van der meer

FLOODPLAIN MANAGEMENT REPORT

Residential Development

22 Raglan Street

Manly NSW 2095

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Position:	Civil Manager
Qualifications:	B.Eng, M.I.E.Aust, NER.
Signed:	
Date:	15/12/2022
Job No:	SY222-012

REVISION STATUS

Revision	Description of Revision	Date	Issued By:
A	For DA	15 December 2022	Phillip Salem

Recipients are responsible for eliminating all superseded documents in their possession.

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1 Contents

2 Executive Summary

In response to the email dated 7th November 2022 Ref: RE: Proposal - 22-24 Raglan St, Manly, this report has been prepared to address the relevant Flood risk management of the proposed development at 22-24 Ragland Street, Manly.

This report assesses the Flood risk to the proposed development at 22-24 Raglan Street, Manly for compliance with the Northern Beaches Council Warringah Development Control Plan.

The proposed development is a residential development with a Retail/Community area in the front, which occupies a single dwelling residence.

The Flood impact assessment shows that Flooding is confined to the frontage of the site. No changes to the existing Flood extents are expected due to the development of the existing dwelling since the building footprint is remaining the same.

The proposed floor levels and basement vehicular access ramp crest level are to be compliant with the Flood Planning Level being RL 6.09. The proposed finished floor levels of the car ramp crest and building lobby are to be placed at RL 6.10, with the Retail/Community space located at RL 5.82 so as not to impede accessibility from the Raglan Street.

Flooding is not anticipated in the basement due to the proposed passenger lift and car park ramp crest being higher than the Flood planning level.

The proposed building is also to be Floodproofed in its structure, materials, and utilities connections up to the Flood Planning Level as detailed in this report.

3 Introduction

Van Der Meer Consultants has been engaged to prepare a Flood Risk Management Report in accordance with the requirements of Northern Beaches Council's 'Water Management for Development Policy'.

In the preparation of this memo Van der Meer has relied upon certain data and information contained within the following documents:

- Architectural Plans prepared by Carlisle Architects, Dated 03.11.2022
- Northern Beaches Council Warringah DCP 2022.
- Northern Beaches Council Warringah LEP 2022.
- Northern Beaches Flood Risk Management Policy 2017
- Northern Beaches Flood Prone Land Design Standard 2017
- Manly to Seaforth Flood Study, Cardno, doc number NA49913018, dated 22nd February 2019
- Northern Beaches Council Flood information report - comprehensive, issue date 14/11/2022.
- 'Technical Flood risk management guideline: Flood hazard' published by the Attorney-General's Department, dated 2014.
- Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas published by the Hawkesbury-Nepean Floodplain Management Steering Committee (HNFMSC), dated 2006.
- 'Floodplain Development Manual: the management of Flood liable land' published by NSW Department of Infrastructure, Planning and Natural Resources (NSW DIPNR), dated April 2005.

The purpose of this report is to provide the Norther beaches Council with sufficient information to assess the proposed development which is located on Flood affected lands.

4 Description of Development

4.1 Existing Site

The subject site area is approximately 713m^2 and faces south onto Raglan St. Currently, the site is utilised by a three-storey residential dwelling, the site being mostly developed, and relatively flat. The site is bounded by residential and commercial buildings on the other cardinal directions.

The location of the subject site shown in Figure 4.1 below.

Figure 4.1 – Site Plan (Google Maps, 2022)

4.2 Proposed Works

The proposed development is located at 22-24 Raglan St Manly. The site is located on Raglan Street near the beach and adjacent to the intersection between Raglan Street and Belgrave Street and is located amongst mixed use commercial/residential blocks.

Figure 2.1: Proposed Development Raglan St Render

Figure 2.2: Proposed Development Roof Plan

The works consist of a knockdown and rebuild of the mostly residential, 3 floor building, with a retail and/or community space in the front of the building.

4.3 Building Components and Method

The proposed development is to be constructed from Flood compatible materials below 6.09m AHD. Extensive guidance on Flood compatible building materials and methods is provided in 'Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas' (HNFMSC, 2006); a selection of the Flood compatible materials and practices described in this resource, supplemented by advice contained within Norther Beaches DCP Chapter 5.4.3: Flood Prone Land states that: B1) All buildings shall be designed and constructed with Flood compatible materials in accordance with "Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas", Hawkesbury-Nepean Floodplain Management Steering Committee (2006). B2) All new development 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. Where shelter-in-place refuge is required, the structural integrity for the refuge is to be up to the Probable Maximum Flood level. Structural certification shall be provided confirming the above. And B3) 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 – Note that this mostly relates to the Retail/Community space. All existing electrical equipment and power points located below the Flood Planning Level within the subject structure must have residual current devices installed that turn off all electricity supply to the property when Flood waters are detected.

Generally, Flood compatible floor and sub-floor materials include reinforced or mass concrete, masonry, and selected types of timber. Suspended timber sub-floor structures constructed of Class 1 (highly durable), Class 2 (durable) or H3 treated timber are Flood compatible; however engineered timber products should not be used unless certified by the manufacturer as being suitable for 96-hour immersion. Hardwood strip flooring with low shrinkage rates is recommended for a timber floor option, with the next best option being marine or exterior grade plywood. Particleboard flooring is not a Flood compatible material. Adequate ventilation

needs to be provided to timber floors to allow the timbers to dry after Flood events to minimise long term timber damage; this may require any under floor insulation to be removable in the event of Floodwaters reaching the insulation.

Suitable wall structure materials include solid brickwork, blockwork, concrete, timber stud walls constructed from Class 1 (highly durable), Class 2 (durable) or H3 treated timber, and steel frames. Steel frames should be constructed of open sections where possible and have holes drilled into the bottom steel plates to allow water to drain from the frame in the event of immersion.

Flood compatible wall linings include fibre-cement board, brick, concrete (including concrete blocks), stone with waterproof grout, clay tiles glazed with waterproof mortar, glass (including glass blocks), plastic sheeting with waterproof adhesive, steel with waterproof applications, exterior grade plywood, and fully sealed solid wood products. Plasterboard is not a Flood compatible material as it requires replacement after extended immersion, however for shallow and short duration Floods there may be little damage to plasterboard wall linings. It is recommended that sheet wall linings be installed horizontally with a 20-30 mm gap provided between the bottom wall plate and the base of the wall lining to facilitate ventilation and cleaning of the wall cavity after a Flood event. The gap may be covered with skirting board when access to the wall cavity is not required.

Insulation should be closed cell type foam. Nails, bolts, hinges and fittings should be made from nylon, brass, stainless steel or hot dipped galvanised steel. Hinges should be of a removable pin type.

Connection to mains power supply, including metering equipment should be located above 6.09 m AHD. All electrical wiring, switches and outlets should, where possible be located above 6.09 m AHD. Note that systems located in the basement are considered above the FPL due to the car ramp crest being above the FP at RL 6.10. Earth core leakage systems or safety switches are to be installed. All wiring, connections, and conduit below 6.09 m AHD should be suitable for submergence in water. Conduits shall be installed so they will be self-draining in the event of Flooding.

Heating and air-conditioning systems, including fuel supply and ducting, should be installed above 6.09 m AHD - Note that systems located in the basement are considered above the FPL due to the car ramp crest being above the FP at RL 6.10. Where this is not possible, they should be installed in such a manner as to minimise damage from submersion. This may be achieved through measures such as access for cleaning and draining of water after Flood events, manually operated cut off valves for fuel supply lines and ducts, securely fastening heating equipment and fuel storage tanks to prevent buoyancy and movement and venting of fuel supply tanks at an elevation of 7.10 m AHD.

4.4 Evacuation

The State Emergency Service of NSW (SES) is responsible for providing Flood updates which can be received by local, radio and television news and SMS messaging. The timing for evacuation of persons is to be established in consultation with the SES.

As the site is located within the Medium Flood Risk Precinct (Northern Beaches Council (2022)) which describes Medium Flood Risk precincts as “not subject to a High Hydraulic Hazard and where there are no significant evacuation difficulties”. As such, evacuation from site is considered possible.

People in the proposed development should evacuate the building and head to the Manly Bowling Club Parking Area see the markup in Figure 1 below:

Figure 1.4 – Evacuation Route and Safe Space

5 Flood Analysis

The site is subject to Flooding from an overland flow path. Overland flows pass the site via Raglan Street towards Manly beach. Flooding within the Manly catchment is the subject of (Manly to Seaforth Flood Study, 22nd February 2019, Cardno).

The nature of Flooding at the site has been identified as overland flow in an east to west direction. Flows originate from a catchment located up raglan street to the east.

The site falls within the Medium Flood Risk Precinct (Cardno 2019) with the localised regions of the frontage on Raglan Street within the Low Flood Risk Precinct.

The PMF Floodwaters impact the site at elevations ranging between 6.04 m AHD and 6.13 m AHD (Cardno 2019), resulting in inundation of the site to depths within to 0.23 m. The 1% AEP Floodwaters information at the site has not been provided in the (Northern Beaches Council Flood Information Report, 2022), however the 1% AEP level is assumed to be 0.5m below the Flood Planning Level of 6.29 m, therefore at 5.79m. Additionally, as the As the overland flow depth is less than 0.3 m and the V.D product is less than 0.3 m^2/s, a freeboard of 0.3 m ca be adopted, resulting in a Flood planning level of 6.09 m.

As described above, the Flood Planning Level (FPL) for the proposed development is approx. 6.09 m AHD, providing 0.3 m freeboard to the 1% AEP Floodwaters, in accordance with the (Northern Beaches Council, Flood Information Report, 2022).

It is noted that Retail/Community Space (RL 5.82) is below the Flood Planning Level, however it is above the 1% AEP Peak Flood extent. The space was kept below the FPL to maintain accessibility from the footpath on the frontage of Raglan St. There is section of the DCP (section G1 part 4: Requirements – Retail Activation **-** 8) which conceptually related to the community/retain space which states: *Except where required by Flood planning level provisions, ground floor uses are to be at the same level as the footpath at the entry to the individual tenancies.* However, this sections only applies the Dee Why Town centre special control area, but the principle here is the same since we have the Retail/community space at the front of the site.

The Northern beaches DCP also states under Section D18 Accessibility and Adaptability: –*" Requirements: 1. The design is to achieve a barrier free environment with consideration given to the design of door handles and switches, entrances, and corridors. Steep, rough, and slippery surfaces, steps and stairs and narrow paths should be avoided.2. There are to be continuous, independent, and barrier-free access ways incorporated into the design of buildings.3. Pathways are to be reasonably level with minimal cross fall and sufficient width, comfortable seating, and slip-resistant floor surfaces.4. Where there is a change of level from the footpath to commercial or industrial floor levels, ramps rather than steps should be incorporated".* The intention of the current design of the Retail/Community space is to facilitate access from the footpath, and elevating the space to above FFL would require an internal ramp within the property, the space to accommodate this is not considered feasible given the other design consideration.

Figure 5.1 – 1% AEP Peak Flood Extent (Manly to Seaforth Flood Study, Cardno, doc number NA49913018, dated 22nd February 2019)

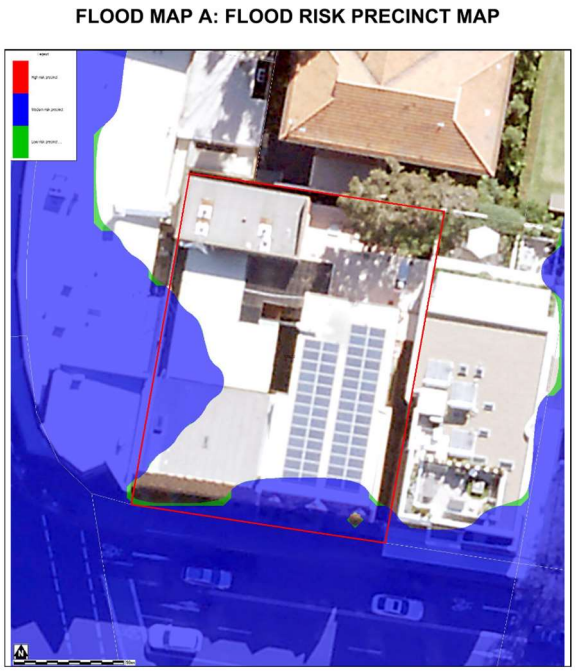

Figure 5.2 – Flood Risk Precinct Map (Manly to Seaforth Flood Study, Cardno, doc number NA49913018, dated 22nd February 2019)

FLOOD LEVEL POINTS

Flood Levels

ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	6.29	6.04	0.19	0.19
3	N/A	N/A	N/A	N/A	N/A	6.34	6.13	0.23	0.19
4	N/A	N/A	N/A	N/A	N/A	6.34	6.13	0.28	0.16

WL – Water Level
PMF – Probable Maximum Flood
N/A = no peak water level/depth/velocity available in flood event

Figure 5.3 – Flood Level Location Map and Floor Level Data Table (Manly to Seaforth Flood Study, Cardno, doc number NA49913018, dated 22nd February 2019)

Note that locations 3 and 4 shown above are protected both by the existing commercial building adjacent and the proposed rear garden masonry boundary walls which are approx. 1m high.

6 Assessment of Impacts

The Manly DCP specifies prescriptive controls for development on Flood prone land, which vary depending on Flood risk and land use. The highest Flood risk for the site of the proposed development is medium risk (Cardno, 2019) and the proposed land use is predominantly residential.

The controls that apply to the proposed development, their impacts on the development, and the proposed development's compliance with these controls are listed in Table 6.2 below

		Medium Flood Risk Precinct				
		Vulnerable & Critical Use	Residential Use	Business & Industrial Use	Recreational & Environmental Use	Subdivision & Civil Works
A	Flood effects caused by Development	A1 A2	A1 A2	A1 A2	A1 A2	A1 A2
B	Building Components & Structural	B1 B2 B3	B1 B2 B3	B1 B2 B3	B1 B2 B3	
C	Floor Levels	C2 C3	C1 C3 C4 C6	C1 C3 C4 C6 C7	C3	C5
D	Car Parking	D1 D2 D3 D4 D7	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1
E	Emergency Response	E1 E2	E1	E1	E1	E3
F	Fencing	F1	F1	F1	F1	F1
G	Storage of Goods	G1	G1	G1	G1	
H	Pools	H1	H1	H1	H1	H1

Figure 6.1 – Flood Prone Land Matrix Requirements Manly DCP 2022

Table 6.2 – Flood Risk Management Compliance Table

Item	Description	Impact on Development	Compliance
A. FLOOD EFFECTS CAUSED BY DEVELOPMENT			
A1	Development shall not be approved unless it can be demonstrated in a Flood Management Report that it has been designed and can be constructed so that in all events up to the 1% AEP event: (a) There are no adverse impacts on Flood levels or velocities caused by alterations to the Flood conveyance; and (b) There are no adverse impacts on surrounding properties; and	A) No building footprint change – and OSD has been provided. B) Street levels are unchanged and OSD is provided meaning no adverse impacts	Yes

Item	Description	Impact on Development	Compliance
	(c) It is sited to minimise exposure to Flood hazard. Major developments and developments likely to have a significant impact on the PMF Flood regime will need to demonstrate that there are no adverse impacts in the Probable Maximum Flood.	to surrounding properties. C) Minimal and only exposure in on the Raglan St frontage.	
A2	Development shall not be approved unless it can be demonstrated in a Flood Management Report that in all events up to the 1% AEP event there is no net loss of Flood storage. Consideration may be given for exempting the volume of standard piers from Flood storage calculations. If Compensatory Works are proposed to balance the loss of Flood storage from the development, the Flood Management Report shall include detailed calculations to demonstrate how this is achieved.	Building footprint remain unchanged, there is no net loss of flood storage, in addition an OSD is provided in the proposed plans.	Yes
B. BUILDING COMPONENTS AND STRUCTURAL SOUNDNESS			
B1	All buildings shall be designed and constructed with Flood compatible materials in accordance with "Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas", Hawkesbury-Nepean Flood plain Management Steering Committee (2006).	Confirmed.	Yes
B2	All new development must be designed and constructed to ensure structural integrity up to the Flood Planning Level, taking into account the forces of Flood water, wave action, flowing water with debris, buoyancy and immersion. Where shelter-in-place refuge is required, the structural integrity for the refuge is to be up to the Probable Maximum Flood level. Structural certification shall be provided confirming the above.	Confirmed	Yes
B3	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 within the subject structure must have residual current devices installed that turn off all electricity supply to the property when Flood waters are detected.	Confirmed – this note relates mainly to the Retail/Community Space which has been placed below the FPL so as not to restrict access.	No
C. FLOOR LEVELS			
C1	New floor levels within the development shall be at or above the Flood Planning Level.	Main Building lobby entry, passenger lift, and	No

Item	Description	Impact on Development	Compliance
		basement carpark entry are all above the FPL. The Retail/Community space has been placed adjacent to the footpath level, which is below the FPL, in order not to restrict access and increase functionality.	
C4	A one-off addition or alteration below the Flood Planning Level of less than 30 square metres (in total, including walls) may be considered only where: (a) it is an extension to an existing room; and (b) the Flood Planning Level is incompatible with the floor levels of the existing room; and (c) out of the 30 square metres, not more than 10 square metres is below the 1% AEP Flood level. This control will not be permitted if this provision has previously been utilised since the making of this Plan. The structure must be Flood proofed to the Flood Planning Level, and the Flood Management Report must demonstrate that there is no net loss of Flood storage in all events up to the 1% AEP event.	NA	NA
C6	Consideration may be given to the retention of an existing floor level below the Flood Planning Level when undertaking a first-floor addition provided that: (a) it is not located within a Flood way; and (b) the original foundations are sufficient to support the proposed final structure above them. The Flood Management Report must include photos and the structural certification required as per Control B2 must consider whether the existing foundations are adequate or should be replaced; and (c) none of the structural supports/framing of existing external walls (d) the ground floor is Flood proofed.	NA	NA
D. CAR PARKING			
D1	Open carpark areas and carports shall not be located within a Flood way.	NA	NA
D2	The lowest floor level of open carparks and carports shall be constructed no lower than the natural ground levels, unless it can be shown that the carpark or carport is free draining with a grade greater than 1% and that Flood depths are not increased.	NA	NA
D3	Carports must be of open design, with at least 2 sides completely open such that flow is not obstructed up to the 1% AEP Flood level. Otherwise	NA	NA

Item	Description	Impact on Development	Compliance
	it will be considered to be enclosed. When undertaking a like-for-like replacement and the existing garage/carport is located on the street boundary and ramping is infeasible, consideration may be given for dry Flood proofing up to the 1% AEP Flood level.		
D4	Where there is more than 300mm depth of Flooding in a car park or carport during a 1% AEP Flood event, vehicle barriers or restraints are to be provided to prevent floating vehicles leaving the site. Protection must be provided for all events up to the 1% AEP Flood event	NA	NA
D5	Enclosed Garages must be located at or above the 1% AEP level	Basement carpark entry crest is above the FPL.	Yes
D6	All enclosed car parks (including basement carparks) must be protected from inundation up to the Flood Planning Level. All access, ventilation, driveway crests and any other potential water entry points to any enclosed car parking shall be above the Flood Planning Level. Where a driveway is required to be raised it must be demonstrated that there is no net loss to available Flood storage in any event up to the 1% AEP Flood event and no impact on Flood conveyance through the site. Council will not accept any options that rely on electrical, mechanical or manual exclusion of the Flood waters from entering the enclosed carpark	Basement carpark entry crest is above the FPL.	Yes
E. EMERGENCY RESPONSE			
E1	If the property is affected by a Flood Life Hazard Category of H3 or higher, then Control E1 applies and a Flood Emergency Assessment must be included in the Flood Management Report. If the property is affected by a Flood Life Hazard Category of H6, then development is not permitted unless it can be demonstrated to the satisfaction of the consent authority that the risk level on the property is or can be reduced to a level below H6 or its equivalent. If the property is Flood affected but the Flood Life Hazard Category has not been mapped by Council, then calculations for its determination must be shown in the Flood Management Report, in accordance with the "Technical Flood Risk Management Guideline: Flood Hazard", Australian Institute for Disaster Resilience (2012). Where Flood-free evacuation above the Probable Maximum Flood level is not possible, new development must provide a shelter-in-place refuge where: a) The floor level is at or above the Probable Maximum Flood level; and b) The floor space provides at least 2m2 per person where the Flood duration is long (6 or more hours) in the Probable Maximum Flood event, or 1m2 per person for less than 6	NA – Expected to be H1 Flood Life Hazard Category.	NA

Item	Description	Impact on Development	Compliance
	hours; c) It is intrinsically accessible to all people on the site, plainly evident, and self-directing, with sufficient capacity of access routes for all occupants without reliance on an elevator; and d) It must contain as a minimum: sufficient clean water for all occupants; portable radio with spare batteries; torch with spare batteries; and a first aid kit Class 10 classified buildings and structures (as defined in the Building Codes of Australia) are excluded from this control. In the case of change of use or internal alterations to an existing building, a variation to this control may be considered if justified appropriately by a suitably qualified professional. Note that in the event of a Flood, occupants would be required to evacuate if ordered by Emergency Services personnel regardless of the availability of a shelter-in-place refuge.		
F. FENCING			
F1	Fencing, (including pool fencing, boundary fencing, balcony balustrades and accessway balustrades) shall be designed so as not to impede the flow of Flood waters and not to increase Flood affectation on surrounding land. At least 50% of the fence must be of an open design from the natural ground level up to the 1% AEP Flood level. Less than 50% of the perimeter fence would be permitted to be solid. Openings should be a minimum of 75 mm x 75mm.	NA	NA
G. STORAGE OF GOODS			
G1	Hazardous or potentially polluting materials shall not be stored below the Flood Planning Level unless adequately protected from Flood waters in accordance with industry standards.	Good storage in Basement, the car ramp crest of which is above the FPL.	Yes
H. POOLS			
H1	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.	NA	NA

7 Conclusion

The subject site is located within the Medium Flood Risk Precinct. The PMF Floodwaters impact the site at elevations ranging between 6.04 m AHD and 6.13 m AHD (Cardno 2019), resulting in inundation of the site to depths within to 0.22 m (at the Retail/Community space only). While the information for the 1% AEP Floodwater for the site has not been provided. As previously mentioned in the report, the PMF Floodwaters will have an impact on the site ranging from 6.04 m to 6.13 m. The current Flood Planning Level (FPL) for the proposed development is approximately 6.09 m AHD, which allows for a 0.3 m freeboard. The proposed finished floor levels of the building lobby and basement car ramp crest being both 6.10m AHD.

Evacuation from site is considered available as the site is located within the Medium Flood Risk Precinct which indicates the site is to have “no significant evacuation difficulties”.

The proposed development is to be capable of withstanding the loads imposed by the PMF Floodwaters plus freeboard (6.09 m AHD). As the existing footprint of the building is not going to increase in size, the effective storage capacity of the site and surrounding areas will not change. Flood compatible building materials are to be used below 6.09 m AHD where relevant, specifically the Retail/Community space. Guidance on appropriate Flood compatible building materials is provided in Section 4.3.

Based on the foregoing, we are of the view that a proposed development in accordance with this report will generally comply with the requirements contained within Norther Beaches Council DCP 2022 and the Norther beaches Council LEP 2022 provisions for sites affected by Flooding.

8 References

- Attorney-General's Department. (2014). Technical Flood risk management guideline Flood hazard. Barton, ACT: Author.
- Hawkesbury-Nepean Floodplain Management Steering Committee (HNFMSC). (2006). Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas. Available from http://www.ses.nsw.gov.au/content/documents/pdf/resources/Building_Guidelines.pdf
- New South Wales Department of Infrastructure, Planning and Natural Resources (NSW DIPNR). (2005).
- Floodplain Development Manual: the management of Flood liable land. Sydney, NSW.
- Northern Beaches Council. Flood Information Report – Comprehensive. Issue Date 14/11/2022.
- Manly to Seaforth Flood Study, Cardno, doc number NA49913018, dated 22nd February 2019.
- Norther Beaches Council Warringah Development Control Plan 2022.
- Norther Beaches Council Warringah Local Environmental Plan 2022.

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Appendix A – Flood Information Request - Northern Beaches Council (June, 2021)

FLOOD INFORMATION REPORT – COMPREHENSIVE

Property: 22 Raglan Street MANLY NSW 2095
Lot DP: Lot 100 DP 1009880
Issue Date: 14/11/2022
Flood Study Reference: Manly to Seaforth Flood Study 2019, Cardno

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Flood Information for lot [1]:

Flood Risk Precinct – See Map A

Flood Planning Area – See Map A

Maximum Flood Planning Level (FPL) [2, 3, 4]: 6.34 m AHD

1% AEP Flood – See Flood Map B

1% AEP Maximum Water Level [2, 3]: N/A mAHD

1% AEP Maximum Depth from natural ground level[3]: N/A m

1% AEP Maximum Velocity: N/A m/s

1% AEP Hydraulic Categorisation: N/A **See Flood Map D**

Probable Maximum Flood (PMF) – See Flood Map C

PMF Maximum Water Level [4]: 6.13 m AHD

PMF Maximum Depth from natural ground level: 0.34 m

PMF Maximum Velocity: 0.65 m/s

PMF Hydraulic Categorisation: N/A **See Flood Map E**

Flooding with Climate Change (See Flood Map F)

The following is for the 30% Rainfall intensity increase and 0.9m Sea Level Rise Scenario:

1% AEP Maximum Water Level with Climate change [3]: 5.88 m AHD

1% AEP Maximum Depth with Climate Change[3]: 0.24 m

1% AEP Maximum Velocity with Climate Change[3]: m/s

Flood Life Hazard Category – See Map G

Indicative Ground Surface Spot Heights – See Map H

[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. The maximum Flood Planning Level may be in a different location to the maximum 1% AEP flood level.
[3] Intensification of development in the former Pittwater LGA requires the consideration of climate change impacts which may result in higher minimum floor levels.
[4] Vulnerable/critical developments require higher minimum floor levels using the higher of the PMF or FPL.

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 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.

FLOOD LEVEL POINTS

Note: Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source:) and aerial photography (Source: NearMap 2014) are indicative only.

Flood Levels

ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	6.29	6.04	0.19	0.19
3	N/A	N/A	N/A	N/A	N/A	6.34	6.13	0.23	0.19
4	N/A	N/A	N/A	N/A	N/A	6.34	6.13	0.28	0.16

WL – Water Level
PMF – Probable Maximum Flood
N/A = no peak water level/depth/velocity available in flood event

A variable Flood Planning Level might apply. Freeboard is generally 0.5m above the maximum 1% AEP water level. However for overland flow with a depth less than 0.3m and a VelocityxDepth product less than $0.3m^2/s$, a freeboard of 0.3m may be able to be justified.

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:) and aerial photography (Source Near Map 2014) are indicative only.

FLOOD MAP C: PMF EXTENT MAP

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:) and aerial photography (Source: NearMap 2014) are indicative only

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

Not Available

FLOOD MAP E: PMF FLOOD HYDRAULIC CATEGORY EXTENT MAP

Not Available

FLOOD MAP F: FLOODING – 1% AEP EXTENT PLUS CLIMATE CHANGE

Note:

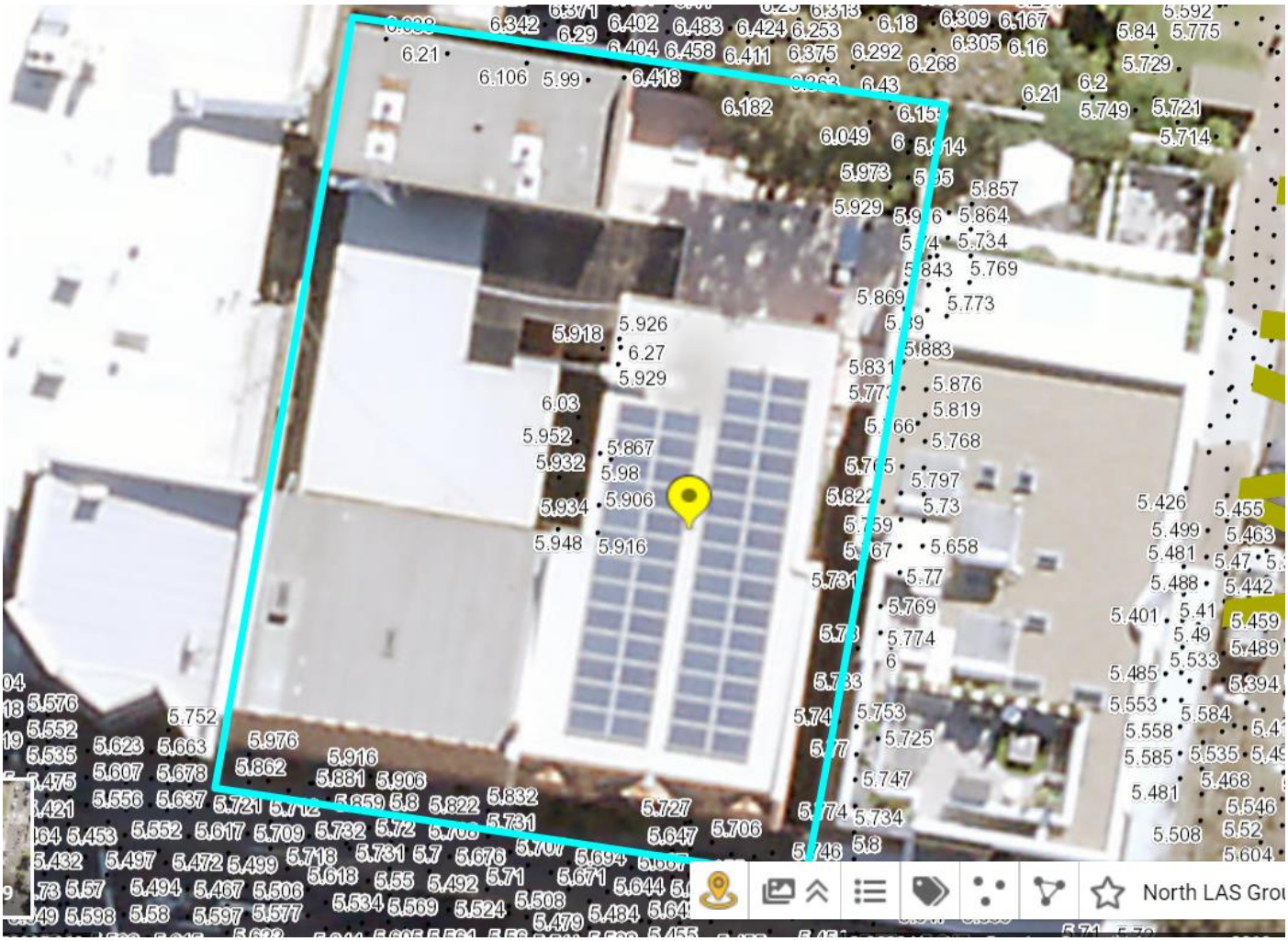
- Extent represents the 1% annual Exceedance Probability (AEP) flood event including 30% rainfall intensity and 0.9m Sea Level Rise climate change scenario
- Flood events exceeding the 1% AEP can occur on this site.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source:) and aerial photography (Source: NearMap 2014) are indicative only

FLOOD MAP G: FLOOD LIFE HAZARD CATEGORY

Notes:

- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source:) and aerial photography (Source Near Map 2014) are indicative only.

MAP H: INDICATIVE GROUND SURFACE SPOT HEIGHTS



Notes:

- The surface spot heights shown on this map were derived from Airborne Laser Survey and are indicative only.
- Accuracy is generally within ± 0.2m vertically and ± 0.15m horizontally, and Northern Beaches Council does not warrant that the data does not contain errors.
- If accuracy is required, then survey should be undertaken by a registered surveyor.

Preparation of a Flood Management Report

Introduction

These guidelines are intended to provide advice to applicants on how to determine what rules apply on flood prone land, and how to prepare a Flood Management Report. The purpose of a Flood Management Report is to demonstrate how a proposed development will comply with flood related planning requirements.

Planning Requirements for Flood Prone Land

Development must comply with the requirements for developing flood prone land set out in the relevant Local Environment Plan (LEP) and Development Control Plan (DCP). There are separate LEPs and DCPs for each of the former Local Government Areas (LGAs), although preparation of a LGA-wide LEP and DCP is currently under way.

The clauses specific to flooding in the LEPs and DCPs are as follows:

LEP Clauses	DCP Clauses
Manly LEP (2013) – 6.3 Flood Planning	Manly DCP (2013) – 5.4.3 Flood Prone Land
Warringah LEP (2011) – 6.3 Flood Planning Warringah LEP (2000) – 47 Flood Affected Land *	Warringah DCP (2011) – E11 Flood Prone Land
Pittwater LEP (2014) – 7.3 Flood Planning Pittwater LEP (2014) – 7.4 Flood Risk Management	Pittwater 21 DCP (2014) – B3.11 Flood Prone Land Pittwater 21 DCP (2014) – B3.12 Climate Change

* The Warringah LEP (2000) is relevant only for the “deferred lands” which affects only a very small number of properties, mostly in the Oxford Falls area.

Development on flood prone land must also comply with Council’s Water Management for Development Policy, and if it is in the Warriewood Release Area, with the Warriewood Valley Water Management Specification. Guidelines for Flood Emergency Response Planning are available for addressing emergency response requirements in the DCP. These documents can be found on Council’s website on the Flooding page.

Note that if the property is affected by estuarine flooding or other coastal issues, these need to be addressed separately under the relevant DCP clauses.

When is a Flood Management Report required?

A Flood Management Report must be submitted with any Development Application on flood prone land (with exceptions noted below), for Council to consider the potential flood impacts and applicable controls. For Residential or Commercial development, it is required for development on land identified within the Medium or High Flood Risk Precinct. For Vulnerable or Critical development, it is required if it is within any Flood Risk Precinct.

There are some circumstances where a formal Flood Management Report undertaken by a professional engineer may not be required. However the relevant parts of the DCP and LEP would still need to be addressed, so as to demonstrate compliance. Examples where this may apply include:

- If all proposed works are located outside the relevant Flood Risk Precinct extent
- First floor addition only, where the floor level is above the Probable Maximum Flood level
- Internal works only, where habitable floor areas below the FPL are not being increased

Note that development on flood prone land will still be assessed for compliance with the relevant DCP and LEP, and may still be subject to flood related development controls.

What is the purpose of a Flood Management Report?

The purpose of a Flood Management Report is to demonstrate how a proposed development will comply with flood planning requirements, particularly the development controls outlined in the relevant LEP and DCP clauses. The report must detail the design, measures and controls needed to achieve compliance, following the steps outlined below.

A Flood Management Report should reflect the size, type and location of the development, proportionate to the scope of the works proposed, and considering its relationship to surrounding development. The report should also assess the flood risk to life and property.

Preparation of a Flood Management Report

The technical requirements for a Flood Management Report include (where relevant):

1. Description of development
   - Outline of the proposed development, with plans if necessary for clarity
   - Use of the building, hours of operation, proposed traffic usage or movement
   - Type of use, eg vulnerable, critical, residential, business, industrial, subdivision, etc

2. Flood analysis
   - 1% AEP flood level
   - Flood Planning Level (FPL)
   - Probable Maximum Flood (PMF) level
   - Flood Risk Precinct, ie High, Medium or Low
   - Flood Life Hazard Category
   - Mapping of relevant extents
   - Flood characteristics for the site, eg depth, velocity, hazard and hydraulic category, and the relevance to the proposed development

   If the property is affected by an Estuarine Planning Level (EPL) which is higher than the FPL, then the EPL should be used as the FPL. If the FPL is higher than the PMF level, then the FPL should still be used as the FPL, as it includes freeboard which the PMF does not.

3. Assessment of impacts
- Summary of compliance for each category of the DCP, as per the table below.

	Compliance		
	N/A	Yes	No
A) Flood effects caused by Development			
B) Building Components & Structural Soundness			
C) Floor Levels			
D) Car parking			
E) Emergency Response			
F) Fencing			
G) Storage of Goods			
H) Pools			

- Demonstration of how the development complies with any relevant flood planning requirements from the DCP, LEP, Water Management for Development Policy, and if it is in the Warriewood Valley Urban Land Release Area, with the Warriewood Valley Water Management Specification (2001)
- For any non-compliance, a justification for why the development should still be considered.
- Calculations of available flood storage if compensatory flood storage is proposed
- Plan of the proposed development site showing the predicted 1% AEP and PMF flood extents, as well as any high hazard or floodway affectation
- Development recommendations and construction methodologies
- Qualifications of author - Council requires that the Flood Management Report be prepared by a suitably qualified Engineer with experience in flood design / management who has, or is eligible for, membership to the Institution of Engineers Australia
- Any flood advice provided by Council
- Any other details which may be relevant

Further information and guidelines for development are available on Council's website at:

https://www.northernbeaches.nsw.gov.au/planning-and-development/building-and-renovations/development-applications/guidelines-development-flood-prone-land

Council's Flood Team may be contacted on 1300 434 434 or at floodplain@northernbeaches.nsw.gov.au .