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No. 4 Yachtsmans Paradise, Newport

FLOOD RISK MANAGEMENT REPORT

Prepared By: Cenn Base - Civil Design Engineer

Checked By: Scott Sharma - Senior Civil Design Engineer - ***MIEAust***

Date: 5th September 2018

Our Reference: E307101

REVISION 1 – DA SUBMISSION

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1. INTRODUCTION

As per email correspondence with Zack Wilson, Donovan Associates have prepared a Flood Risk Management Report to accompany the Development Application which is to be submitted to Pittwater Council for a proposed swimming pool at No. 4 Yachtsmans Paradise, Newport.

Flood information has been supplied by email correspondence from the Northern Beaches Council and included levels for the 1% Annual Exceedance Probability (AEP) storm event, the Flood Planning level and the Probable Maximum storm event (PMF) level. This report provides a review of the potential hazards associated with the addition of a inground pool at 4 Yachtsman Paradise and provides recommendations on how to minimise these risks during a 1% AEP and PMF storm event.

Note that this report covers the addition of an in -ground swimming pool only. Any other alterations and additions outside of this scope will need further analysis to determine any further associated risks in the 1% AEP and PMF flood event.

2. SITE SPECIFIC INFORMATION

The proposed site is at No. 4 Yachtsmans Paradise, Newport. The site falls toward the rear from the frontage at Yachtsmans Paradise. The general property surrounding the subject site is primarily residential and is within close proximity to the coastline (within 500m east of the site) and Pittwater Bay (100m to the west).

Figure 1 below shows the location of the subject site and an indication of the nature of the area surrounding the site.

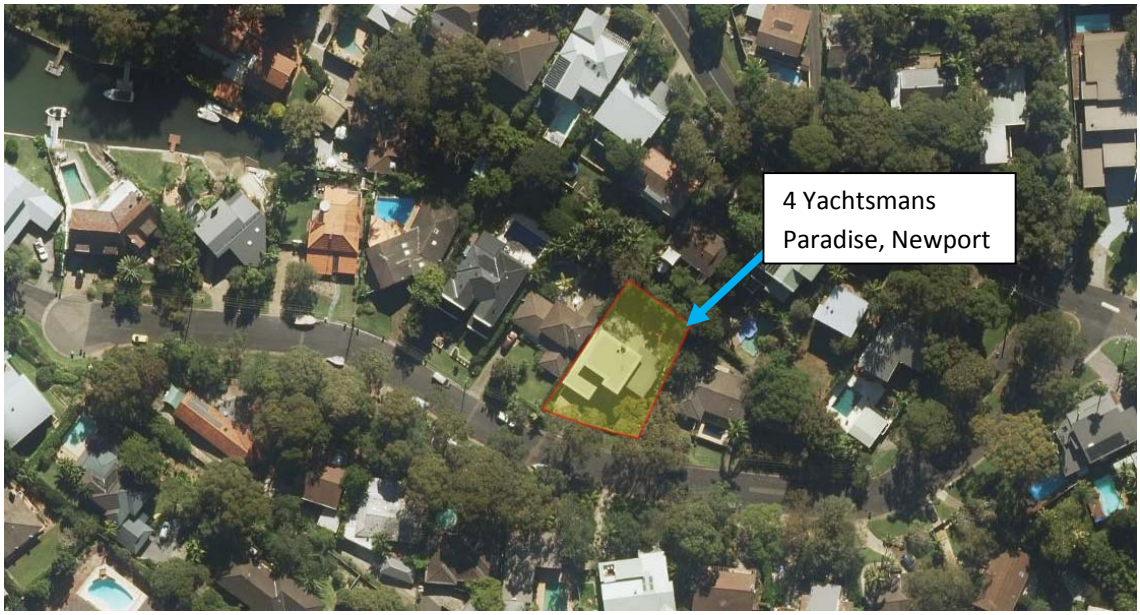

Figure 1: Subject site at No. 4 Yachtsmans Paradise, Newport

The extent of the proposed alterations is the addition of a swimming pool located at the rear of the property as shown below.

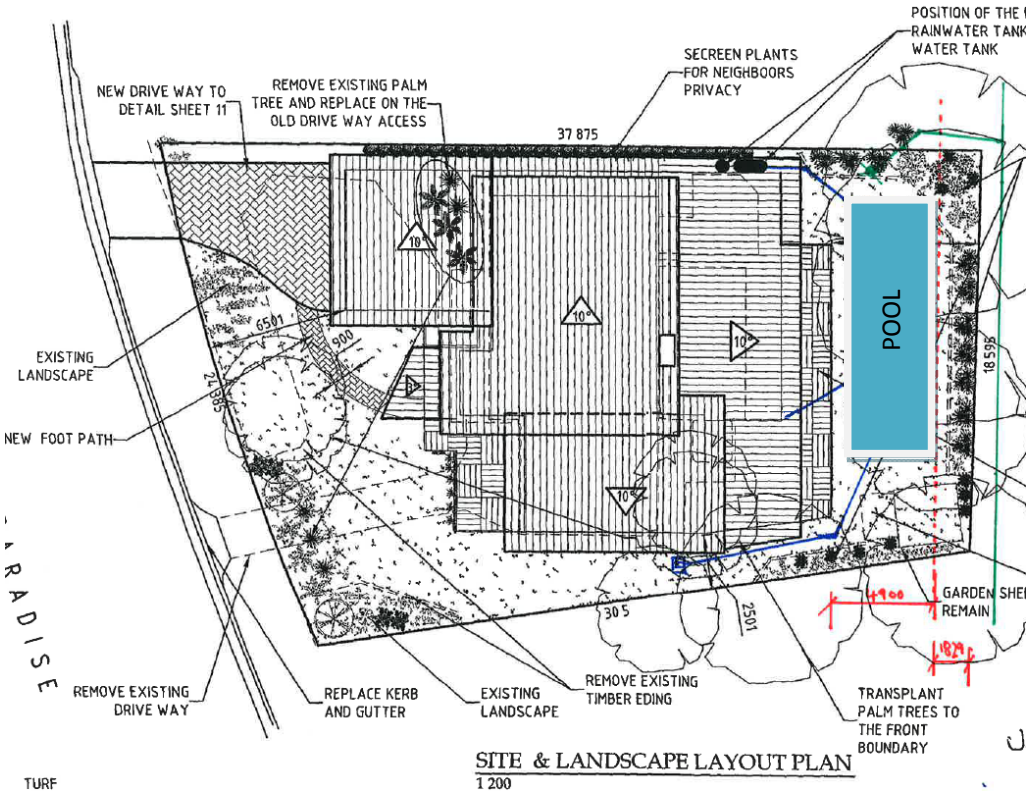

Figure 2: Site Layout and Proposed Pool

3. FLOOD INFORMATION BACKGROUND

The flood Information provided by the Northern Beaches Council Council identifies information that is relevant to the subject site. The flood maps provided indicates that the lot is predominantly associated with **Medium Risk Flooding** as shown by the blue shading**.**

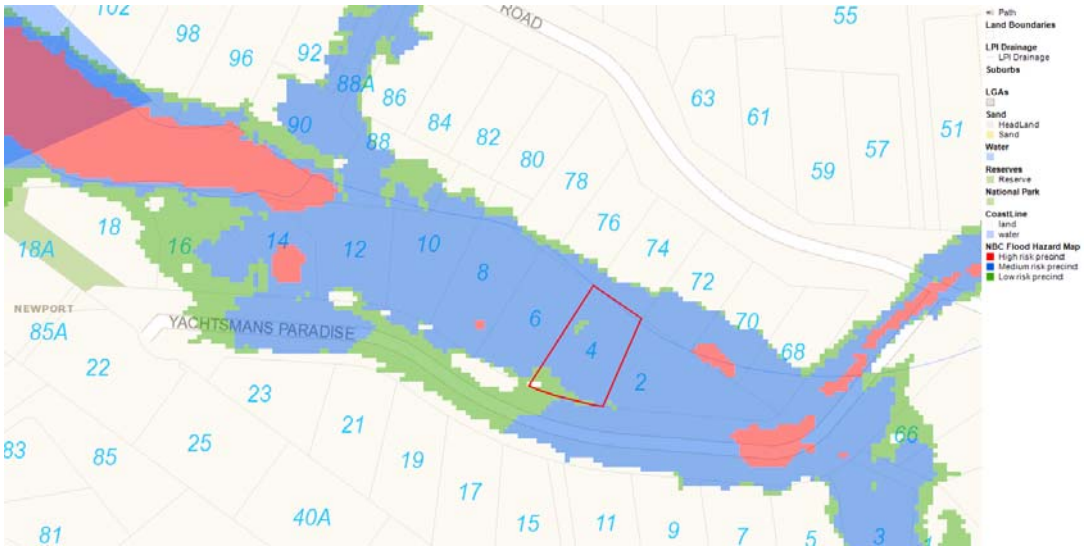

Figure 3: Flood Hazard Map - Northern Beaches Council

Section B3.11 of the Pittwater Council's DCP defines the relevant controls for a Medium Flood Risk zone. This can be seen in the summary table below.

		Medium Flood Risk						
		Critical Uses	Vulnerable Uses	Subdivision	Residential	Business & Industrial	Recreational & Environmental	Concessional
A	**Flood effects caused by Development**	A1 A3 A4	A1 A3 A4	A1 A3	A1 A3	A1 A3	A2 A3	A2 A3
B	**Drainage Infrastructure & Creek Works**	B1 B2	B1 B2	B1 B2	B1 B2	B1 B2	B1 B2	
C	**Building Components & Structural**	C1 C2 C3	C1 C2 C3		C1 C2 C3	C1 C2 C3	C1 C2 C3	C1 C2 C3
D	**Storage of Goods**	D1 D2	D1 D2		D1 D2	D1 D2	D1 D2	D1 D2
E	**Flood Emergency Response**	E1 E2 E3	E1 E2 E3	E1 E4	E1 E2	E1 E2 E3	E1	E1
F	**Floor Levels**	F2 F3 F7	F2 F3 F7	F5	F1 F2 F3 F4 F6 F8 F9	F1 F2 F3 F4 F6 F8 F9 F10 F11	F2	F1 F2 F3 F4 F6 F11
G	**Car Parking**	G1 G4 G6 G7 G9 G10	G1 G4 G6 G7 G9 G10	G1	G1 G2 G3 G5 G6 G7 G8	G1 G2 G3 G4 G5 G6 G7	G1 G2 G3 G4 G5 G6 G7	G1 G2 G3 G4 G5 G6 G7
H	**Fencing**	H1	H1	H1	H1	H1	H1	H1
I	**Pools**	I1	I1	I1	I1	I1	I1	I1

Figure 4: Medium Flood Risk Controls - Section B3.11 of the Pittwater DCP

4. SITE SPECIFIC FLOOD INFORMATION AND REQUIREMENTS

From these controls presented in the summary table above, the specific requirements identified relating to the proposed addition of a pool at 4 Yachtsman Paradise are;

C. BUILDING COMPONENTS AND STRUCTURAL SOUNDNESS

- All buildings shall be designed and constructed as flood compatible buildings in accordance with Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas, Hawkesbury-Nepean Floodplain Management Steering Committee (2006).
- Development (including earthworks and subdivision) shall not be approved unless it can be demonstrated in a Flood Management Report that it been designed and can be constructed so that in a Probable Maximum Flood event:
  (a) There are no adverse impacts on flood levels and velocities caused by alterations to the flood conveyance;
  (b) There are no adverse impacts on surrounding properties; and (c) It is sited to minimise exposure to flood hazard.
- All structures must be designed and constructed to ensure structural integrity up to the Flood Planning Level, taking into account the forces of floodwater, wave action, flowing water with debris, buoyancy and immersion. Structural certification shall be provided confirming the above. Where shelter-in-place refuge is to be provided the structural integrity is to be to the Probable Maximum Flood level.
- All new electrical equipment, power points, wiring, fuel lines, sewerage systems or any other service pipes and connections must be waterproofed and/or located above the Flood Planning Level. All existing electrical equipment and power points located below the Flood Planning Level must have residual current devices installed that turn off all electricity supply to the property when flood waters are detected.

D. STORAGE OF GOODS

- Hazardous or potentially polluting materials shall not be stored below the Flood Planning Level unless adequately protected from floodwaters in accordance with industry standards.
- Goods, materials or other products which may be highly susceptible to water damage are to be located/stored above the Flood Planning Level.

E. FLOOD EMERGENCY RESPONSE

- Development shall comply with Council's Flood Emergency Response Planning for Development in Pittwater Policy and the outcomes of any Flood Risk Emergency Assessment Report where it applies to the land.

H. FENCING

- Fencing, including pool fencing, shall be designed so as not to impede the flow of flood waters and not to increase flood affectation on surrounding land. Appropriate fencing must comply with the Flood Prone Land Design Standard in addition to other regulatory requirements of pool fencing.

I. POOLS

- Pools located within the 1% AEP flood extent are to be in-ground, with coping flush with natural ground level. Where it is not possible to have pool coping flush with natural ground level, it must be demonstrated that the development will result in no net loss of flood storage and no impact on flood conveyance on or from the site.

All electrical equipment associated with the pool (including pool pumps) is to be waterproofed and/or located at or above the Flood Planning Level.
All chemicals associated with the pool are to be stored at or above the flood planning level.

The flood information provided by the Northern Beaches Council in email correspondence on the 6th of June, 2018 and can be found for reference in Appendix A of this report. The levels provided by the Northern Beaches Council are based on the "Draft Pittwater Flood Study", which was not accessible to Donovan Associates during the writing of this report.

The provided flood levels from Northern Beaches Council have been summarised below;

- 1% AEP (100 year) flood level: 5.78 m AHD
- Freeboard: 0.5 m
- Flood Planning Level (FPL): 6.28 m AHD
- Probable Maximum Flood (PMF) level: 6.44 m AHD

5. PROPOSED ALTERATIONS – No. 4 Yachtsmans Paradise, Newport

The proposal for this site is for the addition of a swimming pool located adjacent to the northern face of the building (rear of property).

Figure 5 below represents the approximate top water level through the site for the 1% AEP storm event and PMF event.

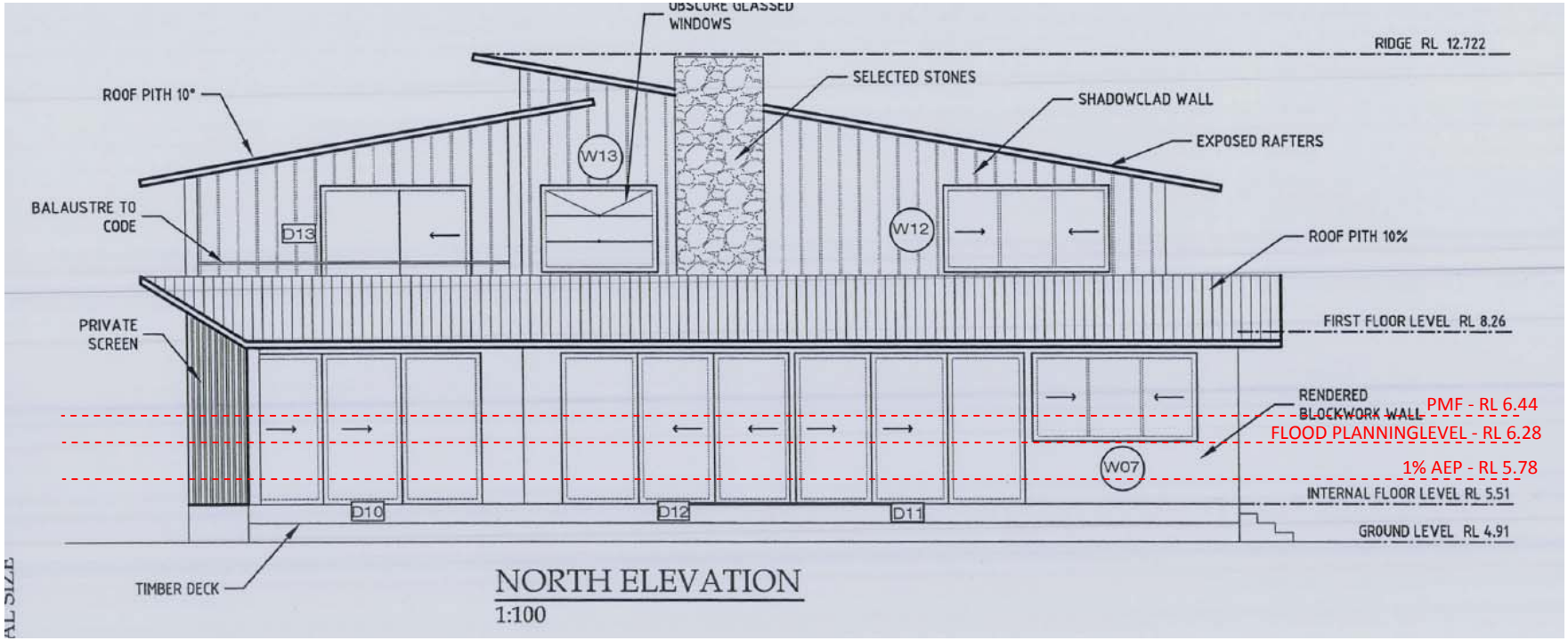

Figure 5: Approximate representation of 1% AEP flood level and PMF level through the site

As outlined in Figure 6 above, the 1% AEP and PMF flood level is 270mm and 770mm above the existing finished floor levels. Because of this, it is extremely important that an effective Flood Risk Management Strategy is prepared and early warning measures are in place to allow occupants on the site to evacuate any flood waters. Refer to Flood Risk Management Plan section of this report for further details.

6. IMPACT OF PROPOSED DEVELOPMENT ON FLOODPLAIN BEHAVIOUR

To minimise the reduction of flood storage and any respective adverse effect on flood levels, it is recommended that the proposed pool should;

- Be in ground with the pool coping not exceeding existing surface levels
- All electrical equipment and storage is to be located above the flood planning level of RL 6.28. Any electrical equipment such as wires/fittings that cannot be located above the flood planning level must be adequately waterproofed.
- Pool fencing must be designed to not impede the flow of flood water and meet the requirements of the Flood Prone Land Design Standard in addition to other regulatory requirements. All new fencing on the property must flood compatible with 50-75% of the fence being of an open design between the natural ground level and the flood planning level (RL 6.28). Openings should permit a 75mm sphere to pass through.

Due to the limitations set above for the construction of the new pool, it is expected that the proposed works will result in negligible changes to total flood storage volume and flood water flow.

7. RECOMMENDATIONS AND CONCLUSIONS

- Based on the information available to Donovan Associates, the existing dwelling finished floor level is 5.51 AHD. This is below the 1% AEP level (RL 5.78), flood planning level (RL 6.28) and PMF level (RL 6.44). To limit any changes in flood storage volume or water flow, it is proposed that the pool is constructed in ground, with all pool copings to suit existing ground levels.
- All electrical equipment associated with the pool including pool pumps, are to be located above the flood planning level of 6.28. Any electrical equipment such as wires/fittings that cannot be located above the flood planning level must be adequately waterproofed.
- Any hazardous, potentially polluting materials or goods/materials that are susceptible to water damage are to be located/stored above the flood planning level of RL 6.28.
- Pool fencing must be designed to not impede the flow of flood water and meet the requirements of the Flood Prone Land Design Standard in addition to other regulatory requirements. All new fencing on the property must flood compatible with 50-75% of the fence being of an open design between the natural ground level and the flood planning level (RL 6.28). Openings should permit a 75mm sphere to pass through.
- Any proposed structures to support the pool pump or storage areas must be designed and constructed to ensure structural integrity up to the Flood Planning Level (RL 6.28), taking into account the forces of floodwater, wave action, flowing water with debris, buoyancy and immersion. Any proposed structure should be built constructed from flood compatible material.
- Due to a risk of limited emergency escape access during a flood event as a result of a) low existing ground floor levels of (5.51RL)/garage level of (4.91RL) and b) the location of the property being in the center of the expected flow path (as indicated in Figure 3), it is recommended that the structural stability of the building during a 1% AEP flood is verified by a suitably qualified structural engineer if not already previously completed. This should consider lateral flood flow, buoyancy, suction effects, and debris load impacts of the 1% AEP design flood depths and velocities. This will ensure that in the case of an alternative emergency response, safe shelter-in-place can be provided on the second floor of the existing dwelling.

8. REFERENCES

- *Pitwatter 21 DCP (2014, Northern Beaches Council (www.northernbeaches.nsw.gov.au)*
- *New South Wales Government Legislation (2008), State Environmental Planning Policy. (legislation.nsw.gov.au)*

9. APPENDICE

APPENDICE A - COUNCIL CORRESPONDENCE

From: Flood plain [mailto:floodplain@northernbeaches.nsw.gov.au]
Sent: Wednesday, 6 June 2018 1:23 PM
To: Zack Wilson <zackw@buildingapprovalsolutions.com.au>
Subject: RE: 4 Yachtsmans Paradise, Newport - FUSSELL

Hi Zack,

Please find below the flood information.

1% AEP (100 year) flood level: 5.78 m AHD
Freeboard: 0.5 m
Flood Planning Level (FPL): 6.28 m AHD
Flood Risk Precinct: Medium
Probable Maximum Flood (PMF) level: 6.44 m AHD

The site is listed as a Floodway and High Hazard in both the 1% AEP flood and the PMF.

The above information is based off the Draft Newport Flood Study. This is currently the best available information on flooding in the area, but could be subject to change in the future.

In addition, the McCarrs Creek, Mona Vale and Bayview Flood Study Review (2017) identified approximately 63% of the lot affected by high hazard in the PMF and 86 % of the lot is affected by a floodway in the PMF.

For development in the flood zone, you would typically need to prepare a flood management report in accordance with the attached guidelines and demonstrating compliance with the Pittwater 21 DCP (Section B3.11 and B3.13 refer to flooding) and the Flood Prone Land Design Standard.

Please do not hesitate to contact the floodplain team on this email with any further queries.

Regards,

Fiona Coe
Engineering Project Manager

Stormwater Floodplain Engineering
t 02 9942 2964 **m** 0422 145 569
fiona.coe@northernbeaches.nsw.gov.au
northernbeaches.nsw.gov.au

northern beaches council

FLOOD RISK MANAGEMENT PLAN

No.4 Yachtsmans Paradise, Newport

1. SITE INFORMATION

Council documentation at the time of this report being prepared has indicated that the subject site is subject to considerable flooding prior to the 1% AEP storm event. Generally, flood evacuation is based on the Probable Maximum Flood (PMF) which is the highest flood level ever likely to occur, however it is extremely rare.

The relevant levels through the subject property are:

1% AEP storm event flood level	**=**	**RL 5.78m AHD**
Probable Maximum Flood level	**=**	**RL 6.44m AHD**

2. EMERGENCY RESPONSE

The main consideration of risk to life of occupants for evacuation is whether there is sufficient time to evacuate before flooding, if occupants can evacuate before flooding occurs then the risk to life may be considered acceptable.

The existing garage finished floor level of RL 4.46 and is well below the 1% AEP flood level of 5.78RL and the PMF flood level of 6.44RL. As a result, it is recommended that residents carefully monitor flood levels during heavy rainfall events and evacuate prior to the flood waters reaching the northern boundary of the property.

1. At the first signs that there may be a rainfall event, check any form of weather reports (i.e. Bureau of Meteorology, ABC Radio 702) for any possible forecast warnings issued. If any storm warnings have been forecast, this Flood Risk Management Plan must be actioned following the proceeding steps below.

2. During flash flood and flood events many local and major streets and roads including the eastern entry of Yachtsman Paradise are likely to be cut off by floodwaters and may make escape by vehicle extremely difficult. Travelling through floodwaters on foot or in a vehicle can be very dangerous as obstructions can be hidden under the floodwaters, or it is possible to be swept away, even if in a car, or the water may be polluted.

3. Develop your own 'Family Flood Plan' generally in accordance with this Flood Risk management Plan. In the case that flooding should occur and children are home alone, arrangements should be made to ensure the children are aware not to leave the premises and to follow the 'Family Flood Plan'.

If flood levels appear to approach the dwelling of the residence:

a. Move important documents, personal items, precious photographs and vital medical supplies to a safe and easily accessible place with a pre-prepared 'Emergency Flood Kit'
b. Gather medicines, special requirements for infants or elderly, mobile phones, first aid kit, special papers, battery operated torch and radio, fresh water, canned food, water proof or easy dry clothing all packed in one location

c. Locate any pets and gather special requirements for them
d. Put on strong shoes, raise any items within the home that may be damaged by water to as high a level as possible, with electrical items on top. Turn off any large electrical items at the power point such as a TV that cannot be raised.
e. If safe, evacuate to higher ground as per the evacuation route shown below. Do not attempt to cross flood waters.
f.

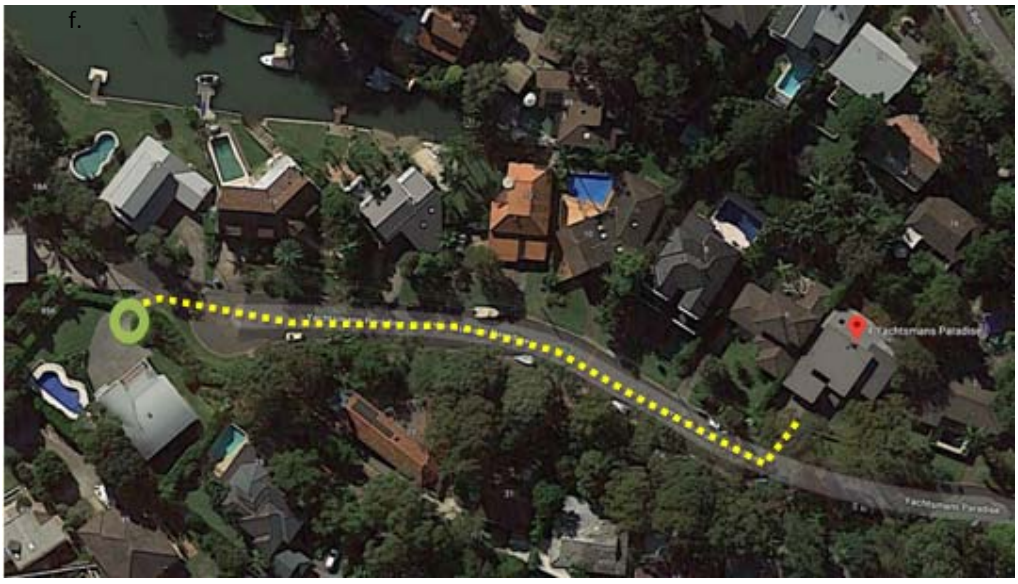

Figure 6: Evacuation Route to higher ground along Yachtsman Paradise

3. ALTERNATIVE EMERGENCY RESPONSE (SHELTER-IN-PLACE)

The AFAC guideline states that evacuation is the most effective strategy, provided that evacuation can be safely implemented. As an alternative emergency response the first floor of the proposed development can be used as a shelter during flooding events.

Based on the adopted requirements for shelter in place by council, the minimum floor level must be equal to the PMF flood level. The first floor level of the proposed development is 8.01 m AHD which is higher than PMF level and could be used as a safe shelter during flood events when evacuation is not possible.

According to the Pittwater LGA adopted requirements for shelter in place, minimum floor space are 2 m^2 per person for all long duration flooding. The proposed first story of the development consisted of 3 bedrooms with total area of 66 m^2 which is enough to theoretically shelter up to about 30 people.

In addition the following requirements for shelter in place shall be implemented:

- Shelter-in-place refuge must be intrinsically accessible to all people on the site, plainly evident, and self directing, with sufficient capacity of access routes for all occupants.
- Structural stability of the refuge building is to be verified by a suitably qualified structural engineer considering lateral flood flow, buoyancy, suction effects, and debris load impact of 1% AEP design flood depths and velocities.
- Refuge must comply with Building Code of Australia requirements, with external components rated appropriately for storm, wind, and moisture.

In term of the long duration flooding, the following serviceability requirements should be accessible;

- Access to sufficient clean water; and

- First Aid Kit
- Portable radio with spare batteries; and
- Torch with spare batteries.

In the event that flood waters appear they may enter the dwelling:

a. Switch off electricity at the switchboard
b. Turn off gas at the meter
c. Turn off water at the meter
d. Block toilet bowls with a strong plastic bag filled with earth or sand
e. Cover drains in showers, baths, and laundry with a string plastic bag filled with earth or sand.
f. Once flood waters have entered the building, all occupants residing within the dwelling must move to the 'First Floor' for refuge from a possible PMF storm event. It is only safe to leave this 'Safe Zone' once the flood water being to reside away from the dwelling.
g. Continue to monitor the Bureau of Meteorology forecasts and warnings, listen to ABC 702 radio
h. In the case of a medical or life threatening emergency ring **000**

4. AFTER A FLOOD EVENT

- Stay tuned to ABC 702 on a battery powered radio for official advice and warnings
- Don't allow children to play in or near flood waters
- Avoid entering flood waters in all circumstances. If it is absolutely necessary to enter flood waters, check depth in front of you before every step using a stick/pole or similar
- Stay away from drains, culverts and water over knee deep
- Don't turn on your gas or electricity until it has been checked by a professional/licensed repairer
- Avoid using gas or electrical appliances which have been in flood water until checked for safety
- Do not consume food that has been in flood waters
- Boil tap water until supplies have been declared safe
- Watch for trapped animals
- Beware of fallen power lines
- Take as many photos as possible for all damages for insurance purposes
- Notify family and friends of your whereabouts