Vipac Engineers and Scientists Limited
279 Normanby Rd, Port Melbourne, VIC 3207, Australia
Private Bag 16, Port Melbourne, VIC 3207, Australia
t. +61 3 9647 9700 | **f.** +61 3 9646 4370 | **e.** melbourne@vipac.com.au
w. www.vipac.com.au | A.B.N. 33 005 453 627 | A.C.N. 005 453 627

Vipac Engineers & Scientists

FVA Group Pty Ltd

Fairview - AS 4284 testing on facades

Test Report - Vitracore G2 with Flexible Membrane

30B-19-0059-TRP-6774694-1

11 November 2020

Job Title:	Fairview - AS 4284 testing on facades
Report Title:	Test Report - Vitracore G2 with Flexible Membrane
Document Reference:	30B-19-0059-TRP-6774694-

PREPARED FOR:
FVA Group Pty Ltd
18-20 Donald St
Lithgow, 2790, Australia
Australia
CONTACT: Ashley How
Tel: +61 2 6352 2355
Fax: -

PREPARED BY:
Vipac Engineers and Scientists Limited
279 Normanby Rd,
Port Melbourne, VIC 3207,
Australia

Tel: +61 3 9647 9700
Fax: +61 3 9646 4370

AUTHORED BY:

Robert Dyck
Facades Team Leader

Date: 11 November 2020

REVIEWED BY:

Sophie Lamande
Wind Group Leader

Date: 11 November 2020

REVISION HISTORY:

Rev. #	*Comments / Details of change(s) made*	*Date*	*Revised by:*
Rev. 00	Original issue	02/04/2020	R.Dyck
Rev. 01	Updated company name, pipe penetration detail, membrane	11/11/2020	R.Dyck
Rev. 02			

NOTE: This report has been prepared solely for the benefit of the client to whom this report is addressed for use herein ("Client") unless otherwise agreed in writing by Vipac Engineers and Scientists Limited ACN 005 453 627 ("Vipac"). Neither the whole of this report or any part of it may be published, duplicated or circulated without the prior written approval of Vipac except as required by law. Vipac does not assume any responsibility or liability for any losses suffered as a result of the publication, duplication or circulation of this report and excludes all liability whatsoever to any third party who may use or rely on the whole, or any part of this report.

Vipac has prepared this report using all reasonable care, skill and due diligence within the time period, budget and resources allocated to Vipac as agreed with the Client. Vipac excludes all liability to the Client whatsoever, whether in whole or in part, for the Client's use or reliance on the report other than for the purposes set out in the report, or any matters outside the agreed scope of the work.

For the purposes of preparing this report, reliance has been placed upon the material, representations, information and instructions provided to Vipac unless otherwise stated in the report. Originals of documents provided have not been required and no audit or examination of the validity of the documentation, representations, information or instructions provided has been undertaken except to the extent otherwise stated in this report. Information and findings contained in this report are based on Vipac's interpretation of data collected.

This document contains commercial, conceptual, engineering and other information that is proprietary to Vipac. The inclusion of this information in the report does not grant the Client any license to use the information without Vipac's prior written permission.

EXECUTIVE SUMMARY

Vipac Engineers and Scientists were commissioned by Fairview Pty Ltd / FVA Group Pty Ltd (the client) to perform AS/NZS 4284:2008 testing for their cladding system.

The sample was installed by the client at the Vipac test laboratory in Port Melbourne, and the sample was tested by Vipac Engineers and Scientists during January 2020.

The test sample was found to have the below results for AS/NZS 4284:2008 compliance:

AS/NZS4284:2008 Test	Result
Clause 8.2 Preliminary tests	Complies +2000Pa, -2400Pa SLS Preload
Clause 8.3 Structural test at serviceability limit state	Complies with Span deflection requirements at +2000Pa, -3000Pa Does not comply with residual deflections
Clause 8.5 Static water test	Complies 600Pa
Clause 8.6 Cyclic water test	Complies Stage 1: 300Pa – 600Pa Stage 2: 400Pa – 800Pa Stage 3: 600Pa – 1200Pa
Clause 8.8 Structural test at ultimate limit state	Complies +4000, -4000

Table 1: Test results summary

Full details are contained within this report.

TABLE OF CONTENTS

1 INTRODUCTION

Document Type:	Test Report
Company:	Fairview Pty Ltd / FVA Group Pty Ltd
Product:	Vitracore G2 with Proclima Extasana membrane
Test Date:	January 2020
Testing Authority:	Vipac Engineers & Scientists

2 TEST REFERENCE & APPLICATION STANDARD

AS/NZS 4284:2008 Testing of Building Facades

3 TEST SPECIMEN

Figure 1: Cladding sample after removal

Details of the test sample sections can be found in Appendix A and B of this report.

4 TEST EQUIPMENT

Measurement	Instrument Type/Make	Model	Vipac Serial Number
Deflection	Dial gauges/ Mitutoyo	3058S-19	000034597 000033756 000034596 000033758 000034598
Distance	Tape Measure / Stanley	8m	000033666
Pressure	Digital Manometer / PCE	PCE-PDA-10L	000033540
Water flow rate	Flow meter/ Siemens	Mag 6000	000031229
Time	Stopwatch/ Dick Smith	Y1299	000033567

Table 2: Instruments used throughout testing

5 TEST RESULTS

5.1 CLAUSE 8.2 – PRELIMINARY TESTS

Test Standard: AS/NZS 4284:2008 – Testing of Building Facades

Test Date: 09/01/2020

5.1.1 CRITERIA: STATIC PRESSURE

Test sample shall withstand the Serviceability Limit State pressure with no structural damage or distortion.

Applied Load: Nominated Serviceability Pressure: +2.0 kPa, -2.4 kPa

Duration: 10 seconds

5.1.2 CRITERIA: STATIC AND CYCLIC WATER TESTS

Under static and cyclic water tests there shall be no leaks. A leak is considered to occur when one or more of the following occur:

a) Water appears on any inside surface of the façade, visible from an occupied space.
b) Uncontrolled water appears on any inside surface of the façade (uncontrolled water is defined as any leakage not contained and drained away after 5 minutes).
c) Water appears that is likely to wet insulation, fixtures and finishes.
d) Water appears in other locations specified as unacceptable by the Specifier

Static water test: **Applied Load:** Nominated pressure: +0.600 kPa

Duration: water spray operated for 5 minutes at 0 kPa chamber pressure, followed by water spray and pressure at the test pressure for 15 minutes. Observe for 5 minutes after removal of both water and air pressure.

Cyclic water test: **Applied Load:** Nominated pressures:

Stage	Lower pressure	Upper pressure	Cycle Duration
Stage 1	0.300 kPa	0.600 kPa	5 minutes
	0 kPa		2 minutes
Stage 2	0.400 kPa	0.800 kPa	5 minutes
	0 kPa		2 minutes
Stage 3	0.600 kPa	1.200 kPa	5 minutes
Observation	0 kPa		5 minutes

Table 3: Cyclic pressure lower and upper limits, cycle time of 3 seconds to 5 seconds

Applied Water: Water spray rate: 3.0 L/m^{2}min

Measured spray area: 8.6 m^2

Resulting spray flow rate: 25.9 l/min

Results: The preliminary static and cyclic water tests were completed successfully.

Conclusion: The preliminary test of the façade complies with the requirements of AS/NZS 4284:2008

5.2 CAUSE 8.3 – STRUCTURAL TEST AT SERVICEABILITY LIMIT STATE (SLS)

Test Standard: AS/NZS 4284:2008 – Testing of Building Facades

Test Date: 13/01/2020

Formulae: The net mid-span deflection (*d*) of each member is given by the following:

$d = D_m - D_e$

where:

D_m = Mid span displacement

D_e = Average of end displacements

Criteria: According to AS/NZS4284:2008 no framing member shall deflect by an amount greater than span/250mm. Successive member displacement shall not exceed 3.0mm. The maximum displacement of a framing member shall not exceed 20mm. All components of the sample are required to remain structurally intact as detailed on test sample drawings with no signs of visible damage or distortion.

Applied Load: +1.5kPa, -1.8kPa and +2.0, -3.0kPa

Results:

Span Detail	Span [mm]	Pressure direction	Measured pressure [Pa]	Measured Span Deflection [mm]	Span deflection Ratio
Span 1 (Node 1,2,3)	1150	Positive	1508	1.26	913
		Negative	-1809	-1.52	757
Span 2 (Node 3,4,5)	1150	Positive	1508	1.38	833
		Negative	-1809	-1.47	782
Span 3 (Node 1,3,5)	2300	Positive	1508	3.52	653
		Negative	-1809	-4.23	544

Table 4: Span deflection results - +1.5kPa, -1.8kPa

Zero Stage	Node 1 [mm]	Node 2 [mm]	Node 3 [mm]	Node 4 [mm]	Node 5 [mm]
Z1	0	0	0	0	0
Z2	0.12	0.15	0.13	0.14	0.08
Z4	-1.12	-1.87	-2.49	-2.69	-3.03
Z5	-1.17	-1.91	-2.56	-1.72	-3.16
Z7	0.13	0.14	0.98	-0.05	-0.25

Table 5: Residual deflection result - +1.5kPa, -1.8kPa

Span Detail	Span [mm]	Pressure direction	Measured pressure [Pa]	Measured Span Deflection [mm]	Span deflection Ratio
Span 1 (Node 1,2,3)	1150	Positive	2007	1.36	846
		Negative	-3003	-1.69	680
Span 2 (Node 3,4,5)	1150	Positive	2007	1.35	852
		Negative	-3003	-1.78	646
Span 3 (Node 1,3,5)	2300	Positive	3007	3.97	579
		Negative	-3003	-5.20	442

Table 6: Span deflection results - +2kPa, -3.0kPa

Zero Stage	Node 1 [mm]	Node 2 [mm]	Node 3 [mm]	Node 4 [mm]	Node 5 [mm]
Z1	0	0	0	0	0
Z2	0.10	0.14	0.07	0.17	0.19
Z4	-0.17	-2.30	-3.08	-3.60	-4.04
Z5	-1.22	-2.41	-3.30	-3.89	-4.44
Z7	0.05	-0.06	-0.22	-0.24	-0.29

Table 7: Residual deflection result - +2kPa, -3.0kPa

Figure 2: Node locations (1-5 from bottom to top)

Conclusion: The test sampled complied with the structural span deflections limits of Span/250.

The sample did not comply with the residual deflection limit of 3mm

5.3 CLAUSE 8.5 – STATIC WATER TEST

Test Standard: AS/NZS 4284:2008 – Testing of Building Facades

Test Date: 13/01/2020

Criteria: Under static water test there shall be no leaks. A leak is considered to occur when one or more of the following occur:

a) Water appears on any inside surface of the façade and is visible from an occupied space.
b) Uncontrolled water appears on any inside surface of the façade.
c) Water appears that is likely to wet insulation, fixtures and finishes.
d) Water appears in other locations specified as unacceptable by the Specifier

Applied Load: Nominated Pressure: +0.600 kPa

Duration: water spray operated for 5 minutes at 0 kPa chamber pressure, followed by water spray and pressure at the test pressure for 15 minutes. Observe for 5 minutes after removal of both water and air pressure.

Applied Water: Water spray rate: 3.0 L/m^{2}min

Measured spray area (inside pressure chamber): 8.64 m^2

Resulting spray flow rate: 25.9 l/min

Results: The Static water test was completed with no uncontrolled water penetration occurring.

Conclusion: The Static water results of the test sample comply with the specified limits set out in AS/NZS 4284:2008.

5.4 CLAUSE 8.6 – CYCLIC WATER TEST

Test Standard: AS/NZS 4284:2008 – Testing of Building Facades

Test Date: 13/01/2020

Criteria: Under cyclic water test there shall be no leaks. A leak is considered to occur when one or more of the following occur:

a) Water appears on any inside surface of the façade and is visible from an occupied space.
b) Uncontrolled water appears on any inside surface of the façade.
c) Water appears that is likely to wet insulation, fixtures and finishes.
d) Water appears in other locations specified as unacceptable by the Specifier

Applied Load: Nominated Pressures:

Stage	Lower pressure	Upper pressure	Cycle Duration
Stage 1	0.300 kPa	0.600 kPa	5 minutes
	0 kPa		2 minutes
Stage 2	0.400 kPa	0.800 kPa	5 minutes
	0 kPa		2 minutes
Stage 3	0.600 kPa	1.200 kPa	5 minutes
Observation	0 kPa		5 minutes

Table 8: Cyclic pressure lower and upper limits, cycle time of 3 seconds to 5 seconds

Applied Water: Water spray rate: 3.0 L/m^{2}min

Measured spray area (inside pressure chamber): 8.64 m^2

Resulting spray flow rate: 25.9 l/min

Results: The Cyclic water test was completed with the test was completed with no uncontrolled water penetration occurring.

Conclusion: The Cyclic water results of the test sample comply with the specified limits set out in AS/NZS 4284:2008.

5.5 CLAUSE 8.8 – STRUCTURAL TEST AT THE ULTIMATE LIMIT STATE

Test Standard: AS/NZS 4284:2008 – Testing of Building Facades

Test Date: 13/01/2020

Criteria: There shall be no disengagement or partial disengagement of any framing member or panel, no failure of fixings, stops or locking devices. No repeated glass breakage or cracking of glass.

Applied Load: Ultimate Limit State Pressures: + 4.0 kPa, - 4.0 kPa

Apply the pressure from zero to ultimate limit state in 50-60 seconds, apply ultimate limit state for 10 seconds.

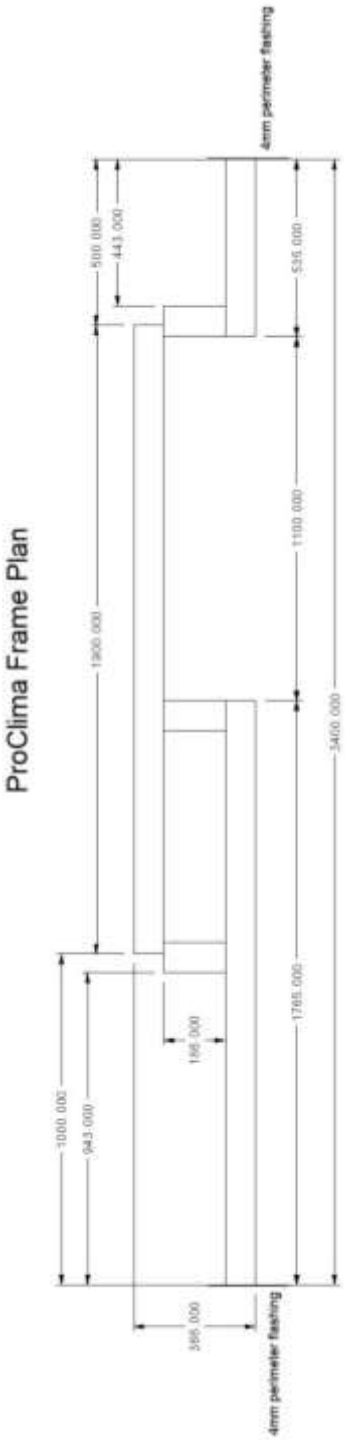
Results:

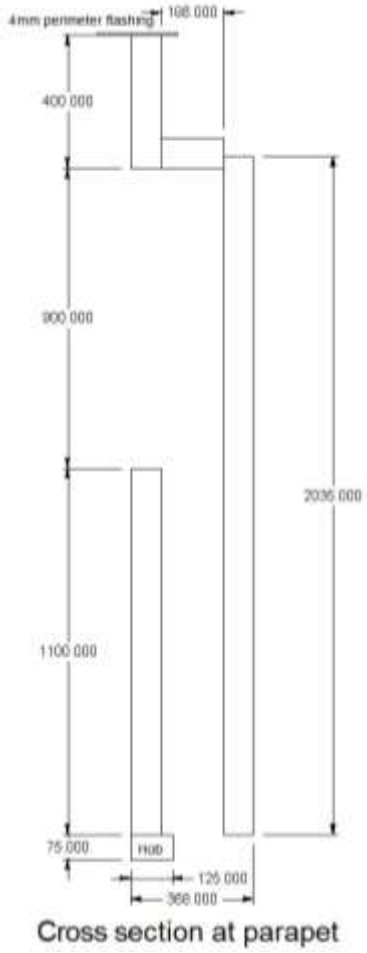
Test Pressure [kPa]	Results
+ 4.0	All criteria met
- 4.0	All criteria met

Table 9: Results, Ultimate Limit State

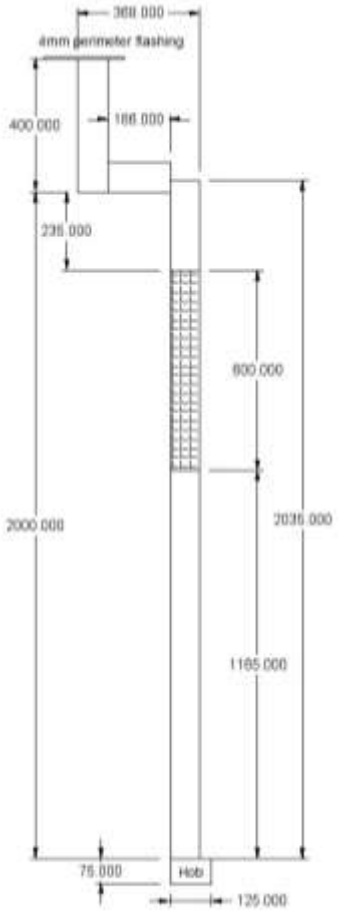
Conclusion: The Ultimate limit state results of the test sample comply with the requirements of AS/NZS 4284:2008.

Appendix A TEST SAMPLE STRUCTURE



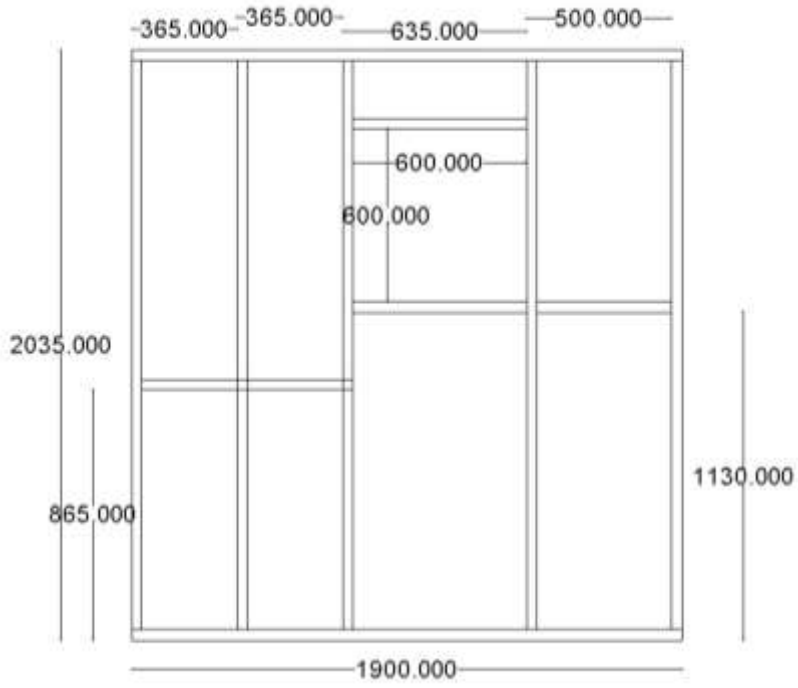


Cross section at parapet

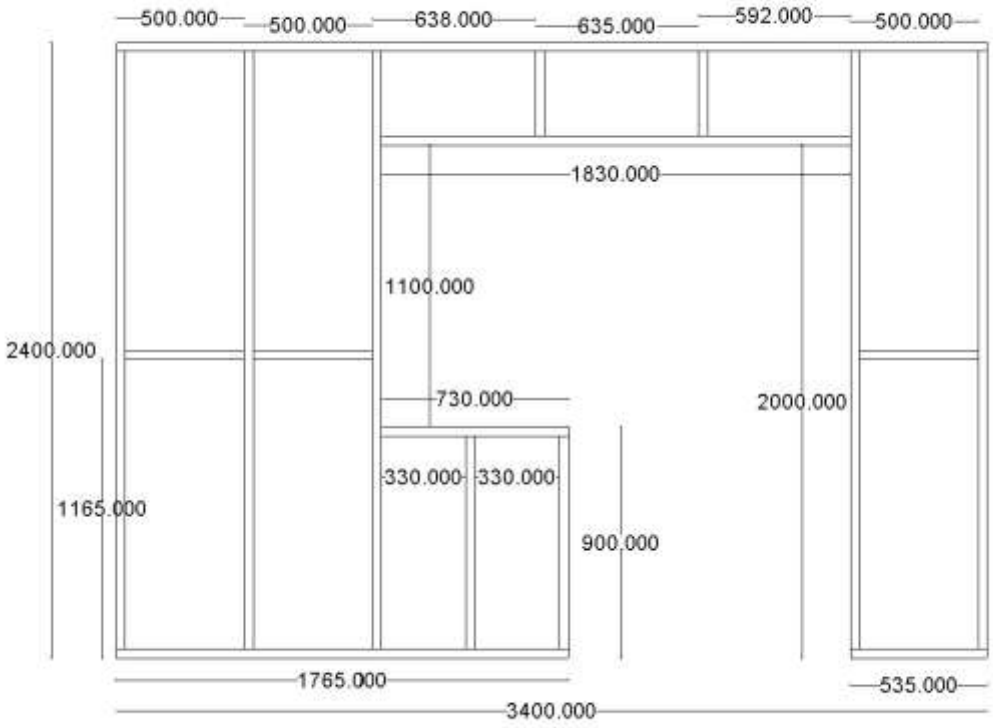


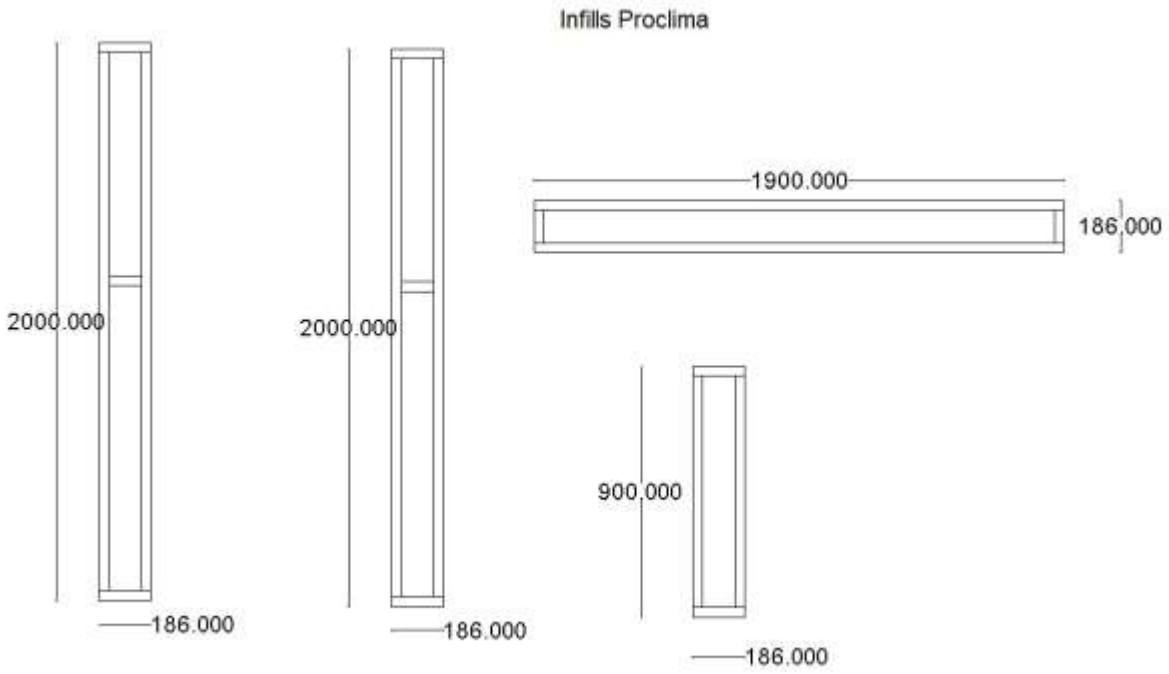
Cross section at Window

Back Frame Proclima



Face Frame Proclima

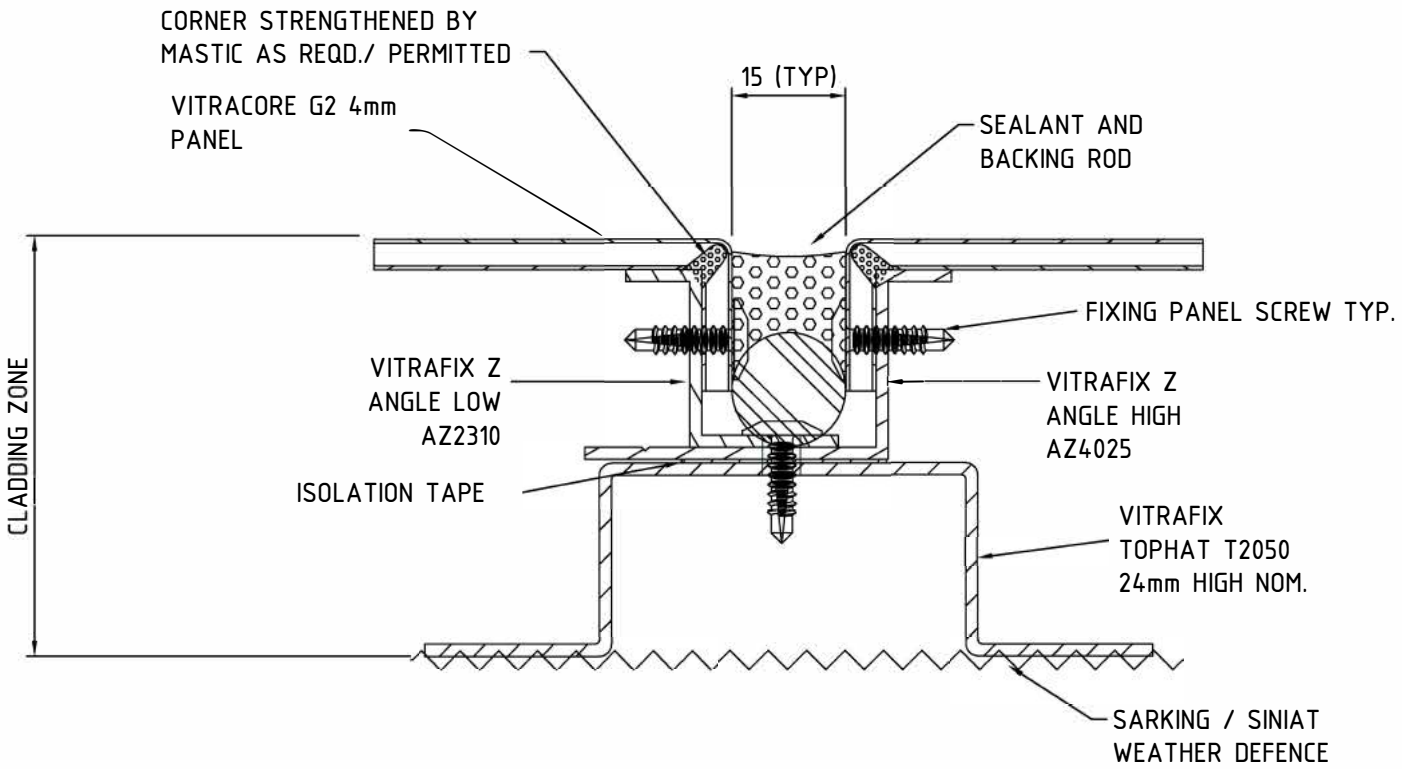



Infills Proclima
2000.000
186.000
2000.000
186.000
1900.000
186.000
900.000
186.000

Appendix B TEST SAMPLE DETAILS

This page is blank and the sample details are in the following pages.

VITRACORE G2 AS4284 INSTALLATION DETAILS



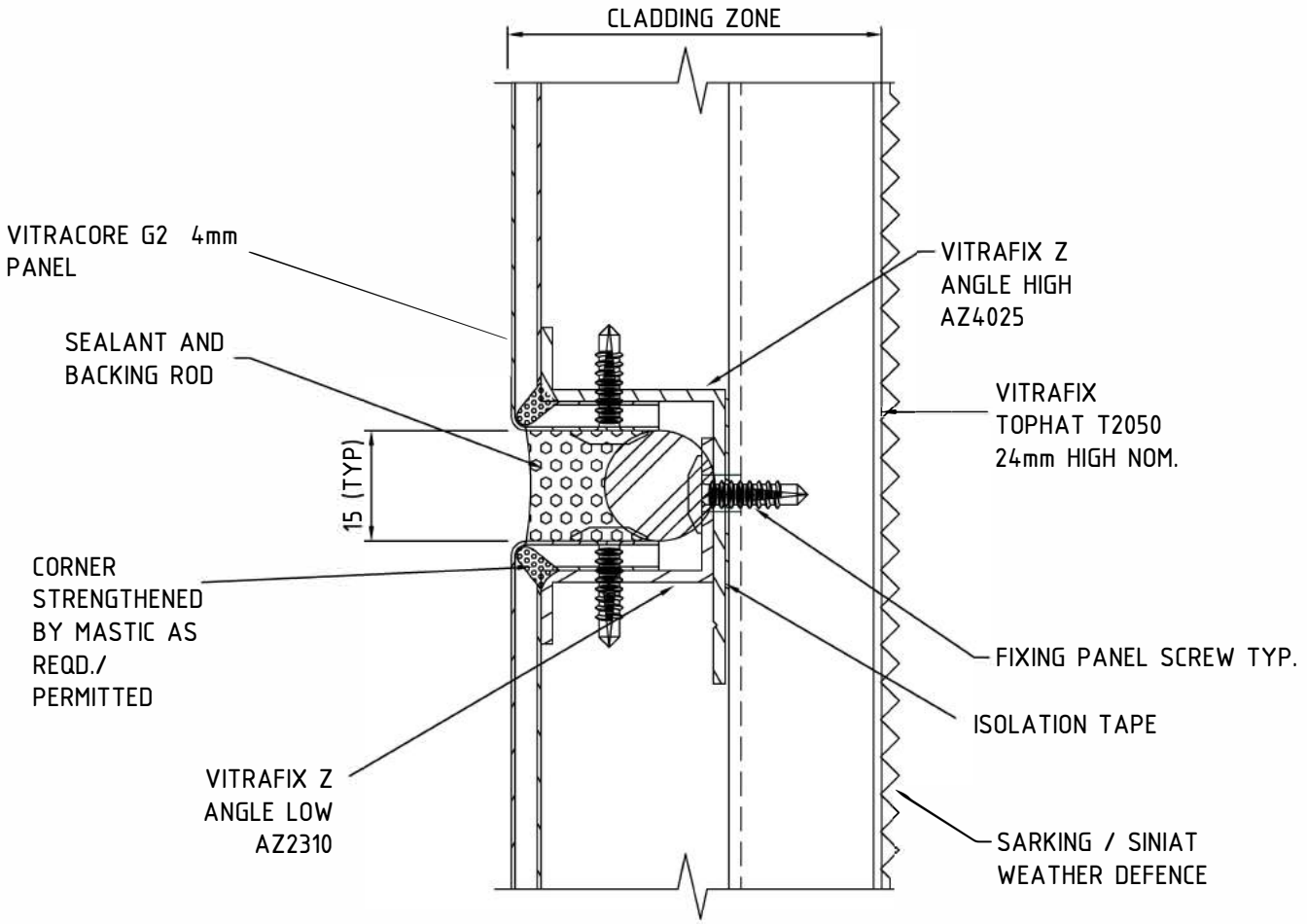
1. TYPICAL VERTICAL PANEL JOINT DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



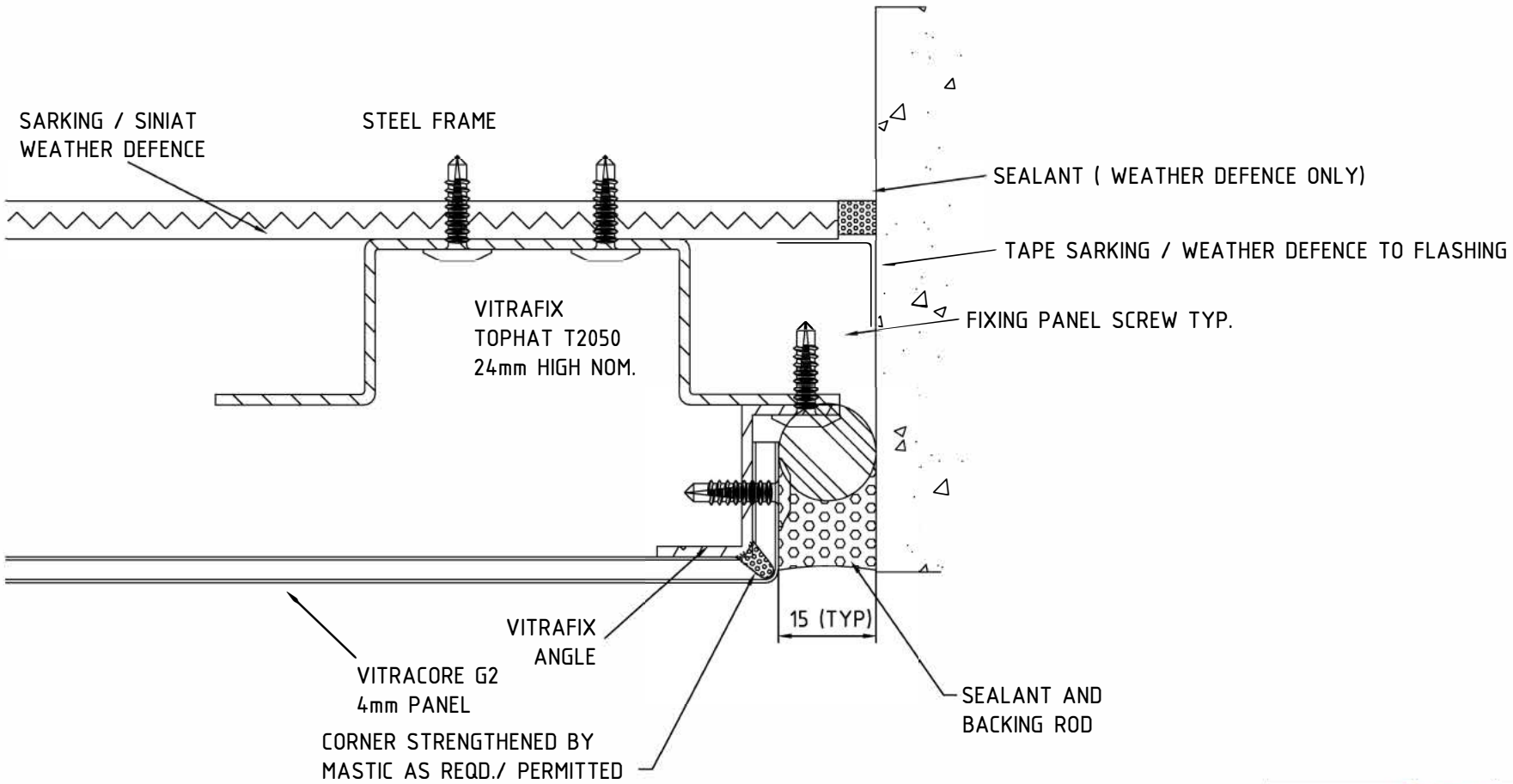
2. HORIZONTAL JOINT DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



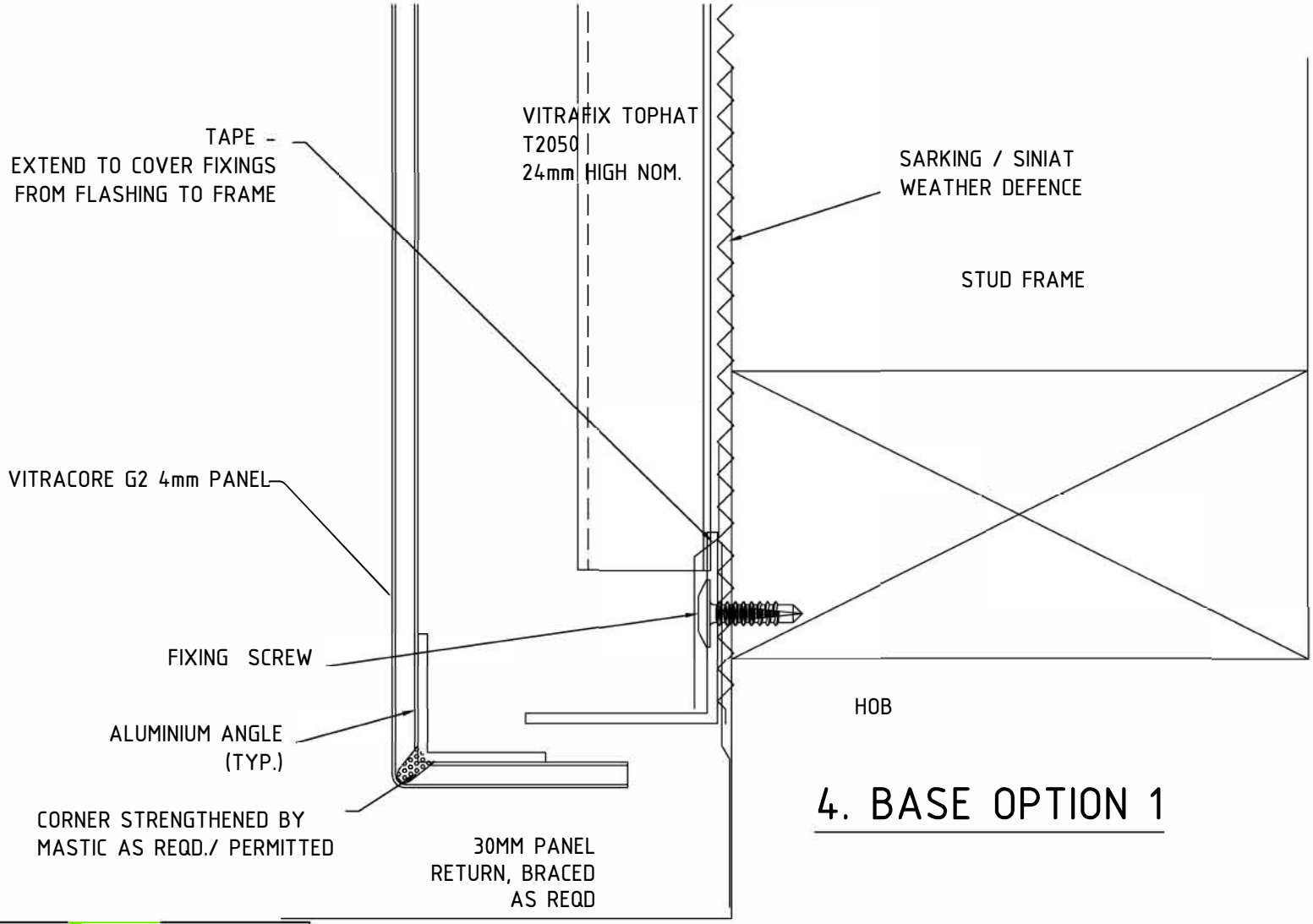
3. WALL JUNCTION DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



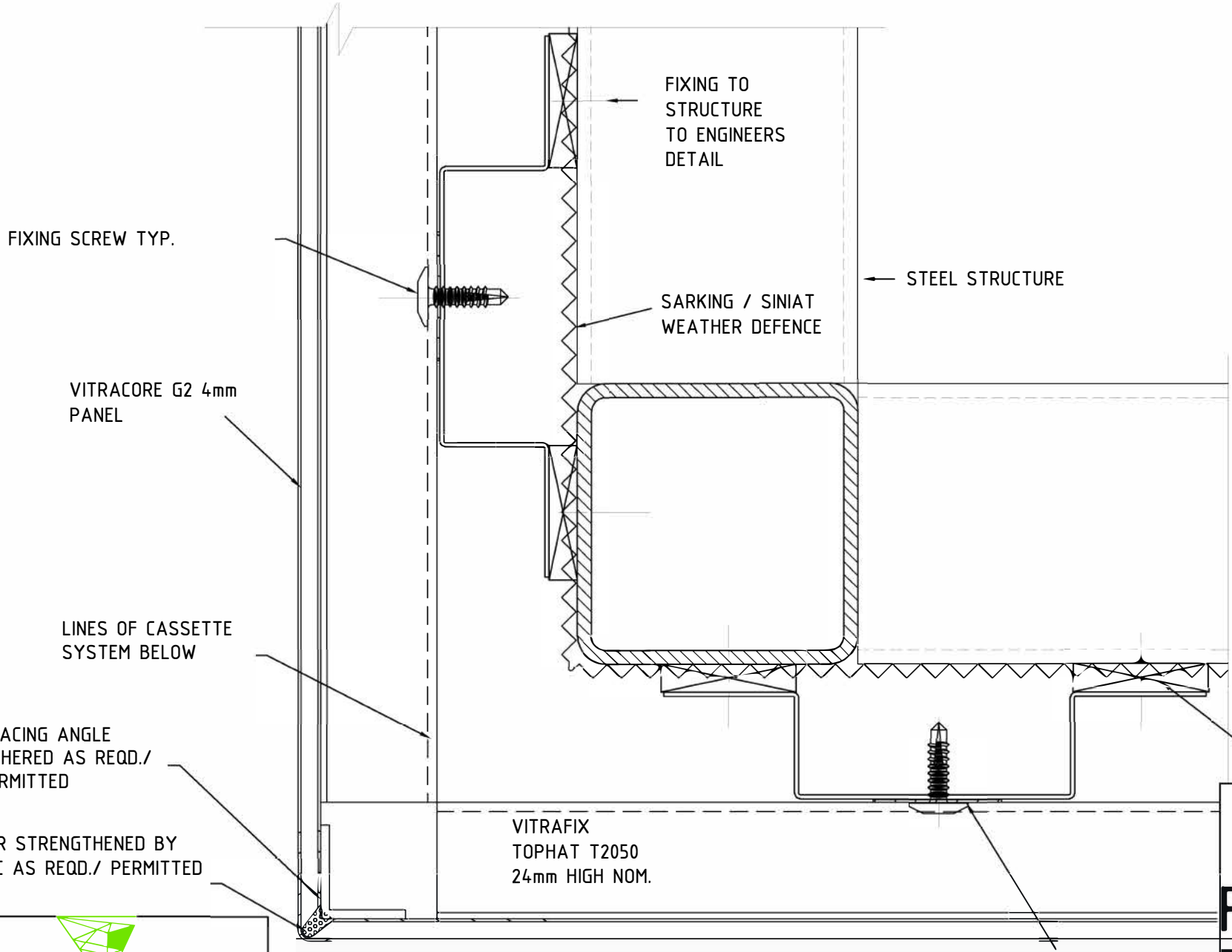
4. BASE OPTION 1

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



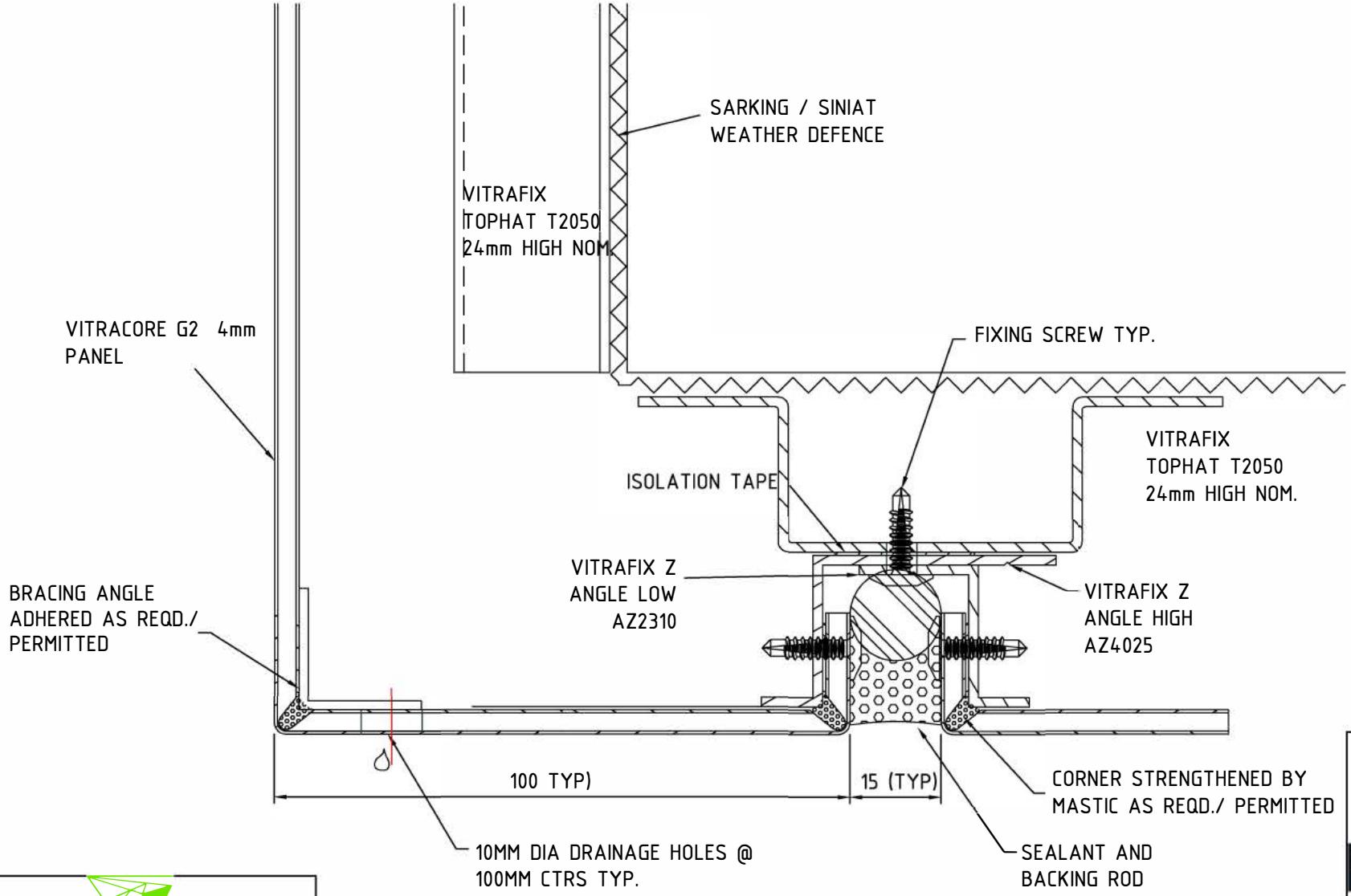
5. EXTERNAL CORNER DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



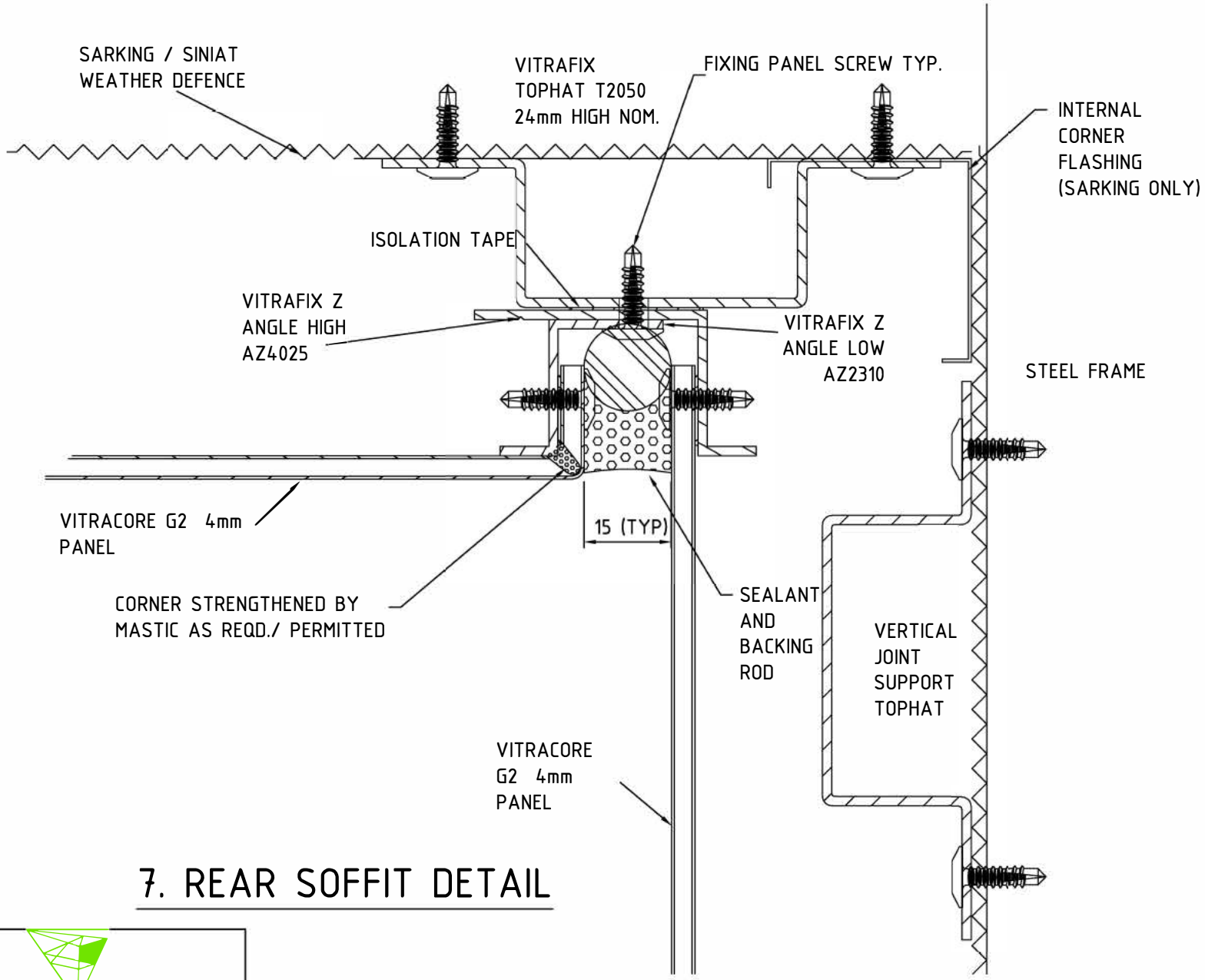
6. DETAIL AT SOFFIT JUNCTION

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



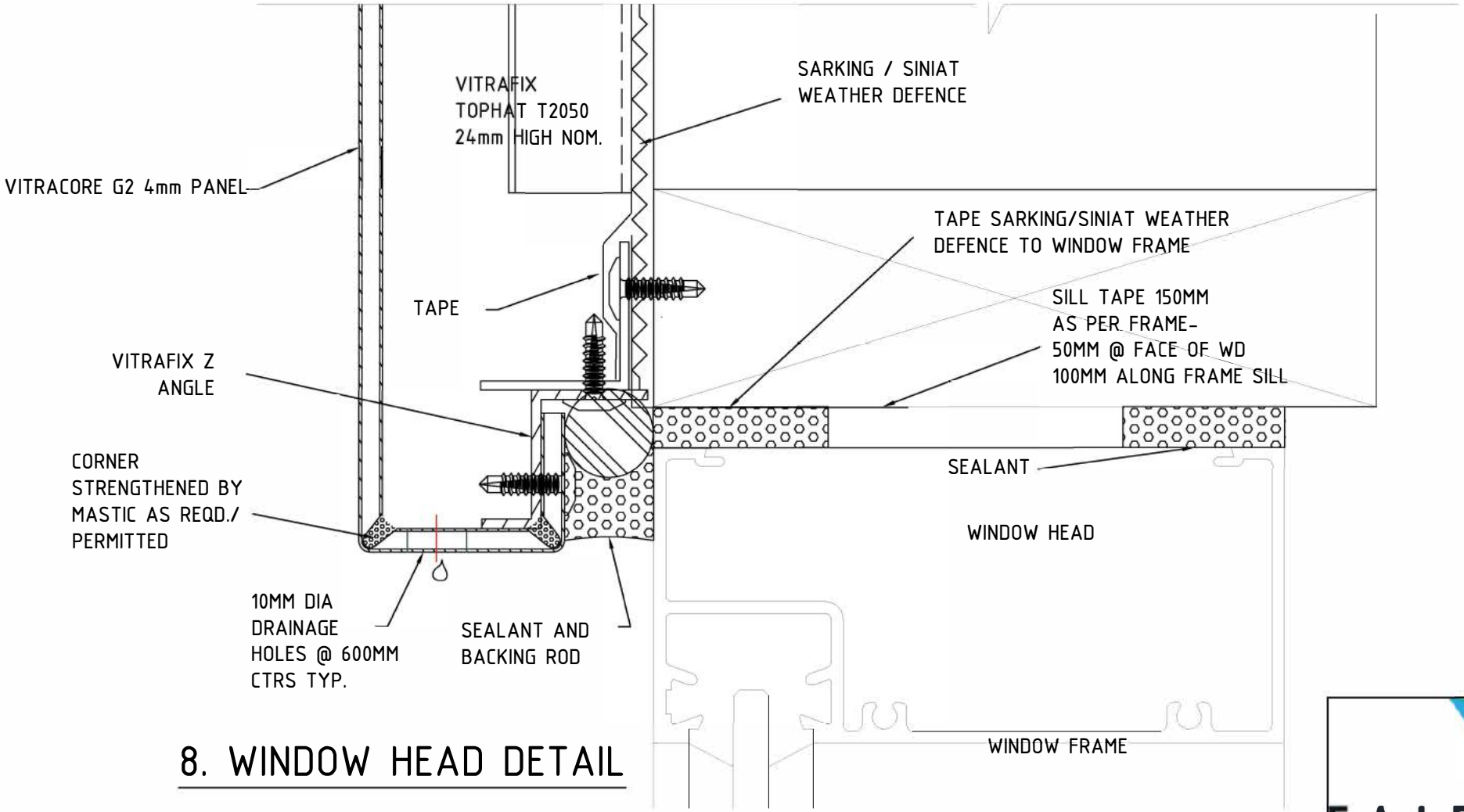
7. REAR SOFFIT DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



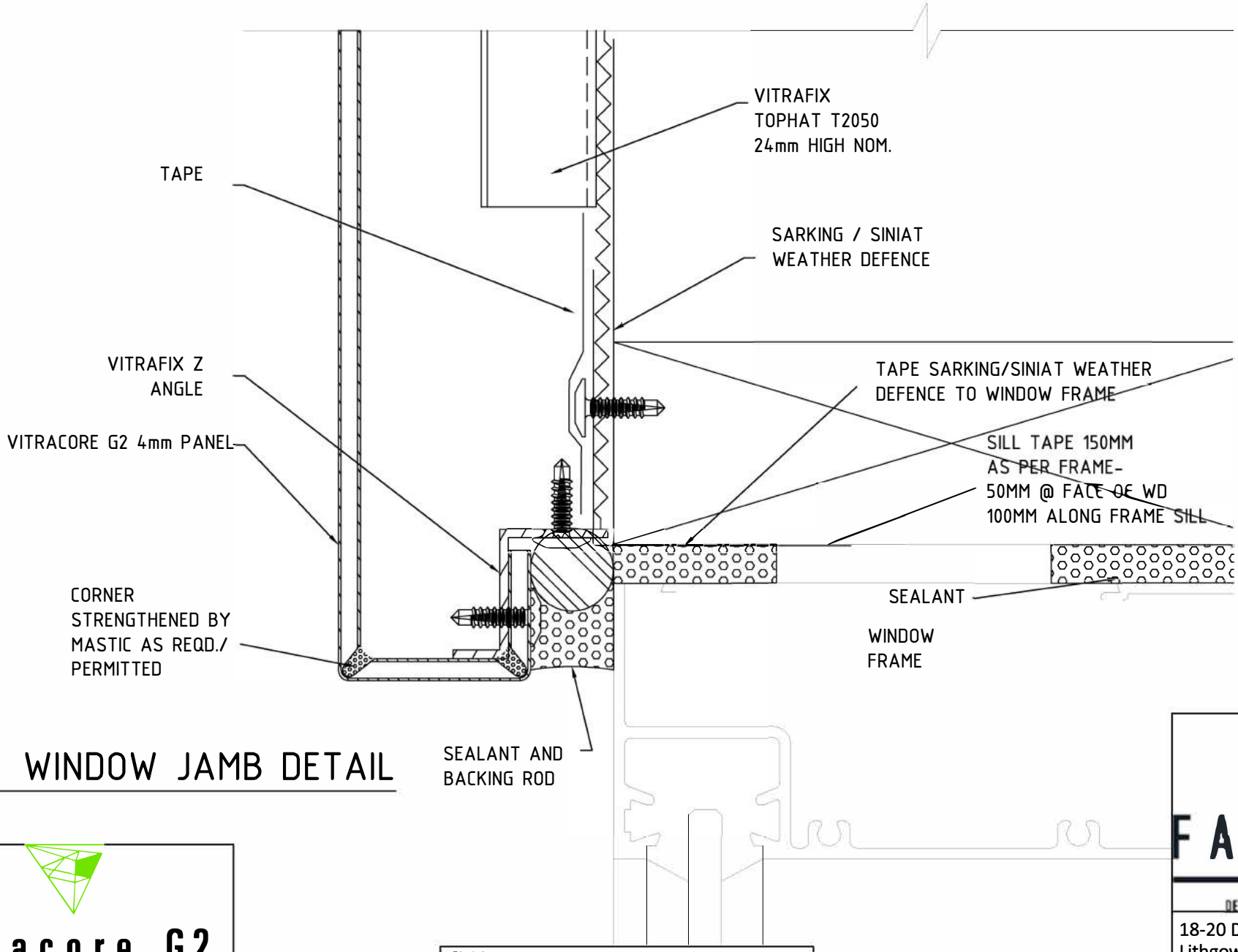
8. WINDOW HEAD DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



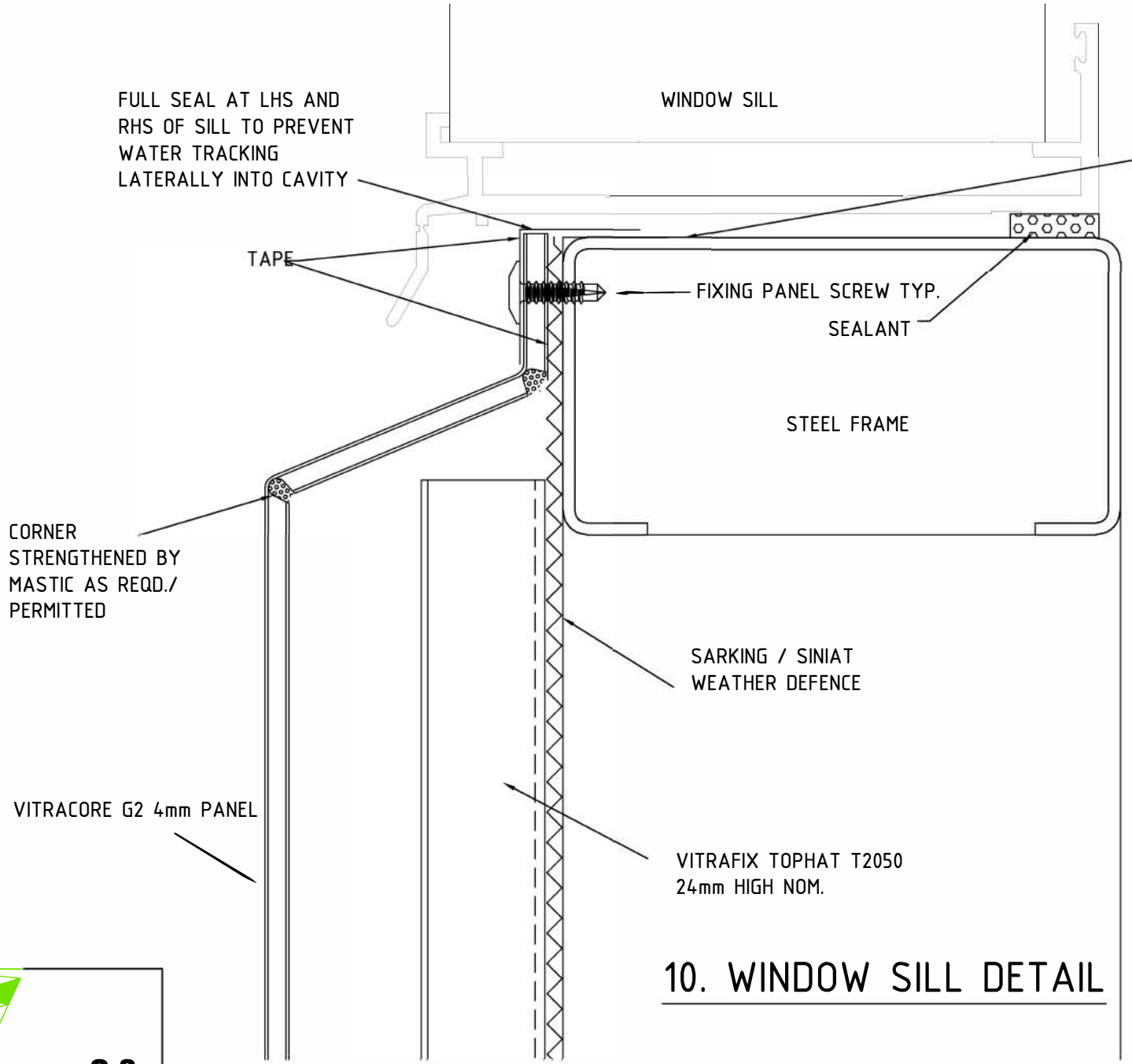
9. WINDOW JAMB DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



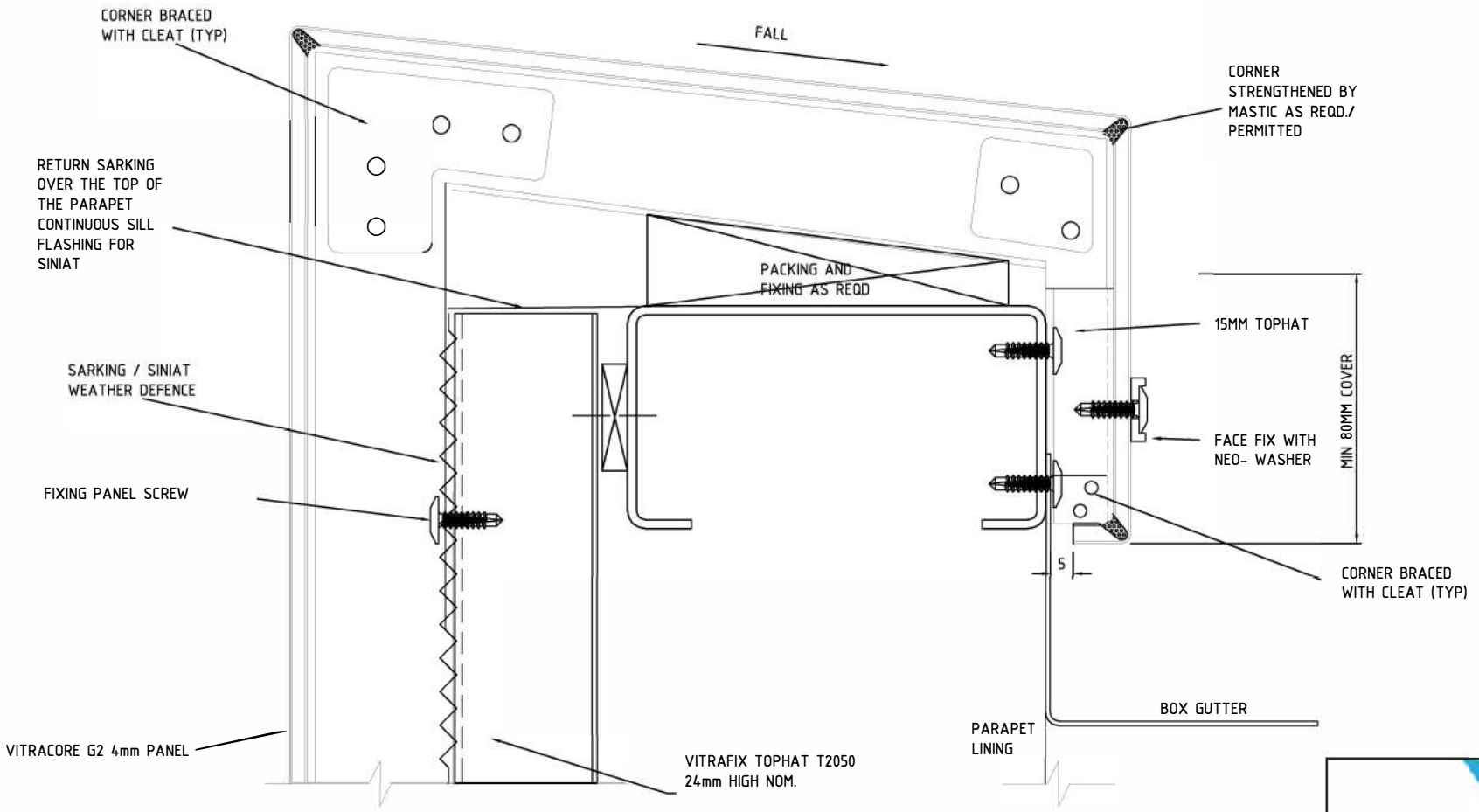
10. WINDOW SILL DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



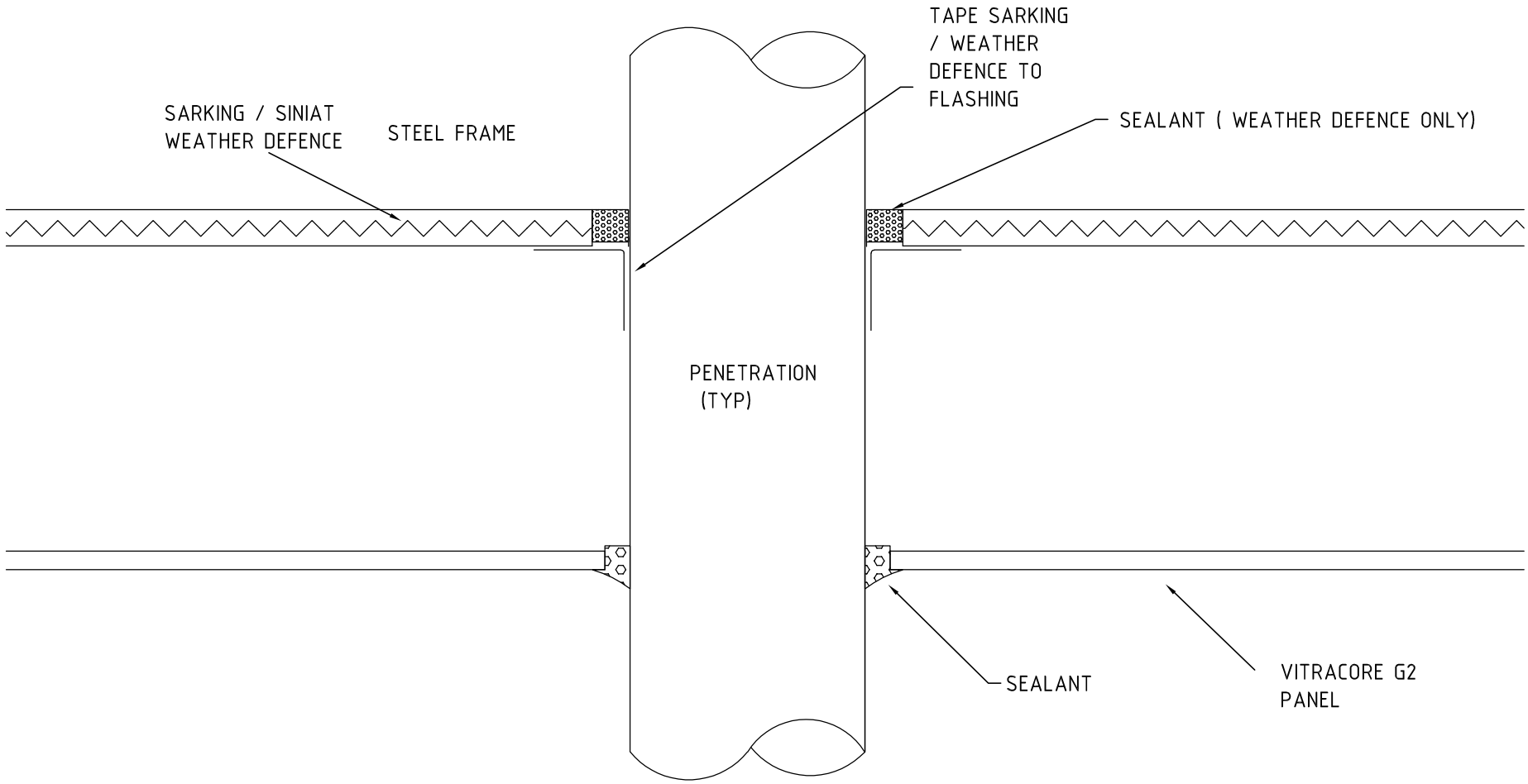
11. PARAPET CAPPING DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2, and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com



12. TYPICAL PENETRATION DETAIL

vitracore G2

NON-COMBUSTIBLE COMPOSITE PANEL / MANUFACTURED BY FAIRVIEW
as deemed by the BCA

Disclaimer:
These details are limited to the generalised design specification for VITRACORE G2 and are intended for use by a technically skilled person only. Any use of the same is at their own discretion and risk.

FAIRVIEW
DEFINING ARCHITECTURE SINCE 1963
18-20 Donald St
Lithgow, NSW 2790
P: 02 6352 2355
E: helpdesk@fairviewarch.com
W: www.fairviewarchitectural.com

END OF REPORT