Compliance Guide – Roof Ventilation

Explanatory information and Practical Examples for
NCC 2022 Housing Provision Standard Part 10.8.3 - Ventilation of Roof Spaces.

DOCUMENT PURPOSE

The purpose of this document is to provide guidance, practical examples and a process to incorporate the NCC 2022 roof ventilation requirements into a residential home.

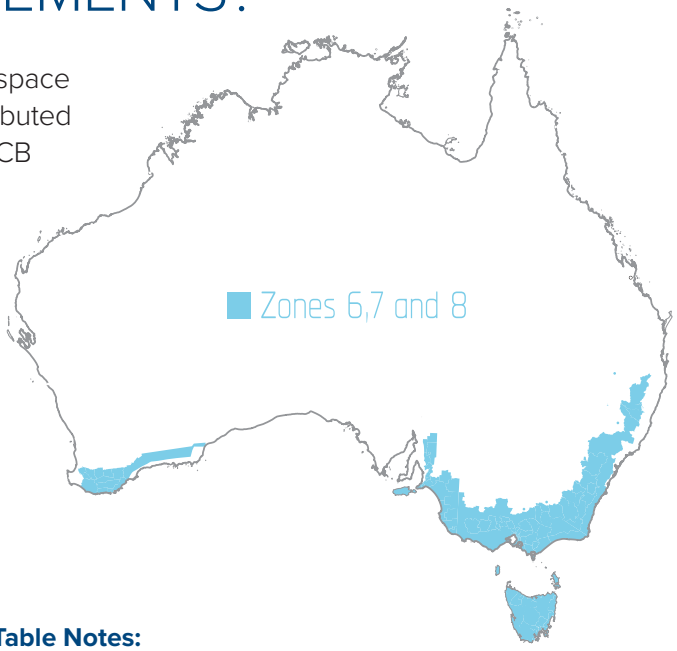
The benefit of using this process is it can be incorporated into existing roof plans. This helps ensure that the requirements are consistently applied throughout all phases of construction, including design, installation, and compliance assessment.

FIELDERS

AUSTRALIAN STEEL INSTITUTE

WHAT ARE THE REQUIREMENTS?

In climate zones 6, 7 and 8 a roof must have a roof space that is ventilated to outdoor air through evenly distributed openings in accordance with Table 10.8.3 of the ABCB Housing Provisions Standard (HPS).



ABCB HPS Table 10.8.3
Roof space ventilation requirements

Roof Pitch	Ventilation Openings
< 10°	25,000 mm²/m provided at each of two opposing ends
≥ 10° and < 15°	25,000 mm²/m provided at the eaves and 5,000 mm²/m at high level
≥ 15° and < 75°	7,000 mm²/m provided at the eaves and 5,000 mm²/m at high level, plus an additional 18,000 mm²/m at the eaves if the roof has a cathedral ceiling

Table Notes:

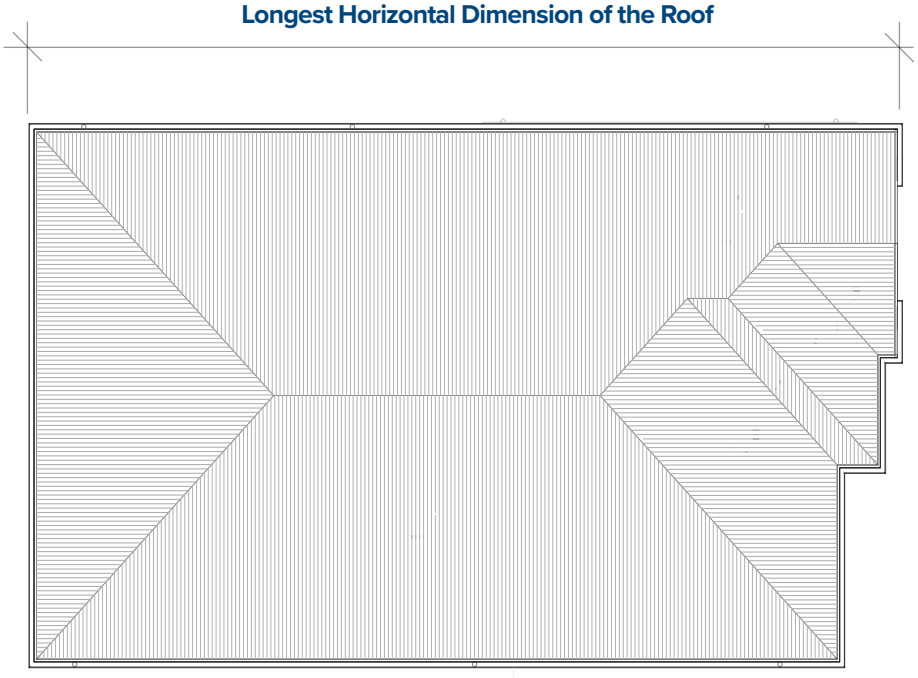
1. Ventilation openings are specified as a minimum free open area per metre length of the longest horizontal dimension of the roof.

2. For the purposes of this table, high level openings are openings provided at the ridge or not more than 900mm below the ridge or highest point of the roof space, measured vertically.

WHAT IS THE LONGEST HORIZONTAL DIMENSION OF THE ROOF?

The longest horizontal dimension of each roof refers to the maximum distance across the roof's surface measured horizontally, parallel to the ground. This dimension is typically the length or width of the roof at its widest point when viewed from above, and it excludes vertical measurements like height or slope.
Put simply, this is the longest length of the roof following the gutter line – and is often where the ventilation is applied at the low level or eave.

Longest Horizontal Dimension of the Roof

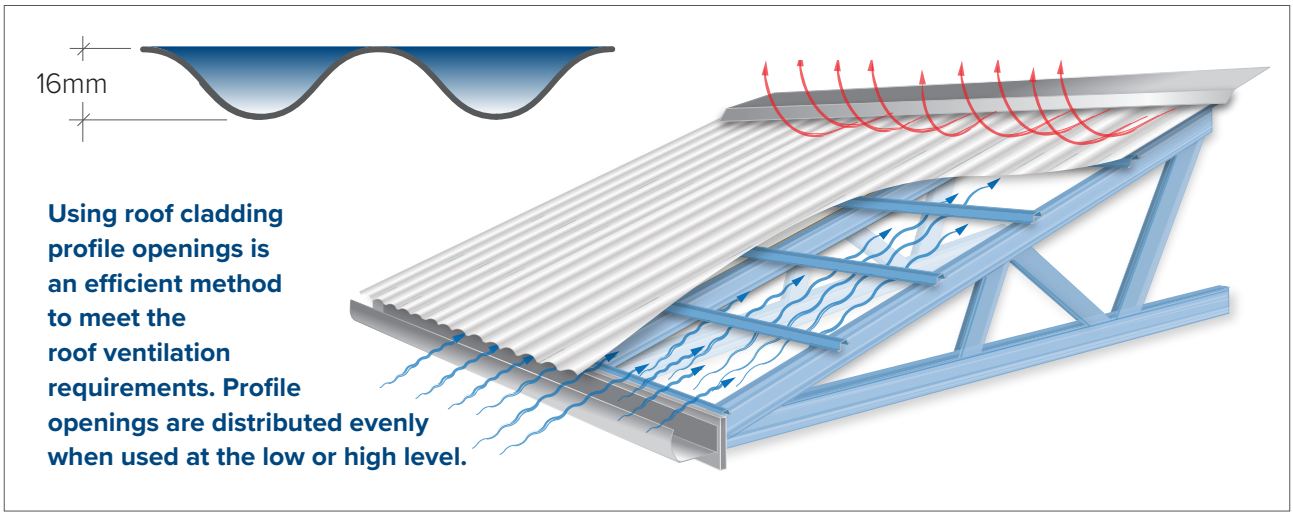


ENSURE VENTILATION OPENINGS ARE EVENLY DISTRIBUTED

Roof ventilation design should consider both the size and location of the of the openings.
The intent of the requirement, is that ventilated openings must be evenly distributed to reduce the risk of localised stagnant air pockets in a roof space.

Careful consideration should be given to complex roof geometries where the risk of stagnant air pockets increases. Cross ventilation through low level openings and high-level openings help prevent moisture accumulation for the entire roof space.

When using cladding profile openings at the low level (eave) or ridge, ensure that the construction detail is applied around the perimeter and the ridge.



Using roof cladding profile openings is an efficient method to meet the roof ventilation requirements. Profile openings are distributed evenly when used at the low or high level.

For vent devices space the devices evenly around the eave (e.g. above fascia vent) or along the ridge (e.g. whirlybird). In some cases, to achieve even distribution, additional vent devices exceeding the minimum requirement may be needed.

APPLYING ROOF VENTILATION TO ATTACHED GARAGES

The roof ventilation requirements do not apply to Class 10 buildings such as attached garages.

However, it is common for most standard residential homes to have a shared roof space for both living areas and garages. In these instances, when determining the roof ventilation opening requirement, the longest horizontal dimension of the roof should include the attached garage. Additionally, low level and high level ventilation openings must also provide even distribution to the roof space above attached garages.

DOUBLE STOREY CONSTRUCTION

Double-storey construction does not increase the roof ventilation requirement. For residential buildings with multiple roof spaces or split roofs across upper and lower levels, each roof space must be calculated separately.

EXTERNAL AWNINGS AND ROOF COVERINGS FOR NON-HABITABLE AREAS

External awnings or roof coverings are open to outdoor air and provided they are not connected to the main roof space they will not contribute to the condensation risk of a residential home. For this reason, they are considered exempt for the purposes of applying roof ventilation. Examples include entertainment areas, pergolas, patios, verandas, or porticos.

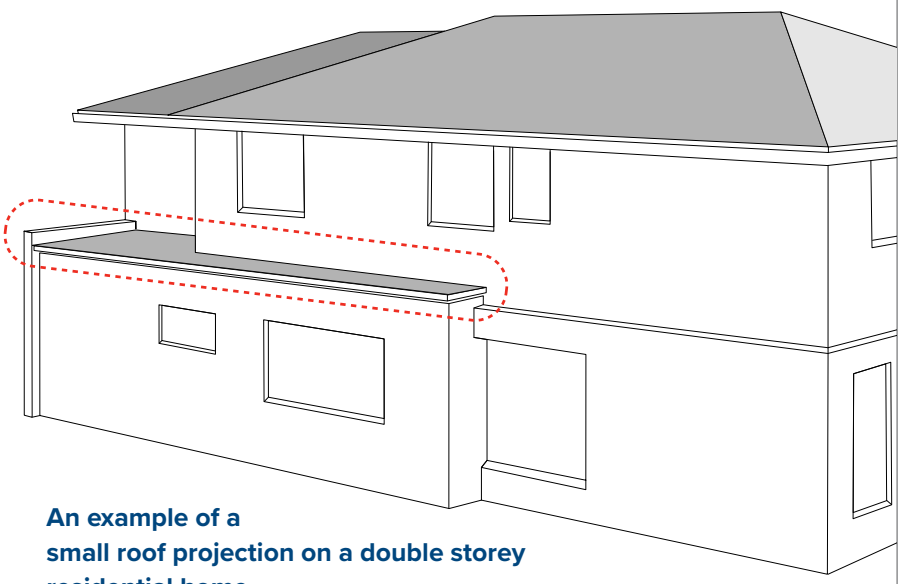
Roof coverings need not be included when determining the longest total plan dimension of the roof. If included, it will create an over specification of the roof ventilation requirement to be applied to the dwelling.

VENTILATING SMALL ROOF PROJECTIONS

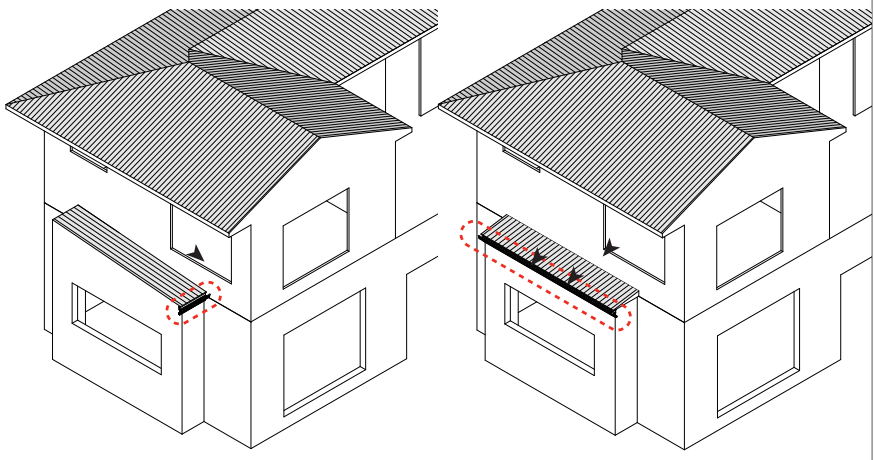
A small roof projection is often used as a design feature to complement a façade, integrate multiple design spaces such as a garage, bay windows and/or allow the extension of a floor living area.

Similar to the main roof of a home, the longest horizontal dimension of a small roof projection will depend on the location of the gutter. For pitched roof types there is a perimeter gutter and sufficient access for profile openings to meet the ventilation requirement.

In low pitched single planed roofs the longest horizontal dimension of small roof projections shall be determined based on the gutter line. Typical examples of this can be seen to the right.



An example of a small roof projection on a double storey residential home.



The longest horizontal dimension of a small roof projection is measured off the gutter line (indicated in red).

PROCESS TO ENSURE COMPLIANT ROOF VENTILATION

This flowchart shows the necessary steps to determine the ventilation opening requirement and how to incoproate that into a design plan.

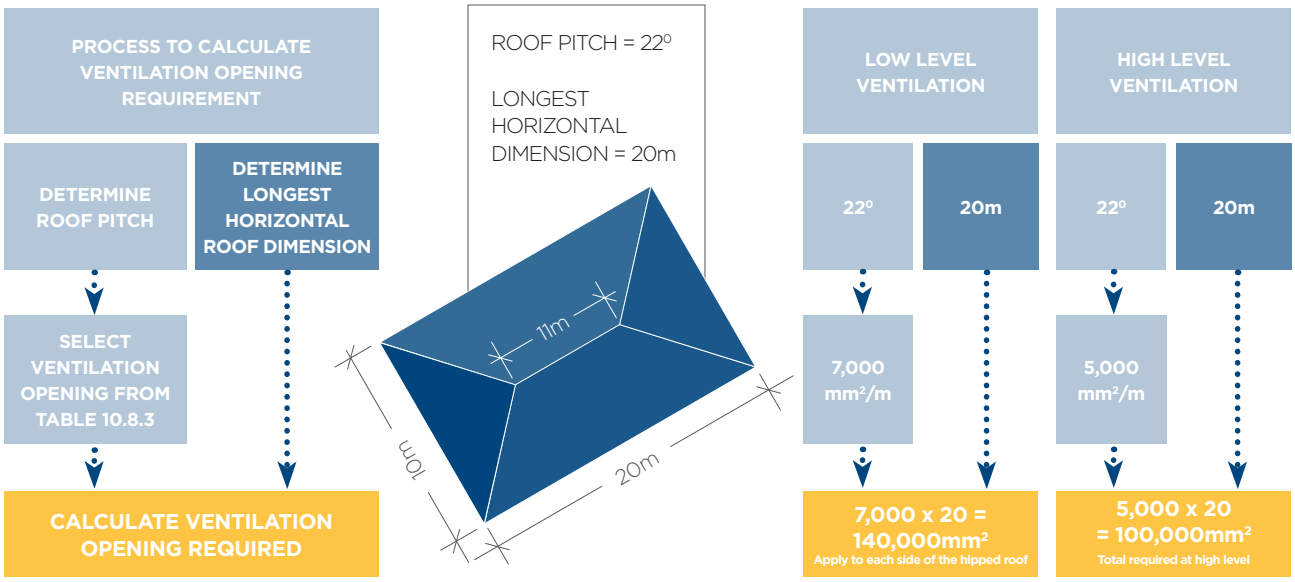
Check if Roof Ventilation is Required	• **Required for Climate Zones 6 To 8***
Determine DtS Roof Vent Opening Requirement	• **ABCB HPS Table 10.8.3**
Select Ventilation Approach	• **Vent Device or Construction Detail**
Incorporate on Roof Plan	• **Vent Opening Calculation** • **Location of Openings** (See Sample 1 & 2)
Check Compliance and Design Principles	• **Even Distribution** • **Vent Balance**

**NCC Climate Zone Map: https://ncc.abcb.gov.au/resources/climate-zone-map*

CALCULATING THE ROOF VENTILATION REQUIREMENT

The total roof ventilation opening requirement is specified as a minimum opening area (mm²) per length (m) of the longest horizontal dimension for each roof. The longest horizontal dimension and the roof pitch determines the total ventilation opening requirement at low and high level.

The total openings for hipped roofs should be calculated from the longest horizontal dimension. For gable or single planed roof types, the total openings should be calculated from the lower, longer side. To determine the required ventilation opening area the specified opening requirement needs to be multiplied by the length of the horizontal dimension. Below is a worked example:



PRACTICAL EXAMPLE 1 - SINGLE STOREY DWELLING

SINGLE STOREY - LOW LEVEL ROOF VENTILATION REQUIREMENT	
NCC VENTING REQUIREMENT	7,000mm²/m
LONGEST HORIZONTAL DIMENSION (House length)	22 m
NUMBER OF SIDES TO VENT	2
TOTAL LENGTH REQUIRED	44 m
NCC REQUIRED VENTED OPEN AREA	308, 000 mm²/m
PERIMETER OF ROOF TO BE VENTED	52.5 m
VENTILATION APPROACH (Insert Construction Detail or Product Reference)	7,500 mm²/m
ACTUAL VENTED AREA	393,750 mm²
PASS/FAIL =ACTUAL OPEN AREA - NCC REQUIREMENT	85,750 mm²

Complies with NCC2022 10.8.3 Roof Ventilation Open Area Requirement

SINGLE STOREY - HIGH LEVEL ROOF VENTILATION REQUIREMENT	
NCC VENTING REQUIREMENT	5,000 mm²/m
LONGEST HORIZONTAL DIMENSION (House length)	22 m
REQUIRED VENTED OPEN AREA	110,000 mm²
LENGTH OF RIDGE & HIPS (Within 900mm of the highest point)	12.3 m
VENTILATION APPROACH (Insert Construction Detail or Product Reference)	5,000 mm²/m
RIDGE SIDES	2
ACTUAL VENTED AREA	123,000 mm²
PASS/FAIL =ACTUAL OPEN AREA - NCC REQUIREMENT	13,000 mm²

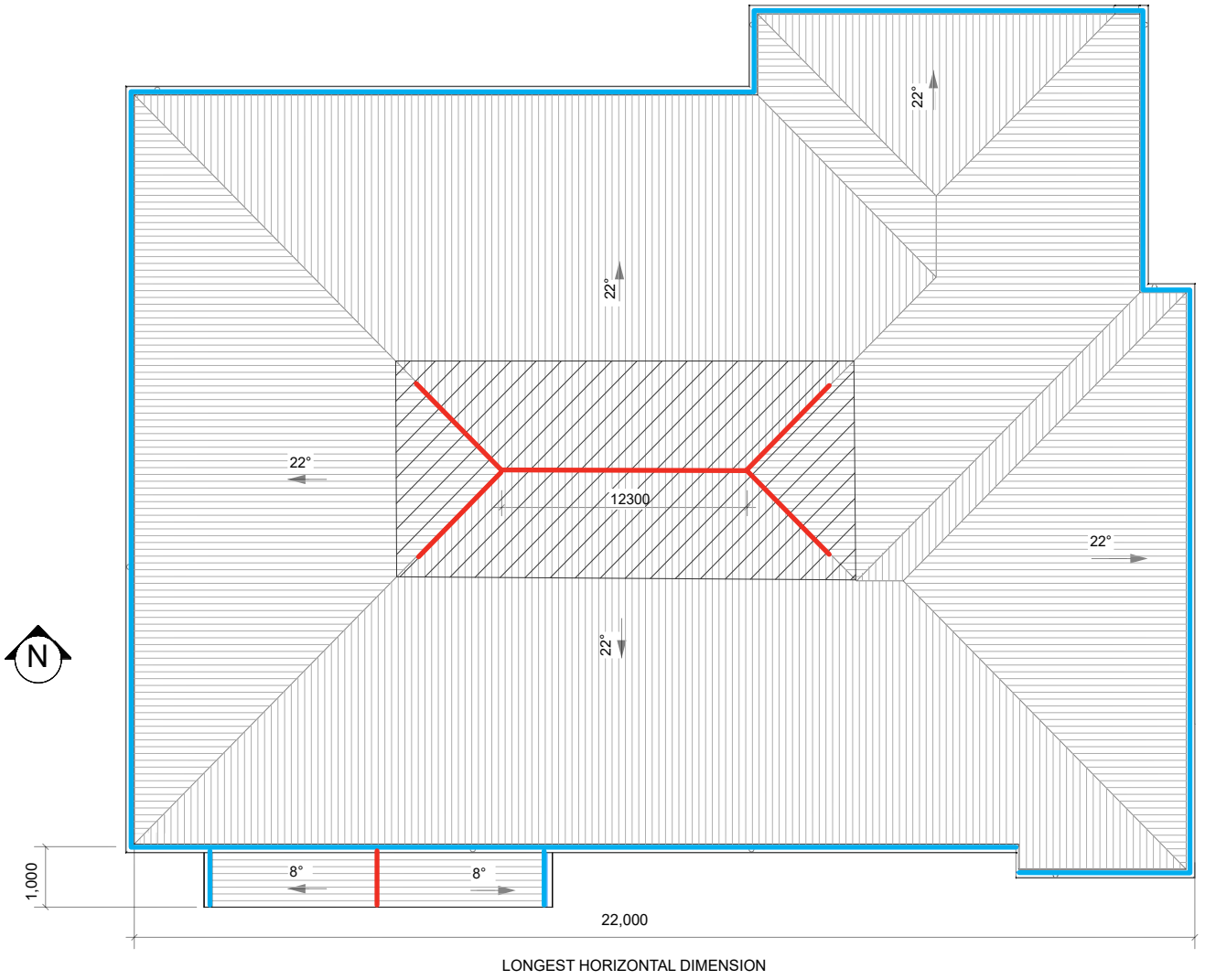
Complies with NCC2022 10.8.3 Roof Ventilation Open Area Requirement

SMALL ROOF - PROJECTION VENTILATION REQUIREMENT - LOW LEVEL	
NCC VENTING REQUIREMENT	25,000 mm²/m
LONGEST HORIZONTAL DIMENSION (House length)	1 m
REQUIRED VENTED OPEN AREA	25,000 mm²
LENGTH OF RIDGE & HIPS (Within 900mm of highest point)	1 m
VENTILATION APPROACH (Insert Construction Detail or Product Reference)	12,500 mm²/m
RIDGE SIDES	2
ACTUAL VENTED AREA	25,000mm²
PASS/FAIL =ACTUAL OPEN AREA - NCC REQUIREMENT	0 mm²

Complies with NCC2022 10.8.3 Roof Ventilation Open Area Requirement

SMALL ROOF - PROJECTION VENTILATION REQUIREMENT - HIGH LEVEL	
NCC VENTING REQUIREMENT	25,000 mm²/m
LONGEST HORIZONTAL DIMENSION (House length)	1 m
REQUIRED VENTED OPEN AREA	25,000 mm²
LENGTH OF RIDGE & HIPS (Within 900mm of highest point)	1 m
VENTILATION APPROACH (Insert Construction Detail or Product Reference)	12,500 mm²/m
RIDGE SIDES	2
ACTUAL VENTED AREA	25,000 mm²
PASS/FAIL =ACTUAL OPEN AREA - NCC REQUIREMENT	0 mm²

Complies with NCC2022 10.8.3 Roof Ventilation Open Area Requirement



LONGEST HORIZONTAL DIMENSION

SMALL ROOF - PROJECTION VENTILATION LENGTHS - LOW & HIGH LEVEL	
LINEAL METRES OF LOW LEVEL VENTILATION (Insert Construction Detail or Product Reference)	1 m
LINEAL METRES OF HIGH LEVEL VENTILATION (Insert Construction Detail or Product Reference) (Excluding garage & Portico)	1 m

SINGLE STOREY - LOW & HIGH LEVEL VENTILATION LENGTHS	
LINEAL METRES OF LOW LEVEL VENTILATION (Insert Construction Detail or Product Reference)	52.5 m
LINEAL METRES OF HIGH LEVEL VENTILATION (Insert Construction Detail or Product Reference) (Excluding garage & Portico)	12.3 m

OWNER	
DESIGN	
FACADE	
JOB NUMBER	
PERMIT NUMBER	
APPROVED	

ASI Ventilation Example

DRAWING TITLE

ROOF PLAN

SIZE	DRAWN	DWG NO	REV
A3		Ventilation 001	2

SCALE NTS

SHEET 1 OF 1

PRACTICAL EXAMPLE 2 - DOUBLE STOREY DWELLING

FIRST FLOOR - LOW LEVEL ROOF VENTILATION REQUIREMENT	
NCC VENTING REQUIREMENT	7,000mm²/m
LONGEST HORIZONTAL DIMENSION (First Floor roof length)	18.5 m
NUMBER OF SIDES TO VENT	2
NCC REQUIREMENT VENTED OPEN AREA	259,000 mm²
PERIMETER OF ROOF TO BE VENTED (Roof perimeter excluding garage)	51 m
VENTILATION APPROACH (Insert Construction Detail or Product Reference)	8,050 mm²/m
ACTUAL VENTED AREA	410,550 mm²
PASS/FAIL =ACTUAL OPEN AREA - NCC REQUIREMENT	151,550 mm²

Complies with NCC2022 10.8.3 Roof Ventilation Open Area Requirement

FIRST FLOOR - HIGH LEVEL ROOF VENTILATION REQUIREMENT	
NCC VENTING REQUIREMENT	5,000mm²/m
LONGEST HORIZONTAL DIMENSION	18.5 m
REQUIRED VENTED OPEN AREA	92,500 mm²
LENGTH OF RIDGE & HIPS (Within 900mm of the highest point)	11 m
VENTILATION APPROACH (Insert Construction Detail or Product Reference)	5,000 mm²/m
RIDGE SIDES	2
ACTUAL VENTED OPEN AREA	110,000 mm²
PASS/FAIL =ACTUAL OPEN AREA - NCC REQUIREMENT	17,500 mm²

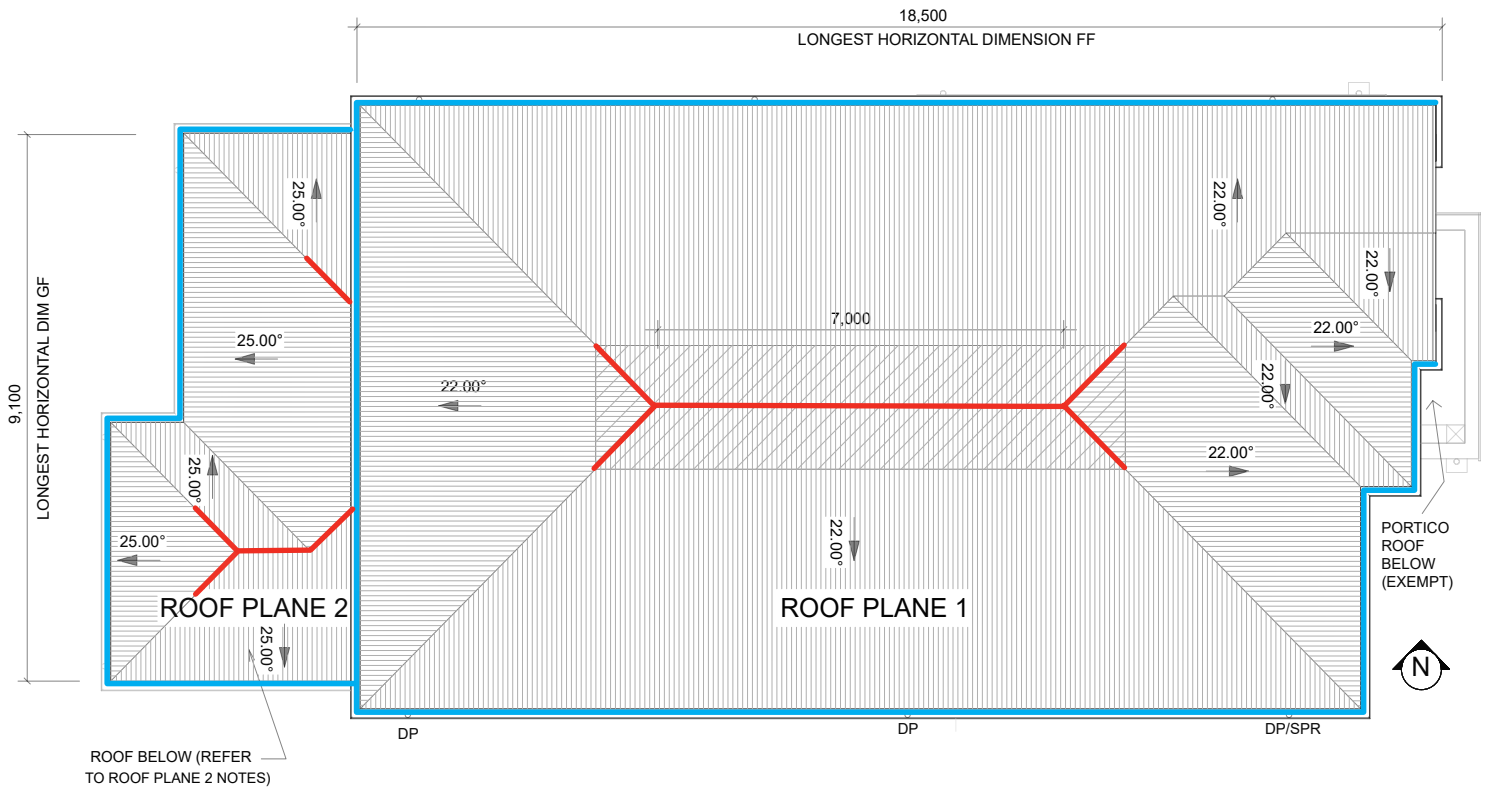
Complies with NCC2022 10.8.3 Roof Ventilation Open Area Requirement

GROUND FLOOR - LOW LEVEL ROOF VENTILATION REQUIREMENT	
NCC VENTING REQUIREMENT	7,000mm²/m
LONGEST HORIZONTAL DIMENSION (House length)	9.1 m
NUMBER OF SIDES TO VENT	2
NCC REQUIREMENT VENTED OPEN AREA	127,400 mm²
PERIMETER OF ROOF TO BE VENTED	17.5 m
VENTILATION APPROACH (Insert Construction Detail or Product Reference)	8,050 mm²/m
ACTUAL VENTED AREA	140,875 mm²
PASS/FAIL =ACTUAL OPEN AREA - NCC REQUIREMENT	13,475 mm²

Complies with NCC2022 10.8.3 Roof Ventilation Open Area Requirement

GROUND FLOOR - HIGH LEVEL ROOF VENTILATION REQUIREMENT	
NCC VENTING REQUIREMENT	5,000mm²/m
LONGEST HORIZONTAL DIMENSION (House length)	9.1 m
REQUIREd VENT OPEN AREA	45,500 mm²
LENGTH OF RIDGE & HIPS (within 900mm of the highest point)	4.8 m
VENTILATION APPROACH (Insert Construction Detail or Product Reference)	5,000 mm²/m
RIDGE SIDES	2
ACTUAL VENTED AREA	48,000 mm²
PASS/FAIL =ACTUAL OPEN AREA - NCC REQUIREMENT	2,500 mm²

Complies with NCC2022 10.8.3 Roof Ventilation Open Area Requirement



FIRST FLOOR - LOW & HIGH LEVEL VENTILATION LENGTHS	
LINEAL METRES OF LOW LEVEL VENTILATION (Insert Construction Detail or Product Reference)	51 m
LINEAL METRES OF HIGH LEVEL VENTILATION (Insert Construction Detail or Product Reference)	11 m

GROUND FLOOR - LOW & HIGH LEVEL VENTILATION LENGTHS -	
LINEAL METRES OF LOW LEVEL VENTILATION (Insert Construction Detail or Product Reference)	17.5 m
LINEAL METRES OF HIGH LEVEL VENTILATION (Insert Construction Detail or Product Reference)	4.8m

Giving the low level (blue) and high level (red) ventilation a colour on the roof plan simplifies the location of for the installer and transparency for compliance.

In addition, having the lengths or quantity listed helps with ordering of vent devices for each house.

ROOF PLANE 2 NOTES:

1. IF HABITABLE: NEED TO DETERMINE ROOF VENTILATION REQUIREMENT - SEE EXAMPLE GROUND FLOOR CALCULATIONS (ABOVE)
2. IF NON-HABITABLE: EXEMPT FROM ROOF VENTILATION REQUIREMENT - NO FURTHER ACTION REQUIRED.
3. IF SMALL ROOF PROJECTION IS OVER A HABITABLE SPACE, A SEPERATE ROOF VENTILATION OPENING CALCULATION MAY BE REQUIRED.

OWNER	
DESIGN	
FACADE	
JOB NUMBER	
PERMIT NUMBER	
APPROVED	

ASI Ventilation Example

DRAWING TITLE: ROOF PLAN 2

SIZE	DRAWN	DWG NO	REV
A3		Ventilation 002	2

SCALE NTS

SHEET 1 OF 1

KEY DESIGN PRINCIPLES TO CONSIDER

Once the compliant low and high-level openings have been applied, it is advised to check with good design principles of roof ventilation:

1. Low level ventilation openings should exceed high level openings
   (A general good rule of thumb is a ventilation ratio of 2:1 low to high level openings)
2. Vent opening location should also consider the household moisture risk of the areas beneath it
   (e.g. wet areas).

For further information on ventilation and condensation management principles please refer to ASI Guidance Documents.

DEFINITIONS

- Awning - roof-like structure, usually of limited extent, projecting from a wall of a building.
- Cathedral ceiling - ceiling that follows the line of the roof, often with the roof timbers exposed.
- Gable roof - pitched roof that terminates at one or both ends as a gable.
- Hipped roof - A roof with a level eave and with its ends inclined as well as its sides.
- Longest horizontal dimension - the longest length of the roof following the gutter line.
- Pergola - open-roofed framework over a path, terrace or patio, supported on posts or columns, and usually covered with plants trained over the members.
- Patio - outdoor paved area open to the sky, surrounded by portions of a house or building and forming part of the living area.
- Portico - large porch at the main entrance or a side entrance to a building, with columns supporting a roof.
- Single planed roof – also known as a mono pitch or monoslope roof having a constant slope and without ridge.
- Small roof projection – also known as a lean-to-roof has its upper edge attached to, and supported by, a wall that extends above the level of the roof, or is supported by structural members next to or attached to a wall.
- Verandah - open or partly open portion of a house or building, or a roofed space attached to a building outside the principal rooms, and covered either by the main roof or a separate, lower roof.
- Whirlybird - also known as ‘turbine vents’ are a type of semi-mechanical vent that can be installed on the roof of a house to help remove heat from the ceiling cavity.

[1]ASI Condensation Principles & ASI Ventilation in Steel Roofing.
https://www.steel.org.au/Membership/media/Australian-Steel-Institute/NCC2022/Condensation-Principles-v14.pdf
https://www.steel.org.au/Membership/media/Australian-Steel-Institute/NCC2022/Ventilation-in-Steel-Roofing-v27.pdf