BEAL Appraisal Certificate

APPRAISAL #C1472

EXPIRY DATE: 30 April 2024

ALPINE STONE Veneer Cladding System

Product

1.1 The ALPINE STONE veneer cladding system (ASVCS) uses a fibre-cement board as the cladding substrate onto which is adhered a manufactured stone veneer, including inter-locking corner pieces, to provide an attractive stone finish for application to residential, and light commercial buildings. Alpine Stone is a manufactured masonry product.

1.2 The ASVCS utilises manufactured stone veneer ranging in weight from 50kg/m² to 70kg/m² with an average thickness of 50mm.

1.3 The cladding 'substrate sheet' is either BGC 7.5 mm or 9mm thick Stonesheet™ or 9mm thick Sumner Board, which is fixed on to the building structure over mechanically fixed timber cavity battens. The nominal 45mm x 20mm H3.2 battens are fixed over a 'frame protection system' (building wrap system) complying the performance requirements of the NZBC to timber framing complying with NZS3604 or over light-gauge steel framing complying with NASH 3405.

1.4 The substrate sheet is fixed over battens to the framing by way of 10g x 65mm stainless steel screws at 150mm centres applied around the perimeter and centre of the board. In order to ensure the board meets the durability requirements, the board is primed on the face using a proprietary sealer. To prevent the ingress of moisture at vertical and horizontal junctions, Render Tape is used, and for inter-storey junctions, the tape is used in place of h or z flashings.

1.5 In certain circumstances described in the technical manual, ALPINE STONE veneer pieces are provided additional support by way of stainless steel angle brackets that are fixed to the substrate sheet by way of 8g x 65mm stainless steel screws.

NZ Building Regulations

2.1 In the opinion of BEAL, the ASVCS, if designed, installed and maintained in accordance with the statements and conditions of this Appraisal Certificate, will meet the following provisions of the New Zealand Building Code (NZBC):

2.2 Clause B1 STRUCTURE

Performance B1.3.1 and B1.3.3.(a), (f), (h), (j) and (q). The ASVCS meets these requirements for loads arising from self weight, earthquake, wind, impact and creep. See paragraphs 10.1 - 10.3.

Applicant:

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2.3 Clause B2 DURABILTY

Performance B2.3.1 (a) & (b), at least 50 or 15 years and B2.3.2. The ASVCS meets these requirements. See paragraphs 11.1-11.5.

2.4 Clause E2 EXTERNAL MOISTURE

Performance E2.3.2. The ASVCS meets this requirement. See paragraph 12.1 - 12.6.

2.5 Clause F2 HAZARDOUS BUILDING MATERIALS

Performance F2.3.1. The ASVCS meets this requirement and is not a health hazard to people.

2.6 The ASVCS has been appraised as an **Alternative Solution** in terms of New Zealand Building Code Compliance.

Scope and Limitations

3.1 The ASVCS has been appraised for use as an external rainscreen (wall cladding system) for buildings within the following scope:

Scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,

Constructed with timber framing complying with NZS 3604:2011; and or,

Constructed with steel framing complying with NASH Standard for Residential and Low-rise Steel Framing Parts 1 and 2; and,

Can be situated in up to and including 'Extra High' wind zones as described in NZS 3604:2011 Timber-framed Buildings.

3.2 The ASVCS must only be installed on vertical surfaces in accordance with the ALPINE Stone Technical Manual v2.1 (dated May 2018).

3.3 The system is appraised for use with aluminum window and door joinery that is installed with vertical jambs and horizontal heads and sills. (The Appraisal of the ASVCS relies on joinery meeting the requirements of NZS 4211 for the relevant building wind zone or to a specific design by suitably qualified persons).

Technical Literature

4.1 Refer to the ASVCS Technical Manual v2.1 (dated May 2018). The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the Technical Literature and scope of this Appraisal Certificate must be followed .

4.2 For a copy of this Technical Literature and any subsequent updates please refer to: www.alpinestone.co.nz

Technical Details

5.1 System components and accessories covered by the technical manual includes:

BGC Stonesheet™ or Sumner Board substrates

Both substrate sheets are fibre-cement type sheets of varying sizes and thicknesses of both 7.5 and 9 mm. The method of installation incorporating the use of Render Tape at all vertical and horizontal joints, is covered in BEAL Appraisal C807.

Cavity Battens

- Timber cavity battens shall be H3.2, 40mm x 20mm. CaviBat Cavity Battens, if used, are manufactured from extruded polypropylene. The battens are cut after extruding to a finished size of approximately
- 45 mm wide by 18 mm thick. The battens are supplied in 1200 mm long lengths . The battens are 45mm wide by 20mm to 50mm thick and are supplied in 250mm minimum lengths or full length battens can be used.

Fasteners

- For timber framed construction – 10g x 65mm Stainless Steel 316 screws with M6 x 19mm x 1.6mm washers compliant with AS3566.2 at 150mm spacings.
- For steel framed construction – 10g x 50mm Stainless Steel 316 screws with M6 x 19mm x 1.6mm washers compliant with AS3566.2 at 150mm spacings.

Adhesive Mortar Sealer

- A proprietary adhesive polymer is mixed with supplied trade mortar to a smooth consistency; typically equal parts polymer concentrate and mortar by volume and adjusted as applied to suit.

Adhesive Mortar

- This is a two-part adhesive system with water resistant properties. This material is a liquid latex adhesive polymer mixed with clean water and added to the supplied bagged trade mortar.

ALPINE STONE Veneer

- The manufactured stone veneer ranges in weight from 50kg/m² to 70kg/m² with an average thickness of 50mm.

5.2 Accessories required as part of the ASVCS include:

- A Frame Protection System incorporating building wrap (underlay), complying with the performance requirements of the NZBC, self-adhesive boots to seal all pipe penetrations to the wrap, and self-adhesive tape suited to seal all overlaps and edges of the wrap, that prevents any ingress of moisture or wind.
- Bottom cavity closer or Vents
- Proprietary pipe seals or flashing tape for sealing around pipes and all penetrations to the BGC Stonesheet™ or Sumner Board.
- The Redway Sill Tray system for use under windows.

5.3 Components supplied by the owner or main con tractor are:

- Window head, jamb and sill flashings complying with the performance requirements of the NZBC, installed in accordance with the manufacturer's instructions. Additional components are specified in the Alpine Stone Technical Manual.
- Handling and Storage

5.4 Handling and storage of all the materials supplied by ALPINE Stone or the licensed contractor, both on and off site are under the control of ALPINE Stone trained and approved contractors.

5.5 Dry storage must be provided on site for the Substrate sheet and Adhesive Mortar and these must be protected from physical damage. CaviBat battens if used, must be protected from direct sunlight, physical damage and stored flat and

under cover. All liquid components shall be stored in dry, frost free conditions.

5.6 Handling of the substrate sheets requires care to prevent damage to corners or excessive flexing.

5.7 Handling and storage of all the materials supplied by the building contractor, both on and off site is the responsibility of the building contractor. Materials must be handled and stored in accordance with the manufacturer's instructions.

Advice for Designers

Framing

Timber Framing

6.1 Timber used in timber framing shall be treated as required by NZS 3602.

6.2 Timber framing must comply with NZS 3604:2011 for both buildings or parts of buildings within the scope and limitations of NZS 3604. Where buildings or parts of buildings are outside the scope of NZS 3604 then they must be to specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least the equivalent stiffness to the framing provisions of NZS 3604. In all cases, studs must be at a maximum of 600mm centres.

6.3 Timber framing must have a maximum moisture content of 18% at the time of cladding application. *(Problems could arise later on due to timber shrinkage if over 18%)*

Steel Framing

6.4 Steel framing must be to a specific design meeting the requirements of the NZBC and NASH Standard for Residential and Low-rise Steel Framing Parts 1 and 2.

6.5 The minimum steel framing specification is 'C' section studs and nogs of overall section dimensions of 76mm web by 40mm flange. Steel thickness must be a minimum of 0.55mm.

6.6 For steel framed buildings situated within NZS3604 defined wind zones up to and including 'Extra High', studs must be at maximum 600mm centres. Dwangs must be fitted flush with the stud.

Substrate sheet layout

6.7 The substrate sheets are installed vertically, supported at fixing locations with vertical and horizontal cavity battens. See technical drawing details supplied with the ALPINE STONE Technical Manual v2.1 (dated May, 2018).

General

6.8 Punchings in the slotted vermin control cavity closer must provide a minimum ventilation opening area of 1000mm² per lineal metre of wall as per the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.8.3 (b).

6.9 The ground clearance between the finished floor level and ground level as outlined in NZS 3604 must be adhered to at all times. At ground level, paved surfaces must be kept clear from the bottom edge of the ASVCS by a minimum of 100mm, and unpaved surfaces by 175mm.

6.10 At balcony, deck or roof to wall junctions , the bottom edge of the ASVCS must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35mm.

6.11 Where the ASVCS abuts other cladding systems, designers must detail the junction to meet their own requirements whilst meeting performance requirements of the NZBC. The Technical Literature includes detail drawings for common junctions. Details not included within the Technical Literature have not been assessed and are therefore outside the scope of this Appraisal.

Control Joints

6.12 Control joints where the substrate sheets are used must be constructed in accordance with the Technical Literature and as follows;

Horizontal control joints - To be installed when intermediate timber floor joists are not seasoned and/or when the height of the wall exceeds 5.6m.

Vertical Control Joints - at maximum 5.4m centres or 6m if wall finishes on an external corner; aligned with any control joint within the structural framing, or where the system abuts other cladding systems.

(Note: Where possible control joints shall be located in line with window and door openings. Horizontal and vertical control joints must be located over structural supports. The Technical Literature provides some guidance for the design of vertical control joints where the system abuts different cladding types. Details not included within the technical literature or those that are marked as 'Specific Design Only' are outside the scope of this Appraisal Certificate and are the responsibility of the designer.)

Structure - Clause B1

Mass

6.13 The ASVCS (stone veneer cladding system') has an approximate mass of 50 to 70kg/m², which ranges from a "medium" to "heavy" cladding in terms of NZS 3604.

Impact Resistance

6.14 The system has adequate resistance to impact loads that the cladding system is likely to be subjected to when used in a residential situation. The likelihood of impact damage to the system when used in light commercial situations should be considered at the design stage, with appropriate protection provided such as bollards or barriers where necessary.

Wind Zone

6.15 The ASVCS is suitable for use in all building wind zones as per NZS 3604, up to, and including 'Extra High'.

Durability– Clause B2

6.16 The ASVCS when used in accordance with this Appraisal Certificate and subjected to normal conditions of environment and use will meet the performance requirements of NZBC *B2.3.1 (a),* at least 50 years for the frame protection system, cavity battens and fixings, and B2.3.1 (b), 15 years for the decorative cladding - the fibre cement sheet and stone veneer.

Maintenance

6.17 Regular maintenance is essential to ensure the performance requirements of the NZBC are met and to ensure the maximum serviceability of the ASVCS .

6.18 Periodic cleaning of the cladding system is required to remove grime, dirt and organic growth as per the Technical Literature in order to maximize the life and appearance of the stones and adhesive.

6.19 Any cracks, damaged areas or areas showing signs of deterioration that could allow water ingress, must be repaired immediately. The ASVCS must be maintained and repaired in accordance with the instructions from ALPINE STONE.

6.20 Minimum ground clearance as set out in this Appraisal and Technical Literature must be maintained at all times during the life of the system to maintain the durability and weathertightness of the system.

External Moisture - Clause E2

6.21 When installed in accordance with this Appraisal Certificate and Technical Literature, the ASVCS will prevent the penetration of water that could cause undue dampness and/or damage to building elements and will therefore comply with clause E2.3.2.

6.22 The cavity must be sealed off from the roof and subfloor space in order to meet the performance requirement of E2.3.5.

6.23 The ASVCS allows excess moisture present at the completion of construction to be dissipated without causing permanent damage to the building elements to meet the performance requirement of Clause E2.3.6.

6.24 The details provided within the Technical Literature for weather resistance incorporating a Frame Protection System are based on the design principle of employing 3 lines of defence against moisture entry for joints, penetrations and junctions. Moisture ingress must be prevented by detailing any joinery or wall junctions as shown in the detail drawings provided in the ASVCS Technical Manual. Any other weathertightness details developed by a designer are outside the scope of this Appraisal Certificate and are the responsibility of the designer

6.25 The presence of a drained cavity does not reduce the requirement to ensure the cladding wall and all the relevant junctions, penetrations etc remain weather resistant in order to comply with Clause E2.3.6.

6.26 When the ASVCS is installed over a steel frame, 10mm extruded polystyrene thermal break sheeting with a R value of at least 0.3, must be installed over the steel frame (stud, nog, top and bottom plate) to provide an effective thermal break. Building wrap (underlay) is then typically dressed over the top of the thermal break followed by the installation of the cavity battens.

Installation Requirements

Installation Skill Level Requirement

7.1 Installation and finishing of the components and accessories supplied by ALPINE STONE and the approved contractors must be completed by trained installers/applicators, approved by ALPINE STONE.

7.2 Installation of the accessories supplied by the be secured in place.

System Installation

7.3 The selected frame protection system (Building Wrap and accessories) must be installed by a contractor in accordance with the manufacturer's instructions, prior to the installation of the cavity battens and the ASVCS.

7.4 Note all laps and outer edges of the wall wrap shall be taped to prevent the ingress of wind. All penetrations shall be sealed with proprietary gaskets suited to the application to the wall wrap.

7.5 Aluminum joinery must be installed by the building contractor in accordance with the manufacturer's instructions. A 7.5-10mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and airseal can be installed after the joinery has been secured in place.

7.6 ASVCS shall be installed in accordance with the Technical Literature by ALPINE STONE approved contractors.

7.7 The Technical Literature must be referred to during any inspections of the ASVCS installations.

Health and Safety

7.8 When cutting, drilling or grinding the substrate sheets, this must be carried out in an open air or well ventilated area, and a dust mask, eye protection and gloves must be worn.

7.9 All aspects of cutting, drilling or grinding must comply with the latest regulations of the occupational health and safety division of the Ministry of Business, Innovation & Employment.

7.10 Refer to the Technical Literature from the relevant manufacturer for the safe use and handling of the components that make up the ASVCS.

Basis of this Appraisal

BEAL use the compliance verification procedure to demonstrate compliance with the relevant clauses of the NZBC based on a risk analysis procedure. The following is a summary of the technical investigations carried out:

Tests

8.1 The following testing of the ASVCS and its respective components has been undertaken by BEAL unless otherwise noted:

BEAL opinion on clause E2 code compliance was based on the evaluation of all details within the scope of this Appraisal and testing of the ASVCS to E2/VM1. The testing assessed the performance of the window head, jamb and sill details, meterbox head, jamb and sill details, vertical control joints, internal and external corners. BEAL have also reviewed the details contained within the Technical Manual v2.1 (dated May 2018), and an opinion has been given by BEAL that the system will meet the performance levels of E2.3.2 as a drained cavity rainscreen.

Density and water absorption of the ALPINE STONE veneer.

Adhesion and compatibility testing of the ALPINE STONE adhesive/mortar mix with the substrate sheets has been carried out in accordance with ASTM C297.

Other Investigations

8.2 Wind loadings, self weight, seismic loadings, shear force, panel capacity, fastener pull through testing and calculations for the ASVCS were determined by an independent Chartered Engineer in respect to the requirements of compliance document B1 Structure. Structural and durability opinions were provided.

8.3 Ease of application has been assessed at BEALs facilities and found satisfactory.

8.4 The Technical Literature for the ASVCS has been examined by BEAL and found to be satisfactory seals in accordance with the manufacturer's instructions and this Appraisal Certificate.

8.5 The manufacture of the stone veneer has been assessed by BEAL, including quality control measures. Details regarding the quality and composition of the materials used were obtained by BEAL and found to be satisfactory.

8.6 The quality of materials, components and accessories supplied by ALPINE STONE is managed through the use of a Building Product Quality Plan.

8.7 The ASVCS Building Product Quality Plan ensures continuous conformance with the quality requirements from purchase to supply of components.

8.8 ALPINE STONE'S Building Product Quality Plan is reviewed at least annually by BEAL.

8.9 Quality on site is the responsibility of the ALPINE STONE licensed contractors.

8.10 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems, joinery, frame protection system (building wrap), flashing tapes, head flashings and air uality Plan.

8.11 The quality of the installation of the ASVCS is managed through the use of a Building Product Quality Plan.

8.12 For a copy of this Technical Literature and any subsequent updates please refer to: www.alpinestone.co.nz

8.13 Building owners are responsible for the maintenance of the ASVCS in accordance with the written maintenance instructions from ALPINE STONE www.alpinestone.co.nz

Sources of Information

- AS 3566 Self Drilling Screws for the Building and Construction Industries.
- AS/NZS 1170:2002 Structural Design Actions.
- ASTM C 297: Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions.
- AS/NZS 2908.2: Cellulose-cement Products.
- NASH Standard for Residential and Low-rise Steel Framing Parts 1 and 2.
- NZS 3602:2003 Timber and Wood-based Products for use in Building.
- NZS 3603:1993 Timber Structures Standard.
- NZS 3604:2011 Timber Framed Buildings.
- NZS 4211:1985 Specification for Performance of Windows.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992

Concluding statement

9.1 In the opinion of BEAL, the ASVCS is fit for purpose and will comply with the NZBC to the extent specified provided that it is used, designed, installed and maintained as set out in this Appraisal Certificate and the ALPINE STONE technical literature.

9.2 The Appraisal Certificate is issued only to ALPINE STONE, and is valid until further notification, subject to the conditions of this Appraisal.

Conditions of Appraisal

10.1 This Appraisal Certificate :

- Relates only to the ASVCS as described herein;
- Must be read, considered and used in full together with the Technical Literature;
- Does not address any legislation, regulations, codes or standards, not specifically named herein;
- Is valid to the date on the front cover of this appraisal certificate;
- Is copyright of BEAL.

10.2 The Appraisal Certificate holder continues to meet the quality requirements of the ASVCS Building Product Quality Plan and has the plan audited before revalidating the appraisal by BEAL on an annual basis.

10.3 Paving Worx Ltd. shall notify BEAL and obtain approval of any changes in product specification or quality assurance prior to product being marketed including any trade literature, web site info or the like.

Authorised Signatory

C R Prouse - Director
BEAL (Building Element Assessment Laboratory Limited)
[Revised format and updated June 2023]

