FLOOD RISK MANAGEMENT REPORT

1 Ross Street, Newport

March, 2020

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Report Description

Report Name	**Flood Risk Management Report**	
Address	**1 Ross Street, Newport**	
Client	**Ron Ivanoff**	
Our Reference	**FAR1817/20**	
Prepared By	**Muna Pradhan** **Flood and Drainage Engineer** **MIEAust CPEng NER**	

Revision History

Date	Version	Author	Comments
10.03.2020	V_1	MP	First Edition

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Executive Summary

The flood risk management report assesses the impacts of proposed additions and alterations to the existing dwelling at No. 1 Ross Street, Newport NSW to the existing flooding characteristics at the site and surroundings and provides the flood risk management plan. This report is primarily based upon the Newport Flood Study (2019) and other relevant documents.

The proposed development site is affected by an overland flooding. During flooding event, floodwater from upstream catchment enters the site via Ross Street once the flood on the existing open channel overtops its banks. As the flow increases, more and more part of the site will be inundated with the flood water.

The foot print of the proposed alterations and addition is almost the same as the existing dwelling. The proposed alterations and additions are located within a small part of the large flood storage area. In such a case, the proposed redevelopment does not have any adverse effects to the existing flooding behaviours at the site and surroundings. The maximum 1% AEP flood level, depth and velocity at the site are 4.16 m AHD, 1.25 m and 0.0.2 m/s respectively. The site is located in medium to high flood risk precincts and H5 Flood Life Hazard Category. Therefore, flood emergency response planning policy is also applicable for the proposed development. The proposed development is compliant with all the requirements for a flood control lot including the flood emergency response planning policy.

The existing dwelling is a single storey dwelling with a habitable floor level (4.62 mAHD) below PMF level (6.15 mAHD). The council has advised that the flood planning level for the subject site as 4.66m AHD. The proposed ground flood level is 4.66 mAHD that complies the council requirement for flood planning level. The access route to the site will be blocked due to flooding once the floodwater on the existing open channel nearby overtops the banks within a very short time. Therefore, shelter-in-place is the only viable option for the development site. The proposed addition of the first floor (7.66 mAHD) can be used as a shelter-in-place refuge during severe flooding event which is higher than the PMF level. Therefore, the proposed development is highly commended from flood risk management perspectives.

1 Introduction

BMB Engineers was commissioned in order to assess the impact of flooding due to the proposed additions and alteration to the existing dwelling at 1 Ross Street, Newport.

This report has been prepared to accompany a Development Application for the proposed development that will address Northern Beaches Council's requirements for a flood control lot. This report describes the existing characteristics of the area, proposed development and quantifies the impact of flooding due to the proposed development. This flood risk management report is primarily based upon Newport Flood Study Report (2019) prepared by Catchment Simulation Solutions and the flood information provided by the council.

2 Site Description

The site is located to the southern side of Ross Street near the junction of The Boulevarde and Ross Street. A locality plan of the site is shown in Figure 1 below.

Figure 1 Location of Site (Source: SIX Maps)

The site is currently developed with a brick residence with tile roof, a concrete driveway and a shed. The survey plan of the site is shown on Figure 2. The site slopes gently towards the front boundary. The site is located above the 3.10 m AHD. Few trees also exist around the site.

An open channel is running almost parallel to the Ross Street about 80m west from the site discharging the flows from upstream catchments to the ocean.

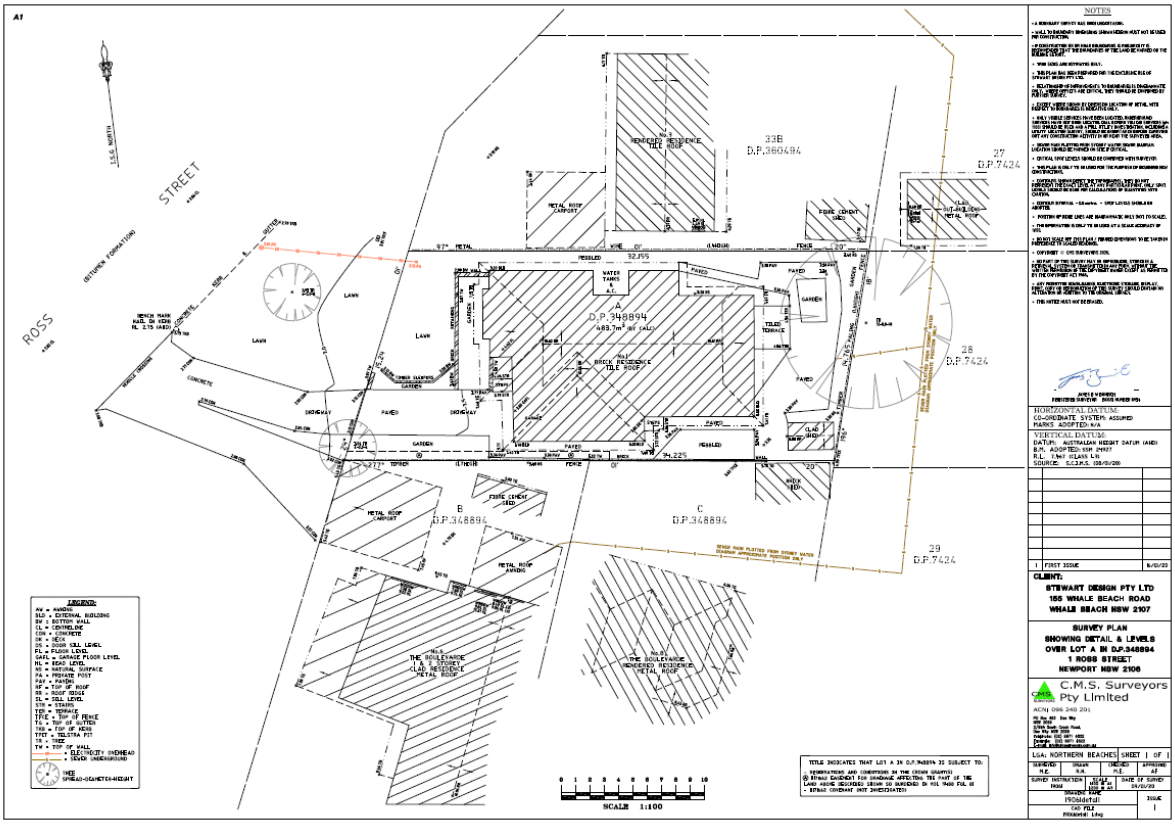

Figure 2 Survey Plan of Development Site

3 Proposed Development

The proposed development comprises alterations and additions to the existing residential dwelling. The site plan of the proposed development is presented in Figure 3.

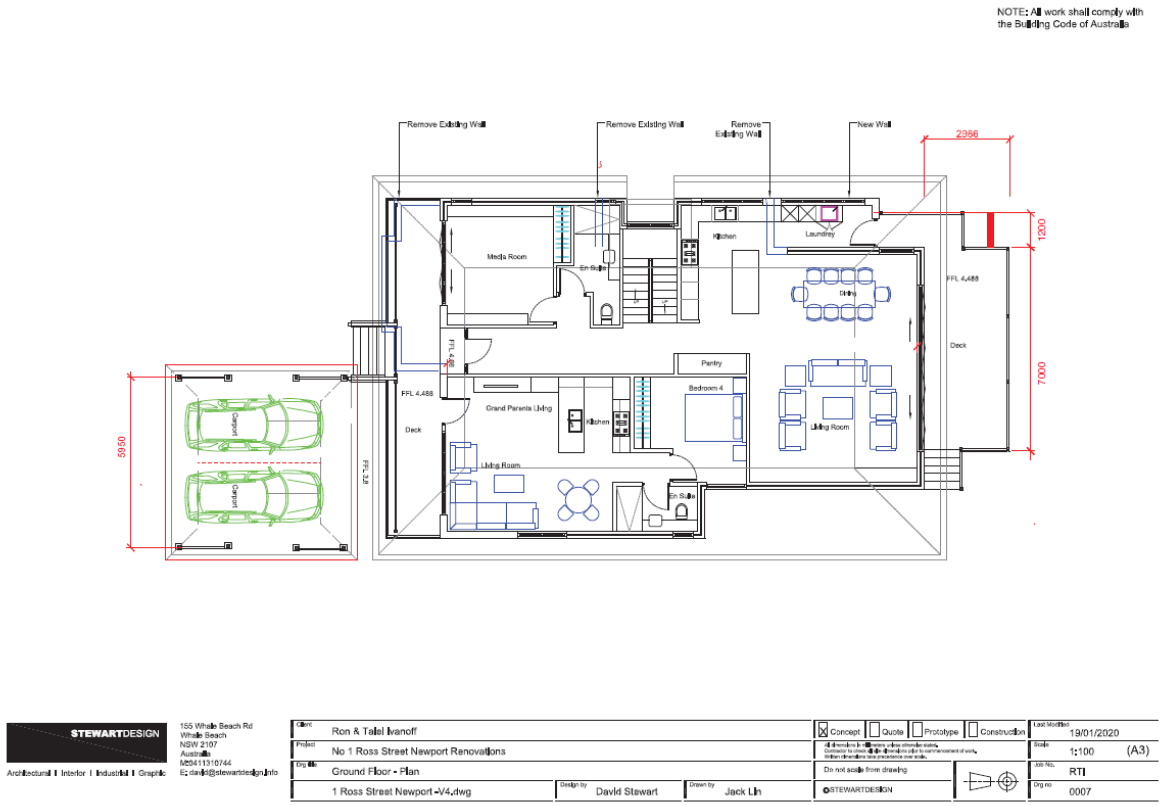

Figure 3 Proposed Development

4 Flood Characteristics

Council has advised that the proposed development site is affected by the flooding. Flood information around the development site provided by Northern Beaches Council is presented in Table 1 and Appendix A. This flood level information is based on Newport Flood Study Report (2019) prepared by Catchment Simulation Solutions. The maximum 1% AEP flood level, depth and velocity at the site are 4.16 m AHD, 1.25 m and 0.0.2 m/s respectively. The site is located within the flood storage area and medium to high flood risk precinct.

Table 1 Flood Information at the Development Site (Source: Northern Beaches Council)

Flood Characteristics	1% AEP	PMF
Maximum Flood Level, m AHD	4.16	6.15
Maximum Flood Depth, m	1.25	2.99
Maximum Velocity, m/s	0.20	0.42

The Flood Life Hazard Category of the site mostly falls to H5. The council has advised that the flood planning level for the subject site is 4.66m AHD.

As per Newport Flood Study (2019), flooding at the site would be produced by relatively short, high intensity storms. The most critical rainfall burst around the development site is two hours. Flooding to the site occurs from the overtopping of the open drain located to the west from the site. The roadways around the development site are likely to be inundated around 30 minutes after the onset of severe rainfall and would remain cut for at least one hour.

5 Flood Risk Assessment

A proposal of development under consideration at No. 1 Ross Street, Newport has been assessed against Pittwater 21 Development Control Plan 2014. A compliance table is shown in Table 2. The assessments for the flood controls are presented below.

Table 2 Prescriptive Controls Compliance Table

SN	Performance Criteria	Compliance		
		Not Applicable	Yes	No
A	Flood effects caused by Development		√	
B	Drainage Infrastructure & Creek Works	√		
C	Building Components and Structural		√	
D	Storage of Goods		√	
E	Flood Emergency Response		√	
F	Floor Levels		√	
G	Car Parking		√	
H	Fencing	√		
I	Pools	√		

5.1 Flood Effects caused by Development

The foot print of the proposed alterations and additions is almost the same as the existing dwelling except a new double carport. Therefore, there will be a negligible change in flood storage loss. The site is located within a relatively flat terrain as a part of a large flood storage area. In such a case there will not be any significant flooding impact due to the proposed development.

5.2 Building Components and Materials

All structural components will be constructed with flood compatible materials up to the PMF level. All electrical equipment and wiring will be water proofed or installed above the flood planning level. Table 3 presents the flood compatible materials that can be used as guidance for the proposed building.

Table 3 Flood Compatible Materials

Building Component	Flood Compatible Materials	Building Component	Flood Compatible Materials
Flooring and Sub-floor Structure	- Concrete slab-on ground - Monolith construction - Suspended reinforced concrete slab	**Doors**	- Solid panel with water proof adhesives - Flush door with marine ply filled with closed cell foam - Painted metal construction - Aluminium or galvanised steel frame

Floor Covering	- Clay tiles - Concrete, precast or in situ - Concrete tiles - Epoxy, form in place - Mastic flooring, formed in-place - Rubber sheets or tiles with chemical-set adhesives - Silicone floors formed in-place - Vinyl sheets or tiles with chemical-set adhesive - Ceramic tiles, fixed with mortar or chemical-set adhesive - Asphalt tiles, fixed with water resistant adhesive	**Wall and Ceiling Linings**	- Fibro-cement board - Brick, face or glazed - Clay tile, glazed in waterproof mortar - Concrete - Concrete block - Steel with waterproof applications - Stone, natural solid or veneer, waterproof grout - Glass blocks - Glass - Plastic sheeting or wall with waterproof adhesive
Wall Structure	- Solid brickwork, blockwork, reinforced concrete or mass concrete	**Insulation Windows**	- Foam (closed cell types) - Aluminium frame with stainless steel - Rollers or similar corrosion and water resistant material
Roofing Structure (for Situations where the Relevant Flood Level is Above the Ceiling)	- Reinforced concrete construction - Galvanised metal construction	**Nails, Bolts, Hinges and Fittings**	- Brass, nylon or stainless steel - Removable pin hinges - Hot dipped galvanised steel wire, nails or similar
Electrical and Mechanical Equipment For dwellings constructed on land, where this plan applies, mechanical and electrical materials, equipment and installation should conform to the following requirements.		**Heating and Air Conditioning Systems** Heating and air conditioning systems should be installed at levels above the relevant flood level, to the maximum height possible. If this is not feasible, care should be taken to minimise the potential damage caused by submersion according to the following guidelines.	
Main power supply The main commercial power service equipment, including metering equipment, shall be located above the relevant flood level, subject to the approval of the relevant authority. A provision for easily disconnecting the dwelling from the main power supply shall be supplied.		**Fuel** Gas or oil fuelled heating systems should have a manually operated valve, which is to be located in the fuel supply line, to enable fuel cut-off.	

Wiring All wiring, switches and power outlets should be located above the relevant flood level, to the maximum height possible. All electrical wiring, which is installed below the relevant flood level, should be suitable for continuous submergence in water, containing no fibrous components. Earth core linkage systems (or safety switches) are to be installed. Only submersible-type splices are to be used below the relevant flood level. All conducts, located below the relevant flood level, should be self draining in the event of flooding.	**Installation** Heating equipment and fuel storage tanks should be mounted on and securely anchored to a footing of sufficient size, in order to withstand buoyancy and to prevent movement capable of damaging the fuel supply line. All storage tanks should be vented to a level 600 millimetres above the relevant flood level.
Equipment Equipment installed below/partially below the relevant flood level should contain a method of disconnection, by a single plug and socket assembly.	**Ducting** All ductwork, located below the relevant flood level, should have openings for drainage and cleaning. A grade may be introduced within ductwork in order to facilitate self draining. In the case where ductwork passes through a water tight wall or a floor below the flood level, the ductwork should be covered by a closure assembly which is to be operated from above the flood level.
Reconnection In the event that an electrical device and/or part of the wiring is flooded, it should be thoroughly cleaned or replaced and checked by an approved electrician before reconnecting.	**Ancillary Structures (steps, pergolas, etc)** Suitable water tolerant materials, such as masonry sealed hardwood and corrosive resistant metals, should be used. Copper Chrome Arsenate (CCA) treated timber is not a suitable material.

5.3 Structural Soundness

All structures will be designed and constructed to ensure structural integrity up to the PMF level. Structural certification shall be provided confirming that the structure can withstand the forces of floodwater debris, wave action, buoyancy and immersion up to the PMF level.

5.4 Storage of Goods

No hazardous or potentially polluting materials are likely being stored below the Flood Planning Level. Highly water susceptible goods, materials and other products to be located above the Flood Planning Level.

5.5 Flood Emergency Response

The Flood Life Hazard Category of the site mostly falls to H5. The development site is subjected to flash flooding and no warning time is available. Therefore, shelter-in- place is the only viable option for the Flood Emergency Response planning for the site. The first floor (7.66 m AHD) is located above the PMF level, which can be used as a shelter-in-place refuge during PMF event. The access to the first floor has been provided through the staircase. A minimum space of 1 m^2 per person is required for shelter-in-place refuge for the proposed development. The first floor is compliant with these requirements. However, **a safe access from Granny flat to the first floor during the PMF event must also be provided.** A Flood Emergency Response Plan is provided on Appendix B.

5.6 Floor Level

The flood planning level of the proposed development has been advised as 4.66 mAHD. The proposed minimum habitable floor level is compliant with this requirement. The proposed alterations and additions will not impede the flood conveyance on the site. There flood storage loss in a 1% AEP event will be insignificant. The first floor addition is above the PMF level.

5.7 Car Parking

The proposed carport is not located in floodway. It will be constructed on the natural ground level. Vehicle restraints to be provided to prevent floating vehicles leaving the site up to or above the Flood Planning Level.

6 Conclusions and Recommendations

The impacts of proposed development at No. 1 Ross Street, Newport to the existing flooding characteristics at the site and surroundings have been assessed in this study. This flood risk management report is primarily based upon the Newport Flood Study (2019) and other relevant documents.

The proposed development site is affected by an overland flooding. During flooding event, floodwater from upstream catchment enters the site via Ross Street once the flood on the existing open channel overtops its banks. As the flow increases, more and more part of the site will be inundated with the flood water.

The foot print of the proposed alterations and addition is almost the same as the existing dwelling. The proposed alterations and additions are located within a small part of the large flood storage area. In such a case, the proposed redevelopment does not have any adverse effects to the existing flooding behaviours at the site and surroundings. The site is located in medium to high flood risk precincts and H5 Flood Life Hazard Category. Therefore, flood emergency response planning policy is also applicable for the proposed development. The proposed development is compliant with all the requirements for a flood control lot including the flood emergency response planning policy.

The existing dwelling is a single storey dwelling with a habitable floor level below PMF level. The access route to the site will be blocked due to flooding once the floodwater on the existing open channel nearby overtops the banks within a very short time. Therefore, shelter-in-place is the only viable option for the development site. The proposed addition of the first floor can be used as a shelter-in-place refuge during severe flooding event. Therefore, the proposed development is highly commended from flood risk management perspectives.

The followings are the recommendations from this study.

- A reliable access to the first floor from the secondary dwelling during severe flooding events is to be provided;
- Vehicle restraints are to be provided up to or above the Flood Planning Level to prevent floating vehicles leaving the site during severe flooding event;
- All structural components up to the PMF level (6.15 mAHD) are to be constructed with flood compatible materials and shall withstand the forces of floodwater debris, wave action, buoyancy and immersion;
- All external power points, air conditioning units, hot water system and any equipment are to be set above the flood planning level;
- All development controls mentioned in section 5 are to be implemented.

Appendix A Flood Information (Source: Northern Beaches Council)

northern beaches council

FLOOD INFORMATION REQUEST - BASIC

Property: 1 Ross St, Newport
Lot DP: A//348894
Issue Date: 19/02/2020
Flood Study Reference: Newport Flood Study 2019

Flood Information for lot:

Flood Life Hazard Category – See Map A

1% AEP – See Flood Map B

1% AEP Maximum Water Level[3]: 4.16 m AHD

1% AEP Maximum Peak Depth from natural ground level[3]: 1.25 m

1% AEP Maximum Velocity: 0.2 m/s

1% AEP Hydraulic Categorisation: Flood Storage **See Flood Map E**

Flood Planning Area – See Flood Map C

Flood Planning Level (FPL) [1, 2, 3 & 4]: 4.66 m AHD

Probable Maximum Flood (PMF) – See Flood Map D

PMF Maximum Water Level[2]: 6.15 m AHD

PMF Maximum Depth from natural ground level: 2.99 m

PMF Maximum Velocity: 0.42 m/s

Flood Risk Precinct – See Map F

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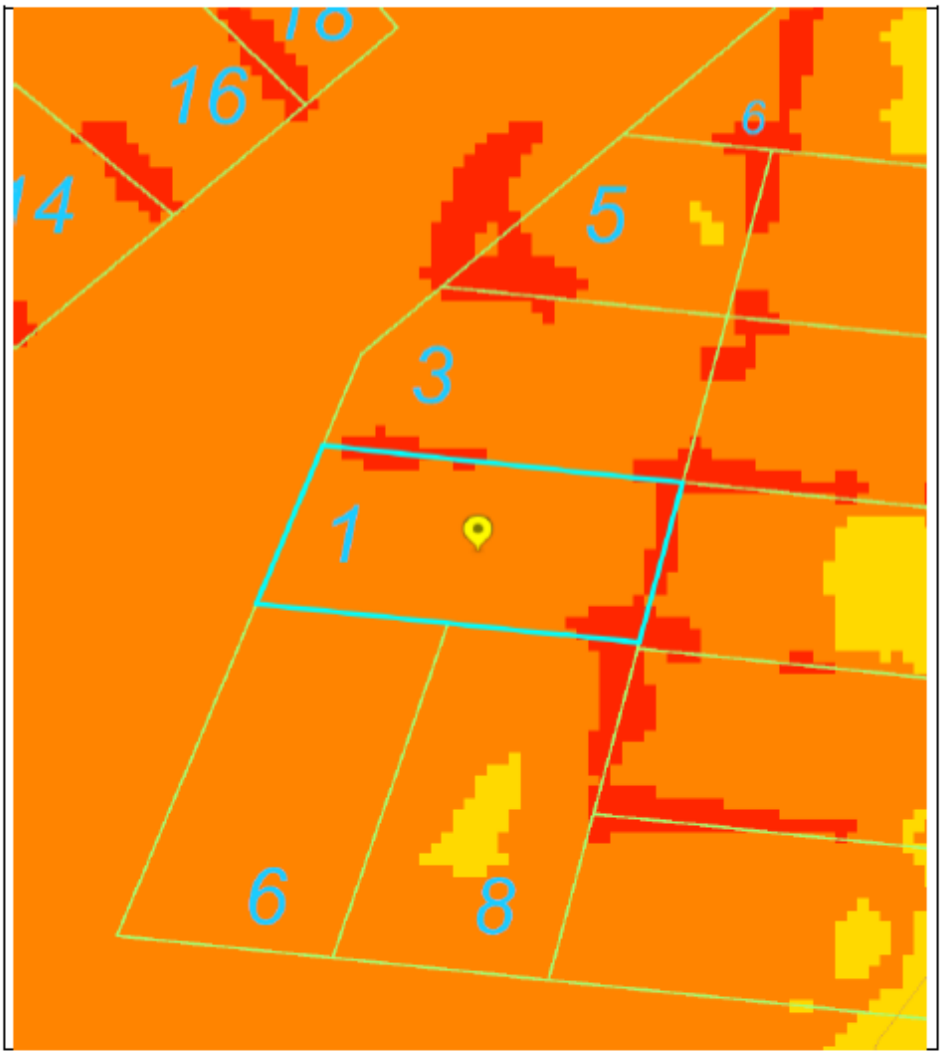
[1]The flood information does not take into account any local overland flow issues nor private stormwater drainage systems.
[2]Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/ flood planning levels across the site.
[3]Intensification of development in the former Pittwater LGA requires the consideration of climate change impacts which may result in higher minimum floor levels than those indicated on this flood advice.
[4]Vulnerable/critical developments require higher minimum floor levels using the higher of the PMF or Flood Planning Level

General Notes:

- All levels are based on Australian Height Datum (AHD) unless otherwise noted.
- This is currently the best available information on flooding; it may be subject to change in the future.
- Council recommends that you obtain a detailed survey of the above property and surrounds to AHD by a registered surveyor to determine any features that may influence the predicted extent or frequency of flooding. It is recommended you compare the flood level to the ground and floor levels to determine the level of risk the property may experience should flooding occur.
- Development approval is dependent on a range of issues, including compliance with all relevant provisions of Northern Beaches Council's Local Environmental Plans and Development Control Plans.
- Please note that the information contained within this letter is general advice only as a detail survey of the property as well as other information is not available. Council recommends that you engage a suitably experienced consultant to provide site specific flooding advice prior to making any decisions relating to the purchase or development of this property.
- The Flood Studies on which Council's flood information is based are available on Council's website.

FLOOD MAP A: FLOOD LIFE HAZARD CATEGORY



Notes:

- H1 = Dark Green. H2 = Green. H3 = Light Green. H4 = Yellow. H5 = Orange. H6 = Red
- Refer to 'Flood Emergency Response Planning for Development in Pittwater Policy' for additional information on the Flood Life Hazard Categories and Pittwater 21 DCP Control B3.13.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source:) and aerial photography (Source: NearMap 2014) are indicative only.

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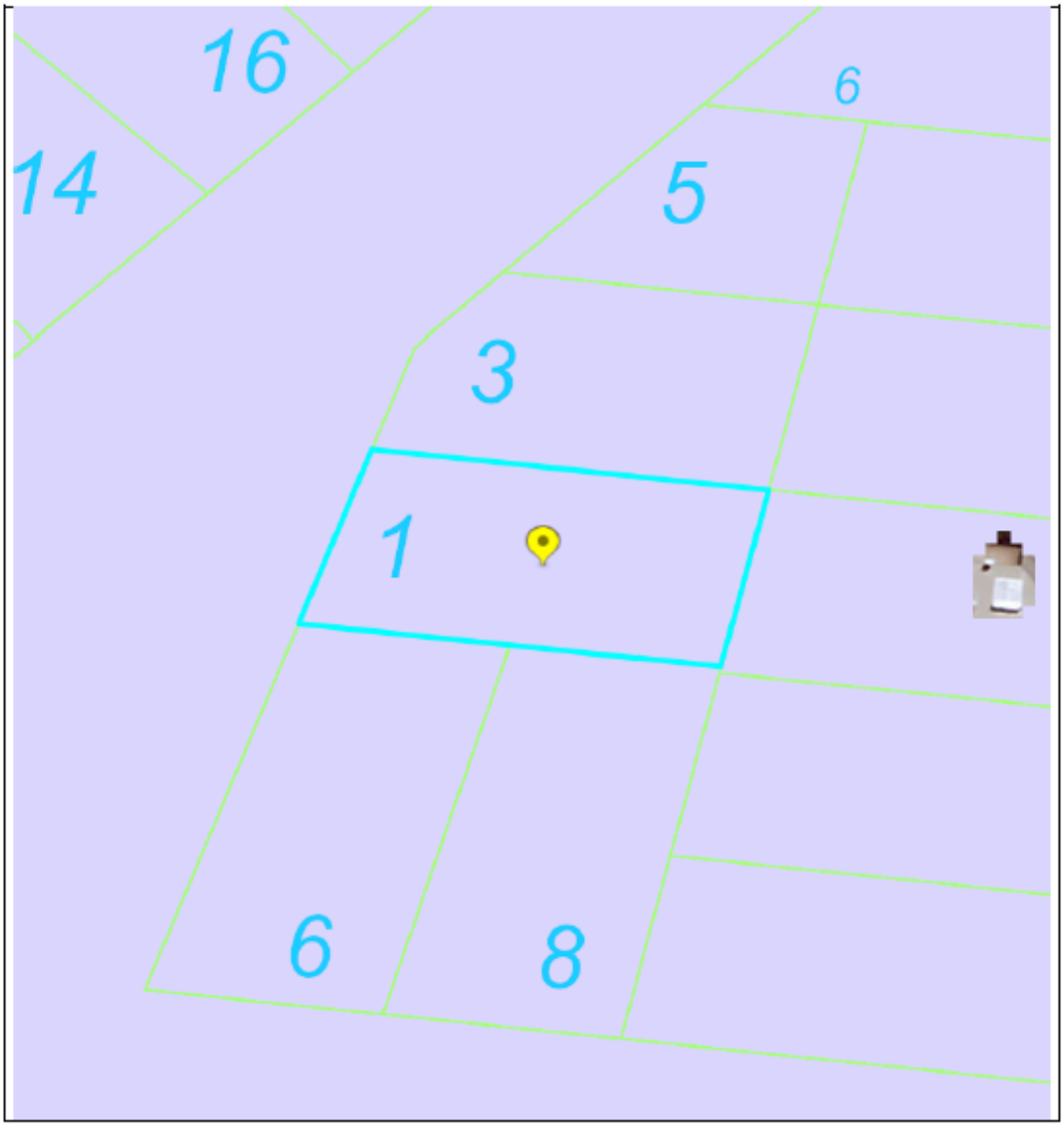
FLOOD MAP B: FLOODING - 1% AEP EXTENT



Notes:

- Pale purple area represents the 1%AEP Flood Extent
- Extent represents the 1% annual Exceedance Probability (AEP) flood event.
- Flood events exceeding the 1% AEP can occur on this site.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source:) and aerial photography (Source: NearMap 2014) are indicative only.

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FLOOD MAP C: FLOOD PLANNING AREA EXTENT

Notes:

- Blue Extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source:) and aerial photography (Source: NearMap 2014) are indicative only.

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FLOOD MAP D: PROBABLE MAXIMUM FLOOD EXTENT

Notes:

- Green Extent represents the Probable Maximum Flood (PMF) flood event.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source:) and aerial photography (Source: NearMap 2014) are indicative only.

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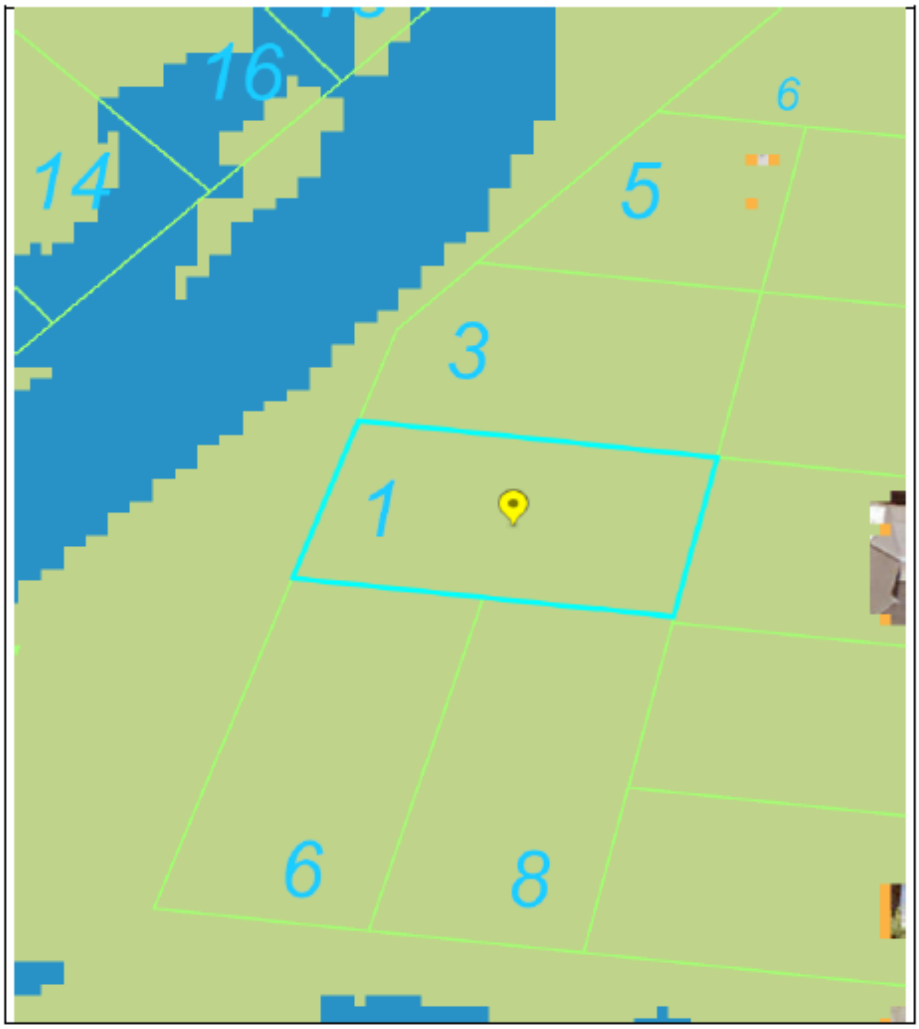
FLOOD MAP E: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



Notes:

- Flood fringe = orange. Flood Storage = pale green. Floodway = Blue
- Extent represents the 1% annual Exceedance Probability (AEP) flood event.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source:) and aerial photography (Source: NearMap 2014) are indicative only.

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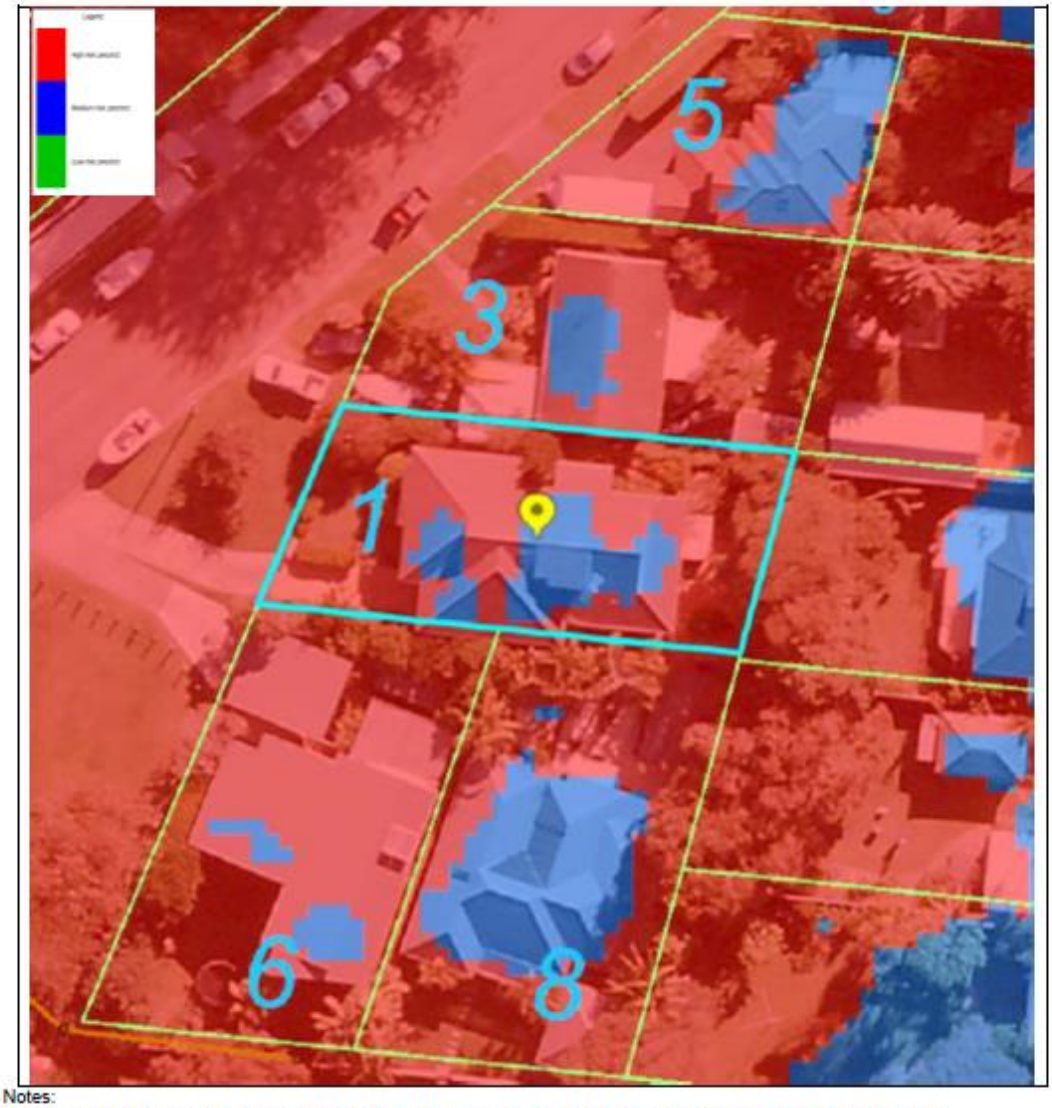
FLOOD MAP F: FLOOD RISK PRECINCT MAP



Notes:

- **Low Flood Risk precinct** means all flood prone land not identified within the High or Medium flood risk precincts.
- **Medium Flood Risk precinct** means all flood prone land that is (a) within the 1% AEP Flood Planning Area; and (b) is not within the high flood risk precinct.
- **High Flood Risk precinct** means all flood prone land (a) within the 1% AEP Flood Planning Area; and (b) is either subject to a high hydraulic hazard, within the floodway or subject to significant evacuation difficulties (H5 and or H6 Life Hazard Classification)

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APPENDIX B Flood Emergency Response Plan

Flood Emergency Response Plan for 1 Ross Street, Newport

Council has advised that this site is subject to flooding.

Relevant levels at the site are:

- 1% AEP Flood Level: 4.16 m Australian Height Datum (AHD)
- 1% AEP Maximum Flood Depth ≥ 1.25 m
- PMF Level: 6.15 m AHD
- PMF Depth ≥ 2.99 m
- Ground Floor Level: 4.66 m AHD
- First Floor Level: 7.66 m AHD

Ground floor level is 0. 5m above the 1% AEP flood level. During severe flooding events the floodwater will enter the ground floor. The upper floor is above the PMF level. Staying within the home will provide protection for a wide range of floods.

Following procedures are advised to follow before, during and after a severe flooding event.

1. Develop your own Family Flood Safe Plan. Save the numbers in the mobile and keep handy near the phone and on the fridge: 132 500 to call SES in case of emergency help in flood and storm, and 000 in a life-threatening emergency. A portable radio with spare batteries may be useful on some extreme event.
2. Monitor warnings for severe local weather events all the time on local TV channel, local radio station, weather Apps or media reports.
3. If a severe Flood Warning is issued in this area, activate your Family Flood Safe Plan. Inform all residents and visitors of the potential flood situation and this Plan. Place sand bags across/around the external doors or place wet towels across the bottom and lower sides of external doors to slow down the entry of water through the door. Stack any light items on benches and tables placing electrical items on the top or move to upper floor. Relocate any items that may be damaged by water, poisons, chemicals and waste containers to a level as high as possible (upper floor). Secure objects that are likely to float and cause damage. Ensure the mobile phones and portable power banks are fully charged. Keep listening to local radio station or check media reports for more information, updates and advice.
4. In the very rare event, floodwater may enter the ground floor. In such a case, move safely to the upper floor. Do not evacuate the home unless instructed to do so by the SES or the police. Keep on listening to the local radio or check media reports for updated information and advice; and follow all instructions given by emergency services.
5. If all clear is issued, arrange qualified personnel for inspection of utilities if exposed to floodwater. Be aware of any slip, trip or fall hazards. Clean up the flood debris using suitable personal protective equipment.
6. A laminated copy of this flood plan should be permanently attached (glued) on the most visible place, inside cupboard door in the kitchen and laundry and inside of the electrical meter box.
7. This flood evacuation plan should be reviewed every 5 years, particularly with the potential flood level rise due to Climate Change.

Appendix C Standard Hydraulic Certification Form

Attachment A

NORTHERN BEACHES COUNCIL STANDARD HYDRAULIC CERTIFICATION FORM

FORM A/A1 – To be submitted with Development Application

Development Application for

Address of site: No. 1 Ross Street, Newport NSW

Declaration made by hydraulic engineer or professional consultant specialising in flooding/flood risk management as part of undertaking the Flood Management Report:

I, Muna Pradhan on behalf of BMB Engineers
(Insert Name) (Trading or Business/ Company Name)

on this the 11.03.2020 certify that I am engineer or a
(Date)

professional consultant specialising in flooding and I am authorised by the above organisation/ company to issue this document and to certify that the organisation/ company has a current professional indemnity policy of at least $2 million.

***Flood Management Report* Details:**

Report Title: Flood Risk Management Report

Report Date: March 2020

Author: Muna Pradhan

Author's Company/Organisation: BMB Engineers

I: Muna Pradhan
(Insert Name)

Please tick all that are applicable (more than one box can be ticked)

☑ have obtained and included flood information from Council (must be less than 12 months old) **(This is mandatory)**

☑ have followed Council's Guidelines for Preparing a Flood Management Report

☐ have requested a variation to one or more of the flood related development controls. Details are provided in the *Flood Management Report*.

Signature Mpradhan

Name Muna Pradhan

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