



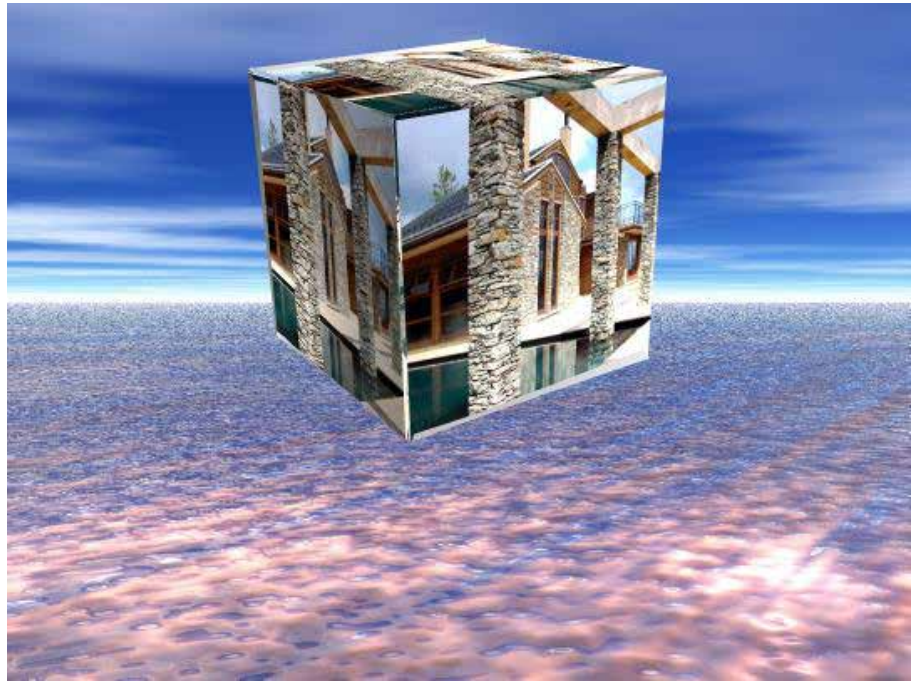
BRANZ Appraised

Appraisal No. 508 [2015]

THE HYDESTONE® SCHIST WALL CLADDING SYSTEM

Appraisal No. 508 (2015)

This Appraisal replaces BRANZ
Appraisal No. 508 [2006]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 The Hydestone® Schist Wall Cladding System consists of Hyde Brown or Hyde Grey schist stone, installed over a vented 40 mm wet cavity system. It can be installed on residential and light commercial buildings where domestic construction techniques are used.

Scope

- 2.1 The Hydestone® Schist Wall Cladding System has been appraised for use as a veneer wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 in terms of floor area; and,
 - with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Section 9.2; and,
 - with slab on ground and foundation walls constructed in accordance with NZS 3604 and as modified in the Technical Literature; and,
 - constructed with timber framing complying with the NZBC; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.
- 2.2 The Hydestone® Schist Wall Cladding System must only be installed on vertical surfaces.
- 2.3 The Hydestone® Schist Wall Cladding System is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills.
[The Appraisal of The Hydestone® Schist Wall Cladding system relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone.]
- 2.4 The Hydestone® Schist Wall Cladding System must only be installed by Stonemasons approved by Hydestone Limited as documented in the Technical Literature.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, The Hydestone® Schist Wall Cladding System, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. The Hydestone® Schist Wall Cladding System meets the requirements for loads arising from self-weight, earthquake, wind, impact and creep and shrinkage [i.e. B1.3.3 (a), (f), (h), (j) and (q)]. See Paragraphs 9.1 - 9.7.

Clause B2 DURABILITY: Performance B2.3.1 (a), not less than 50 years. The structural support elements and hidden flashings meet this requirement. Performance B2.3.1 (b), 15 years. The veneer wall cladding meets this requirement. See Paragraphs 10.1 - 10.3.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Hydestone® Schist Wall Cladding System meets this requirement. See Paragraphs 14.1 - 14.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Hydestone® Schist Wall Cladding System meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 System components and accessories supplied by Hydestone Limited are:

- Schist Stone - quarried stone is supplied pre-dressed to a maximum depth of 150 mm front to back and is available in two grades being Hyde Brown and Hyde Grey. The stone is supplied stacked on a wooden pallet weighing approximately 1 tonne. The stone varies in thickness and length and can be laid in various styles with the mortar being visibly raked or recessed. One tonne of dressed stone will cover approximately 5 m².
- Cavity Battens - nominal 45 x 40 mm minimum [45 x 70 mm maximum] timber treated to Hazard Class H3.2. The battens are grooved with 20 mm wide by 15 mm deep grooves at maximum 150 mm centres along the length of the batten to provide free air movement within the cavity.

4.2 Accessories used with the Hydestone® Schist Wall Cladding System which are supplied by the Stonemason are:

- Mortar - composed of Portland cement, sand, hydrated lime and water complying with NZS 4210, Section 2.2.
- Masonry Ties and Fixings - Eagle Wire 135 mm "King Ties" manufactured in accordance with AS/NZS 2699.1. Fixings are 14g x 35 mm long Tek screws. Ties and fixings are either hot-dipped galvanised or grade 316 stainless steel to meet the durability requirements of NZBC Acceptable Solution E2/AS1 Table 18C.
- Steel lintels - complying with NZBC Acceptable Solution E2/AS1 Paragraph 9.2.9 and the Technical Literature.
- Fibre cement sheet and fixings - 4.5 mm thick fibre cement sheet manufactured in accordance with AS/NZS 2908.2 with fixings of 40 x 2.8 mm hot-dipped galvanised flat-head fibre cement nails.
- Cavity batten fixings - 100 x 4.0 mm hot-dipped galvanised flat-head nails for attaching the batten to the bottom plate and 100 x 4.0 mm bright steel nails **for temporary nailing of the batten to the top plate/blocking.**
- Damp proof course [to separate the cavity batten from timber framing members] - 50 mm wide damp proof course complying with NZBC Acceptable Solution E2/AS1 Paragraph 9.2.4 c), or a damp proof course covered by a valid BRANZ Appraisal.
- First course waterproof membrane [to stepped concrete slab edge rebate] - bituminous, liquid-applied damp-proof membrane complying with NZBC Acceptable Solution E2/AS1 Paragraph 9.2.5 4) a) i), or waterproof membranes covered by a valid BRANZ Appraisal.

- 4.3 Accessories used with The Hydestone® Schist Wall Cladding system which are supplied by the building contractor are:
- Flexible wall underlay - building paper complying with NZBC Acceptable Solution E2/AS1, Table 23 or breather-type wall underlay covered by a valid BRANZ Appraisal for use as a wall underlay.
 - Flexible wall underlay support - polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible wall underlay in place and preventing bulging of the bulk insulation into the drainage cavity. *[Note: mesh and wire galvanising must comply with AS/NZS 4534.]*
 - Rigid wall underlay - Plywood or fibre cement sheet complying with NZBC Acceptable Solution E2/AS1 Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid wall underlay systems.
 - Flexible sill and jamb tapes - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
 - Window and door trim cavity air seals - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6 or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal for use around window and door penetration openings.
 - Flexible sealant - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.
 - Aluminium joinery head flashings - as supplied by the joinery manufacturer or contractor.

Handling and Storage

- 5.1 Hydestone® Schist is packaged and delivered on pallets. The stone must be handled with care to avoid physical damage, and must be stored so that they are protected from dust and contamination.
- 5.2 Components such as masonry ties and lintels must be handled so as to avoid damage. They must also be stored in dry locations protected from the weather.
- 5.3 Handling and storage of all materials supplied by the building contractor, whether on or off site, are under the control of the building contractor. Materials must be handled and stored in accordance with the relevant manufacturer's instructions.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for The Hydestone® Schist Wall Cladding System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 The Hydestone® Schist Wall Cladding System consists of Hyde Brown or Hyde Grey schist stone laid and mortared in arranged patterns against a fibre cement sheet, which is used as a permanent former. Masonry ties penetrate through the fibre cement sheet and are fixed into the studs.
- 7.2 The vented wall cavity construction consists of 45 mm wide by 40 or 70 mm deep grooved battens with DPC attached to the rear of the batten where the batten contacts the top and bottom plates and dwang timbers. The batten installation is designed to allow for seismic movement. The battens must be offset 100 mm from the external framing studs to allow for movement between the stone cladding and the external wall framing.
- 7.3 Building designers incorporating The Hydestone® Schist Cladding System into their design must ensure that the design information contained within the Technical Literature is adhered to.
- 7.4 Where the building designer has the requirement for vertical expansion joints, these must comply with NZBC Acceptable Solution E2/AS1 Paragraph 9.2.8.2.

- 7.5 Drainage and ventilation openings through the perpend at the base of the wall must provide a ventilation opening area of 1000 mm² per lineal metre of wall in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.2.6 c]. The cavity must be ventilated to the outside at the top of walls in accordance with NZBC Acceptable Solution, Paragraph 9.2.6 d].
- 7.6 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level, paved surfaces, such as footpaths, must be kept clear of the bottom edge of the cladding system by a minimum of 50 mm, and unpaved surfaces by 100 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Table 18.
- 7.7 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for Wind Zones up to and including Very High, and rigid underlays for buildings in the Extra High Wind Zone. Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the masonry tie fixing length must be increased by a minimum of the thickness of the underlay.
- 7.8 Where the system abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Framing

Timber Framing Treatment

- 8.1 Timber wall framing behind The Hydestone® Schist Wall Cladding System must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

- 8.2 Due to the mass of the Hydestone® Schist wall cladding system, the studs will be required to resist greater inertia face loads in an earthquake. These loads are greater than allowed for by NZS 3604. To allow for this additional loading, studs must be sized from NZS 3604 Stud Tables using the greater of the actual Wind Zone or the Wind Zone given in Table 1.

Table 1: Equivalent Wind Zone

Soil Class	Earthquake Zone (NZS 3604)			
	1	2	3	4
A or B	Low	Low	Medium	High
C	Low	Medium	High	Very High
D	Low	High	Very High	Extra High
E	Low	High	Very High	Extra High

Structure

Mass

- 9.1 For structural design purposes, Hydestone® Schist has a mass of approximately 360 kg/m² as a total system including mortar. The total system ranges between 220 kg/m² and 360 kg/m².

Impact Resistance

- 9.2 The Hydestone® Schist Wall Cladding System has good resistance to impact loads likely to be encountered in normal residential use. Some chipping of the finish could occur with hard impacts.

Wind Zones

- 9.3 The Hydestone® Schist Wall Cladding System is suitable for use in all Wind Zones of NZS 3604, up to, and including Extra High. A rigid wall underlay is to be used in the Extra High Wind Zone.

Foundations

9.4 Foundation systems supporting the schist veneer must be designed and constructed in accordance with NZS 3604 and the Technical Literature to cater for the total veneer system mass.

Masonry Ties

9.5 The mass of the veneer system results in maximum spacings for the masonry tie. Ties must be fixed to the wall framing at maximum centres as specified in Table 2.

Table 2: Maximum Masonry Tie Spacing

Earthquake Zone (NZS 3604)	Maximum Hydestone® Schist Veneer Mass			
	220 kg/m ²		360 kg/m ²	
	Horizontal	Vertical	Horizontal	Vertical
1			600 mm	400 mm
1, 2, 3	600 mm	400 mm	400 mm	400 mm
1, 2, 3			600 mm	300 mm
4	600 mm	300 mm	600 mm	180 mm
4	400 mm	400 mm	400 mm	280 mm

Wall Bracing Requirements

9.6 The mass of the veneer system results in a greater wall bracing demand. A minimum bracing demand of 15 bracing units/m is required. The Bracing Demand Table in Appendix A of the Technical Literature must be used for calculating the bracing demand requirements.

Steel Lintel Angles

9.7 Lintel angle sizes and support details must be taken from NZBC Acceptable Solution E2/AS1, Table 18E and be modified as required by the Technical Literature.

Durability

10.1 Assessment of durability to meet the NZBC is based on difficulty of access and replacement, and the ability to detect failure of The Hydestone® Schist Wall Cladding System both during normal use and maintenance of the building.

10.2 Masonry ties, fixings and lintels must meet the durability requirements of NZBC Acceptable Solution E2/AS1 Paragraphs 9.2.7 and 9.2.9.

Serviceable Life

10.3 The Hydestone® Schist Wall Cladding System will have a serviceable life of at least the life of the building and in excess of 50 years.

Maintenance

11.1 An inspection of The Hydestone® Schist Wall Cladding System must be carried out at least annually. Weep holes must be kept clear of dust, dirt, spider webs and the like to ensure that moisture can continue to drain from the cavity. Any cracks that develop in the mortar or stone must be investigated [this may require a structural engineer's assessment].

Prevention of Fire Occurring

12.1 The Hydestone® Schist Wall Cladding System is considered a non-combustible material and need not be separated from heat sources such as fire places, heating appliances, flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the requirements of Part 7 of NZBC Acceptable Solutions C/AS1 - C/AS6 and NZBC Verification Method C/VM1.

Control of External Fire Spread

- 13.1 The Hydestone® Schist Wall Cladding System is a non-combustible material and hence the exterior surface finish requirements of NZBC Acceptable Solutions C/AS1 Paragraph 5.4 and C/AS2 - C/AS6 Paragraph 5.8.1 do not apply in accordance with NZBC Acceptable Solutions C/AS1 Paragraph 5.4 and C/AS2 - C/AS6 Paragraph 5.8.2 a).

External Moisture

- 14.1 The Hydestone® Schist Wall Cladding System, when installed in accordance with this Appraisal and the Technical Literature, prevents the penetration of moisture that could cause undue dampness or damage to building elements.
- 14.2 The cavity must be sealed off from the roof and sub-floor space to meet code compliance with NZBC Clause E2.3.5.
- 14.3 The Hydestone® Schist Wall Cladding System allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet compliance with NZBC Clause E2.3.6.
- 14.4 Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

Installation Information

Installation Skill Level Requirements

- 15.1 Installation of components and accessories supplied by Hydestone Limited must be installed by Stonemasons approved by Hydestone Limited.
- 15.2 Installation of accessories supplied by the building contractor must be completed by, or under the supervision of, a Licensed Building Practitioner with the relevant license class in accordance with the instructions given within this Appraisal and the Technical Literature.

The Hydestone® Schist Wall Cladding System Installation

- 16.1 This section must be read in conjunction with the Technical Literature. All framing and foundation requirements must be met prior to the installation of the cladding system.

Wall Underlay and Flexible Sill and Jamb Tape Installation

- 16.2 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of The Hydestone® Schist Wall Cladding System. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid wall underlays must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems must be installed in accordance with the manufacturer's instructions. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.
- 16.3 Where studs are at greater than 450 mm centres and a flexible wall underlay is being used, a wall underlay support must be installed over the underlay at maximum 300 mm centres horizontally.

Aluminium Joinery Installation

- 16.4 The aluminium joinery and associated head flashings must be installed in accordance with the window manufacturer's instructions. A 7.5 - 10 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

Hydestone® Schist System

- 16.5 The 45 x 40 mm minimum [45 mm x 70 mm maximum] cavity battens are installed after the wall underlay has been secured to the framing. A 50 mm wide DPC must be nailed to the batten where the batten contacts the wall framing. The battens are to be fixed in accordance with the Technical Literature.
- 16.6 The fibre cement sheet can be installed horizontally or vertically and must be fixed at 150 mm centres to the battens. The fibre cement sheet does not require any additional moisture protection as the sheet acts as a 'former' only.
- 16.7 The stud centre lines must be clearly marked to allow for the accurate positioning and cutting of the holes required to enable the installation of the masonry ties back onto the wall framing studs. The masonry ties are installed in accordance with the Technical Literature.
- 16.8 The installation of the schist stone must be carried out by a Hydestone Limited approved Stonemason. All masonry construction methods and techniques must comply with NZS 4210.
- 16.9 During the construction of the schist stone wall, it is important that all residual mortar is cleaned from the masonry ties and removed from the wet wall cavity. Removal of any surplus material out from the cavity weepholes can be achieved by raking out with a fabricated wire scraper.
- 16.10 The lintels and flashings must be installed in accordance with the Technical Literature.

Inspections

- 16.11 The Hydestone® Schist Wall Cladding System incorporates a batten fixing method which allows the masonry ties to perform their function and accommodate lateral movement during an earthquake. The Technical Literature must be referred to during the inspection of The Hydestone® Schist Wall Cladding System installations.

Health and Safety

- 17.1 Hearing, eye and foot protection must be worn while installing the Hydestone® Schist Wall Cladding System.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 18.1 The following testing has been completed by BRANZ:
- Durability testing of The Hydestone® Schist Wall Cladding System to AS/NZS 4456.10.
 - Masonry tie testing for ties used in The Hydestone® Schist Wall Cladding System to AS/NZS 2699.1.

Other Investigations

- 19.1 BRANZ expert opinion on NZBC E2 code compliance for The Hydestone® Schist Wall Cladding System was based on design and evaluation of all details within the scope and as stated within this Appraisal. The details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the expected performance requirements of NZBC Clause E2, External Moisture.
- 19.2 Durability and structural opinions have been provided by BRANZ technical experts.
- 19.3 Site inspections were carried out to examine the practicability of installation.
- 19.4 The Technical Literature for The Hydestone® Schist Wall Cladding System has been reviewed by BRANZ and found to be satisfactory.

Quality

- 20.1 The manufacturing process of The Hydestone® Schist Wall Cladding System has been examined by BRANZ, and the details of the quality and composition of the materials used were obtained and found to be satisfactory.
- 20.2 The quality of materials, components and accessories supplied by Hydestone Limited is the responsibility of Hydestone Limited.
- 20.3 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, wall underlay, flashing tapes, airseals and joinery head and jamb flashings in accordance with the instructions of Hydestone Limited.
- 20.4 Hydestone Limited approved Stonemasons are responsible for the installation of the cladding system.
- 20.5 The quality of installation, handling and storage on site is the responsibility of the installer.
- 20.6 Building owners are responsible for the maintenance of the Hydestone® Schist Wall Cladding System in accordance with the instructions of Hydestone Limited.

Sources of Information

- AS/NZS 2699.1:2000 Built-in components for masonry construction - Wall ties.
- AS/NZS 2699.3:2002 Built-in components for masonry construction - Lintels and shelf angles (durability requirements).
- AS/NZS 4456.10:1997 Masonry units and segmental pavers - Method of test - Determining resistance to salt attack.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4210:2001 Masonry construction: Materials and workmanship.
- NZS 4211: 2008 Specification for performance of windows.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 (Amendment 6, 14 February 2014).
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.



In the opinion of BRANZ, **The Hydestone® Schist Wall Cladding System** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Hydestone Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Hydestone Limited**:
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions.
 - d) Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Hydestone Limited**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Hydestone Limited** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

Date of Issue:

31 July 2015