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OVERLAND FLOW ASSESSMENT

1289 PITTWATER ROAD, NARRABEEN

REF 24245

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Introduction

Cane Consulting has been commissioned by to carry out an Overland Flow Assessment at 1289 Pittwater Road, Narrabeen.

This Overland Flow Assessment has been prepared to address the comment from Northern Beaches Council regarding potential overland flow impacts on the subject site located at 1289 Pittwater Road, Narrabeen. Specifically, this report evaluates the potential for overland flows in storm events exceeding the 5% AEP (Annual Exceedance Probability) up to and including the 1% AEP event and proposes measures to protect the site from flooding, as required under the Flood Prone Land clause of the DCP if required.

The proposed works as part of this development is wholly contained within the existing building footprint.

Site Description

- Location: The subject site is situated at number 1289 along Pittwater Road in Narrabeen. The site is within walking distance to Narrabeen beach and the fronting Pittwater Road is contains two lanes in each direction with a parking lane. Pittwater Road also contains a central median and has adverse crossfall to either side kerb and gutter.

- Topography: The site has a gentle/moderate slope from back to front with a driveway providing access to the property. The surrounding area has a range of flat to steep grades with multiple different catchment break-ups.

Figure 1 – Existing topographical contours

- Existing Drainage: Current stormwater management of the site includes roof downpipes and on-site pit and pipe network which discharges to Pittwater Road. Within Pittwater Road, there is council owned drainage infrastructure which directs water down Goodwin Street and into the bay. The extent of drainage network along with the topography of the surrounding area is used to determine the existing catchment area concentrating at this location.

Figure 2 – Existing Drainage Network (Source) Northern Beaches Council E-maps

- Flood Prone Land: The property is not explicitly identified as flood-prone in Council's documentation; however, overland flow concerns have been raised due to past complaints and potential risks during significant storm events.

Overland Flow Assessment

Methodology

The assessment was conducted using the following steps:

1. Review of relevant Council documents, including flood studies and mapping.
2. Analysis of topographic and hydrological data for the catchment area surrounding the site.
3. Hydraulic modelling of storm events for 5% AEP, 2% AEP, and 1% AEP scenarios using DRAINS modelling and analysis.
4. Identification of flow paths, flows, and depths of overland flow impacting/adjacent to the site.

Analysis

- Catchment Characteristics: The contributing catchment area for overland flow has been delineated based on topographical data and local detail survey. Based on the information gathered the existing catchment extent, the subject site falls within an existing catchment size of approximately 1.45ha and contains council pit and pipe network which directs flows down Goodwin Street and into the bay.

- The total catchment has been broken into four (4) sub-catchments based on the existing drainage pit locations and for modelling purposes as shown below in figure 3.

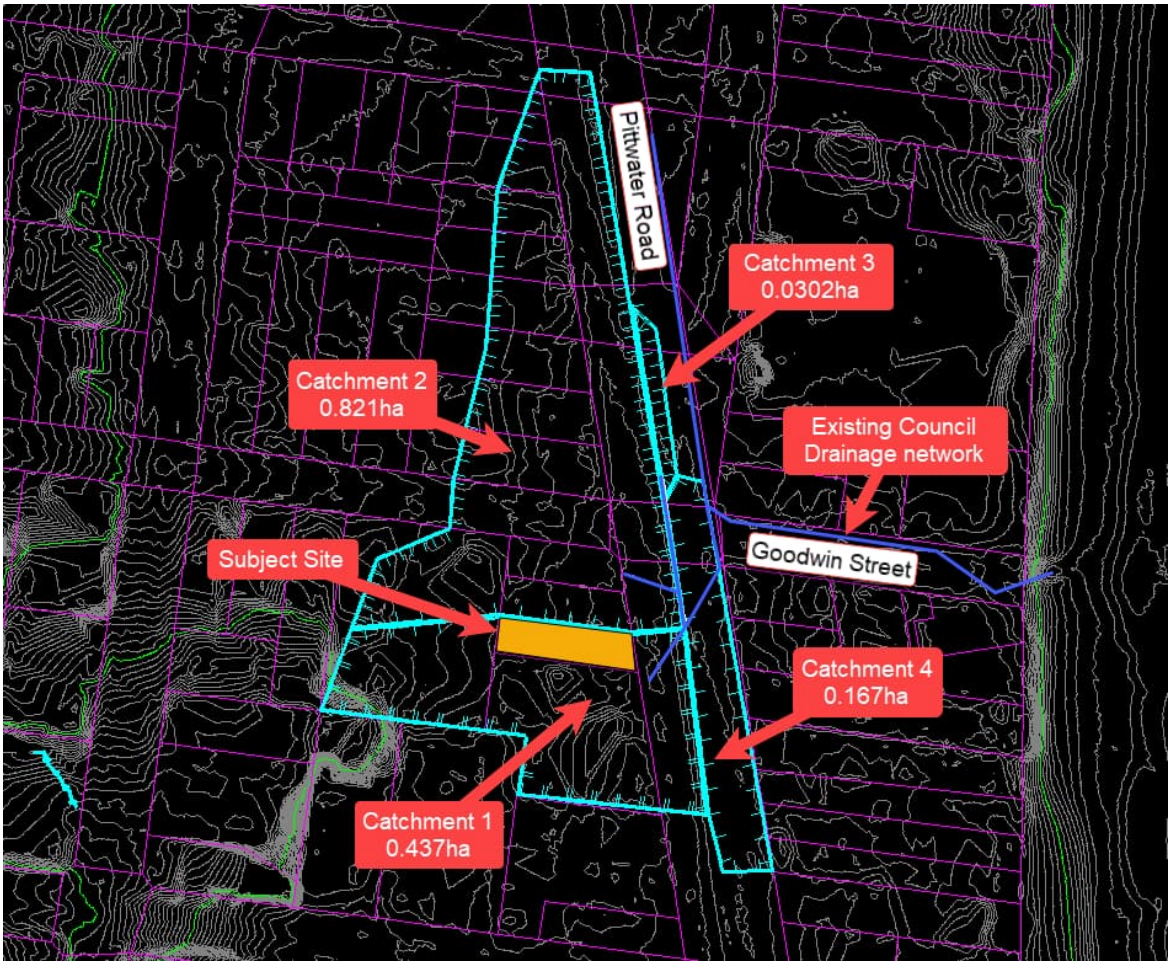


Figure 3 – Existing Catchment break-up

- A DRAINS model was created to replicate the current scenario. The pit and pipe alignment are based on collated information from Northern Beaches Council E-maps, Detailed survey, topographical survey, site visit and google street view. The grades and depths of each pipe is assumed based on best industry practice with a minimum 0.6m cover and a 1% minimum grade. The assumptions were determined to have a negligible impact on the results. Figure 4 below shows the DRAINS model produced for the purpose of this assessment.

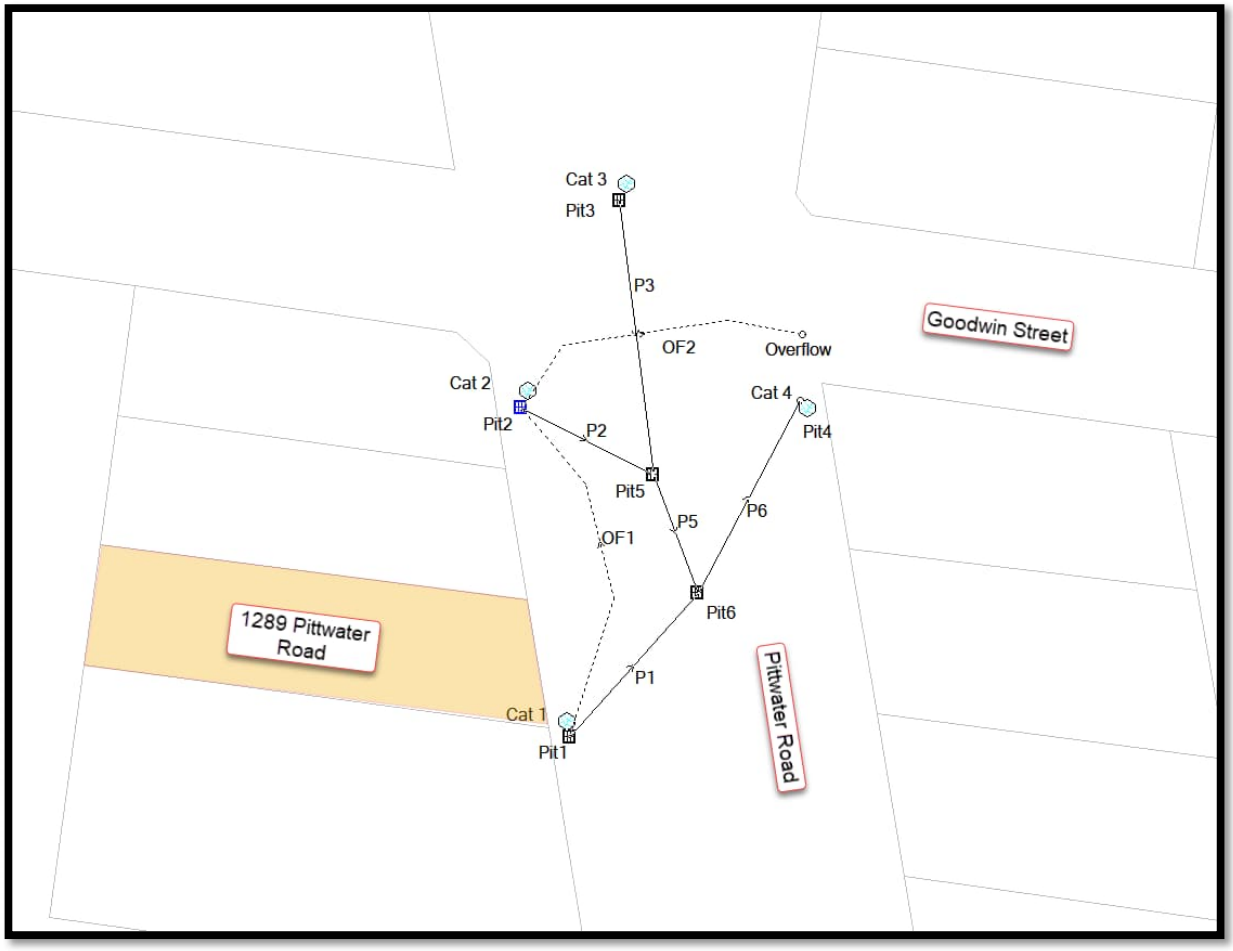


Figure 4 – DRAINS model

- Flow Pathways: Flow pathways have been identified along Pittwater Road, with potential entry points to the site via the existing driveway. OF1 as shown in Figure 4 is the flow path which fronts 1289 Pittwater Road. The typical road cross-section for Pittwater Road at this location is shown in Figure 5 below.

- This typical cross-section will serve as the analysis flow path to determine the maximum water depth within the road required to accommodate the flow calculated in DRAINS. Refer to the hydraulic results for further details.

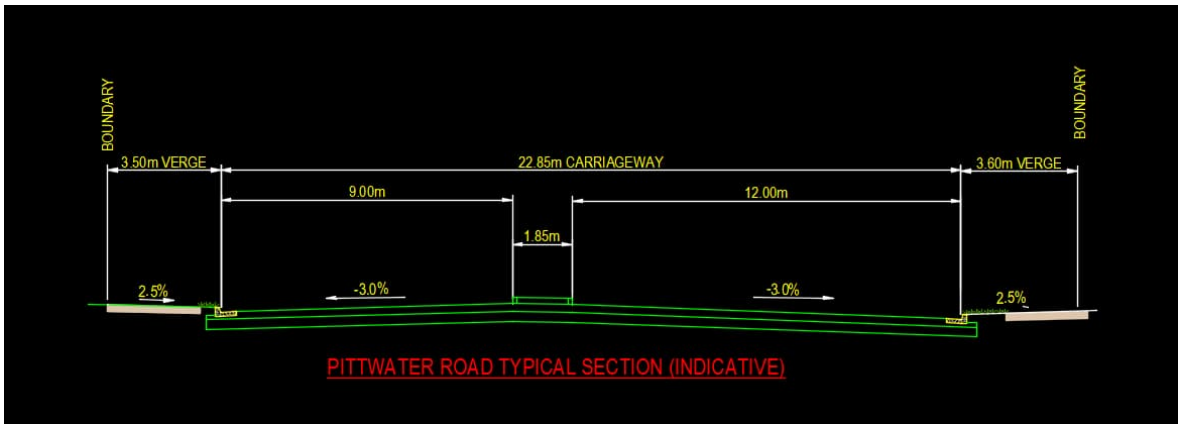
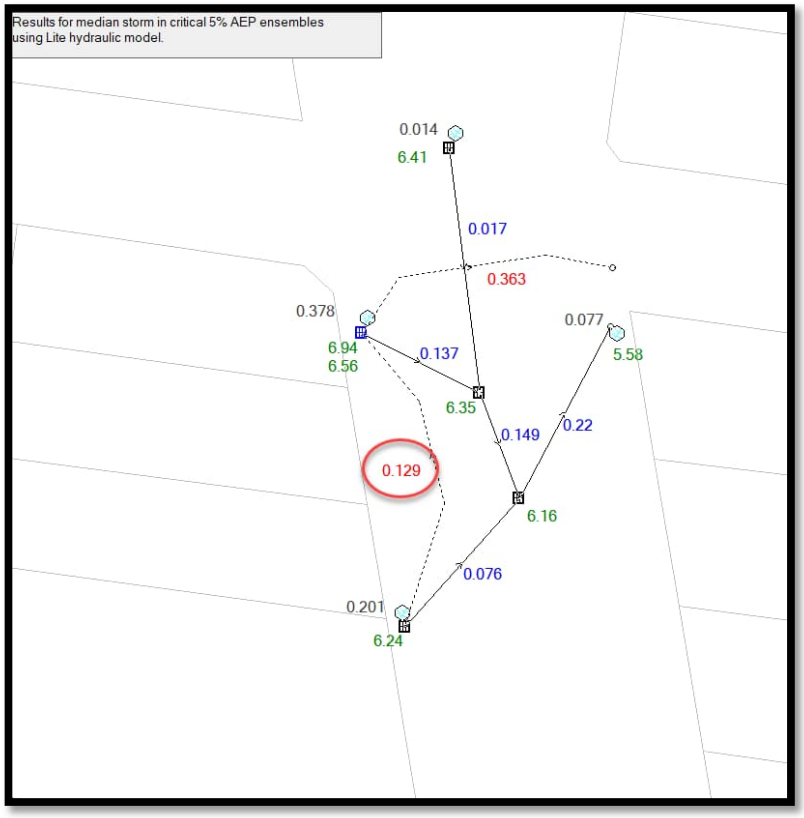


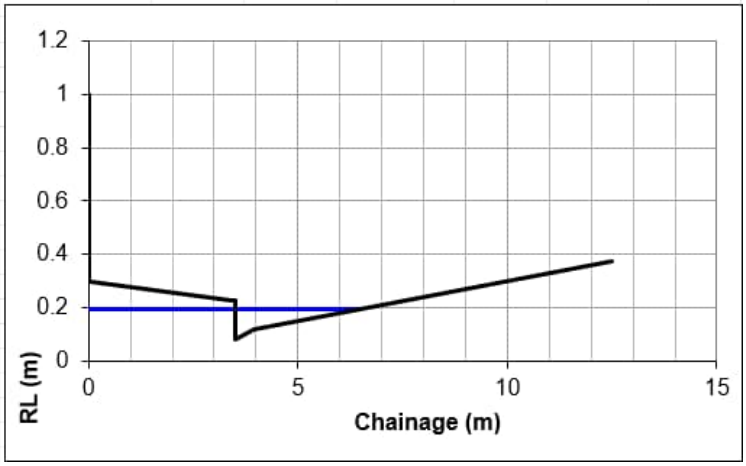
Figure 5 – Pittwater Road Cross Section

- Hydraulic Results:

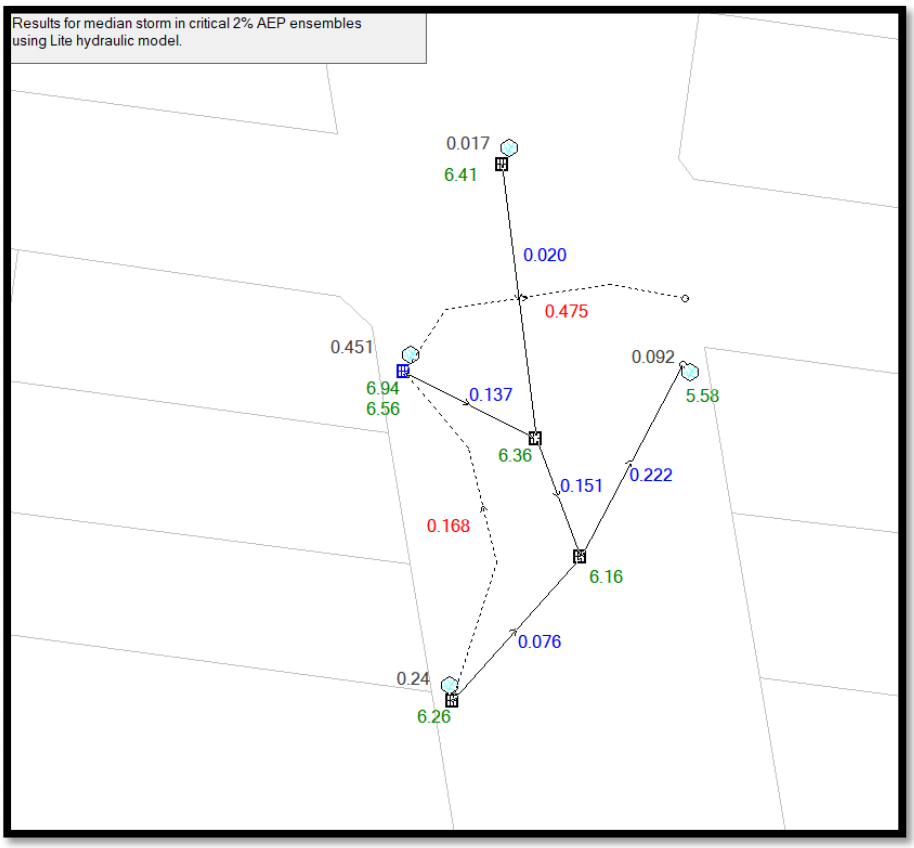
- 5% AEP Event:
  - Calculated maximum flow: 129L/s
  - Calculated Depth: 0.195m (within road carriageway)



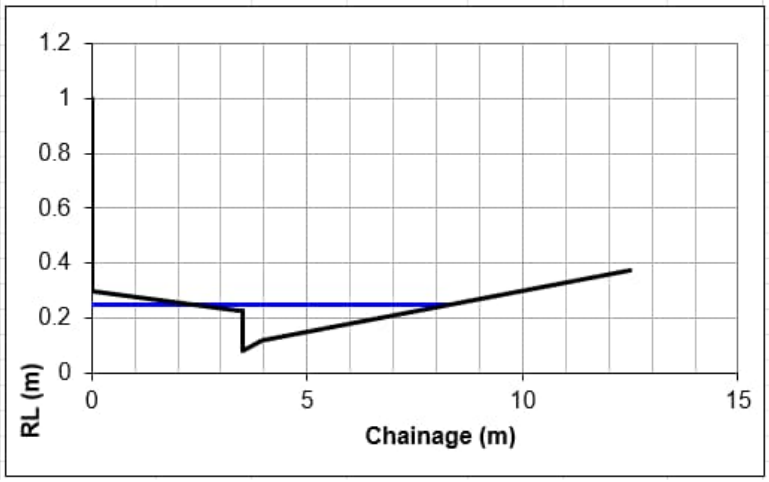
	Area	R	n	K	Flow (l/s)	Velocity
Left Overbank	0.00	0.00	0.000	0	0.00	0.00
Main Channel	0.14	0.04	0.013	1.2905	0.13	0.95
Right Overbank	0.00	0.00	0.000	0	0.00	0.00
Total	**0.14**	**0.04**	**0.013**	**1.2905**	**129**	**0.95**



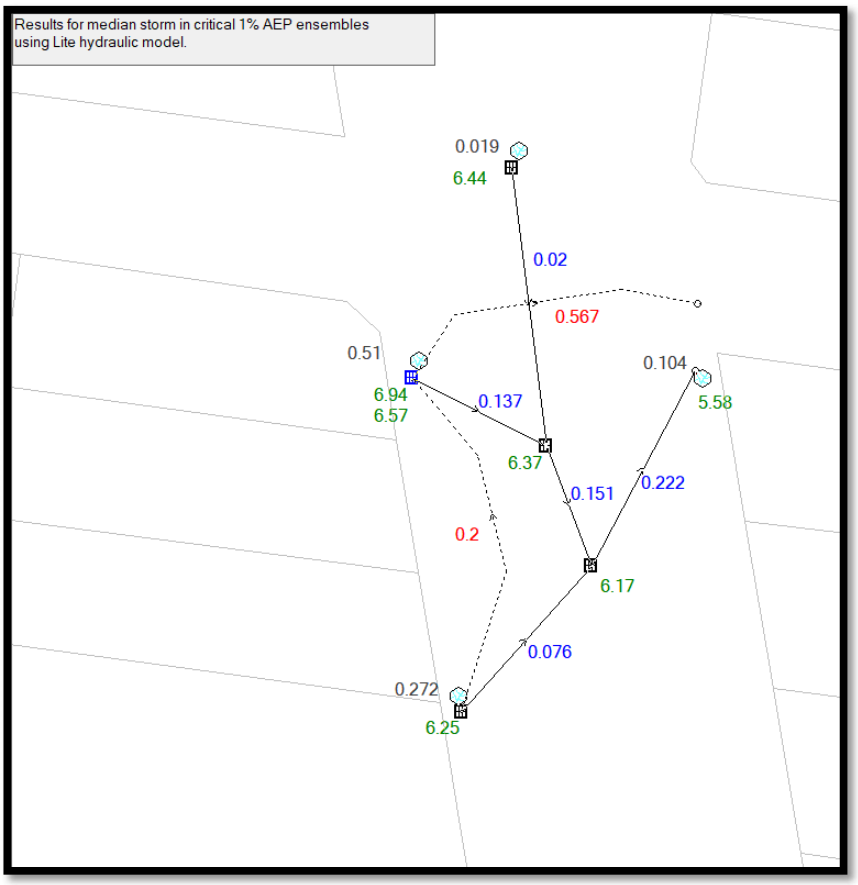
- 2% AEP Event:
  - Calculated maximum flow: 168L/s
  - Calculated Depth: 0.249m (within road reserve)



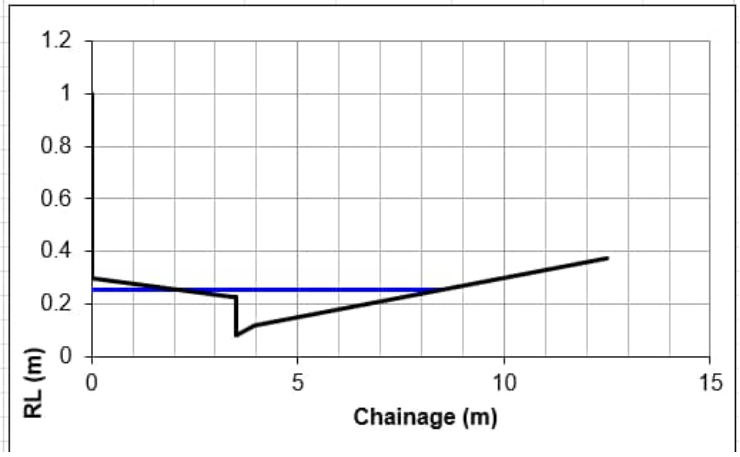
	Area	R	n	K	Flow (l/s)	Velocity
Left Overbank	0.00	0.00	0.000	0	0.00	0.00
Main Channel	0.36	0.04	0.026	1.676	0.17	0.47
Right Overbank	0.00	0.00	0.000	0	0.00	0.00
Total	**0.36**	**0.04**	**0.026**	**1.676**	**168**	**0.47**



- 1% AEP Event:
  - Calculated maximum flow: 200L/s
  - Calculated Depth: 0.256m (within road reserve)



	Area	R	n	K	Flow (l/s)	Velocity
Left Overbank	0.00	0.00	0.000	0	0.00	0.00
Main Channel	0.40	0.05	0.025	2.0041	0.20	0.51
Right Overbank	0.00	0.00	0.000	0	0.00	0.00
Total	**0.40**	**0.05**	**0.025**	**2.0041**	**200**	**0.51**



Risk Assessment

The results indicate that overland flow during storms, including those up to the 1% AEP event, is confined within the road reserve and does not encroach onto the property.

The model identifies a maximum water depth of 0.256 m during the 1% design storm. Based on the detailed survey, the adjacent kerb invert level is 6.60m. Therefore, the top water level fronting the property during the 1% storm event is calculated as 6.60m + 0.256m = 6.856m.

The existing dwelling at Lot 1289 Pittwater Road has a Finished Floor Level (FFL) of 7.19 m, providing a freeboard of 0.334m above the 1% overland flow level. This ensures an additional safety margin to account for potential blockages or maintenance requirements within the council's drainage network and infrastructure.

Conclusion

This assessment confirms that overland flow during storms up to and including the 1% AEP event is contained within the road reserve and does not enter the property. The Finished Floor Level (FFL) of the existing dwelling provides a sufficient freeboard of 0.334m above the 1% overland flow level, ensuring compliance with Council's requirements and adequate protection from potential flooding. No further mitigation measures are required at this time, given the existing protective buffer and the findings of this assessment and the fact the proposed works is contained within the existing building footprint and level.

We trust this report satisfies the Council's request.