

# **FLOOD IMPACT ASSESSMENT**

## **DEVELOPMENT:**

Alterations and Additions and Construction of a  
Secondary Dwelling

## **ADDRESS:**

14 Kristine Pl, Mona Vale

## **CLIENT:**

Mr James Sullman

## **LGA:**

Northern Beaches Council

**Issue: P2**

**Date: 06/07/2023**

## TABLE OF CONTENTS

<b>1. INTRODUCTION.....</b>	<b>4</b>
1.1 BRIEF.....	4
1.2 SCOPE.....	4
1.3 LIMITATIONS.....	4
1.4 REFERENCE DOCUMENTS .....	4
<b>2. SITE ANALYSIS.....</b>	<b>5</b>
<b>3. FLOOD ASSESSMENT AND RECOMMENDATIONS .....</b>	<b>5</b>
3.1 FINISHED FLOOR LEVELS.....	5
3.2 BUILDING COMPONENTS AND STRUCTURAL SOUNDNESS.....	6
3.3 VOLUME.....	6
3.4 VELOCITY .....	6
3.5 IMPACT ON ADJACENT LANDS.....	6
<b>4. EVACUATION.....</b>	<b>6</b>
<b>5. CONCLUSION .....</b>	<b>7</b>

## LIST OF FIGURES

FIGURE 1 - SITE PLAN (SOURCE: SIX MAPS - ACCESSED APRIL 2023) .....	8
FIGURE 2 – PRE-DEVELOPED SITE PLAN.....	9
FIGURE 3 - POST-DEVELOPED SITE PLAN.....	10
FIGURE 4 – FLOOD INFORMATION SHEET (SOURCE; NORTHERN BEACHES COUNCIL DATED 13/07/2021- Pg 1 OF 6) .....	11
FIGURE 5 – FLOOD INFORMATION SHEET (SOURCE; NORTHERN BEACHES COUNCIL DATED 13/07/2021 - Pg 2 OF 6) .....	12
FIGURE 6 – FLOOD INFORMATION SHEET (SOURCE; NORTHERN BEACHES COUNCIL DATED 13/07/2021 - Pg 3 OF 6) .....	13
FIGURE 7 – FLOOD INFORMATION SHEET (SOURCE; NORTHERN BEACHES COUNCIL DATED 13/07/2021 - Pg 4 OF 6) .....	14
FIGURE 8 – FLOOD INFORMATION SHEET (SOURCE; NORTHERN BEACHES COUNCIL DATED 13/07/2021 - Pg 5 OF 6) .....	15
FIGURE 9 – FLOOD INFORMATION SHEET (SOURCE; NORTHERN BEACHES COUNCIL DATED 13/07/2021 – Pg 6 OF 6) .....	16



## GLOSSARY

### **Annual Exceedance Probability (AEP)**

The chance of a flood of a given or a larger size occurring in any one year, usually expressed as a percentage.

### **Australian Height Datum (AHD)**

A common national surface level datum approximately corresponding to mean sea level.

### **Average Recurrence Interval (ARI)**

The long-term average number of years between the occurrence of a flood as big as or larger than the selected event.

### **Flood**

Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse.

### **Flood Liable Land or Flood Prone Land**

Land susceptible to flooding by the PMF.

### **Flood Planning Levels (FPLs)**

Are the combinations of flood levels and freeboards selected for floodplain risk management purposes.

### **Freeboard**

Is a factor of safety typically used in relation to the setting of floor levels.

### **Habitable Room**

In industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to damage in the event of a flood.

### **Peak Discharge**

The maximum discharge occurring during a flood event.

### **Probable Maximum Flood**

PMF is the largest flood that could conceivably occur at a location, usually estimated from probable maximum precipitation.

### **Probable Maximum Precipitation**

PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year.

### **Runoff**

The amount of rainfall which actually ends up as stream flow.



## 1. INTRODUCTION

### 1.1 Brief

GEBA Consulting has been engaged to carry out a Flood Management Report as part of the development application at 14 Kristine Pl, Mona Vale.

This report has been prepared to meet the Council's requirements for the Development Application. The Flood Management Report is required to assess the impact of the proposed development on the existing flood conditions of the subject site and the neighbouring properties.

### 1.2 Scope

The scope of this study covers:

- Reviewing Council's Flood Study and Site Specific Flood Information;
- Pre-development flood behaviour, including the flood inundation line marked on the survey plan;
- Loss of flood storage within the subject lot due to the proposed development;
- Post-development flood behaviour, including the flow path construction details and the flood inundation line, marked on the site plan;
- The flood impact on adjoining properties (upstream and downstream) in the locality;
- Design measures including maintaining an unobstructed flow path, raising the building with appropriate freeboard and flood proofing the walls that form part of the flow path;

### 1.3 Limitations

This report is intended solely for Mr James Sullman as the Client of GEBA Consulting and no liability will be accepted for use of the information contained in this report by other parties than this client.

This report is limited to visual observations and to the information including the referenced documents made available at the time when this report was written.

### 1.4 Reference Documents

For the purpose of the study, the following information has been supplied by the Architect, Council, and the surveyor:

- I. Survey Plan prepared by DP Surveying (Job No.3007 Dated 17/02/2022)
- II. Architectural Plans by Canvas Architecture & Design (Dated 30/06/2023)
- III. Flood Information Sheet provided by Northern Beaches Council via email dated 13/04/2021
- IV. Flood Study Reference: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV
- V. NSW Government Floodplain Development Manual – The management of Flood Liable Land (2005)
- VI. Australian Rainfall & Runoff (AR&R 1999) and (AR&R 2016 and Revision Projects)



## 2. SITE ANALYSIS

The site is located within the municipality of Northern Beaches Council and is identified as Lot 11 on DP 242690. The site is located on the Northern side of Kristine Pl and has a total site area of approximately 699.9m<sup>2</sup> in total. The site is bounded by residential allotments to the North, East and West, Kristine Pl to the South (See Figure 1 – Site location).

The proposed development consists of the construction of alterations and additions to the existing garage, and the construction of a secondary dwelling attached to the main dwelling. The existing garage is to be partially demolished and incorporated into the new garage and secondary dwelling footprint. There are no proposed changes to the existing main dwelling and the existing central courtyard to be removed is currently built up. With this, there is no expected net decrease in flood storage volume as a result of an increase in building footprint from the development. (See Figures 3 & 4 Pre-developed & Post-developed site plans).

## 3. FLOOD ASSESSMENT AND RECOMMENDATIONS

The Flood Information Sheet provided by council dated 13/04/2021 states that the subject site is impacted by low-medium risk flooding entering the site from the rear boundary. The flood information has been extracted from *McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV*. The 100 Year flood extent depths that impact the site range from 0.00 - 1.11m from the front to rear respectively. Therefore, interpolating the flood depths and the natural ground level, the maximum 100 Year ARI Flood level at the area of the proposed secondary dwelling is determined to be **RL5.16mAHD**.

With this, the Flood Planning level (FPL) for the site is to be set at the 100YR ARI Flood Level Plus 500mm Freeboard and therefore the FPL is set at **5.66mAHD**.

### 3.1 Finished Floor Levels

As per Northern Beaches Council's guidelines - '*Northern Beaches Council – Pittwater 21 DCP*', for flood affected sites, habitable floor levels are to be set at the 100YR ARI Flood Level Plus 500mm Freeboard. Therefore, a minimum habitable floor level of **FFL5.66mAHD** has been determined for the site. The proposed architectural plans are to provide a ground floor level of **FFL5.66mAHD** and meet the minimum requirements.

The existing portion of the garage to be retained has an existing garage floor level of **GFL5.08mAHD** and is partially located unaffected by the 1% AEP Flood extent. This is non-habitable and provides an existing freeboard of 350mm.



### 3.2 Building Components and Structural Soundness

The Flood Planning Level for the site has been set at **FPL5.66mAHD**. Due to this, the dwelling ground floor levels are to be wholly constructed as brickwork and reinforced concrete slab on ground as necessary to the structural engineer's details.

All materials proposed in the construction of the extension below the Flood Planning level of FPL5.66mAHD are to be flood compatible material including concrete footings & foundations with full brick construction.

This form of construction will ensure structural soundness and the ability to withstand all forces of flowing waters, including debris and buoyancy. All building components below the 100YR ARI plus freeboard (i.e the Flood Planning Level) are to be flood compatible materials as described above. All power points are to be at least 500mm above the 1:100 flood levels.

### 3.3 Volume

Through our Flood Assessment, the 1% ARI flooding for the site occurs from the rear of the property and extends to the garage. The area of development is located between the garage and existing main dwelling. This courtyard area is shielded with walls and fence lines and is not expected to accommodate and flood storage volume. Therefore, there will be no impact to the net flood storage volume of the site as a result of this proposal.

### 3.4 Velocity

Through our Flood Assessment, the 1% ARI flooding for the site occurs from the rear of the property and extends to the garage. The proposed secondary dwelling does not make changes to flow widths and setbacks. Therefore, with no reduction in widths of flow, there is no expected impact to the flow of floodwater and velocity as a result of this proposal.

### 3.5 Impact on adjacent lands

As per the Flood Extent shown in Figure 5, it can be seen that the site is partially affected by the 1 in 100YR Flood. The site will be inundated with approximately 0.00-1.11m of flood water. The proposal consists of a secondary dwelling to be constructed within the building footprint with the surrounding structures as fully developed. The proposed building footprint is not impacting the flood storage area; therefore, the flood impact is expected to remain unchanged on the neighbouring properties.

## 4. EVACUATION

It is recommended that evacuation procedures shall be carried out pending instructions from authorities i.e. State Emergency Services.

Prior to storms reaching the 1% AEP, all occupants are to evacuate the property before floodwater reaches 0.2m depth at the front boundary. The dwelling also consists of existing/proposed upper floors. These areas are above the PMF and occupants are able to seek refuge should evacuation be dangerous. Evacuation during flooding may be quite dangerous and is NOT recommended.



## 5. CONCLUSION

The proposed alterations and additions as presented in this Flood Management Report will meet the requirements of Department of Planning's 'Floodplain Development Manual', Northern Beaches Council's Flood requirements as specified in '*Northern Beaches Council – Pittwater 21 DCP*', provided that all procedures and recommendations presented in this report are implemented.

Should you require any further information or clarification, feel free to contact our office.

Yours Sincerely,

George Elbarhoun

**Civil Engineer | Director**

B.E. (Civil – Construction) (Hons1), Dip. Eng. Prac., MIEAust







*Figure 1 - Site Plan (Source: SIX Maps - Accessed April 2023)*





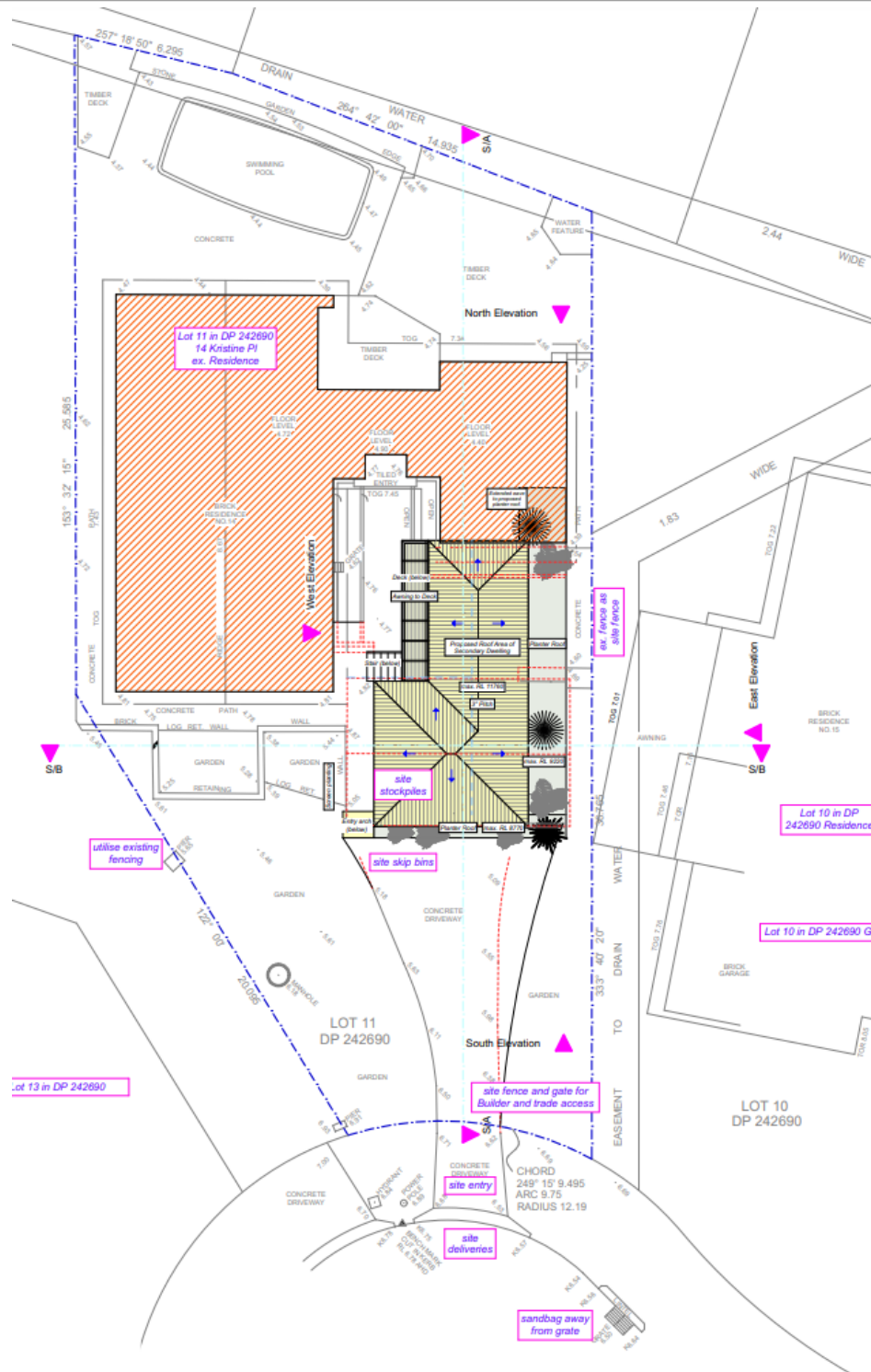


Figure 3 - Post-Developed Site Plan  
(Source: Canvas Architecture & Design; Dated 30/06/2023)





## FLOOD INFORMATION REPORT - BASIC

**Property:** 14 Kristine Place MONA VALE NSW 2103

**Lot DP:** Lot 11 DP 242690

**Issue Date:** 13/07/2021

**Flood Study Reference:** McCarrs Creek, Mona Vale and Bayview Flood Study  
Review 2017, Royal HaskoningDHV

---

### Flood Information for lot 1:

**Flood Risk Precinct** – See Map A

**Flood Planning Area** – See Map A

**Maximum Flood Planning Level (FPL)** <sup>2,3,4</sup>: 5.76 m AHD

**1% AEP Flood** – See Flood Map B

**1% AEP Maximum Water Level** <sup>2,3</sup>: 5.26 m AHD

**1% AEP Maximum Depth from natural ground level**<sup>3</sup>: 0.88 m

**1% AEP Maximum Velocity:** 0.42 m/s

**1% AEP Hydraulic Categorisation:** Floodway See Flood Map D

**Probable Maximum Flood (PMF)** – See Flood Map C

**PMF Maximum Water Level** <sup>4</sup>: 6.63 m AHD

**PMF Maximum Depth from natural ground level:** 1.80 m

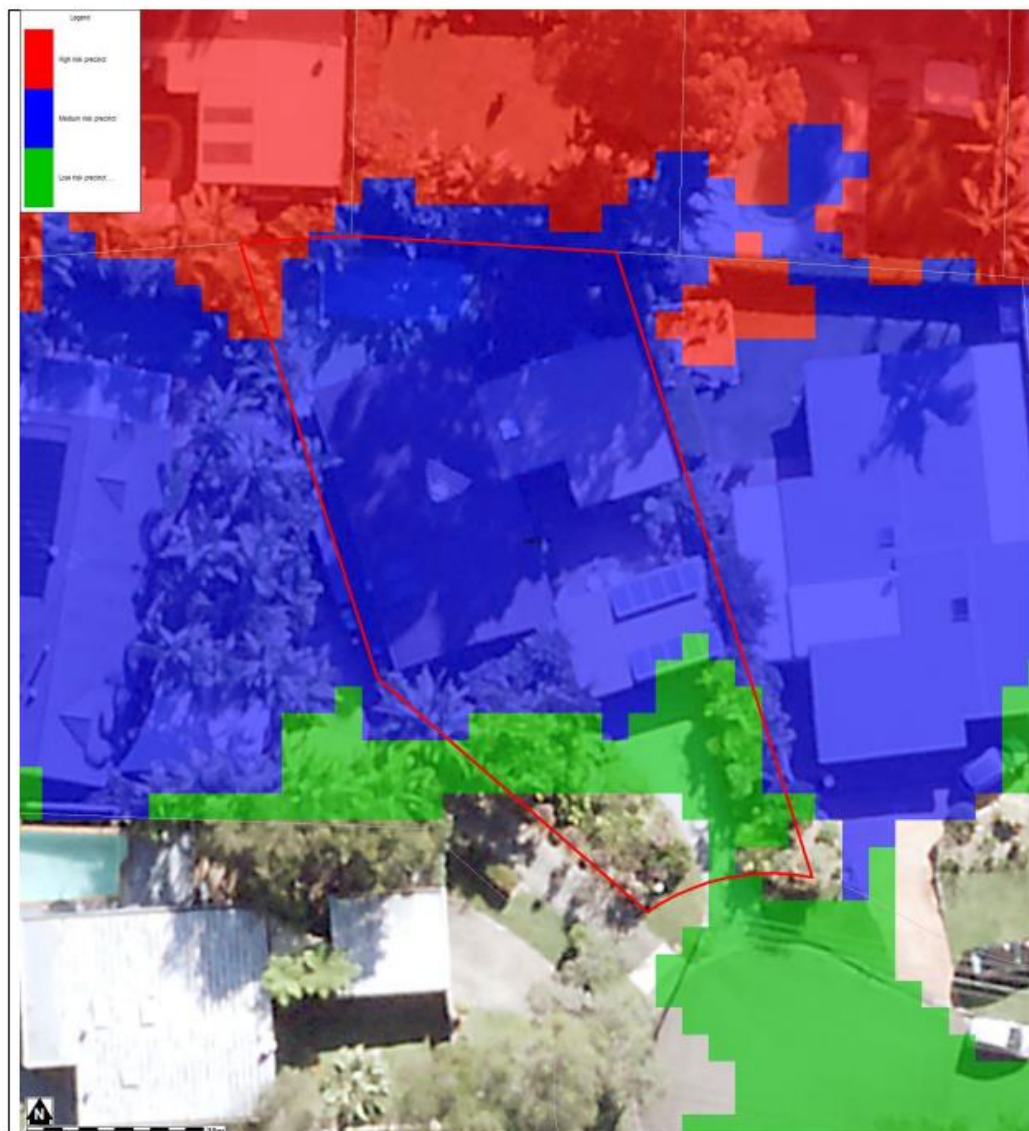
**PMF Maximum Velocity:** 1.04 m/s

**Flood Life Hazard Category** – See Map E

*Figure 4 – Flood Information Sheet (Source; Northern Beaches Council Dated 13/07/2021- Pg 1 of 6)*



## FLOOD MAP A: FLOOD RISK PRECINCT MAP



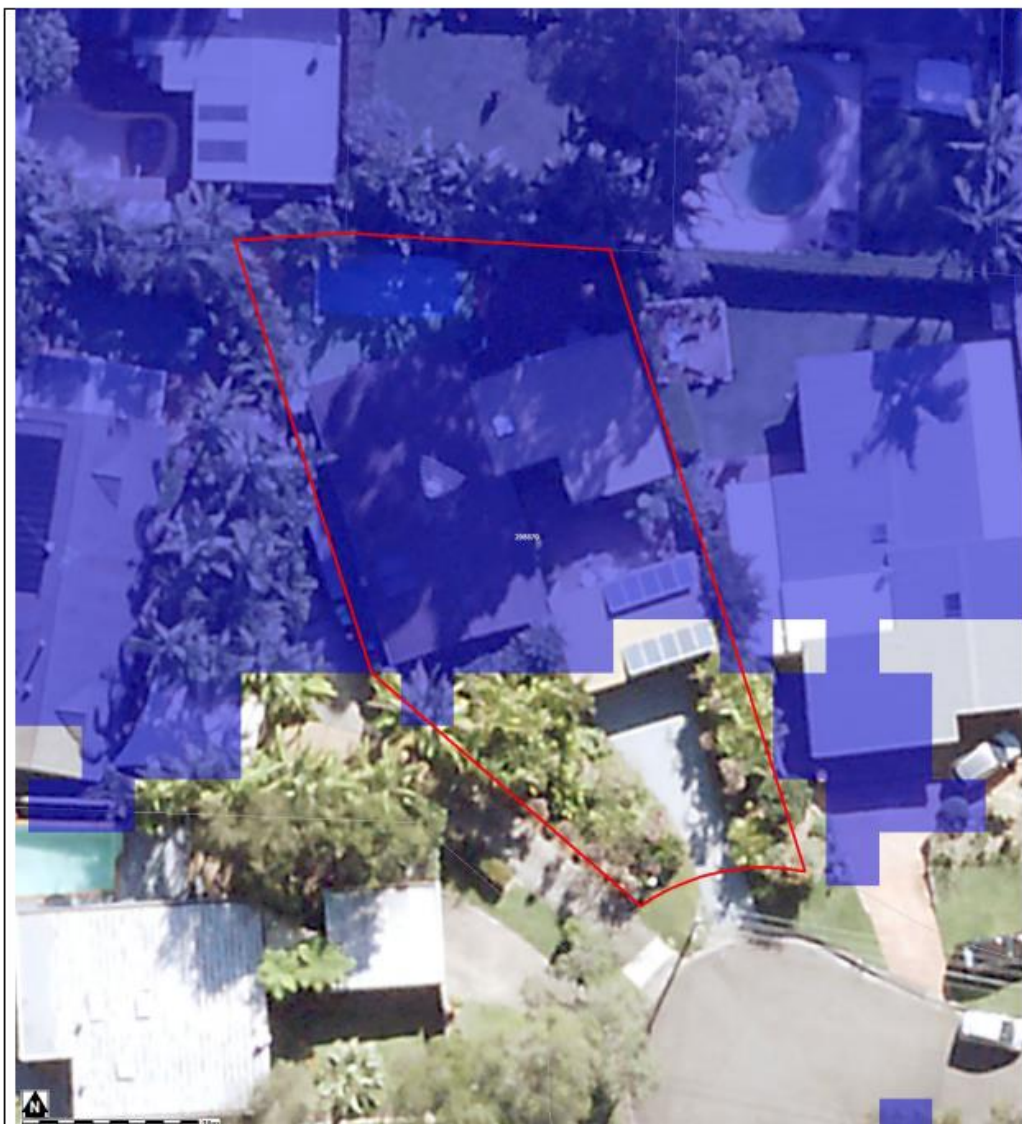
Notes:

- **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 or H6 Life Hazard Classification)
- The **Flood Planning Area** extent is equivalent to the Medium Flood Risk Precinct extent, and includes the High Flood Risk Precinct within it. The mapped extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- None of these mapped extents include climate change.

Figure 5 – Flood Information Sheet (Source; Northern Beaches Council Dated 13/07/2021 - Pg 2 of 6)



## FLOOD MAP B: FLOODING - 1% AEP EXTENT

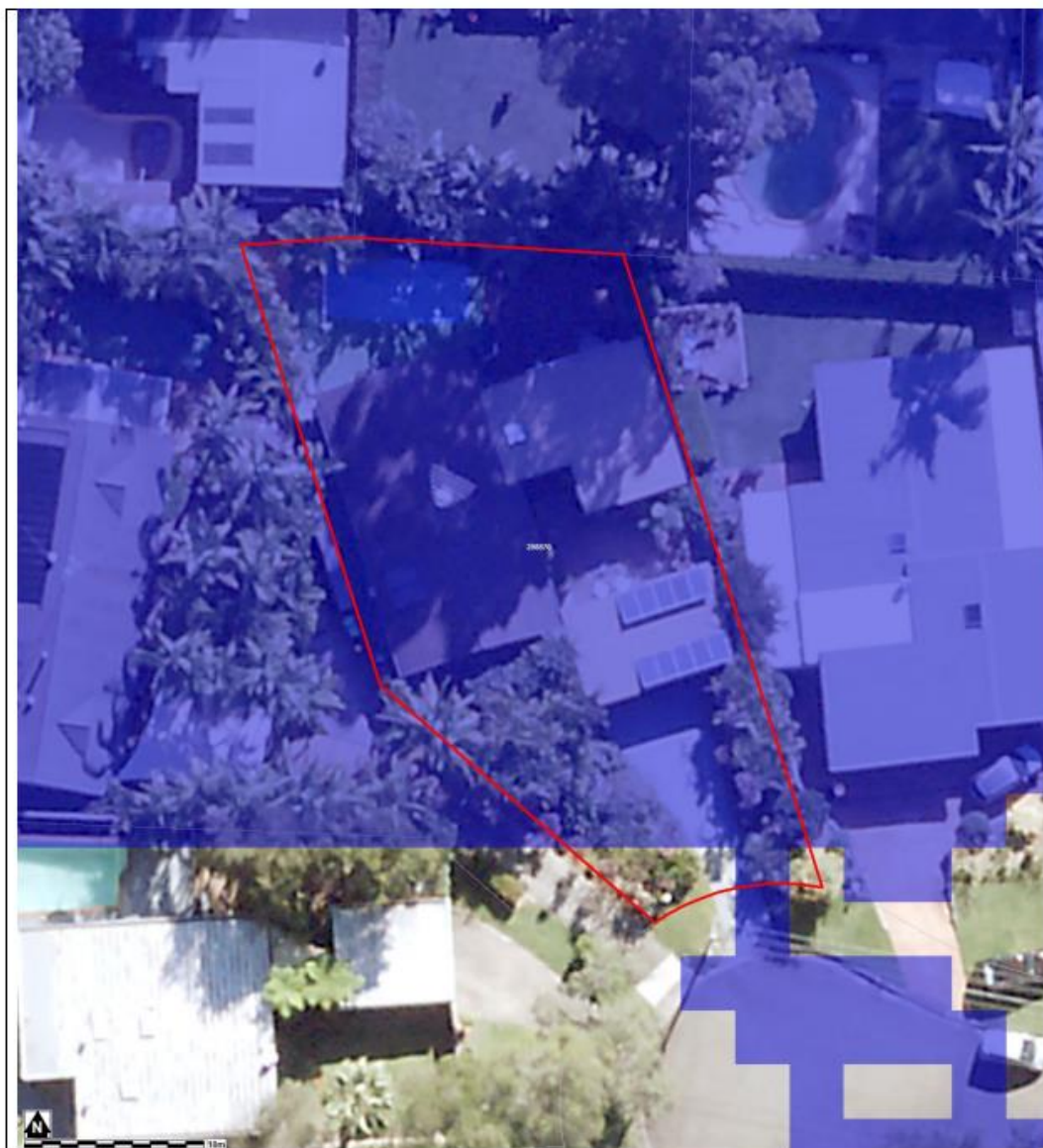


**Notes:**

- 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: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) and aerial photography (Source: NearMap 2014) are indicative only.

*Figure 6 – Flood Information Sheet (Source; Northern Beaches Council Dated 13/07/2021 - Pg 3 of 6)*

## FLOOD MAP C: PROBABLE MAXIMUM FLOOD EXTENT



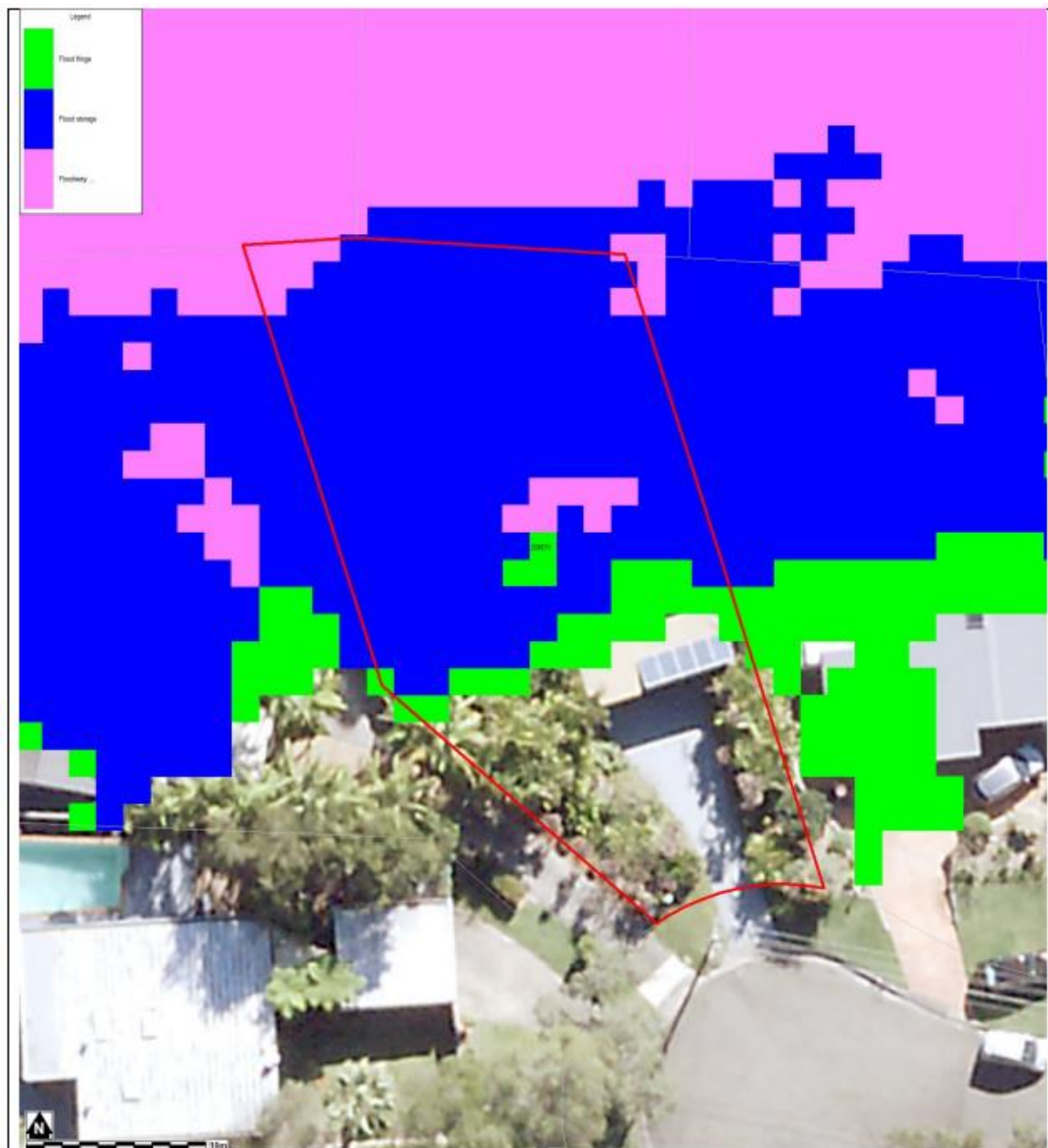
Notes:

- 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: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) and aerial photography (Source: NearMap 2014) are indicative only.

Figure 7 – Flood Information Sheet (Source; Northern Beaches Council Dated 13/07/2021 - Pg 4 of 6)



## FLOOD MAP D: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP

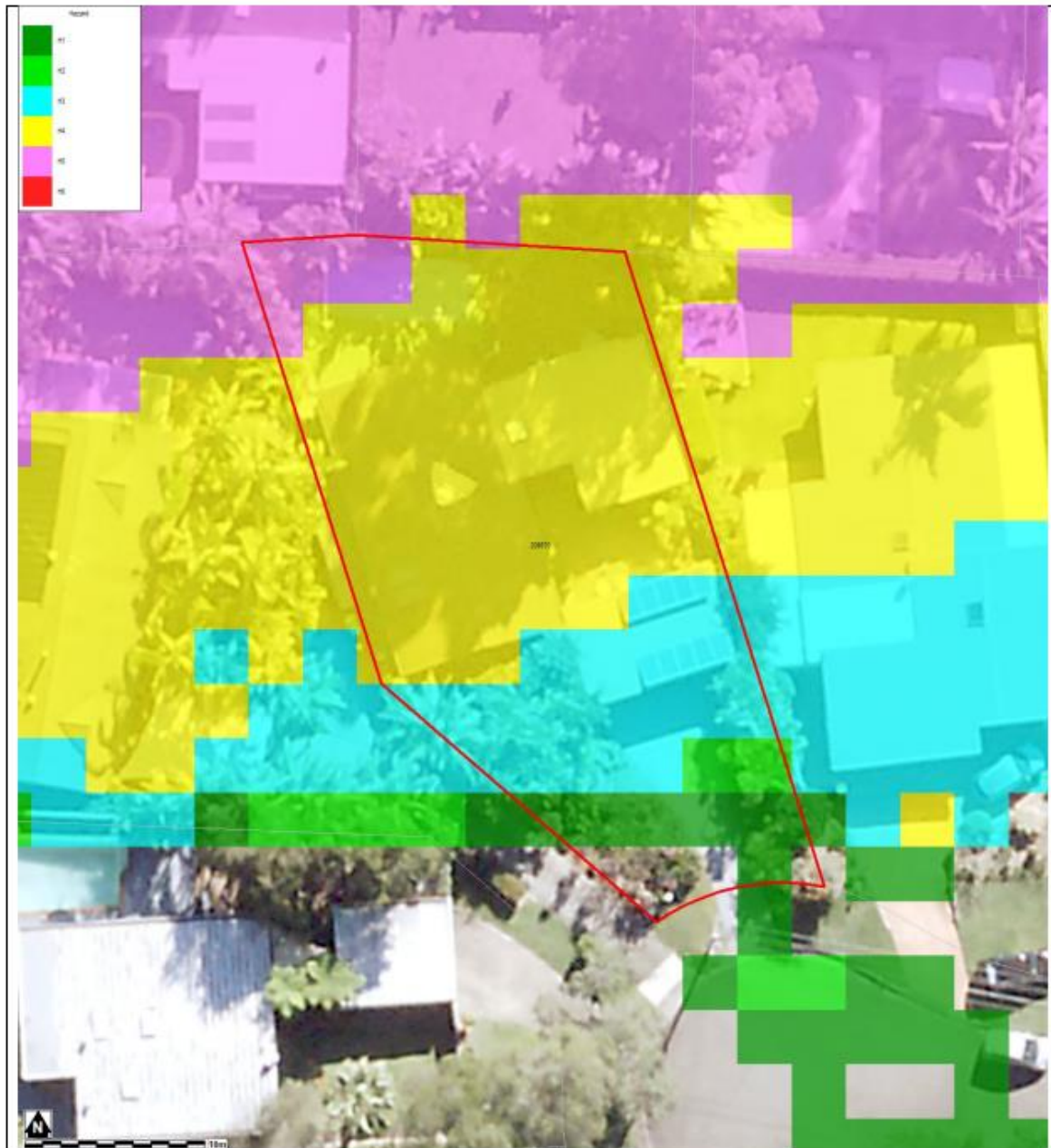


**Notes:**

- 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: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) and aerial photography (Source: NearMap 2014) are indicative only.

*Figure 8 – Flood Information Sheet (Source; Northern Beaches Council Dated 13/07/2021 - Pg 5 of 6)*

## FLOOD MAP E: FLOOD LIFE HAZARD CATEGORY



Notes:

- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) and aerial photography (Source: NearMap 2014) are indicative only.

Figure 9 – Flood Information Sheet (Source; Northern Beaches Council Dated 13/07/2021 – Pg 6 of 6)

