CONSULTING ENGINEERS

Proposed Commercial Development

34-35 South Steyne, Manly, NSW 2095

Flood Risk Management Report

Prepared for: Fortis Development Group

Ref: 220553R002

Document Verification

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1 Introduction

1.1 Purpose

EDGE Consulting Engineers (EDGE) have been engaged by Fortis Group to prepare a Flood Risk Management Report (FRM) for the proposed Commercial development at 34-35 South Steyne, Manly. The preparation of this report is based on our understanding of the existing and proposed topography of the site and its surroundings, and the constraints surrounding this development.

This report discusses the methodology and results of the assessment that include:

- Collection and review of available data;
- Determination of existing design flood conditions and impact to proposed Commercial development;
- Requirements for the proposed development to comply with Council's policies relating to flooding; and
- Any impact the proposed development has on the existing design flood conditions.

1.2 Site Location

The site is located within Northern Beaches Council local governing area. It is bounded by South Steyne along its northeastern boundary, Rialto Lane along its southwestern boundary, a neighboring lot consisting of several restaurants along the south eastern boundary and multiple commercial neighbors along its north western boundary - Refer Figure 1 for site location.

Figure 1 - Site Location (Source: Six Maps NSW)

1.3 Relevant Standards and Guidelines

The report has been carried out in accordance with the relevant local, state and national design guidelines and Australian Standards. These include, but are not limited to:

- Australian Rainfall and Runoff guidelines (2019)
- AS3500.3:2018 – Plumbing and Drainage – Stormwater Drainage
- Department of Infrastructure, Planning and Natural Resources Floodplain Development Manual (2005)
- Manly Development Control Plan (2013)
- Manly Local Environmental Plan (2013)
- Water Management for Development Policy (Version 1 26/08/2020)
- Manly to Seaforth Flood Study Report (22/02/2019)
- Flood Information Report – Basic – North Side
- Flood Information Report – Basic – South Side

1.4 Glossary of Terminology

Table 1 - Glossary

Annual Exceedance Probability (AEP)	The chance of a storm event of a given size occurring in any one year, expressed as a percentage. For example, if a peak flood discharge of 500 m3/sec has an AEP of 5%, it means that there is a 5% chance (i.e. a 1 in 20 chance) of a peak discharge of 500 m3/s (or larger) occurring in any one year. (see also average recurrence interval)
Astronomical Tide	Astronomical Tide is the cyclic rising and falling of the Earth's oceans water levels resulting from gravitational forces of the Moon and the Sun acting on the Earth.
Attenuation	Weakening in force or intensity.
Australian Height Datum (AHD)	National survey datum corresponding approximately to mean sea level.
Average Recurrence Interval (ARI)	The estimated average time period between random rain events of the same duration and size as a probability of occurring in any one year. For example, if a peak discharge of 500m3/sec has an average recurrence interval of 20 years based on historical data, it means that there is a 1 in 20 chance of an event occurring in any one year. (see also annual exceedance probability)
Calibration	The adjustment of model configuration and key parameters to best fit an observed data set.
Catchment	The area of land that drains to a point.
Design flood event	A hypothetical flood event representing a specific likelihood of occurrence (for example the 100 year ARI or 1% AEP storm event).
Development	Existing or proposed works that may or may not be impacted by flooding.
Discharge	The rate of flow of water measured in terms of volume per unit time, for example, cubic meters per second (m3/s).
Flood	Relatively high stormwater flows, which overtop the natural or artificial banks, and inundate floodplains and/or coastal inundation resulting from super elevated sea levels and/or waves overtopping coastline defences
Flood behaviour	The pattern / characteristics / nature of a flood.
Flood fringe	Land that may be affected by flooding but is not designated as floodway or flood storage
Flood hazard	A source of potential harm or a situation that has potential to cause harm.
Flood level	The height or elevation of floodwaters relative to a datum (typically the Australian Height Datum). Also referred to as "stage".
Flood liable land	see flood prone land
Floodplain	Land that is periodically inundated due to floods. The floodplain includes all land that is susceptible to inundation by the probable maximum flood (PMF) event.
Floodplain management	The co-ordinated management of activities that occur on the floodplain.
Floodplain risk management plan	A document outlining a range of actions aimed at improving floodplain management. The plan is the principal means of managing the risks associated with the use of the floodplain. A floodplain risk management plan needs to be developed in accordance with the principles and guidelines contained in the NSW
Floodplain Management Manual.	The plan usually contains both written and diagrammatic information describing how particular areas of the floodplain are to be used and managed to achieve defined objectives.
Flood planning levels (FPL)	Flood planning levels selected for planning purposes are derived from a combination of the adopted flood level plus freeboard, as determined in floodplain management studies and incorporated in floodplain risk management plans. Selection should be based on an understanding of the full range of flood behaviour and the associated flood risk. It should also consider the social, economic and ecological consequences associated with floods of different severities. Different FPLs may be appropriate for different categories of land use and for different flood plans. The concept of FPLs supersedes the "standard flood event" in past NSW FDMs. As FPLs do not necessarily extend to the limits of flood prone land, floodplain risk management plans may apply to flood prone land beyond that defined by the FPLs.

Flood prone land	Land susceptible to inundation by the probable maximum flood (PMF) event. Under the merit policy, the flood prone definition should not be seen as necessarily precluding development. Floodplain Risk Management Plans should encompass all flood prone land (i.e. the entire floodplain).
Flood risk	The potential danger to life and potential damage to property resulting from flooding. The degree of flood hazard varies with circumstances across the full range of flood events.
Flood source	The source of the floodwaters.
Flood storage	Floodplain area that is intended for the temporary storage of floodwaters during a flood event.
Floodway	Area of a floodplain that has an substantial amount of discharge during a flood event.
Freeboard	Factors of safety usually expressed as a height above the adopted flood level thus determine the flood planning level. Freeboard tends to compensate for factors such as wave action, localised hydraulic effects and uncertainties in the design flood levels.
Geomorphology	The study of the origin, characteristics and development of landforms.
Gauging (tidal and flood)	Measurement of flows and water levels during tides or flood events.
Historical flood	A flood that has actually occurred.
Hydraulic	Relating to water flow in rivers, estuaries and coastal systems; in particular, the evaluation of flow parameters such as water level and velocity.
Hydrodynamic	Pertaining to the movement of water.
Hydrograph	A graph showing how a river or creek's discharge changes with time
Hydrographic survey	Survey of the bed levels of a waterway
Hydrologic	Pertaining to rainfall-runoff processes in catchments
Hydrology	The term given to the study of the rainfall-runoff process in catchments
Hyetograph	A graph showing the distribution of rainfall over time.
Intensity Frequency Duration (IFD) Curve	A statistical representation of rainfall showing the relationship between rainfall intensity, storm duration and frequency (probability) of occurrence.
Isohyets	Equal rainfall contour.
Morphological	Pertaining to geomorphology
Peak flood level, flow or velocity	The maximum flood level, flow or velocity that occurs during a flood event
Pluviometer	A rainfall gauge capable of continuously measuring rainfall intensity
Probable maximum flood (PMF)	An extreme flood deemed to be the maximum flood likely to occur
Probability	A statistical measure of the likely frequency or occurrence of flooding.
Riparian	The interface between land and waterway. Literally means "along the river margins"
Runoff	The amount of rainfall from a catchment that actually ends up as flowing water in the river or creek
Stage	See flood level.
Stage hydrograph	A graph of water level over time.
Sub-critical	Refers to flow in a channel that is relatively slow and deep.
Topography	The shape of the surface features of land
Velocity	The speed at which the floodwaters are moving. A flood velocity predicted by a computer flood model is quoted as the depth averaged velocity, i.e. the average velocity throughout the depth of the water column or velocity across the whole river or creek section.
Validation	A test of the appropriateness of the adopted model configuration and parameters (through the calibration process) for other observed events.
Water level	See flood level.

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2 Site Description

2.1 Existing Site

The current site of the proposed commercial development comprises of an existing two story commercial building currently tenanted by a restaurant on ground floor and a corporate office on Level 1. The existing site also has approximately 2 staff parking spots and a loading zone for restaurant deliveries on the south west side of the site accessible by Rialto Lane. With the developable extents, the total area is 690.2m^2 with an 100% impervious area.

The development is proposed to take place on two separate land parcels being:

- Lot B DP 102407
- Lot 2 DP 861591

A review of the survey shows that majority of the site (approximately 645m$^{2)}$ is roofed area falling towards guttering systems discharging to downpipes then spitters in the rear carpark with the stormwater then flowing overland to the existing grated drain and council stormwater pit. The rear impervious carpark falls in a southwest direction to an existing grated drain and council stormwater pit at an approximate grade of 3.2%.

Refer Figure 2 for survey information.

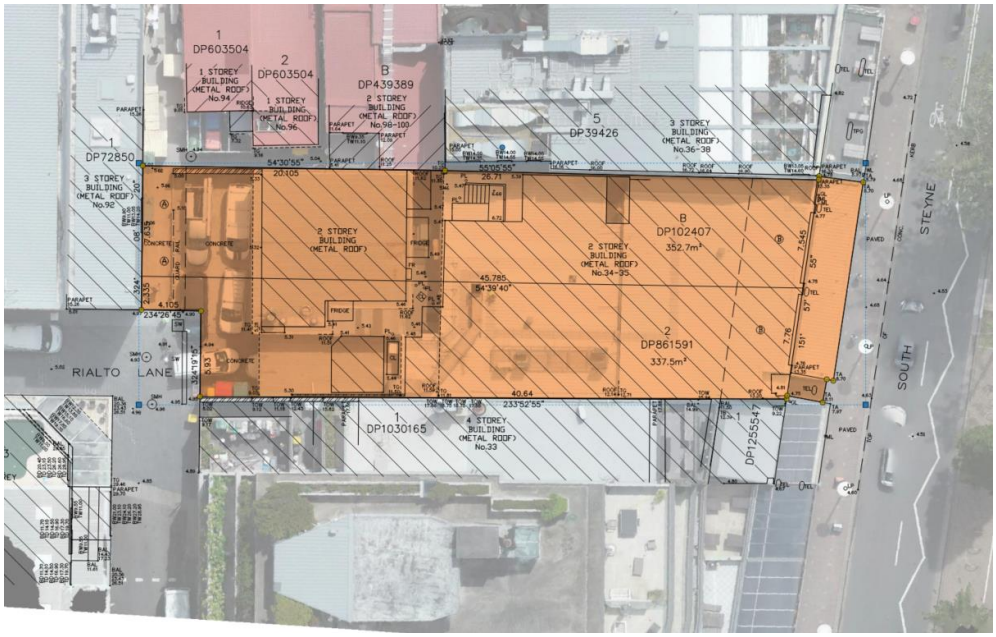


Figure 2 – Marked up Site Survey Plan (Source: Hill & Blume Consulting Surveyors Ref 63239 Rev A)

2.2 Proposed Development

The proposed development will incorporate the construction of a new four storey commercial building with a below grade basement level comprising of:

- Basement 2; a commercial bin store and multiple designated carparking spaces
- Basement 1; a commercial space, designated plant areas and end of trip bathroom facilities.

- Ground floor; a retail area, Lobby and external parking.
- Level 1; a commercial space with terraces, a lobby area and amenities.
- Level 2; a a commercial space, a lobby area and amenities.
- Level 3; a commercial space, terrace area and a designated plant space.

The proposed development will maintain the same total impervious area of 690.2m^2. The building will be constructed on both parcels of land (as the existing building does). Refer Figure 3 for site plan prepared by Durbach Block Jaggers.

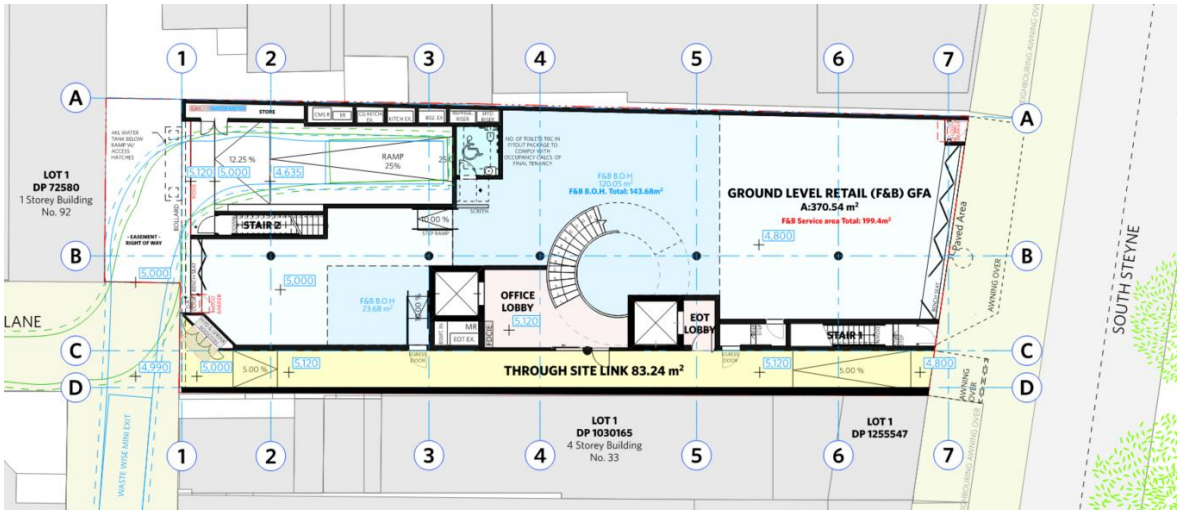


Figure 3 – Proposed Site Plan (source: DURBACH BLOCK JAGGERS GA Plan Ground Plan A-DA-110-003 REV DA)

3 Floodplain Impact

The site is impacted as depicted in Norther Beaches Council's Flood Information Report. In accordance with the Northern Beaches Council Flood Hazard Map the site is identified as a medium risk precinct – Refer to Figure 4.

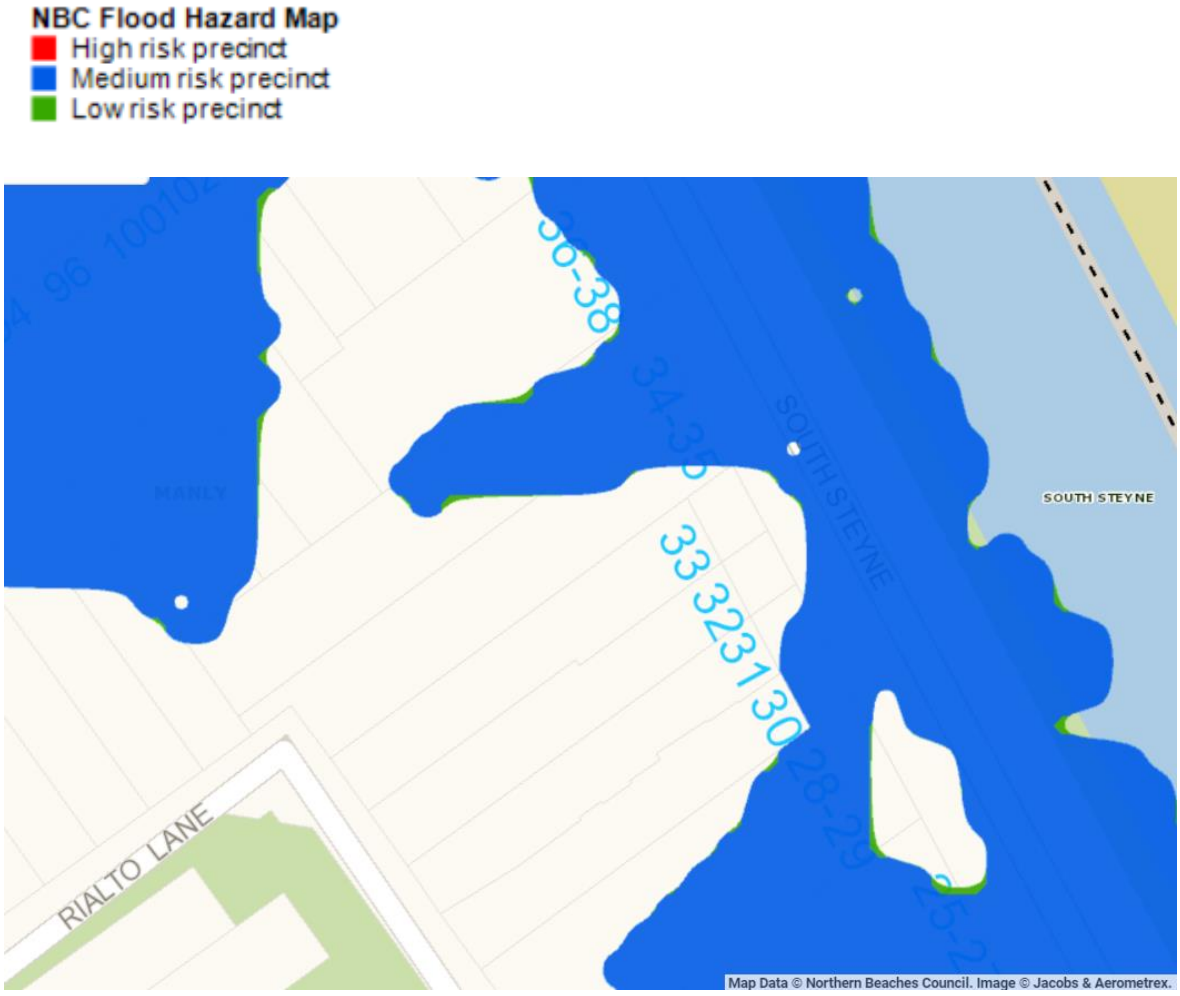


Figure 4 – Northern Beaches Council Flood Hazard Map (Manly Development Control Plan 2013)

To this end, the site is identified as land within the floodplain based on the Probable Maximum Flood (PMF) event, however above the 1% AEP flood level – Figure 5 for 1% AEP flood level extent map.

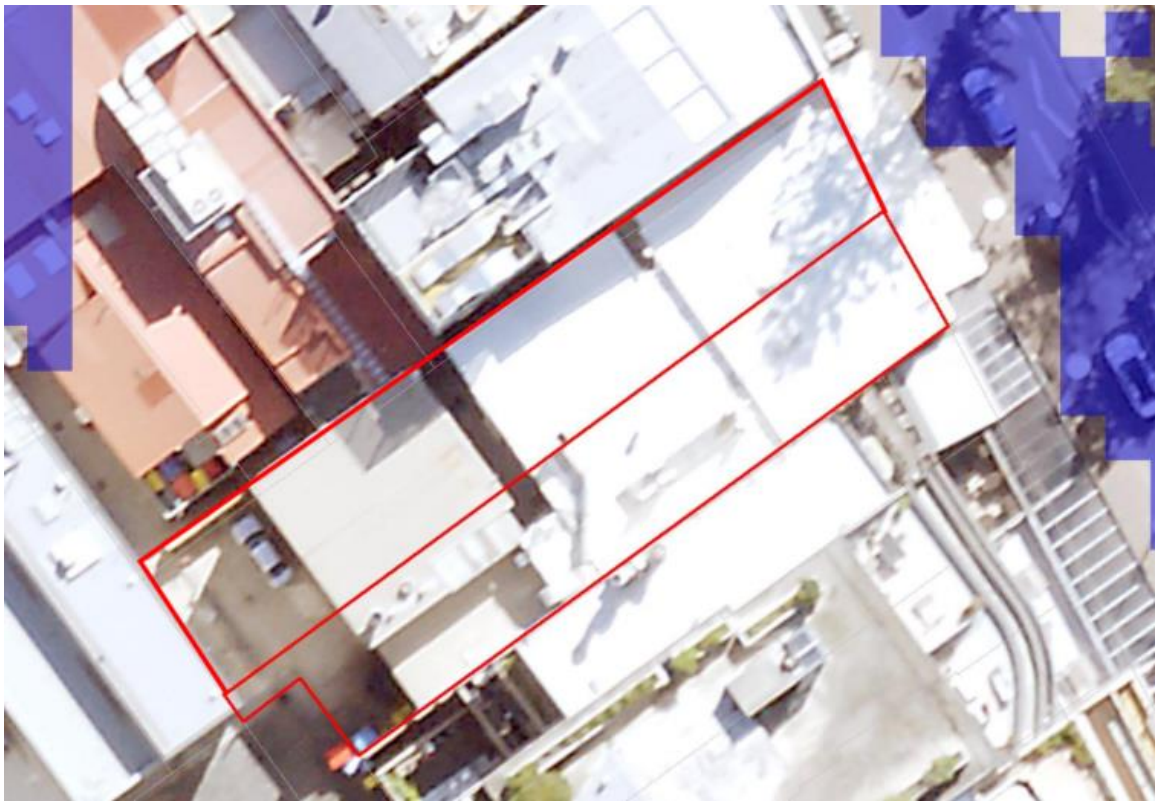


Figure 5 – Basic Information Report North Side & South Side – 1% Provisional Flood Risk Precinct Map (source: Manly to Seaforth Flood Study 2019)

Refer to Figure 6 for illustration of the flood depth predicted within the site in a PMF event.

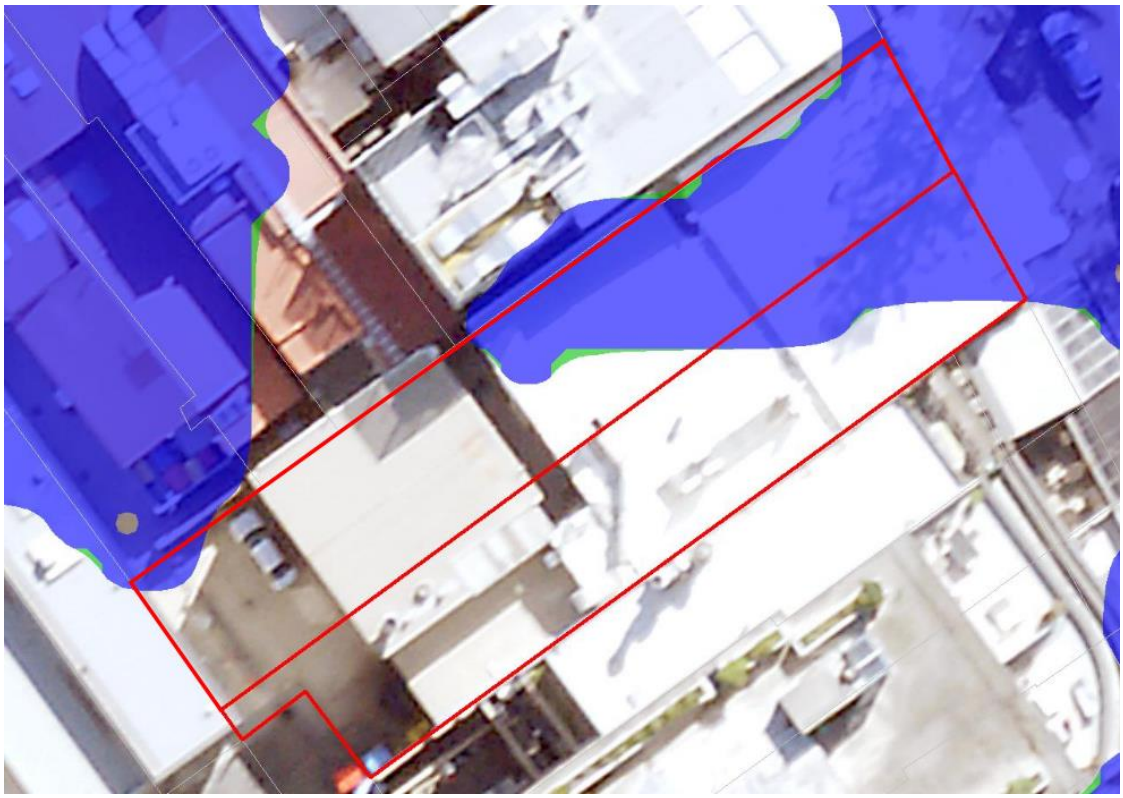


Figure 6 – Basic Information Report North Side & South Side – PMF Provisional Flood Hazard Map B (source: Manly to Seaforth Flood Study 2019)

Based on the above overlay, it is can be seen that the site is catergorised as a Medium Flood Risk Precinct affected in PMF storm events.

4 Development Controls

In accordance with the NSW Floodplain Development Manual, the site is subject to development controls as set by Northern Beaches Council for development within floodplains in accordance with their floodplain risk management plans. These controls have adapted the NSW Floodplain Development Manual's guidelines in the preparation of Council's flood study(s), risk management study(s) and plan(s), and addressing hydraulic and hazard categorisation, and emergency response planning.

4.1 General Floodplain Management

The development is guided by Council's Development Control Plan 2013, particularly Part 5.4.3 Flood Prone Land. Under Table 1:Land Use Groups, the development is classified in a Business or Industrial Land Use Category, no planning considerations are applicable as highlighted in the Medium Risk Precinct matrix 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 7 – Medium Flood Risk Precinct Matrix – Manly DCP 2013

Table 2 - Medium Flood Risk Precinct Planning Considerations - Manly DCP 2013

Submission Requirement	Response
A. Flood effects caused by the development	
A1. 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 floodproofed 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.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.*	A1. Refer 4.2.3 of this report for protection against adverse impacts.
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.*	A2. Site is not affected by flood in a 1% AEP storm event.
B. Building Components & 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 Floodplain Management Steering Committee (2006).	B1. Development proposes concrete structure slabs, shored basement structure and footing system. Boundary walls are to be concrete, other walls are to be steel framed and sheeted and columns are to be concrete. To be determined in detailed design.

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.	B.2 Refer to 4.2.3 for structural protection considerations up to the FPL. Structural certification to be provided during detailed design. Refuge shall be on level 1 with a proposed FFL of 8.75
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.	B.3 The proposed flood barrier protection outlined in 4.2.3 protects the listed service plant/equipment from flood water.
C. Floor Levels	
C1. New floor levels within the development shall be at or above the Flood Planning Level.	C1. Ground floor levels are below the FPL but flood barrier protection has been proposed to account for this. Refer to 4.2.3.
C3. All new development must be designed and constructed so as not to impede the floodway or flood conveyance on the site, as well as ensuring no net loss of flood storage in all events up to the 1% AEP event. *For suspended pier/pile footings:* *(a) The underfloor area of the dwelling below the 1% AEP flood level is to be designed and constructed to allow clear passage of floodwaters, taking into account the potential for small openings to block; and* *(b)* *At least 50% of the perimeter of the underfloor area is of an open design from the natural ground level up to the 1% AEP flood level; and* *(c)* *No solid areas of the perimeter of the underfloor area would be permitted in a floodway*	C3. Site not affected by flood in a 1% AEP storm event.
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*	C4. Not applicable

(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 floodproofed 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.*	
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 floodway; 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 of are to be removed unless the building is to be extended in that location; and* *(d)* *the ground floor is floodproofed.*	C.6 Not applicable
C7. *Consideration may be given to a floor level below the Flood Planning Level within the first 5 metres from the street front in an existing business zone provided it can be demonstrated that:* *(a)* *The minimum floor level is no lower than the adjacent footpath level, and* *(b)* *The maximum internal distance from the front of the building is 5 metres, which can only apply to one side of an individual premises, and* *(c)* *The maximum area for the floor area to be below the Flood Planning Level for an individual premises is 30 square metres, and* *(d)* *There is direct internal access between areas above and below the Flood Planning Level for each individual premises*	C7. Flood barriers have been proposed to protect the FFLs below the FPL refer to 4.2.3
D. Car Parking	
D1. Open carpark areas and carports shall not be located within a floodway.	D1. Not applicable

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.	D2. Not Applicable
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 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 floodproofing up to the 1% AEP flood level.*	D3. Not Applicable
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	D4. Site is not affected by flood in a 1% AEP.
D5. Enclosed Garages must be located at or above the 1% AEP level	D5. Site is not affected by flood in a 1% AEP.
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 floodwaters from entering the enclosed carpark*	D6. A crest has been proposed at the driveway prior to grading down towards basement levels. The site is not flood affected in a 1% AEP storm event.
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).*	E1. The Flood life hazard category for this site is H2.

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 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	F1. Site is not flood affected in a 1% AEP storm event.
G. Stored Goods	
G1. Hazardous or potentially polluting materials shall not be stored below the Flood Planning Level unless adequately protected from floodwaters in accordance with industry standards.	G1. No hazardous goods are proposed to be stored below the flood level.
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	H1. No pools located on ground floor. The site is

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.*	also not flood affected in a 1% AEP storm event.

4.2 Flood Planning Requirements

The development complies with all of Council's flood planning requirements where applicable discussed above and below.

4.2.1 Finished Floor Level

The minimum finished floor levels/material level requirements are outlined in Table 3.

Table 3 - Flood Planning Levels

Floor	Flood Level	Minimum Finished Floor/Compatible Material Level	Proposed Finished Floor/Compatible Material Level
Finished Floor Level	5.12m AHD (PMF)	5.12m AHD	Eastern floor-4.8 Western floor-5.0

4.2.2 Evacuation

The overall site is affected partially by the PMF event, with majority of the site out of the floodplain. In the event of a flood, personnel will relocate from the proposed development and seek refuge at the rear exit opposite Rialto Lane.

4.2.3 Other Controls

Generally, structure located below the PMF year flood level plus freeboard will have proposed upstands at both east and west boundaries and then have a designated entry point to the building protected via a flood gate. There is also a ridge at the entry to the carpark to deal with the flooding issues there.

Table 4 -Ground floor flood barrier details

Entrance	Flood Barrier methodology	RL at the Crest of the Barrier
Northeast door entry	Flood Gate	Minimum 5.12 when activated
Eastern main tenancy entrance	Upstand	5.25
Southeast stair 1 emergency exit	Stepped upturn	5.12

Entrance	Flood Barrier methodology	RL at the Crest of the Barrier
Northwestern Carpark ramp	Ridge	5.12
Western stair 2 emergency exit	Ridge	5.12
Western main tenancy entrance	Upstand	5.25
Western DA Door entrance	Flood Gate	Minimum 5.12 when activated
Southwestern entrance	Ramp up to FFL	5.12

All areas for storing goods are protected by the above-mentioned barriers.

No external storage of materials below the flood planning level (equivalent to the PMF level plus freeboard) is allowable.

4.2.4 Flood Gate

The principles of operation regarding the flood gate include (but are not limited to);

- The barrier shall be activated by rising floodwater being captured within the proprietary interception chamber
- A submersible pump is located inside the chamber. This will drain the chamber once the flood level recedes and keep up with water ingress flowing at a slow rate (which is not consistent with flooding characteristics).
- A sealing mechanism shall be fitted to the barrier so it cannot be tampered with during non-flood events

Refer to Figure 8 for elevation diagram of the flood gate.

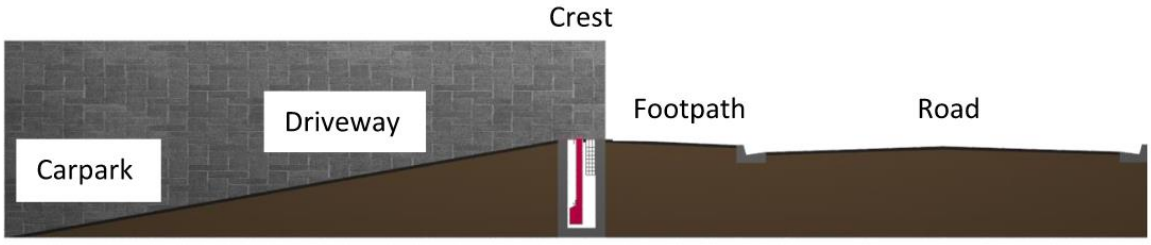


Figure 8 – Typical cross section with an integrated flood gate

5 Conclusion

This report has summarised the outcomes of a flood risk management assessment that was completed for the proposed commercial development at 34-35 South Steyne, Manly.

The flood risk management report was completed on the review of Council's Flood Information Report (22/05/2022) undertaken by Northern Beaches Council to assess the impact of the development to the floodplain and to demonstrate the flood risk management requirements set by Northern Beaches Council have been met.

Flood mapping for the development depicts the proposed development is within a medium risk precinct, that is typically within the 1% AEP Flood Planning Area (although we note the site in question is not in fact not in the 1% AEP Flood Planning Area). The report has identified how the development has complied with flood-related development controls outlined in Council's Development Control Plan 2013. These include highlighting the finished floor level is below the FPL but protected at each entrance with flood barriers and the inclusion of flood-compatible materials for all structures at or below the FPL.

Appendix A – Northern Beaches Council Flood Information Report – North & South

FLOOD INFORMATION REPORT - BASIC

Property: 34-35 South Steyne MANLY NSW 2095
Lot DP: Lot B DP 102407
Lot 2 DP 861591
Issue Date: 22/05/2022
Flood Study Reference: Manly to Seaforth

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]: 5.60 m AHD

1% AEP Flood – See Flood Map B

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

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]: 5.26 m AHD

PMF Maximum Depth from natural ground level: 0.24 m

PMF Maximum Velocity: 0.44 m/s

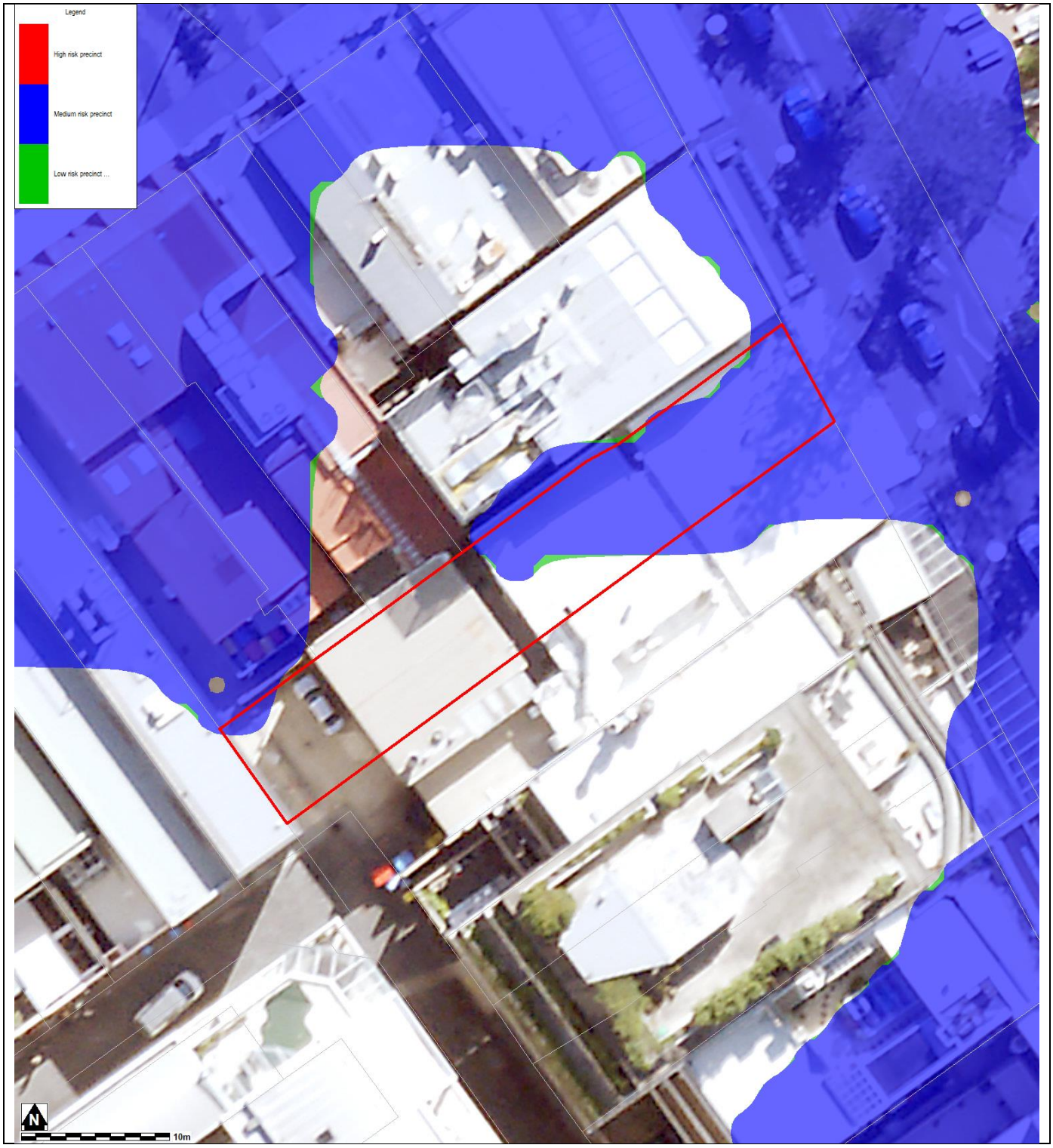
Flood Life Hazard Category – See Map E

[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 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: NearMap 2014) are indicative only.

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

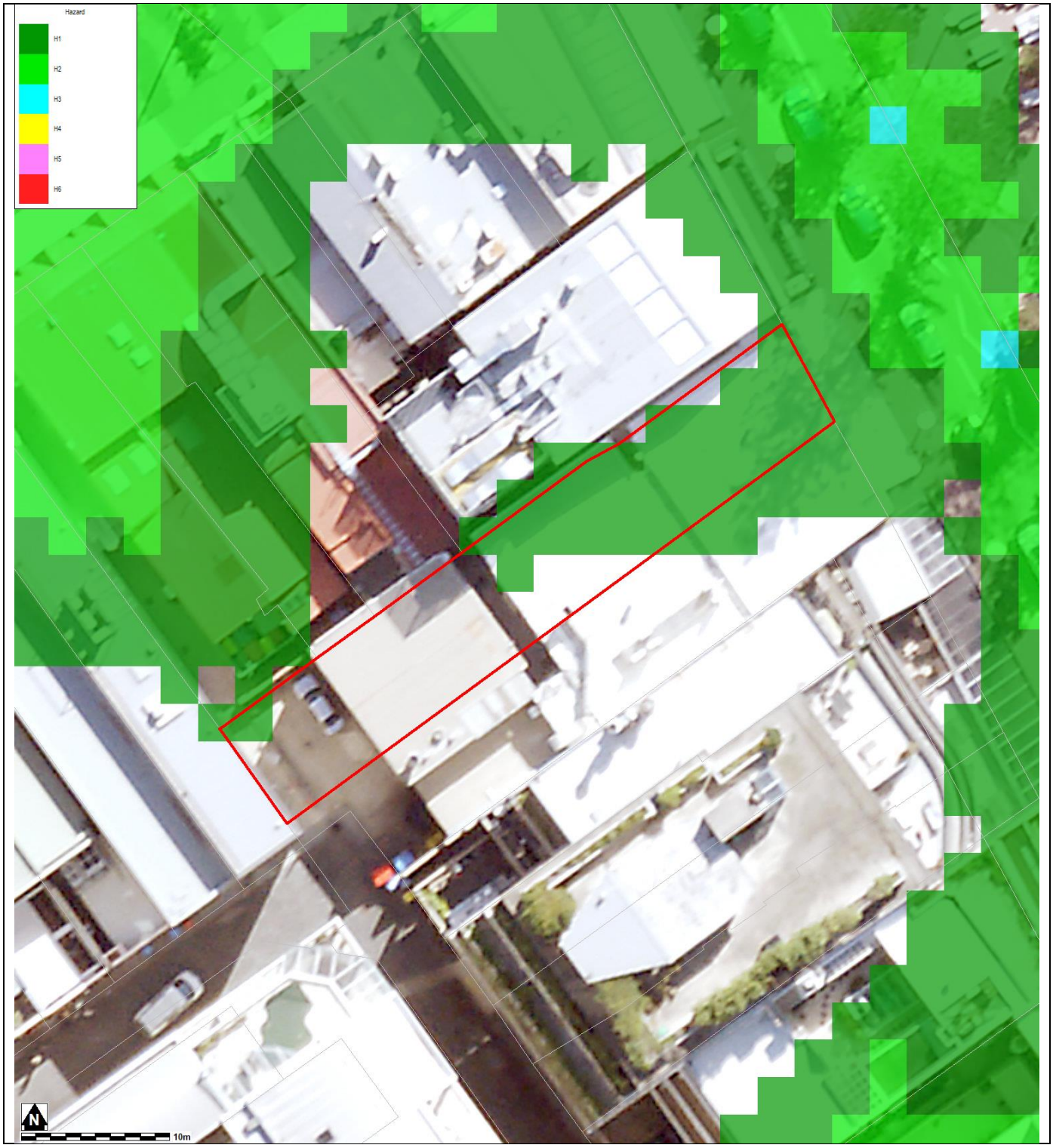
FLOOD MAP D: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP

N/A

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

FLOOD MAP E: FLOOD LIFE HAZARD CATEGORY



Notes:

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

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 .

Chris Veleski

From: Chris Veleski
Sent: Thursday, 30 June 2022 2:02 PM
To: Chris Veleski
Subject: FW: 34-35 South Steyne Manly - FPL and PMF levels

From: Christina Femia <Christina.Femia@northernbeaches.nsw.gov.au>
Sent: Tuesday, 31 May 2022 4:49 PM
To: Keegan Edwards <kedwards@edgece.com>
Cc: Valerie Tulk <Valerie.Tulk@northernbeaches.nsw.gov.au>; Alex Kwok <Alex.Kwok@northernbeaches.nsw.gov.au>
Subject: RE: 34-35 South Steyne Manly - FPL and PMF levels

Dear Keegan,

The FPL for 34-35 South Steyne MANLY NSW 2095 is **5.12 m AHD**. This includes a freeboard of 0.3. The max PMF flood depth is 0.25m and PMF flood level is 5.26 m AHD.

The site is not affected by the 1% AEP extent.

I can send you an updated Flood Information Report tomorrow.

Kind regards,
Christina

Christina Femia
Senior Water Cycle Officer

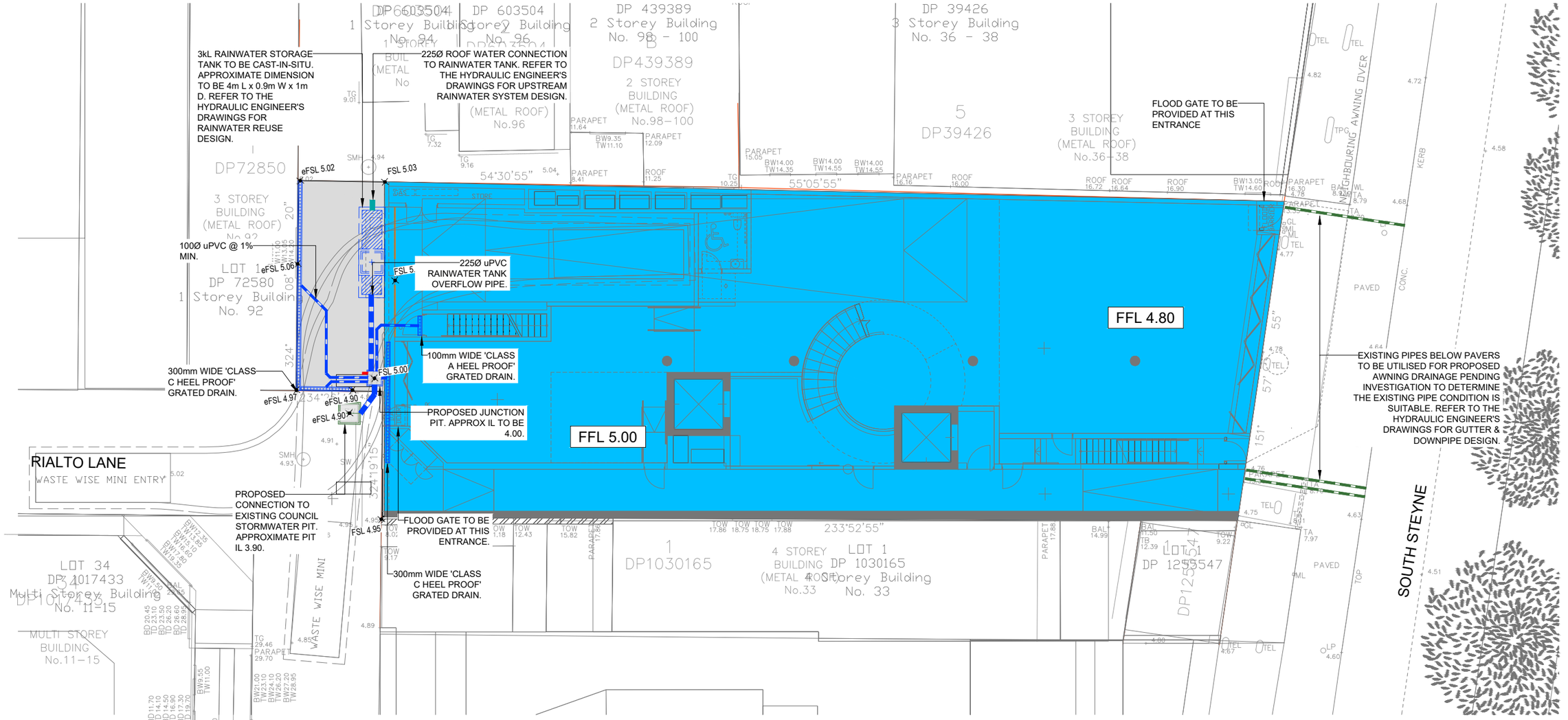
Stormwater, Floodplain Engineering
t 02 8495 6656 **m** 0407921040
christina.femia@northernbeaches.nsw.gov.au
northernbeaches.nsw.gov.au

From: Keegan Edwards <kedwards@edgece.com>
Sent: Friday, 27 May 2022 4:18 PM
To: Christina Femia <Christina.Femia@northernbeaches.nsw.gov.au>; Alex Kwok <Alex.Kwok@northernbeaches.nsw.gov.au>
Cc: Chris Veleski <cveleski@edgece.com>; Valerie Tulk <Valerie.Tulk@northernbeaches.nsw.gov.au>
Subject: RE: 34-35 South Steyne Manly - FPL and PMF levels
Importance: High

Hi Christina,

Thanks for your time on the phone.

Appendix B – Civil Engineering Site Plan



LEGEND

- PROPERTY BOUNDARY
- PROPOSED STORMWATER PIPE
- PROPOSED RAINWATER PIPE
- PROPOSED STORMWATER RISING MAIN
- EXISTING STORMWATER PIPE
- PROPOSED GRATED DRAIN
- F 136.287 — PROPOSED FINISHED SURFACE LEVEL
- PROPOSED STORMWATER PIT
- PROPOSED STORMWATER DROPPER
- PROPOSED BUILDING REFER STRUCTURAL DWGS
- EXISTING CONCRETE SLAB REFER STRUCTURAL DWGS

0 mm 10 20 30 40 50

NOTES:

1. CONTRACTOR TO READ DRAWING IN CONJUNCTION WITH ARCHITECT'S, STRUCTURAL AND HYDRAULIC ENIGNEER'S PLANS.
2. CONTRACTOR TO CONFIRM LOCATION OF EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS AND NOTIFY ENGINEER IF ANY DISCREPANCY OR POTENTIAL CLASH IS NOTED. ALL EXISTING SERVICES TO BE RETAINED UNO. ALL LIDS WITHIN EXTENT OF WORKS TO BE MODIFIED.
3. REFER HYDRAULIC ENGINEER FOR ALL ROOF WATER/BALCONY OUTLET/ SUSPENDED DRAINAGE CONNECTIONS. CONTRACTOR TO ALLOW FOR ALL PROPRIETARY FITTINGS/CONNECTIONS TO PROPOSED INGROUND STORMWATER SYSTEM.
4. ALL LEVELS ARE TBC PENDING REVISED ARCHITECTURAL DRAWINGS DETAILING THE REVISED FFL.

NORTH

0 2 4 6m

Scale 1:100 @A1

WARNING

THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING SERVICES ON AND EXTERIOR TO THE SITE INCLUDING WATER MAINS, SEWER MAINS, GAS MAINS, TELECOMMUNICATIONS CABLES, ELECTRICAL CABLES, AND STORMWATER PIPES. ANY DAMAGE TO EXISTING SERVICES SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.

Rev	Date	Description	By	Chk
P3	30.06.22	ISSUED FOR DA	KE	CV
P2	06.06.22	ISSUED FOR CLIENT REVIEW	KE	CV
P1	06.05.22	PRELIMINARY ISSUE	KE	CV

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Project Name: COMMERCIAL DEVELOPMENT
34-35 SOUTH STEYNE
MANLY 2095

Client: FORTIS DEVELOPMENT GROUP

Drawing Title: GROUND STORMWATER LAYOUT

Designed	Drawn	Checked	Scale @ A1
KE	KE	CV	1:100

Project No.: 220553 — PRELIMINARY

Drawing No.: C-301 — Revision: P3