

Flood Emergency Response Plan

Pathways Cremorne – Residential Aged Care and Independent Living Units

Prepared for: Pathways

Issue no: A

Revision	Date	Purpose	Prepared By	Reviewed By
A	07/12/23	Issue to Client	N.Pearce	

This report has been prepared by Nathan Pearce (NER 4425065) who is a chartered engineer on the National Engineering Register in the field of Civil Engineering and is a suitably qualified person to be providing stormwater drainage and flooding advice for this project.

Table of Contents

1 Introduction4

 1.1 Project Scope.....5

 1.2 Existing Site Description.....5

2 Flood Characteristics.....6

 2.1 Site Flooding6

 2.2 Precinct Wide Flooding7

3 Site Evacuation Route9

4 Flood Emergency Response Plan.....11

 4.1 General Information11

 4.2 Storm events up to the 1% AEP11

 4.3 PMF storm event.....12

1 Introduction

ENTECC Consultants have been engaged by Pathways as the Civil Engineer on the Residential Aged Care and Independent Living Unit development at 50-88 Parraween Street and 59-67 Gerard Street, Cremorne NSW 2090.

This report has been prepared in response to the NSW State Emergency Services (SES) comments to the State Significant Development Application (SSDA) as provided in the letter response reference ID2085 dated 19 September 2023, refer Appendix A.

The Request For Information (RFI), refer below, relates to the flood response of the proposed residential aged care facility and requests that a flood emergency response plan be completed.

The proponent to create a Flood Emergency Response Plan to mitigate the risk associated with isolation of the site during flooding.

In the preparation of this report the following reference information has been used:

- SES response letter dated 19/09/23
- Architectural plans prepared by MDP Architecture, Project No. 3236
- North Sydney LGA-Wide FRMSP, 2022, GRC Hydro
- NSW Government Flood Prone Land Policy
- NSW Government Flood Risk Management Manual 2023
- NSW Government Support for Emergency Management Planning
- 'Technical flood risk management guideline: Flood hazard' published by the Attorney-General's Department, dated 2014;
- 'Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas' (HNFMSC 2006)

1.1 Project Scope

The proposed development consists of a Residential Aged Care Facility (RACF) and Independent Living Units (ILU) complex which includes 2 levels of basement carparking and 4 new multistorey buildings.

Ancillary uses include Pool, Dining areas, Lounge areas, Mens shed & Beauty/hair area

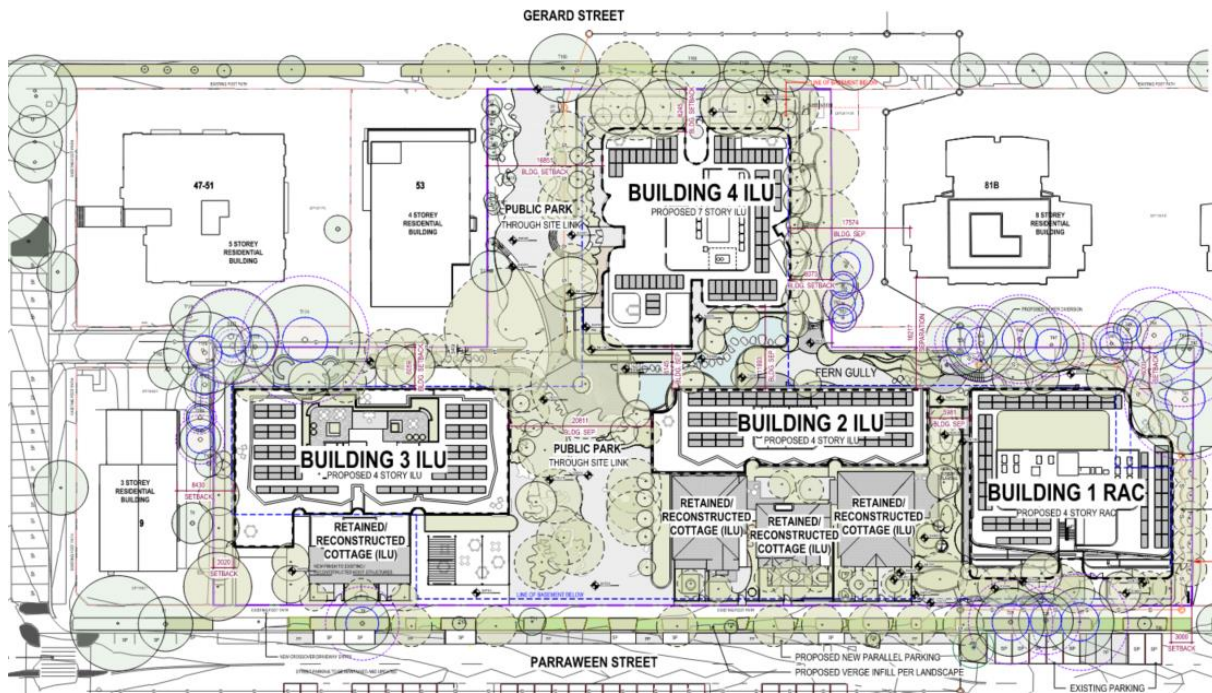


Figure 1 – Architectural site plan

1.2 Existing Site Description

The Pathways development is to be located on 24 existing residential lots encompassing properties 50-88 Parraween Street as well as 59-67 Gerard Street, Cremorne NSW 2090. These lots will be consolidated to allow the development of the Pathways complex. The site is bounded by Parraween Street to the south and Gerard Street to the north and is surrounded by existing large scale apartment complexes to the east and west along Gerard Street. Mixed use commercial buildings are located on the south side of Parraween Street which also have street frontage to Military Road

The existing site area is approximately 7,350m² and is located near the top of the crest in Parraween Street. The site generally falls to the northeast from the Parraween Street frontage (Approx. RL85) towards Gerard Street (Approx RL82.10). The site is relatively built up with standard single-dwelling residential homes with additional features at the rear such as granny flats, sheds, and decking.

There is no Council inground stormwater along the site frontage, as shown in the Council planning mapping below, and as such the existing properties generally discharge directly to the kerb with flows either collected by the downstream pit or travelling further overland within the kerb.

2 Flood Characteristics

2.1 Site Flooding

The Pathways RACF site is located near the top of the crest at Parraween Street and Gerard Street. Stormwater overland flows generated from the development generally travel east along Parraween Street and Gerard Street to a low point at the eastern end of Gerard Street before heading towards to Willoughby Bay at Primrose Park. The entire northern catchment area generally falls to this discharge location, as shown by the Council flood maps in figure 2 below.



Figure 2 – Map showing overland flow path for flood waters from the Pathways site

The North Sydney Council floodplain management policy states that the minimum floor levels for buildings that house older people must be 0.5m above the 1% annual exceedance probability (AEP) flood level or the probable maximum flood (PMF) level, whichever is higher.

A review of the North Sydney LGA – Wide Floodplain Risk Management Study and Plan, as prepared by GRC Hydro, has been undertaken. Figure 29 of the flood study, refer to extract and overlay below, indicates that the development is flood free and not within a flood risk zone or subject to external flooding for all flood events up to and including the PMF.

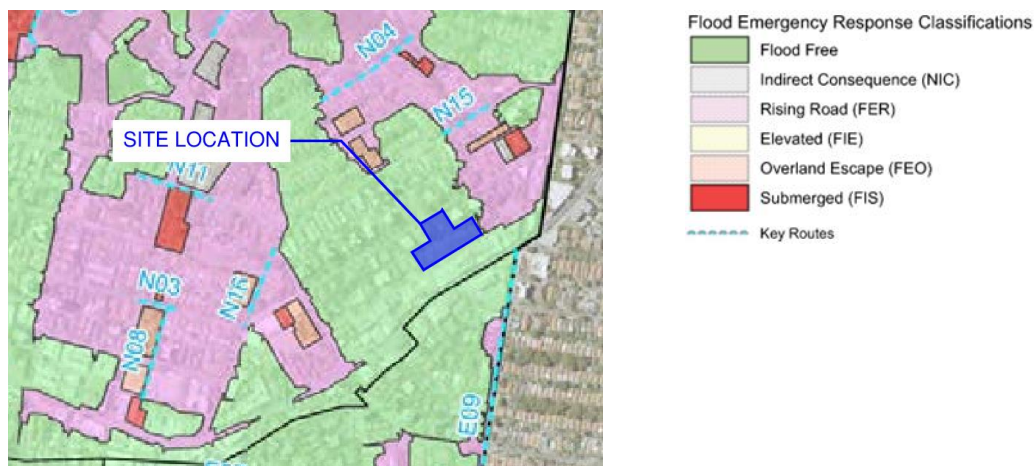


Figure 3 – Flood Emergency Response plan for PMF – Figure 29 from GRC flood Study

2.2 Precinct Wide Flooding

The Pathways development site is not subject to flooding, however, the surrounding neighbourhood and road network are affected during storm events.

Overland flows from the rain events in Cremorne and the neighbouring suburbs of Neutral Bay and Crows Nest generally travel in a northerly direction to the local low point and discharge to Willoughby Bay near Primrose Park.

These flood water are generally conveyed by the road network and follow three main overland flow routes as shown in figure 4 below. These are mainly via the following roads;

- Benelong Street, Cremorne
- Young Street, Neutral Bay
- Falcon Street, Miller Street and Cammeray Road, Crows Nest

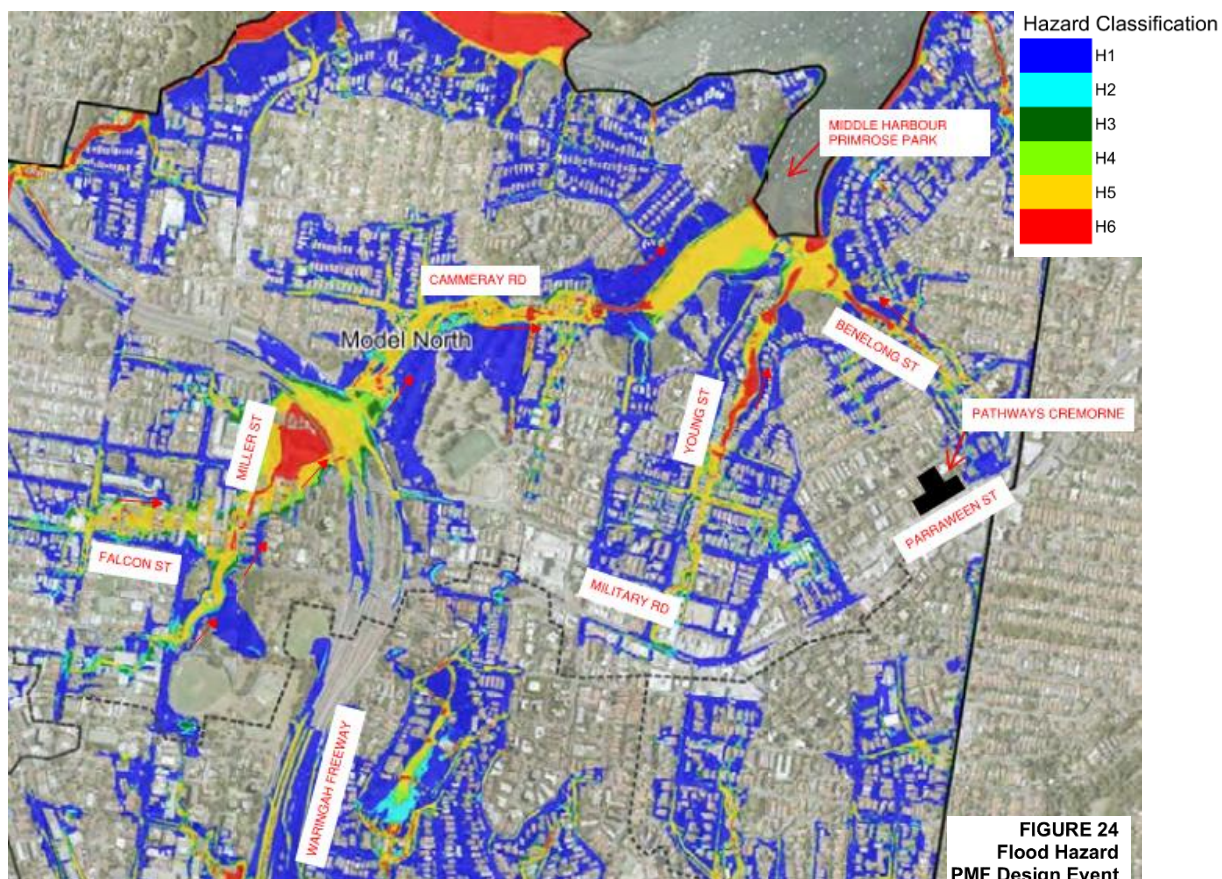


Figure 4 – Flood Hazard Classification map for surrounding neighbourhood – Figure 24 from GRC flood study

These three main overland flow routes convey the majority of the flood water within the whole catchment area. As a result the water depths in the roads during large storm events can be upwards of 1m with velocities greater than 2m/s. These conditions are dangerous, with a hazard classification of H5 and H6, which are unsafe for all vehicles and people. These roads therefore become inaccessible during large storm events.

Flooding also occurs within the southern suburbs of North Sydney and Kirribilli with access to the city cut off by flooding within the Warringah Freeway prior to the Harbour Bridge and Tunnel.

The neighbourhood is therefore considered to be a flood island with surrounding properties, that may not be directly affected by the flood waters, becoming isolated during these flood events as the road network is unable to be used as an evacuation routes for residents.

Flooding in the area is characterised as flash flooding, with flood waters generally generated by short-duration rainfall events of between 25 and 60 minutes as stated 6.4.1 of the GRC flood study. This is indicated by the hydrograph below, refer to figure 5, which shows that all storms, including the 1% AEP, are generally over and flood water receding to safe levels within 1.2 hours of rainfall commencing.

The PMF has a very short duration with peak flood depths occurring in the first 15 minutes of the storm event with water levels back to below 100mm in depth after 30 minutes, as the flood water tracks through the road network towards Middle Harbour.

Consequently, the impact of the flood on the neighbourhood and the surrounding road network is extreme and dangerous, however, it is over relatively quickly with road access available within 1.2 hours in all storms up the 1% AEP and within 30 minutes in a PMF event.

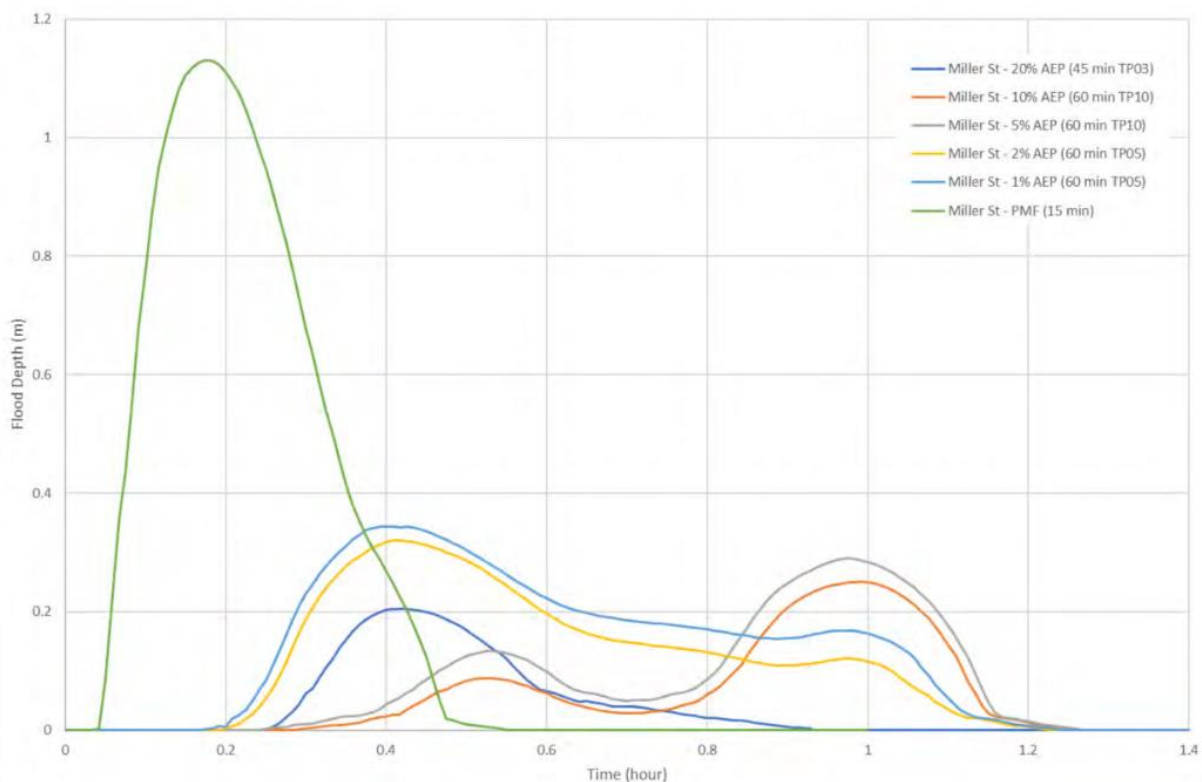


Figure 5 – Hydrograph of storm events at Miller St Crows Nest – Chart 10 page 96 of GRC flood study

3 Site Evacuation Route

Residents in aged care facilities are generally vulnerable elderly people who require additional medical care throughout the day. As such isolation during flooding can cause significant risk to their health and therefore evacuation from flood-isolated buildings is recommended by the State Emergency Service of New South Wales (SES).

The main evacuation route for the Pathways development is via Military Road, which is a major arterial road for the northern suburbs of Sydney and is also considered a key evacuation route for the local area.

Residents at the Pathways Aged Care Facility can have the choice of evacuating in three directions;

- North via Military Road to the Northern Beaches
- South via the Harbour Bridge to the City
- West via Military Road and Falcon Street

These roads can be used as the first evacuation response by staff and residents until such time that the surrounding roads become inaccessible or cut off from flood water, which include the Warringah Freeway to the city and Military Road to the Northern Beaches.

Advanced notice of extreme rainfall events is typically provided by the State Emergency Service of New South Wales (NSW SES) and Bureau of Meteorology (BOM). As such staff and residents should be able to evacuate prior to major flooding occurring, provided that advanced warning of possible flood events is provided.

It is recommended that vulnerable residents who require constant medical attention be relocated to The Royal North Shore Hospital (RNSH), which is located approximately 4km west of the Pathways site. Hospitals are considered emergency evacuation locations for vulnerable people in flood events and as such the RNSH, given its close proximity to the site, will be a safe location in the event of a significant flood event.

The route to the RNSH from the Pathways aged care facility is west via Parraween Street, Military Road, Falcon Street and Pacific Highway as shown in figure 6.

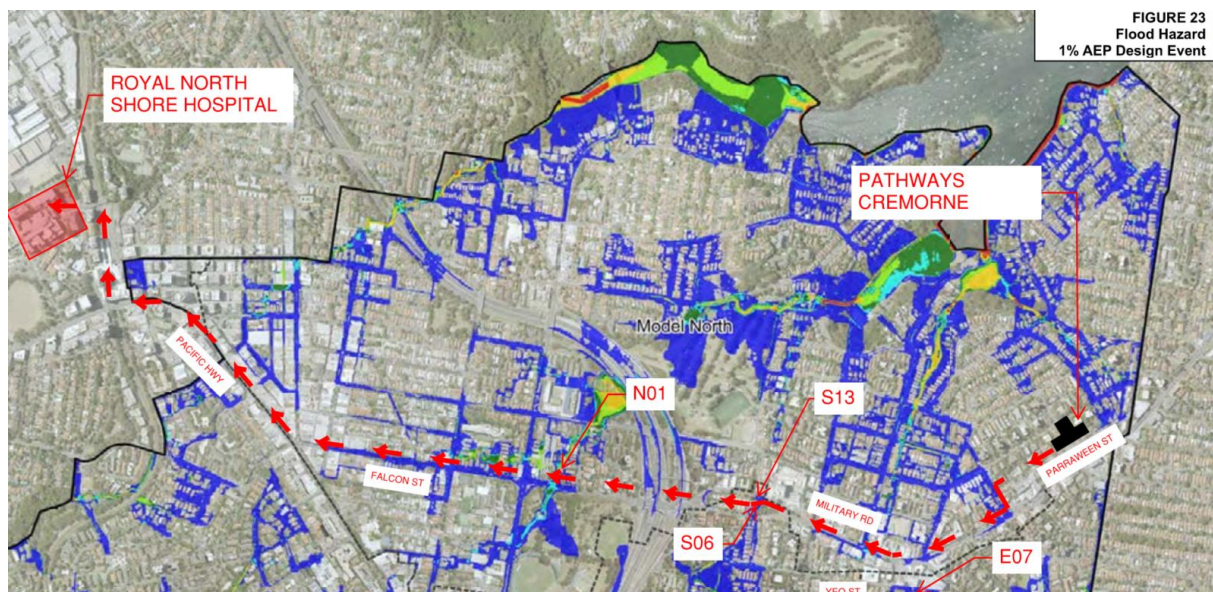


Figure 6 – Evacuation route to Royal North Shore

The GRC flood study nominates the hazard classification of the surrounding road during all storm events up to the PMF. The Pathways evacuation route to the RNSH has been extracted from the report and is summarised in figure 7 below.

ID	Location (refer Figure 29)	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	PMF
E07	Yeo St - Between Rangers Rd and Barry La	H1	H1	H1	H1	H1	H1
S06	Falcon St - Between Military Rd and Merlin St	H1	H1	H1	H1	H1	H2
S13	Military Rd - Between Falcon St and Park Av	H1	H1	H1	H1	H1	H1
N01	Falcon St - Between Rodborough Ave and Lytton St	H1	H1	H1	H1	H2	H5

Figure 7 – Hazard Classification for Evacuation Route – refer section 6.4.1 of the GRC flood study

The table indicates that the proposed roads along the route to the hospital have a hazard classification of either H1 or H2 for all storms up to the 1% AEP. This hazard classification is considered safe for all people and larger vehicles. It is therefore possible to evacuate residents to the RNSH or for emergency vehicles, such as ambulances, to access the Pathways site during these flood events.

During a PMF event, Falcon Street becomes hazard classification H5, which is unsafe for all people and vehicles. As such the Pathways facility is isolated from the RNSH during this period. Evacuation south towards the city and north towards the northern beaches is also not possible due to flooding of surrounding access roads.

The duration of the PMF is relatively short, as discussed in section 2 above, with flood water receding within 30 minutes from the time the rainfall starts. The isolation of residents is less than an hour and any residents that have may not been evacuated prior to the food can shelter in place until it has passed.

It is recommended that residents, in particular those who are vulnerable and require constant medical attention, be evacuated from the Pathways premises in advance of any known extreme rainfall. Should this not be possible, then they should shelter in place until the flood event is passed. This is further detailed in flood emergency response plan below.

4 Flood Emergency Response Plan

4.1 General Information

The State Emergency Service of New South Wales (NSW SES) is responsible for providing flood updates and issuing Flood Evacuation Warnings and Flood Evacuation Orders. Flood information issued by the NSW SES may be received by local, radio and television news, SMS messaging, Facebook and door-knocking in affected communities. The timing for the evacuation of persons is to be established in consultation with the NSW SES.

During any form of flood event, occupants must not attempt to leave the site by means of wading through floodwaters.

To increase the flood-readiness of the occupants of the proposed development, Pathways should create a detailed business Flood Emergency Plan using the FloodSafe kit developed by the NSW SES. Information regarding FloodSafe kits is available at <https://www.sesemergencyplan.com.au/business/>

The following general advice is provided for all flood events;

- Monitor for potential flooding events through media broadcasts or alerts. If there is a potential that the property is likely to be affected by rising flood waters, consideration should be given to vacating the premises prior to flooding.
- This is particularly critical for vulnerable residents who require additional ongoing medical care and may be at risk during a flood event. It is recommended that such residents be relocated to the nearby Royal North Shore Hospital where medical support can be provided uninterrupted during the flood event.
- During severe weather events and during periods of active flood alerts, staff and residents should listen to local radio or television broadcasts for information, updates, and advice, as well as follow any instructions given by emergency services.
- During severe weather events and during periods of active flood alerts, staff and residents should be prepared to evacuate if advised to do so by emergency services.
- Early action before flood events is vital as roads may quickly become congested or closed.
- Under no circumstances should passenger vehicles attempt to drive through floodwaters

4.2 Storm events up to the 1% AEP

For flood events up to the 1% AEP the following emergency response and evacuation plan is recommended;

- Follow the above-mentioned general flood information
- If sufficient warning for significant rainfall and flood events is provided then;
 - Relocate vulnerable residents who require additional ongoing medical care to the nearby Royal North Shore Hospital where medical support can be provided uninterrupted during the flood event.
 - Evacuate other residents and staff to a safe location away from the known flood areas
 - Alternatively, remain at the Pathways Residential Aged Care Facility and shelter in place until storm event has passed and flood waters have receded.
- If warning for significant rainfall and flood events is not provided and flash flooding occurs, then;
 - Remain at the Pathways Residential Aged Care Facility and shelter in place until the storm event has past and flood waters have receded

- Staff and residents may be able to leave the site by car via the main road network of Pacific Highway, Falcon Street and Military Road. This is however not recommended as roads outside of the North Sydney Council area may be flood-affected and likely congested or closed.

4.3 PMF storm event

For flood events above the 1% AEP including the PMF the following emergency response and evacuation plan is recommended;

- Follow the above-mentioned general flood information
- If sufficient advanced warning for significant rainfall and flood events is provided then;
 - Relocate vulnerable residents who require additional ongoing medical care to the nearby Royal North Shore Hospital where medical support can be provided uninterrupted during the flood event.
 - Evacuate other residents and staff to a safe location away from the known flood areas
 - Alternatively, remain at the Pathways Residential Aged Care Facility and shelter in place until storm event has passed and flood waters have receded.
- If a warning for extreme rainfall and flooding is not provided, then;
 - Remain at the Pathways Residential Aged Care Facility and shelter in place until storm event has passed and flood waters have receded which should occur in approximately 30 minutes
 - Staff and residents must not leave the site either by walking or by vehicles as the flood waters in both directions are dangerous and unsafe.