metroeng
consulting engineers

Petima Pty Ltd
Factory 52, 37-39 East Street
Daylesford VIC 3460

# RE: SPA and Tridek SIPs Structural Assessment Report

# Appendix B
# SPA SIPs (EPS/XPS/PUR core)
# Wall and Roof Framing
# Loading Capacity and Span Tables
# For Non-Cyclonic Areas

**Assessment Items**

The items have been checked are as listed below:

- Wall framing: SPA SIPs (EPS/XPS/PUR core)
- Roof framing and cladding: SPA SIPs (EPS/XPS/PUR core)

Note:
Wind loads calculated in accordance with AS1170.2 and AS4055 for non-cyclonic areas.
SIPs like all timber products will creep under the action of long term loads. It is recommended that long term deflections should be estimated using a factor of 4 TO 7 times the initial deflections for SIPs Panels.

This appendix must be used in conjunction with the SPA and Tridek SIPs Structural Assessment Report, prepared by Metroeng Pty Ltd, dated 9 June 2022

Yours Faithfully,

Huade He
B.Eng, MIEAust, CPEng, NER, APEC Engineer, IntPE(Aus), EBE, RPEQ, BSP TAS
Principal Civil/Structural Engineer
For and on behalf of Metroeng Pty. Ltd.

**Building Code of Australia Compliance**

The Loading Capacity and Span Tables complies with the following provisions of Building Regulations 2018 (Victoria):

- NCC 2019 Building Code of Australia - Volume One
  - BP1.1(a)
  - BP1.1(b)(i) to (iV)
  - BP1.2(a) to (d)
  - B1.0(a) to (b)
  - B1.1(a) to (b)
  - B1.2(a) to (b)
  - B1.2(c) (i) to (ii)
  - B1.4(f)

- NCC 2019 Building Code of Australia - Volume Two
  - 2.1.1 P2.1 (a)
  - 2.1.1 P2.1 (b) (i) and (ii)
  - 2.1.1 P2.1 (b) (iii)
  - 2.1.1 P2.1 (b) (iv) for non-cyclonic areas only
  - 2.1.1 P2.1 (c) for non-cyclonic areas only
  - 3.0.2 (a)&(b)
  - 3.0.3 (a)&(b)
  - 3.0.3 (c)(i)
  - 3.0.3 (c)(ii) for non-cyclonic areas only
  - 3.0.3 (c)(iv)

- Relevant Australian Standards
  - AS/NZS 1170.0-2002 Structural design actions Part 0: General principles
  - AS/NZS 1170.1-2002 Structural design actions Part 1: Permanent, imposed and other actions
  - AS/NZS 1170.2-2011 Structural design actions Part 2: Wind for non-cyclonic areas only
  - AS1170.4-2007 Structural design action Part 4: Earthquake actions in Australia
  - AS4055-2012 Wind loads for housing for non-cyclonic areas only
  - AS1720.1-2010 Timber structures Part 1: Design methods
  - AS1684.2-2010 Residential timber-framed construction Part 2: Non-Cyclonic Areas
  - AS1684.4-2010 Residential timber-framed construction Part 4: Simplified Non-Cyclonic Areas

***Combustible external wall cladding***

*The following external wall cladding products are **prohibited** from being used in class 2 to 9 buildings:*
*expanded polystyrene (EPS) products used in an external insulation and finish (rendered) wall system.*
*All EPS products application in buildings **must** be checked and confirmed against the updated local laws and statutory requirements.*

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

| Non-Load Bearing Wall - Allowable Uniform Transverse Ultimate Wind Pressure (kN/m2) | | | | | | |
|---|---|---|---|---|---|---|
| **Panel Length (mm)** | **115mm Thick SIP** | **145mm Thick SIP** | **165mm Thick SIP** | **215mm Thick SIP** | **265mm Thick SIP** | **315mm Thick SIP** |
| **2400** | 1.65 | 2.23 | 2.75 | 3.83 | 5.10 | 6.40 |
| **3000** | 1.07 | 1.49 | 1.85 | 2.64 | 3.60 | 4.59 |
| **3600** | 0.72 | 1.04 | 1.29 | 1.89 | 2.62 | 3.39 |
| **4200** | - | 0.74 | 0.93 | 1.38 | 1.95 | 2.56 |
| **4800** | - | - | 0.68 | 1.04 | 1.49 | 1.98 |
| **5400** | - | - | - | 0.79 | 1.15 | 1.55 |
| **6000** | - | - | - | 0.62 | 0.91 | 1.23 |

| Non-Load Bearing Wall - Allowable Uniform Transverse Wind Classification | | | | | | |
|---|---|---|---|---|---|---|
| **Panel Length (mm)** | **115mm Thick SIP** | **145mm Thick SIP** | **165mm Thick SIP** | **215mm Thick SIP** | **265mm Thick SIP** | **315mm Thick SIP** |
| **2400** | N3 | N4 | N4 | N5 | N6 | N6 |
| **3000** | N2 | N3 | N3 | N4 | N5 | N6 |
| **3600** | N1 | N2 | N2 | N3 | N4 | N5 |
| **4200** | - | N1 | N2 | N3 | N3 | N4 |
| **4800** | - | - | N1 | N2 | N3 | N3 |
| **5400** | - | - | - | N1 | N2 | N3 |
| **6000** | - | - | - | N1 | N2 | N2 |

Note:
Wind loads calculated in accordance with AS1170.2 and AS4055 for non-cyclonic areas.

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

| Load Bearing Wall when full bearing on top of wall - Allowable Uniform Ultimate Loads (kN/m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 115mm Thick SIP (EPS/XPS/PUR) | | | | | | | | |
| Wind Pressure | | Wall height(mm) | | | | | | |
| | | 2.4 | 2.55 | 2.7 | 3 | 3.2 | 3.4 | 3.6 |
| Internal wall | 0 | 14.1 | 13.9 | 13.7 | 13.2 | 12.9 | 12.5 | 12.2 |
| External wall N1 | 0.62 | 9.9 | 9.3 | 8.8 | 7.7 | 6.9 | 6.2 | 5.4 |
| External wall N2 | 0.86 | 8.2 | 7.6 | 6.9 | 5.6 | 4.6 | 3.7 | 2.8 |
| External wall N3 | 1.35 | 4.9 | 4.0 | 3.1 | 1.2 | N/A | N/A | N/A |
| External wall N4 | 2.01 | 0.4 | N/A | N/A | N/A | N/A | N/A | N/A |
| External wall N5 | 2.96 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| External wall N6 | 3.99 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

| Load Bearing Wall when full bearing on top of wall - Allowable Uniform Ultimate Loads (kN/m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 145mm Thick SIP (EPS/XPS/PUR) | | | | | | | | |
| Wind Pressure | | Wall height(mm) | | | | | | |
| | | 2.4 | 2.55 | 2.7 | 3 | 3.2 | 3.4 | 3.6 |
| Internal wall | 0 | 14.5 | 14.4 | 14.2 | 14.0 | 13.8 | 13.6 | 13.4 |
| External wall N1 | 0.62 | 11.1 | 10.7 | 10.3 | 9.5 | 8.9 | 8.3 | 7.7 |
| External wall N2 | 0.86 | 9.8 | 9.3 | 8.8 | 7.7 | 7.0 | 6.2 | 5.5 |
| External wall N3 | 1.35 | 7.2 | 6.5 | 5.7 | 4.2 | 3.1 | 2.1 | 1.0 |
| External wall N4 | 2.01 | 3.7 | 2.6 | 1.6 | N/A | N/A | N/A | N/A |
| External wall N5 | 2.96 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| External wall N6 | 3.99 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

| Load Bearing Wall when full bearing on top of wall - Allowable Uniform Ultimate Loads (kN/m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 165mm Thick SIP (EPS/XPS/PUR) | | | | | | | | |
| Wind Pressure | | Wall height(mm) | | | | | | |
| | | 2.4 | 2.55 | 2.7 | 3 | 3.2 | 3.4 | 3.6 |
| Internal wall | 0 | 15.1 | 15.0 | 14.9 | 14.7 | 14.6 | 14.4 | 14.2 |
| External wall N1 | 0.62 | 12.1 | 11.7 | 11.4 | 10.6 | 10.1 | 9.6 | 9.0 |
| External wall N2 | 0.86 | 10.9 | 10.5 | 10.0 | 9.0 | 8.4 | 7.7 | 7.0 |
| External wall N3 | 1.35 | 8.5 | 7.9 | 7.2 | 5.8 | 4.8 | 3.8 | 2.8 |
| External wall N4 | 2.01 | 5.3 | 4.4 | 3.4 | 1.4 | 0.1 | N/A | N/A |
| External wall N5 | 2.96 | 0.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| External wall N6 | 3.99 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

| Load Bearing Wall when full bearing on top of wall - Allowable Uniform Ultimate Loads (kN/m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 215mm Thick SIP (EPS/XPS/PUR) | | | | | | | | |
| Wind Pressure | | Wall height(mm) | | | | | | |
| | | 2.4 | 2.7 | 3 | 3 | 3.2 | 3.4 | 3.6 |
| Internal wall | 0 | 15.3 | 15.2 | 15.1 | 15.1 | 15.0 | 14.9 | 14.8 |
| External wall N1 | 0.62 | 12.6 | 12.3 | 12.1 | 12.1 | 11.9 | 11.7 | 11.6 |
| External wall N2 | 0.86 | 11.5 | 11.2 | 10.9 | 10.9 | 10.7 | 10.5 | 10.3 |
| External wall N3 | 1.35 | 9.4 | 9.0 | 8.6 | 8.6 | 8.3 | 8.1 | 7.8 |
| External wall N4 | 2.01 | 6.5 | 6.0 | 5.5 | 5.5 | 5.1 | 4.7 | 4.4 |
| External wall N5 | 2.96 | 2.4 | 1.7 | 0.9 | 0.9 | 0.4 | N/A | N/A |
| External wall N6 | 3.99 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

| Load Bearing Wall when full bearing on top of wall - Allowable Uniform Ultimate Loads (kN/m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 265mm Thick SIP (EPS/XPS/PUR) | | | | | | | | |
| Wind Pressure | | Wall height(mm) | | | | | | |
| | | 2.4 | 2.55 | 2.7 | 3 | 3.2 | 3.4 | 3.6 |
| Internal wall | 0 | 2.4 | 2.7 | 3 | 3.3 | 3.6 | 3.9 | 4.2 |
| External wall N1 | 0.62 | 15.6 | 15.5 | 15.4 | 15.4 | 15.3 | 12.1 | 15.1 |
| External wall N2 | 0.86 | 13.4 | 13.2 | 13.0 | 12.9 | 12.6 | 9.9 | 6.1 |
| External wall N3 | 1.35 | 12.5 | 12.3 | 12.1 | 12.0 | 11.6 | 9.1 | 5.5 |
| External wall N4 | 2.01 | 10.8 | 10.5 | 10.2 | 10.1 | 9.5 | 7.3 | 4.4 |
| External wall N5 | 2.96 | 8.5 | 8.0 | 7.6 | 7.5 | 6.7 | 5.0 | 2.9 |
| External wall N6 | 3.99 | 5.1 | 4.5 | 3.9 | 3.8 | 2.6 | 1.6 | 0.7 |

| Load Bearing Wall when full bearing on top of wall - Allowable Uniform Ultimate Loads (kN/m) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 315mm Thick SIP (EPS/XPS/PUR) | | | | | | | | |
| Wind Pressure | | Wall height(mm) | | | | | | |
| | | 2.7 | 3 | 3.3 | 3.6 | 3.9 | 4.2 | 4.5 |
| Internal wall | 0 | 15.7 | 15.7 | 15.6 | 15.6 | 12.4 | 9.3 | 7.7 |
| External wall N1 | 0.62 | 13.8 | 13.6 | 13.5 | 13.5 | 10.5 | 7.8 | 6.4 |
| External wall N2 | 0.86 | 13.0 | 12.8 | 12.6 | 12.7 | 9.8 | 7.2 | 5.9 |
| External wall N3 | 1.35 | 11.5 | 11.2 | 10.9 | 11.1 | 8.3 | 6.1 | 4.9 |
| External wall N4 | 2.01 | 9.4 | 9.0 | 8.6 | 9.0 | 6.3 | 4.5 | 3.6 |
| External wall N5 | 2.96 | 6.4 | 5.9 | 5.4 | 5.8 | 3.4 | 2.3 | 1.6 |
| External wall N6 | 3.99 | 3.2 | 2.5 | 1.8 | 2.5 | 0.3 | N/A | N/A |

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

## Span Table for Roof framing and cladding: SPA SIPs (EPS/XPS/PUR core) ONLY

Wind loads calculated in accordance with AS1170.2 and AS4055 for non-cyclonic areas.

### SINGLE SPAN

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | PUR CORE | | |
| 115 | 2.7 | 2.9 | 2.3 | 2.6 | N1/N2 0.89 kPa uplift ultimate wind pressure |
| 145 | 3.2 | 3.3 | 2.7 | 2.9 | |
| 165 | 3.6 | 3.6 | 3.0 | 3.1 | |
| 215 | 4.3 | 4.1 | 3.6 | 3.6 | |
| 265 | 5.0 | 4.6 | 4.2 | 4.0 | |
| 315 | 5.6 | 5.0 | 4.7 | 4.4 | |

### CONTINUOUS SPANS (SPAN RATIO < 1:1.2)

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | PUR CORE | | |
| 115 | 3.5 | 3.5 | 2.9 | 3.1 | N1/N2 0.89 kPa uplift ultimate wind pressure |
| 145 | 4.1 | 4.0 | 3.5 | 3.5 | |
| 165 | 4.6 | 4.3 | 3.8 | 3.8 | |
| 215 | 5.5 | 4.9 | 4.6 | 4.3 | |
| 265 | 6.4 | 5.5 | 5.3 | 4.8 | |
| 315 | 7.2 | 6.0 | 6.0 | 5.3 | |

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

## Span Table for Roof framing and cladding: SPA SIPs (EPS/XPS/PUR core) ONLY

Wind loads calculated in accordance with AS1170.2 and AS4055 for non-cyclonic areas.

### SINGLE SPAN

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | PUR CORE | | N3 1.43kPa uplift ultimate wind pressure |
| 115 | 2.7 | 2.9 | 2.3 | 2.6 | |
| 145 | 3.2 | 3.3 | 2.7 | 2.9 | |
| 165 | 3.6 | 3.6 | 3.0 | 3.1 | |
| 215 | 4.3 | 4.1 | 3.6 | 3.6 | |
| 265 | 5.0 | 4.6 | 4.2 | 4.0 | |
| 315 | 5.6 | 5.0 | 4.7 | 4.4 | |

### CONTINUOUS SPANS (SPAN RATIO < 1:1.2)

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | PUR CORE | | N3 1.43kPa uplift ultimate wind pressure |
| 115 | 3.5 | 3.5 | 2.9 | 3.1 | |
| 145 | 4.1 | 4.0 | 3.5 | 3.5 | |
| 165 | 4.6 | 4.3 | 3.8 | 3.8 | |
| 215 | 5.5 | 4.9 | 4.6 | 4.3 | |
| 265 | 6.4 | 5.5 | 5.3 | 4.8 | |
| 315 | 7.2 | 6.0 | 6.0 | 5.3 | |

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

## Span Table for Roof framing and cladding: SPA SIPs (EPS/XPS/PUR core) ONLY

Wind loads calculated in accordance with AS1170.2 and AS4055 for non-cyclonic areas.

### SINGLE SPAN

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | PUR CORE | | N4 2.15kPa uplift ultimate wind pressure |
| 115 | 2.7 | 2.9 | 2.3 | 2.6 | |
| 145 | 3.2 | 3.3 | 2.7 | 2.9 | |
| 165 | 3.6 | 3.6 | 3.0 | 3.1 | |
| 215 | 4.3 | 4.1 | 3.6 | 3.6 | |
| 265 | 5.0 | 4.6 | 4.2 | 4.0 | |
| 315 | 5.6 | 5.0 | 4.7 | 4.4 | |

### CONTINUOUS SPANS (SPAN RATIO < 1:1.2)

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | PUR CORE | | N4 2.15kPa uplift ultimate wind pressure |
| 115 | 3.4 | 3.4 | 2.9 | 3.1 | |
| 145 | 3.9 | 3.9 | 3.5 | 3.5 | |
| 165 | 4.3 | 4.3 | 3.8 | 3.8 | |
| 215 | 4.9 | 4.9 | 4.6 | 4.3 | |
| 265 | 5.5 | 5.5 | 5.3 | 4.8 | |
| 315 | 6.1 | 6.0 | 6.0 | 5.3 | |

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

## Span Table for Roof framing and cladding: SPA SIPs (EPS/XPS/PUR core) ONLY

Wind loads calculated in accordance with AS1170.2 and AS4055 for non-cyclonic areas.

### SINGLE SPAN

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | PUR CORE | | |
| 115 | 2.7 | 2.7 | 2.3 | 2.6 | N5 3.39kPa uplift ultimate wind pressure |
| 145 | 3.1 | 3.1 | 2.7 | 2.9 | |
| 165 | 3.4 | 3.4 | 3.0 | 3.1 | |
| 215 | 3.9 | 3.9 | 3.6 | 3.6 | |
| 265 | 4.4 | 4.4 | 4.2 | 4.0 | |
| 315 | 4.8 | 4.8 | 4.7 | 4.4 | |

### CONTINUOUS SPANS (SPAN RATIO < 1:1.2)

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | PUR CORE | | |
| 115 | 2.7 | 2.7 | 2.7 | 2.7 | N5 3.39kPa uplift ultimate wind pressure |
| 145 | 3.1 | 3.1 | 3.1 | 3.1 | |
| 165 | 3.4 | 3.4 | 3.4 | 3.4 | |
| 215 | 3.9 | 3.9 | 3.9 | 3.9 | |
| 265 | 4.4 | 4.4 | 4.4 | 4.4 | |
| 315 | 4.8 | 4.8 | 4.8 | 4.8 | |

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288

## Span Table for Roof framing and cladding: SPA SIPs (EPS/XPS/PUR core) ONLY

Wind loads calculated in accordance with AS1170.2 and AS4055 for non-cyclonic areas.

### SINGLE SPAN

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | | | |
| | EPS / XPS CORE | | PUR CORE | | |
| 115 | 2.2 | 2.2 | 2.2 | 2.2 | N6 4.33kPa uplift ultimate wind pressure |
| 145 | 2.8 | 2.8 | 2.7 | 2.8 | |
| 165 | 3.0 | 3.0 | 3.0 | 3.0 | |
| 215 | 3.5 | 3.5 | 3.5 | 3.5 | |
| 265 | 3.9 | 3.9 | 3.9 | 3.9 | |
| 315 | 4.3 | 4.3 | 4.3 | 4.3 | |

### CONTINUOUS SPAN (SPAN RATIO < 1:1.2)

| Panel Thickness | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | Maximum span (m) for Span/300 deflection | Maximum span (m) for 12mm deflection | |
|---|---|---|---|---|---|
| | EPS / XPS CORE | | | | |
| | EPS / XPS CORE | | PUR CORE | | |
| 115 | 2.2 | 2.2 | 2.2 | 2.2 | N6 4.33kPa uplift ultimate wind pressure |
| 145 | 2.8 | 2.8 | 2.8 | 2.8 | |
| 165 | 3.0 | 3.0 | 3.0 | 3.0 | |
| 215 | 3.5 | 3.5 | 3.5 | 3.5 | |
| 265 | 3.9 | 3.9 | 3.9 | 3.9 | |
| 315 | 4.3 | 4.3 | 4.3 | 4.3 | |

admin@metroengconsulting.com.au
PO Box 4815 Knox City Centre VIC 3152
(03) 8806 0108, 0430 411 288