56 Pitt Street, Sydney

Flood Risk Management Report

Prepared for:	**Dexus**
Date:	**6 May 2024**
Prepared by:	**Jackson Bramley**
File Reference:	**44189-SYD-C-R-FRM**
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Development Details

Site Address:	56 Pitt Street, Sydney
Proposed Development:	Planning proposal for a new commercial office tower to a height of RL 310m AHD with approximately 90,000m^2 of employment generating GFA
Client:	Dexus
Local Authority	City of Sydney Council
Authority Reference #:	N/A
Stantec Reference:	44189-SYD-C-R-FRM

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Principal, Civil Team Lead

For and on behalf of
Stantec Australia Pty Ltd

Contents

1. Executive Summary

Stantec Australia have been commissioned by Dexus to prepare this Flood Impact Assessment for the proposed planning envelope for a new commercial tower at 56 Pitt Street, Sydney.

This study has assessed the existing flood risks and existing adjacent major overland flow paths around the site and determine the impact of the proposed development on existing flood behaviour. This study has been prepared to accompany a planning proposal for the site being lodged with City of Sydney Council. This study has been undertaken in accordance with Australian Rainfall and Runoff 2019, the NSW Floodplain Management Manual and Council's Interim Floodplain Management Policy.

In preparing this assessment, the City Area Catchment TUFLOW flood model was obtained from the City of Sydney Council to confirm the existing flood conditions around the site and determine whether the proposed development impacts on existing flood behaviour. The post development results have also been used to set floor levels for the development in line with Council's Interim Floodplain Management Policy.

Flood modelling results demonstrate that generally, flood impacts are typically contained within Pitt St in the 1% AEP event with minor increases and decreases observed locally in pockets along Pitt St. In the PMF event, a flood level increase is observed within the road network to the west of the site; however, this is considered minor and there is no change to flood hazard within the public domain.

A review of the FJC issued Reference Scheme Drawings, as shown in Figure 2 and Figure 3, indicate that the finished floor levels have been designed in accordance with the recommendations of this report and as per the flood planning levels as set out in City of Sydney Council's Interim Floodplain Management Policy.

2. Introduction

2.1 Property Detail

Address: 56 Pitt Street, Sydney

Total Site Area: 3,319m² (0.3319Ha)

The site is bound by:

- Gresham Street to the east
- Spring Street to the south
- Bridge Street to the north
- Pitt Street to the west

Refer to locality plan in Figure 1.

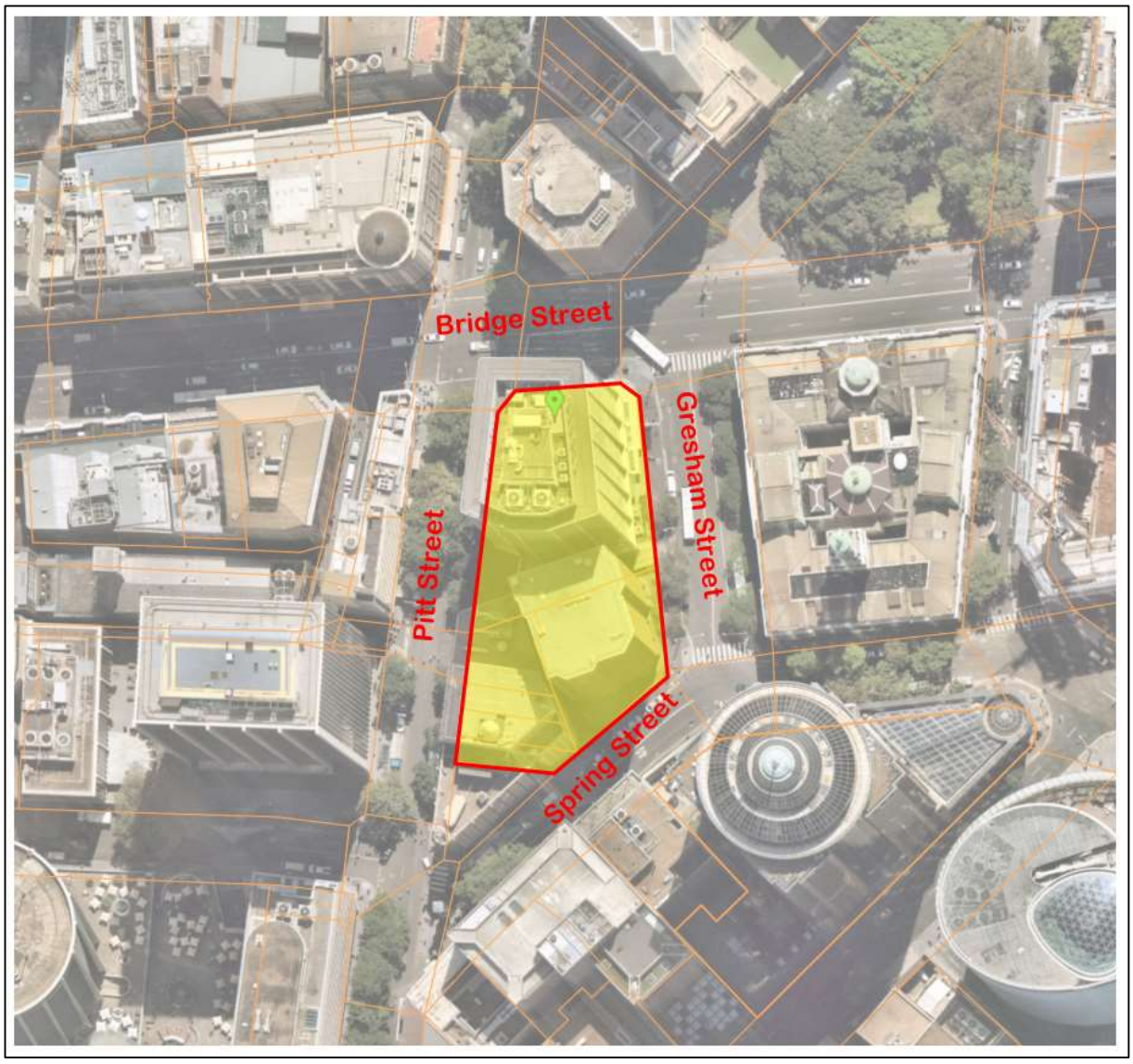


Figure 1: Site Location Plan (Source: Nearmaps 2020)

2.2 Proposed Site Layout

FJC Studio have prepared a reference scheme which accompanies the proposed planning envelope that is the subject of this Planning Proposal. The purpose of the reference scheme is to provide proof that the planning envelope is successful in achieving a future detailed design and is for indicative purposes only. These reference scheme layouts have been reviewed and used in the assessment of the flood levels of the development, as shown in Figures 2 and 3, which provide extracts of the indicative lower ground floor and upper ground floor design of the development, respectively.

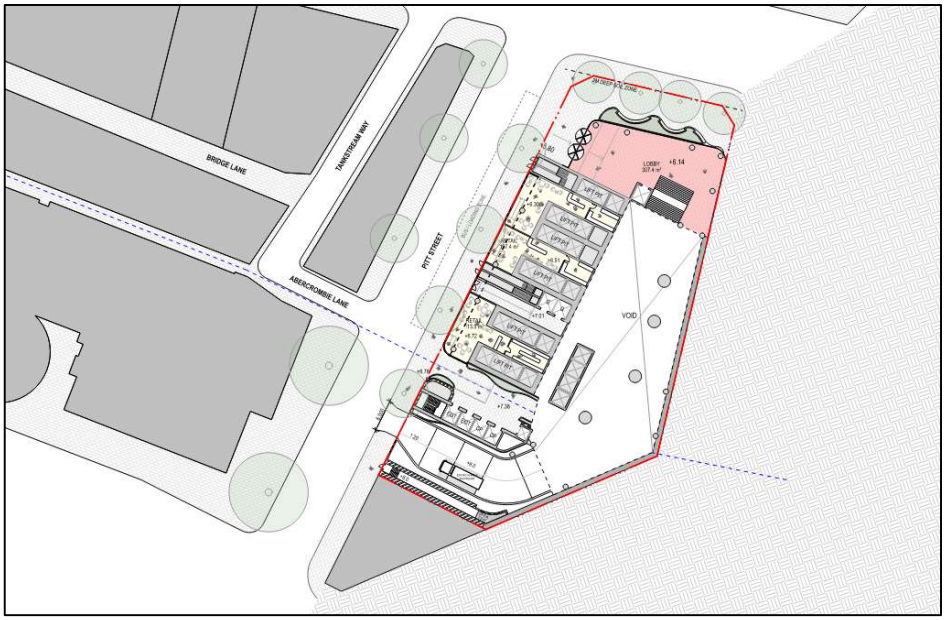


Figure 2: Proposed Lower Ground Floor Layout – Pitt Street (Source: FJC Studio)

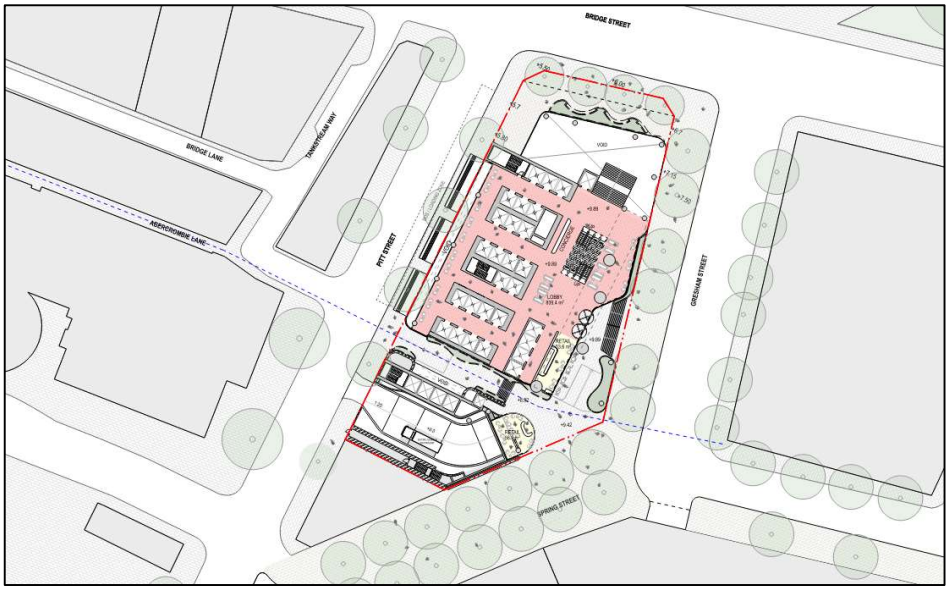


Figure 3. Proposed Upper Ground Floor Layout – Gresham Street (Source: FJC Studio)

The following elements need to be considered when assessing flood levels:-

- Basement Entry Level;
- Retail Property Floor Levels, and;
- Tower & Lift Entry Floor Levels.

3. Flood Assessment

When considering a new development, it is important to assess the impact of existing flooding on the proposed development and also the impact of the proposed development on existing or potential flooding both upstream and downstream of the development.

3.1 Existing Flooding

Flooding assessments have been based on City of Sydney Councils "City Area Catchment Flood Study" prepared by BMT WBM, dated October 2014. City of Sydney Council have provided the City Area Catchment TUFLOW flood model to confirm the existing flood conditions around the site. Site-specific flood modelling has been undertaken for the proposed development to demonstrate the impact of the proposed development.

Stantec have run the flood model to ensure the results are in agreeance with those in the BMT WBM report, which has been confirmed by way of running the existing scenario for the 1% AEP and Probable Maximum Flood (PMF) storm events. A cell size of 2m has been adopted for the flood model in line with the BMT WBM model. No adjustments have been made the existing flood model in undertaking this flood assessment. The results displayed in the following sections include results for all flood depths. It is noted that flooding less than 50mm was not displayed in the BMT WBM flood report figures.

3.1.1 1% AEP Results

Figure 4 and Figure 5 present the flood depth and level contours and flood hazard maps, respectively, in the existing scenario for the 1% AEP flood event.

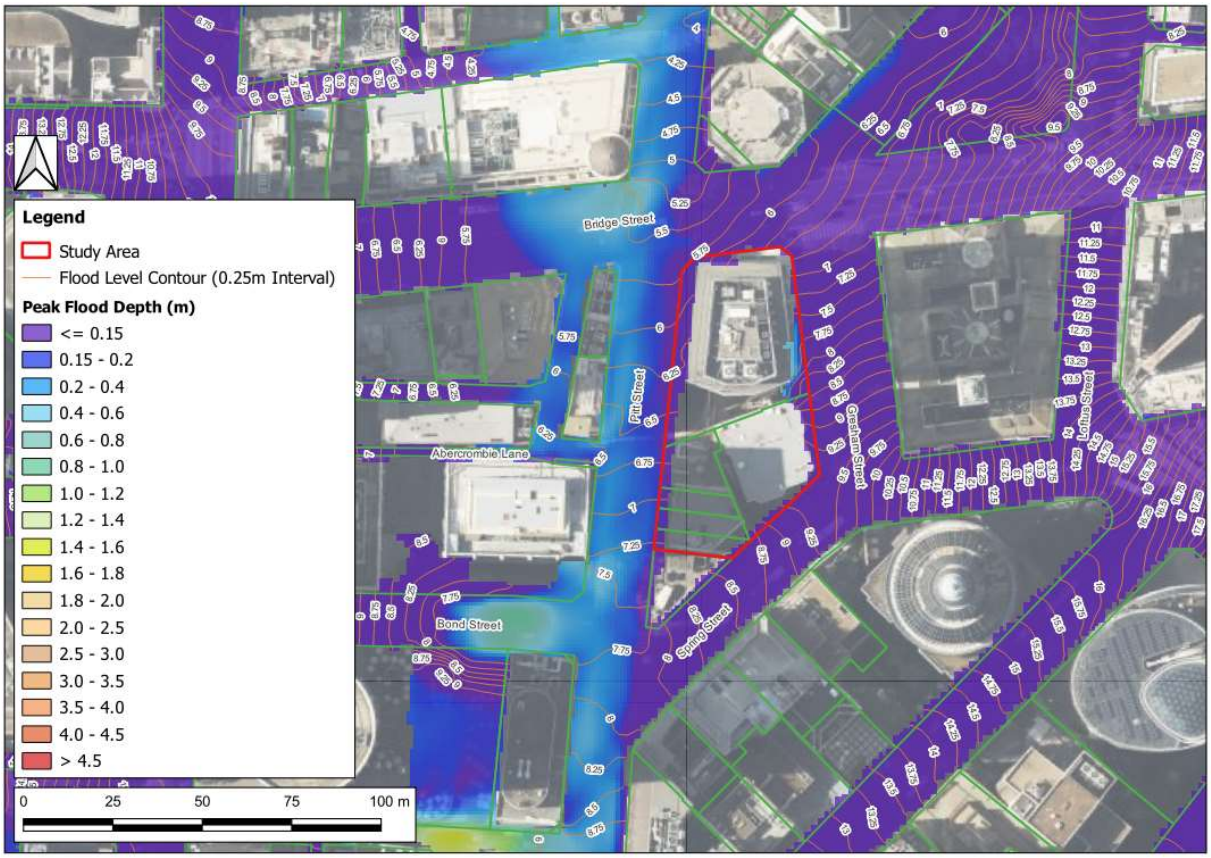


Figure 4: 1% AEP Event – Peak Flood Depth & Level Contours (Existing Scenario)

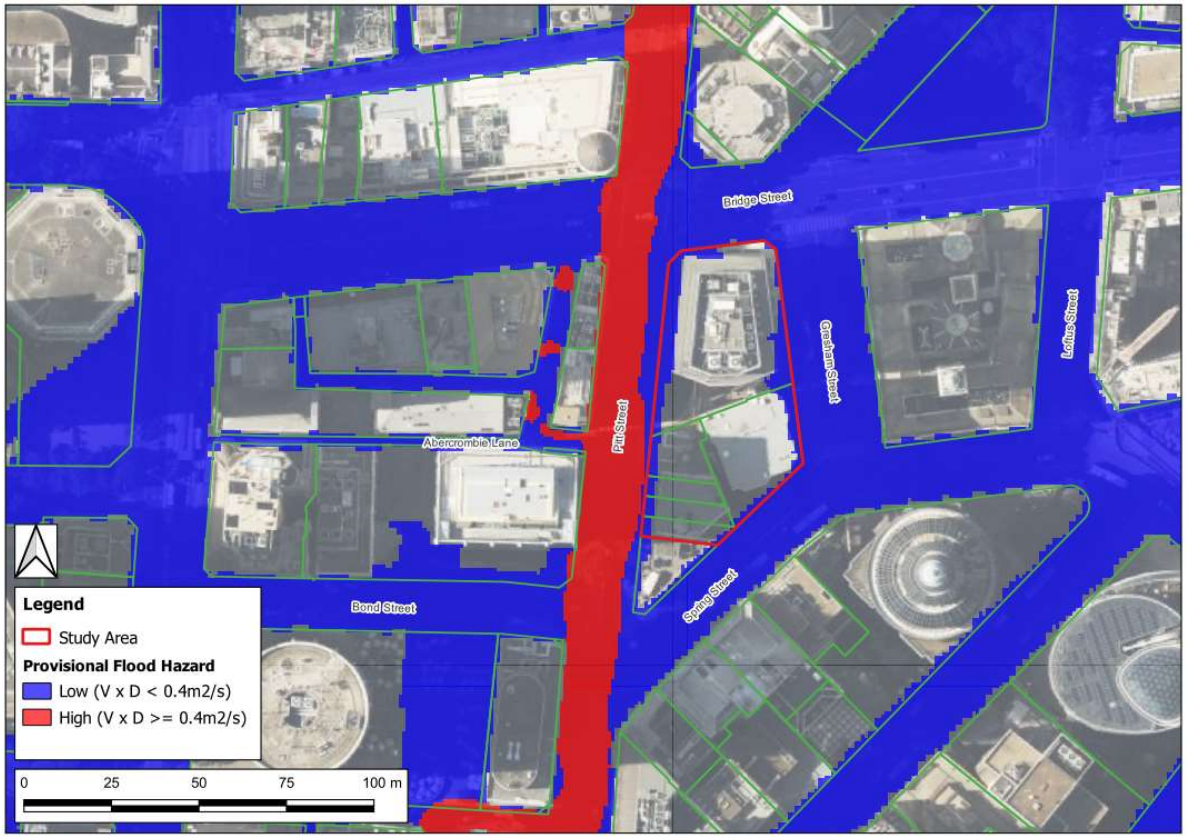


Figure 5: 1% AEP Event – Provisional Flood Hazard (Existing Scenario)

3.1.2 PMF Results

Figure 6 and Figure 7 present the flood depth and level contours and flood hazard maps, respectively, in the existing scenario for the PMF flood event.

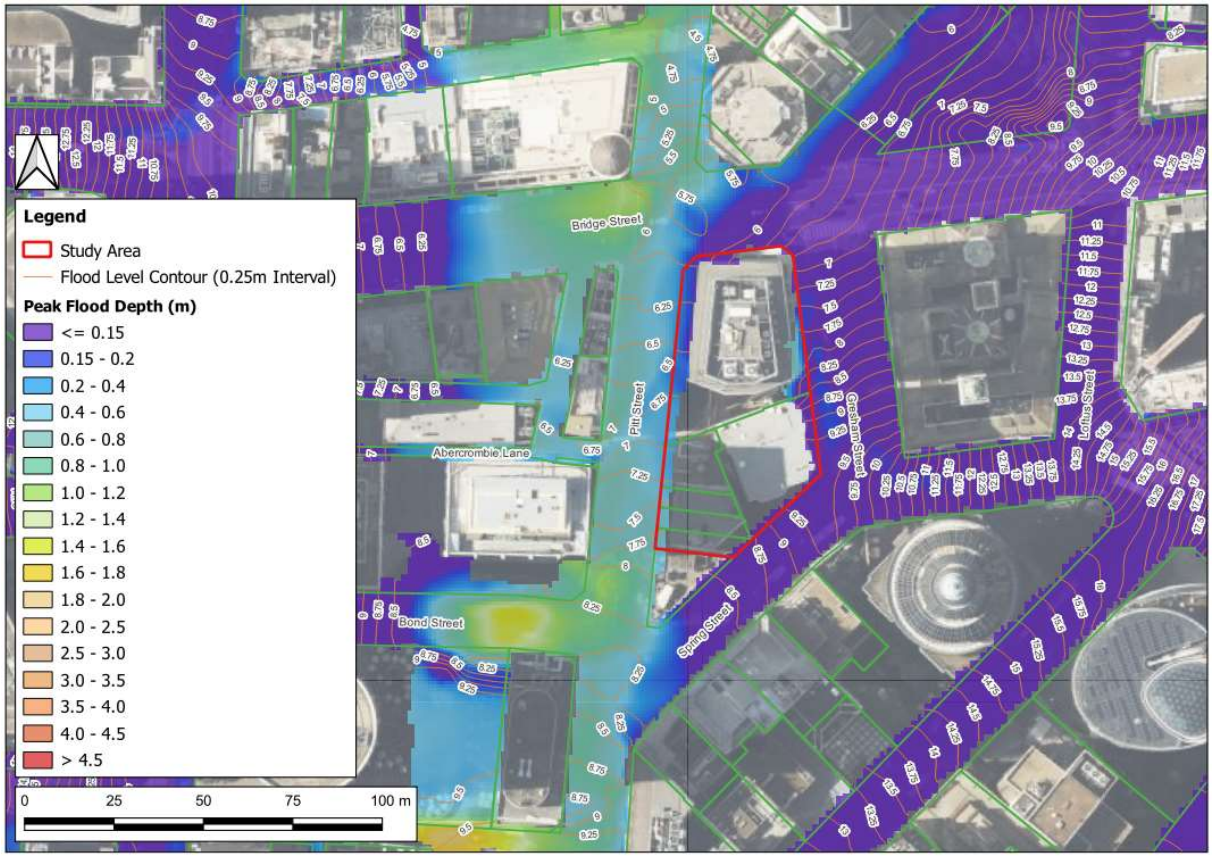


Figure 6: PMF Event – Peak Flood Depth & Level Contours (Existing Scenario)

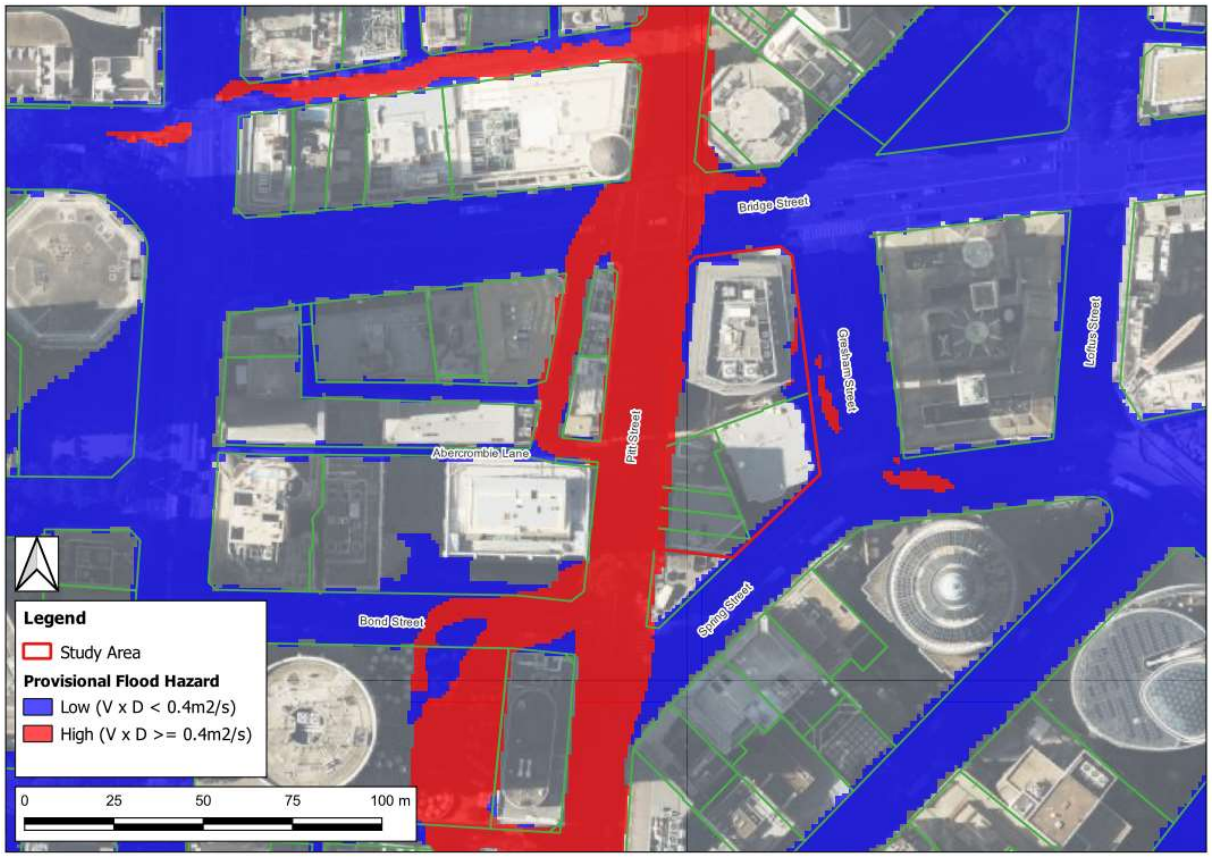


Figure 7: PMF Event – Provisional Flood Hazard (Existing Scenario)

Modelling indicates that flood water currently flows primarily along Pitt Street in a northerly direction towards Circular Quay. There is some local ponding on Gresham Street likely due to in ground drainage network capacity exceedance. Generally, the surrounding road network is classified as a Low Hazard, with the exception of Pitt Street, being a major overland flow path through the city.

3.2 Post Development Flooding

A post development scenario has been modelled to determine the impact of the proposed development on existing flood levels and evaluate flood mitigation methods to reduce flood impacts to adjacent and downstream properties, if required. The proposed building footprint has been incorporated into the existing flood model to prepare the post development scenario.

3.2.1 1% AEP Results

Figure 8 and Figure 9 present the flood depth and level contours and flood hazard maps, respectively, in the post development scenario for the 1% AEP flood event. Figure 10 presents the flood level impact as a result of the proposed development on existing flood levels.

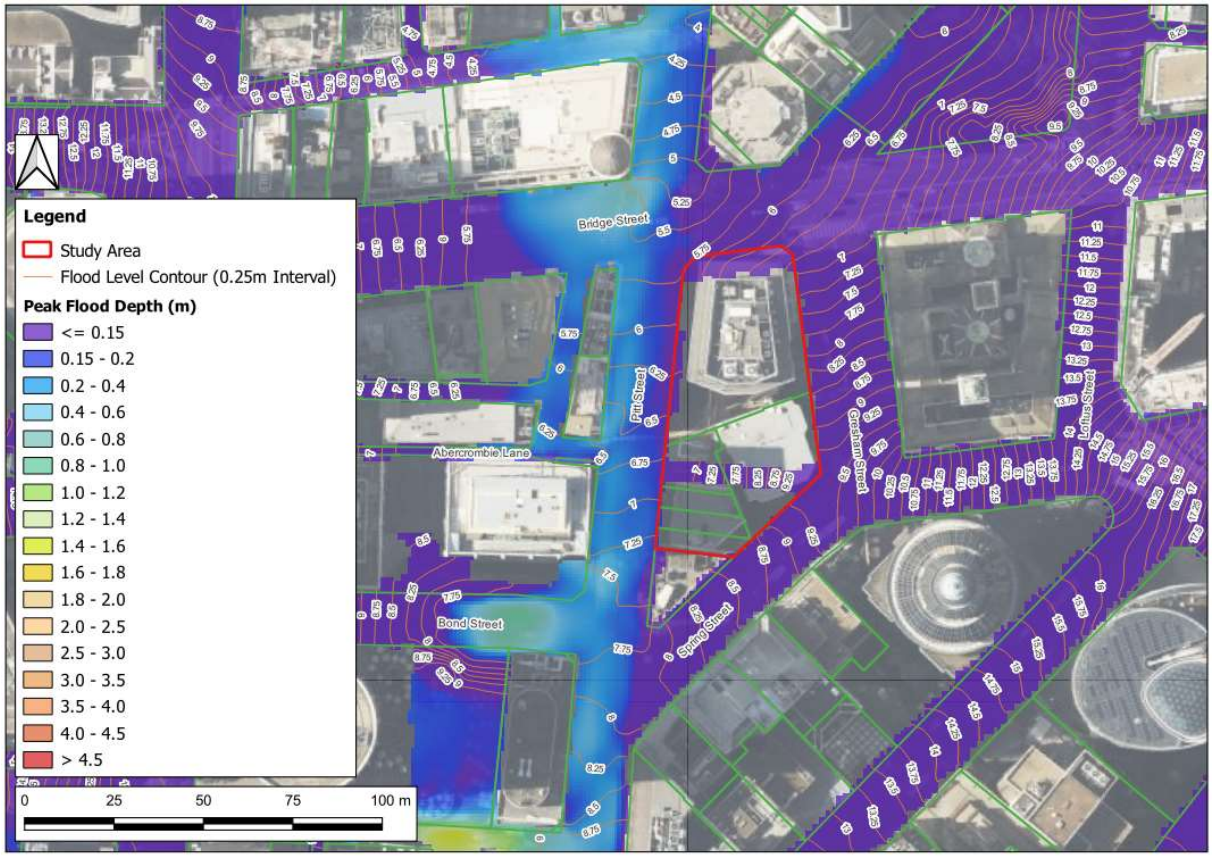


Figure 8: 1% AEP Event – Peak Flood Depth & Level Contours (Post Development Scenario)

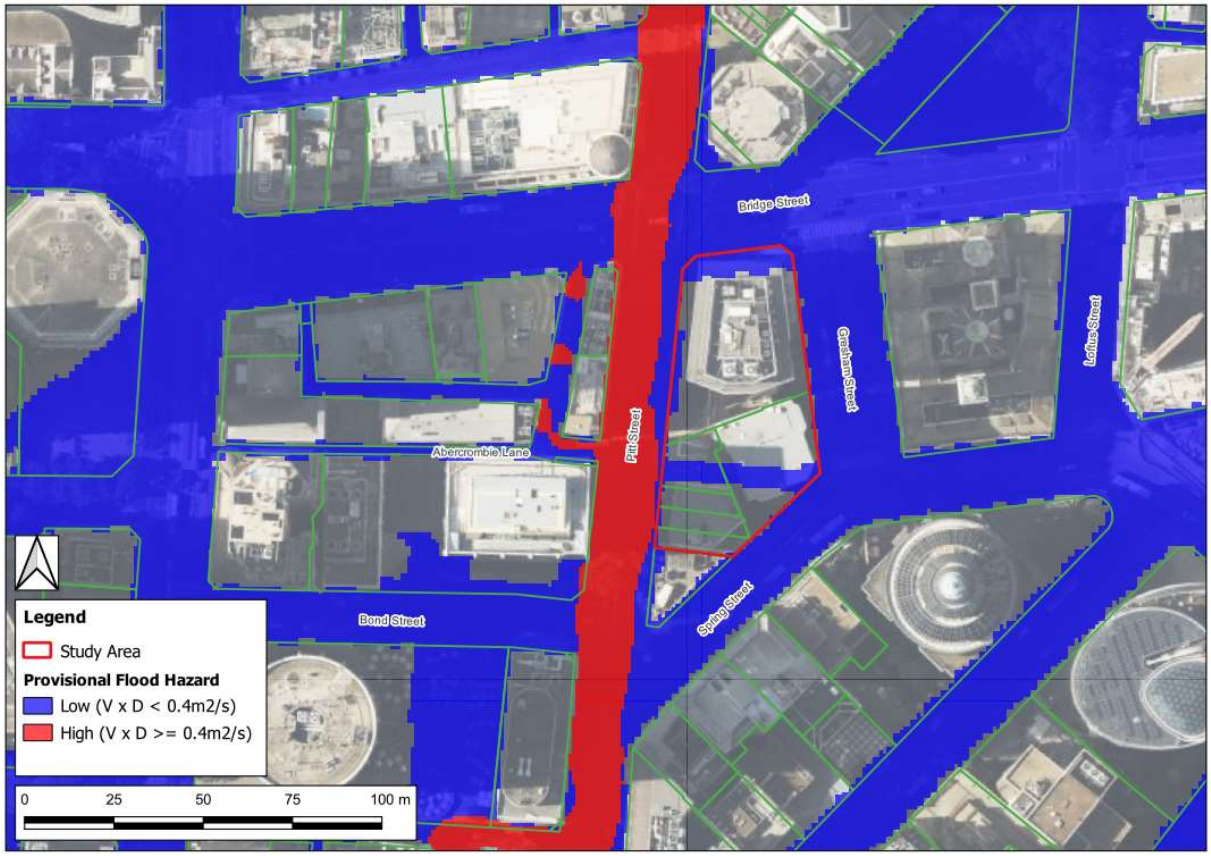


Figure 9: 1% AEP Event – Provisional Flood Hazard (Post Development Scenario)

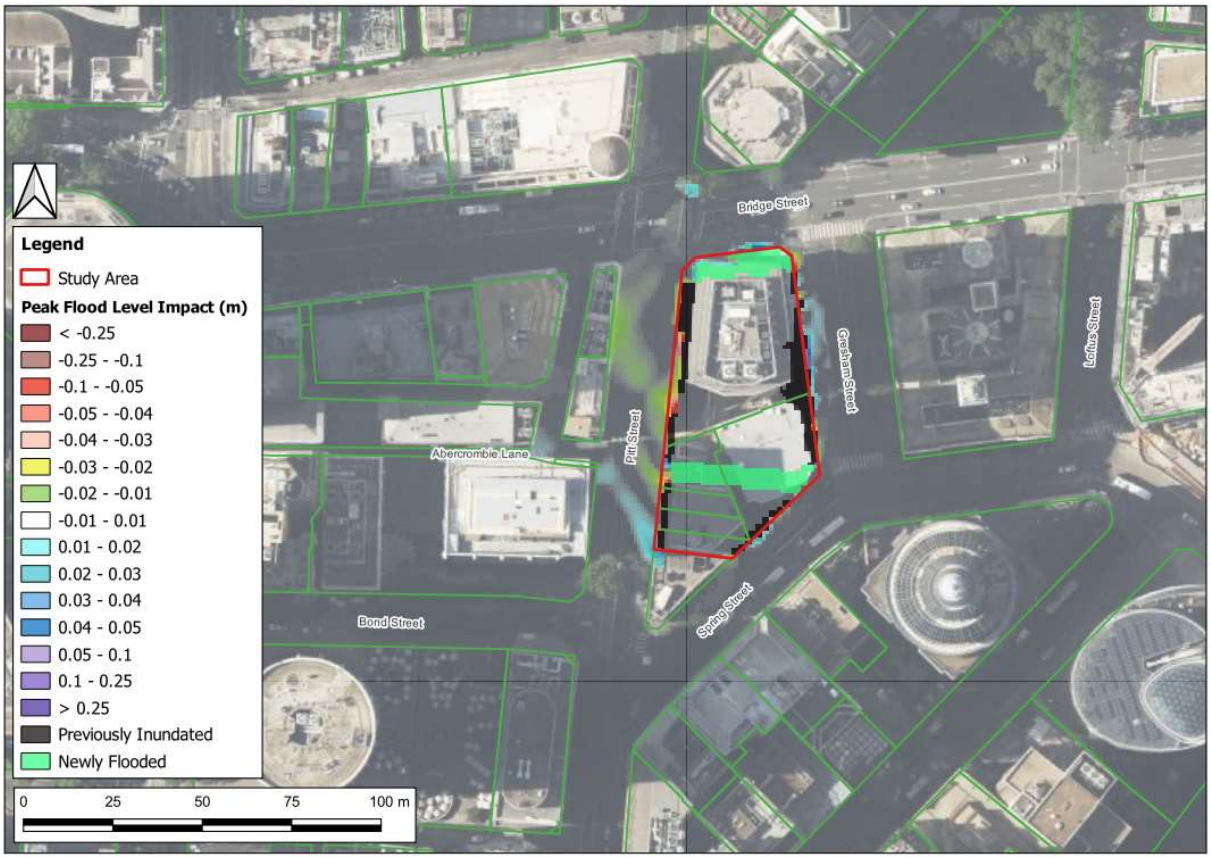


Figure 10: 1% AEP Event – Peak Flood Level Impact (Post Development Scenario)

As can be seen in Figure 10, generally a minor increase in flood levels up to 22mm is observed at the south-western boundary of the site within Pitt Street and a decrease in flood levels up to 12mm is observed immediately west of the site. Where the site is newly flooded, flood depths of between 3mm and 40mm is observed within the site. The flood hazard is low within the site in the 1% AEP event.

3.2.2 PMF Results

Figure 11 and Figure 12 present the flood depth and level contours and flood hazard maps, respectively, in the post development scenario for the PMF flood event. Figure 13 presents the flood level impact as a result of the proposed development on existing flood levels.

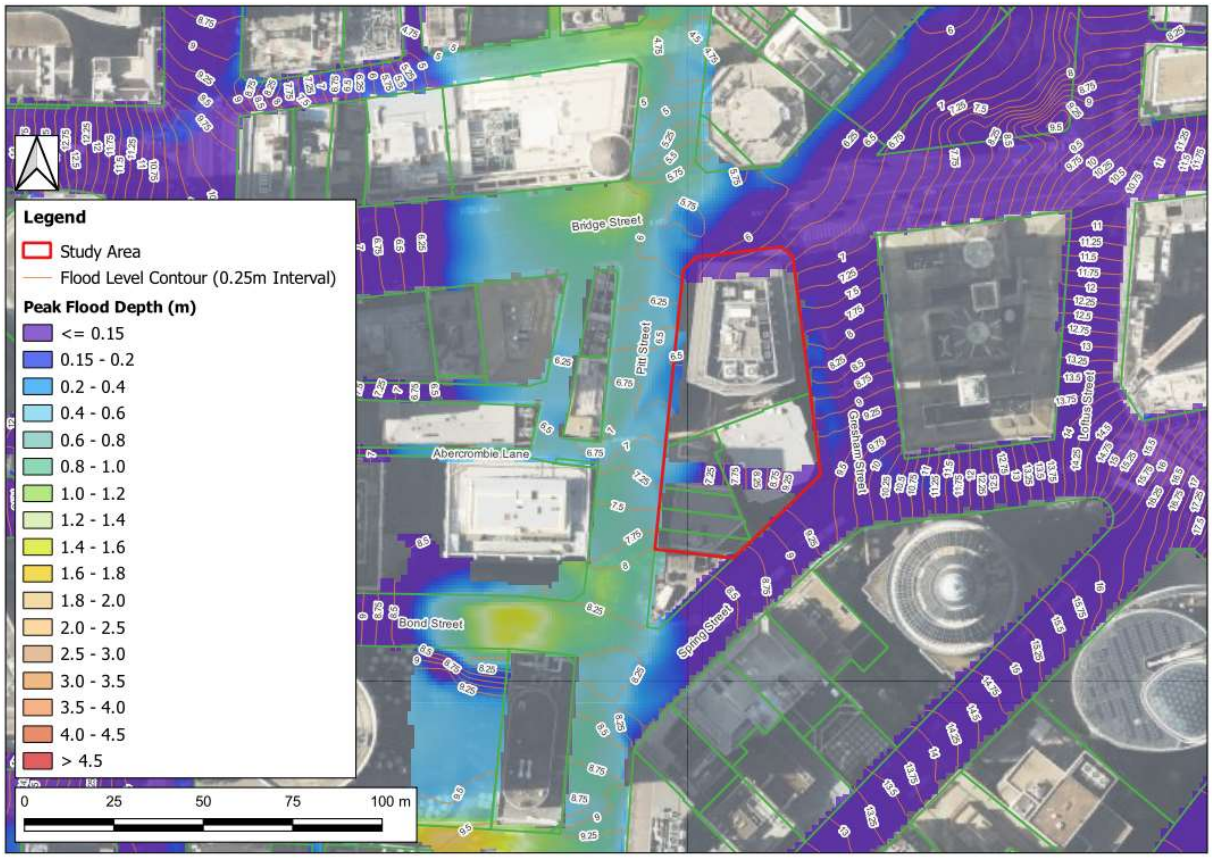


Figure 11: PMF Event – Peak Flood Depth & Level Contours (Post Development Scenario)

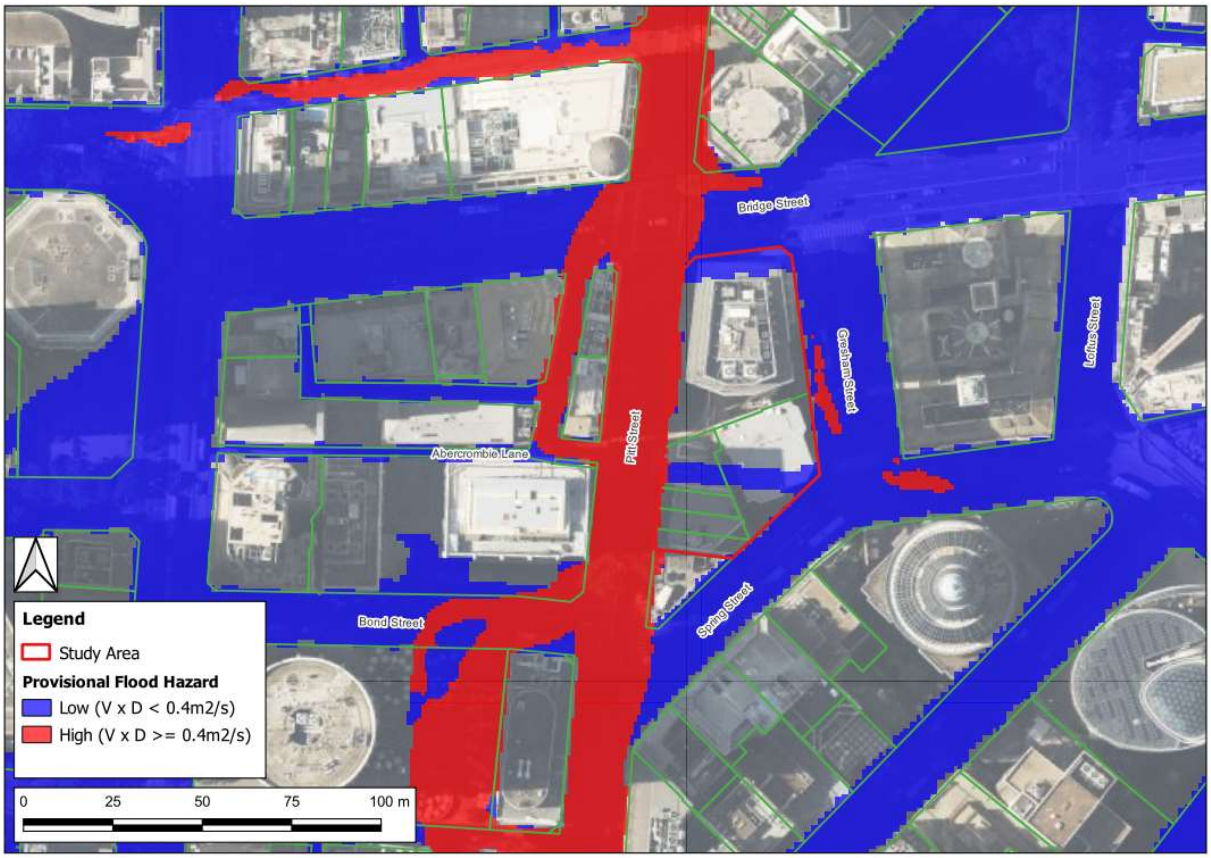


Figure 12: PMF Event – Provisional Flood Hazard (Post Development Scenario)

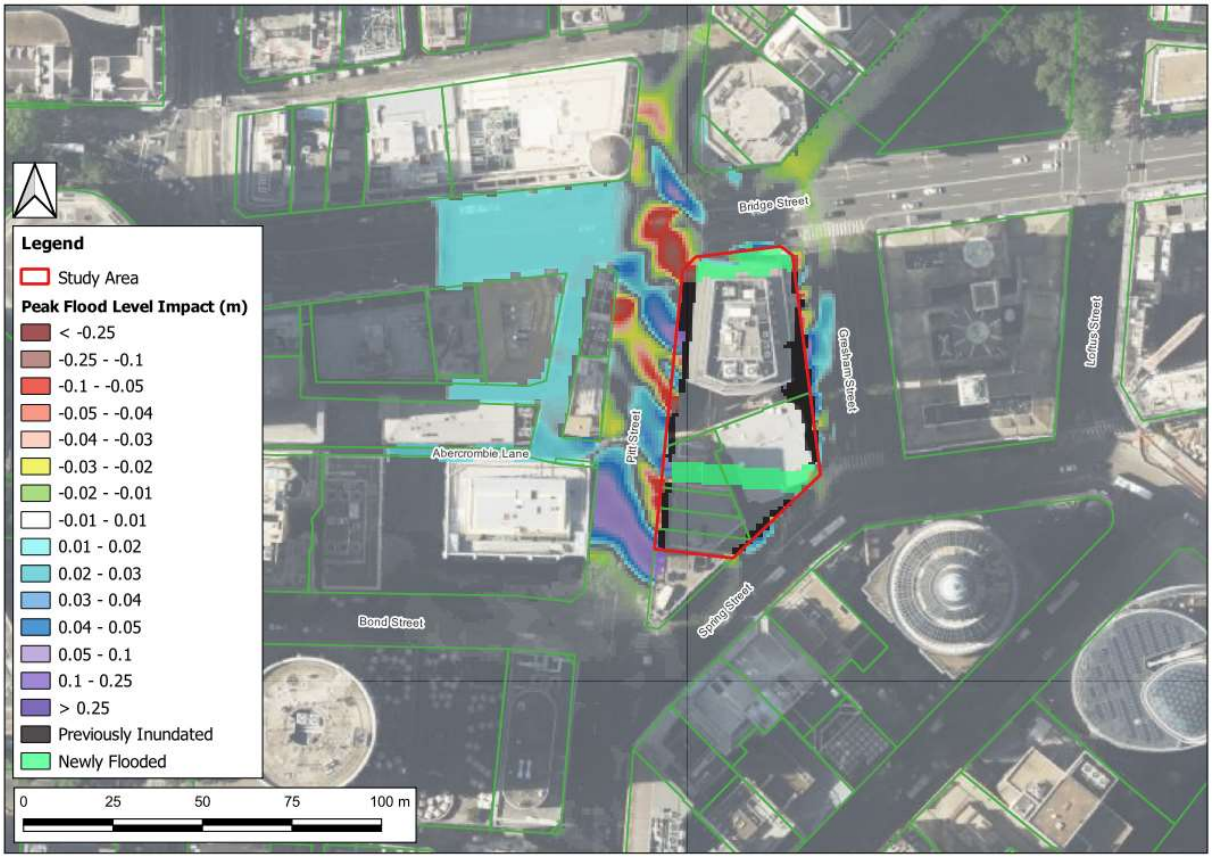


Figure 13: PMF Event – Peak Flood Level Impact (Post Development Scenario)

As can be seen in Figure 13, flood level increases are seen along sections of Pitt Street ranging between 30mm and 150mm south-west of the site in the PMF flood event. In the streets to the west of the site, a flood level increase of 20mm is observed. Pockets of Pitt Street observe a flood level decrease of up to 90mm. There is no change to flood hazard within the public domain.

4. Flood-Related Development Controls

4.1 City of Sydney (CoS) Flood Planning Requirements

4.1.1 Flood Planning Levels

CoS Council have specified the design flood planning levels required in their Interim Floodplain Management Policy. Table 1 below identifies the freeboard requirements as specified in CoS Council's Interim Floodplain Management Policy for various building/structure types.

Table 1: - CoS Council's Flood Planning Levels (Source: Interim Floodplain Management Policy)

Development		Type of Flooding	Flood Planning Level
Residential	Habitable Rooms	Mainstream Flooding	1% AEP flood level + 0.5m
		Local Drainage Flooding	1% AEP flood level + 0.5m OR Two times the depth of flow with a minimum of 0.3m above the surrounding surface if the depth of flow in the 1% AEP flood is less than 0.25m
		Outside floodplain	0.3m above surrounding ground
	Non-habitable rooms such as a laundry or garage (excluding below-ground car parks	Mainstream or local drainage flooding	1% AEP flood level
Industrial or Commercial	Business	Mainstream or local drainage flooding	Merits approach presented by the applicant with a minimum of the 1% AEP flood level
	Schools and childcare facilities	Mainstream or local drainage flooding	Merits approach presented by the applicant with a minimum of the 1% AEP flood level + 0.5m
	Residential floors within tourist establishments	Mainstream or local drainage flooding	1% AEP flood level + 0.5m
	Housing for older people or people with disabilities	Mainstream or local drainage flooding	1% AEP flood level + 0.5m OR PMF flood level, whichever is higher
	On-site sewer management (sewer mining)	Mainstream or local drainage flooding	1% AEP flood level
	Retail Floor Levels	Mainstream or local drainage flooding	Merits approach presented by the applicant with a minimum of the 1% AEP flood level. The proposal must demonstrate a reasonable balance between flood protection and urban design outcomes for street activation
Below-ground garage/car park	Single property owner with not more than 2 car spaces	Mainstream or local drainage flooding	1% AEP flood level + 0.5m
	All other below-ground car parks	Mainstream or local drainage flooding	1% AEP flood level + 0.5m OR PMF flood level, whichever is higher

	Below-ground car park outside floodplain	Outside floodplain	0.3m above surrounding ground
Above-ground car park	Enclosed car parks	Mainstream or local drainage flooding	1% AEP flood level
	Open car parks	Mainstream or local drainage flooding	5% AEP flood level
Critical Facilities	Floor level	Mainstream or local drainage flooding	1% AEP flood level + 0.5m OR PMF flood level, whichever is higher
	Access to and from critical facility within development site	Mainstream or local drainage flooding	1% AEP flood level

Notes:-

- The below ground garage/car park level applies to all possible ingress points to the basement level car parks such as vehicle entrances and exits, ventilation ducts, windows, light wells, lift shaft openings, risers and stairwells;
- Local drainage flooding occurs where:-
  - The maximum cross-sectional depth of flooding in the local overland flow path through and upstream of the site is less than 0.25m for the 1% AEP flood;
  - The development is at least 0.5m above the 1% AEP flood level at the nearest downstream trapped low point;
  - The development does not adjoin the nearest upstream trapped low point, and;
  - Blockage of an upstream trapped low point is unlikely to increase the depth of flow past the property to greater than 0.25m in the 1% AEP flood.
- Mainstream flooding occurs where the local drainage flooding criteria cannot be satisfied;
- A property is considered to be outside the floodplain where it is above the mainstream and local drainage flood planning levels including freeboard.

4.1.2 Flood-Compatible Materials

In accordance with CoS Council's policy, all areas of the development that will be impacted by flood water are to be constructed with flood compatible materials as noted in Table 2 below.

Table 2: CoS Council's Flood Compatible Materials (Source: Interim Floodplain Management Policy)

Component	Flood Compatible Material
Flooring and Sub-Floor	• Concrete slab-on-ground monolith construction • Suspended reinforced concrete slab
Wall Structure	• Solid brickwork, blockwork, reinforced concrete or mass concrete
Wall and Ceiling Linings	• Fibro-cement board • Brick, face or glazed • Clay tile glazed in waterproof mortar • Concrete • Concrete block • Steel with waterproof applications

	• Stone, natural solid or veneer, waterproof grout • Glass blocks • Glass • Plastic sheeting or wall with waterproof adhesive
Roof Structure	• Reinforced concrete construction • Galvanised metal construction
Doors	• Solid panel with waterproof adhesives • Flush door with marine ply filled with closed cell foam • Painted metal construction • Aluminium or galvanised steel frame
Insulation	• Closed cell solid insulation • Plastic/polystyrene boards
Windows	• Aluminium frame with stainless steel rollers or similar corrosion and water-resistant material
Nails, Bolts, Hinges and Fittings	• Brass, nylon or stainless steel • Removable pin hinges • Hot dipped galvanised steel wire nails or similar
Main Power Supply	• Subject to the approval of the relevant authority, the incoming main commercial power service equipment, including all metering equipment, shall be located above the designated flood planning level. Means shall be available to easily disconnect the dwelling from the main power supply
Wiring	• All wiring, power outlets, switches, etc., should be located above the designated flood planning level. All electrical wiring installed below this level should be suitable for continuous underwater immersion and should contain no fibrous components. This will not be applicable for below-ground car parks where the car park complies with the flood planning level requirements • Earth leakage circuit-breakers (core balance relays) or Residual Current Devices (RCD) must be installed • Only submersible type splices should be used below maximum flood level • All conduits located below the relevant designated flood level should be so installed that they will be self-drainage if subjected to flooding
Electrical Equipment	• All equipment installed below or partially below the designated flood planning level should be capable of disconnection by a single plug and socket assembly
Heating and Air Conditioning Systems	• Heating and air conditioning systems should be installed in areas and spaces of the house above the designated flood planning level

Fuel storage for heating purposes	• Heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off • The heating equipment and related fuel storage tanks should be mounted on and securely anchored to a foundation pad of sufficient mass to overcome buoyancy and prevent movement that could damage the fuel spill line. The tanks should be vented above the flood planning level
Ducting for heating/cooling purposes	• All ductwork located below the relevant flood level should be provided with openings for drainage and cleaning. Self-drainage may be achieved by constructing the ductwork on a suitable grade. Where ductwork must pass through a water-tight wall or floor below the relevant flood level, a closure assembly operated from above the relevant flood level should protect the ductwork

4.1.3 Floor Levels

Based on Council's Interim Floodplain Management Policy, the flood modelling results and the proposed development design the following Flood Planning Levels (FPLs) in areas deemed flood affected are appropriate for the development:-

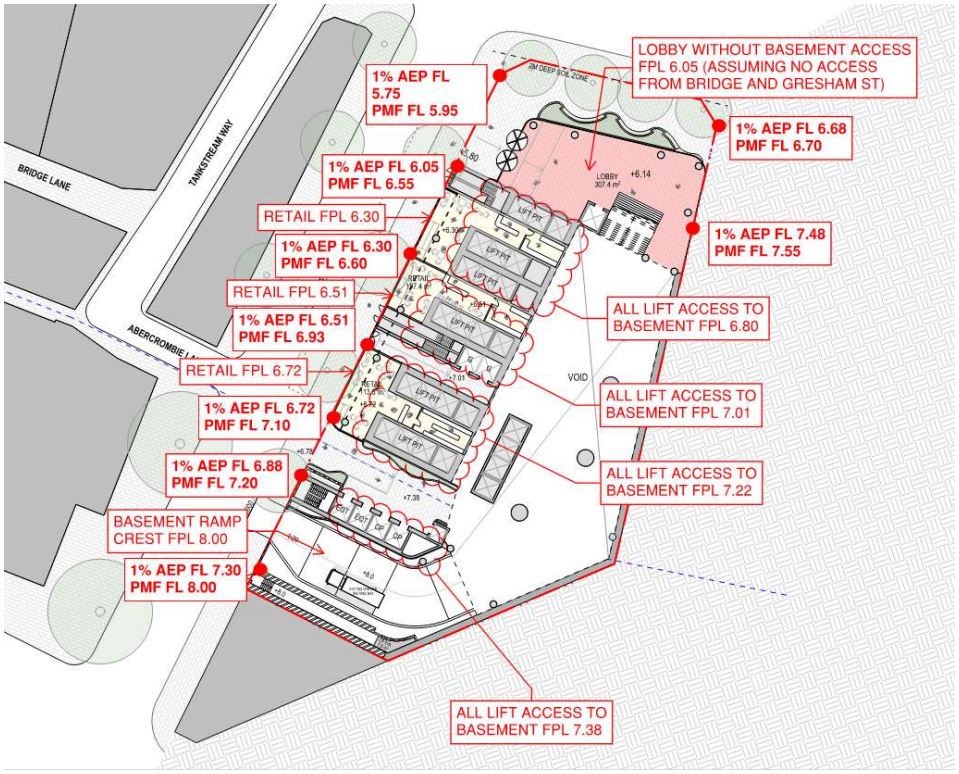
Retail Floor Levels	1% AEP
Lobby with lift access to basement	1% AEP + 0.5m or PMF (whichever is greater)
Lobby without lift access to basement	1% AEP
Basement Car Park Entry	1% AEP + 0.5m or PMF (whichever is greater)
Any openings on the building face leading to basement	1% AEP + 0.5m or PMF (whichever is greater)
Critical Infrastructure such as Substation	1% AEP + 0.5m or PMF (whichever is greater) Access to infrastructure 1% AEP

A mark-up of the current proposed reference scheme layout is shown in Appendix A which provides the minimum Flood Planning Levels required for the development.

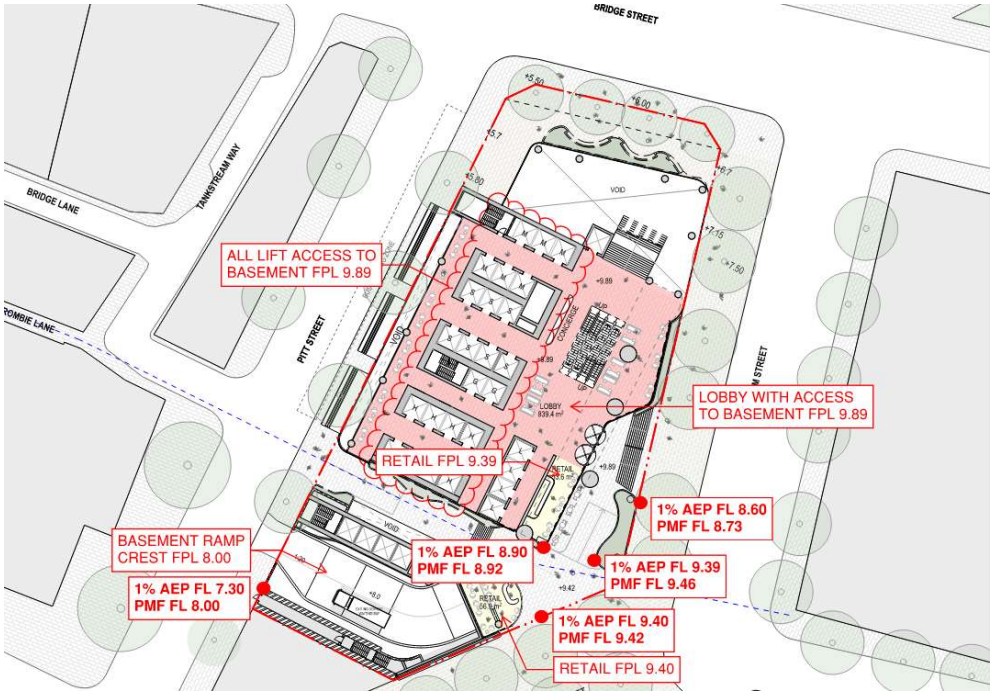
5. Conclusion

Flood modelling of the proposed planning envelope and reference scheme demonstrates that impacts as a result of the development are minimal and localised along the street network. There are no increases in flood hazard as a result of the development. The proposed development complies with the flood planning levels as set out in City of Sydney Council's Interim Floodplain Management Policy and specified in Appendix A of this report.

Appendix A – Flood Planning Levels



Lower Ground Floor Flood Planning Levels



Upper Ground Floor Flood Planning Levels

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