

# **SSDA Flood Statement**

## **253–265 Pacific Highway, North Sydney**

**Prepared for Legacy Property / LegPro 45 Pty Ltd ATF LegPro 45 Unit Trust**

20 June 2025

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## Glossary and Abbreviations

Annual Exceedance Probability	AEP	The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage
Australian Height Datum	AHD	A common national surface level datum often used as a referenced level for ground, flood and flood levels, approximately corresponding to mean sea level.
Average Recurrence Interval	ARI	The long-term average number of years between the occurrence of a flood equal to or larger in size than the selected event. ARI is the historical way of describing a flood event. AEP is generally the preferred terminology.
Bureau of Meteorology	BoM	An executive agency of the Australian Government responsible for providing weather services to Australia and surrounding areas.
Development Control Plan	DCP	A Development Control Plan is a document prepared by the Council which provides detailed guidelines which assist a person proposing to undertake a development. A DCP must be consistent with the provisions and objectives of a Local Environmental Plan (LEP).
Finished Floor Level	FFL	The level, or height, at which the floor of a building or structure (including alterations and additions) is proposed to be built.
Flood hazard		A source of potential harm or a situation with a potential to cause loss of life, injury and economic loss due to flooding. Flood hazard is defined as a function of the relationship between flood depth and velocity.
Flood Planning Level	FPL	The combination of the flood level from the defined flood event and freeboard selected for flood risk management purposes.
Freeboard		A factor of safety typically used in relation to the setting of floor levels or levee crest levels. Freeboard provides a factor of safety to compensate for uncertainties in the estimation of flood levels across the floodplain, such as wave action, localised hydraulic behaviour etc.
Local Environmental Plan	LEP	LEPs provide a framework that guides planning decisions for local government areas through zoning and development controls. Zoning determines how land can be used (for example, for housing, industry, or recreation).
New South Wales State Emergency Service	NSW SES	The NSW SES is an agency of the Government of New South Wales, is an emergency and rescue service dedicated to assisting the community in times of natural and man-made disasters.
Probable Maximum Flood	PMF	The largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain.
Representative Concentration Pathways	RCP	RCPs make predictions of how concentrations of greenhouse gases in the atmosphere will change in future as a result of human activities. The four RCPs range from very high (RCP8.5) through to very low (RCP2.6) future concentrations.

## Severe Weather Warning

The Bureau of Meteorology issues Severe Weather Warnings whenever severe weather is occurring in an area or is expected to develop or move into an area. Severe Weather Warnings are issued for:

- Sustained winds of gale force (63 km/h) or more
- Wind gusts of 90 km/h or more (100 km/h or more in Tasmania)
- Very heavy rain that may lead to flash flooding
- Widespread blizzards in Alpine areas
- Very large waves and high tides expected to cause unusually damaging or dangerous conditions on the coast

## 1.0 Introduction

TTW has been engaged by Legacy Property / LegPro 45 Pty Ltd ATF LegPro 45 Unit Trust to provide flood consultancy services for the proposed development at 253-265 Pacific Highway, North Sydney. The purpose of this report is to outline the existing constraints of flooding and overland flow paths at the site, alongside the likely impact of the proposed new building on flood behaviour, if any. The details of this report are based on currently available information at the time of writing and no modelling have been carried out as part of the assessment.

This Flood Statement has been prepared to accompany a State Significant Development Application (SSDA) for the construction of a mixed-use development with associated works (**SSD-84416958**). The Secretary's Environmental Assessment Requirements (SEARs) for the proposal were issued on 29 May 2025. This report addresses the flood-related SEARs issued for this project, as presented in Table 1.

Table 1: Flood-related SEARs requirements

SEARs No.	Requirements	Report Section
19. Flood Risk	Identify the flood planning area and level as set out in the relevant EPI and other supporting documents to determine; <ul style="list-style-type: none"> <li>The flood extent and velocity up to the Probable Maximum Flood and risk on-site having regard to adopted flood studies and, floodplain risk management studies and plans</li> <li>The site access and egress routes</li> <li>The potential effects of climate change,</li> <li>Any relevant provisions of the NSW Flood Risk Management Manual</li> </ul>	Adopted flood studies are discussed in Section 4.1.  Flood extents and velocities up to the PMF event are presented in Section 4.2.  Site access and egress routes are outlined in Section 6.2 and 6.3.  The potential effects of climate change are discussed in Section 4.3.
	Where the development is occurring on flood prone land a flood impact and risk assessment (FIRA) must be prepared having regard to the <i>Flood Impact and Risk Assessment – Flood Risk Management Guide LU01</i> . When determining the scope and category of the FIRA the requirements outlined in the FIRA guide must be considered.	Flood affectation is discussed in Section 4.2 and Section 5.0.
	Detail any flood risk management measures that are to be incorporated as part of the development having regard to relevant guidelines (including any design solutions, flood modification measures, property modification measures, operational procedures or Flood Emergency Response Plan).	Flood emergency management constraints are considered in Section 6.0.

### 1.1 Reference Documents

The following documents have been reviewed and referenced in preparing this report:

- Australian Institute of Disaster Resilience (AIDR) Guideline 7-3: Flood Hazard (2017);
- Department of Planning, Housing and Infrastructure – Planning Circular PS 24-001, Update on addressing flood risk in planning decisions, 1st March 2024;
- FloodSafe guidelines and the relative FloodSafe Tool Kits;
- North Sydney Council Development Control Plan (DCP) 2013;
- North Sydney Local Environmental Plan (LEP) 2012;
- North Sydney Local Government Area (LGA) Flood Study, 2017;
- North Sydney LGA Wide Floodplain Risk Management Study and Plan (FRMSP), 2022;

- North Sydney Council – [Terminology Index](#);
- NSW Department of Environment and Heritage – Flood Risk Management Guideline LU01, June 2023;
- NSW Department of Planning and Environment (2021) Considering Flooding in Land Use Planning Guideline;
- NSW Department of Planning and Environment (2023) Flood Risk Management Manual <https://www.environment.nsw.gov.au/topics/water/floodplains/floodplain-manual>; and
- NSW Planning Portal Spatial Viewer – <https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>.

## 1.2 Project Description

The SSDA (SSD – 84416958) seeks approval for: the demolition of existing buildings at 253-265 Pacific Highway, and the retention and reuse of the existing local heritage item building at 265 Pacific Highway; the construction of a part 10, part 13 storey, mixed use, shop top housing development including: a 2 storey podium consisting of ground and first storey commercial tenancies, ground level communal open space and deep soil landscaping at 265 Pacific Highway; a tower above consisting of 35 residential apartments and communal roof garden; excavation of four levels of basement level car parking and servicing; and the stratum and strata subdivision of the building.

As part of the proposed residential component, 10 affordable housing apartments are proposed to be provided under Chapter 2 – Infill Affordable Housing under the State Environmental Planning Policy (Housing) 2021 (Housing SEPP).

The proposed ground floor site plan by Nettleton Tribe is shown in Figure 1.

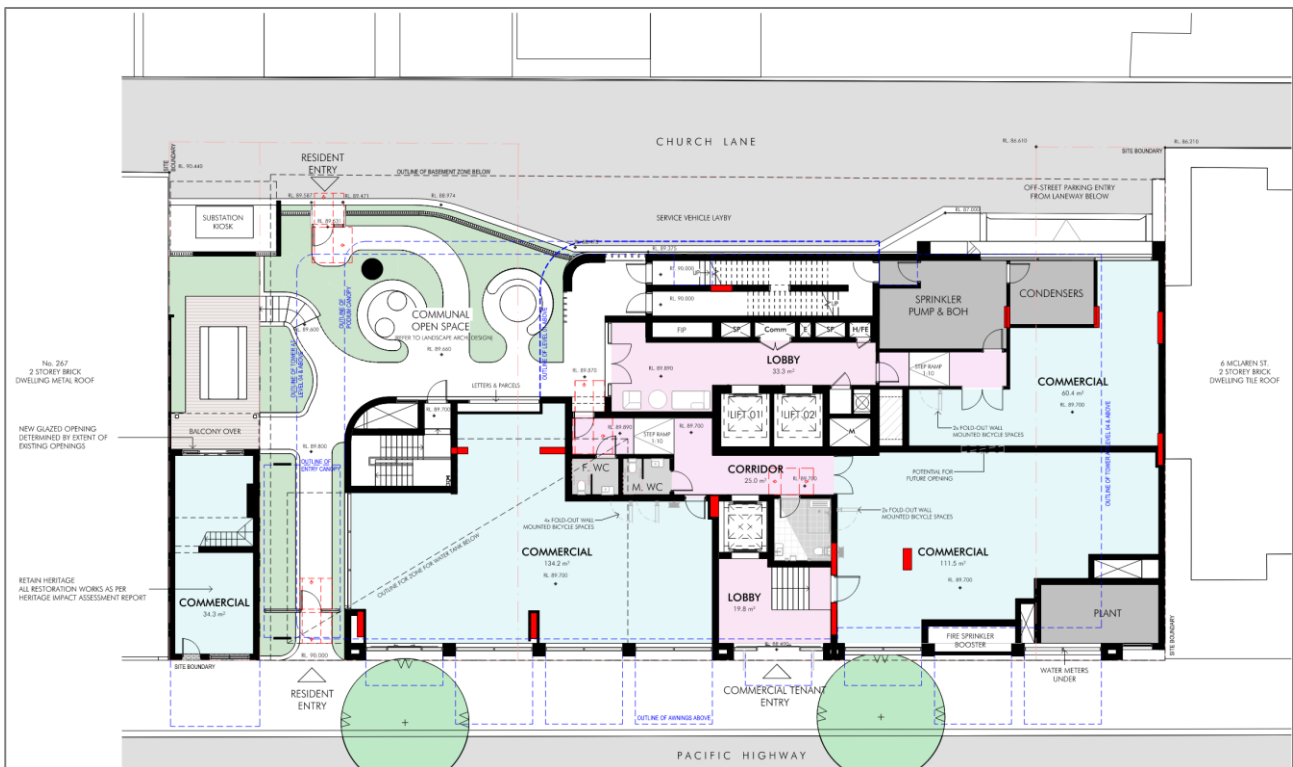


Figure 1: Arch Ground Floor Layout (Source 14344: Ground Floor Plan by Nettleton Tribe, dated 13 June 2025).

## 2.0 Site Description

### 2.1 Site Location

The project site is located at 253-265 Pacific Highway, North Sydney, NSW 2060, within the North Sydney Local Government Area (LGA) and has an approximate area of 1,100m<sup>2</sup>. An aerial photograph of the site is provided in Figure 2. The site is comprised of four lots, legally referred to as follows:

- Lot CP/-/SP16134
- Lot CP/-/SP22870
- Lot 51/-/DP714323
- Lot B/-/DP321904

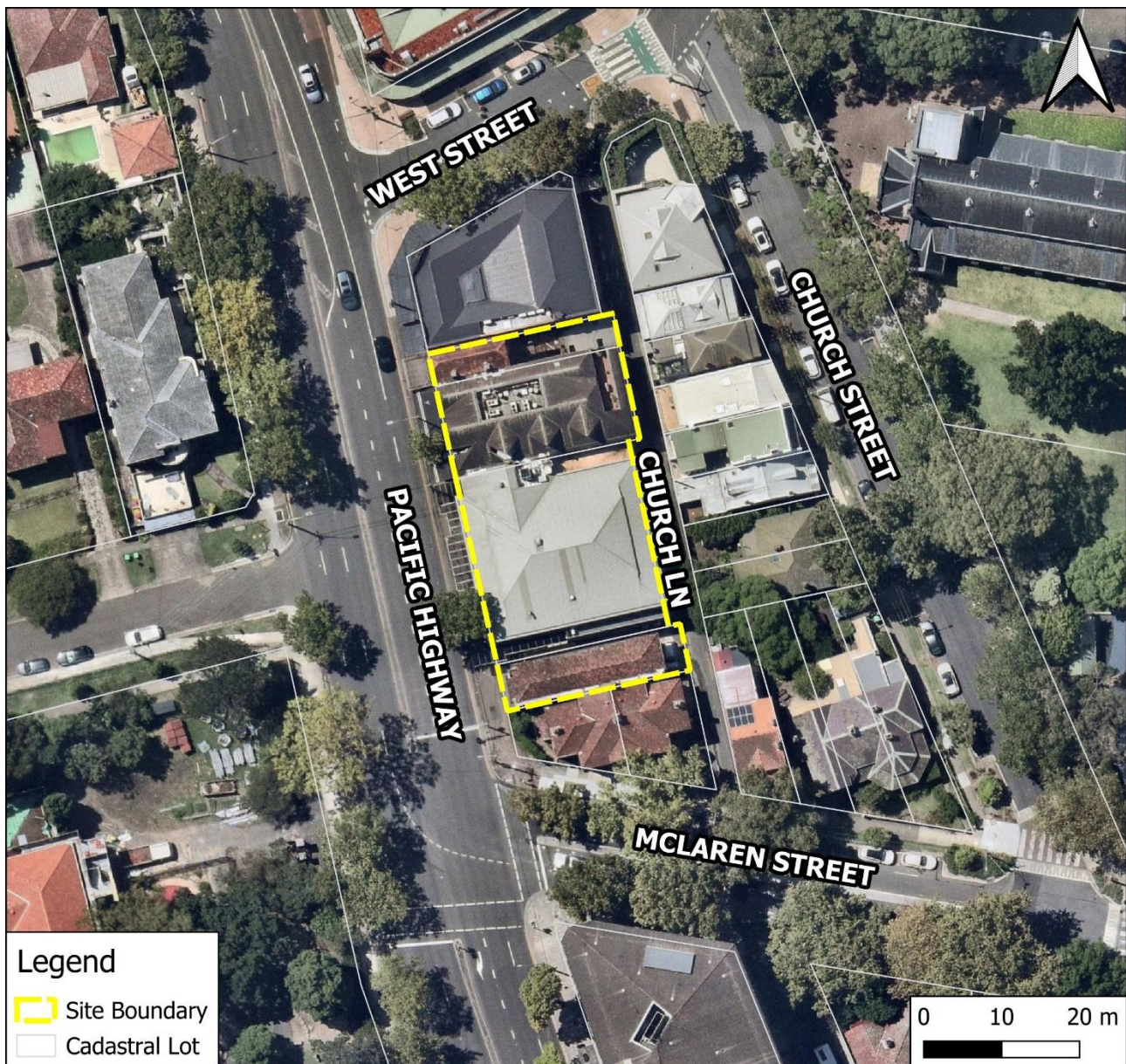


Figure 2: Site location (Source: aerial imagery obtained from Nearmap, dated 20 January 2025)

According to detail and level information collected by Linker Surveying in 2017, the site currently contains four two-storey dwellings. The site has two street frontages, with Pacific Highway bounding the site to the west,

and Church Lane to the east. Two residential properties bound the site's southern border, with a commercial property to the north of the site. The site at 265 Pacific Highway is a locally listed heritage item, I0959 "The Cloisters", a terrace in the Victorian Free Gothic Style.

## 2.2 Site Topography

To assess the topography of wider area, the latest available elevation data (2020) was obtained from the NSW Spatial Services, Elevation Information System (ELVIS), at a spatial resolution of 1 metre.

As presented in the Digital Elevation Model (DEM) in Figure 3, the site is located just south of a catchment crest and is therefore located at the top of the catchment. The overall catchment grades down to the southeast along Pacific Highway in the direction of Sydney Harbour and towards the Warringah Freeway. Flows upstream of the site are generally directed adjacent to the site (i.e. along the Pacific Highway to the west, or along Church Street to the east). As a result, the external upstream catchment area contributing to the site itself is very small and will not produce significant overland flows across the site.

At the site itself, elevation peaks at approximately 90.3m AHD along its northern border, falling to approximately 86.2m AHD at the southeastern boundary (at a 9.7% gradient). The predominant fall from the site is from northwest to southeast. The general slope through the site (north to south) is shown in the elevation profile in Figure 4.

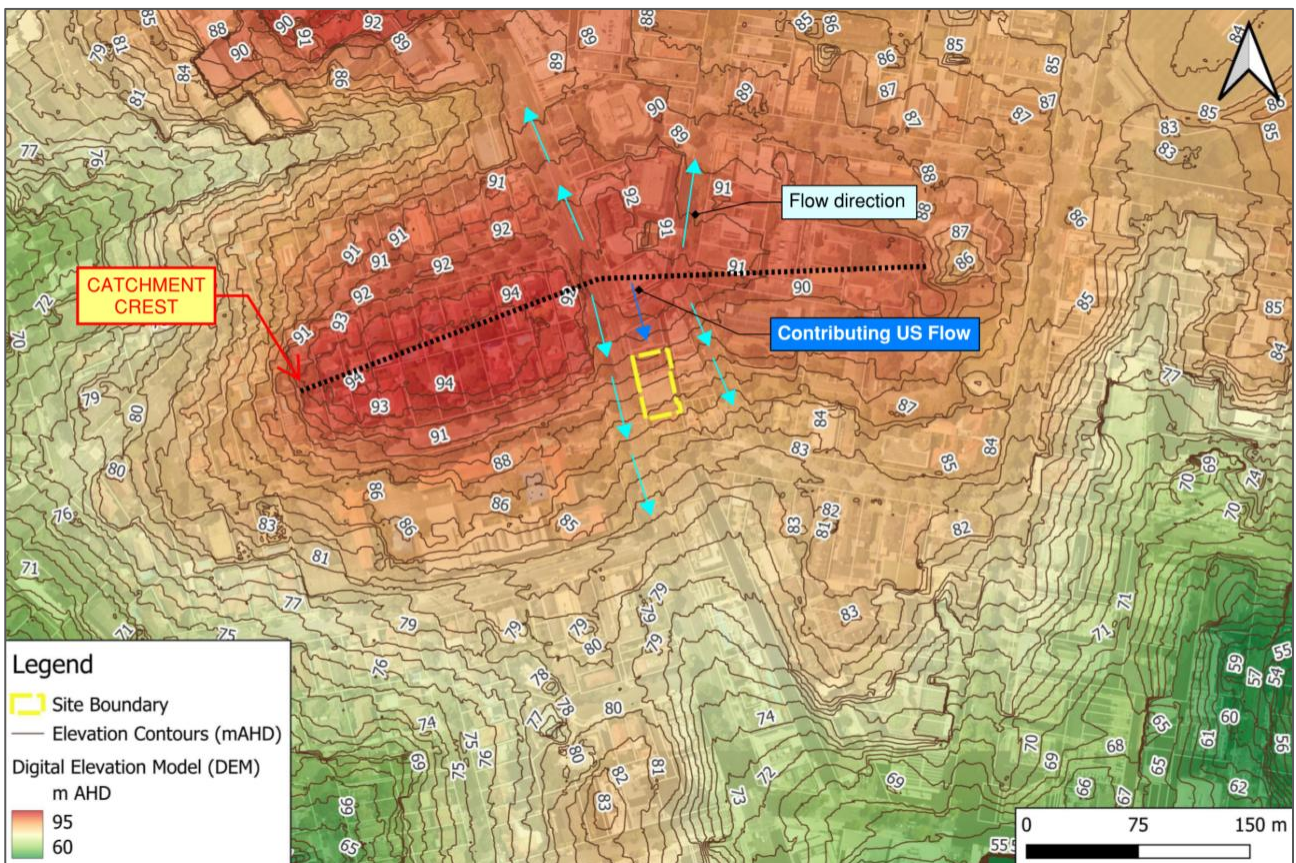


Figure 3: Topography of the site and surrounding area (Source: DEM obtained from ELVIS, 2020)

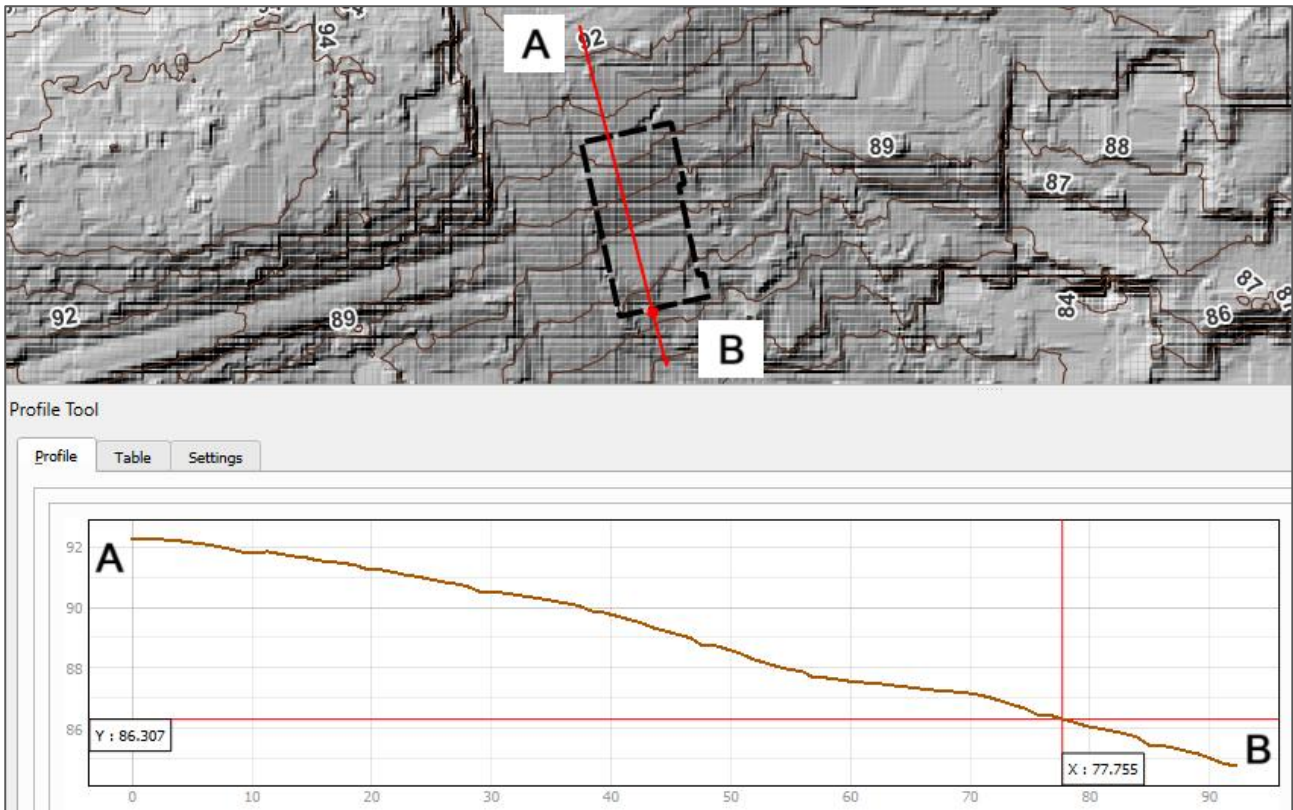


Figure 4: Elevation profile through the site from north to south

### 3.0 Flood Planning Requirements

Flood-related development controls apply to developments on a flood control lot. These are lots identified as being within the Flood Planning Area (FPA).

While flood planning controls are not strictly defined in the North Sydney Development Control Plan (DCP, 2013), the North Sydney Council Terminology Index and the North Sydney LGA-Wide Floodplain Risk Management Study and Plan (FRMSP) (2022) state that the Flood Planning Level (FPL) is the 1% AEP flood level plus a freeboard. An extract from the North Sydney FRMSP is shown in Figure 5, while a definition of the FPL and associated freeboard contained within the North Sydney Council Terminology Index (part of the FRMSP Q&A) is shown in Figure 6.

It is generally accepted that for sites impacted by overland flooding, the **FPL is the 1% AEP flood level plus a 0.3m freeboard**. Due to the higher risk to life associated with basement flooding, basement entrances should be generally protected to the PMF.

**6.7.1.2 Flood Planning Level**

The Flood Planning Level (FPL) is generally used to set minimum building floor levels for new developments, in addition to defining the FPA extent. As discussed in Section 6.7.1.1, whilst an FPL based on the 1% AEP flood level plus 0.5 m freeboard is suitable for mainstream flooding, its application to the North Sydney LGA would be onerous particularly for areas affected solely by overland flow flooding.

While the 1% AEP flood level could be adopted as the baseline for setting the FPL, the freeboard for areas affected by overland flow flooding can be reduced based on the land use type, e.g. lower freeboard for commercial properties could be applied due to lesser flood risk to life when compared to habitable residential properties. The FPL should therefore be defined according to the different land use type within the LGA and incorporated as part of Council's controls including the LEP and DCP. For properties not included as part of the FPA, it may be necessary to enforce a nominal level above surrounding ground for new developments especially those with underground basements. This is done to reduce exposure of the new developments to potential local drainage or stormwater issues which are not the subject of the study herein.

Figure 5: Extract from North Sydney LGA-Wide Floodplain Risk Management Study and Plan, 2022 recommendations on Flood Planning Level

**What is a Flood Planning Level?**

A Flood Planning Level (FPL) is the estimated height of a 1% AEP flood event, with freeboard added (see below). It is used as the basis to determine planning controls for flood control lots.

[top of the page](#)

**What does "freeboard" mean?**

The term "freeboard" is used to describe a safety buffer, to account for unknown factors and uncertainties in the modelling that determines the Flood Planning Level and is typically applied as 0.3 or 0.5m above the 1% AEP Flood Level.

Figure 6: Extract from North Sydney Council Terminology Index (part of the FRMSP Q&A) on Flood Planning Level and freeboard recommendations

## 4.0 Flood Assessment

### 4.1 Previous Studies

North Sydney Council commissioned WMA Water to complete the North Sydney LGA Flood Study in 2017, which assessed flood behaviour and impacts in the area. WMA Water prepared an integrated 1D/2D TUFLOW model to investigate both local overland flooding (inundation by local runoff) and mainstream flooding in North Sydney.

This model was subsequently updated by GRC Hydro in their flood assessment for the 2022 Floodplain Risk Management Study and Plan.

Council have provided TTW with the latest North Sydney LGA TUFLOW model and results (GRC Hydro, December 2022). This has been confirmed by Council as suitable to use for this development and has therefore been used as the basis of the flood assessment completed as part of this report.

### 4.2 Council's Results

The peak flood levels and depths in the area surrounding the site in the 1% Annual Exceedance Probability (AEP) event are shown in Figure 7, while peak flood velocity in the 1% AEP event is depicted in Figure 8.

The site is shown to be flood immune in the 1% AEP event, with only negligible flow depths of approximately 5mm evident along Pacific Highway (southwest of site), increasing to around 100mm in the western road gutter. Peak levels reach 88.5m AHD adjacent to the site. Flow velocities are mostly low at around 0.2 m/s along Pacific Highway, though this similarly increases in the road gutter, peaking at almost 1.4 m/s at the end of McHatton Street to the west.

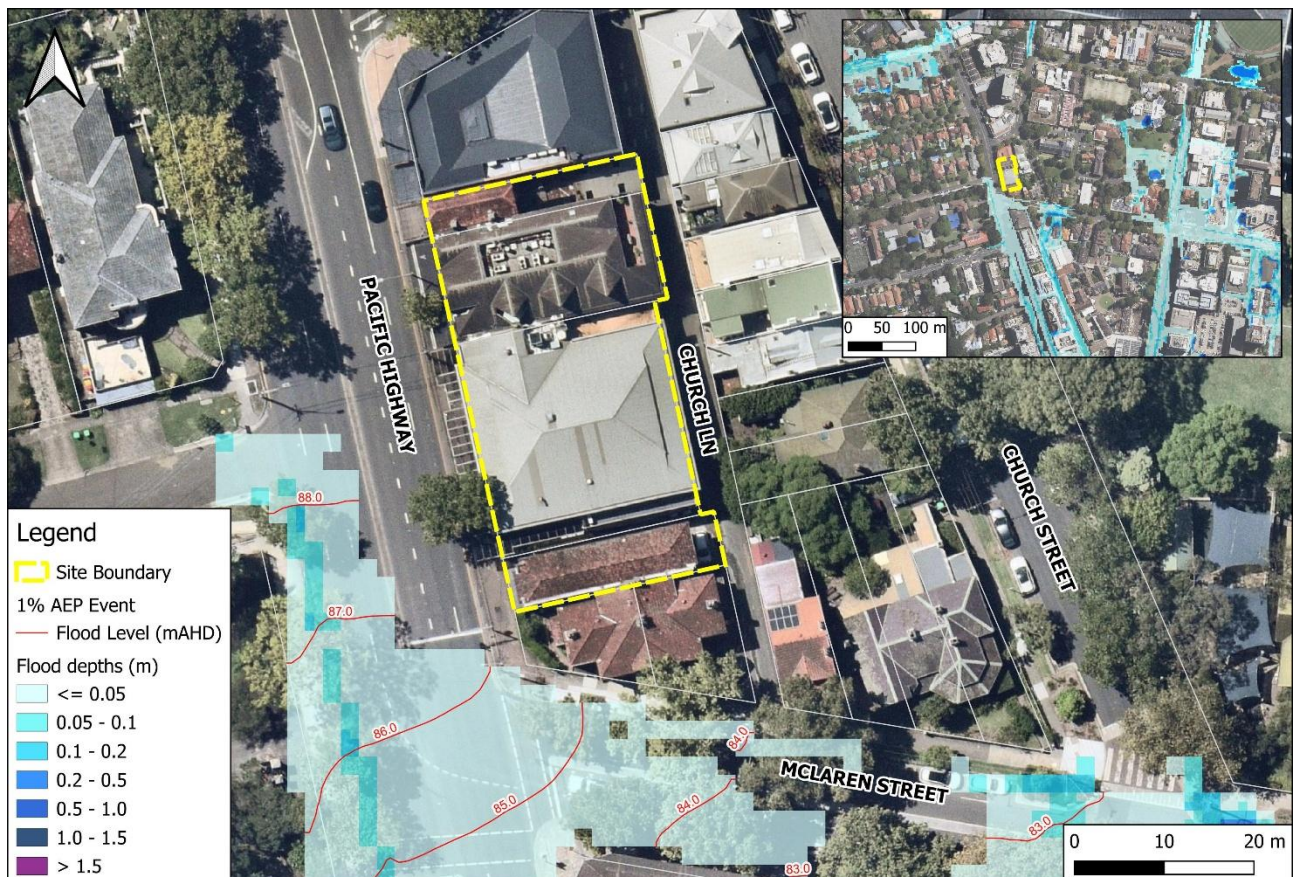


Figure 7: Flood levels and depths around the site area in the 1% AEP event

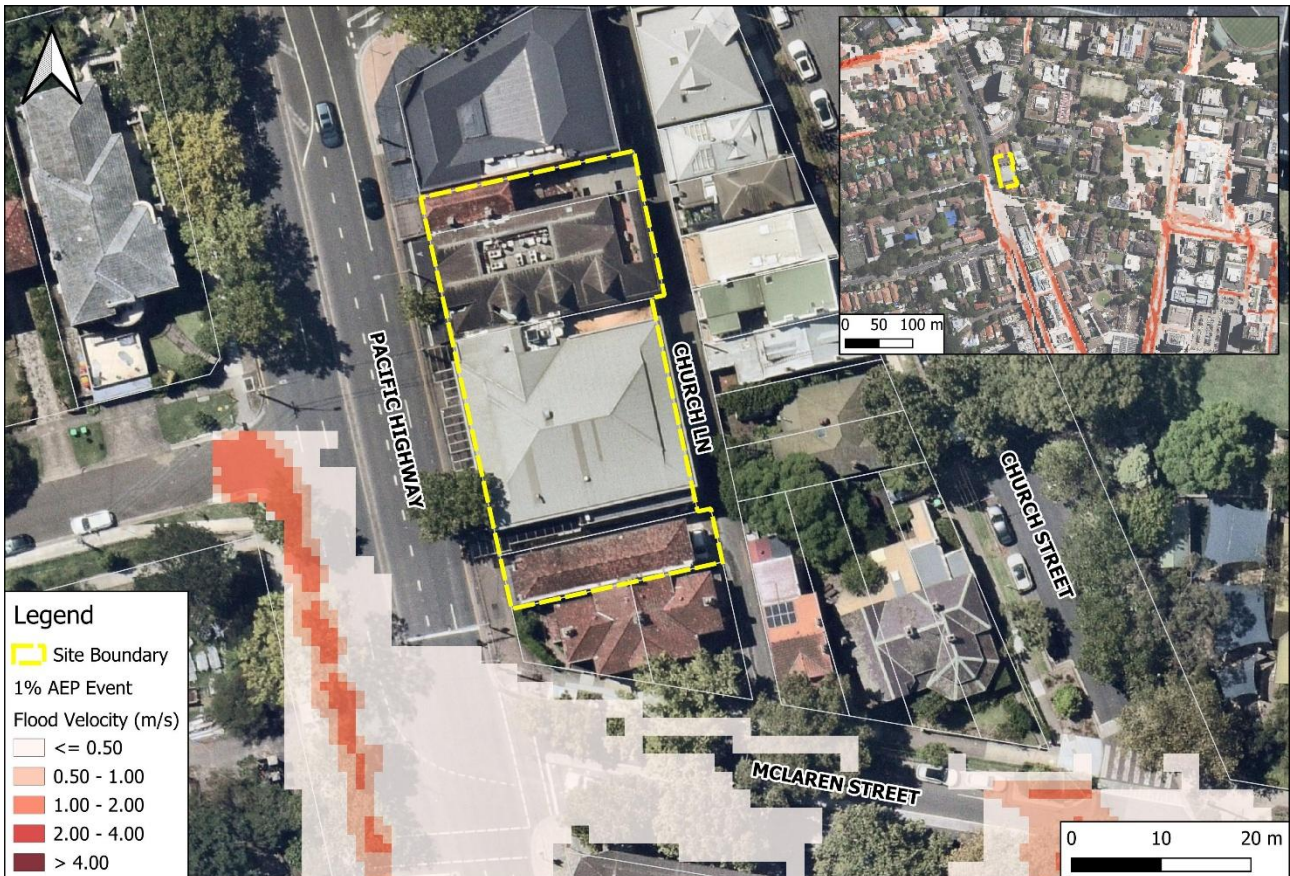


Figure 8: Flow velocity around the site area in the 1% AEP event

The peak flood levels and depths in the Probable Maximum Flood (PMF) event are shown in Figure 9, while peak PMF event flow velocity is depicted in Figure 10. The PMF event is the largest flood event that could conceivably occur at a particular location, based on the most extreme possible combination of meteorological and hydrological conditions.

The PMF event extent is slightly larger than the 1% AEP event, but the site remains well outside the flood-affected area of this event. Flood depths within the Pacific Highway western gutter system has increased with peak depths of approximately 230mm, while flow velocities on McHatton Street increase to around 2.5 m/s.



Figure 9: Flood levels and depths around the site area in the PMF event

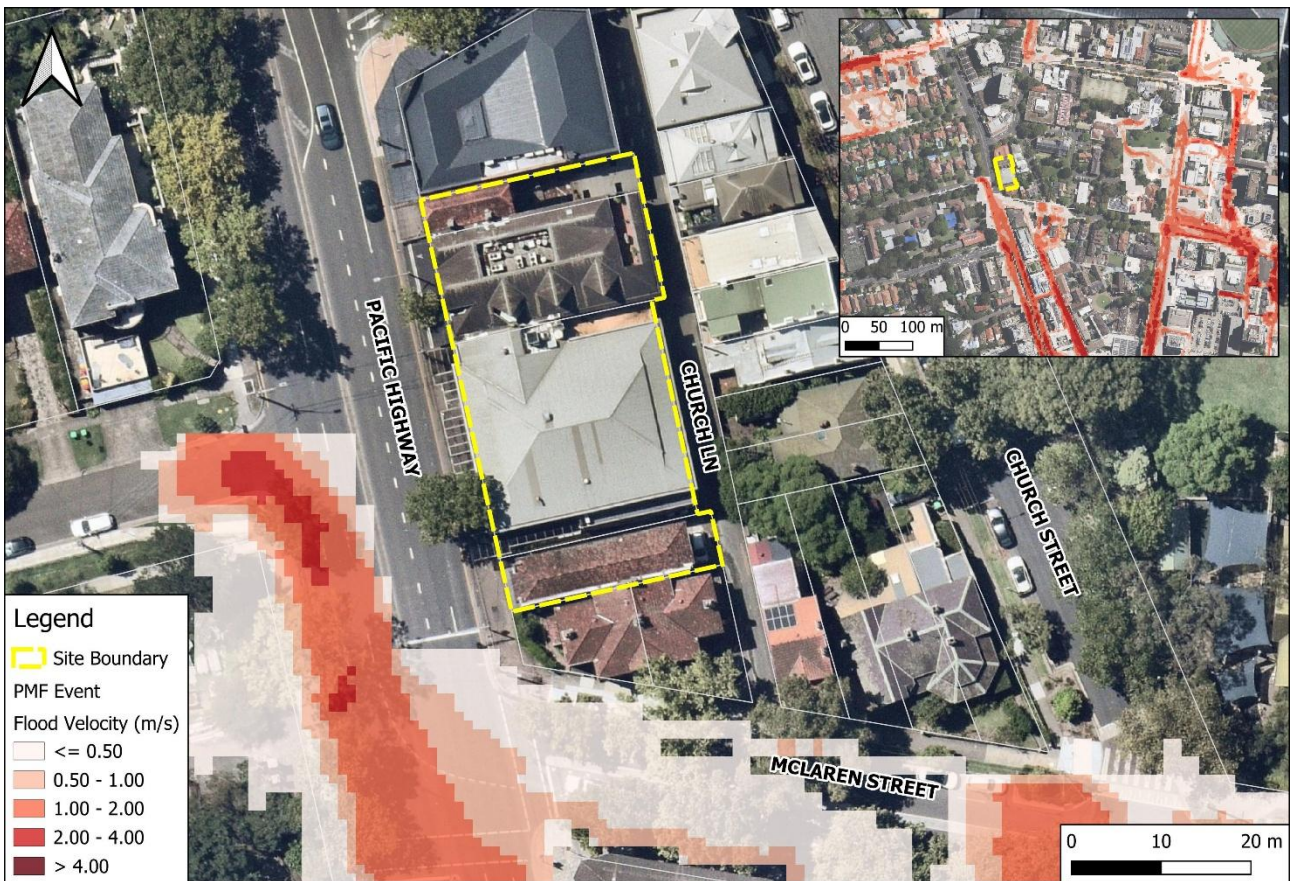


Figure 10: Flood velocity around the site area in the PMF event

### 4.3 Assessment of Climate Change

Climate change is expected to have an adverse impact on the frequency and severity of flood-producing rainfall events, which has the potential to have a significant impact on flood behaviour. As per FB01 (Understanding and Managing Flood Risk) of the Flood Risk Management Guidelines (NSW Department of Planning and Environment, 2023), flood studies under the Floodplain Management Program must consider how changes in flood-producing rainfall events impact on flood behaviour.

The climate change assessment within the North Sydney FRMSP (the latest available flood information for the site) used the Intergovernmental Panel on Climate Change (IPCC) greenhouse gas concentration scenarios to estimate the effect of each scenario on rare rainfall events. The study notes that the ARR2019 methodology recommends the use of RCP4.5 and 8.5 scenarios, which are the least optimistic. The RCP8.5 scenario accounts for a 18.6% increase in rainfall intensity in 2090.

The increase in 1% AEP flood level in the RCP8.5 2090 scenario is shown in Figure 11. Generally, increase in flood level is between +0 – 20mm. Directly adjacent to the site, increases on Pacific Highway and McLaren Street is just 1mm. While there are areas within the North Sydney catchment subject to higher increases, this is generally found to the far southeast (Miller Street, Berry Street) and does not impact upon the site or its potential access and egress routes.



Figure 11: Increase in 1% AEP flood level in the RCP 8.5 2090 scenario

It should be noted that the ARR2019 guidelines were updated on 27<sup>th</sup> August 2024 with new guidance on how to consider climate change when planning for future floods, which includes variable rainfall adjustments based on storm duration. Under the intermediate Shared Socioeconomic Pathway (SSP) 2-4.5, there is a projected 40% increase in rainfall by 2090, which has not been assessed in the FRMSP.

However, it is not anticipated that this would impact on the outcome of this assessment, as the site is shown to be insensitive and outside the PMF extent – defined in the Floodplain Risk Management Manual (2023) as ‘the largest flood that could conceivably occur at a particular location, usually estimated from probable

maximum precipitation coupled with the worst flood-producing catchment conditions'. While the wider site area is sensitive to increase in rainfall intensity as a result of climate change, the flood study shows that the immediate surrounding area of the site is not, and it is anticipated that the site itself will remain flood free in the PMF event after consideration of the effects of climate change.

## 5.0 Compliance with Flood Planning Requirements

Flood-related development controls apply to developments on a flood control lot. These are lots identified as being within the Flood Planning Area (FPA). As noted in Section 3.0, the generally accepted Flood Planning Level is the 1% AEP flood level, plus a 0.3m freeboard for sites impacted by overland flow flooding.

Assessment of the site has found that the site lies above of the Probable Maximum Flood extent, and is therefore not a flood control lot.

A draft Flood Planning Area map was also produced as part of the FRMSP, as shown in Figure 12. This mapping similarly indicates that the site lies outside of the FPA and therefore the site is not subject to the flood planning requirements laid out in Section 3.0.

Similarly, as the site is located outside of the PMF extent, the basement flood planning level requirement also does not apply to the site.



Figure 12: Draft flood planning area map (Source: North Sydney FRMSP, 2022)

## 6.0 Flood Emergency Response Planning

### 6.1 Flood Hazard Assessment

It is important to assess the vulnerability of the wider area in the PMF event for the purpose of flood emergency response planning.

The relative vulnerability of the community to flood hazard has been assessed by using the flood hazard vulnerability curves set out in 'Handbook 7 – Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia' of the Australian Disaster Resilience Handbook Collection (2017). These curves assess the vulnerability of people, vehicles and buildings to flooding based on the velocity and depth of flood flows. The flood hazard categories are outlined in Figure 13, ranging from a level of H1 (generally safe for people, vehicles and buildings) to H6 (unsafe for vehicles and people, with all buildings considered vulnerable to failure). Table 2 outlines the threshold limits for each hazard category.

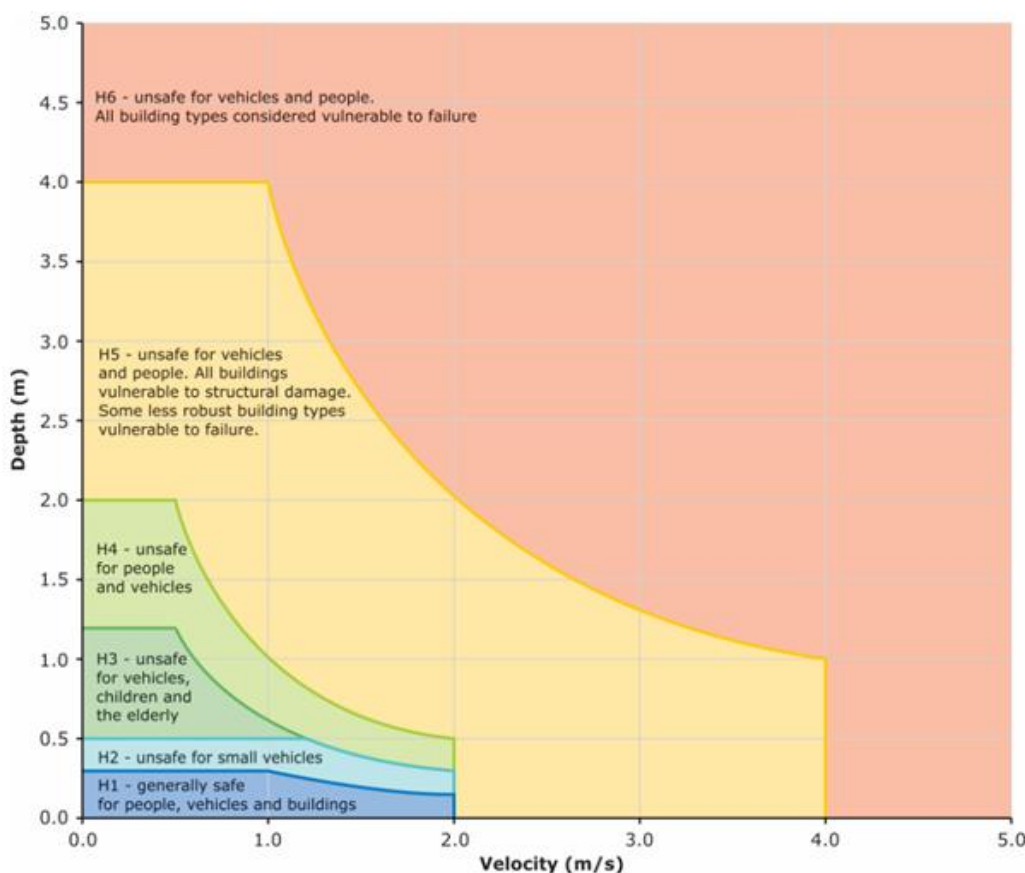


Figure 13: Flood hazard vulnerability curve (Source: Flood Risk Management Guide FB03, DPE, 2022)

Table 2: Hazard vulnerability threshold limits

Hazard	Description	Classification Limit (m2/s)	Limiting still water depth (D) (m)	Limiting velocity (V) (m/s)
H1	Generally safe for people, vehicles and buildings	$D \times V \leq 0.3$	0.3	2.0
H2	Unsafe for small vehicles	$D \times V \leq 0.6$	0.5	2.0
H3	Unsafe for vehicles, children and the elderly	$D \times V \leq 0.6$	1.2	2.0
H4	Unsafe for people and vehicles	$D \times V \leq 1.0$	2.0	2.0
H5	Unsafe for people and vehicles. All buildings vulnerable to structural damage.	$D \times V \leq 4.0$	4.0	4.0
H6	Unsafe for people and vehicles. All building types considered vulnerable to failure.	$D \times V > 4.0$	No Limit	No Limit

## 6.2 Site Access

Figure 14 shows the peak flood hazard in the area surrounding the site in the PMF event.



Figure 14: Peak flood hazard in the wider area in the PMF event.

As evident in Figure 14, the site itself is not impacted in the PMF event and access to and from the site is not cut off at any time, with an accessible, low hazard (H1) route in and out of the site. The site therefore remains

accessible in the peak PMF event and is not isolated. This is corroborated in the North Sydney Floodplain Risk Management Study and Plan (FRMSP) (2022) flood emergency response classification, in which the site is mapped as 'flood free' (refer to Figure 15).

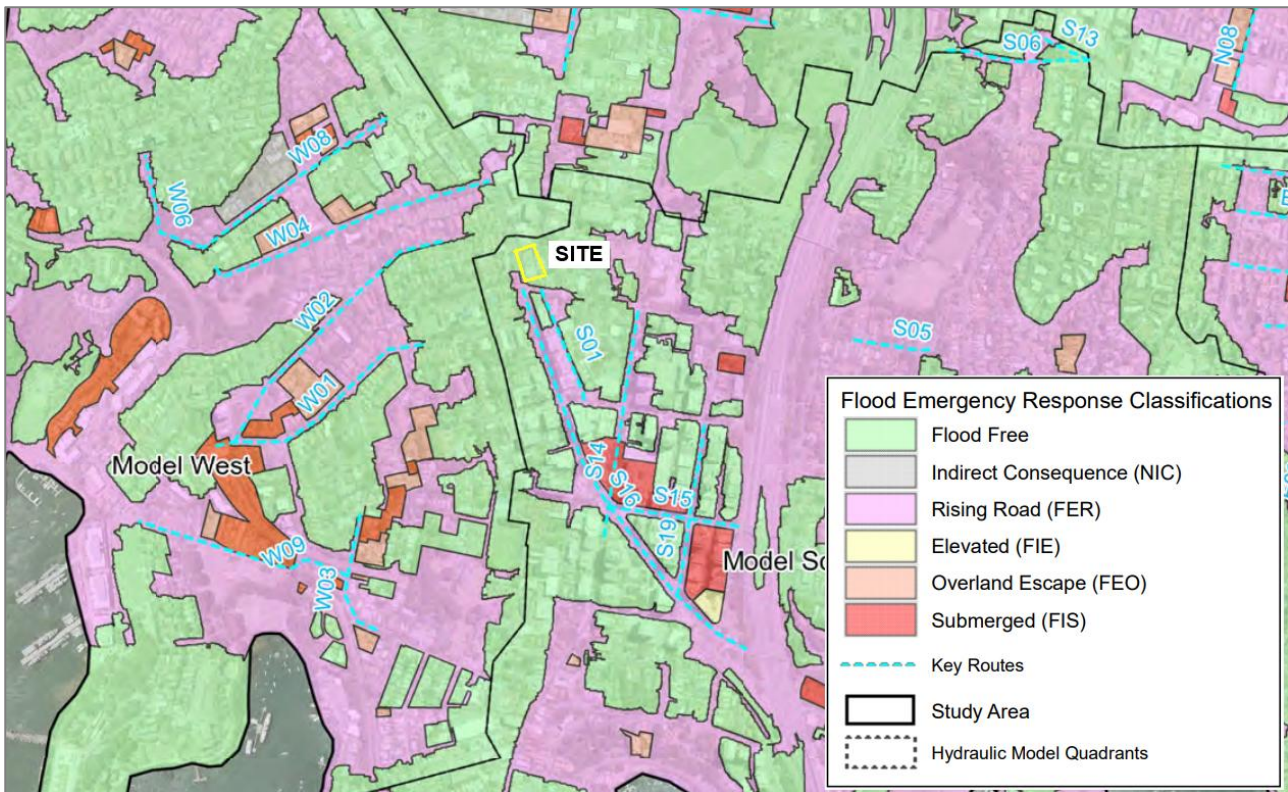


Figure 15: Flood Emergency Response Classification as per the North Sydney Floodplain Risk Management Study and Plan (FRMSP) (2022)

While travel south should be avoided (with H5 hazard along Pacific Highway south of the site, and up to H6 hazard on Mount St and Waringah Freeway), roads remain trafficable to the north and west of the site (via Pacific Highway, Crows Nest Road, Rocklands Road). Some areas of H5 hazard are evident on Hazelbank Road along the kerb and gutter, which should subsequently be avoided in rare storm events, alongside McHattons Steet. Similarly, travel north via West Street should be avoided due to H3 hazard adjacent to Myrtle Street, and H5 hazard evident further north.

The main flood mechanism affecting the surrounding site area is overland flow. This type of flooding is often referred to as “flash flooding” due to short warning times. Typically, this type of flooding rises and recedes over a short period of time and the floodwaters are usually relatively shallow and fast moving. The FRMSP notes that flood events within the catchment are typically of a short duration, and residents are generally safest waiting for floodwater to recede before exiting properties. Therefore, although travel south is impeded due to high hazard, this will only be anticipated for a short duration.

As the site is not impacted by flooding up to the PMF event, and is similarly not cut off in the PMF event, a standalone Flood Emergency Response Plan is not deemed necessary for the site.

### 6.3 Secondary Emergency

While the site is flood free, it is important to consider evacuation potential in the event that there is a secondary emergency (e.g. medical or fire).

As shown in Figure 14, the site has a trafficable route to the Mater Hospital via northward travel on Pacific Highway, and turning left onto Rocklands Road (refer to Figure 14 for location).

If site users need to be evacuated from the site (e.g. in the event of a fire), there are flood free routes to

community centres which have been nominated as evacuation centres. Community centres that are flood free in the PMF were identified in the North Sydney Floodplain Risk Management Study and Plan (FRMSP) (2022) and are outlined in Figure 16. The closest to the site is the Fred Hutley Hall (refer to Figure 14 for location), which is a 1-minute drive from the site, and can be accessed by travelling east on McLaren Street and taking a left turn onto Kelrose Lane.

Infrastructure	Location	Flooded
<b>Crows Nest Centre</b>	2 Ernest Place, Crows Nest	Not flooded
<b>Fred Hutley Hall</b>	200 Miller Street, North Sydney	Not flooded
<b>Neutral Bay Community Centre</b>	190-192 Military Road, Neutral Bay	Not flooded
<b>Kirribilli Neighbourhood Centre</b>	16-18 Fitzroy Street, Kirribilli	Not flooded

Figure 16: Evacuation Centres for North Sydney as identified in North Sydney FRMSP.

## 7.0 Conclusions and Recommendations

TTW have reviewed the results of Council's Floodplain Risk Management Study and Plan (2022) hydraulic modelling. The following conclusions have been drawn:

- The site is located at the top of the catchment. Therefore, it is anticipated that overland flow would be minimal given the small upstream catchment area that contributes excess rainfall runoff to the site.
- The site is shown to be located above the Probable Maximum Flood event extent.
- The site is therefore not subject to the flood planning controls laid out in the North Sydney FRMSP.
- The site is not cut off in the PMF event, with access to/egress from the site possible even during the peak of the event.
- There is a trafficable route to both the Mater Hospital and the nearest evacuation centre in the event of a secondary emergency (e.g. medical or fire).

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