



EXPIRES 30 April 2024



## BEAL Appraisal Certificate

### Watson Group Enterprises (Stoneworks) Stone Veneer Cladding System



## Product

- 1.1 The Stone Veneer Cladding System from Stoneworks uses a fibre-cement board as the cladding substrate onto which is adhered a selected natural stone or manufactured veneer, to provide an attractive stone finish for application to residential, and light commercial feature walls, within the limitations described in E2/AS1.
- 1.2 P&S's SVC system utilises P&S's Solid Stone which is a natural stone veneer precision hand cut to thickness and size by skilled craftsmen with an average weight of 50kg/m<sup>2</sup> or Wairau Stone NZ manufactured veneer with an average weight of 30kg/m<sup>2</sup>.
- 1.3 The cladding substrate is BGC 9mm thick Stonesheet, which is fixed on to the building structure over mechanically fixed timber cavity battens. The 40mm x 20mm H3.1 battens are fixed over a wall wrap complying with the performance requirements of the NZBC to timber framing complying with NZS3604 or light-weight steel framing complying with NASH 3405.
- 1.3 The BGC Stonesheet is fixed over battens to the framing by way of 10g x 40mm stainless steel screws at 200mm 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, a special board tape is used, and for inter-storey junctions, the tape is used in place of h or z flashings.

## Building Regulations

- 2.1 In the opinion of BEAL, the P&S's SVC system, 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:
- 2.2 Clause B1 STRUCTURE  
Performance B1.3.1 and B1.3.3. The P&S's SVC system meets the requirements for loads arising from self weight, earthquake, wind, impact and creep [ i.e. B1.3.3 (a), (f), (h), (j) and (q)]. See paragraphs 11.1 - 11.3
- 2.3 Clause B2 DURABILITY  
Performance B2.3.1 (a) and B2.3.2. The P&S's SVC system meets this requirement. See paragraphs 12.1-12.5
- 2.4 Clause E2 EXTERNAL MOISTURE  
Performance E2.3.2. The P&S's SVC system meets this requirement. See paragraph 13.1 - 13.6
- 2.5 Clause F2 HAZARDOUS BUILDING MATERIALS  
Performance F2.3.1. The P&S's SVC system meets this requirement and is not a health hazard to people.
- 2.6 The P&S's SVC system has been appraised as an **Alternative Solution** in terms of New Zealand Building Code Compliance.

Appraisal holder:

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The most up to date version of this BEAL Appraisal Certificate can be viewed at [www.beal.co.nz](http://www.beal.co.nz)

## Scope and Limitations

3.1 The P&S's SVC system has been appraised for use as an external 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 the NZBC; and,
- Constructed with steel framing complying with the NZBC; and,
- With a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- Can be situated in up to and including 'Extra High' wind zones as described in NZS 3604 Building Wind Zones

3.2 The P&S's SVC system has also been appraised for weathertightness and structural wind loading when used for timber or steel framed buildings subject to specific design up to a design differential ultimate limit state (ULS) wind pressure of 2500Pa.

3.3 The P&S's SVC system must only be installed on vertical surfaces in accordance with the Technical Literature.

3.4 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 P&S's SVC system relies on joinery meeting the requirements of NZS 4211 for the relevant building wind zone or being specifically designed for use in specifically designed buildings).

3.5 Installation of components and accessories supplied by P&S's SVC system must be carried out only by personnel trained and certified by Stoneworks.

## Technical Literature

4.1 Refer to the P&S's SVC system Technical Manual (v3.2 Dated May 2013). 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.stone-works.co.nz](http://www.stone-works.co.nz)

## Technical Specification

5.1 System components and accessories supplied by Stoneworks is as follows:

### BGC Stonesheet™

- BGC Stonesheet™ is a fibre-cement type sheet, 2400mm by 1200mm, 9mm thick. 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 H3.1, 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 200mm 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 200mm spacings.

### RL20 Hydrocoat Grey Sealer

- Brush applied to all surfaces that are to receive the stone adhesive.

### Stone Stick Adhesive Mortar

- A two part adhesive specifically designed for stone veneer is used; Part A is a liquid general purpose latex polymer, which is added to Part B, which is a pre-bagged premium grade cement based adhesive.
- Part A and B are mixed in the correct proportions to be suitable for use with the P&S's SVC system. Refer to the technical literature.

### P&S's Solid Stone

- Solid Stone is a natural stone approximately 30mm to 50mm thick with an average weight of 50kg per square metre, though some patterns and styles may vary this a little.

5.2 Accessories used with the system which are supplied by the P & S Partnership's approved installers are:

- Bottom cavity closer or Vents
- Proprietary pipe seals or flashing tape for sealing around pipes and the like to the BGC board.
- Stain Proof sealer.

5.3 Components supplied by the owner or main contractor are:

- 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 in order to make the wrap water and windtight.
- Window head, jamb and sill flashings complying with the performance requirements of the NZBC, installed in accordance with the Technical Literature.
- Flexible flashing sill and jamb tapes - flexible flashing tapes complying with AAMA 711-07, or a flexible flashing tape that is part of a 'Frame Protection System' for use around window and door joinery openings.
- Air seals around windows and doors - air seals complying with NZBC Acceptable Solution E2/AS1 9.1.6, or low foaming self expanding, moisture cure polyurethane foam air seals covered by a valid Appraisal for use around window, door and other wall penetration openings or manufactured to comply with AAMA 812-04.
- Building wrap strapping - Polypropylene tape for securing the building wrap in place and preventing bulging of the insulation into the drain cavity where cavity battens are installed at greater than 450mm centres as per NZBC Acceptable Solution E2/AS1 9.1.8.5 (b).



## Handling and Storage

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

6.2 Dry storage must be provided on site for the BGC Stonesheet, Sealer and Stone Stick Adhesive Mortar and 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.

6.3 Handling of BGC Stonesheets require care to prevent damage to corners or excessive flexing.

6.4 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 manufacturers instructions.

## Design Information

### Framing

#### Timber Framing

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

7.2 Timber framing must comply with NZS 3604:2011 for both buildings or parts of buildings within the scope 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.

7.3 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

7.4 Steel framing must be to a specific design meeting the requirements of the NZBC and NASH 3405:2006.

7.5 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 0.55mm.

7.6 For steel framed buildings situated within NZS3604 defined wind zones up to and including 'Very High', studs must be at maximum 600mm centres. All other buildings studs must be at maximum 400mm centres. Dwangs must be fitted flush with the stud.

#### BGC Stonesheet Layout

7.7 BGC Stonesheets are installed vertically, supported at fixing locations with vertical and horizontal CaviBat battens. At the base of the wall the BGC Stonesheets can be either rested on a concrete rebate (75mm below finished floor level) or hang 50mm below the finish floor level.

### General

8.1 Punchings in the slotted vermin control cavity closer must provide a minimum ventilation opening area of 1000mm<sup>2</sup> per lineal metre of wall as per the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.8.3 (b).

8.2 The vertical weep holes must provide a minimum ventilation opening area of 1000mm<sup>2</sup> per lineal metre of wall, when installed at 575mm to 600mm centres.

8.3 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 P&S's SVC system by a minimum of 100mm, and unpaved surfaces by 175mm in accordance with the requirements of NZBC Acceptable Solutions E2/AS1, Table 18.

8.4 At balcony, deck or roof to wall junctions, the P&S's SVC system bottom edge of the must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.3.6.

8.5 Where the P&S's SVC system abuts other cladding systems, designers must detail the junction to meet their own requirements whilst meeting performance requirements of the NZBC. The Technical Literature does provide some guidance. Details not included within the Technical Literature have not been assessed and are therefore outside the scope of this Appraisal.

8.6 All buildings must have barriers to airflow consisting of interior linings with all joints stopped, or where walls are not lined, such as attic spaces at gable end, a rigid sheathing or air barrier, complying with Acceptable Solutions E2/AS1 Table 23, must be fixed to framing prior to fixing cladding or cavity battens as per paragraph 9.1.4 E2/AS1.

### Control Joints

9.1 Control joints where BGC Stonesheets are used must be constructed in accordance with the Technical Literature and as follows;

- Horizontal control joints - To be installed when intermediate floor joists are not seasoned and/or when the height of the wall exceeds 8m
- Vertical Control Joints - at maximum 5m centres; aligned with any control joint within the structural framing, or where the system abuts other cladding systems.
- Located at both internal and external corners. *(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.)*

#### Interstorey Junction

10.1 Inter-storey drained joints must be provided for walls over 2 storeys in height in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.9.4 (b).

### Structure - Clause B1

#### Mass

11.1 The mass of P&S's SVC system (panel and coating system) has a approximate mass of 45 to 92kg/m<sup>2</sup>, considered a heavy wall cladding in terms of NZS 3604.

#### Impact Resistance

11.2 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

11.3 The P&S's SVC system is suitable for use in all building wind zones as per NZS 3604, up to, and including 'Extra High' where buildings are designed to meet the performance requirements of NZBC Acceptable Solution E2/AS1, or up to the ultimate limit state (ULS) wind pressure of 2500Pa when the building is subject to specific design.

#### Durability- Clause B2

12.1 The P&S's SVC system 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), 50 years for the cladding system.

#### Maintenance

12.2 Regular maintenance is essential to ensure the performance requirements of the NZBC are met and to ensure the maximum serviceability of the P&S's SVC system.

12.3 Periodic cleaning of the System wall 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.

12.4 Any cracks, damaged areas or areas showing signs of deterioration that could allow water ingress, must be repaired immediately. The P&S's SVC system must be maintained and repaired in accordance with the instructions from Stoneworks.

12.5 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

13.1 When installed in accordance with this Appraisal Certificate and Technical Literature, the P&S's SVC system 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.

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

13.3 The P&S's SVC system 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.

13.4 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 P&S's SVC system technical manual. Any weathertightness details developed by a designer are outside the scope of this Appraisal Certificate and are the responsibility of the designer.

13.5 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.

#### Water Vapour

13.6 The P&S's SVC system is not a barrier to the passage of water vapour, and when correctly installed in accordance with both this Appraisal and Technical Literature will not create or increase the risk of moisture damage resulting from condensation. When installed over steel frame please refer to 13.7.

13.7 When the P&S's SVC system is installed over a steel frame, 10mm (V.H) 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 a thermal break in accordance with the requirements of NZBC Acceptable Solution E3/AS1, Paragraph 1.1.4(d). Building wrap (underlay) is then dressed over the top of the sheeting followed by the installation of the cavity battens.

## Installation Information

### Installation Skill Level Requirement

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

14.2 Installation of the accessories supplied by the building contractor must be completed by a tradesperson who has an understanding of cavity based cladding construction, in accordance with instructions given within the P&S's SVC System Technical Manual and this Appraisal Certificate.

### System Installation

15.1 The selected building wrap (underlay) and tape(s) must be installed by the building contractor in accordance with the wrap and tape manufacturer's instruction, prior to the installation of the cavity battens and the rest of the P&S's SVC system. The building wrap (underlay) shall be run horizontally and be continuous around corners. The wrap must be lapped not less than 75mm at horizontal joints and not less than 150mm over studs at vertical joints. Care must be taken in the installation of the building wrap and flashing tape around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

15.2 Note all laps and outer edges of the wall wrap shall be taped to prevent the ingress of wind.

15.3 Aluminum joinery must be installed by the building contractor in accordance with the P&S's SVC system Technical Literature. 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.

15.4 P&S's SVC system shall be installed in accordance with the Technical Literature by Stoneworks approved contractors.

15.5 The Technical Literature must be referred to during the inspection of the P&S's SVC system installations.

15.6 The application of the Stain Proof sealer shall be applied in accordance with the manufacturers instructions at all times.

## Health and Safety

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

16.2 All aspects of cutting, drilling or grinding must comply with the latest regulations of the occupational safety and health division of the labour department.

16.3 Refer to the Technical Literature from the relevant manufacturer for the safe use and handling of the components that make up the P&S's SVC system .

## Basis of 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

18.1 The following testing of the P&S's SVC system 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 P&S's SVC System 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 (v3.2 dated May 2013), and an opinion has been given by BEAL that the system will meet the performance levels of E2/AS1 for a drained cavity system.
- Adhesion and compatibility testing of the RL20 Hydrocoat Grey Sealer and Stone Stick Adhesive Mortar with the BGC Stonesheet has been carried out in accordance with ASTM C297.
- The wet slip-adhesion resistance of Stone Stick Adhesive Mortar in a vertical plane were also assessed to verify durability.

### Other Investigations

19.1 Wind loadings, self weight, seismic loadings, shear force, panel capacity, fastener pull through testing and calculations for the P&S's SVC system were determined by an independent Chartered Engineer in respect to the requirements of compliance document B1 Structure. Structural and durability opinions were provided.

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

19.3 The Technical Literature for the P&S's SVC system has been examined by BEAL and found to be satisfactory.

### Quality

20.1 The manufacture of the renders 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.

20.2 The quality of materials, components and accessories supplied by P&S's SVC system is managed through the use of the Building Product Quality Plan.

20.3 The P&S's SVC system Building Product Quality Plan ensures continuous conformance with the

quality requirements from purchase to supply of components.

20.4 P&S's SVC system Building Product Quality Plan is reviewed at least annually by BEAL.

20.5 Quality on site is the responsibility of the P&S's licensed contractors.

20.6 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems, joinery, building wrap, flashing tapes, head flashings and air seals in accordance with the instructions of Stoneworks and this Appraisal Certificate.

20.7 For a copy of this Technical Literature and any subsequent updates please refer to:

[www.stone-works.co.nz](http://www.stone-works.co.nz)

20.8 Building owners are responsible for the maintenance of the P&S's SVC system in accordance with instructions of Stoneworks and this Appraisal Certificate.

### 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 3405:2006 Steel framed buildings
- 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.
- The Building Regulations 1992, up to, and including October 2004 Amendment.

### Concluding statement

21.1 In the opinion of BEAL, the P&S's SVC system 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.

The Appraisal Certificate is issued only to P&S Partnership Limited, and is valid until further notification, subject to the conditions of this Appraisal.

## Conditions of Appraisal

1. This Appraisal Certificate :

- Relates only to the P&S's SVC System 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.

2. The Appraisal Certificate holder continues to meet the quality requirements of the P&S's SVC system Building Product Quality Plan and has the plan audited before revalidating the appraisal by BEAL on an annual basis.



3. Stoneworks 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.

4. BEAL makes no representation 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 the Appraisal Certificate holder

5. BEAL's verification of the building product or system complying with one or more above-mentioned criteria is given on the basis that the criteria used were those that were appropriate to demonstrate compliance with the NZBC at the date of this Appraisal Certificate. In the event that the criteria is withdrawn or amended at a later date, this Appraisal may no longer remain valid.

6. Any reference in this Appraisal Certificate to any other publication shall be read as a reference to the version of publication specified in this Appraisal Certificate.

Authorised Signatory



C R Prouse - Principal Building Scientist  
Original March 2013, Updated March 2016

