Meinhardt- Bonacci Group (AKL) Pty Ltd
ABN 29 102 716 352
Consulting Engineers
Structural • Civil • Facade
Level 4, 203 Queen Street
Auckland 1143
Tel: +64 09 300 6228
auckland@bonaccigroup.com
www.bonaccigroup.com

15 OCTOBER 2020

ATTN: LOUISE SWANN
DIRECTOR
THE BUILDING BUSINESS LTD.

DEAR LOUISE,

RE: ALPOLIC NC – NZBC E2/VM1 COMPLIANCE

As part of Meinhardt-Bonacci's engagement, this letter is to provide an expert façade consultants advice for compliance only to NZBC E2/VM1 in regard to the Alpolic NC Cladding System using the Alpolic FR test report and comparing the materials properties of both systems to show weathertightness performance.

The material properties between Alpolic FR and Alpolic NC are listed below;

Characteristic	Alpolic NC (4 mm)	Alpolic FR (4 mm)	Comment
Composition - skin	0.5 mm thick 3105-H14 aluminium alloy	0.5 mm thick 3105-H14 aluminium alloy	Characteristic is the same
Composition – core	3 mm non-combustible 100% mineral core	3 mm thick 70% mineral 30% polyethylene core	NC core is 100% composite compared to FR having 70% mineral & 30% polyethylene
Coating - front	Lumiflon™- based fluoropolymer coating	Lumiflon™- based fluoropolymer coating	Characteristic is the same
Coating - back	Polyester- based wash coating	Polyester- based wash coating	Characteristic is the same
Panel thickness mm	4	4 (also available in 3 mm and 6 mm)	Characteristic is the same
Weight kg/m²	8.6	7.6	This does not effect E2/VM1 property's
Thermal expansion x10-6 /°C	20.6	24	This does not effect E2/VM1 property's
Deflection temperature °C	115	116	This does not effect E2/VM1 property's
Tensile strength MPa or N/mm²	48.2	49	This does not effect E2/VM1 property's
0.2% proof stress MPa or N/mm²	46.5	44	This does not effect E2/VM1 property's
Elongation %	2.7	5	This does not effect E2/VM1 property's
Flexural elasticity GPa or kN/mm²	45600 (45.6?)	39.8	This does not effect E2/VM1 property's
0.2% proof stress of aluminium skin MPa or N/mm²	150	152	This does not effect E2/VM1 property's
Elasticity of aluminium skin GPa or kN/mm²	70	70	This does not effect E2/VM1 property's
Gloss front coating %	15 – 80	15 – 80	Gloss front coating % is the same.
Formability front coating	2T, no cracking	2T, no cracking	Coating is the same
Reverse impact cross hatch front coating	No pick off	No pick off	Characteristic is the same
Hardness-pencil front coating	H	H	Characteristic is the same
Adhesion front coating	No pick off	No pick off	Characteristic is the same
Abrasive resistance front coating L/mil	40	40	Characteristic is the same

Chemical resistance front coating	No change	No change	Characteristic is the same
Colour retention front coating	Maximum 5	Maximum 5	Characteristic is the same
Gloss retention %	70	70	Characteristic is the same
Chalk resistance units	Maximum 8	Maximum 8	Characteristic is the same
Salt spray resistance	Blister –10, scribe –8	Blister –10, scribe –8	Characteristic is the same
Humidity – thermal front coating	No blister, no cracking	No blister, no cracking	Characteristic is the same
Humidity resistance front coating	No change	No change	Characteristic is the same

The Alpolic FR system has been tested in accordance with E2/VM1 and AS/NZS 4284. The test as reported in report no: 15/02 has been undertaken by FacadeLab which is recognized as an accredited laboratory by IANZ.

The full outcome of the FacadeLab test report 15/02 showed the following results below;

Preliminary test for initial water test #1 *(28/05/2015)*
- Water leakage observed during preliminary testing of initial water test from a pressure of ±525 Pa for 15 minutes.

Preliminary test for Static Pressure #1 *(28/05/2015)*
- Water leakage observed during preliminary testing of static test from a pressure of ±1750 Pa (1.75kPa).

Preliminary test for initial water test #2 *(08/06/2015)*
- No water leakage was observed during preliminary testing of initial water test from a static pressure of 525 Pa and cyclic pressures of 525 – 1050 Pa.

Preliminary test for Static Pressure #2 *(08/06/2015)*
- No water leakage was observed during preliminary testing of static test

Structural test at serviceability limit state *(08/06/2015)*
- The façade mock-up was subjected to the serviceability test pressures of ±1750 Pa (1.75kPa). However, no measurements were recorded. No visible concerns were observed.

Water penetration test (static pressure) #1 *(10/06/2015)*
- Testing showed incorrect glazing beads & sealant were incorrectly used on the façade mock-up. Testing would be resumed after the sealant had appropriately been cured.

Water penetration test (static pressure) #2 *(17/06/2015)*
- Due to time delays, the serviceability pressures of ±1750 Pa were reapplied to still show compliance prior to static water tests. The mock-up complied with the specific requirements of 525 Pa without any visible leakages recorded.

Water penetration test (cyclic pressure) *(17/06/2015)*
- The mock-up complied with the specific cyclic requirements of 525 - 1050 Pa (0.52kPa – 1.05kPa)

Structural test at ultimate limit state *(17/06/2015)*
- No structural damages or collapse of the panels were observed during the ultimate limit state test at the specified pressure of ±2500 Pa (±2.5kPa)

The overall testing results are as follows:

Serviceability Limit State	± 1750 Pa (1.75 kPa)
Ultimate Limit State	± 2500 Pa (2.50 kPa)
Water penetration (static)	± 525 Pa (0.52 kPa)
Water penetration (cyclic)	± 525 Pa – 1050 Pa (0.52 kPa – 1.05 kPa)

Meinhardt-Bonacci have reviewed the testing report from FacadeLab, compared the physical characteristics of Alpolic NC and Alpolic FR and have concluded that PSP Limited can rely on the test report (15/02) supplied by FacadeLab as the basis for compliance of Alpolic NC Cladding System in respect of E2.3.2, E2.3.3, E2.3.5, and E2.3.5.7 and for the following scope and limitations.

Scope	Limitations
In wind zones up to and including extra high as defined in NZS 3604:2011 or calculated design wind pressure (ULS) of 2.50 kPa	As described in the scope.
In all exposure zones as defined in NZS 3604:2011.	The system cannot be used where adverse microclimatic conditions apply as set out in paragraph 4.2.4 of NZS 3604:2011
As an external wall cladding, and in conjunction with a drained and ventilated cavity.	In accordance with the fixing method used in FacadeLab E2/VM1 test or subject to specific design for supporting structural system. A building wrap that meets the performance characteristics of Table 23, E2/AS1 and has an airflow resistance greater than 0.1 MNs/M3. Where design wind pressure is greater than 1.55kPa a rigid air barrier is required. Metal flashings and stainless-steel fixings complying with Table 7 and Table 20 of E2/AS1 must be used.

The FacadeLab testing report 15/02 included with drawings are attached to the end of this letterhead for ease of further understanding for compliance purposes.

Yours sincerely,
MEINHARDT-BONACCI GROUP PTY LTD

Nofal Umarjan, MEngNZ
Associate Director - Façade

APPENDIX

PO Box 285, Kumeu, Auckland, New Zealand.
Phone: +64 9-415 2800 Mob +64 21-977 876.

TEST REPORT No. 15/02

REFERENCE: PSP Ltd
PO Box 101851
NSMC
Auckland 0754

Performance tests on cavity cladding façade mock-up for Mainfreight Building, Hamilton, in accordance with the method of AS/NZS 4284: 2008 Testing of Building Facades, excluding the deflection test.

ULS test pressures calculated by Mathew Paget of Aurecon New Zealand Limited

DATE OF TEST: 28 May - 17 June 2015

SUMMARY

Preliminary tests

Preliminary static water penetration tests resulted in significant leakage around the bottom corners of the frame, and into the cavity space. Subsequent investigation showed the absence of end dams on the sill tray that formed part of the window sill.

Subsequent in-situ addition of end dams, and resealing of the window perimeter failed to fully prevent penetration into the cavity below the window corners. Subsequent investigation of the window design revealed that the window supplied was not designed for the face sealed installation method required for the cavity cladding used. The window was removed and modified with replacement glazing beads and sill tray with end dams before reinstallation and resealing. The full test was then commenced.

Structural test at serviceability limit state wind pressure

The façade mock-up was subjected to the serviceability test pressures of ±1750 Pa, but without any deflection measurements being made. There were no problems observed.

Water penetration test by static pressure

With the exception of the meterbox, the façade mock-up complied with the specified test requirements at test pressures of 525 Pa. Following reconstruction and seal modifications, the window achieved the equivalent NZS 4211 water penetration performance at the specified positive serviceability pressure of 1750 Pa.

Water penetration test by cyclic pressure

With the exception of the meterbox, the façade mock-up complied with the specified test requirements.

Structural test at ultimate limit state wind pressure

No structural damage or collapse was observed during the Ultimate Limit State Structural test, at the specified pressures of +2500 Pa, and -2500 Pa.

DESCRIPTION:

The test mock-up was specified by BSW Architects, and consisted of a timber frame structure incorporating Alpolic FR™ aluminium composite material (ACM) panels supplied by PSP Ltd and installed by CCS Manufacture and Installations Ltd. The ACM cladding is a 4mm thick pre-coated sheet product containing two 0.5 mm aluminium skins over a non-combustible mineral core. It is V routed and folded into panels with aluminium profile reinforcing on panels which exceed certain dimensions. The panels are screw fixed over packers to timber framing with silicon sealant over PEF rods in the inter-panel joints.

The timber framing was 140 x 45 mm single studs running full height of 3550 mm. Stud spacing was generally at 400 mm centers with nogs at approximately 800 mm centers. The rigid air barrier was simulated by 4.5mm clear polycarbonate sheet fixed over the framing with flashing tape over the joints.

The test sample included; a parapet, internal and external corners, simulated meterbox, scupper, soffit junctions, top and bottom plate and all window junctions.

The client representative (Alisa Bennett) has verified that the sample was a true representation of the system details attached in the appendix of this report.

SPECIFICATIONS:
The following performance requirements were agreed with the clients for assessing performance :

Serviceability Wind Pressure	± 1750 Pa,
Water penetration by Static pressure;	+ 525 Pa
Water penetration by Cyclic pressures	up to + 525 to + 1050 Pa
Structural Test at Ultimate Limit State	± 2500 Pa

These exceeded the specifications for the Mainfreight Building, Hamilton façade contract which specified maximum serviceability pressures of +1300 Pa and -1200 Pa and the Ultimate Limit State pressures of +1900 Pa and -1800 Pa.

TESTING

The tests were performed by John Yolland using the testing procedures of AS/NZS 4284:2008 Testing of Building Facades, in the IANZ accredited window test facility Facadelab Ltd, Rosedale Road, Albany, Auckland with representatives of the client in attendance.

During the preliminary water penetration tests, water penetration was evident through the sill area of the fixed window and into the cavity below the bottom corners of the window installation. This was addressed during the preliminary test phase.

The standard order of AS/NZS 4284 tests was undertaken except that the client elected not to measure the deflection during the serviceability structural test.

Following the unfortunate demise of John Yolland before the report could be completed, this test report was completed by John Burgess from worksheets, materials and evidence taken during the testing. The worksheets for the information reported in Appendix 1 could not be found, so this information has been taken outside of the formal test report.

Similarly, the drawings provided by the client are attached, however there is insufficient information available to confirm that these drawings represent the sample tested.

TEST RESULTS:

PRELIMINARY TEST Static Pressure 28/5/15

The façade mockup was exposed to the agreed Serviceability test pressures of ±1750 Pa, for the specified 10 seconds.

PRELIMINARY TEST Water - Initial test, 28/5/15

The façade mockup was exposed to the static water penetration test at the agreed test pressures of 525 Pa for 15 minutes. Significant water penetration was evident from the window installation. The test was stopped to allow investigation of the window installation.

PRELIMINARY TEST Static Pressure, 8/6/15

The façade mockup was exposed to the agreed serviceability test pressures of ±1750 Pa, for the specified 10 seconds, with no leakage evident.

PRELIMINARY TEST Water - Initial test 8/6/15

The façade mockup was exposed to the static water penetration test at the agreed test pressures of 525 Pa and cyclic pressures of 525 – 1050 Pa. No water leakage evident.

STRUCTURAL TEST AT SERVICEABILITY LIMIT STATE 8/6/15

The façade mock-up was subjected to the serviceability test pressures of ±1750 Pa, but without any deflection measurements being made. There were no problems observed.

WATER PENETRATION TEST BY STATIC PRESSURE 10/6/15

During this test water leakage through the glazing seals of the window occurred and flowed into the cavity. On investigation the window glazing beads were found to be incorrect. The window glazing was remedied and reinstated. Testing resumed once sealants had cured.

WATER PENETRATION TEST BY STATIC PRESSURE 17/6/15

Due to the delay in resuming testing the serviceability pressures of ±1750 Pa were reapplied before restarting the static water penetration test. The façade mock-up complied with the specified test requirements at test pressures of 525 Pa with the exception of the meterbox which was found to have leakage through the spot welds and was removed from the test.

WATER PENETRATION TEST BY CYCLIC PRESSURE 17/6/15

The façade mock-up complied with the specified test requirements.

STRUCTURAL TEST AT ULTIMATE LIMIT STATE WIND PRESSURE 17/6/15

No structural damage or collapse was observed during the Ultimate Limit State Structural test, at the specified pressures of +2500 Pa, and -2500 Pa.

John Burgess
IANZ accredited engineer
July 2017

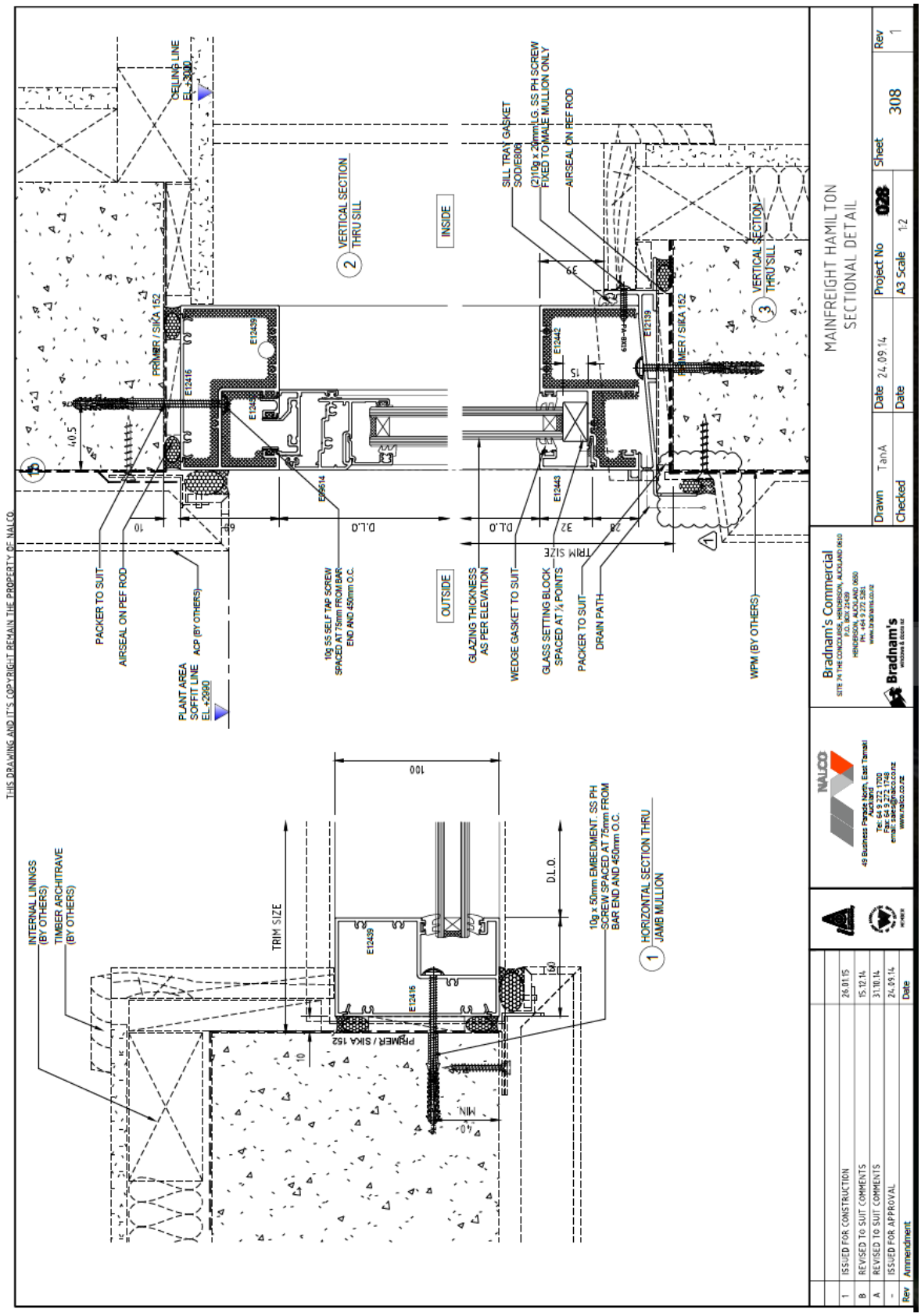
APPENDIX 1

To confirm the panels were able to withstand the site specific wind loadings without permanent deformation or collapse, ULS pressures of +1900 Pa and -1800 Pa were applied across the panel. This was achieved by cutting holes of approximately 120 mm diameter in the rigid air barrier throughout the test sample. Pressure measurements were made on either side of the panels, in the booth and cavity to determine pressure differential. Pressure was maintained for several minutes during which time measurements were taken with a steel ruler to give an indication of panel deflection at the ULS. These were taken at three points approximately halfway between stiffener pairs, where maximum displacement was expected.

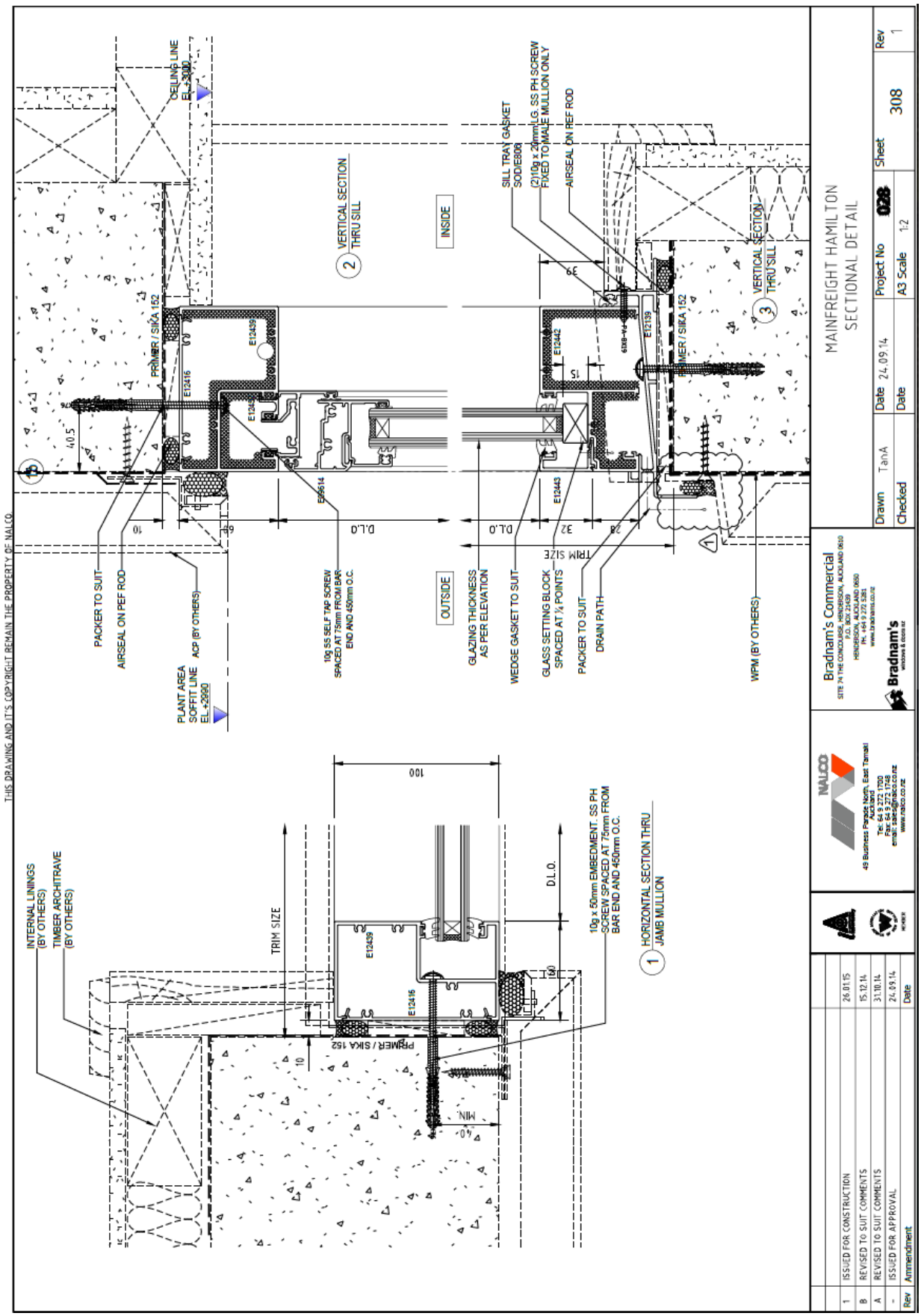
No damage or collapse was observed.

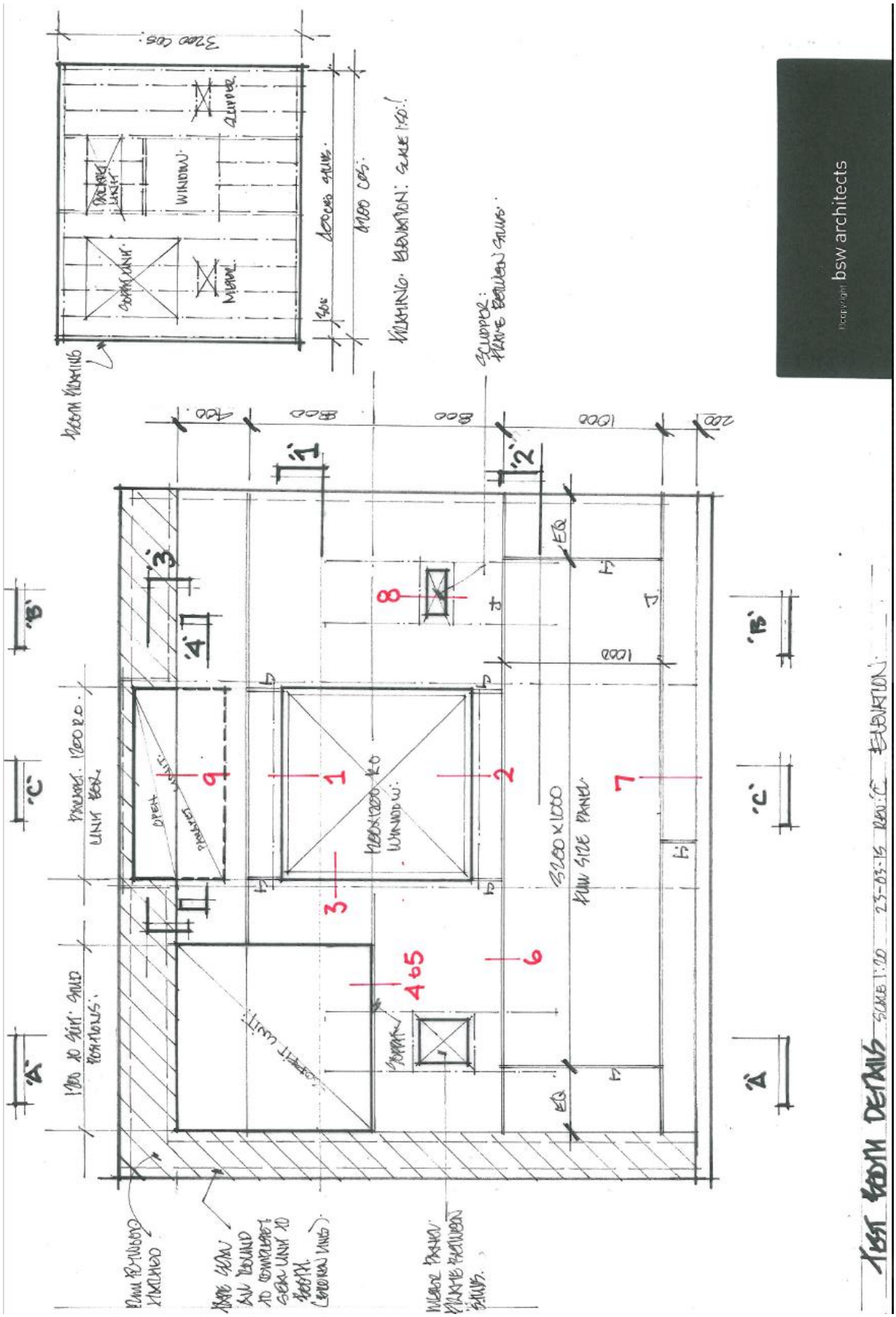
The panel was found to deflect by approximately 10 mm in either direction from a 50 mm base measurement.

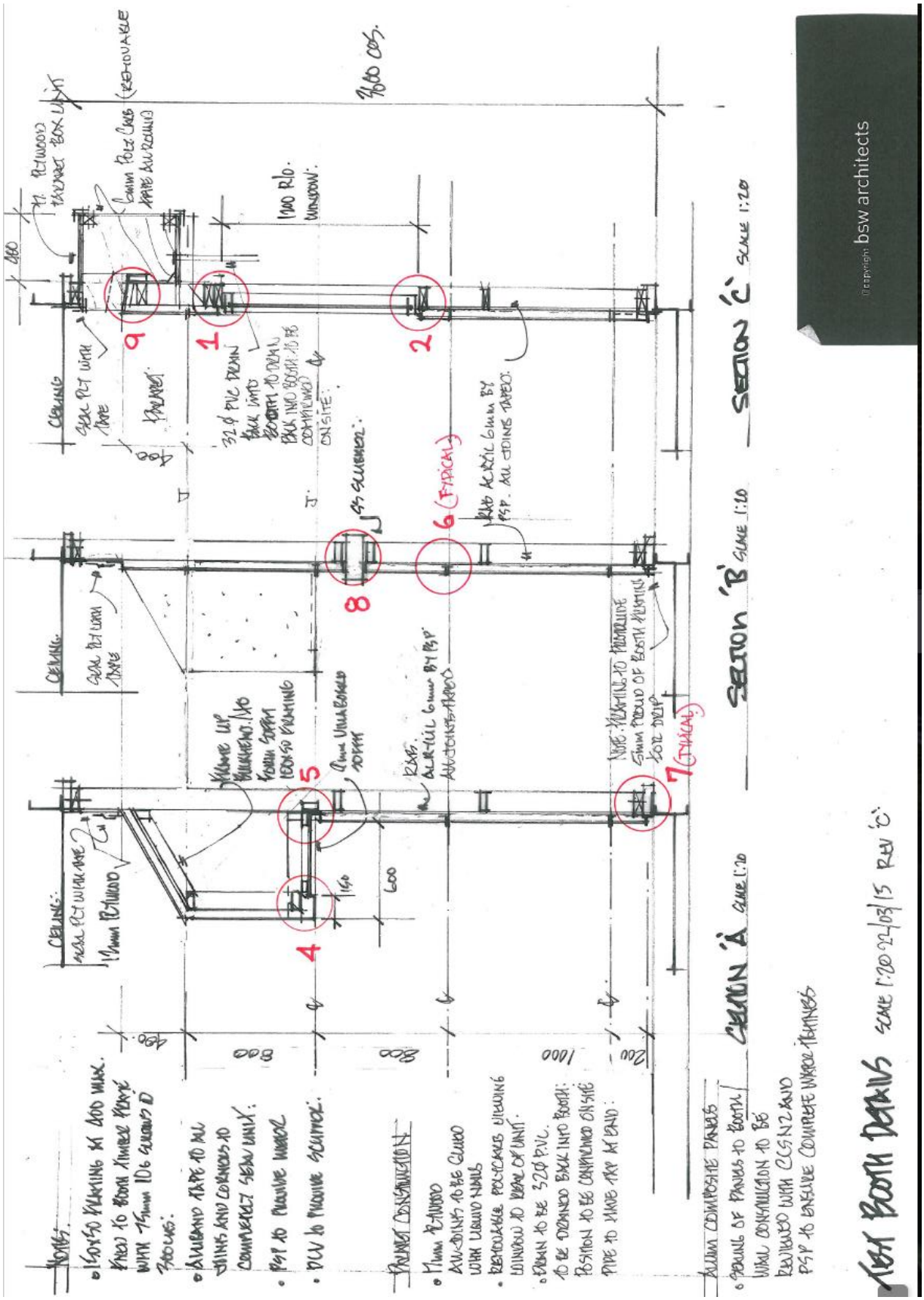
Drawings

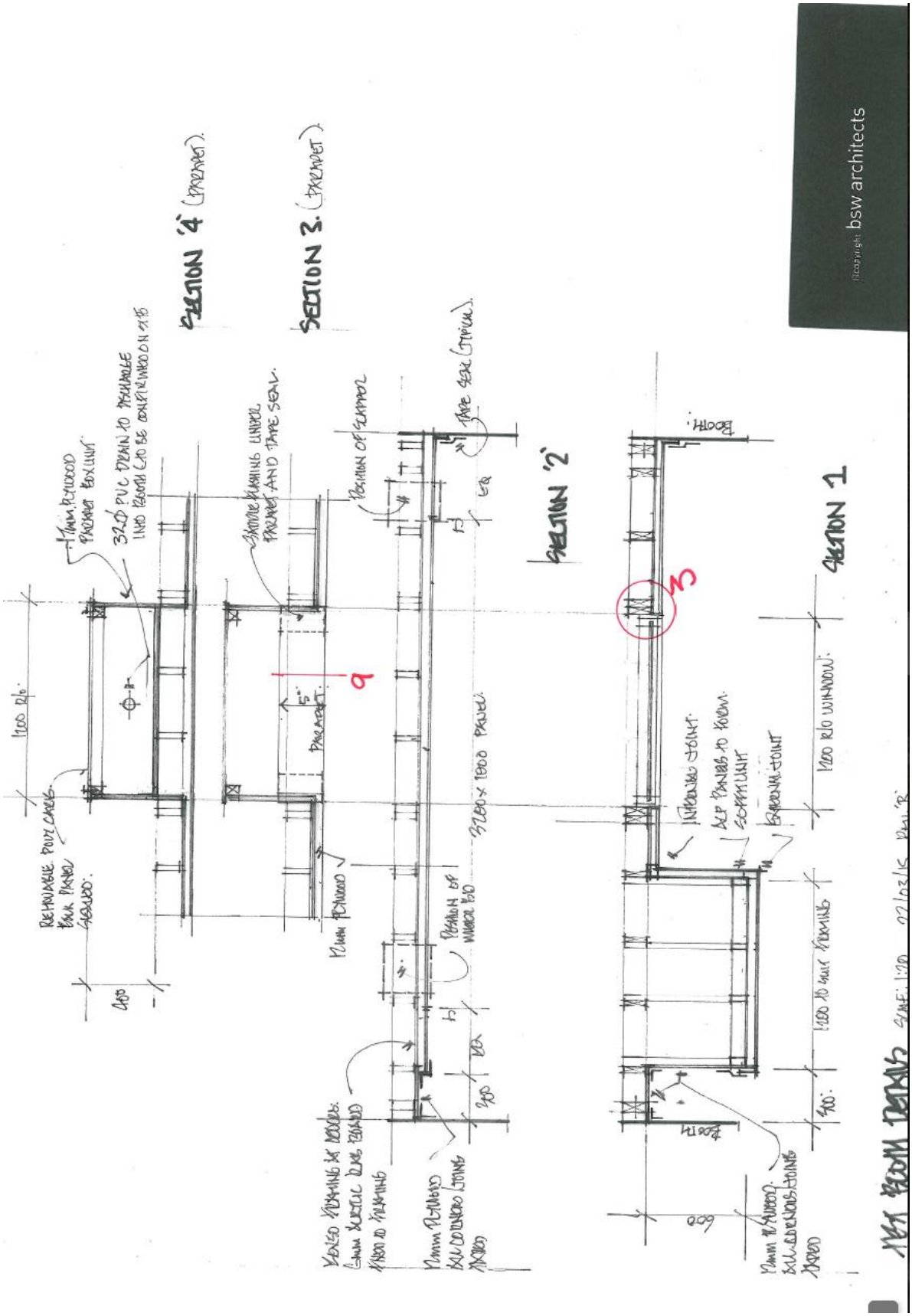


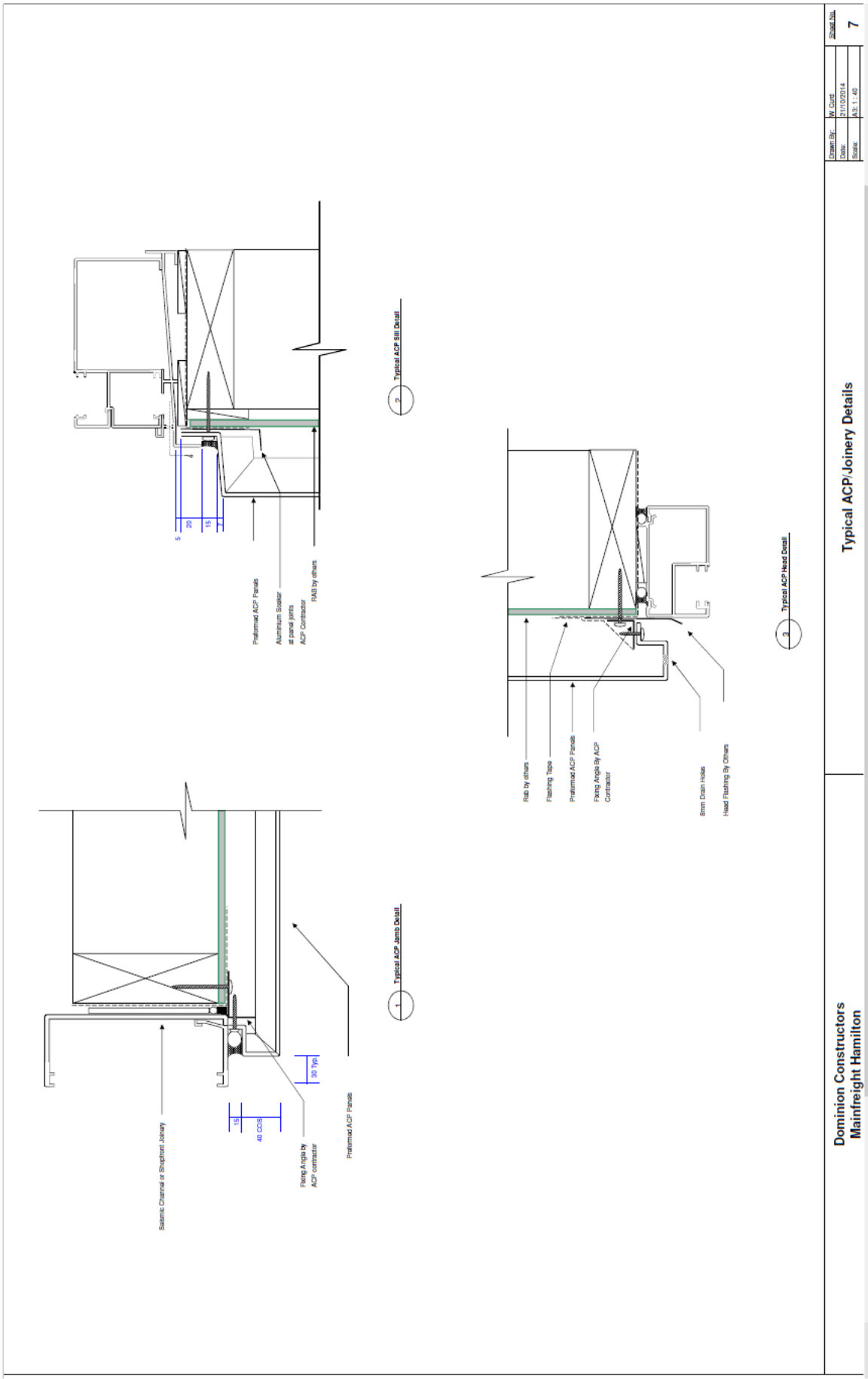
Tested by:..John Yolland (Deceased) Checked by...John Burgess...



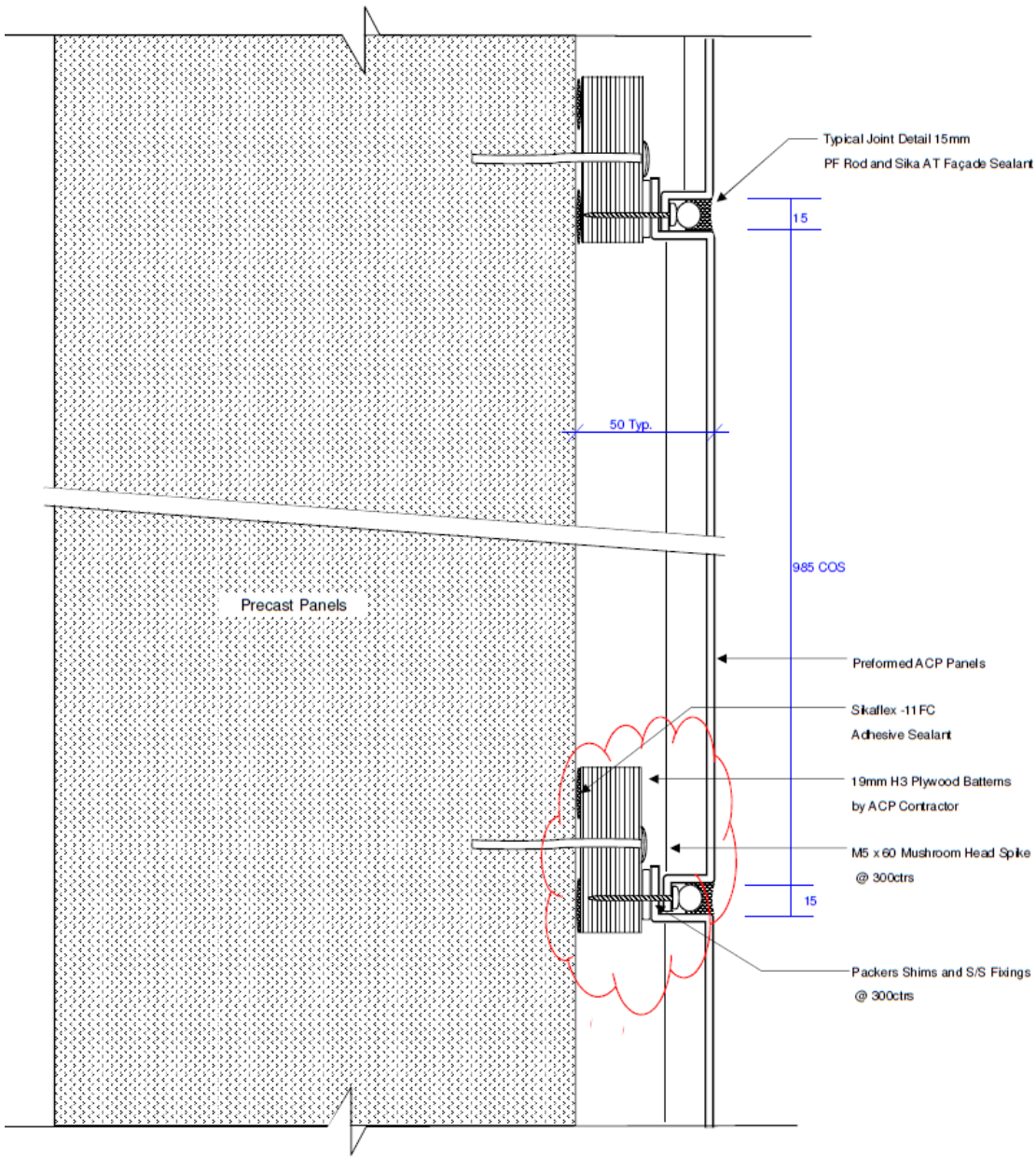




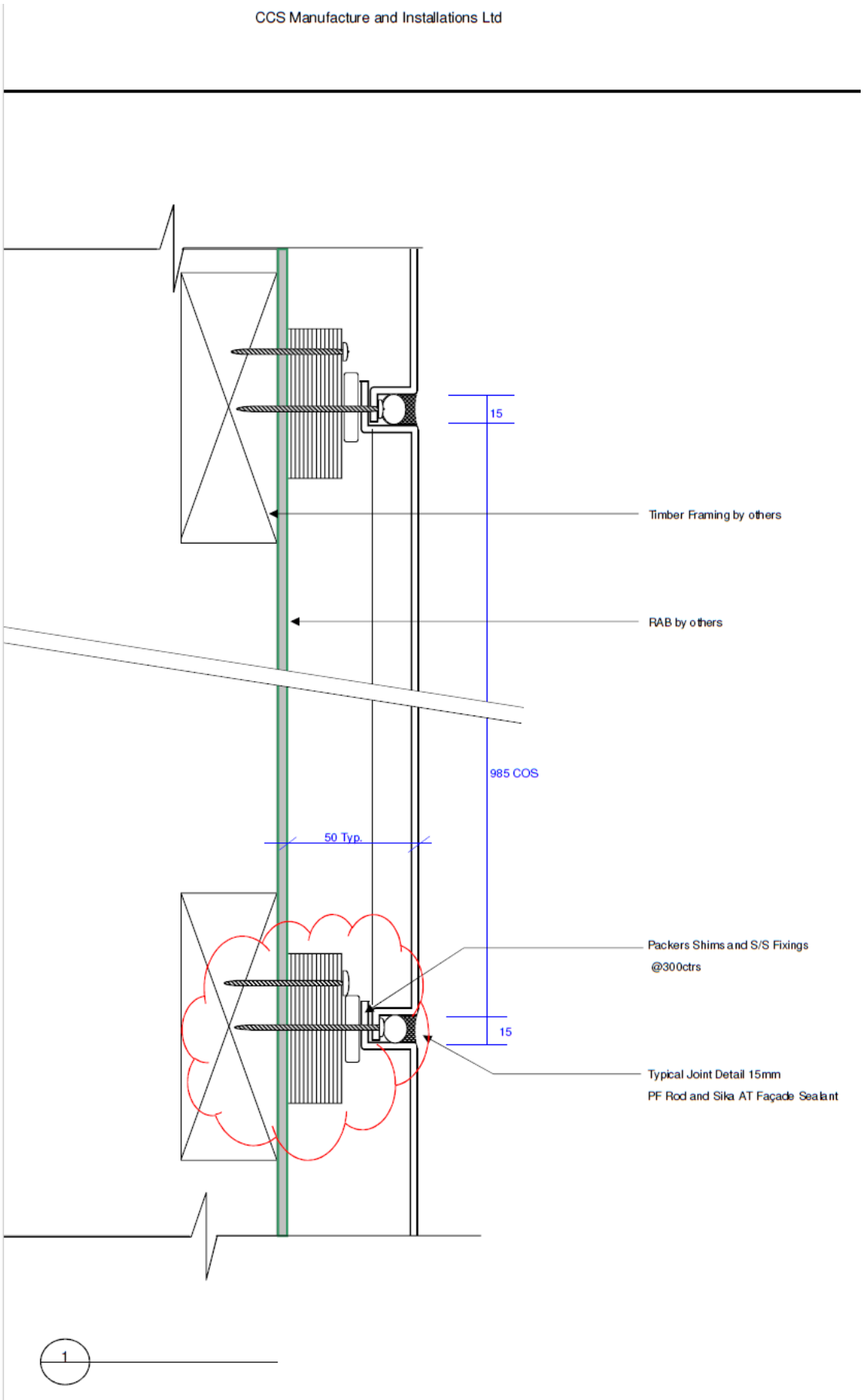


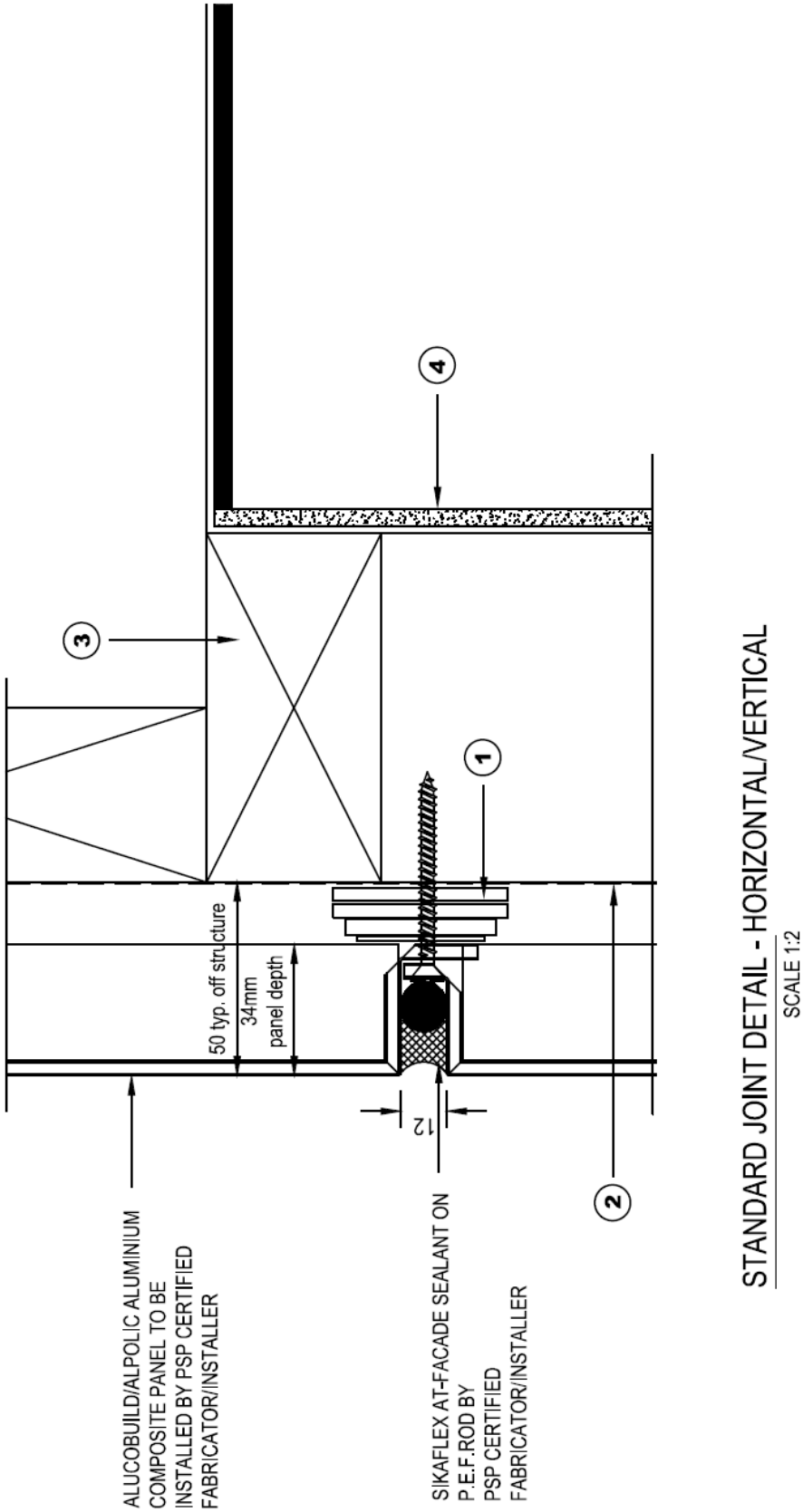


CCS Manufacture and Installations Ltd



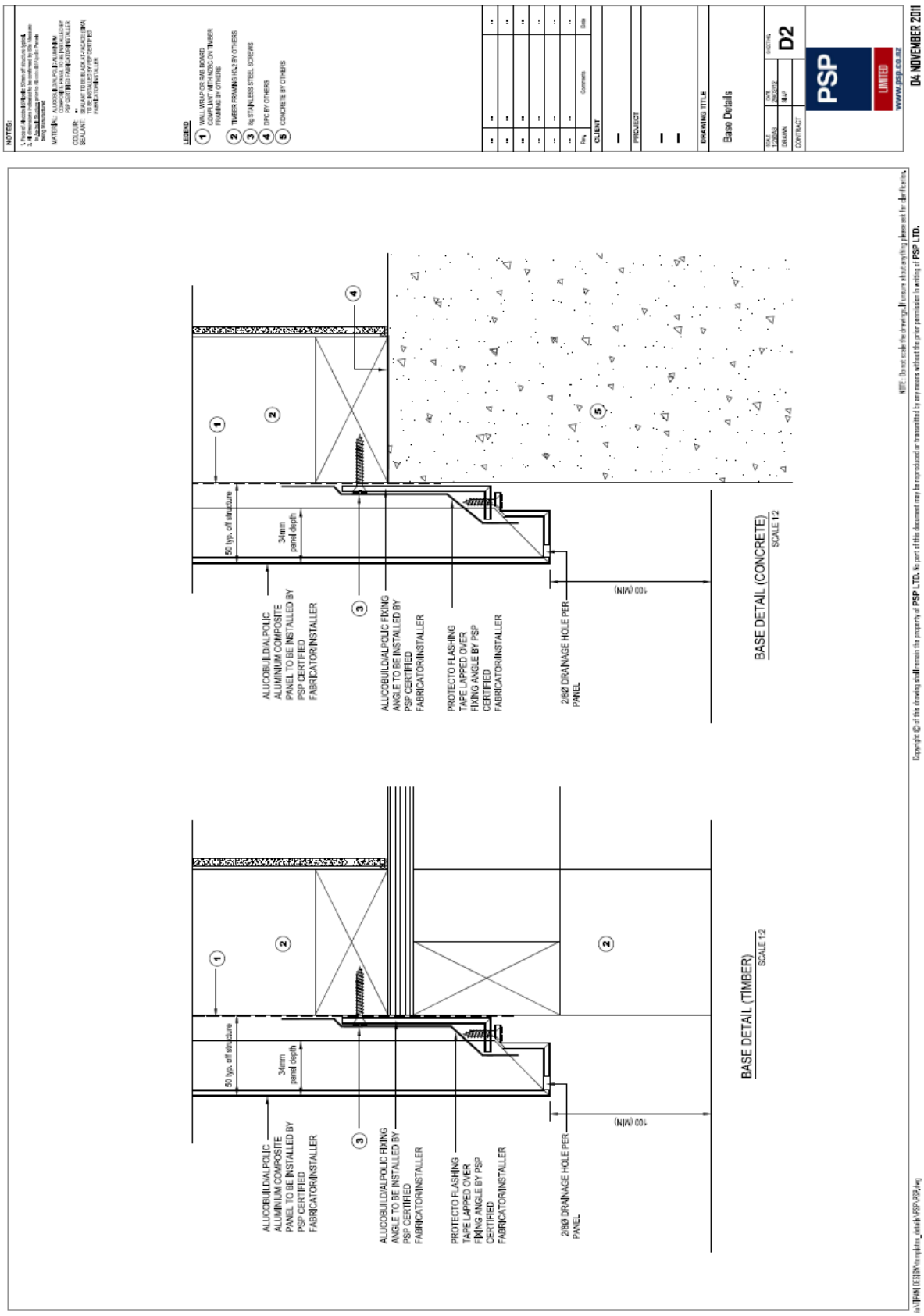
1



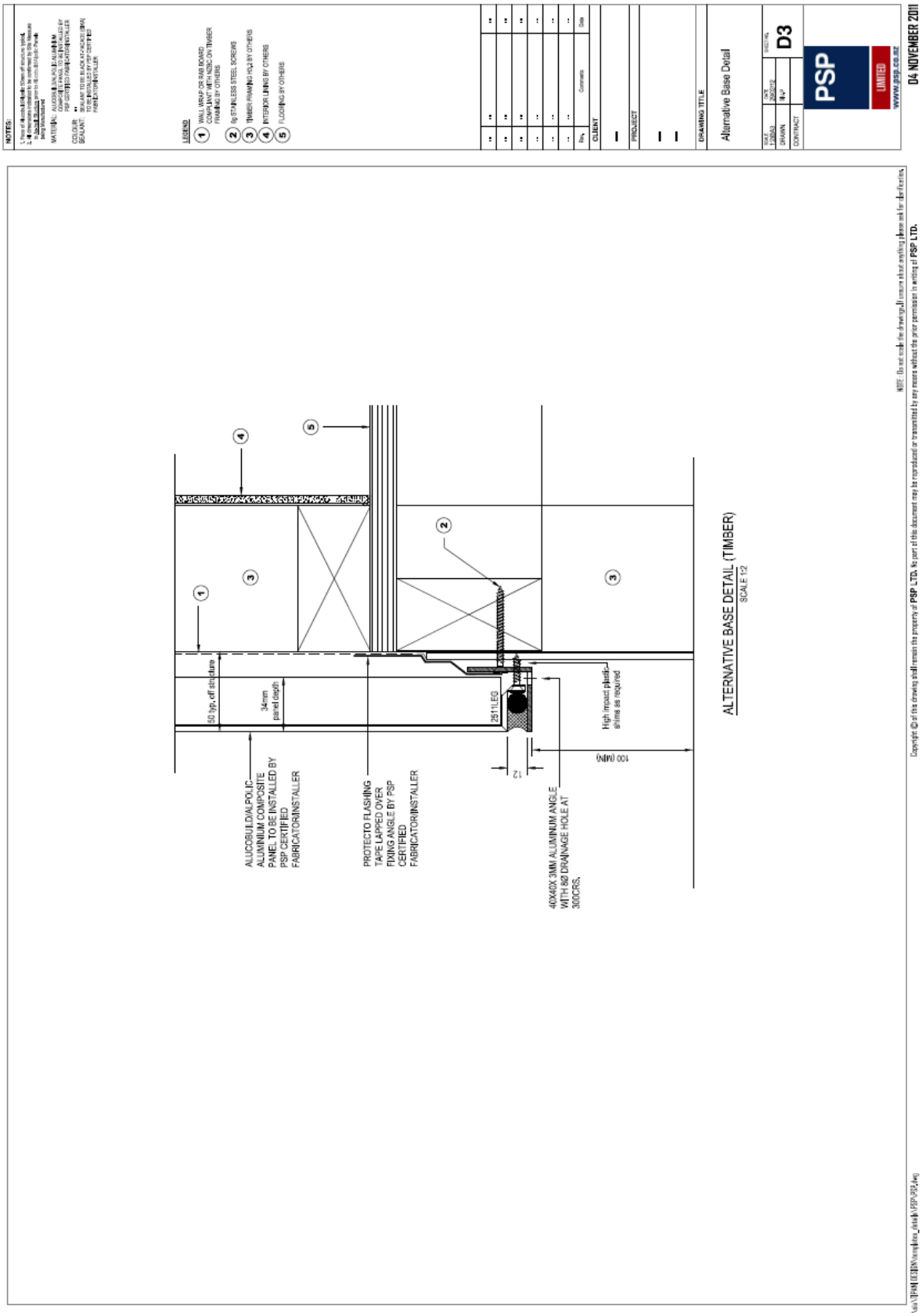


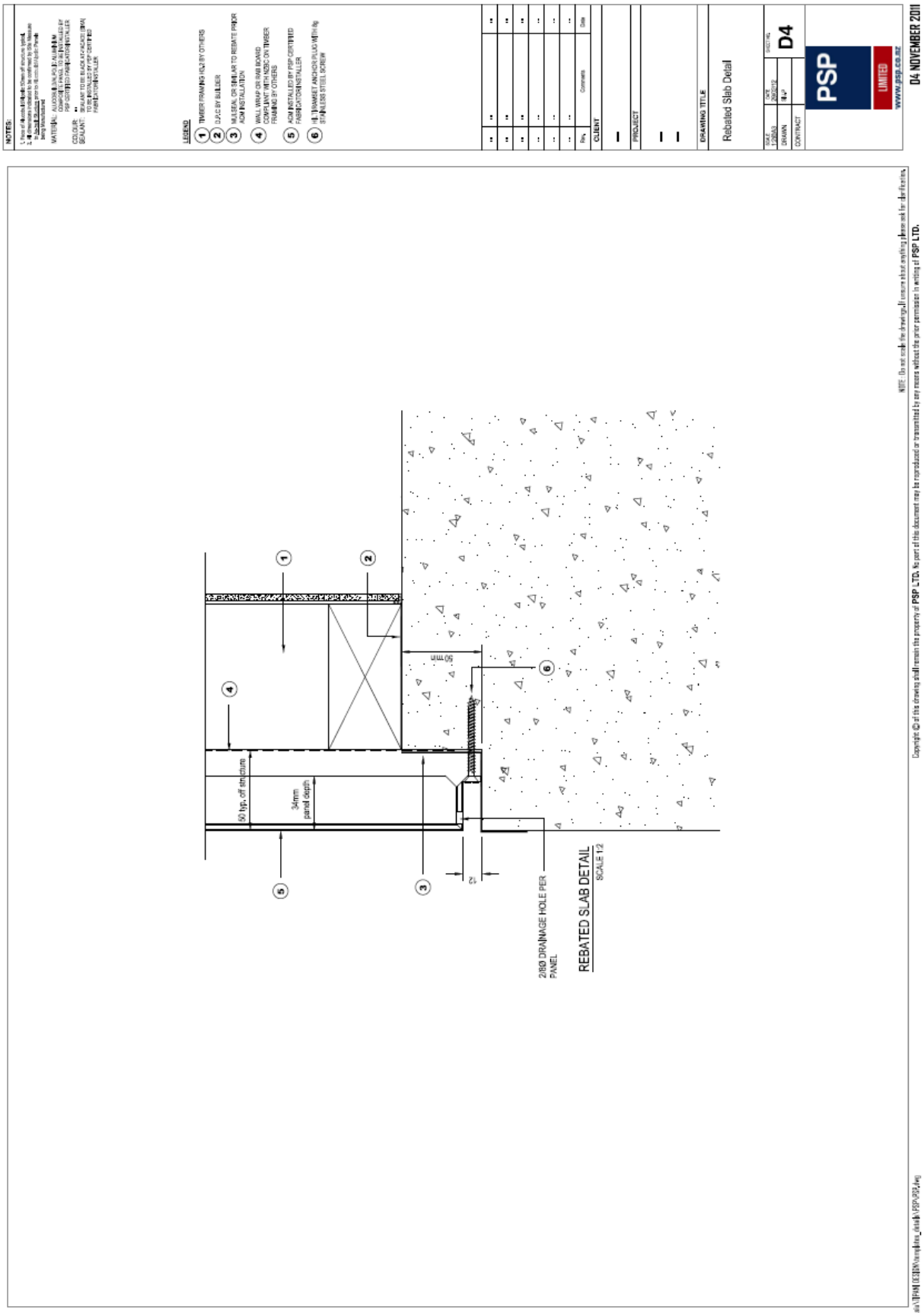
STANDARD JOINT DETAIL - HORIZONTAL/VERTICAL

SCALE 1:2

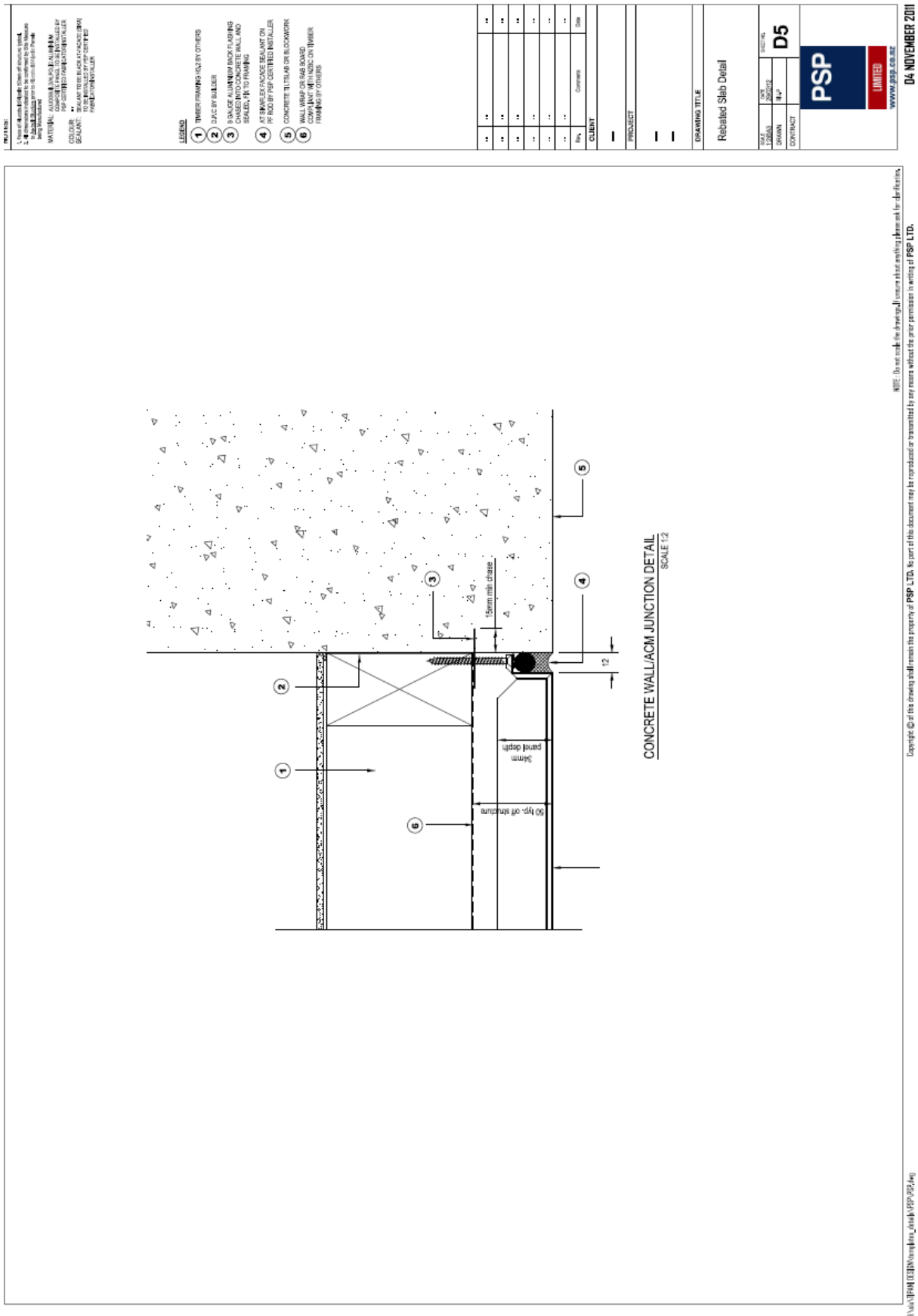


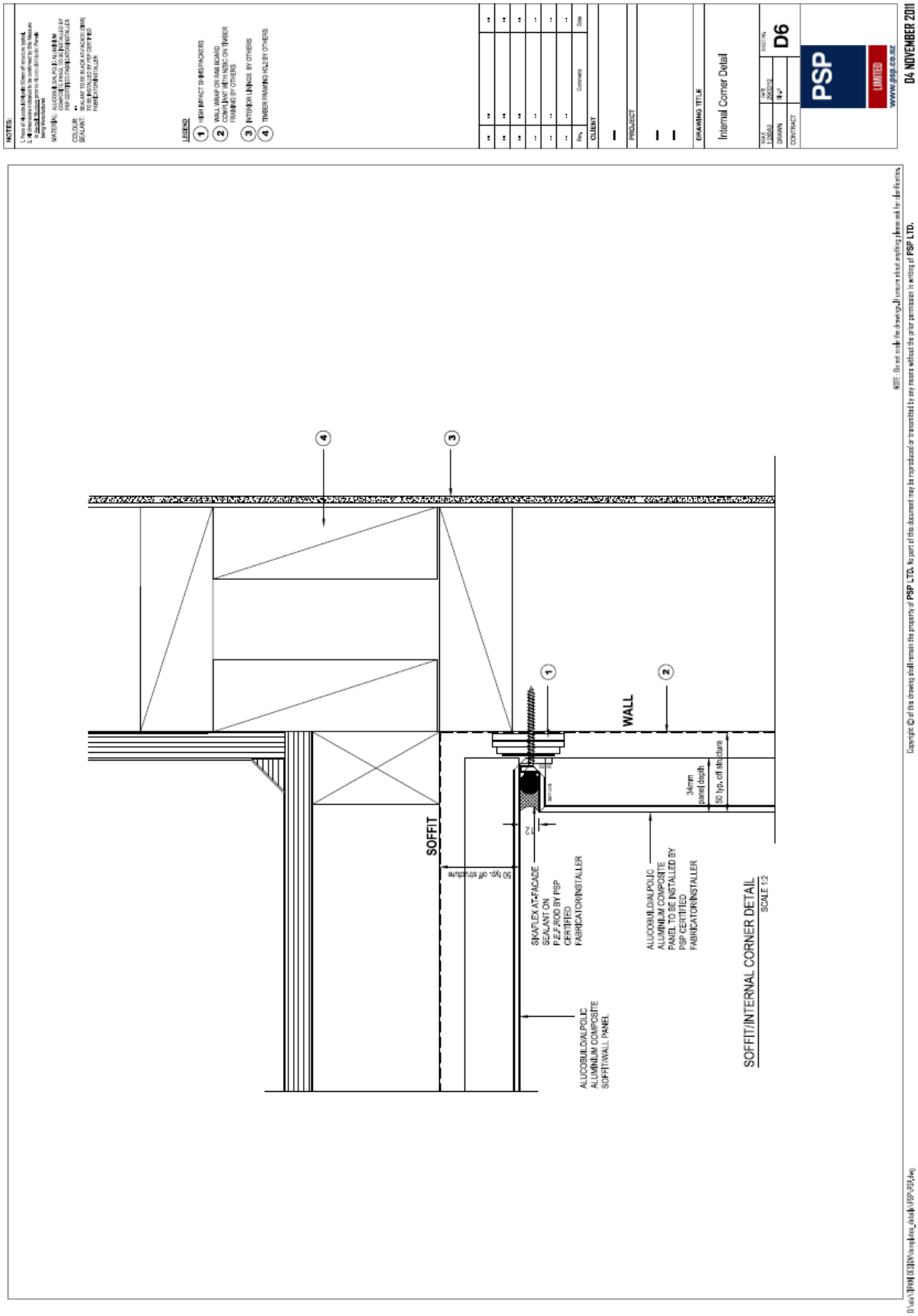
Tested by:..John Yolland (Deceased) Checked by...John Burgess...

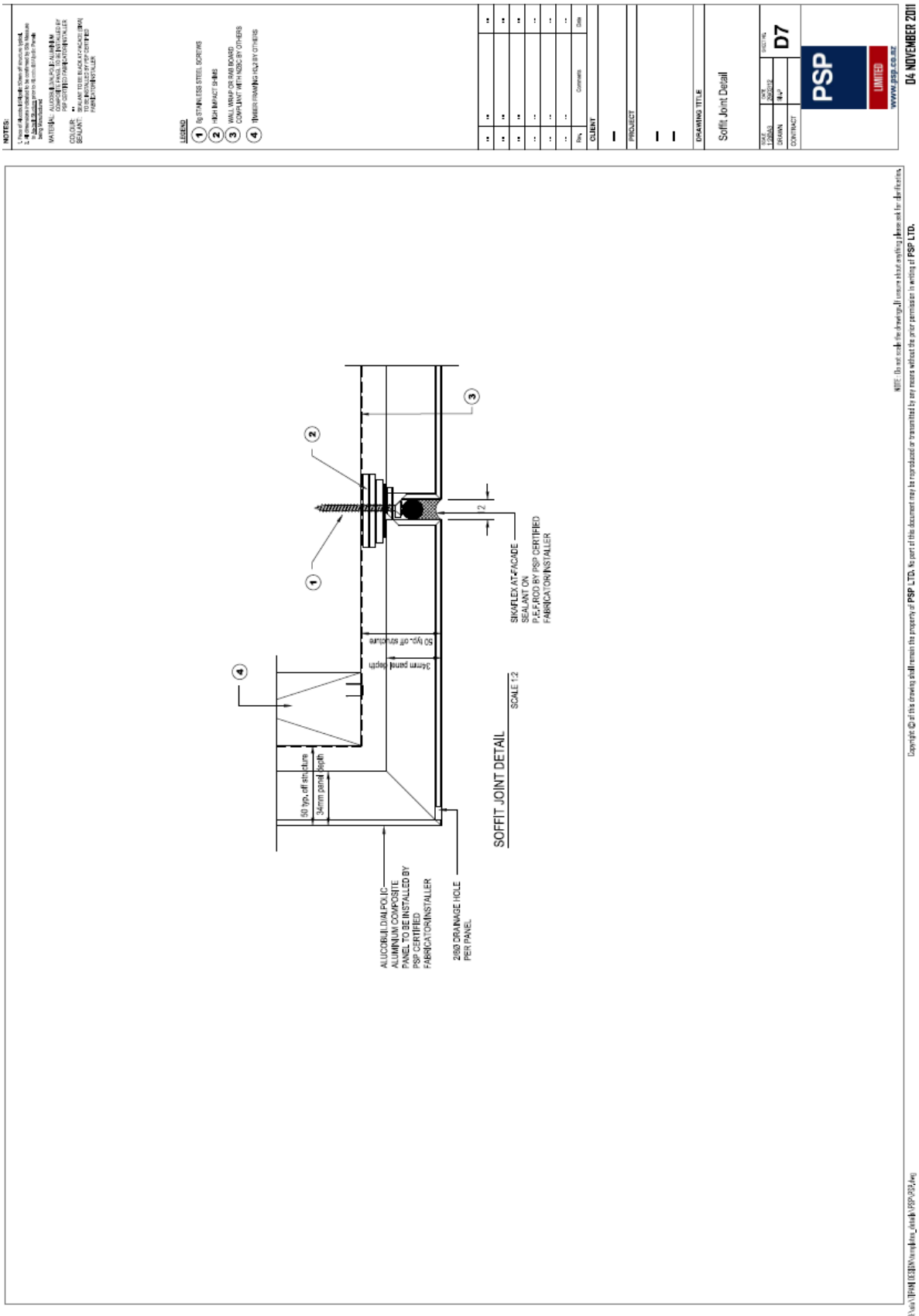


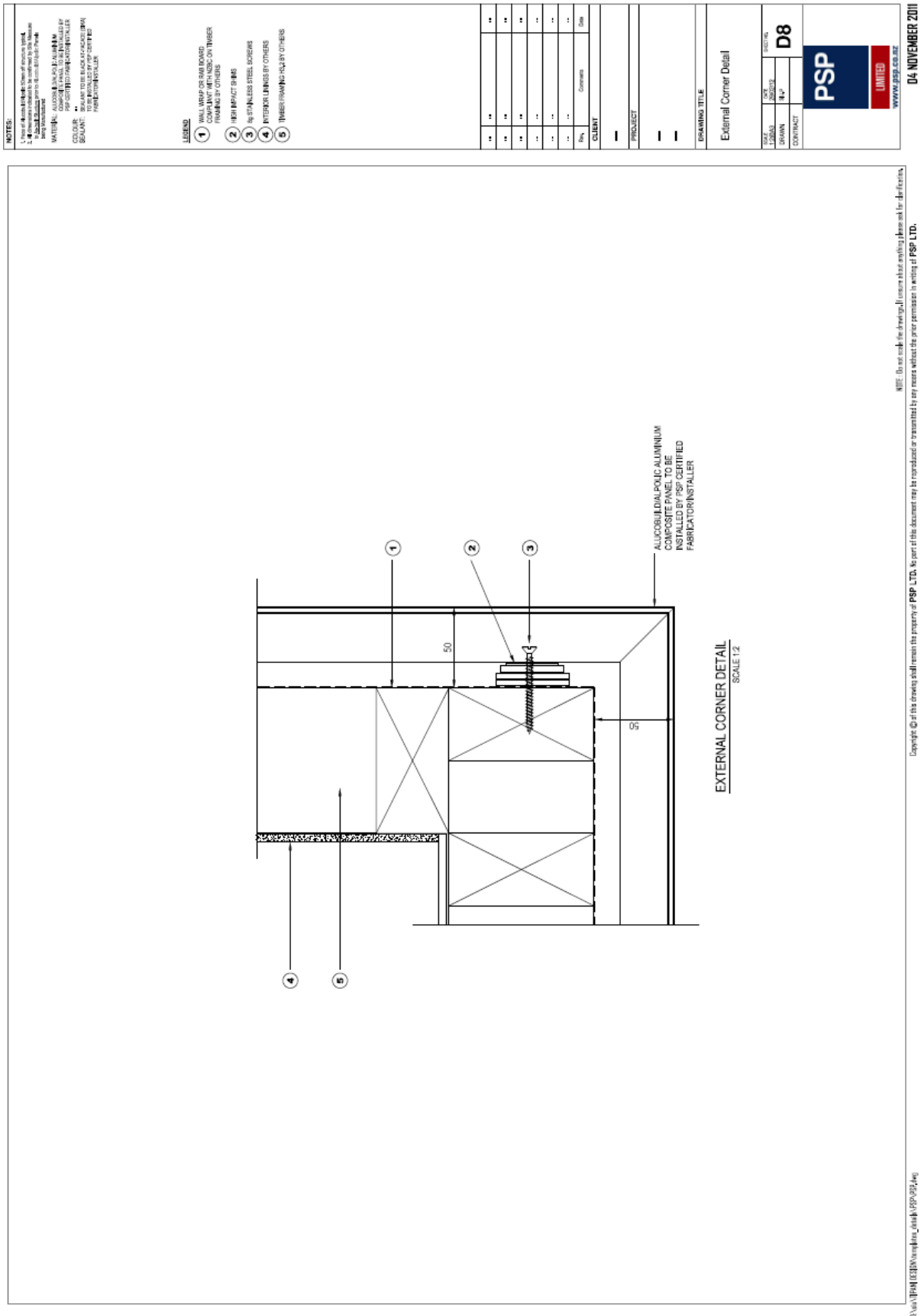


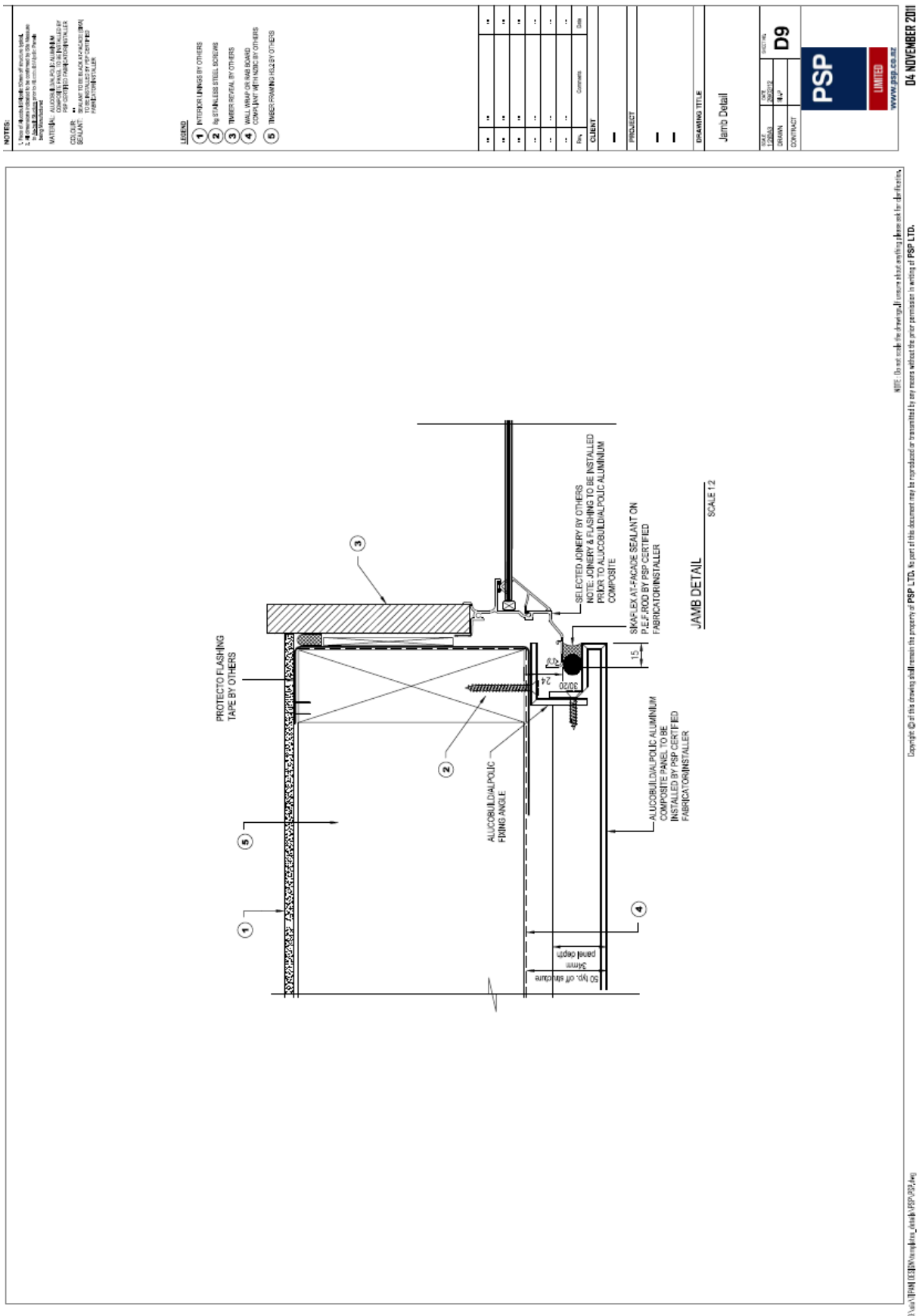
Tested by:..John Yolland (Deceased) Checked by...John Burgess...

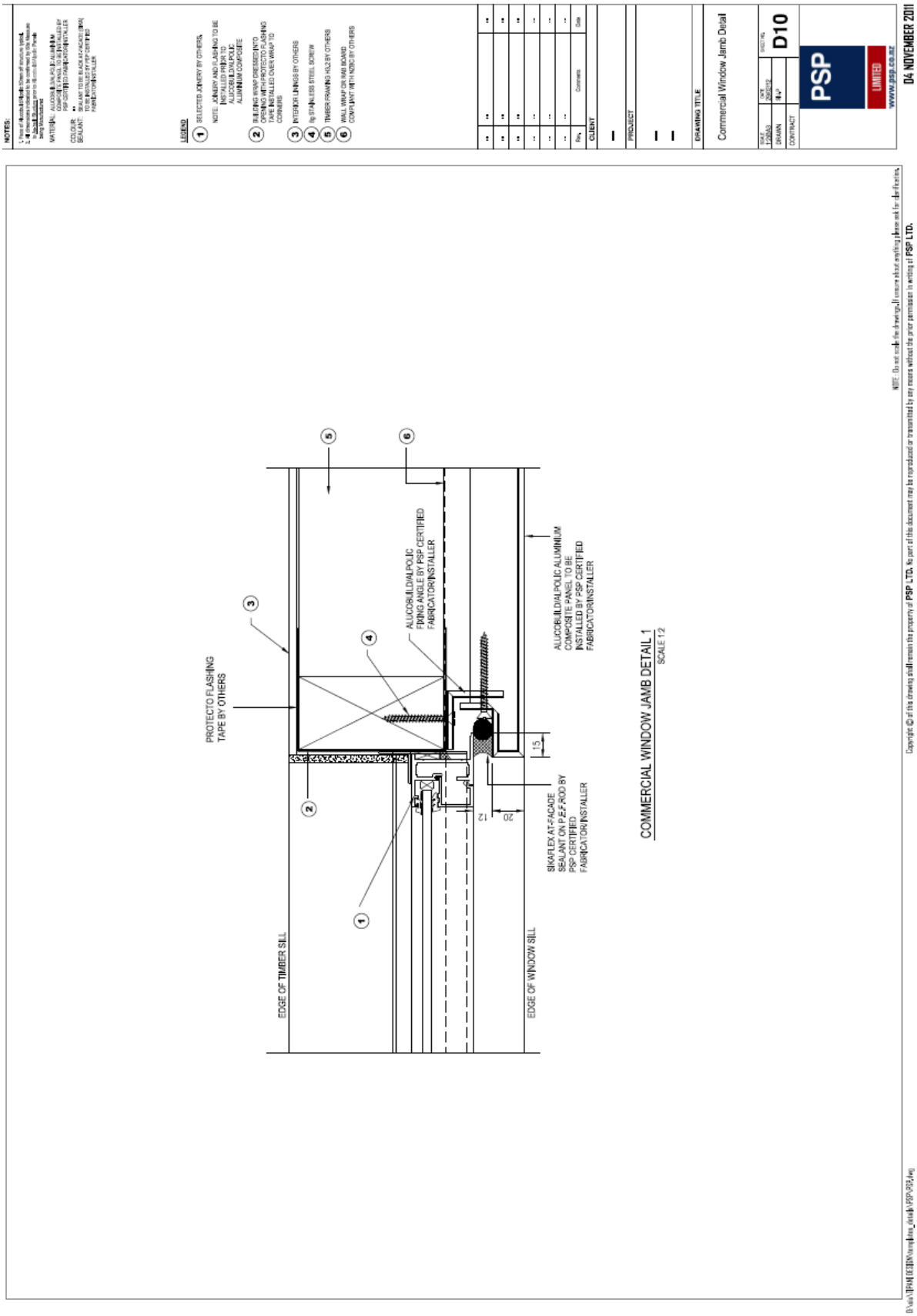




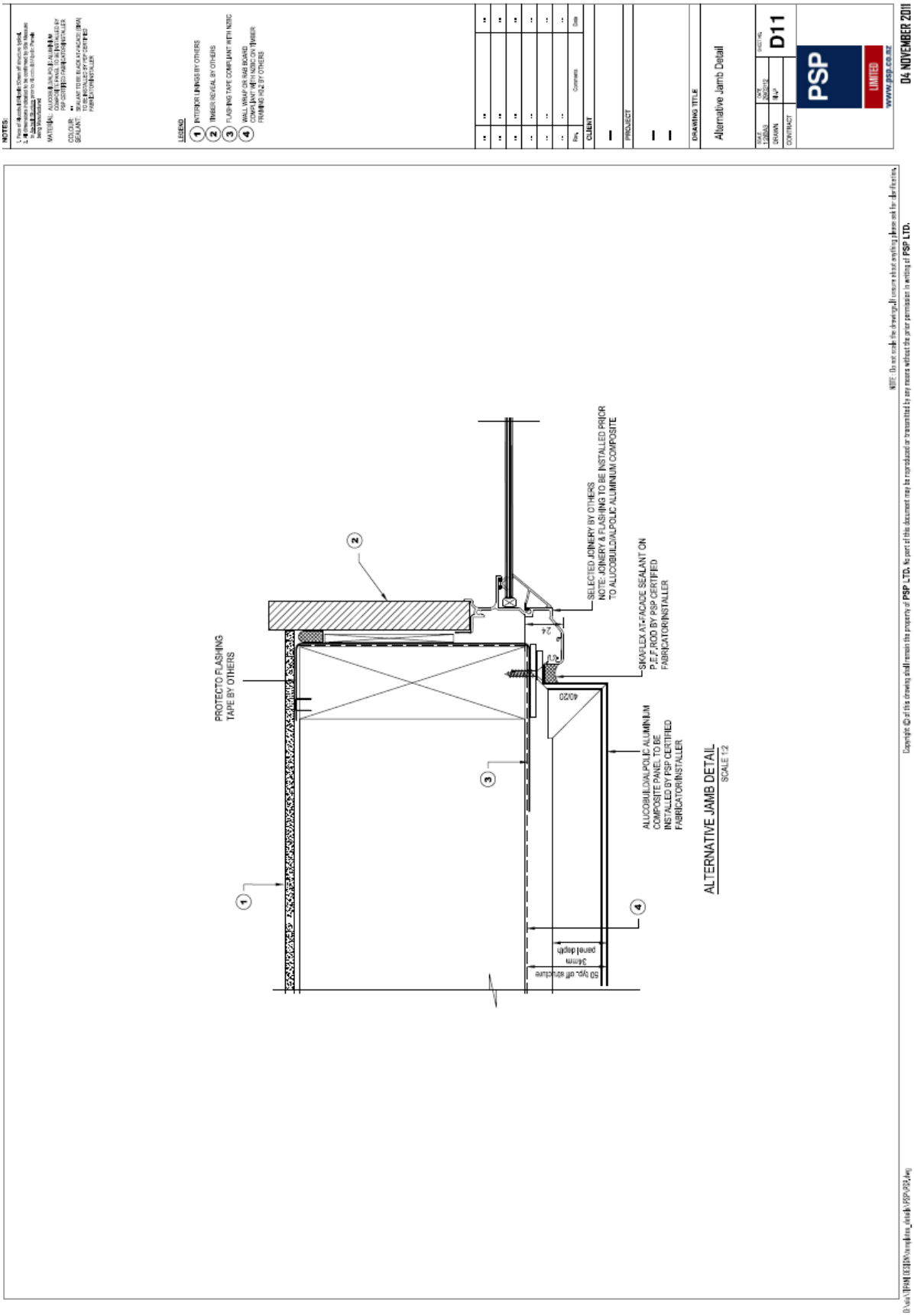




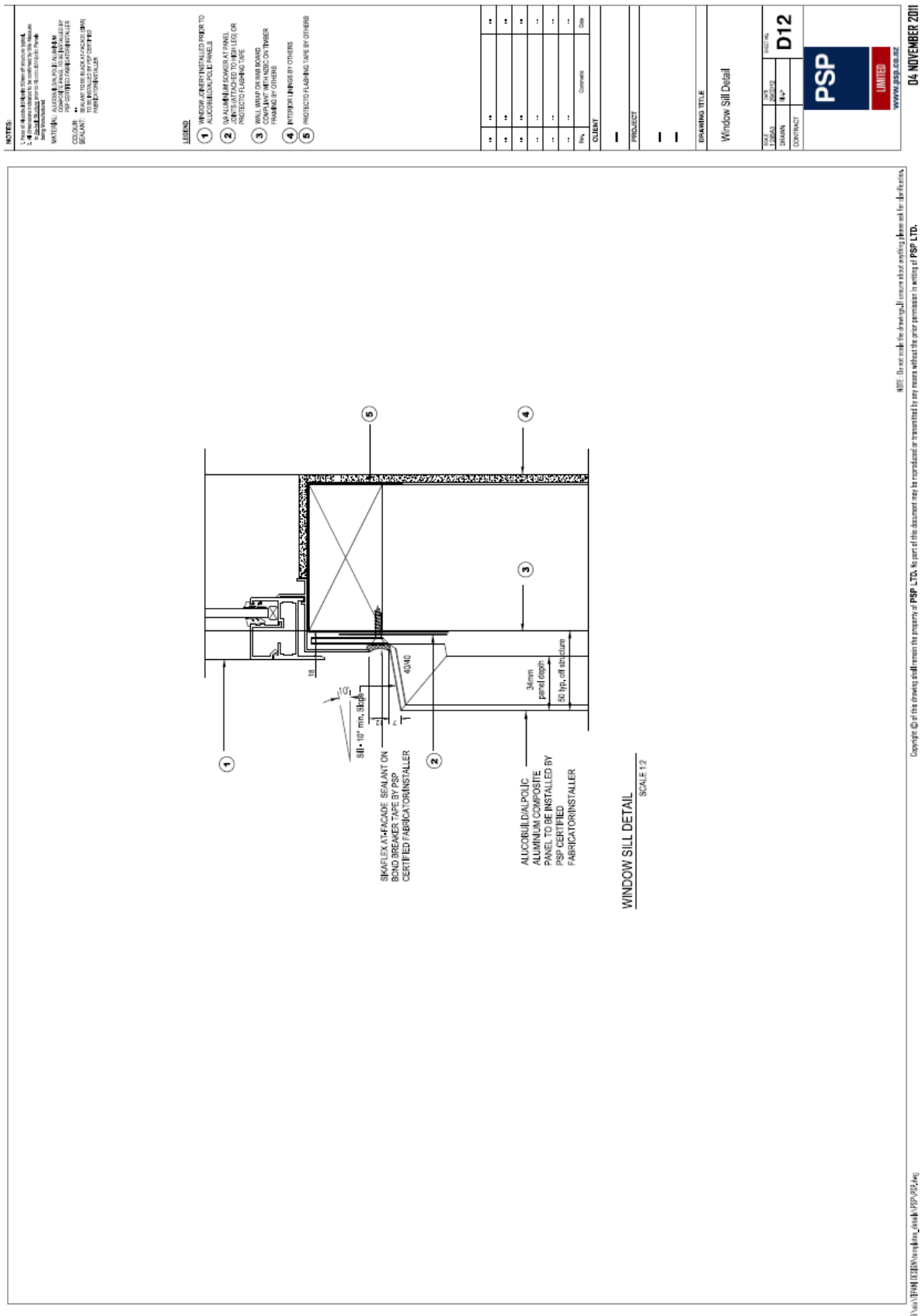


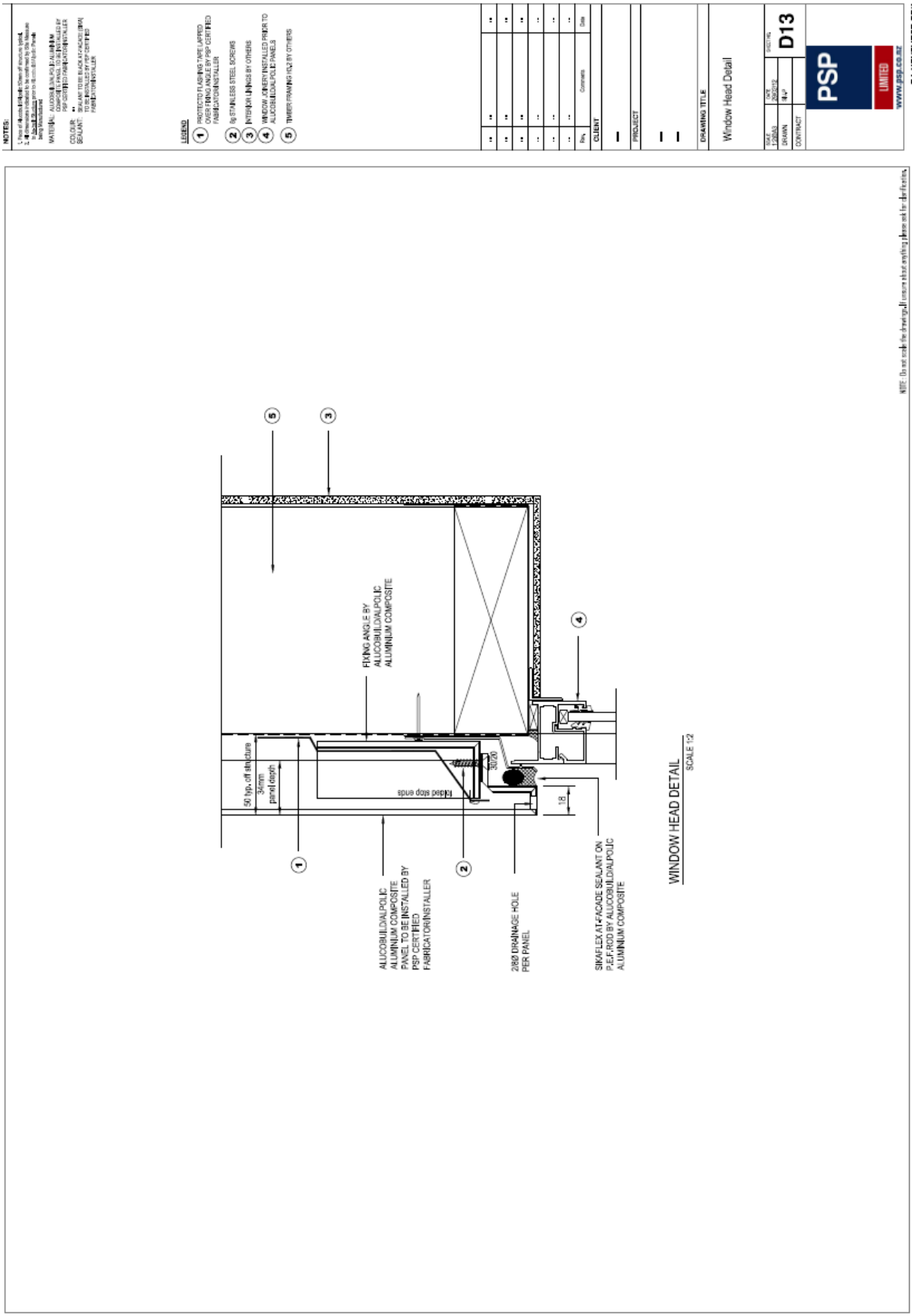


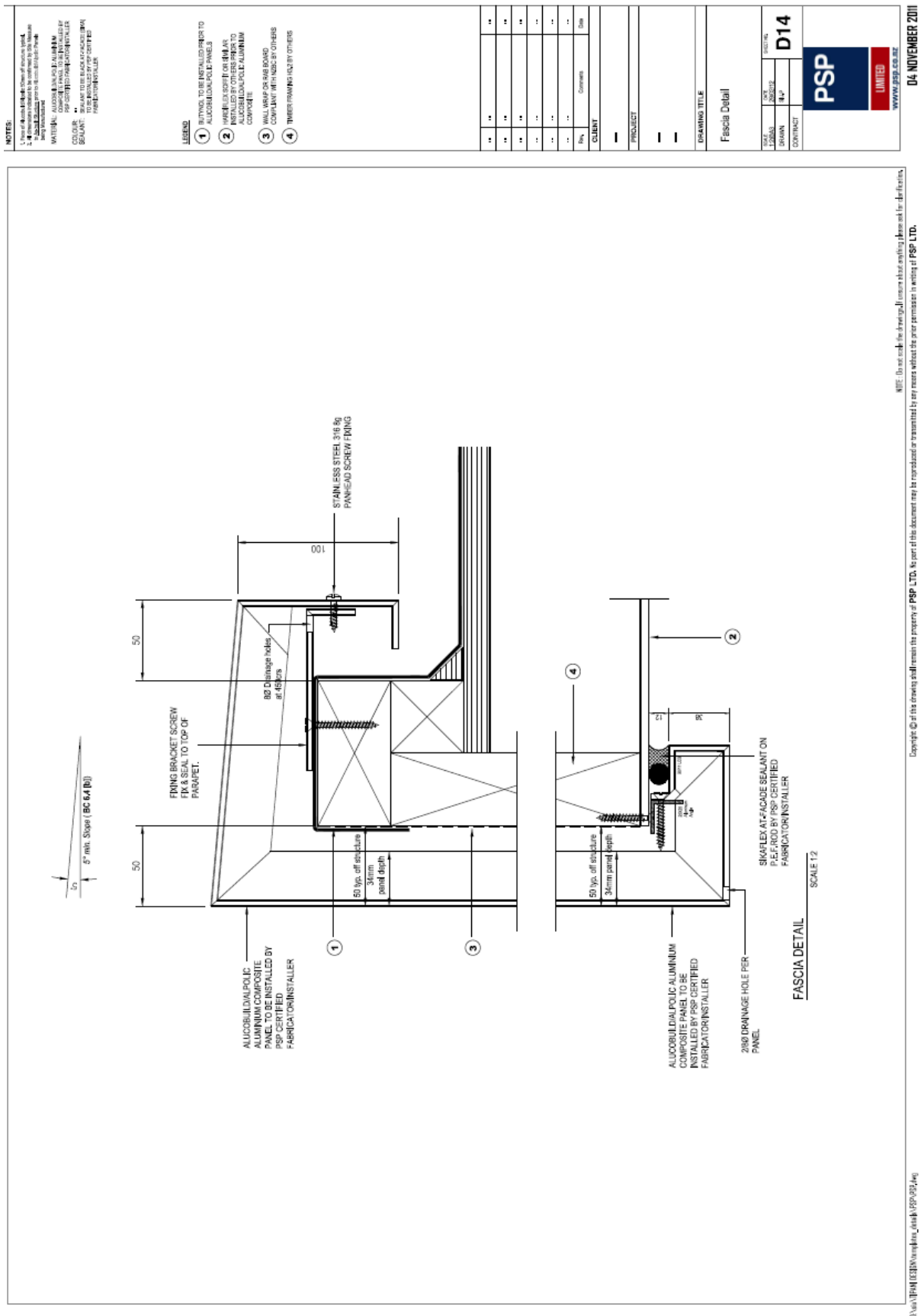
Tested by:..John Yolland (Deceased) Checked by...John Burgess...

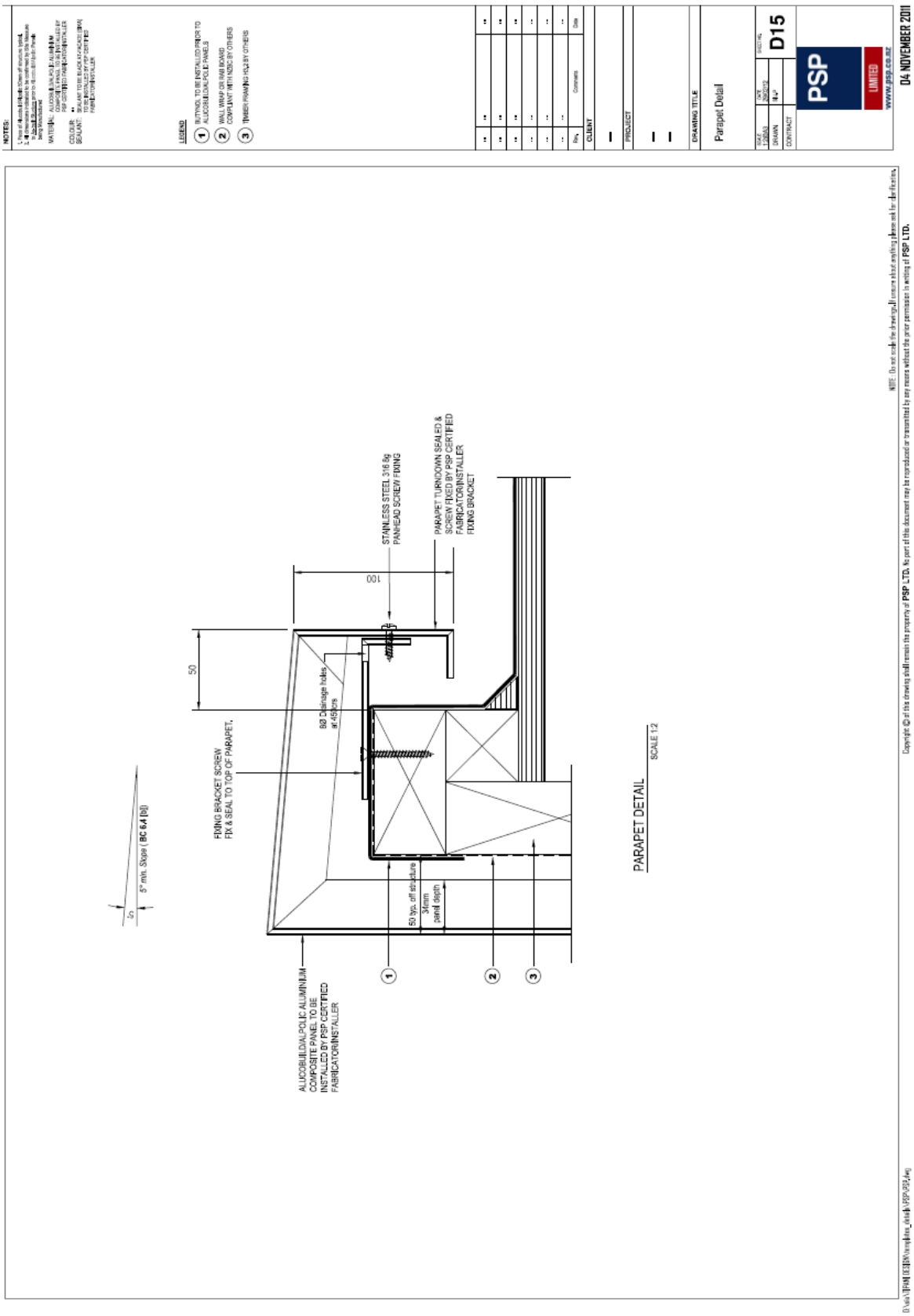


Tested by:..John Yolland (Deceased) Checked by...John Burgess...

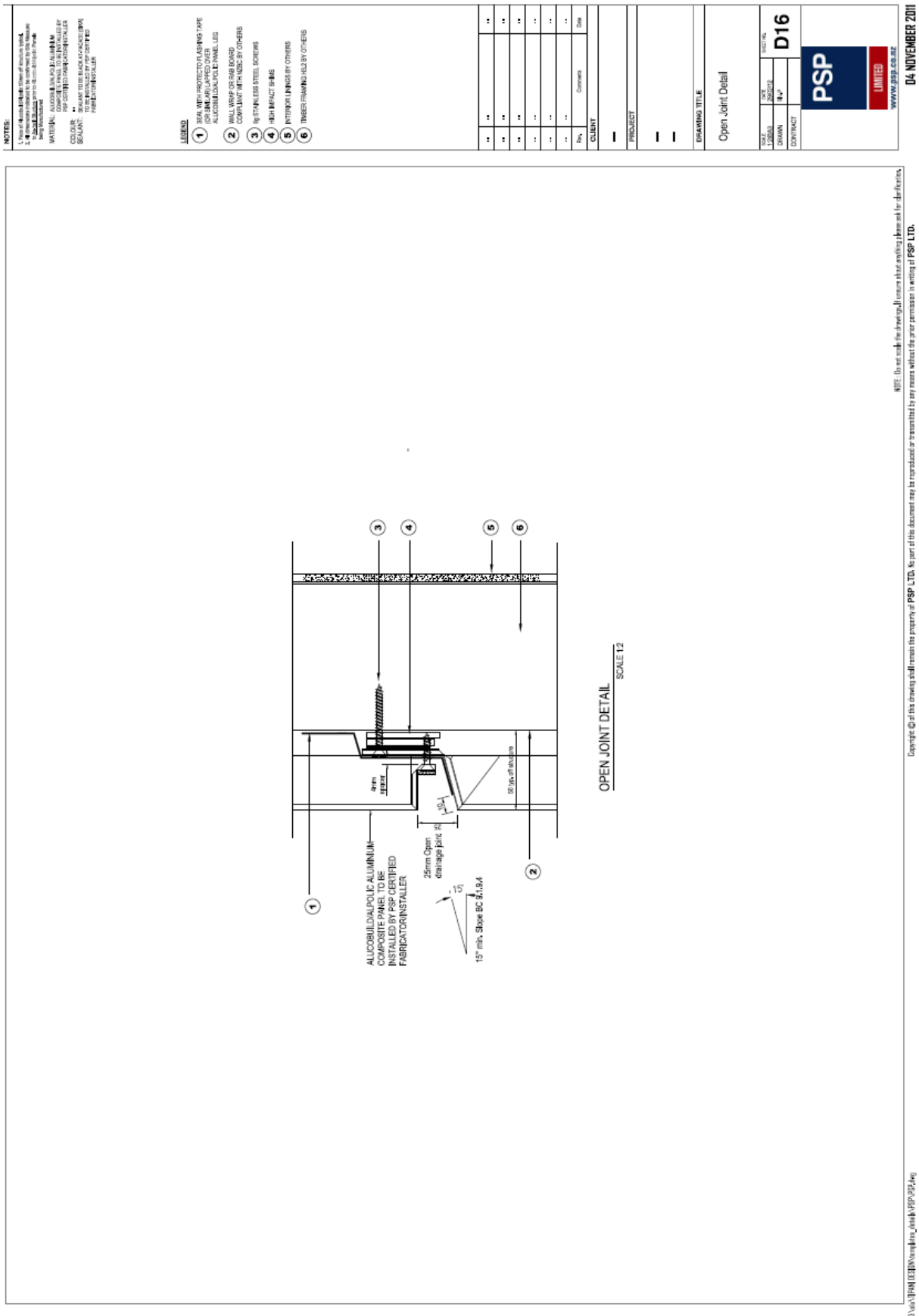




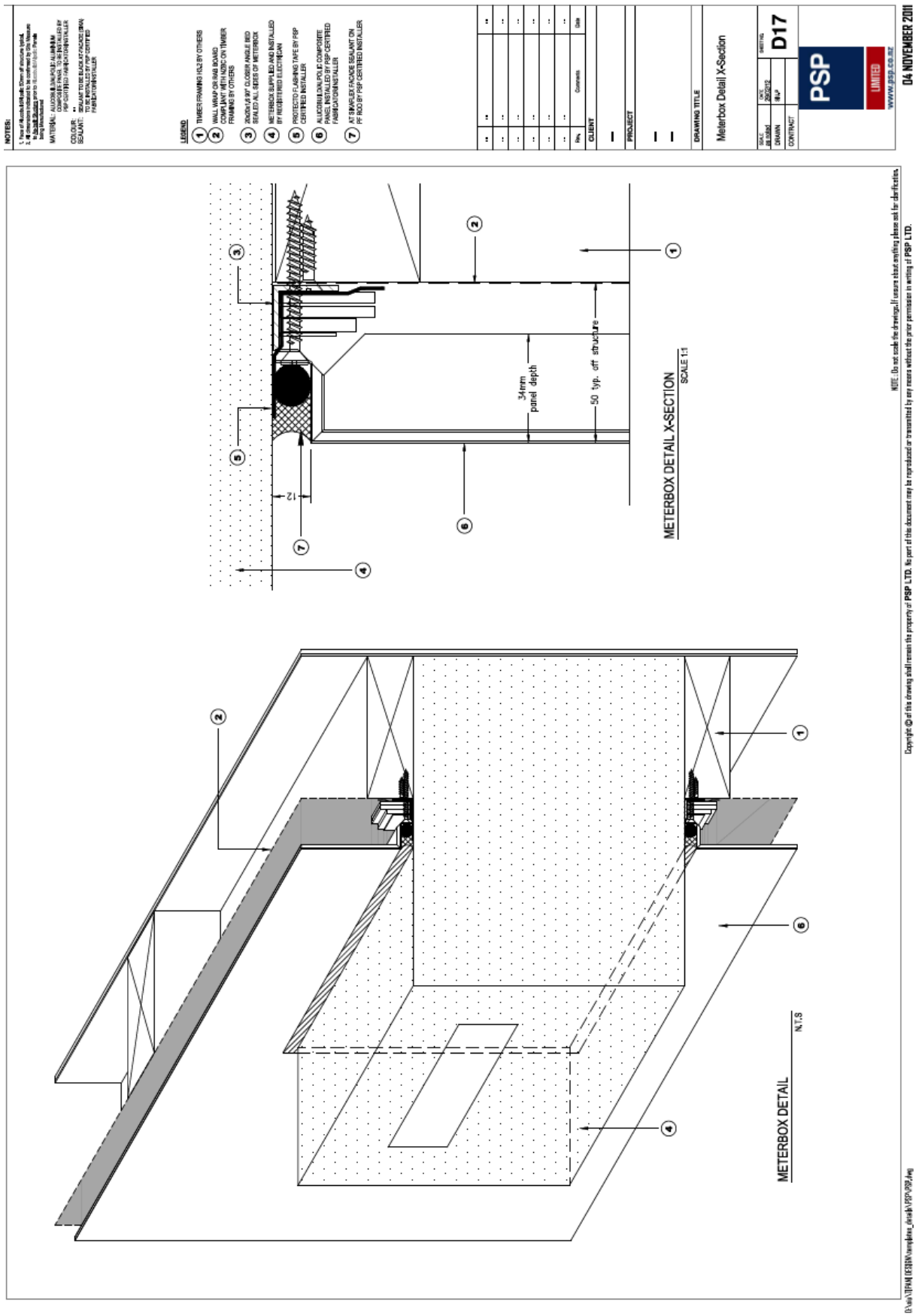




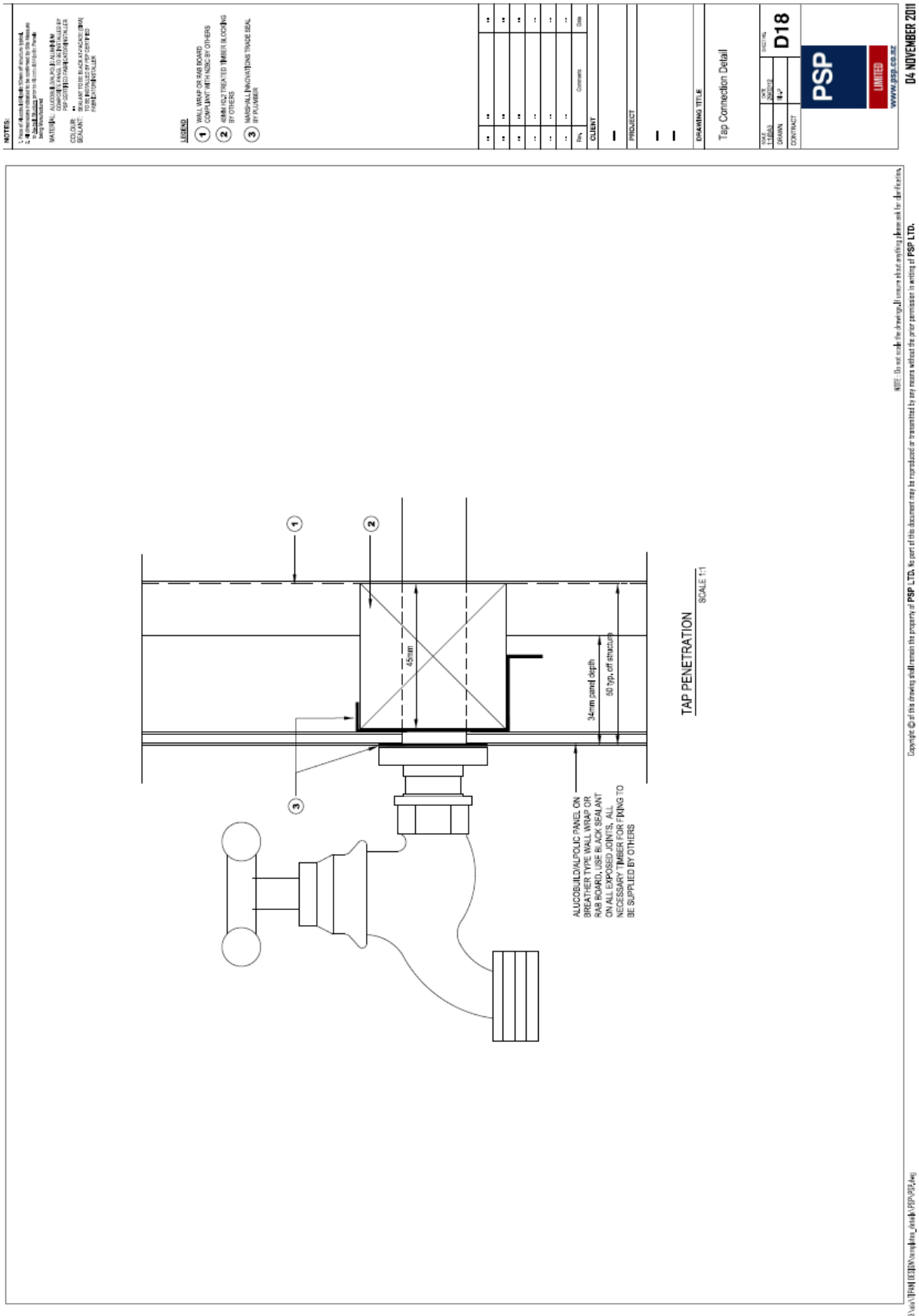
Tested by:..John Yolland (Deceased) Checked by...John Burgess...

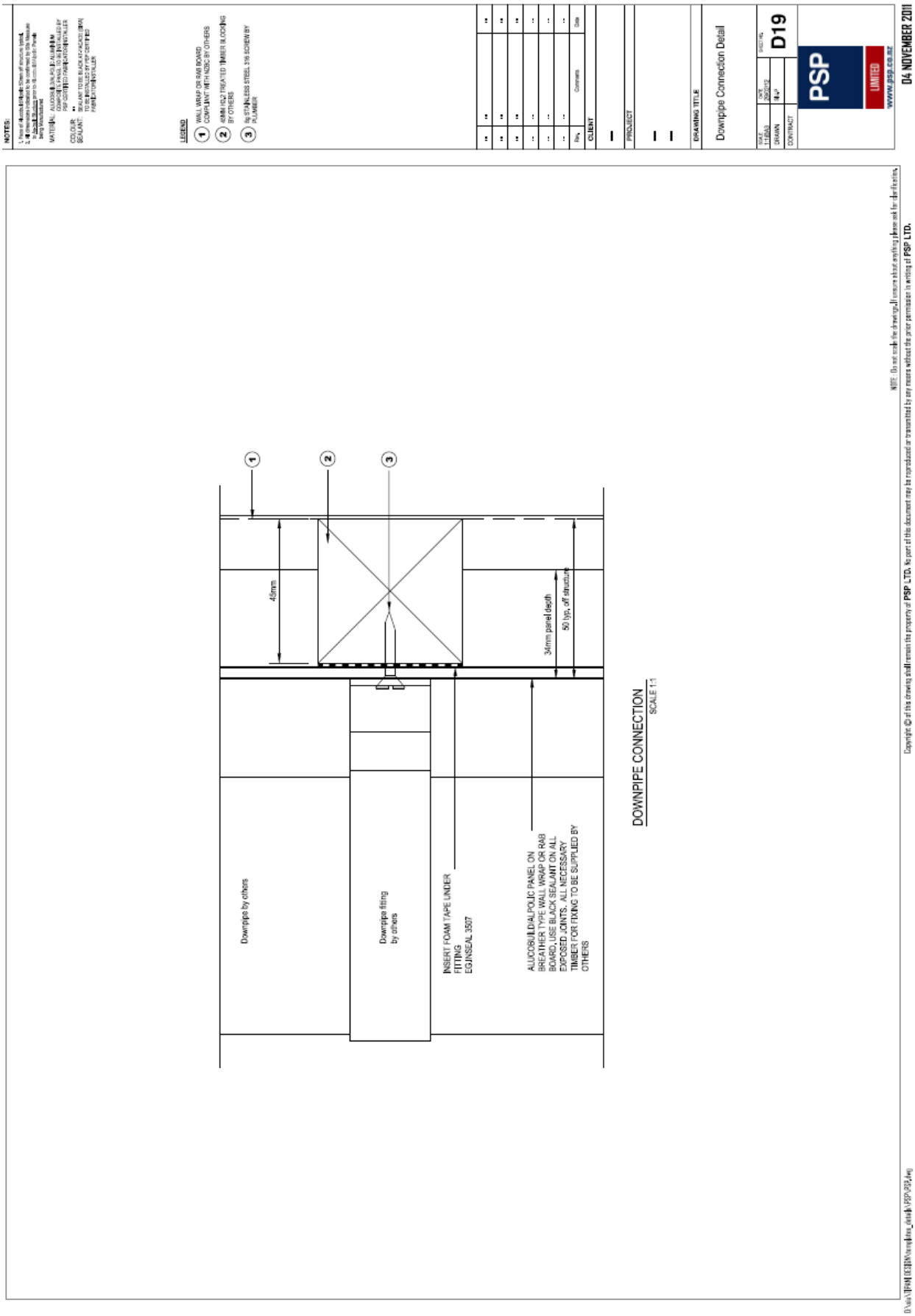


Tested by:..John Yolland (Deceased) Checked by...John Burgess...

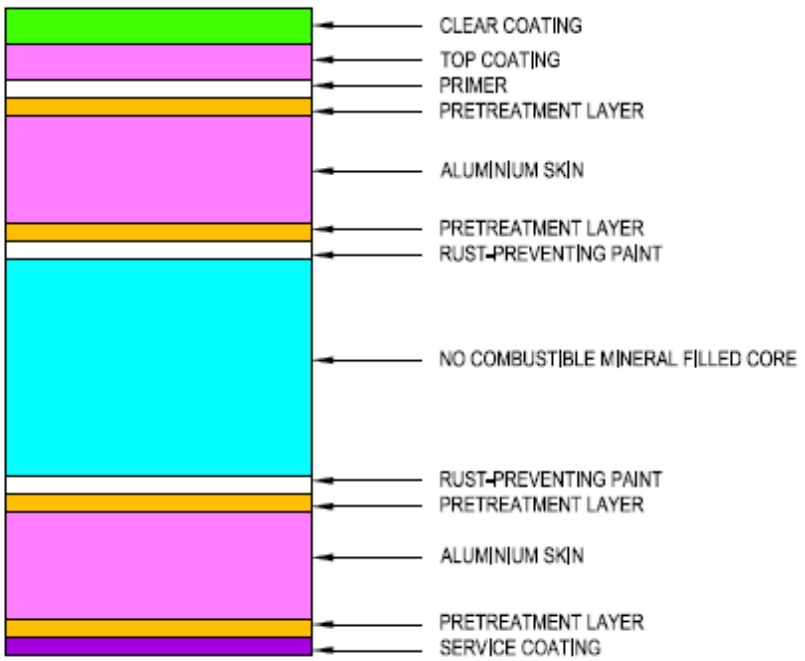


Tested by:..John Yolland (Deceased) Checked by...John Burgess...





Tested by:..John Yolland (Deceased) Checked by...John Burgess...



NOTE : Do not scale the drawings. If unsure about anything please ask for clarification.

NOTES:

Rev.	Comments	Date
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

CLIENT
—

PROJECT
—
—

DRAWING TITLE
Alpolic Composition
—

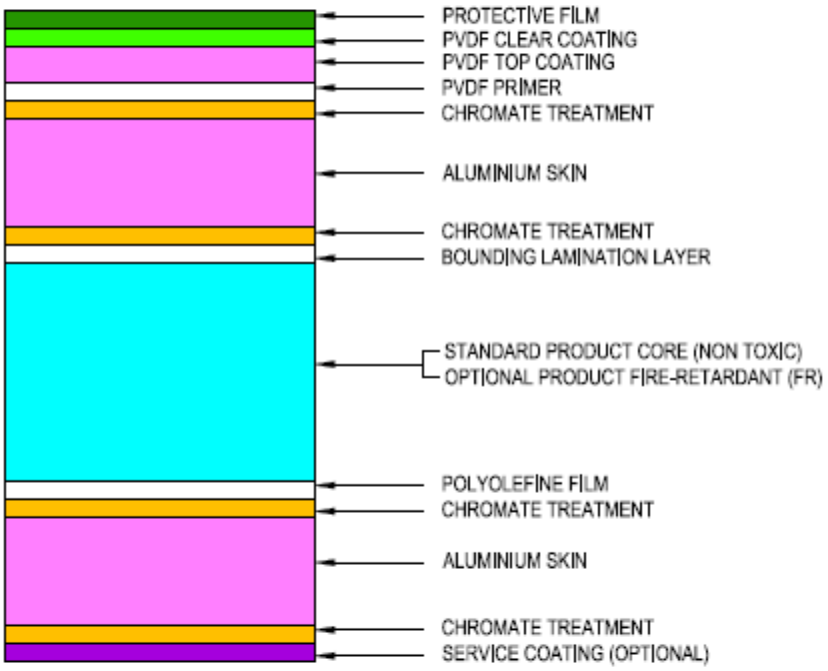
SCALE	DATE	SHEET NO.
N.T.S	29/03/12	D20
DRAWN	RHP	
CONTRACT		

PSP LIMITED
www.psp.co.nz

D:\cia\TP&M DESIGN\templates_details\PSP\PSP.dwg

04 NOVEMBER 2011

Tested by:..John Yolland (Deceased) Checked by...John Burgess...



NOTES:

Rev.	Comments	Date
--	--	-
--	--	-
--	--	-
--	--	-
--	--	-
--	--	-

CLIENT

—

PROJECT

—
—

DRAWING TITLE

Alucobest Composition

—

SCALE	DATE	SHEET NO.
N.T.S	29/02/12	D21
DRAWN	MP	
CONTRACT		

PSP LIMITED
www.psp.co.nz

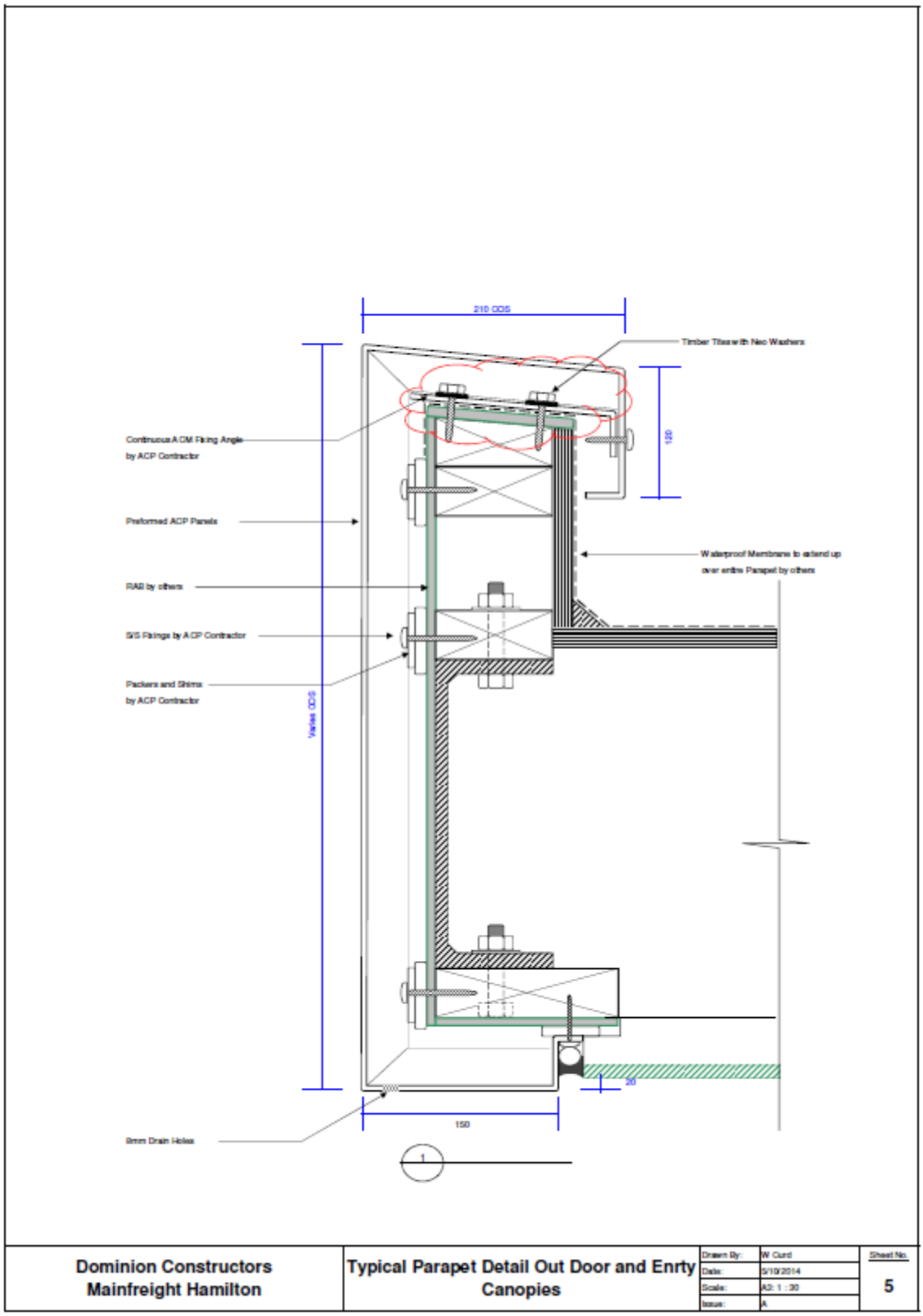
NOTE : Do not scale the drawings. If unsure about anything please ask for clarification.

F:\cad\[PSP/MI DESIGN\templates_details\PSP\PSP.dwg

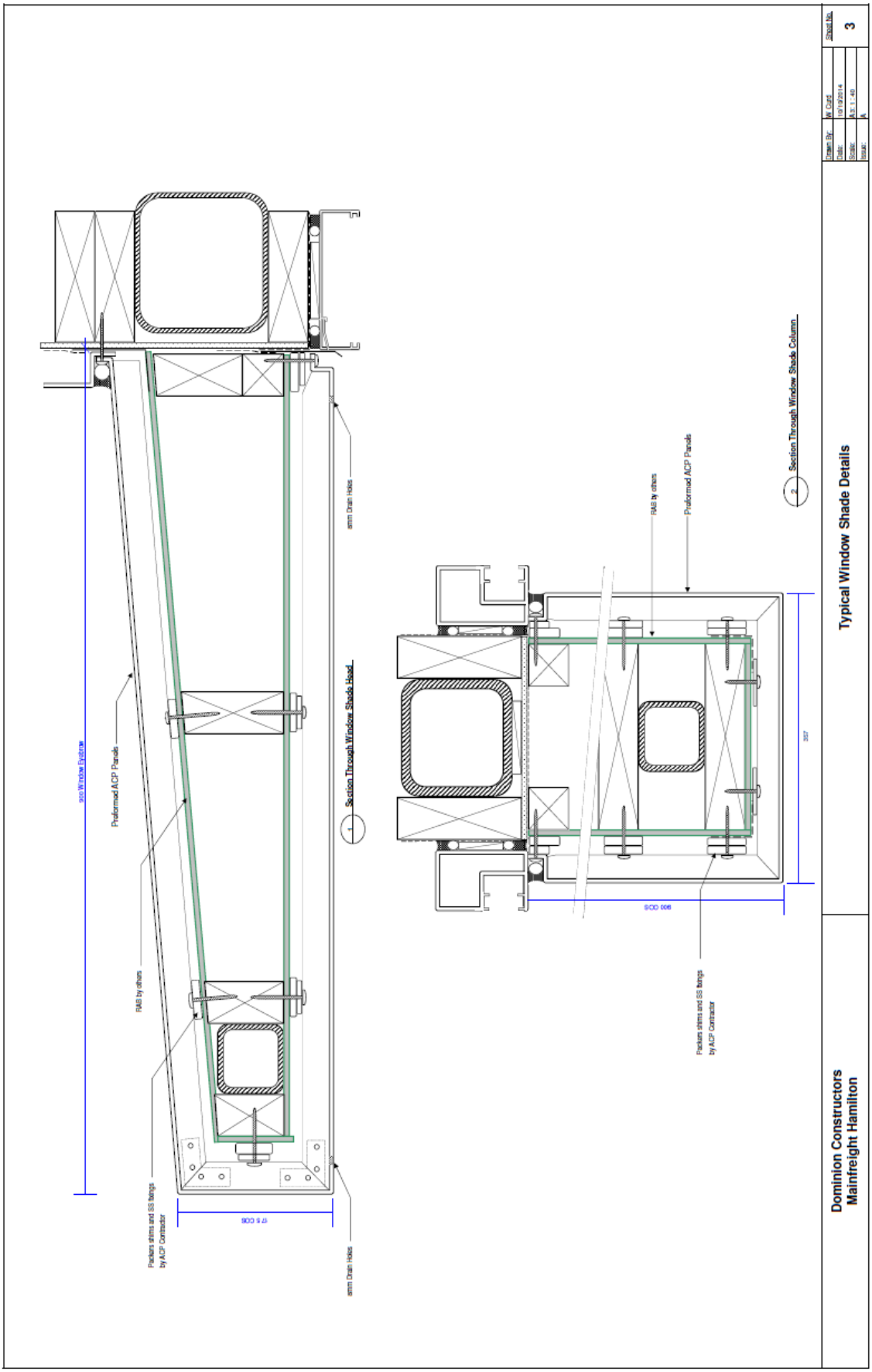
04 NOVEMBER 2011

Tested by:..John Yolland (Deceased) Checked by...John Burgess...

CCS Manufacture and Installations Ltd



Tested by:..John Yolland (Deceased) Checked by...John Burgess...



Tested by:..John Yolland (Deceased) Checked by...John Burgess...

Tested by:..John Yolland (Deceased) Checked by...John Burgess...

MITSUBISHI PLASTICS
Mitsubishi Plastics Building
2-2, Nihonbashi Hongokucho 1-chome
Chuo-ku, Tokyo 103-0021 Japan

MATERIAL SAFETY DATA SHEET

MSDS No: LL75-0002

Company identification	
Name of manufacturer:	Mitsubishi Plastics, Inc.
Name of division:	Composite Materials Department, Industrial Materials Division
Address:	2-2, Nihonbashi Hongokucho 1-chome, Chuo-ku, Tokyo 103-0021 Japan
Telephone:	81-3-3279-3064 / 3065
Facsimile:	81-3-3279-6672
Date of preparation or revision	23 April, 2008

1. Product name:
   ALPOLIC®/fr, Aluminum Composite Material with fire-retardant core filled with non-combustible mineral.

2. Composition / information on ingredients:
   Components:
   Aluminum
   Polyethylene
   Aluminum tri-hydroxide as non-combustible mineral filler
   Coating
   CAS Nos. of each component:
   Aluminum: 7429-90-5
   Polyethylene: 9002-88-4
   Aluminum tri-hydroxide as non-combustible mineral filler: 21645-51-2
   Fluorocarbon coating as coating layer: 98728-78-0 & 88795-12-4
   Identification in accordance with UN:
   Not defined in identifications in UN
   The product does not contain asbestos.

3. Hazardous identification:
   Not applicable to hazardous classifications

4. First-aid measures
   Eye contact: When eyes are hurt with particle and/or powder during mechanical processing of the product, rinse affected eyes with clean running water. If irritation is persistent afterwards, get ophthalmic check immediately.
   Skin contact: In case of slight burns due to heated product, flush out affected part with large amount of water immediately, to cool down the affected part. In case of serious burns, get medical check immediately.
   Inhalation: When having inhaled a large quantity of powder and/or particle during mechanical processing of the product, move to fresh air, to ensure rest and keep warm, and get medical attention immediately.
   Ingestion: When having ingested a large quantity of powder and/or particles during mechanical processing of the product, get medical check immediately.

5. Fire-fighting measures
   Prevention of fire spread: In case of occurrence of fire near by the product, cover the products with incombustible sheet or dry sand, to prevent from fire spread to the products.

Fire extinguishing: If the product is ignited, it is effective for initial extinguishing to dash water. Fire fighting shall be done from the lower portion of the products and then to upper portion. Fire fighting shall be done from windward side with wearing air-breathing apparatus.

Extinguishing media: Water, carbon dioxide, dried chemical powder and foam fire extinguisher.

6. Accidental release measures: Not applicable.
Generally, the product is unlikely to spill out accidentally, because of solid nature.

7. Handling and storage

Handling: Wear gloves to protect hands from scratch and cut with panel edges.

Storage: Store horizontally where the products can be piled up without deflection. Do not wet the product with rain. Keep it away from such chemicals as acid, alkali, strong oxidizer and chlorides, organic solvents, spark and fire.

8. Exposure control

Control content: Not established in Ministry of Labor of Japan, Notification No.26, March 27, 1995

Permissible content: Normally, control is not required. But, when a large quantity of powder and particles are likely to occur due to mechanical processing of the product, apply the following standards as a reference value.

Applied material	ACGIH TLV, 1999 Edition	Industrial Hygiene Academy of Japan, 1999 Edition
Aluminum particle	10.0mg/m^3	Inhalant particle 0.5mg/m^3 Total particle 2mg/m^3

Note: Unless special remarks are indicated, long term work consisting of 8hrs per day and 5 days per week is available under the above condition.

Facility measures: When the particle content can not be maintained within the permissible range, provide such a suitable facility as partial ventilation.

Personal protection:

Respiratory protection: When particle and small chips exist in certain range, wear respirator.

Eye protection: When operators are exposed to particles and small chips, wear protection glasses during the operation.

Hand protection: Wear gloves to protect hands from scratch and cut with panel edges.

Skin protection: Wear working clothes and safety shoes.

9. Physical and chemical properties

Appearance: Panel of 3 to 6mm thick. Coating of 25 to 50 microns is applied on the surface.

Boiling temperature: Approx. 2500ºC in aluminum

Melting temperature: Approx. 645ºC in aluminum

Specific gravity: 2.7g/cm^3 in aluminum
0.89 to 1.54g/cm^3 in polyethylene

Solubility: Insoluble to water

10. Stability and reactivity

Flash point: Approx. 340ºC in polyethylene

Ignition point: 400ºC or higher in polyethylene

Possibility of self-ignition: None

Susceptibility of oxidization: None
Reactivity with water: None
Self-reactivity: None
Danger of explosion of particle: None
Other reactivity: None
Stability: Stable

11. Toxicological information

The product (4mm thick) cleared the Combustion Toxicity Testing, New York State Uniform Fire Prevention and Building Code.
There is no information available except the above.

12. Ecological information

There is no information available.

13. Disposal consideration

In accordance with official regulations for waste disposal, dispose by incineration or reclamation as factory waste.

14. Transport information

The product is packed in wooden crate for transportation. During transportation, please prevent the product from being wet.

15. Regulations

There is no applicable regulation.

16. Other information

The information contained herein is based on data currently considered accurate. No warranty, however, is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Mitsubishi Chemical Functional Products, Inc. and any associated companies assume no responsibility for personal injury or property damage to vendees, users or third parties caused by the material. Such vendees or users assume all risks associated with use of the material.

MITSUBISHI CHEMICAL
ALPOLIC Department
1-1-1, Marunouchi, Chiyoda-ku
Tokyo 100-8251, Japan

Summary of Technical Data Sheet – ALPOLIC™ NC

1. General

ALPOLIC™ NC is an aluminum composite material (ACM) with a non-combustible core, suitable for exterior or interior claddings, soffit linings and roof covering in new buildings and retrofit applications wherever a non-combustible material is required. The ALPOLIC NC material is manufactured by Mitsubishi Chemical Corporation and is furnished by approved distributors and authorised dealers.

Note: Technical data may be changed in part without affecting the material quality.

2. Product composition

ALPOLIC NC is composed of non-combustible core sandwiched between two skins of 0.5mm thick aluminum alloy (3105-H14):

Composition	Skin material:	0.5mm thick aluminum alloy (3105-H14)
	Core material:	Non-combustible core

The surface is finished with a high-performance Lumiflon™-based fluoropolymer coating as standard. ALPOLIC NC is available in finishes of: Solid Colors, Metallic Colors, Sparkling Colors, Prismatic Colors and Patterns. In these finishes, Lumiflon-based fluoropolymer paints are applied in manufacturer's continuous coil coating lines.

The back side of ALPOLIC NC, which will face the structural wall or steel when it is installed as a cladding panel, has a polyester-based wash coating or a service coating to protect it from possible corrosion problems.

The surface is protected with a co-extruded (white/black) removable, self-adhesive protection film. According to weathering tests under normal outdoor conditions, the protective film will withstand six months' exposure without losing its original peel-off characteristic or causing stains or other damages.

3. Product dimension and tolerance

(1) Panel thickness: 4 mm
(2) Panel size: Width = 1270 and 1575 mm
Length = less than 7200 mm

Note: Custom width can be accepted between 1270 mm and 1575 mm subject to minimum quantity. Please contact local distributors or our office.

(3) Product tolerance

Width:	±2.0 mm
Length:	±1.0 mm/m
Thickness:	±0.2 mm
Bow:	Maximum 0.5% (5mm/m) of the length or width
Diagonal difference:	Maximum 5.0 mm
Surface defect:	The surface shall not have any irregularities such as roughness, buckling and other imperfections in accordance with our visual inspection rules. ALPOLIC NC is supplied with a cut edge and without aluminum sheet displacement or core protrusion.

4. Principal properties

(1) Physical properties

Item	Unit	
Panel weight	kg/m^2	8.6
Thermal expansion (ASTM D696)	$\times 10^{-6}$ /°C	20.6
Thermal conductivity (ISO 8990)	W/m.K	0.4
Deflection temperature (ISO 75-2)	°C	115

(2) Mechanical properties

Item	Unit	
Tensile strength (ASTM E8)	MPa or N/mm^2	48.2
0.2% proof stress (ASTM E8)	MPa or N/mm^2	46.5
Elongation (ASTM E8)	%	2.7
Flexural elasticity (ASTM D7250)	GPa or kN/mm^2	45600

(3) Mechanical properties of aluminum skin metal (3105-H14 alloy):
0.2% proof stress: 150 MPa or N/mm^2
Elasticity: 70 GPa or kN/mm^2

(4) Sound transmission loss (ASTM E413): STC (Standard Transmission Class) 27

5. Summary of fire tests

ALPOLIC NC has passed the following fire tests:

Table 5-1 **Fire tests for general and external cladding material**

Country	Test standard	Results & classification
Australia	AS 1530.1	NOT deemed COMBUSTIBLE *
	AS 1530.3	Ignitability Index 0, Spread of Flame Index 0, Heat Evolved Index 0, Smoke Developed Index 0

***** AS 1530.1 is combustibility test of core material.

6. Paint finish

(1) Coating system

The surface is finished with Lumiflon-based fluoropolymer coating as standard; and the back side is a wash coating or a service coating. ALPOLIC NC is available in finishes of: Solid Colors, Metallic Colors, Sparkling Colors, Prismatic Colors and Patterns (Stone, Timber, Metal, and Abstract). In these finishes, Lumiflon-based fluoropolymer paints are applied in the manufacturer's coil coating lines.

The coating system of each finish is:

A. "Solid Colors" are three-coat three-bake system.
The thickness is 30 microns (1.18 mils) minimum and consists of a conversion coating, an inhibitive primer, a Lumiflon-based fluoropolymer coating and a clear coating.

B. "Metallic Colors", "Sparkling Colors" and "Prismatic Colors" are a three-coat three-bake system.
The thickness is 28 microns (1.1 mils) minimum and consists of a conversion coating, an inhibitive primer, a Lumiflon-based metallic coating and a clear coating.

C. "Patterns" is coated with a unique image transfer process.
The thickness is 45 microns (1.77 mils) minimum and consists of a conversion coating, an inhibitive primer and a Lumiflon-based fluoropolymer coating including the image transfer layer.

Note 1: Lumiflon-based fluoropolymer coating has a coating warranty for maximum 20 years.

Note 2: ALPOLIC NC is finished with Lumiflon-based fluoropolymer paint as standard, but polyester and other coatings are also available as an option.

(2) Colors and gloss level

Standard colors are provided in the Color Chart. Custom colors are available for all finishes upon request subject to respective minimum quantities. The standard gloss is 30% for Solid and Metallic Colors, 30-80% for Sparkling Colors, 80% for Prismatic Colors and 15-80% for Patterns (Stone, Timber, Metal, and Abstract). Custom gloss is available between 15 and 80% in all colors upon request subject to minimum quantities. Please contact local distributors or our office for custom color requests.

(3) Coating performance

The Lumiflon-based fluoropolymer coating meets the following criteria:

Table 6-1 **General properties**

Dry film property	**Test method**	**Criteria**
Gloss (60°)	ASTM D523	15 to 80%
Formability (T-bend)	NCCA II-19 ASTM D1737	2T, no cracking
Reverse impact-crosshatch	NCCA II-5	No pick off
Hardness-pencil	ASTM D3363	H
Adhesion Dry Wet Boiling water	 ASTM D3359 37.8°C, 24 hrs. 100°C, 20 min.	 No pick off No pick off No pick off
Abrasive resistance	ASTM D968 (Falling sand)	40 liters/mil
Chemical resistance: Muriatic acid, 10%HCl, 72 hrs. Sulphuric acid, 20%H2SO4, 18 hrs. Sodium hydroxide, 20%NaOH, 1 hr. Mortar, pat test, 24 hrs. Detergent, 3% solution, 38ºC, 72 hrs.	 ASTM D1308 ASTM D1308 ASTM D1308 AAMNC605 ASTM D2248	 No change No change No change No change No change

Table 6-2 **Weatherability**

Dry film property	**Test method**	**Criteria**
Weather-o-meter test Colour retention: Gloss retention: Chalk resistance:	 ASTM D2244 ASTM D523 ASTM D4214	 Maximum 5 units after 4000 hrs. 70% after 4000 hrs. Maximum 8 units after 4000 hrs.
Salt spray resistance:	ASTM B117	Blister-10, scribe-8, after 4000 hrs., 35°C salt fog
Humidity-thermal	ASTM D2246	No blister, no cracking After 15 cycles of 38ºC 100%RH for 24 hrs. and -23ºC for 20 hrs.
Humidity resistance:	ASTM D2247	No change After 4000 hrs., 100%RH, 35°C