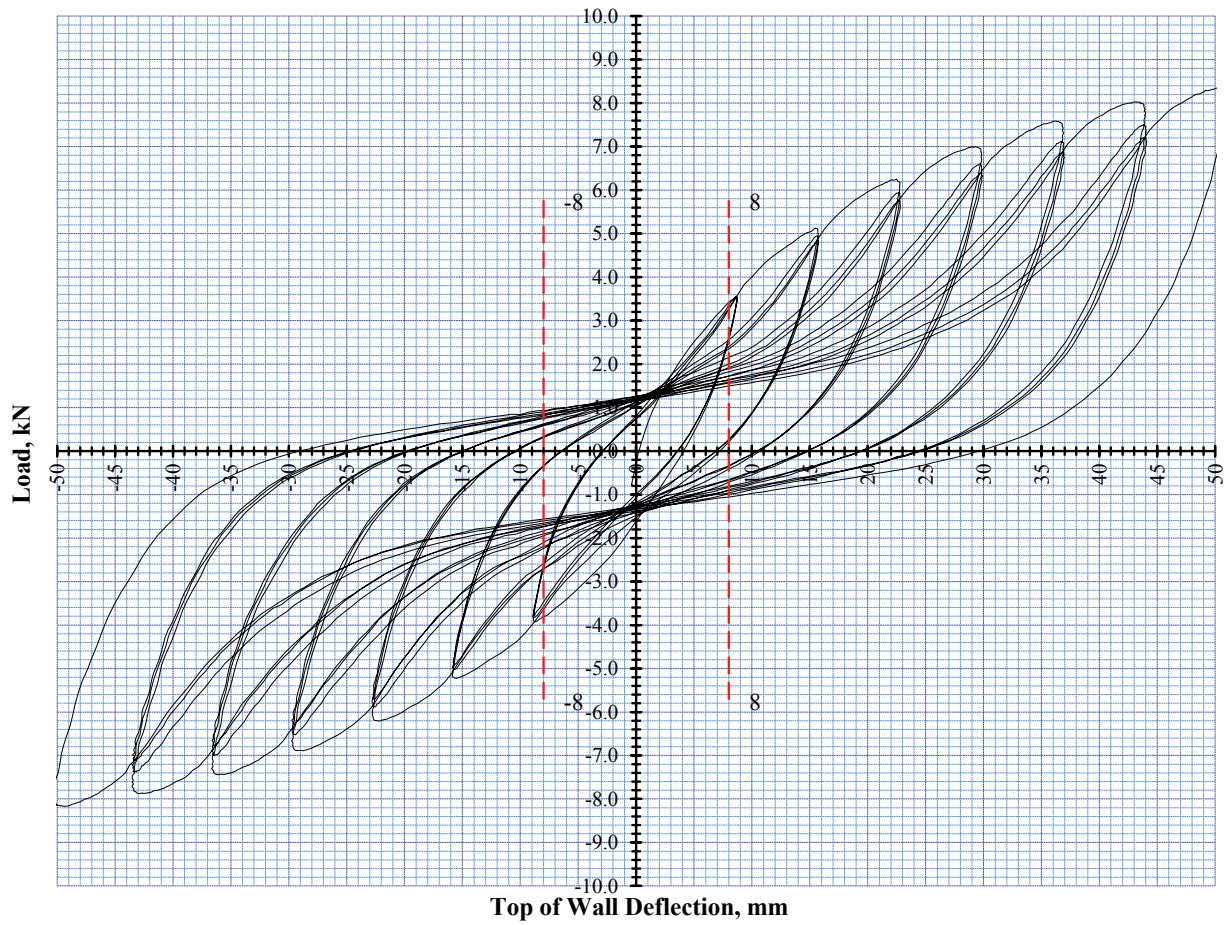


Figure 3: Wall 289129

AMENDMENT ISSUED BC230758.02 - 27/02/2024 - Page 90 of 96									
P21:2010 BRACING RACKING TEST RESULT EVALUATION									
Wall Construction									
1200mm, bbi BlondeLine Birch Poplar Core Plywood 12mm one side									
90x45 H1.2 SG8 framing, studs at 600mm centres, no nogs									
Plywood fixed 50mmx2.8mm Galv Steel Nails at 150mm centres							Summary		
to plates and external studs, 300mm to internal studs,							Earthquake	106 (U)	BU/m
7mm min edge distances all around. GIB Handibracs used each end							Wind	106 (S)	BU/m
M12 hold down bolts to bottom plate & brackets									
P21 Supplementary restraints used									
Date of test:-		25-May-22	Ship No.		3251	Tested by		John Lee	
Date of calc's:-		25-May-22	Job No.		TE21-068	Analysed by		Doug Gaunt	
Calculated to BRANZ P21:2010, AS/NZS1170.2&5, NZS3604:2011 Scion, Private Bag 3020 Rotorua.									
		Serviceability Cycles		Ultimate Cycles					
Lab Number	Direction	Cycle to H/300 or DLQ or DLW		Cycle to Displacement		Wall dimensions			
		8.0	X mm	y=(mm)		L(mm)		H(mm)	
		Loads	Residual	Maximum		1200		2410	
		(P ₈)	Defln, C	Load	def @ P	d at P/2		4th, R	
		kN	mm	P(kN)	y (mm)	P/2 (kN)	d mm	kN	
289127	+	3.92	2.40	7.90	36.0	3.95	8.2	7.05	
	-	3.90	3.50	8.00	36.0			7.05	
289128	+	3.62	3.30	7.75	36.0	3.88	12.2	6.70	
	-	3.88	3.00	7.72	36.0			6.96	
289129	+	3.52	3.00	7.55	36.0	3.78	8.7	6.80	
	-	3.75	3.30	7.45	36.0			6.80	
		(P ₈)	(C)	(P)	(y)	P/2 (kN)	(d)	(Ry)	
Averages		3.77	3.08	7.73	36.00	3.87	9.70	6.89	
Coefficient of Variation %		4.01	11.45	2.44	0.00	1.85	18.35	1.95	
y = average failure deflection or peak deflection of the three tests.									
d= average first cycle displacement at half peak, (the very first cycle wall reaches the load)									
R = Residual load, P = Peak Load, S = Serviceability load									
Displacement Recovery Factor (K1), (0.8 <= K1 <= 1.0)									
Systems factor K2 = 1.2									
Average Structural Displacement Ductility factor									
u = y/d 3.71									
Ductility Modification factor									
K4 = 0.92									
DLW = Selected deflection limit for wind forces									
DLQ = Selected deflection limit for earthquake forces									
P21:2010 BR Calc's									
Lab Number		K1	EQ ultimate	EQ service	Wind Ultimate	Wind Service			
		(= 1.4 - C/X)	BU's	BU's	BU's	BU's			
289127	(BU)	1.00	130.0	170.6	159.0	132.2			
	(BU/m)		108	142	133	110			
289128	(BU)	1.00	125.9	163.6	154.7	126.8			
	(BU/m)		105	136	129	106			
289129	(BU)	1.00	125.4	158.6	150.0	122.9			
	(BU/m)		104	132	125	102			
<20% Result Check		289127	3% Ok result	6% Ok result	4% Ok result	6% Ok result			
		289128	-1% Ok result	-1% Ok result	0% Ok result	-1% Ok result			
		289129	-2% Ok result	-5% Ok result	-5% Ok result	-5% Ok result			
Note: Where the value of BR Wind or BR EQ for any specimen is more than 20% greater than either of the other two specimens, assign it a value of 1.2 times the lower value before averaging.									
Average Earthquake BR									
EQ (BU's)		20 x K4 x Ry =	Ultimate			Serviceability			
		106	BU/m	(P8 x K1) x (K2/0.55) =		164			
			Ultimate			Limited by	Ultimate limit state		
Average Wind BR							Serviceability		
Wind (BU's)		20 * P =	155	(P8 x K1) x (K2/0.71) =		127			
		106	BU/m			Limited by	Serviceability limit state		

Figure 4: P21:2010 calculations for 1200mm x 2.40m bbi BlondeLine Birch Poplar Core Plywood 12mm one side wall

Please feel free to contact me to discuss this information.

Doug Gaunt

100%

Endless possibilities.

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Section 4

H1 Calculations

Risk Matrix

Section 5

Specifications

Section 6

Technical Information

- **Septic Tank & Effluent Design incl. fencing**
- **ECan Approval Documents**
- **Gas Fire**
- **Heating Unit**
- **Solar Panels**
- **Central Heating Systems**
- **Manufacturer's Literature**
- **A4 Details/Acceptable Solution Extract**
- **Well/Water Test**