REHAU®

Unlimited Polymer Solutions

RAUVENT

Design and Installation Guide

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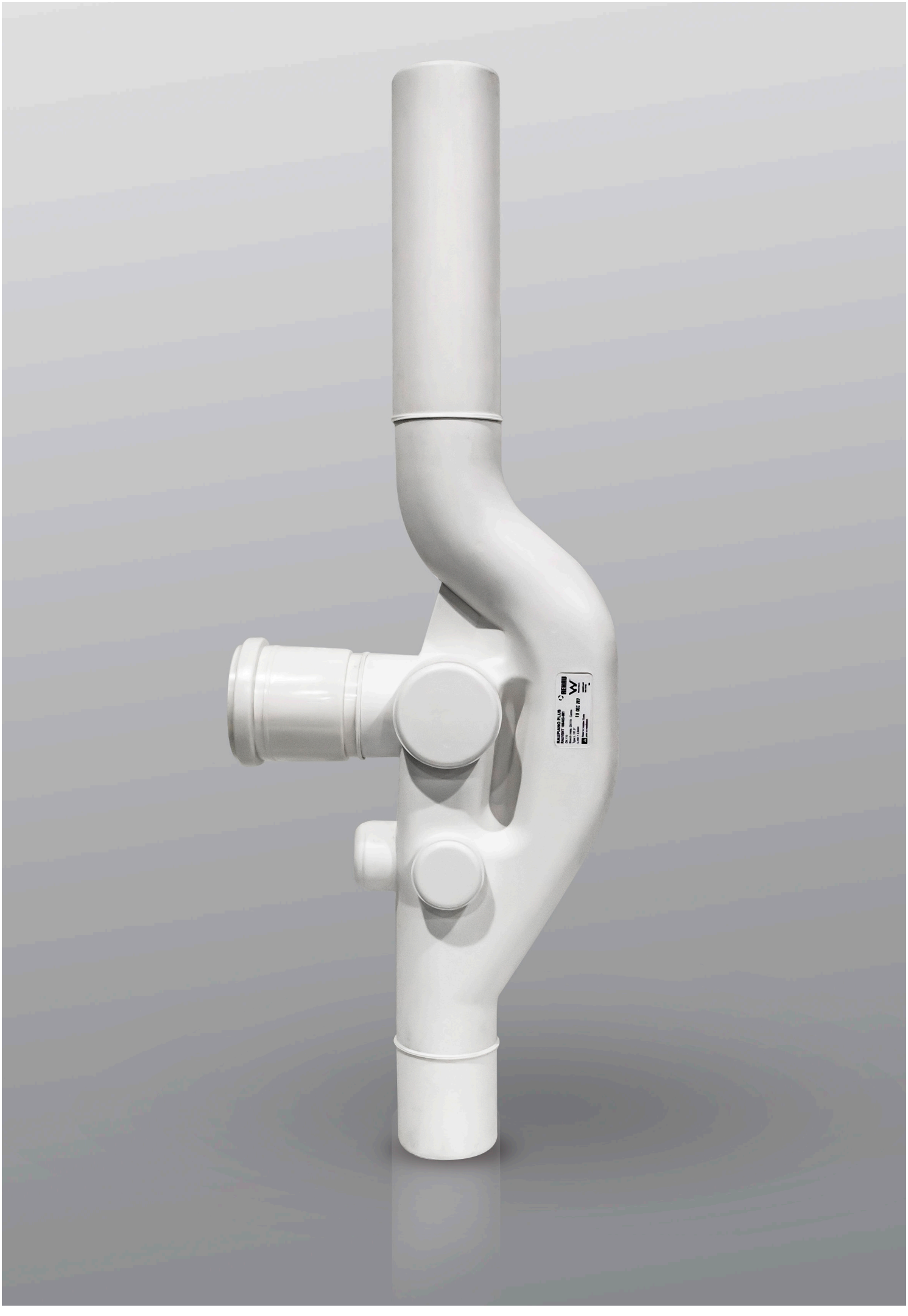
Valid from May 2019
Subject to technical modifications



CONTENTS

INFORMATION AND SAFETY ADVICE

NOTES ON THIS TECHNICAL INFORMATION

Validity

This Technical Information is valid for Australia and New Zealand.
This publication is valid from May 2019.

Navigation

At the beginning of this document you can find a detailed contents page which lists the individual chapters and their respective page numbers.

RAUPIANO System components

This Technical Information describes the requirements for the installation of the RAUPIANO RAUVENT Fitting as part of the RAUPIANO Reduced Velocity Aerator Stack System (RVASS). Further information on RAUPIANO System components are available in “RAUPIANO – Acoustic Drainage” Technical Information.

Explanation of symbols


Safety information


Legal information


Important information, which needs to be taken into account

Latest Technical Information

For safe usage of REHAU products, please check regularly if a newer version of the technical information is available. The date of issue of this technical information can be found on the back cover in the bottom right hand corner. The latest technical information manuals are available from the REHAU sales office, appointed wholesalers as well as from our websites:
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www.rehau.com.au
www.rehau.co.nz

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Safety advice and operating instructions

- Please read these safety instructions and technical information carefully and completely for your own safety and other’s before beginning the installations.
- Please keep this copy for your future reference.
- If you have any questions or need further clarification on the safety instructions and/or the individual installation instructions, please contact your nearest REHAU sales office. Refer to the last page for contact details.

Failure to observe the safety information/instructions can result in damage to property and persons.

Intended use

The RAUPIANO RAUVENT Fitting is intended to be used as part of the RAUPIANO Reduced Velocity Aerator Stack System (RVASS) and must be installed in accordance with this document, as well as with “RAUPIANO – Acoustic Drainage” Technical Information. Any other use of the system is prohibited.

All measurements and weights are approximate.

Our verbal and written advice in regards to operation is based on years of experience and standardised assumptions and provided to the best of our knowledge. The intended use of REHAU products is described comprehensively in the Technical Information book. REHAU has no control over the application, use or processing of the products and responsibility remains entirely with the respective user/processor.

When installing RAUPIANO products, including the RAUVENT, please observe all applicable national and international regulations on installation, accident prevention and safety together with the information contained in this Manual.

Also observe the applicable laws, standards, guidelines and regulations (e.g. DIN, EN, ISO, NCC, BCA, PCA, NZBC, AS/NZS) as well as regulations on environmental protection, provisions of professional associations and regulations of the local public utility companies.

Any applications not described in this Manual - i.e. non-standard applications - must be discussed with our Technical Applications Department. For more detailed advice, please contact your REHAU Sales Office.

This design and installation information is related solely to the specific REHAU product. Occasionally, references are made to parts of applicable standards and directives. Always observe the current version of any guidelines, standards or directives.

Further standards, directives and guidelines related to the design, installation and operation of sanitary plumbing and drainage systems should also be referred to, however these do not form part of this Technical Information.

General safety measures

- Keep your workplace tidy and free of obstructions.
- Ensure there is always sufficient light.
- Keep children, pets and unauthorised persons away from tools and installation areas. This is especially important when carrying out refurbishment/repair work in occupied areas.
- Only use the corresponding components in the piping system that have been generally approved by REHAU. Using components which are not part of the system can lead to accidents or other hazards.

Trades Qualifications

- Only authorised and trained persons are allowed to install systems.

Work clothing

- Wear eye protection, adequate work clothing, protective shoes, safety helmets, and a hairnet if you have long hair.
- Do not wear loose clothing or jewelry as these can be caught by moving parts.
- A safety helmet must be worn especially when carrying out installation work at face level or overhead.
- Wear NBR gloves when applying lubricant by hand.

Follow the installation instructions

- Always read and comply with the respective operating instructions of the tool being used.
- Cutting tools used for cutting pipes to length have a sharp blade. The cutting tools are to be stored and handled in a safe way to prevent injuries.
- When shortening pipes, maintain a safe distance between the hand holding the object and the cutting tool.
- Never put your hands near the area where the tool is cutting, or on moving parts.
- When performing service, maintenance and alteration work and when relocating within the work site, always unplug the power cable of the tools being used and ensure they cannot be switched on inadvertently.

Operating parameters

- All permissible operating parameters and restrictions outlined in “RAUPIANO – Acoustic Drainage” Technical Information, as well as the additional restrictions in section 1.2 of this document, must be observed. Failure to observe these could result in the pipes and joints becoming overstrained and/or compromise the desired performance of the system. Not adhering to the operating parameters is therefore strictly prohibited.
- Keeping within the operating parameters is the sole responsibility of the Designer / Installer of the system.

1 PRODUCT OVERVIEW

1.1 RAUVENT Details and function

In high-rise wastewater drainage stacks, the ventilation design of the system is crucial to ensure the balance of hydraulic forces. This results in effective control of pressure fluctuations and ensures a fully functioning system. Pressure imbalances within the stack can cause unwanted consequences, including the loss of the water seal in traps.

The RAUVENT fitting is designed to increase the drainage capacity of the system for the same size stack, while still allowing effective ventilation. The result is an economical solution to an increased demand on the system.

The RAUVENT is a ready-made fitting design to be used immediately in the RAUPIANO Push-Fit system, allowing fast and easy installation off the shelf. It's available in three pre-fabricated configurations that will suit majority of projects. Project specific configurations may be available if required. Additional lead time applies; please contact REHAU for more information.

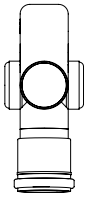
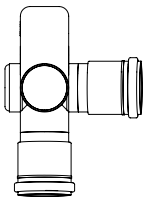
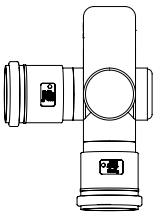
REHAU Article Number	Reece Code	Description	Diagram (Top view i.e. looking down on stack)
106483-001	1451100	RAUVENT – DN110 Branch Inlet: Centre Only	
106482-001	1451101	RAUVENT – DN110 Branch Inlets: Centre + Right	
106484-001	1451102	RAUVENT – DN110 Branch Inlets: Centre + Left	

Table 1.1 Overview of RAUVENT Standard configurations.

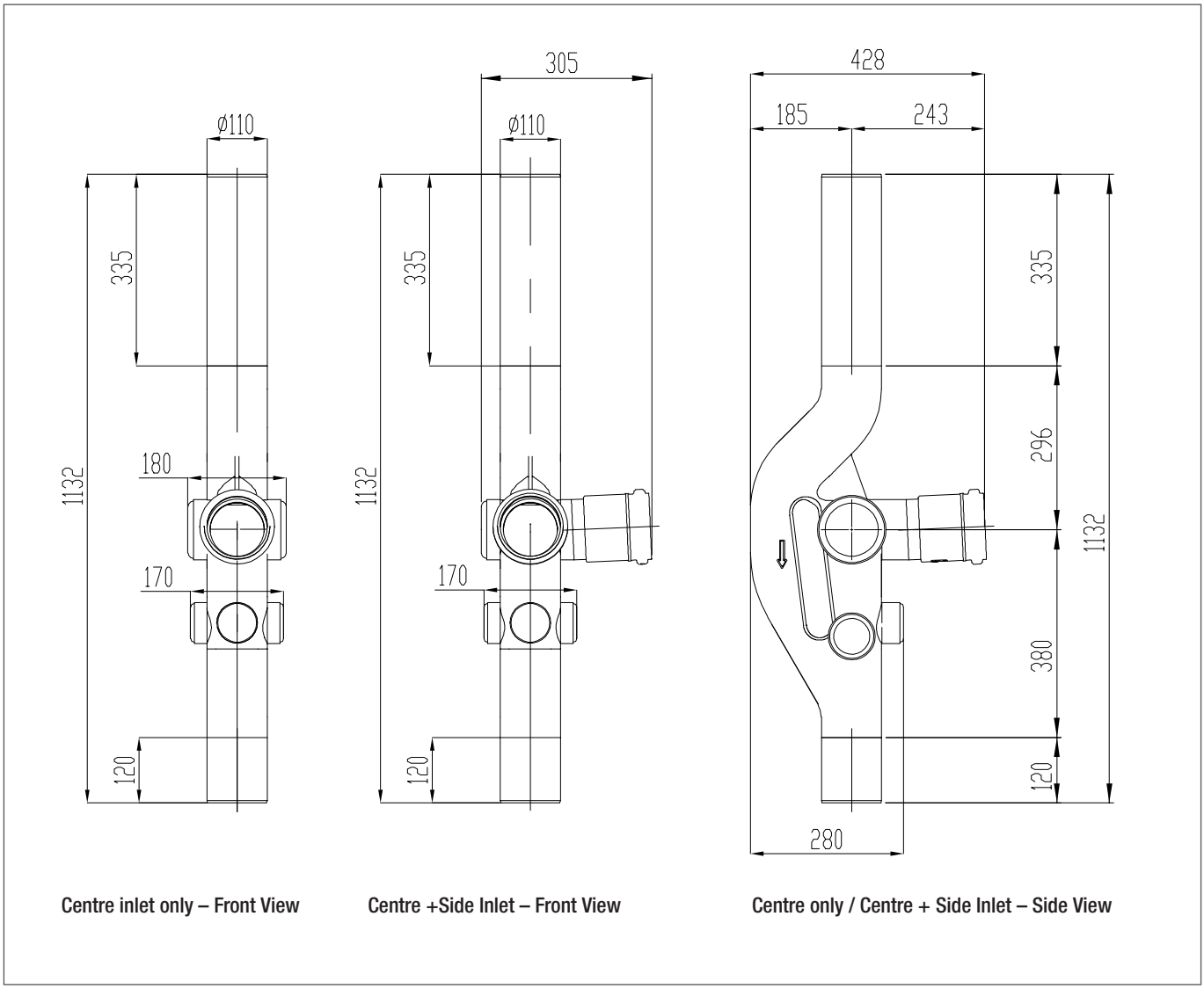


Figure 1.1 RAUVENT fitting dimensions [mm] for each standard configuration.

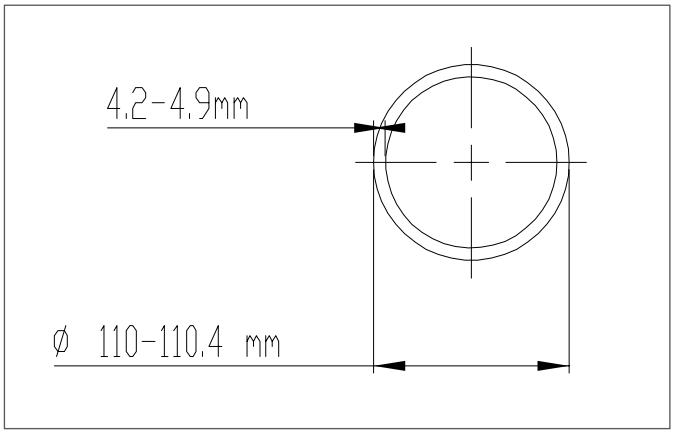


Figure 1.2 RAUVENT spigot end (Vertical inlet / outlet) cross-sectional dmensions

1.2 Application Suitability

1.2.1 Approved Applications

The RAUVENT Reduced Velocity Aerator Stack System (RVASS) is ideal for use in multi-storey buildings. The system becomes most economical when it is installed in buildings higher than 5 storeys. As such, the types of buildings that usually lend themselves to this kind of drainage design include:

- High-rise Office buildings
- High-rise Residential buildings
- Hotels

1.2.2 Trade Waste

The RAUVENT System is suitable for drainage of greasy kitchen trade waste, up to a maximum temperature of 80˚C (and up to 95°C for brief periods). The waste water must contain no prohibited chemicals as per the RAUPIANO chemical resistance guide (See section 12 and 13 “RAUPIANO Plus – Acoustic Drainage” Technical information) and must have a pH value from 2 (acidic) to 12 (basic).

RAUPIANO PLUS is ideal for drainage of greasy waste water from commercial kitchens up to the grease separator.

For lengthy grease waste lines, the use of pipe trace heating may be necessary. This prevents premature grease accumulation. The temperature of the pipe trace heating suitable for plastic pipes may not exceed 65°C.

1.2.3 Unapproved Applications

The RAUVENT shall not be installed in any applications outside of those suitable for RAUPIANO (See Section 2.1.4 and Section 12 of “RAUPIANO Plus – Acoustic Drainage” Technical information). In addition the following exclusions apply:

- Installations exposed to long-term operating temperature higher than 80˚C (or higher than 95˚C for brief periods).
- Trade waste applications outside of those described in section 1.2.2 of this document.
- Exposure to waste water containing prohibited chemicals (See section 12 and 13 “RAUPIANO Plus – Acoustic Drainage” Technical information)
- Installations exposed directly or indirectly to UV radiation (e.g. sunlight).
- Fuel Stations
- Oil Discharge
- Siphonic drainage

Any applications not included in this technical information (special applications) require consultation with our technical department. For special applications, please contact your REHAU sales office.

1.3 Certification

The RAUVENT fitting is certified under WaterMark License Number WM74758.

RAUPIANO Acoustic Drainage is certified under WaterMark License Numbers WM70060 & WM71503.

The entire RAUPIANO Plus range, including the RAUVENT, is designed to be installed in accordance with AS/NZS 3500.2 and as per REHAU’s Technical Information.

WaterMark®

2 DESIGN AND PLANNING

2.1 Important Pre-Planning Checks

Whether you are an experienced RAUVENT and/or RAUPIANO installer, a regular specifier of the products or a new user, the fundamental compatability of the system to your application must be confirmed prior to planning for your project. Please see section 1.2 and contact REHAU for any queries.

The RAUVENT system can provide drainage solutions and performance that surpasses the limitations of AS/NZS 3500.2. For ease of planning, section 2 aims to outline the minimum requirements of the RAUVENT system from REHAU, with the Australian Standards in mind, however it is vital that the designer / installer confirms conformance to both AS/NZS 3500.2, as well as REHAU's requirements outlined in sections 1.2, 2, 3 and 4.

1 - 5 Entire System
See Sections
1.2
4

1 Stack Ventilation Line
See Section
2.5

2 Branch Line
See Sections
2.2, 2.3, 2.4.1,
3.1.1, 3.1.2,
5.1, 5.2, 5.3

3 RAUVENT Stack
See Sections
2.2, 2.4, 2.5,
3.1, 3.2

4 Pressure Relief Bypass
See Sections
2.4.5, 2.4.6, 2.5.2
5.3

5 Collector Line
See Sections
2.4.7
3.1, 3.3
5.4

For additional solutions please refer to section 5 or consult REHAU for further guidance.

2.1.1 RAUVENT System Overview

For design and planning purposes the RAUVENT RVASS can be divided into 5 sections as shown below in Figure 2.1. It is important to design each section correctly to ensure a fully functioning system. The below shows relevant sections of this Design and Installation Guide to each part of the system.

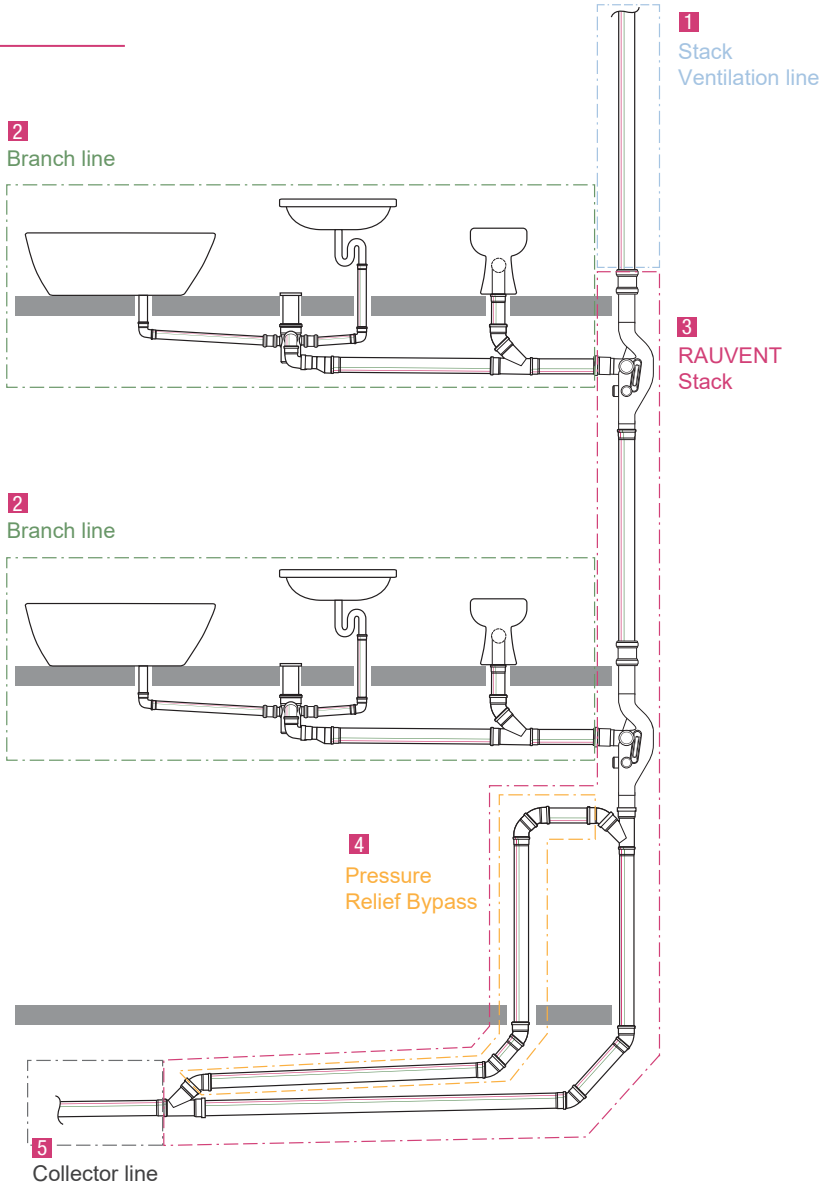


Figure 2.1 RAUVENT RVASS Overview

2.2 Maximum Flow Capacity

The maximum allowable flow in each section of the system is defined in terms of Discharge Units (DU) in litres per second. For information on the DU for each type of fixture, See Table 3.1.

2.3 Branch Lines Design

The branches are to be designed primarily as per AS/NZS 3500.2. While meeting the requirements of the Australian standard, the below requirements from REHAU, summarised in Table 2.1, shall be met concurrently.

	Ventilation		Capacity		
Branch Inlet Size [DN/OD]	Branch Line Ventilation	Maximum Branch Length (L)	Maximum DU Per Branch Inlet	Maximum combined DU	Maximum Single DU (Single Fixture)
110	Unvented	10m	15	25	2.5
110	Vented	20m	25	25	2.5

Table 2.1 Branch line requirements

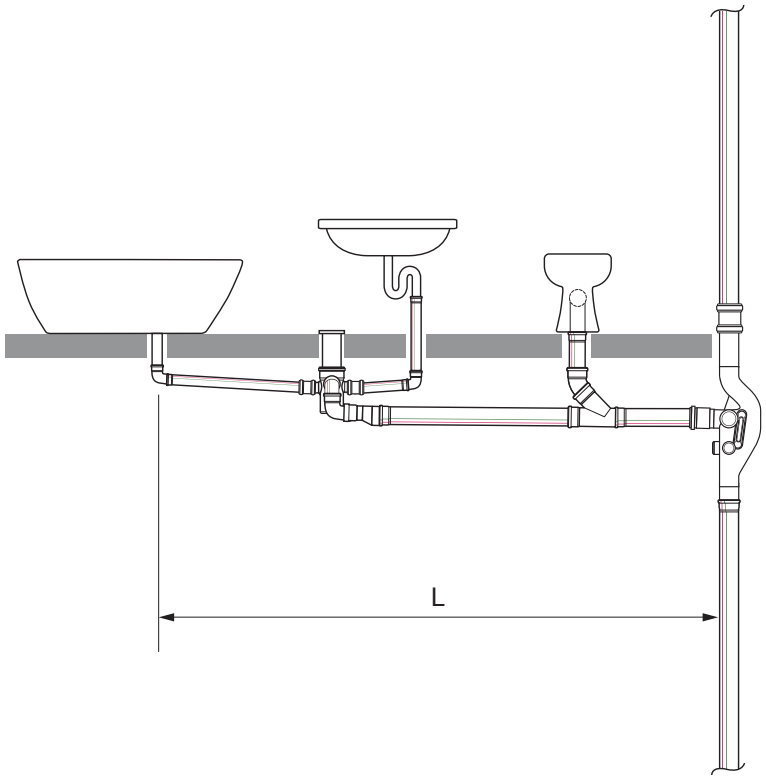


Figure 2.2 Example Maximum branch length (L) to suit requirements of Table 2.1.

2.4 RAUVENT Stack Design

2.4.1 Maximum Stack Capacity

The maximum allowable design flow rate (Q) in each RAUVENT Stack is 8.7l/s. This is calculated using the associated DU of each of the fixtures draining to the stack. Please refer to Section 3 – System sizing, for information on how to calculate the loading on the stack and for example calculations.

2.4.2 Stack Division

Should the calculated design flow rate (Q) exceed 8.7 l/s, the RAUVENT stack shall be divided into 2 separate stacks as shown below:

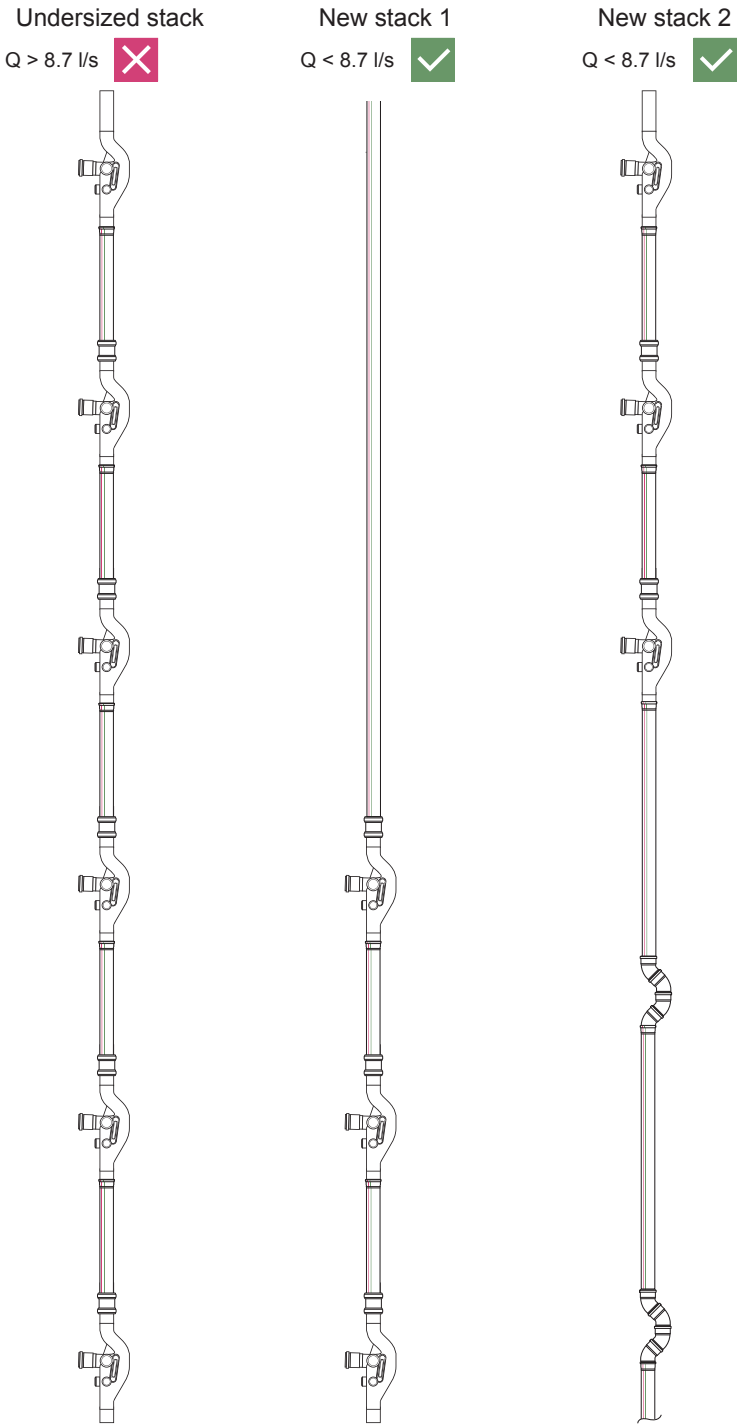


Figure 2.3 Example of RAUVENT stack division

2.4.3 Location of RAUVENT Fittings Within the Stack

- The RAUVENT fitting is to be installed on every floor with connections to the vertical stack.
- The vertical distance between 2 RAUVENT fittings must not be more than 5m. Should the distance be more than 5m, a Double Inline Offset must be installed in between the RAUVENT fittings to maintain this 5m distance. A Double Inline Offset consists of four 45° bends as shown in Figure 2.4.

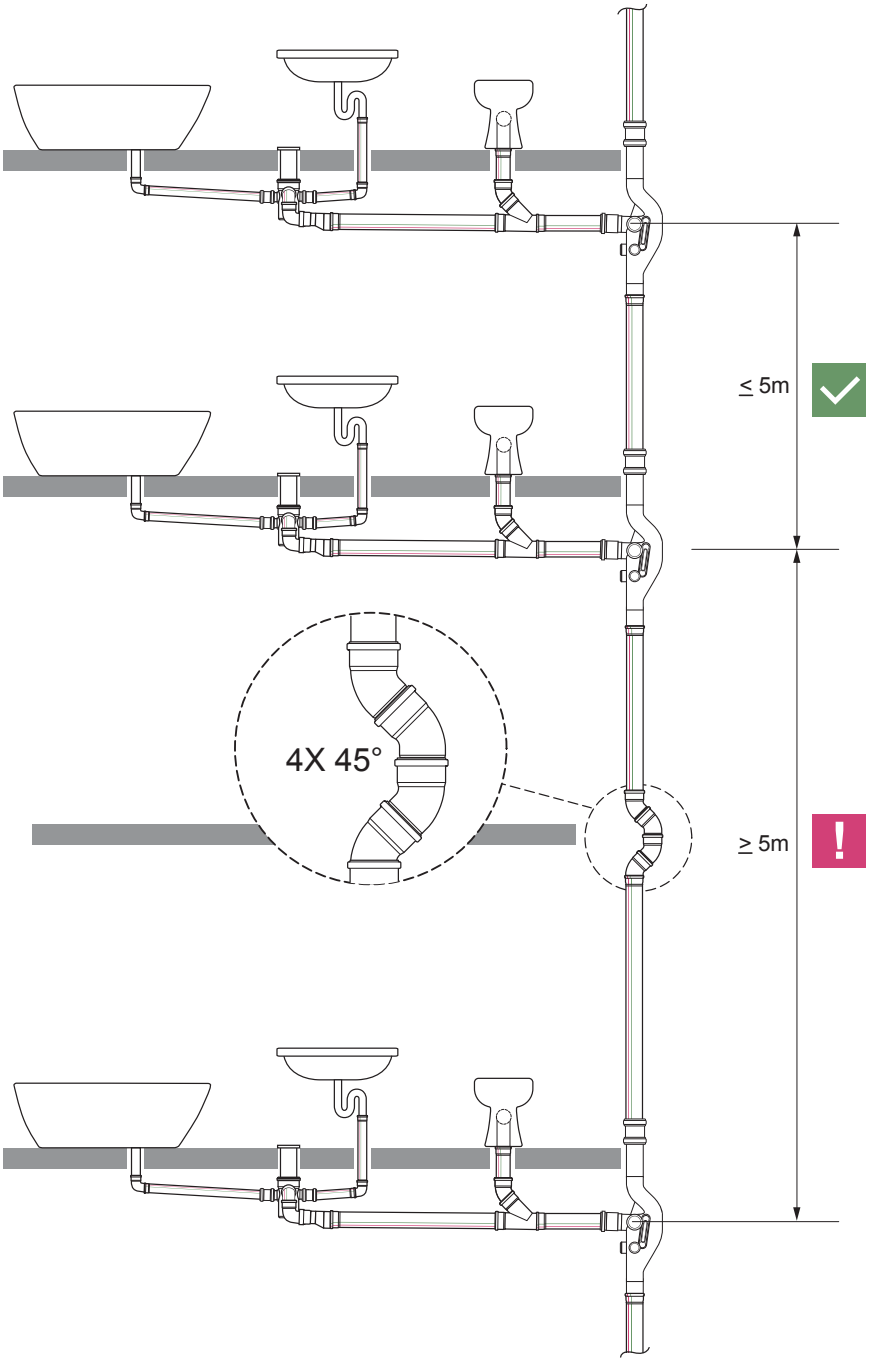


Figure 2.4 Required location of RAUVENT fittings and Double Inline Offsets.

2.4.4 Steep Stack Offsets

A steep offset is considered as being greater than 45° to the horizontal. Should the building design require a steep offset within the RAUVENT stack:

- The offset must be made at 45° and must not exceed 1m as shown in Figure 2.5.

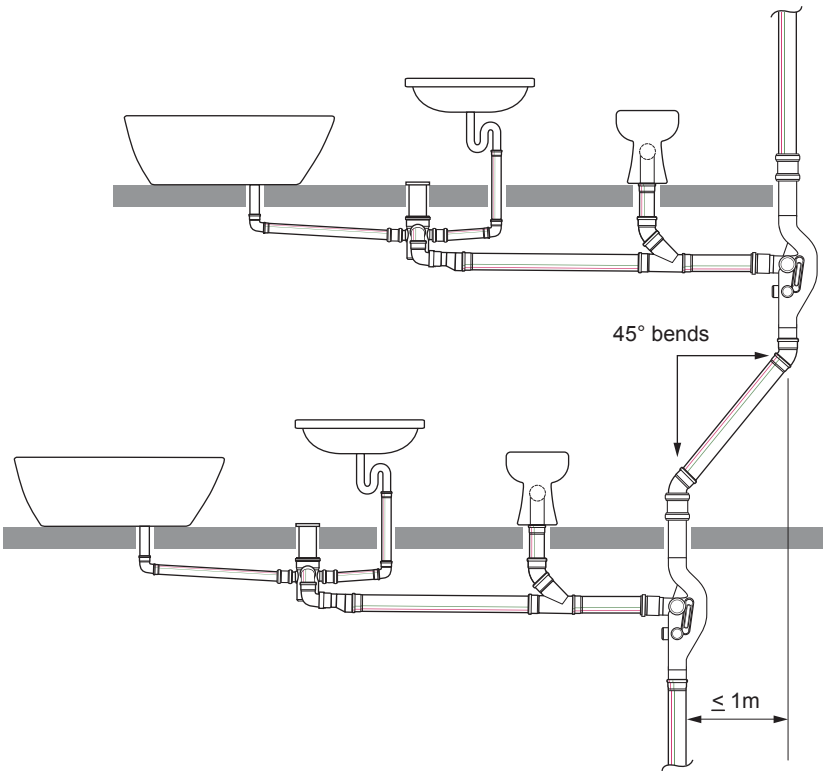


Figure 2.5 Example of RAUVENT stack with steep offset.

2.4.5 Graded Stack Offsets

Should the building design require an offset that cannot be achieved as a steep offset, a pressure relief bypass must be installed. The design of this is similar to the pressure relief bypass at the end of the RAUVENT stack (see Section 2.4.6) with additional requirements, as shown in Table 2.2.

Offset Length (L)	Length of Horizontal Connection-Exclusion Zone (E_1)	Length of Vertical Connection-Exclusion Zone (E_2)	Maximum Grade	Ventilation Required for horizontal offset line
< 10 m	0.45m	0.6m	5%	No
> 10 m	2m	2m	5%	Yes

Table 2.2 Graded stack offset requirements for RAUVENT stacks.

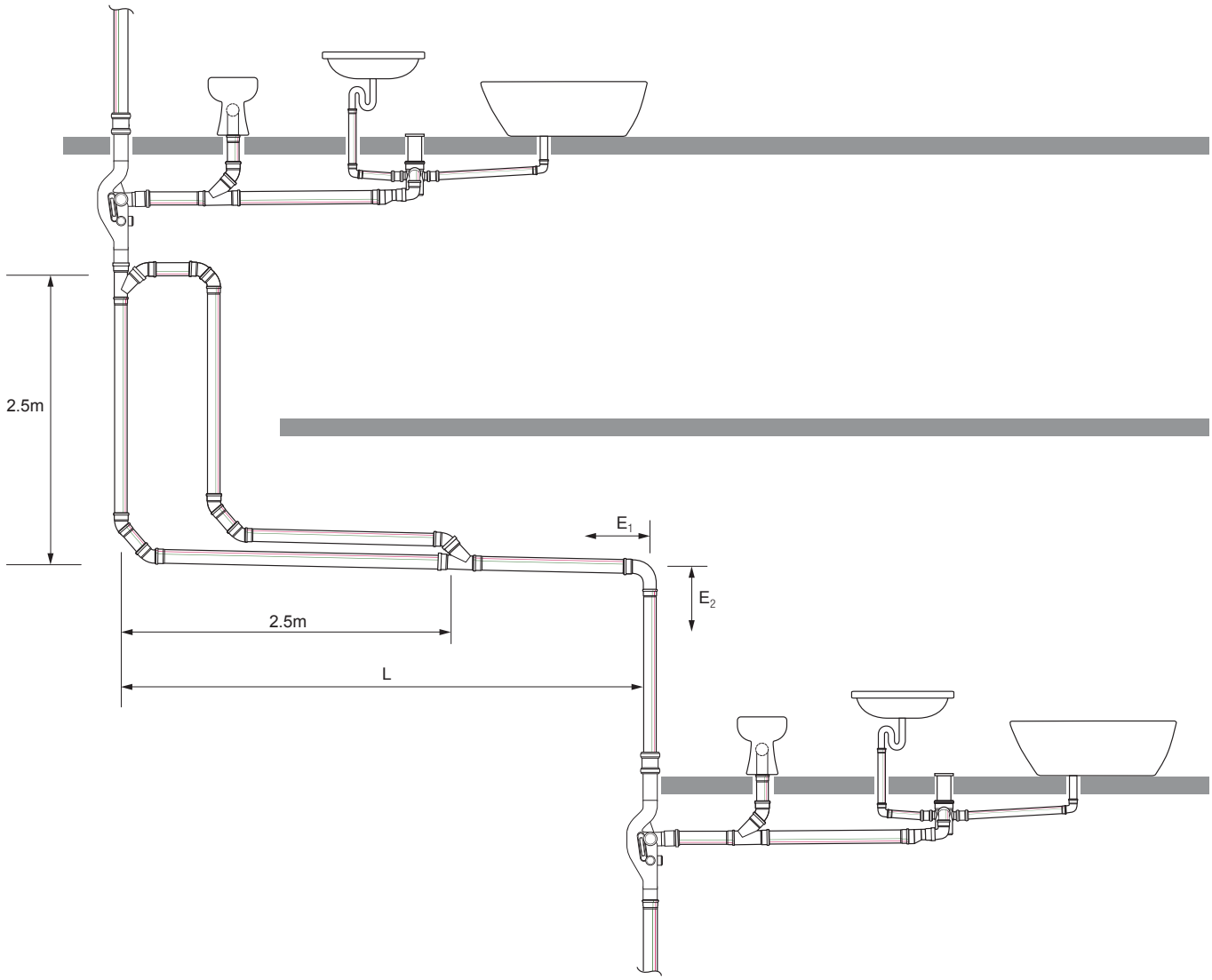


Figure 2.6 Graded stack offset layout in RAUVENT stacks.

2.4.6 Pressure Relief Bypass

To ensure a fully functioning RAUVENT system, a pressure relief bypass must be installed at the base of the RAUVENT stack. The following requirements must be observed when designing the pressure relief bypass:

- The pressure relief bypass must be DN 110 in size.
- The pressure relief bypass must be connected to the graded pipe at least 2.5 meters from the centreline of the vertical stack.

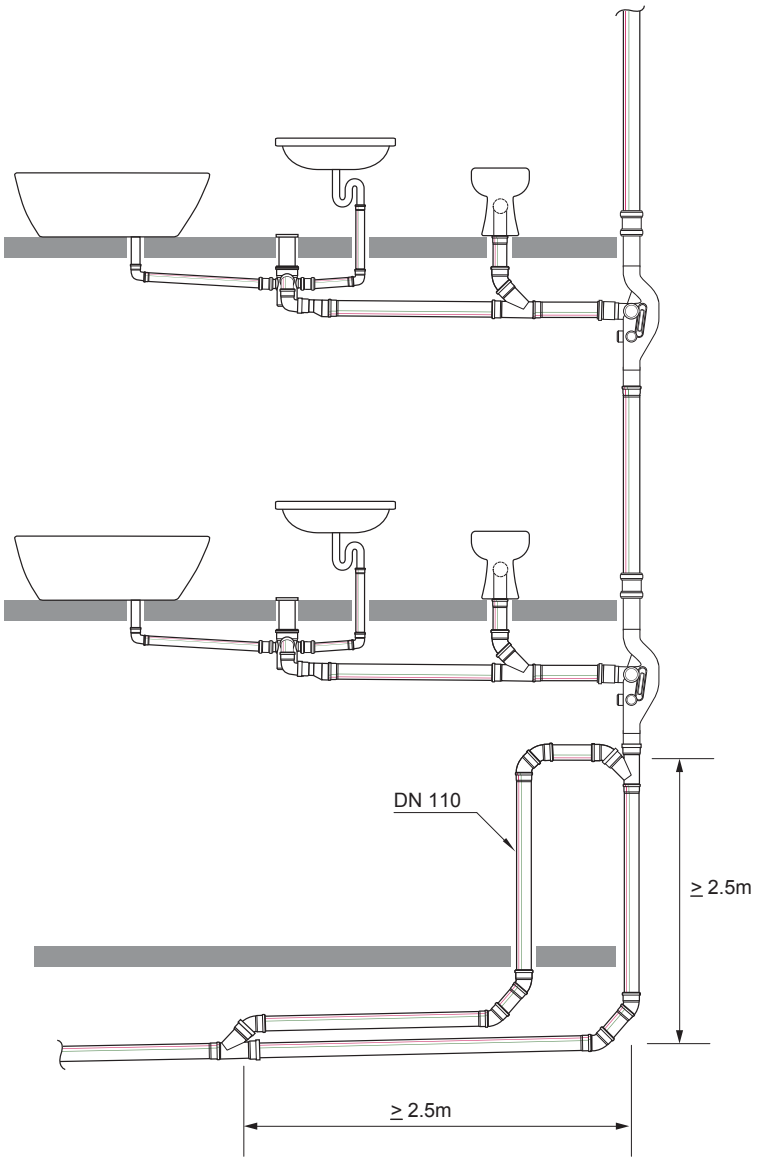


Figure 2.7 Pressure relief bypass

2.4.7 End of RAUVENT Stack & Transition to Collector / Drain

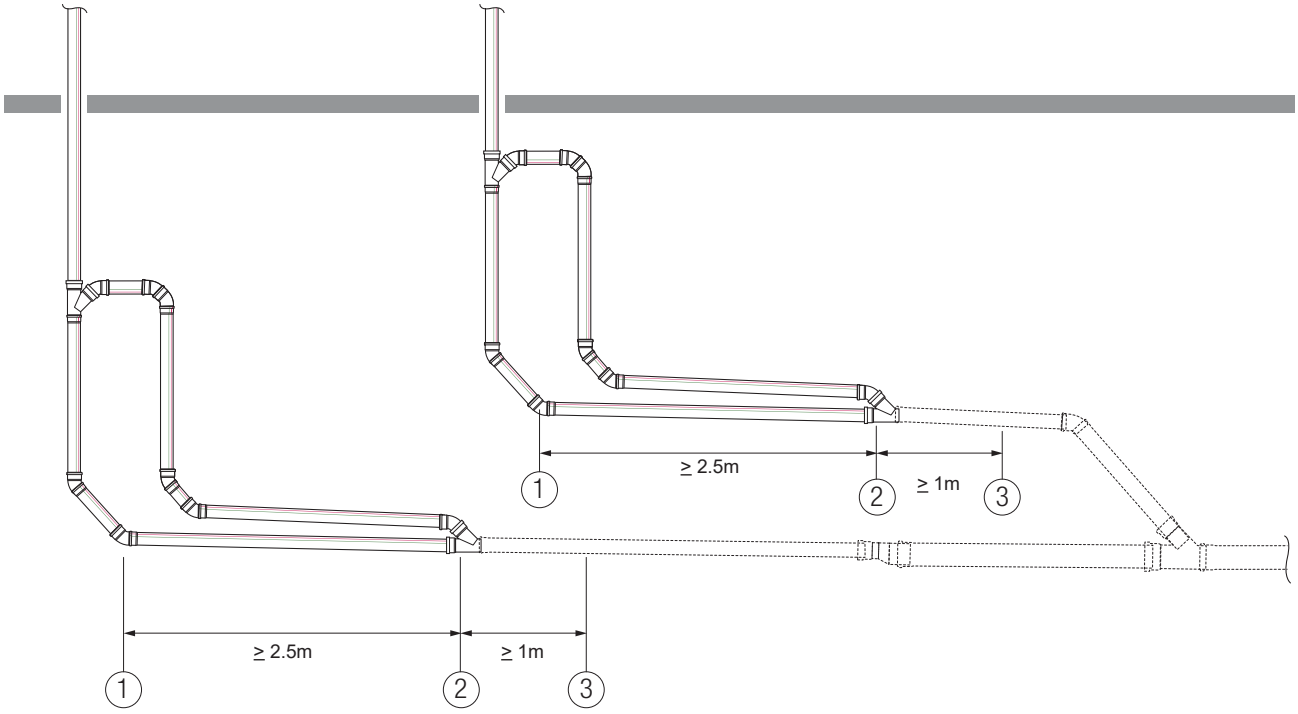
There are 2 possible scenarios to consider when planning the subsequent drainage following the end of the RAUVENT Stack:

- Provided the system meets all requirements of Section 11 of AS/NZS 3500.2, the subsequent drainage may be designed in accordance with either AS/NZS 3500.2 or as a RAUPIANO Collector.

- If a part of the system deviates from the scope of Section 11 of AS/NZS 3500.2, the subsequent drainage must be designed as a RAUPIANO Collector.

Figure 2.8 illustrates the end of the RAUVENT stack and transition to the Collector / Drain as applicable and Section 3.3 shows Example calculations.

In each case, the performance of the system is maintained as per REHAU's requirements and any conformance to relevant standards is the responsibility of the designer / installer.



Location	1	2	3
Change in system	Start of connection - free zone	End of RAUVENT stack	End of connection - free zone
Instructions	No connections permitted until after point 3	Design subsequent pipework as RAUPIANO collector / AS/NZS 3500.2. Drain as applicable - See section 3.3 for example calculations	Connections permitted ≥ 1m after pressure relief line connection

Figure 2.8 End of RAUVENT Stack and transition to Collector / Drain.

2.5 RAUVENT Stack Ventilation Design

2.5.1 Approved Stack Ventilation Methods

The RAUVENT stack requires primary ventilation through the roof of the building. The design and sizing of the ventilation line must conform to AS/NZS 3500.2.

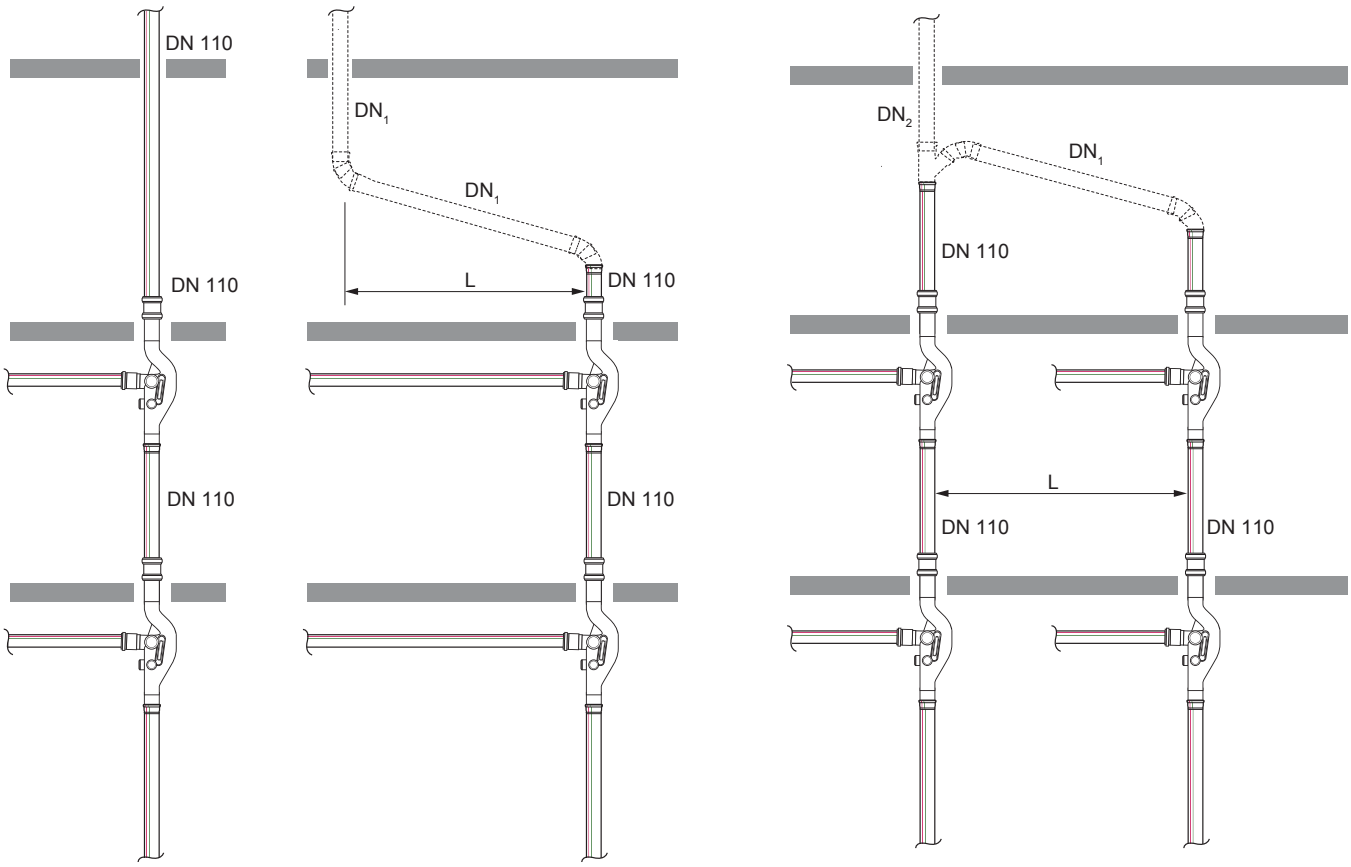
Preferred Configuration

The preferred configuration is that each RAUVENT stack continues vertically above the highest RAUVENT fitting, through to the roof undiminished in size (see Figure 2.9).

Possible Configurations

Should an offset in the stack ventilation line be necessary, the following requirements shall be met:

- A stack vent offset greater than 12m requires an increase of one pipe size of the offset section of the vent.
- An interconnection of stacks requires an increase of one pipe size in the subsequent ventilation pipe work. Only a maximum of 3 RAUVENT Stack Ventilation lines may be interconnected.
- Should both the above be required in a single instance, both size increases must be observed.



Preferred Configuration — Possible Configuration – (Single Stack) — Possible Configuration – (Interconnected Stacks)

Stack Vent Offset Length (L)	DN_1 [DN/OD]	DN_2 [DN/OD]
<12m	DN110	DN160
>12m	DN160	DN200

Figure 2.9 Ventilation line sizes for RAUVENT stack configurations.

2.5.2 Unapproved Stack Ventilation Methods

De-Aerator fittings at the termination of the stack are not permitted.
The pressure relief bypass must be installed as per section 2.4.6 and acts as a de-aerator.

Air admittance valves are not permitted to be installed anywhere within the RAUVENT stack section as they affect the capacity of the system. The balancing of the pressure within the RAUVENT stack is achieved by the RAUVENT fittings in combination with the pressure relief bypass at the base of the RAUVENT stack.

3 SYSTEM SIZING

3.1 System Sizing Resources

3.1.1 Fixture Discharge Units (DU)

To size the RAUVENT system, please refer to Table 3.1, which is derived from Table 6.2 (A) of AS/NZS 3500.2 - 2015. One discharge unit (DU) is equal to 1 l/s.

Fixture	Fixture Abbreviations	Min. Size of trap outlet and fixture discharge pipe DN	NZ (only)	Fixture Unit Rating (FU)	Discharge Units (DU)
Basin	B	40	32	1	0.5
Bath (with or without shower)	Bath	40	-	4	0.8
Bath (baby)	Bath (baby)	40	-	3	0.8
Bath (shower)	Bath (shr)	40	-	4	0.8
Bidet, bidette	Bid	40	32	1	0.5
Clothes-washing machine – domestic	CWM	40	-	5	1.0
Dishwashing machine – domestic	DWM	40	-	3	0.5
Shower:	Shr				
- Single		40	-	2	0.6
- Multiple		50	-	2 per shower head	0.8
Sink:					
- Single (with or without disposal unit)	S	50	40	3	0.8
- Double (with or without disposal unit)	S	50	40	3	1.0
- Tea	T	50	40	1	0.5
- Bar, domestic	BS(D)	40	-	1	0.5
- Bar, commercial	BS(C)	50	-	3	1.0
Slop hopper	SH	100	-	6 (F. valve) 2 (Cist.)	2.5
Trough- laundry (single or double)	Tr.(L)	40	-	5	2.0
Urinal:	Ur				
- Wall-hung (including waterless)		40	32	1	0.5
- Stall, or each 600mm length of slab		50		1	0.8
Water closet pan	WC	80	-	6 (F. valve) 2 (Cist.)	2.0
Water closet pan	WC	100	-	6 (F. valve) 4 (Cist.)	2.5 2.0
Bathroom group in a single room (basin, bath, shower, water closet)	-	-	-	6	3.5
Combination pan room sink and flushing bowl	PRS	80	-	6 (F. valve) 4 (Cist.)	2.5
Combination pan room sink	PRS	100	-	6 (F. valve) 4 (Cist.)	2.5

Table 3.1 Discharge units of common fixtures.

Please note the table is derived from table 6.2(A) of AS/NZS 3500.2-2015 only and is intended to be used as a guide for DU values of given fixtures. For the complete table including important notes, please refer directly to the standard.

For other fixtures or for further information, please contact REHAU.

3.1.2 RAUVENT Stack Capacity

The RAUVENT Stack & RAUPIANO Collectors are sized based on a hydraulic relationship dependent on 2 key variables:

- The sum of the DU's of the connected fixtures;
- A frequency Factor (K).
  Given that the maximum design flow (Q) for the RAUVENT is 8.7l/s, the stack can be sized accordingly:

RAUVENT Stack Flow Rate Equation

$$Q = K \cdot \sqrt{\Sigma DU}$$

Where:

Q	-	RAUVENT stack design flow rate (l/s)
K	-	Frequency factor (refer to Table 3.2)
ΣDU	-	Total Discharge Unit (l/s)

Frequency factor

Different types of high-rise buildings assume different frequency factors. The following frequency factors are recommended for calculation purpose:

Type of Building	Frequency Factor (K)
Residential, offices	0.5
Hospitals, schools, hotels, restaurants	0.7
Public toilets, showers in sport facilities	1.0
Laboratories	1.2

Table 3.2 Frequency factor of different building types.

3.1.3 RAUPIANO Collector Pipes

Slope (J)	DN 40 d_i = 36.4		DN 50 d_i = 46.4		DN 75 d_i = 71.2		DN 110 d_i = 104.6		DN 160 d_i = 152.2		DN 200 d_i = 187.6	
	Q	v	Q	v	Q	v	Q	v	Q	v	Q	v
cm/m/%	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s	l/s	m/s
0.5							2.2	0.5	6.0	0.7	10.5	0.8
0.6					0.9	0.4	2.4	0.6	6.6	0.7	11.5	0.8
0.7					0.9	0.5	2.6	0.6	7.1	0.8	12.5	0.9
0.8					1.0	0.5	2.8	0.7	7.6	0.8	13.3	1.0
0.9					1.1	0.5	3.0	0.7	8.1	0.9	14.2	1.0
1.0					1.1	0.6	3.1	0.7	8.6	0.9	14.9	1.1
1.1					1.2	0.6	3.3	0.8	9.0	1.0	15.7	1.1
1.2			0.4	0.5	1.2	0.6	3.4	0.8	9.4	1.0	16.4	1.2
1.3			0.4	0.5	1.3	0.6	3.6	0.8	9.8	1.1	17.0	1.2
1.4			0.4	0.5	1.3	0.7	3.7	0.9	10.1	1.1	17.7	1.3
1.5			0.4	0.5	1.4	0.7	3.9	0.9	10.5	1.2	18.3	1.3
2.0	0.3	0.5	0.5	0.6	1.6	0.8	4.5	1.0	12.1	1.3	21.2	1.5
2.5	0.3	0.6	0.6	0.7	1.8	0.9	5.0	1.2	13.6	1.5	23.7	1.7
3.0	0.3	0.6	0.6	0.7	2.0	1.0	5.5	1.3	14.9	1.6	26.0	1.9
3.5	0.3	0.7	0.7	0.8	2.1	1.1	5.9	1.4	16.1	1.8	28.1	2.0
4.0	0.4	0.7	0.7	0.8	2.3	1.1	6.3	1.5	17.2	1.9	30.0	2.2
4.5	0.4	0.8	0.8	0.9	2.4	1.2	6.7	1.6	18.3	2.0	31.8	2.3
5.0	0.4	0.8	0.8	0.9	2.5	1.3	7.1	1.6	19.3	2.1	33.6	2.4

Table 3.3 RAUPIANO PLUS maximum flow rates per pipe size, assuming 50% Pipe fill ratio.

3.2 RAUVENT Stack Loading Calculation Examples

3.2.1 Example 1 – Residential Building Stack Size

A 20-storey residential building with 2 apartment units per floor is designed to have the following fixtures:

Drainage fixtures	DU	Qty
Shower	0.6	1
Basin	0.5	1
Sink	0.8	1
Toilet (6l Cist.)	2.0	1

Total DU per apartment: 0.6 + 0.5 + 0.8 + 2.0 = **3.9 l/s**
Total DU per floor: 2 x 3.9 = **7.8 l/s**
Total DU of building: 20 x 7.8 = **156 l/s**

RAUVENT stack flow rate calculation:

$$Q = K \cdot \sqrt{(\Sigma DU)}$$
$$= 0.5 \cdot \sqrt{156}$$
$$= 6.25 \text{ l/s}$$

Result:

- The total building flow rate is less than 8.7 l/s, so the building can be designed with a single DN 110 RAUVENT stack system.

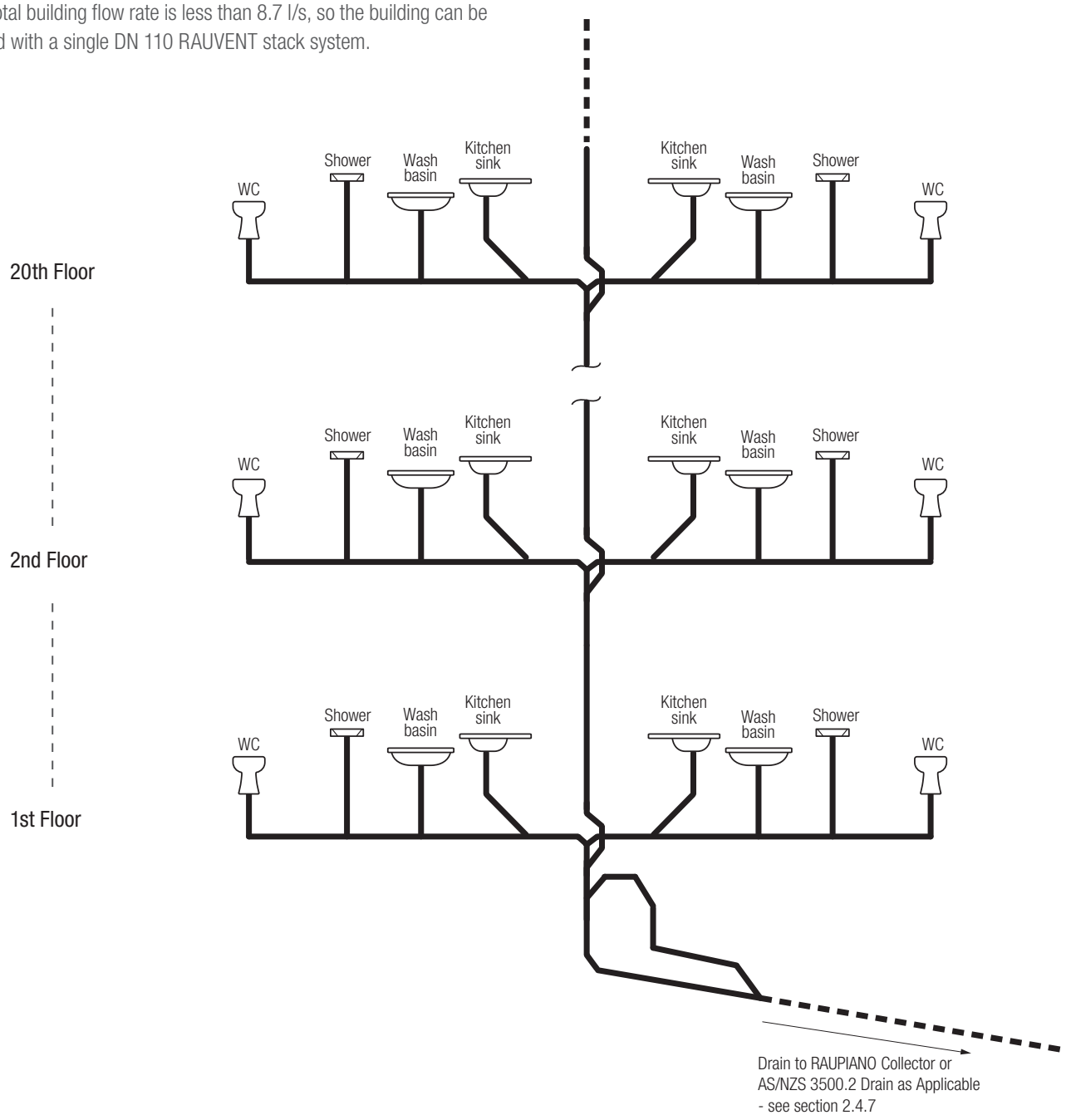


Figure 3.1 RAUVENT RVASS drainage plan – Example 1

3.2.2 Example 2 – Residential Building Requiring Multiple Stacks

A 36-storey residential building with 2 apartment units per floor is designed to have the following fixtures:

Drainage fixtures	DU	Qty
Shower	0.6	1
Basin	0.5	2
Sink	0.8	1
Toilet (6l Cist.)	2.0	1

Total DU per apartment: 0.8 + (2 x 0.5) + 0.8 + 2.0 = **4.4 l/s**
Total DU per floor: 2 x 4.4 = **8.8 l/s**
Total DU of building: 36 x 8.8 = **316.8 l/s**

RAUVENT stack flow rate calculation:

$$Q = K \cdot \sqrt{(\sum DU)}$$
$$= 0.5 \cdot \sqrt{316.8} = \mathbf{8.9\ l/s}$$

Result:

- The total building flow rate is more than 8.7 l/s, so the RAUVENT system must be designed with 2 separate RAUVENT stacks (see section 2.4.2):
  - RAUVENT stack A serving level 1 – 18
  - RAUVENT stack B serving level 19 – 36

Note – Flow does not always need to be divided evenly between the number of levels. The level at which the stack is divided must result in each stack only being supplied with a maximum of 8.7l/s.

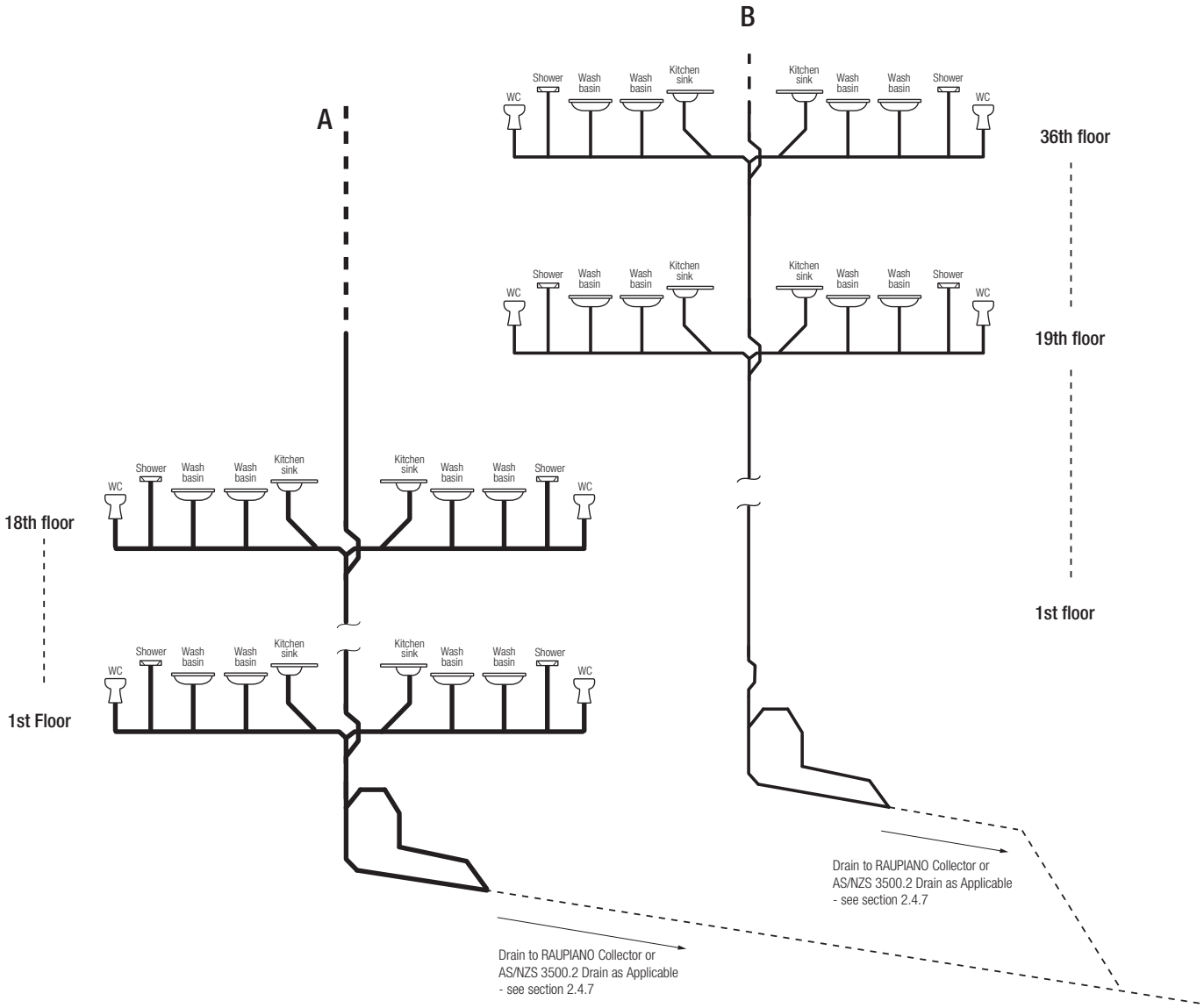


Figure 3.2 RAUVENT RVASS drainage plan – Example 2

3.3 Collector / Drain Calculation Examples

3.3.1 Collector Design to AS/NZS 3500.2

As outlined in section 2.4.7, provided the system meets all requirements of Section 11 of AS/NZS 3500.2, the subsequent drainage may be designed in accordance with the standard.

3.3.2 Example 3 – REHAU Collector Design

Consider a building with 2 RAUVENT Stacks:

Stack 1 - Draining a total design flow (Q) of 8.7 l/s (∑DU = 303)
Stack 2 - Draining a total design flow (Q) of 3.1 l/s. (∑DU = 39)
The desired collector is to be at a 2% (2cm/m) grade.

For Stack 1, the total flow is 8.7 l/s at a 2% (2cm/m) grade. From Table 3.3, DN160 RAUPIANO would be required to support the flow at this grade.

For Stack 2, the total flow is 3.1 l/s at a 2% (2cm/m) grade. From Table 3.3, DN110 RAUPIANO would be required to support the flow at this grade.

After the connection point of Stack 2 to Stack 1, the collector is sized using the flowrate equation, where ∑DU is the total DU for both stacks. Therefore, for frequency factor K= 0.5:

$$Q = K \cdot \sqrt{(\sum DU)}$$

$$Q = 0.5 \cdot \sqrt{(303+39)}$$

$$Q = 9.25\ l/s$$

Result:
Therefore, the desired 2% grade can be maintained after the connection point in size DN160 RAUPIANO, which can support a total flow of 12.1l/s at a 2% grade.

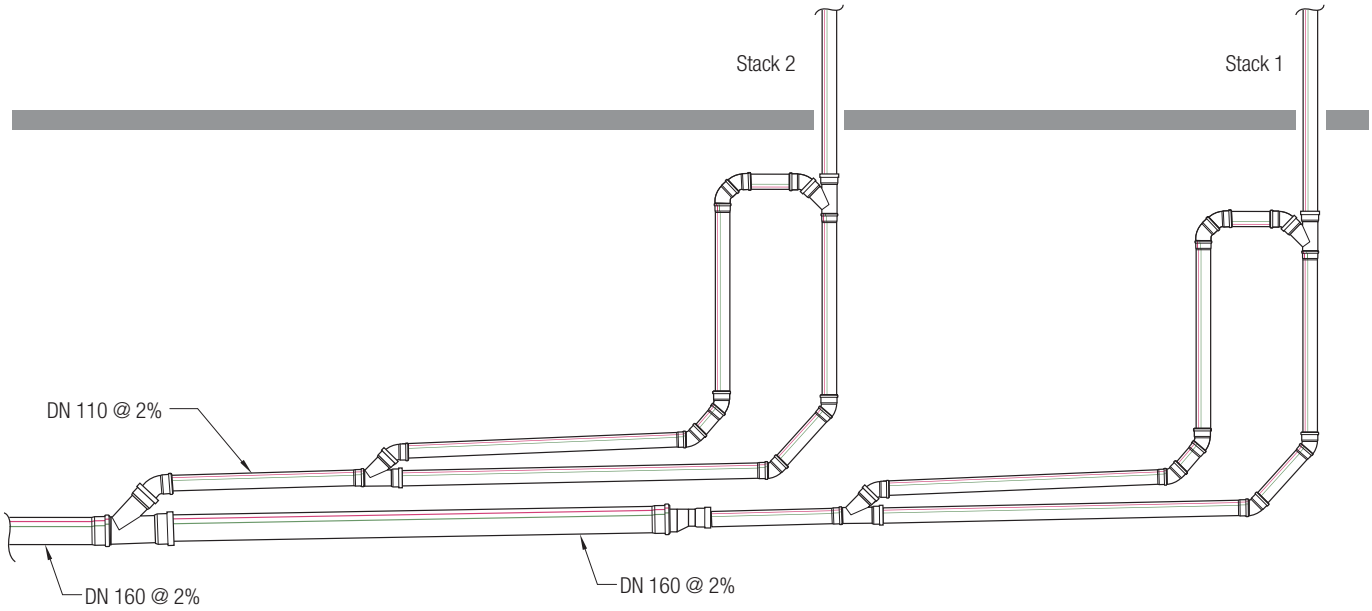


Figure 3.3 RAUPIANO Collector drainage plan – Example 3

4 INSTALLATION GUIDELINES

4.1 General

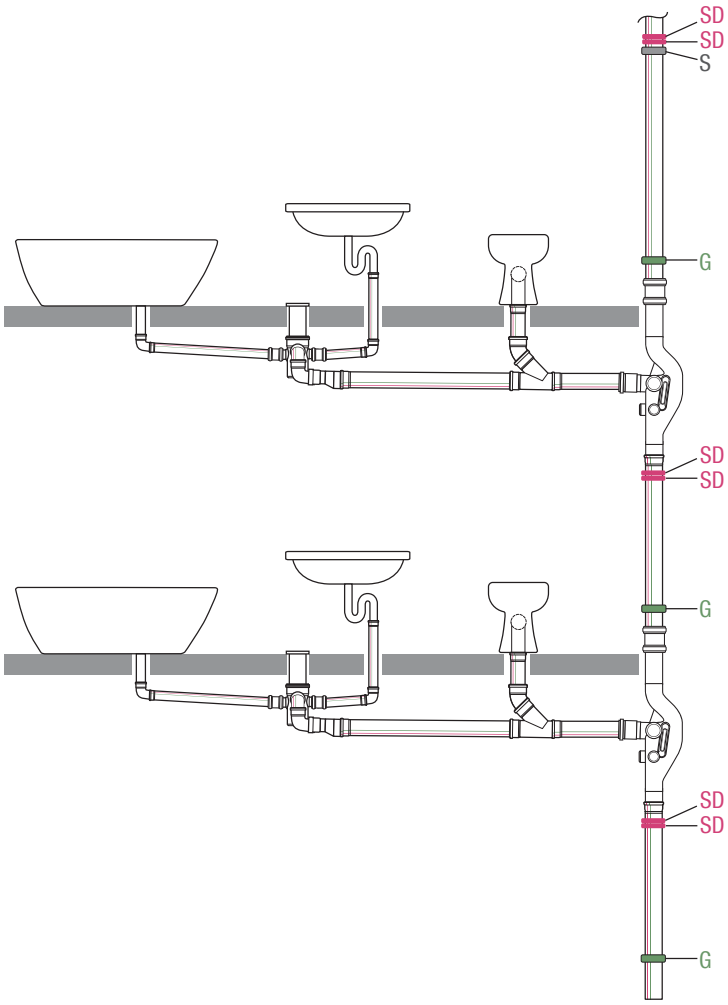
The RAUVENT is designed to be used as a part of the RAUPIANO system. The jointing method and installation guidelines, other than the RAUVENT-specific guidelines mentioned within this document, are the same as for RAUPIANO. Please refer to "RAUPIANO Plus – Acoustic Drainage" Technical Information for further details.

4.2 Pipe Support

For horizontal pipework the pipe fixing requirements are the same as for a standard RAUPIANO Installation.

The RAUVENT stack system can be fixed similar to a standard RAUPIANO stack:

- Install the RAUPIANO Plus sound-dampening bracket below the next socket, downstream of the RAUVENT fitting, as shown in Figure 4.1.
- Install one guiding bracket per floor per stack within the bottom quarter of the floor (i.e. 0.5 to 1 metres above floor level). If the distance between the sound-dampening bracket and the guiding bracket in that floor is longer than 2 metres (i.e. floor height greater than 4 metres), install additional guiding bracket(s) every 2 metres.
- At every 3rd floor, install a security bracket directly under the sound-dampening bracket to prevent the vertical stack from sliding apart.



SD Sound Dampening Bracket

S Security bracket (every 3rd floor)

G Guiding Bracket

Figure 4.1 Pipe support overview for RAUVENT stack

4.3 Fire Protection

The standard RAUVENT Fittings are configured to be used to penetrate the slab by means of a spigot on the vertical inlet. As such, for slab penetrations throughout a RAUVENT Stack system, there are 2 possible configurations:

- If the fire protection collar is installed on a RAUPIANO PLUS pipe/ fitting, an approved fire protection solution for RAUPIANO PLUS is required. (RAUPIANO Plus – Acoustic Drainage" Technical Information for further information).
- If the fire protection collar is installed on the RAUVENT fitting spigot (vertical inlet), an approved fire protection solution for DN110 HDPE pipe is required to be installed above the weld seam, as pictured in Figure 4.2. Please see Figure 1.2 for dimensions of the HDPE Spigot and consult fire collar manufacturers for compatibility confirmation and approval.

If a fire collar is installed on the RAUVENT fitting spigot (vertical inlet, as shown in figure 4.2), the fire collar must be suitable for use with the HDPE spigot. See Figure 1.2 for dimensions. Consult fire collar manufacturers for compatibility confirmation and approval.

- When planning and assembling fireproof collars, the requirements of the general building construction approval and the specifications of the assembly instructions must be observed.
- When using fireproof collars, the applicable national regulations must be observed."

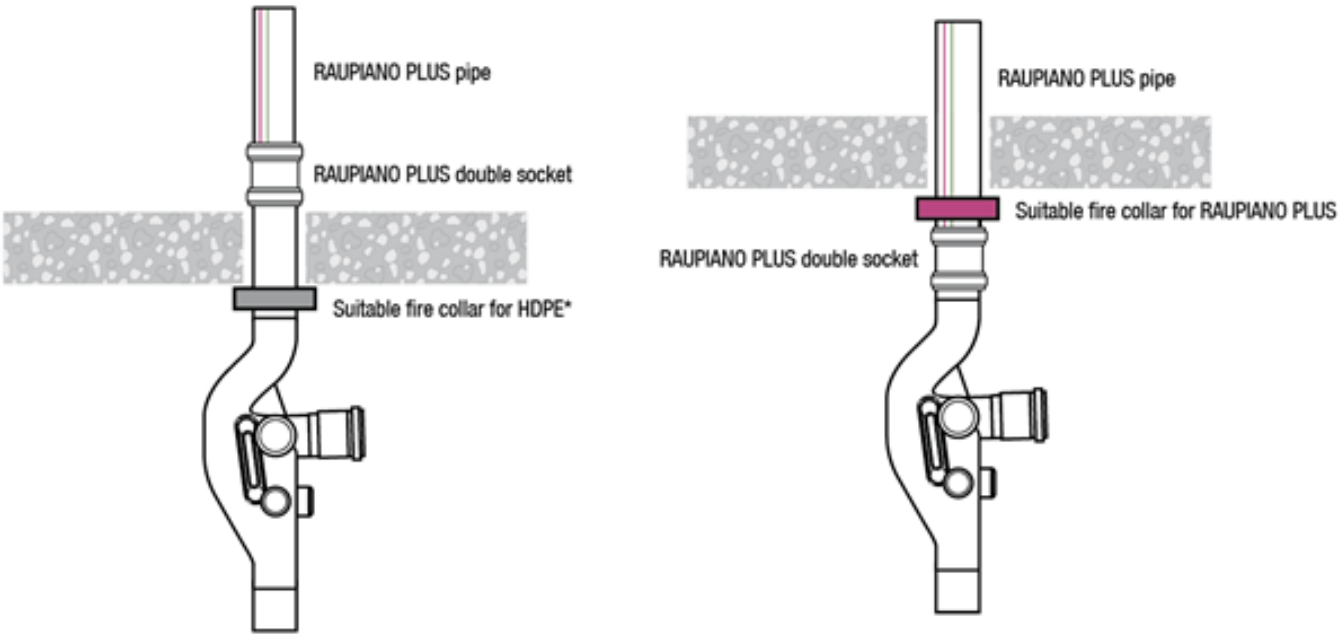


Figure 4.2 Possible fire collar configurations for RAUVENT stack slab penetrations.

4.4 Acoustic Performance

The Acoustic performance of the RAUVENT Fitting must be considered separately compared to the rest of the RAUPIANO System.

In order to comply with the NCC requirements for Habitable and Non-Habitable rooms, the following is required:

- For locations adjacent to non-habitable rooms requiring (R_w+C_{tr} 25), no further acoustic treatment is required, provided the RAUVENT is installed behind a minimum of 10mm plasterboard.
- For locations adjacent to Habitable rooms (requiring R_w+C_{tr} 40); R_w + C_{tr} 41 is achieved when the RAUVENT is installed in combination with RAUPIANO pipe, behind 13mm plasterboard and R1.5 Insulation Batts between ceiling joists or riser studs.

4.5 Leak Test

Following installation and prior to commissioning, the system must be leak tested in accordance with AS/NZS 3500.2. See "RAUPIANO Plus – Acoustic Drainage" Technical information for further information.

5 ALTERNATIVE SOLUTIONS

The following alternative solutions are approved by REHAU and by implementing them, the performance of the system is maintained. These solutions may be outside of the scope of AS/NZS 3500.2 and it is the responsibility of the designer / installer to ensure they are suitable for the project.

5.1 Alternative Collector / Drain Sizing

Should any alternative solutions be used within the RAUVENT system, the subsequent drainage following the RAUVENT Stacks must be sized as a RAUPIANO Collector. Refer to Sections 3.1 and 3.3 for further information.

5.2 Back-venting to the stack

As an alternative ventilation method, REHAU permits the use of DN50 RAUPIANO to back vent to the stack, in order to meet the performance of a vented branch as per Section 2.3.

5.3 Single Branch Connections to Stack

REHAU permits a single, low discharge fixture to be connected directly to the RAUVENT stack on a floor without a RAUVENT Fitting, provided:

- The maximum size of the discharge pipe is DN50
- The maximum length of the branch is 6m.
- Maximum DU of the fixture, as per Table 3.1 is 1.5 l/s.

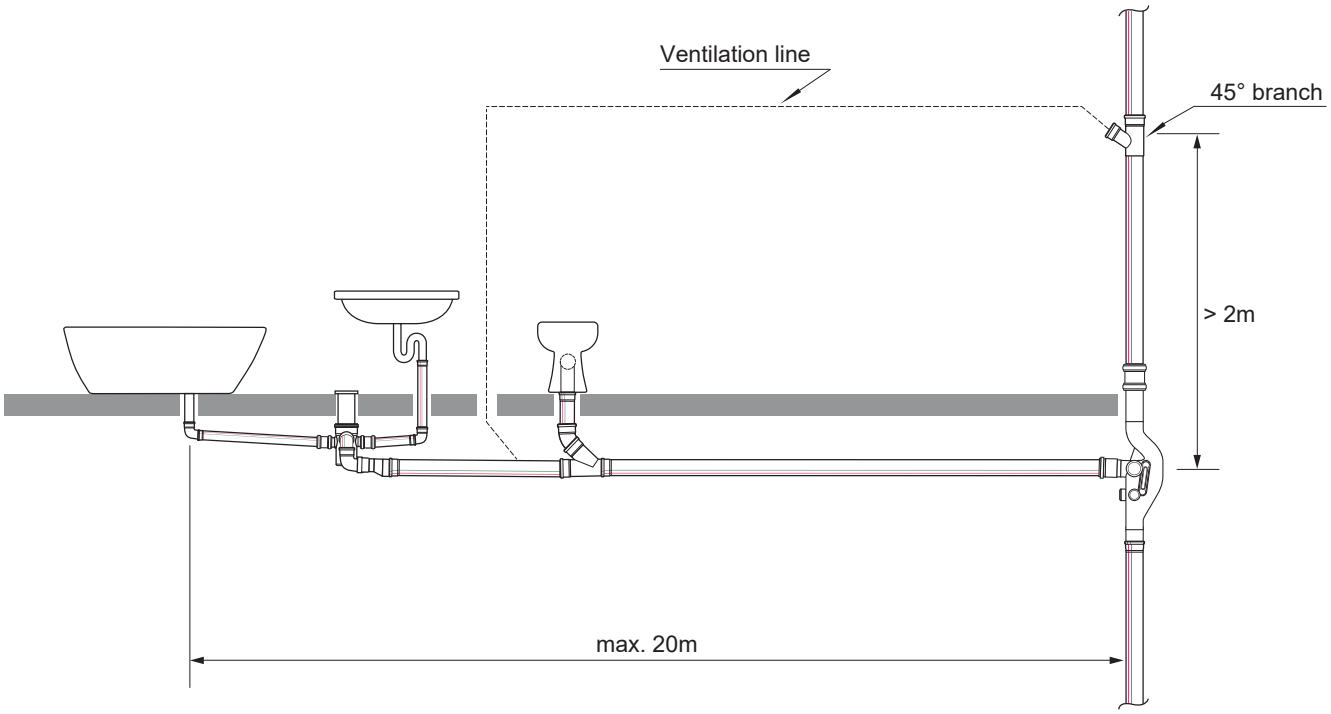


Figure 5.1 Alternative solution for ventilation of branches greater than 10m.

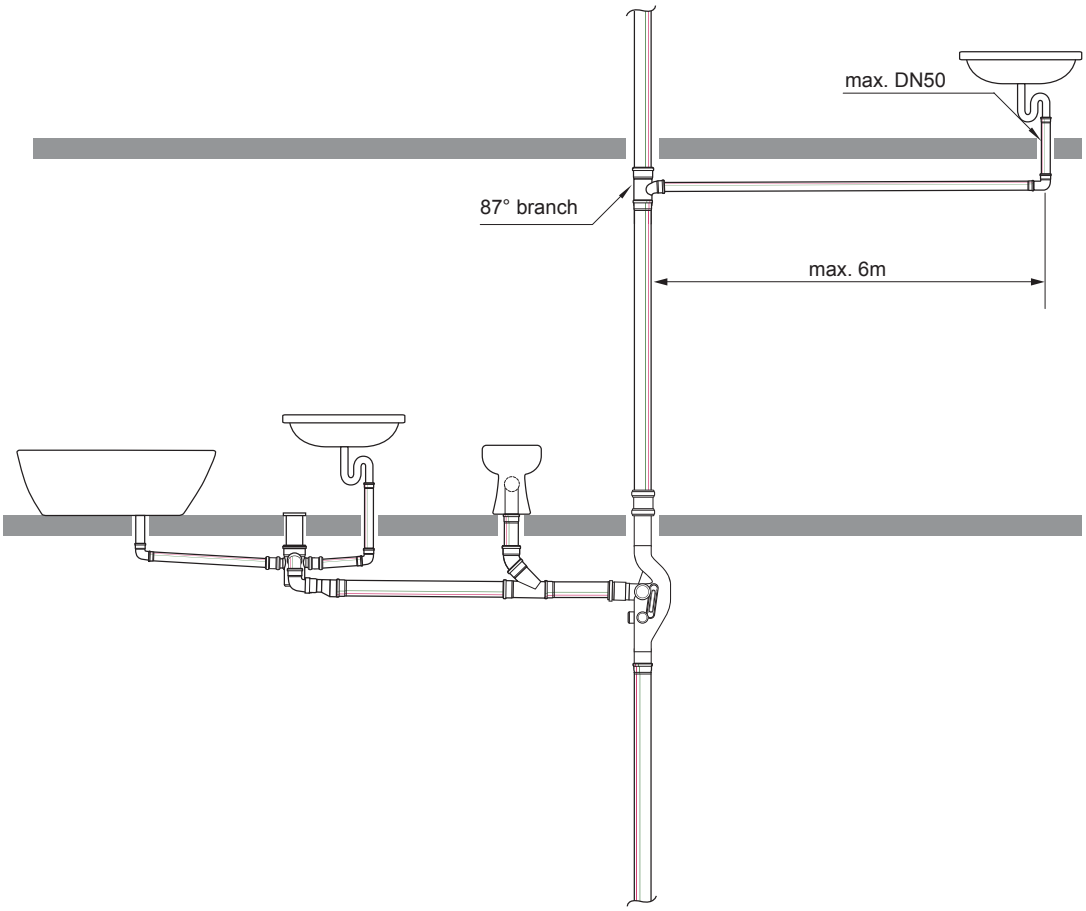


Figure 5.2 Single branch connection to RAUVENT stack without RAUVENT Fitting.

5.4 Single Branch connection to the Pressure Relief Bypass.

REHAU permits a single branch connection within the pressure relief bypass at the base of the stack or at a graded offset, provided the conditions of an Unvented Branch as per Table 2.1 are satisfied.

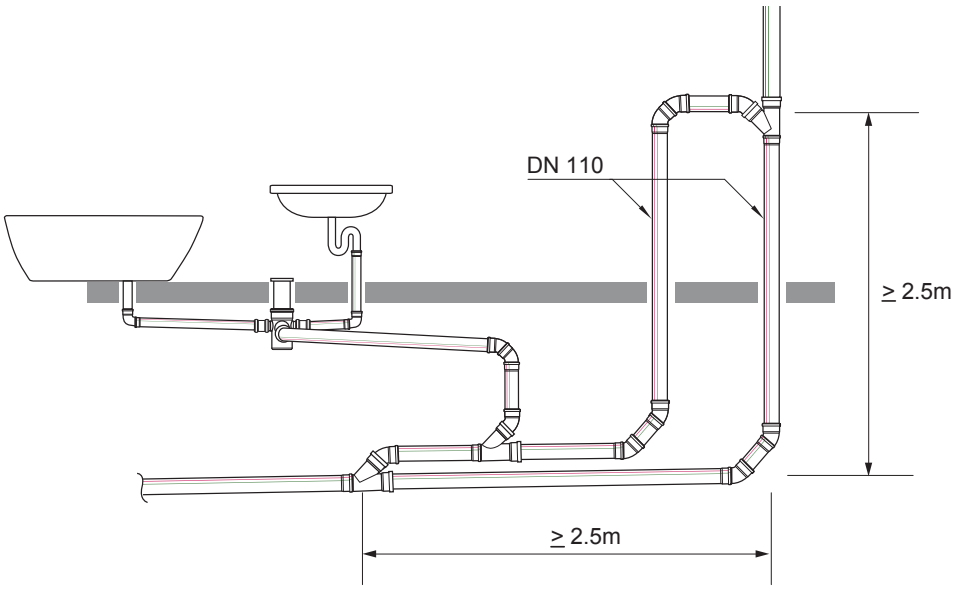


Figure 5.3 Single branch connection to the Pressure Relief Bypass.

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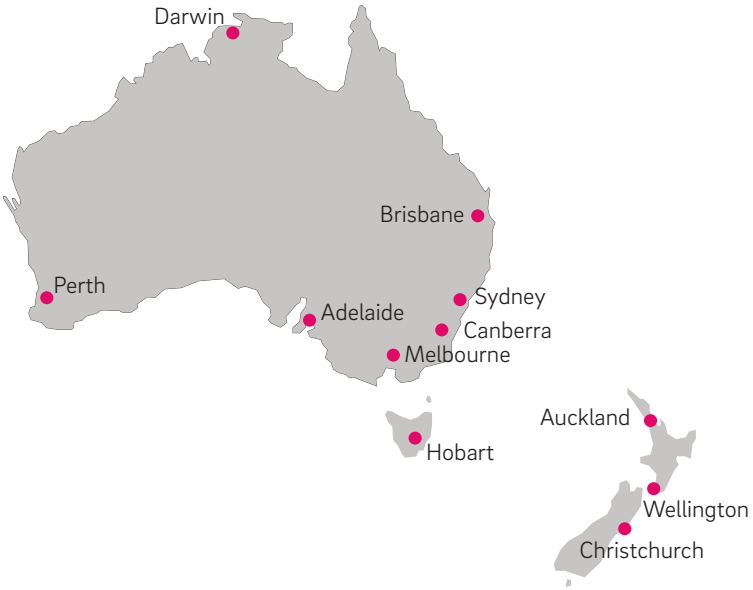

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