Attachment A11

Flood risk assessment

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Wentworth Capital

Life Sciences Hub, 84-94 Parramatta Road, Camperdown

Flood Risk Assessment Technical Memo

Reference: 304985-00

G | 29 September 2026



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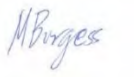
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Glossary

Term	Meaning
Annual Exceedance Probability (AEP)	The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. 1% AEP flood is approximately equal to 1 in 100 year Average Recurrence Interval (ARI) flood event (or simply 100 year flood). It has 1% chance of occurring in a given year.
Australian Height Datum (AHD)	A common national plan of level corresponding approximately to mean sea level.
Average Recurrence Interval (ARI)	The long-term average number of years between the occurrence of a flood as big as or larger than, the selected event. For example, floods with a discharge as great as, or greater than, the 100 year ARI flood event occurs on average once every 100 years
Basement Car Parking or Below-Ground Car Parking	The car parking area generally below ground level where inundation of the surrounding areas may raise water levels above the entry level to the basement, resulting in inundation. Basement car parks are areas where the means of drainage of accumulated water in the car park has an outflow discharge capacity significantly less than the potential inflow capacity.
Extreme Flood	An estimate of the probable maximum flood (PMF), which is the largest flood that could conceivably occur at a particular location, generally estimated from the probable maximum precipitation (PMP). Generally it is not physically or economically possible to provide complete protection against this event.
Flood Planning Level (FPL)	The combinations of flood levels and freeboards selected for floodplain risk management purposes, as determined in flood studies and floodplain risk management studies and plans.
Floodplain	The area of land which is subject to inundation of floods up to and including the probable maximum flood (PMF) event. (Interim Floodplain Management Policy 2014)
Probable Maximum Flood (PMF)	The largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation.
Probable Maximum Precipitation (PMP)	The greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends (World Meteorological Organisation, 1986). It is the primary input to the estimation of the probable maximum flood.

Acronyms

Acronym	Definition
AEP	Annual Exceedance Probability
ARI	Average Recurrence Interval
ARR	Australian Rainfall and Runoff
BoM	Bureau of Meteorology
BYDA	Before You Dig Australia
CoS	City of Sydney
DCP	Development Control Plan
DEM	Digital Elevation Model

Acronym	Definition
EMPLAN	Emergency Management Plan
FFL	Finished Floor level
FPL	Flood Planning Level
FSR	Floor Space Ratio
GFA	Gross Floor Area
LEP	Local Environmental Plan
LGA	Local Government Area
LiDAR	Light Detection and Ranging
mAHD	Metres above Australian Height Datum
NSW	New South Wales
PMF	Probable Maximum Flood
SSP	Shared Socioeconomic Pathway
SWC	Sydney Water Corporation

1. Introduction

This Flood and Risk Assessment Technical Memo is submitted to the City of Sydney on behalf of University of Sydney / Wentworth Capital in support of a Planning Proposal for an amendment to the Sydney Local Environmental Plan 2012 for the introduction a new site specific Floor Space Ratio (FSR) and Height of Buildings development standard for the purpose of a built life sciences research facility and ancillary uses at 88-94 Parramatta Road, Camperdown.

This Planning Proposal seeks approval for the amendment of Floor Space Ratio (FSR) and Height of Buildings in the Sydney Local Environmental Plan 2012. Specifically, approval is sought for the following:

88 – 94 Parramatta Road

- A new maximum building height of part 80 metres, part 30 metres.
- A new site-specific provision for 88-94 Parramatta Road that enables up to 6.5:1 floor space ratio for non-residential uses only.
- Retention of the existing warehouse at 88-90 Parramatta Road.
- Amendments to the Sydney Development Control Plan 2012 (Sydney DCP 2012) to address site specific outcomes.

84 Parramatta Road

- A new mapped maximum height of 30 metres.
- A new mapped maximum floor space ratio for the Veriu site (84 Parramatta Road) of 4.5:1 floor space ratio (retaining the existing MU1 Mixed Use zone)
- Amendments to the Sydney Development Control Plan 2012 (Sydney DCP 2012) to address site specific outcomes.

Full details of the proposed amendments are outlined in the Planning Proposal Report prepared by Colliers Urban Planning.

1.1 Site Description

The site is located at 84-94 Parramatta Road, Camperdown within the City of Sydney Local Government Area (LGA). The site is situated on the traditional land of the Gadigal people.

The land is owned by the University of Sydney and is located on the opposite side of Parramatta Road from the main University of Sydney Camperdown/Darlington campus. The site fronts Parramatta Road along its southern boundary and is bounded by a mixture of residential and commercial uses to the north, east, and west of the site. The site is located just 4km south-west of the Sydney CBD, and 2.5km west of Central Station, and is currently largely used by the University of Sydney for university purposes.

The site's locational context is shown at Figure 1.

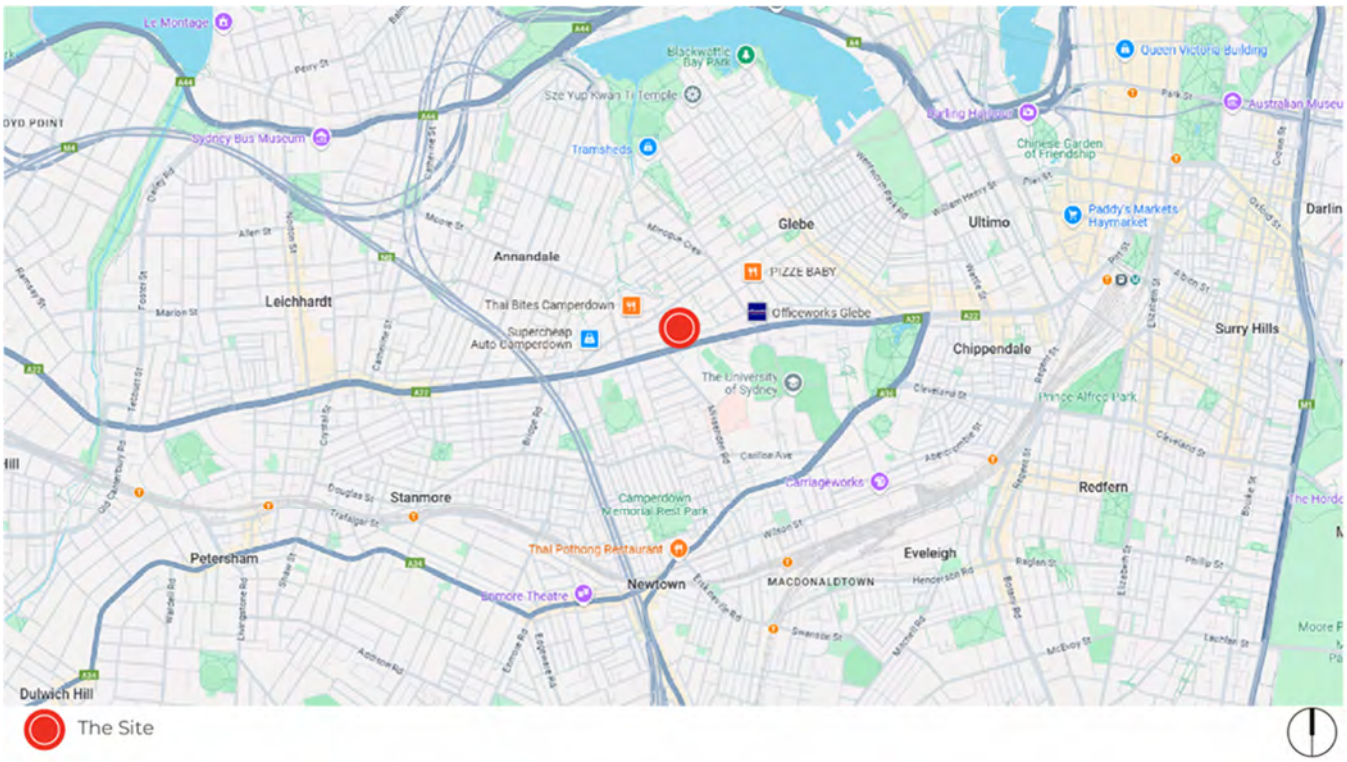


Figure 1 Locational Context

Source: Google Maps, edits by Collier Urban Planning.

An additional map showing the site location is provided in Figure 2.

The proposed development comprises of:

- **Life Science Tower Block** - 27,685 m^2 GFA, 15 storeys + 2 plant levels & 3 basement levels (80 m height)
- **Ancillary Life Science Block** – 6,647 m^2 GFA, 8 storeys (29.7 m height)
- **Serviced Apartments Block (Veriu)** – 3,545 m^2 GFA, 9 storeys – 6 existing + 3 additional (29.3 m height)

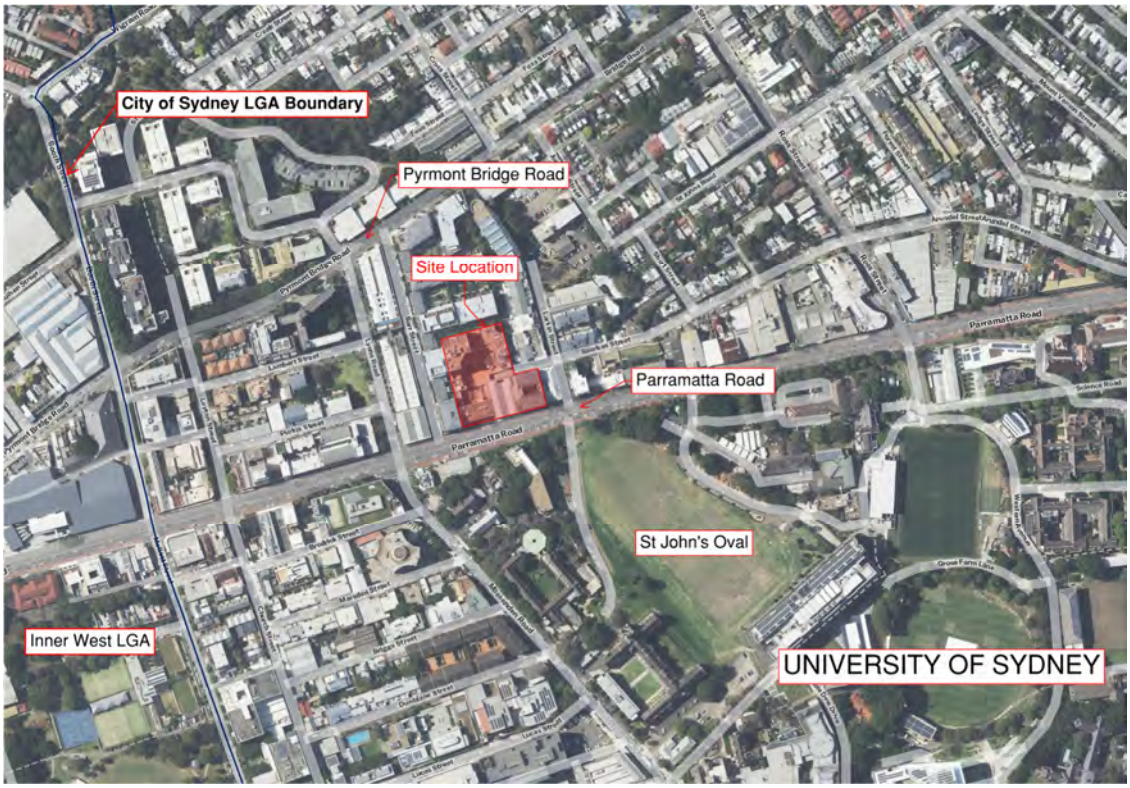


Figure 2 Site Location

To undertake the floor level assessment for the proposed development, the reference locations shown in Figure 3 have been identified as potential ingress points. These have been identified based on the ground floor plan provided in the *Camperdown Life Sciences - Reference Scheme Summary Plans 02.10.25.pdf* document, and drawings of the existing Veriu Building at 84 – 86 Parramatta Road (which is proposed to remain, with additional 3 storeys). It is understood the existing ground floor levels for the Veriu building and the adjacent warehouse (88 – 90 Parramatta Road) are being retained and incorporated into the proposed development.

Compliance with the Flood Planning Level Criteria is discussed in Section 6.2. The current architectural drawings are indicative only and the layout may be refined at future stages of design.

The following information has been provided by the architect of relevance to this assessment:

- No change is proposed to ground floor levels of the existing Veriu Building
- The ground floor of the existing warehouse at 88 – 90 Parramatta Road is to be retained, with access provided to the internal laneway at the rear of the building
- The proposed elevator within the science building entrance lobby services the upper floors only and does not connect to the basement levels
- The elevators proposed in the retail section of the science lobby can be raised to match the internal walkway level of 21.75 m AHD should there be a risk of floodwater affecting the elevator shafts. The elevators are proposed to connect to the basement floor levels.

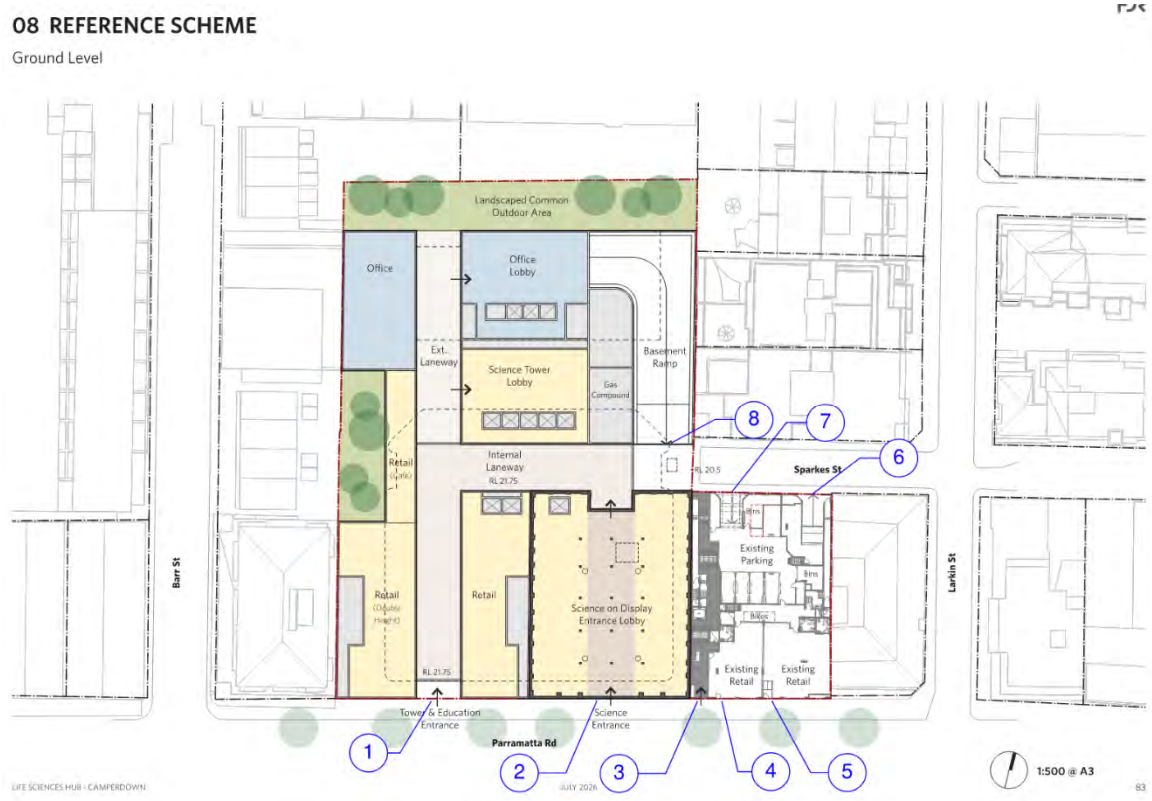


Figure 3 Ground Floor Plan - Life Sciences Hub Camperdown. Entrance locations marked up on plan (Source: Wentworth Capital (Issue July 2026))

1.2 Purpose of memo

The purpose of this technical memo is to provide an overview of flood risk to the site, and outline flooding constraints and likely flood planning implications for the proposed development.

Flooding advice is based on a desktop review of:

- Johnstons Creek Catchment Flood Study, Final Report, September 2015, WMAwater;
- Interim Floodplain Management Policy, May 2014, CoS Council;
- Sydney Development Control Plan 2012;
- Sydney Local Environmental Plan 2012;

1.3 Objectives

The key objectives of this flood assessment are to:

- Review the relevant flood studies and model results around the site;
- Review the existing site topography, external catchments and existing stormwater infrastructure in the immediate vicinity of the site;
- Review the relevant Council flood risk management policies that may apply to the site;
- Identification of Flood Planning Level Requirements;
- Identify existing emergency management strategies.
- Updates to flood model and run to establish existing baseline;
- Provide a description of risk to development and users; and
- Provide comment on potential emergency response strategy.

2. Review of Existing Conditions

2.1 Site catchment context

The site is situated within Johnstons Creek Catchment, which spans both the City of Syndey (CoS) and Inner West Local Government Areas (LGA). The proposed development site lies completely within the CoS LGA.

The site is located approximately halfway down the Johnstons Creek catchment. The catchment generally slopes from south to north, with steeper topography in upper areas, before the becoming relatively flat further down the catchment, particularly near Rozelle Bay.

The topography of the Johnstons Creek catchment within the CoS LGA is shown in Figure 4.

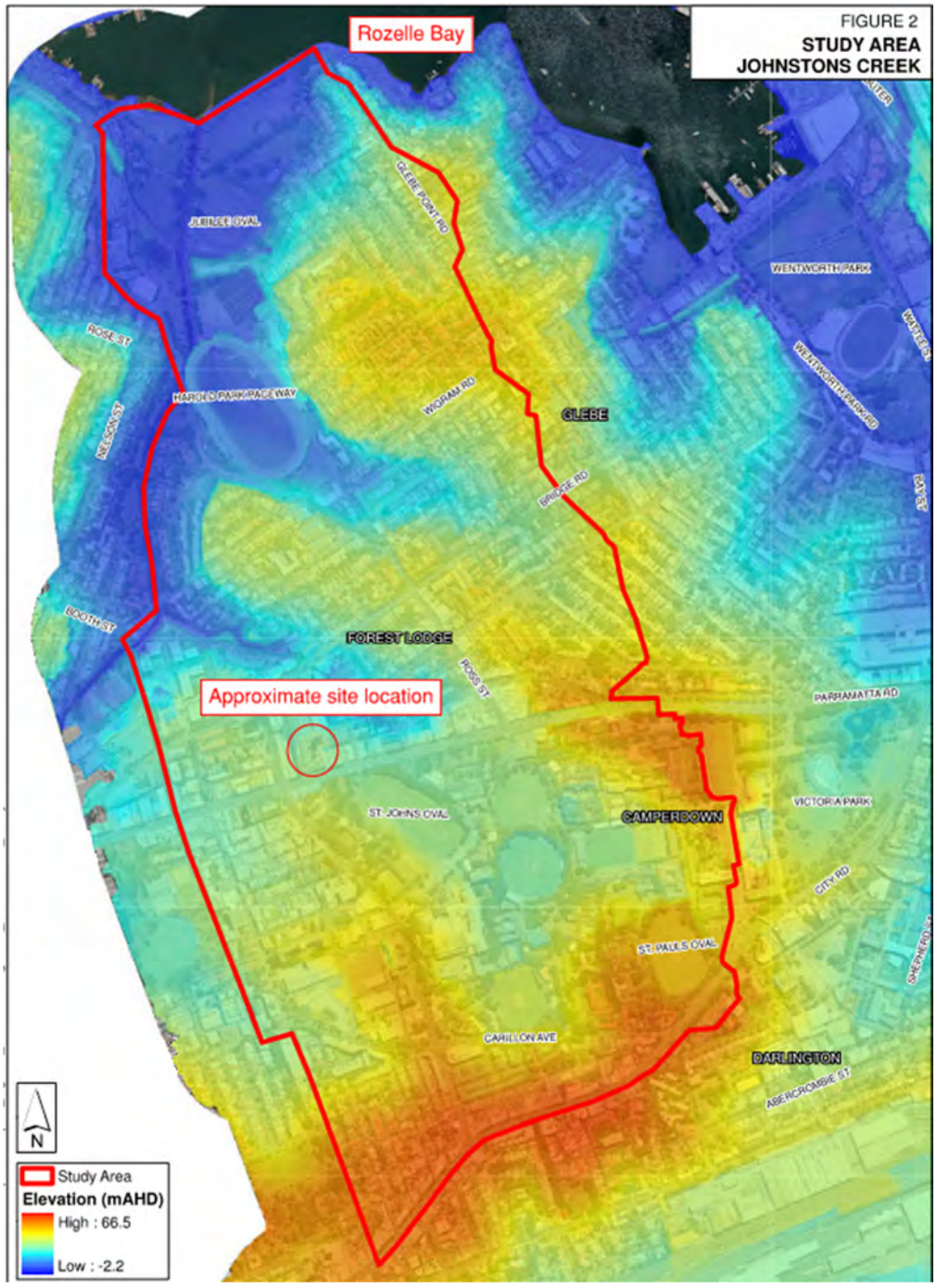


Figure 4: Johnstons Catchment CoS Council Extents (Johnstons Creek Catchment Flood Study, 2015, CoS)

2.2 Topographic survey

Topographic survey of the site area was undertaken by Crux Surveying Australia in August 2024. The topographic survey covers the Barr Street, Larkin Street and Sparkes Street corridors adjacent to the site, the footpath and kerb side lane along Parramatta Road, the existing vehicular entrance driveway and the internal open space area.

Along the southern frontage of the site (on Parramatta Road), the survey illustrates the surface slopes from west to east, with elevations ranging from 21.9 m AHD down to 20.1 m AHD along the site boundary.

Ground levels within the internal open space areas within the site (at 92 Parramatta Road) generally range from 21.5 m AHD to 22.0 m AHD. There is a crest elevation of 22.0 m AHD at the internal walkway entrance at Parramatta Road.

The existing vehicular entrance (at Sparkes Street) has a crest level of approximately 20.0 m AHD where the driveway begins to ramp down towards the car park. The ground surface slopes away from the crest elevation to the east, towards the intersection of Sparkes Street and Larkin Street. Elevations range from 20.0 m AHD at the eastern boundary to 18.3 m AHD at the intersection.

Figure 5 illustrates the topographic survey at the site.

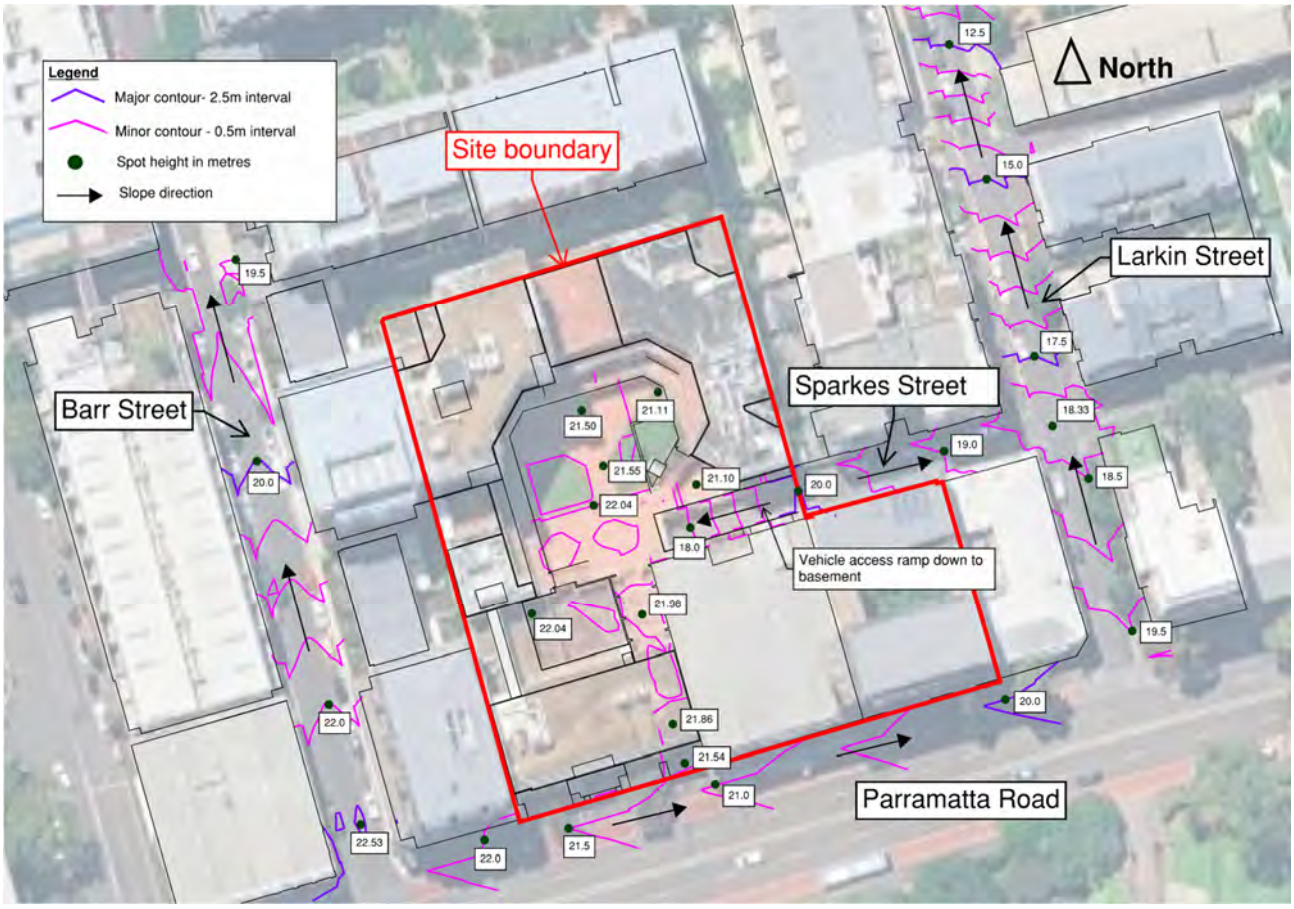


Figure 5 Site Topography

2.3 Existing Veriu building

Drawings for the existing Veriu apartment building were provided to compare the floor levels against the CoS flood planning requirements. A screenshot of the ground floor plan is shown in Figure 6.

The following was noted from a review of the ground floor plan

- The general ground floor level is stated as 20.66 m AHD, however there are locally raised areas within the ground floor for the residential lobby, essential services and storage areas.

- The essential services and storage area levels are illustrated to be 21.60 m AHD.
- The residential lobby does not have a floor level specified on the latest revision of the drawing (revision P). However a previous revision of the drawing (revision N, accessed from the City of Sydney DA portal, reference D/2014/69/B) indicates the floor level of the residential lobby to be 21.60 m AHD, consistent with the other raised ground floor areas (essential services and storage areas). There are no changes between the two drawing revisions to suggest the floor level of the residential lobby has changed.
- The eastern car park entrance at Sparkes Street provides entry to the to the basement level (17.56 m AHD), but has a raised threshold before descending to the basement. The raised threshold level is not specified on the existing plans, however an elevation of 19.71 m AHD is shown at the ramp in the topographic survey.
- The western car park entrance ramps up from the street level to the ground floor level, at 20.66 m AHD.
- There are three entrances from the Parramatta Road into the Veriu building; two to retail areas, and one to the residential lobby. The ground floor level is assumed to be 20.66 m AHD at all entrance locations, with the residential lobby raised internally within the building beyond the western entrance.
- Additional entrances or points of ingress at Sparkes Street (at the northern side of the building) include:
  - Egress corridor from fire stair/amenities area, with the FFL set at the ground level (20.66 m AHD) at the top of the internal stairs
  - Pedestrian entrance to residential lobby. FFL set at 20.66m AHD at top of internal stairs.
  - Two access points to the waste collection store room, with FFL's estimated from survey to be at approximately 19.6 m AHD and 19.4 m AHD. Note the waste collection store room is lowered from the remainder of the ground floor, with an internal ramp up to the car park at 20.66 m AHD
  - Fire hydrant/diesel pump room access, with the FFL estimated from survey at 19.4 m AHD based on survey; and
  - Egress corridor from fire stairs, with the FFL set at the ground level (20.66 m AHD) at the top of the internal stairs.

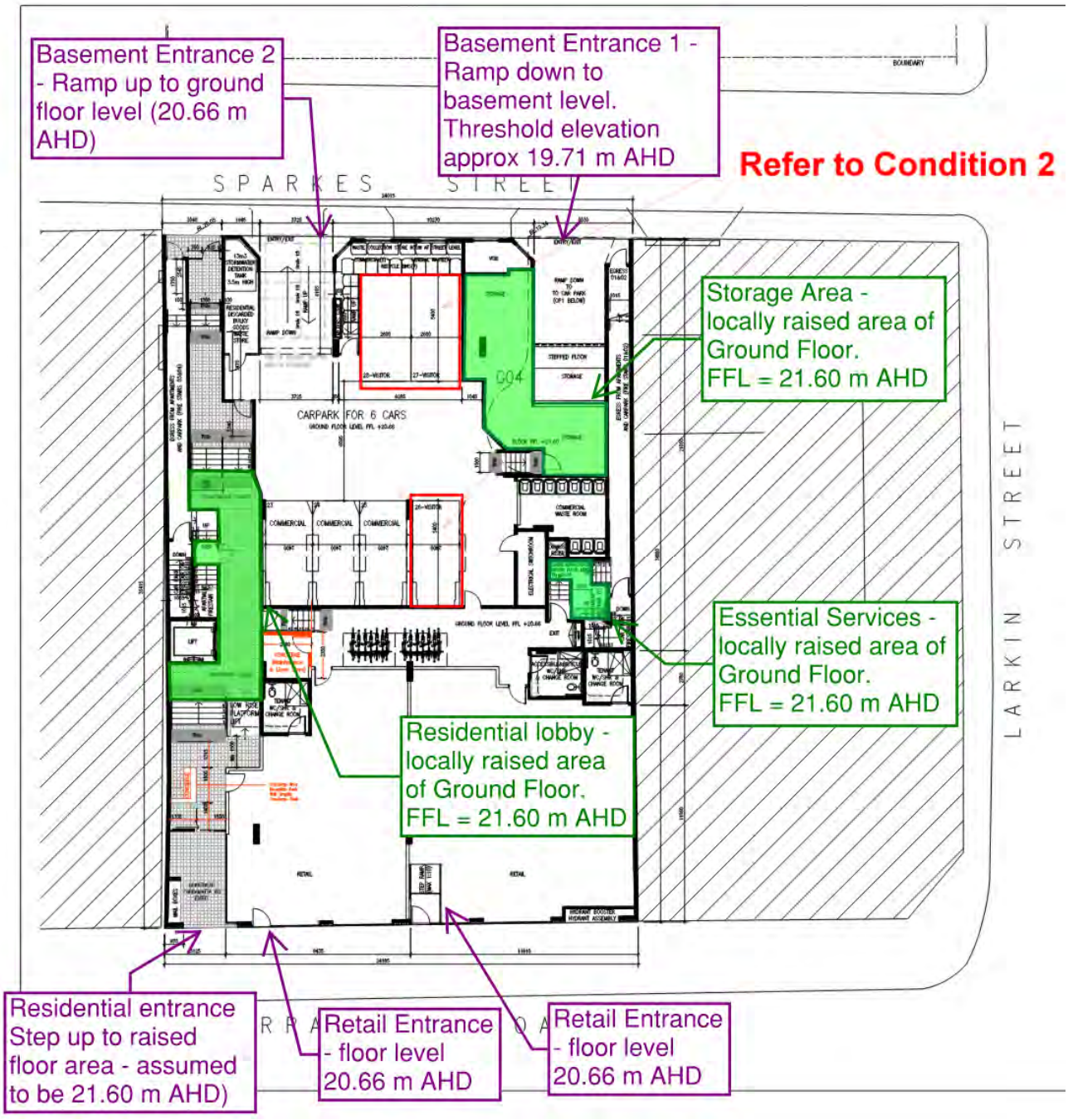


Figure 6 Existing Veriu building ground floor plan. Floor levels and main entrance locations marked up for clarity

2.4 Previous flood studies

The flood study relevant to this development is the Johnstons Creek Catchment Flood Study, completed by WMAwater in September 2015 on behalf of the CoS.

Mapping illustrating peak flood depths, flood levels, velocities and provisional hazard is provided in the flood study report for a range of design flood events.

Flood mapping from the Johnstons Creek Catchment Flood Study has been re-produced below:

- Peak Flood Depths – 1% AEP Event (Figure 7);
- Peak Flood Depths – PMF (Figure 8);

- Provisional Hydraulic Hazard – 1% AEP (Figure 9);
- Provisional Hydraulic Hazard – PMF (Figure 10);

Discussion on the flood mapping in the Council Study is contained in Section 4.1.

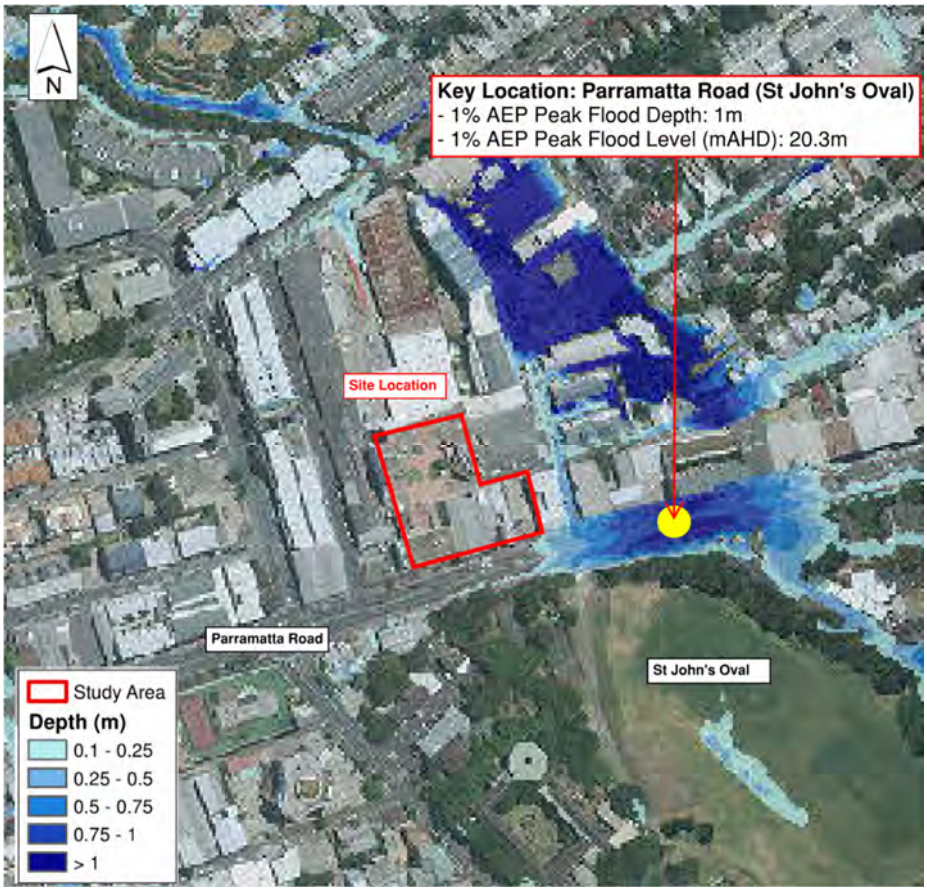


Figure 7 Peak Flood Depths 1% AEP Event (Johnstons Creek Catchment Flood Study, 2015, CoS)

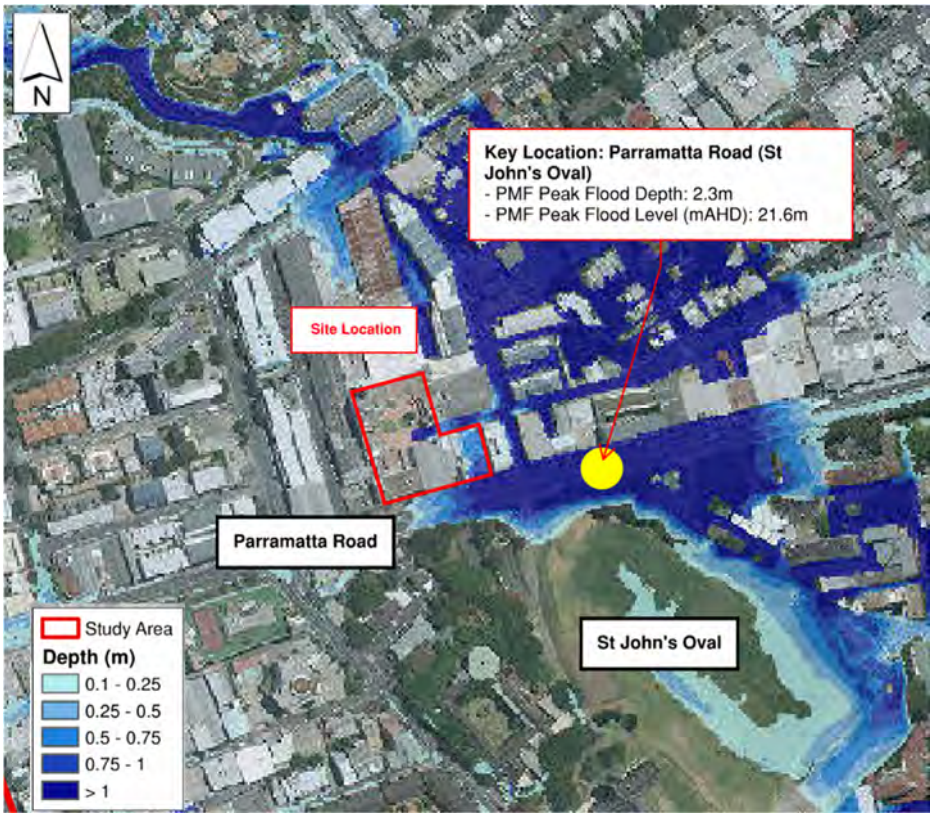


Figure 8 Peak Flood Depths PMF Event (Johnstons Creek Catchment Flood Study, 2015, CoS)

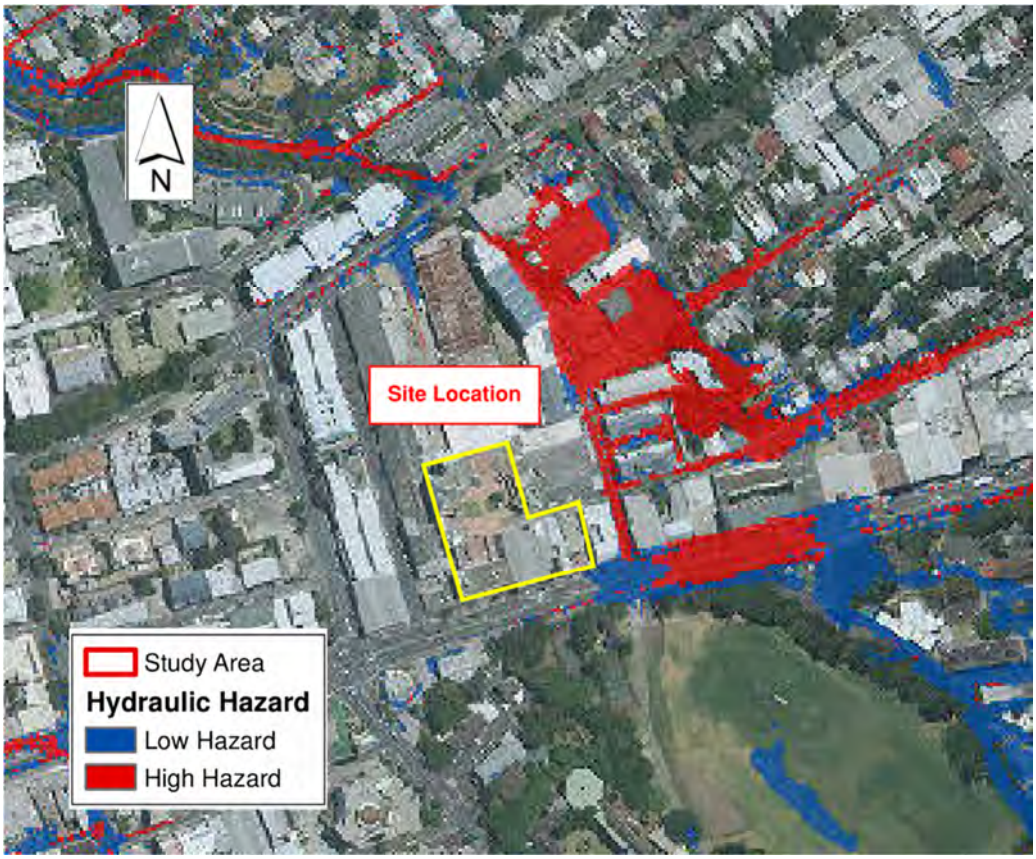


Figure 9 Hydraulic Hazard 1% AEP Event (Johnstons Creek Catchment Flood Study, 2015, CoS)

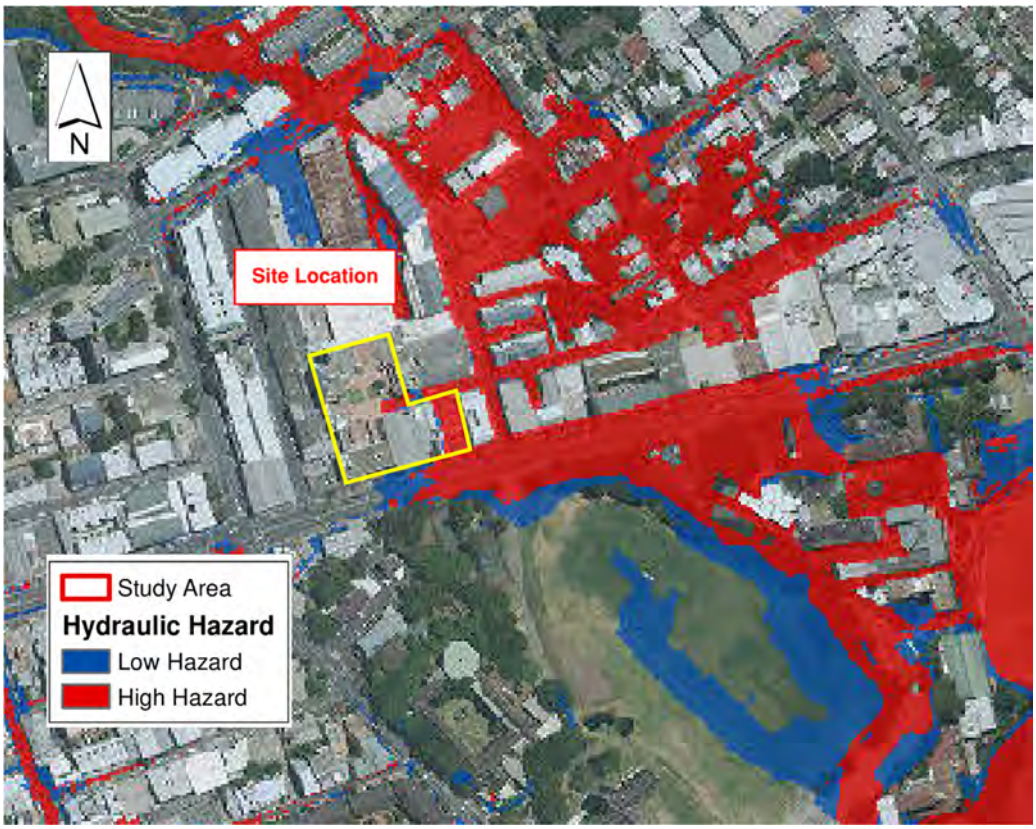


Figure 10 Hydraulic Hazard PMF Event (Johnstons Creek Catchment Flood Study, 2015, CoS)

2.5 Existing stormwater infrastructure

Information on existing stormwater infrastructure surrounding the site was obtained from:

- Responses from a Before You Dig Australia (BYDA) enquiry made on the 29 May 2025;
- Subsurface utilities investigation conducted by Crux Surveying Australia, dated 24 August 2024;
- Johnstons Creek Catchment Flood Study, Final Report, September 2015;
- Google street view at and surrounding the site location.

Existing stormwater infrastructure surrounding the site belongs to CoS and is shown in Figure 11. Further information on the stormwater can be found in the *Life Sciences Hub, 84-94 Parramatta Road, Camperdown Water Cycle & Stormwater Management Technical memo*.

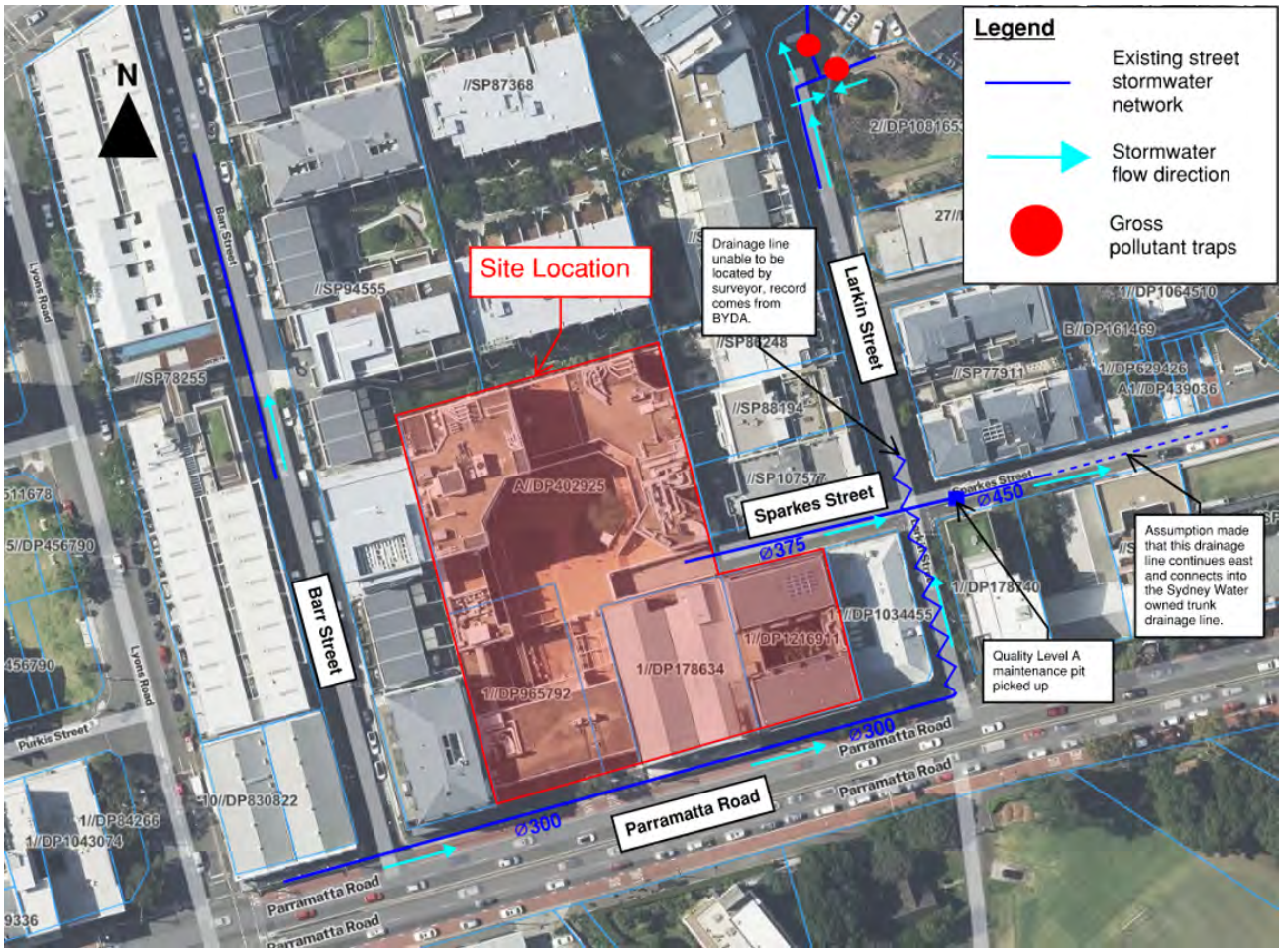


Figure 11 Existing Stormwater Network

2.6 Existing emergency management plans

The City of Sydney has a publicly available *Local Emergency Management Plan (EMPLAN), January 2025* that details arrangements for the prevention of, preparation for, response to, and recovery from emergencies within the LGA. In this plan reference is made to the State Flood Emergency sub plan in the case of flooding, the *NSW State Flood Plan, December 2024*. This plan sets out the prevention, preparation, response and initial recovery arrangements for flooding in NSW.

The University of Sydney also has a *University of Sydney Response Plan (UERP)*. Information relating to management of flood emergencies is limited, and only refers to the Site Emergency Liaison Officer liaison with emergency services when called to attend to a hazard.

It is understood there no site-specific flood emergency response plans exist for the current buildings.

3. Relevant Legislation/Flood Design Criteria

3.1 Sydney Local Environmental Plan (LEP) 2012

The Sydney LEP stipulates several requirements concerning flood planning, which are stated below:

5.21 Flood Planning

(1) The objectives of this clause are as follows—

(a) to minimise the flood risk to life and property associated with the use of land,

(b) to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change,

(c) to avoid adverse or cumulative impacts on flood behaviour and the environment,

(d) to enable the safe occupation and efficient evacuation of people in the event of a flood.

(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development—

(a) is compatible with the flood function and behaviour on the land, and

(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and

(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and

(d) incorporates appropriate measures to manage risk to life in the event of a flood, and

(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.

(3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters—

(a) the impact of the development on projected changes to flood behaviour as a result of climate change,

(b) the intended design and scale of buildings resulting from the development,

(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,

(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.

3.2 Flood planning level requirements

According to the City of Sydney *Interim Floodplain Management Policy,* Flood Planning Level (FPL) is defined as: "*The combinations of flood levels and freeboards selected for floodplain risk management purposes, as determined in flood studies and floodplain risk management studies and plans."*

The FPL refers to the permissible minimum building floor level or threshold level. For below-ground parking, the FPL refers to the minimum level at each access point, including ventilation ducts, windows, light wells, lift shaft openings, risers, services pits and stairwells.

The CoS Interim Floodplain Management Policy provides Flood Planning Level criteria based on the development type, and the "type of flooding" present at the Site.

Details of the relevant flood planning level criteria are included in Table 1, as extracted from the *Interim Floodplain Management Policy*.

Table 1 Flood Planning Level Requirements (Extracted from the City of Sydney *Interim Floodplain Management Policy*)

Development	Flood Planning Level (FPL)
Residential – habitable rooms subject to mainstream or local drainage flooding	1% AEP flood level + 0.5 m or Two times the depth of flow with a minimum of 0.3 m above the surrounding surface if the depth of flow in the 1% AEP flood is less than 0.25 m.
Residential – habitable rooms outside floodplain	0.3 m above the surrounding surface
Residential – non-habitable rooms such as laundry or garage (excluding below-ground car parks) subject to mainstream or local drainage flooding	1% AEP flood level
Industrial or commercial – business subject to mainstream or local drainage flooding	Merits approach with a minimum of the 1% AEP flood level
Industrial or commercial – retail floor levels subject to mainstream or local drainage flooding	Merits approach with a minimum of the 1% AEP flood level. The development must demonstrate a reasonable balance between flood protection and urban design outcomes for street level activation.
Below-ground car park subject to mainstream or local drainage flooding*	1% AEP flood level + 0.5 m or the PMF (whichever is the higher)
Below-ground car park outside floodplain*	0.3 m above the surrounding surface

* The criteria for below ground car parks includes any intended use for spaces located below the surrounding surface levels e.g. car parking, retail, commercial uses, plant etc.

3.3 Other relevant guidelines and policies

A summary of the relevant flood related guidelines relevant to the proposal is provided below:

- NSW Flood Prone Land Policy (Department of Planning and Environment, June 2023)
- NSW Flood Risk Management Manual (Department of Planning and Environment, June 2023), including supporting guidelines:
  - Flood Impact and Risk Assessment (LU01)
  - Flood Function (FB02)
  - Flood Hazard (FB03)
  - Support for Emergency Management Planning (EM01)
- Considering Flooding in Land Use Planning Guideline (Department of Planning, Housing and Infrastructure, 2026)
- Ministerial Direction – Priority 5.7 Flooding (NSW Government, 1 July 2026)
- Shelter in Place Guideline for flash flooding (Department of Planning, Housing and Infrastructure, 2025)
- Climate Change Scenario Guidelines – Draft for Consultation (Department of Planning, Housing and Infrastructure, February 2026)

4. Existing Flood Behaviour

4.1 Discussion on results from Johnstons Creek Flood Study

Flood modelling files for the flood (TUFLOW) modelling undertaken for the Johnstons Creek Flood Study were provided by CoS for the purpose of this flood risk assessment. The flood model was re-run to confirm the results grids re-produced those illustrated in the flood maps in the flood study report.

The results indicate the site is located on the fringe of a floodplain area located east of the site. Flooding is predicted to occur once the capacity of the trunk drainage line conveying runoff from the upstream catchment is exceeded. This is particularly pertinent within trapped localised sag points (e.g. Parramatta Road), from which surface flows cannot easily escape. Larkin Street (to the east of the site) acts as an overland flow path corridor once the water level within the trapped sag at Parramatta Road ponds high enough to drain away to the north. This overland flow path is activated in events as frequent as the 20% AEP.

The setup of the Johnstons Creek flood model was noted to contain some limitations in the vicinity of the site area:

- The Veriu building (84 – 86 Parramatta Road) appears to have been a vacant lot at the time the Johnstons Creek flood study was prepared. Flood mapping presented in the report illustrates the Veriu building site to be within an overland flow path for the PMF event. The existing Veriu building occupies nearly the entire lot and the building would now prevent surface flows draining through the site (refer Figure 12 and Figure 13)
- Local stormwater elements (pits/pipes) were deactivated in the flood model files provided by Council. For this assessment, pits and pipes within surrounding road corridors (Parramatta Road, Larkin Street and Barr Street) have been incorporated into the model.
- The PMF event rainfall inputs in the flood model did not match the PMF rainfall depths in the Johnstons Creek flood study report. The rainfall depths documented in the Johnstons Creek report were noted to be correct, and subsequently rainfall inputs for the PMF were updated in the flood model to match the report values.
- The categorisation of flood hazard was noted to be as per the guidance provided in the 2005 NSW Floodplain Development Manual. This guidance for flood hazard has since been superseded, and revised general flood hazard categorisations have been prepared in accordance with the latest guidance.

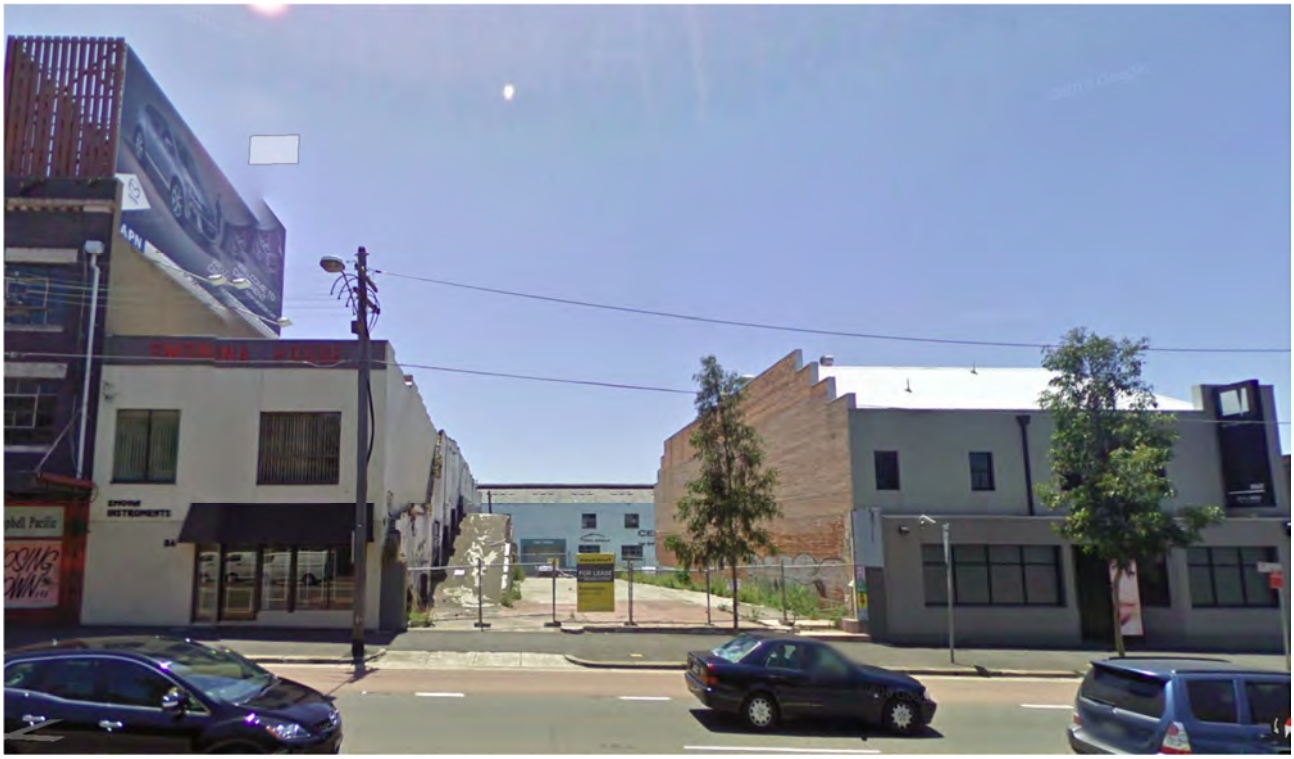


Figure 12 Veriu building site prior to construction, viewed from Parramatta Road (Source: Google Streetview, December 2009)

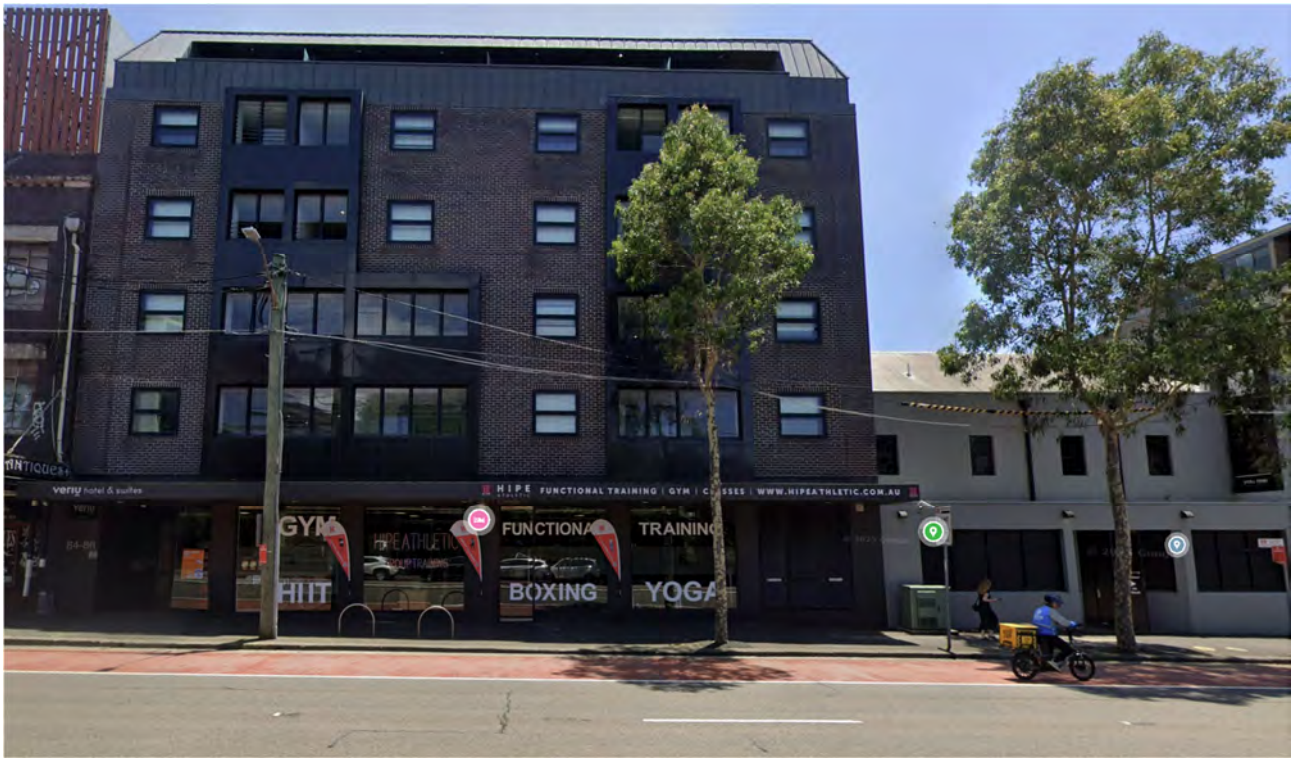


Figure 13 Veriu building viewed from Parramatta Road (Source: Google Streetview, December 2024)

4.2 Revised baseline model results

The flood model was re-run incorporating updates to address the limitations identified in the previous section, to generate revised flood results for the site area. The following conclusions were drawn following the model updates.

- Peak flood levels in the 1% AEP event were relatively similar to those reported in the Council flood study report. Reductions in peak flood level of up to 0.03 m are reported from the revised model compared to the original model. This is likely due to the inclusion of the local stormwater elements in the revised model.
- The flood extent for the PMF was no longer shown to be impacting the existing basement entrance at Sparkes Street, due to the overland flow path through the Veriu building site being blocked in the revised flood model. The peak flood level within Sparkes Street (adjacent to the basement entrance) in the revised flood model is approximately 0.31 m lower for the PMF compared to the original flood model.
- The peak flood level for the PMF event within the Parramatta Road corridor is approximately 0.17 m higher in the revised flood model, compared to the original model results, due to the removal of the overland flow path through the Veriu building. The revised peak PMF level at Parramatta Road is 21.72 m AHD.
- Flood hazard within the Parramatta Road corridor is categorised as H4 (unsafe for vehicles and people) in the PMF event. Note this is primarily driven by high flood depths with the road corridors.

A comparison of peak flood levels between the original flood model provided by Council and the revised baseline flood model is shown in Table 2. Reporting point locations are shown in Figure 14.

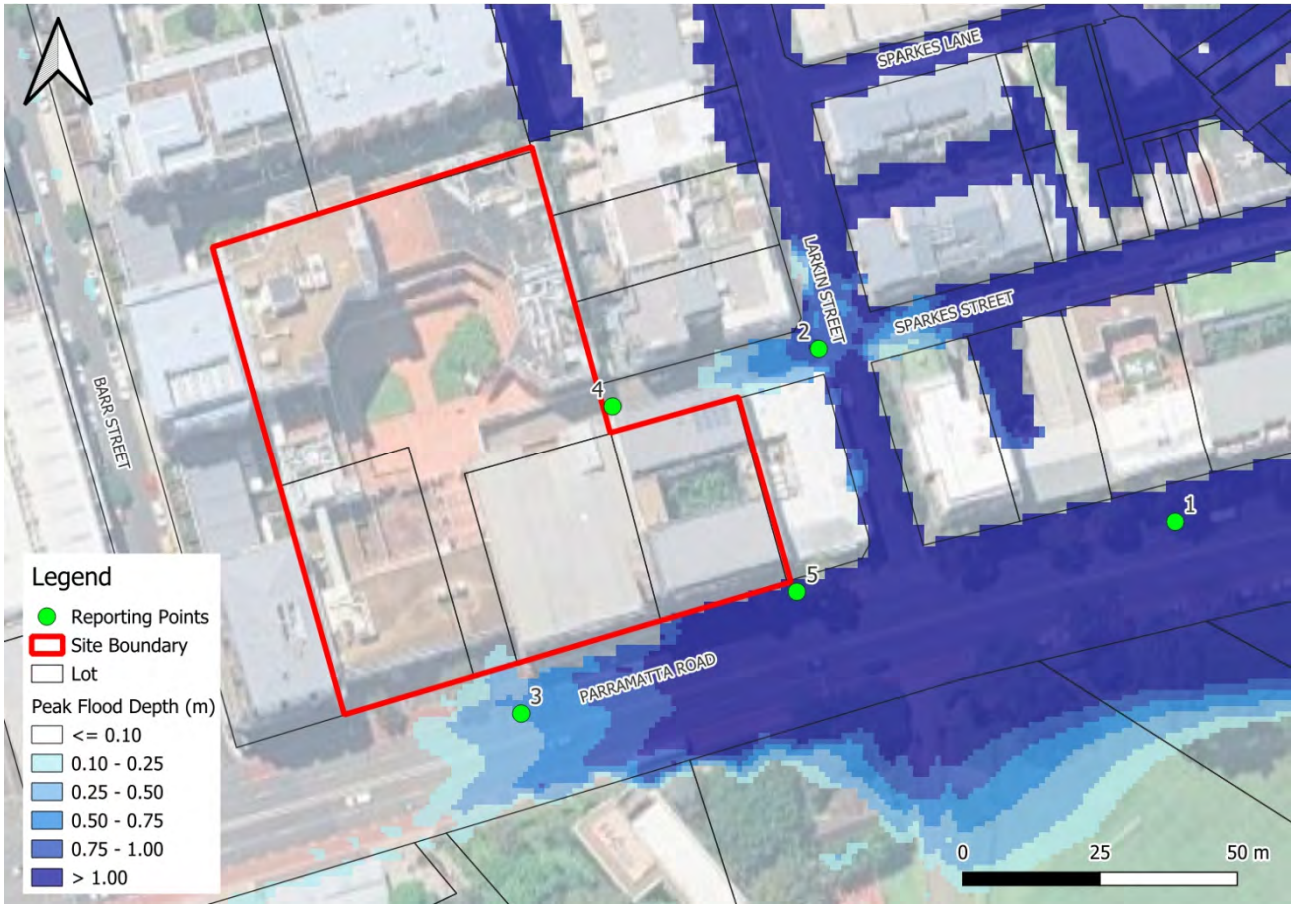


Figure 14 Reporting Point locations

Table 2 Peak Depths and Flood Levels - Comparison of Original (Council) vs. revised baseline flood model results

Reporting Point	1% AEP				PMF			
	Depths		Water Levels		Depths		Water Levels	
	Council	Revised	Council	Revised	Council	Revised	Council	Revised
1	1.04	1.03	20.31	20.30	2.29	2.45	21.56	21.72
2	0.15	0.12	18.58	18.55	1.36	1.05	19.79	19.48
3	Not Flooded	Not Flooded	Not Flooded	Not Flooded	0.34	0.51	21.55	21.72
4	Not Flooded	Not Flooded	Not Flooded	Not Flooded	0.71	Not Flooded	20.63	Not Flooded
5	0.11	0.10	20.30	20.30	1.32	1.53	21.51	21.72

Figure 17 and Figure 18 illustrate the peak flood depths for the 1% AEP and PMF events respectively from the revised baseline model. Note the flood extent both events remains similar to those documented in the Johnstons Creek Flood Study, with the exception of the change in the extent of the PMF previously noted in Sparkes Street.

The classification of hydraulic hazard was updated in line with the general flood hazard curves available in ARR 2019. Hydraulic hazard classification criteria are illustrated in Figure 15, and hazard vulnerability thresholds are illustrated in Figure 16.

Figure 19 and Figure 20 illustrate the hydraulic hazard for the 1% AEP and PMF events respectively from the revised baseline flood model.

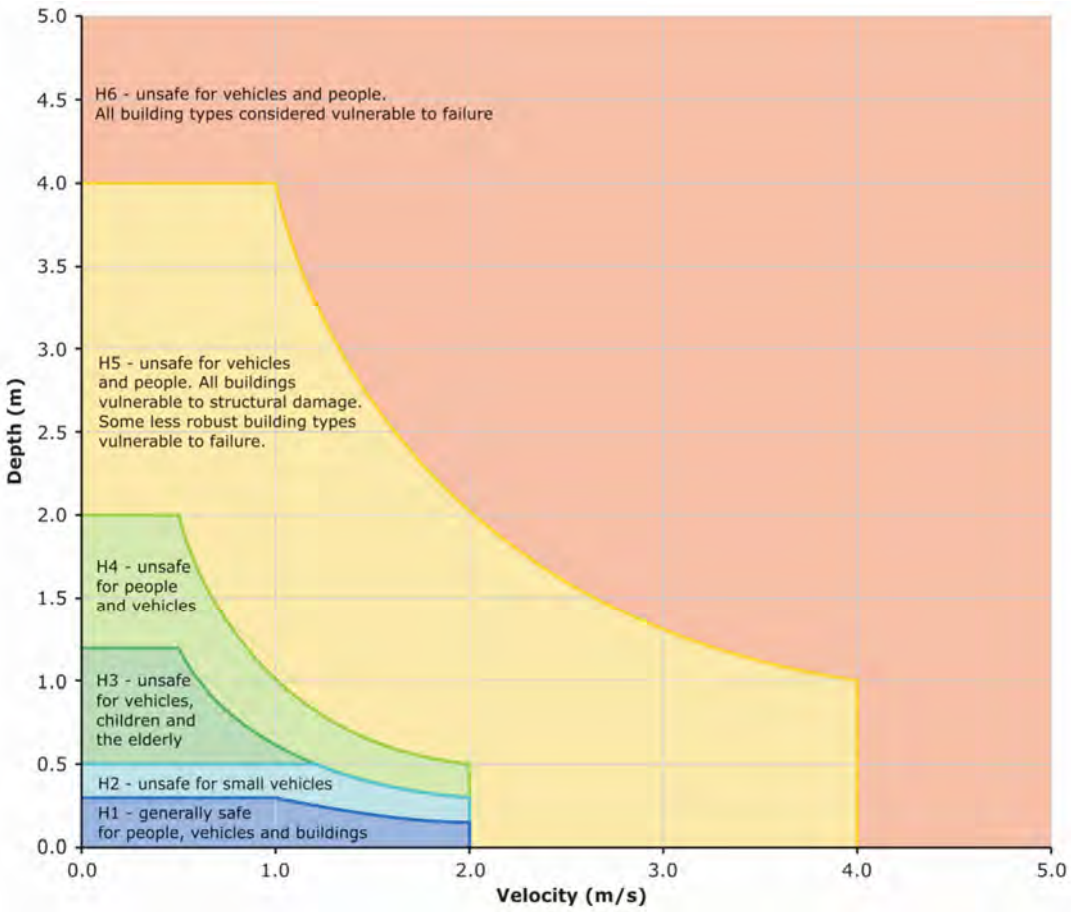


Figure 15 Combined Flood Hazard Curves (Smith et al, 2014)

Hazard Vulnerability Classification	Description
H1	Generally safe for vehicles, people and buildings.
H2	Unsafe for small vehicles.
H3	Unsafe for vehicles. children and the elderly.
H4	Unsafe for vehicles and people.
H5	Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure.
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

Figure 16 Combined Hazard Civers - Vulnerability Thresholds (Smith et al, 2014)



Figure 17 Revised Baseline Flood Model Peak Flood Depths – 1% AEP Event

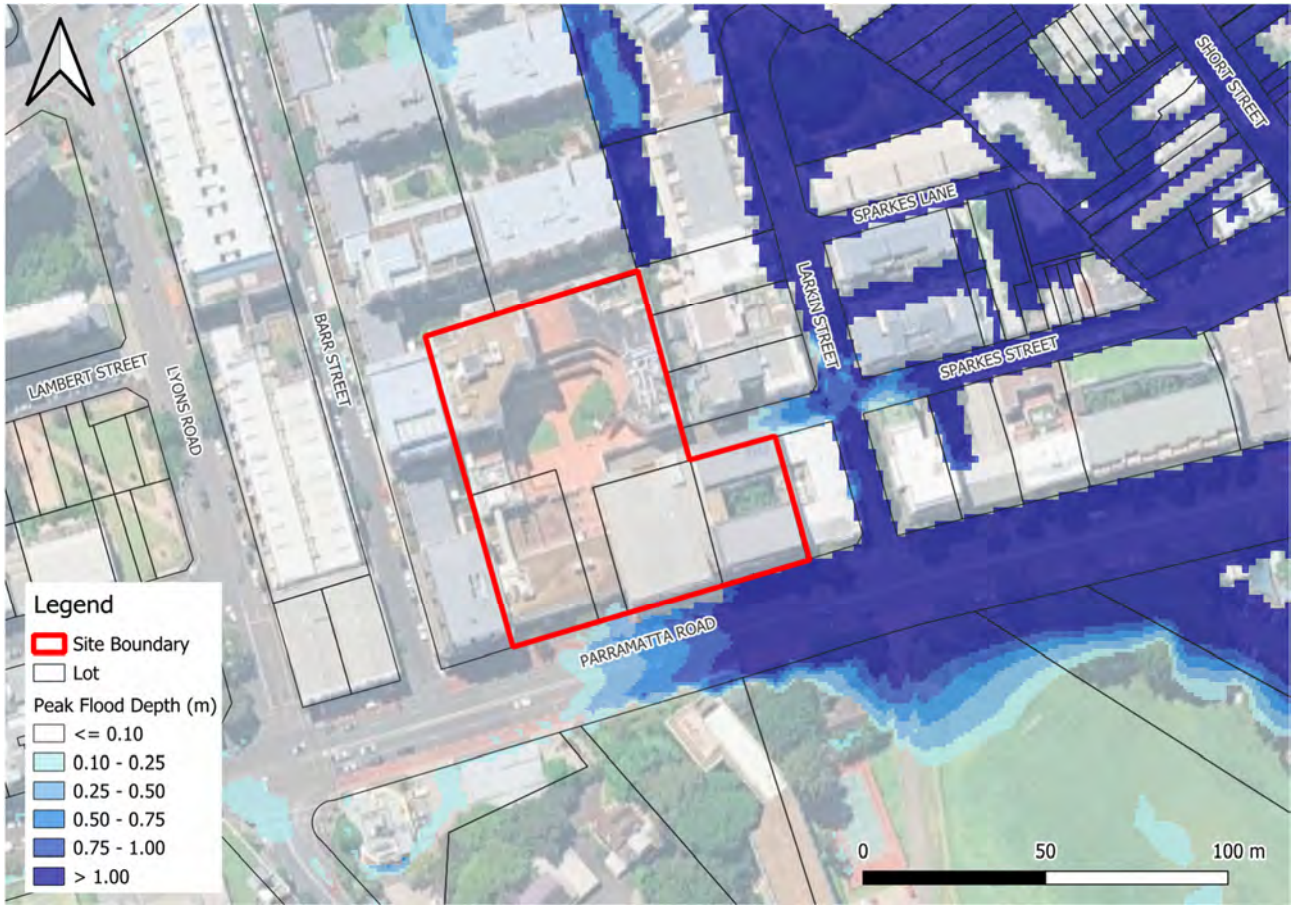


Figure 18 Revised Baseline Flood Model Peak Flood Depths – PMF Event



Figure 19 Revised Baseline Flood Model Peak Flood Hazard – 1% AEP Event



Figure 20 Revised Baseline Flood Model Peak Flood Hazard – PMF Event

4.3 Climate change assessment

The Johnstons Creek Catchment Floodplain Risk Management Study pre-dates the latest revision of Australian Rainfall and Runoff 2019 (version 4.2, August 2024), which contains significant updates to guidance on the impacts of climate change on rainfall intensities. The most important of these updates in relation to the proposed development are summarised below.

- Rainfall increase factors have generally increased for most climate change pathways from the previous (interim) guidance.
- Rainfall increases are to be applied to the Probable Maximum Flood, which is a change from previous guidance (in which PMF rainfall was not increased due to climate change)

To understand the sensitivity of peak flood levels to the predicted impacts of climate change under the updated guidance in ARR 2019, the 1% AEP and PMF events were run for the following climate change scenarios:

- SSP2 4.5 Year 2030
- SSP2 4.5 Year 2100
- SSP3 7.0 Year 2100.

Rainfall and hydrologic loss inputs in the flood model were scaled up by the applicable climate change factors available on the ARR 2019 data hub. The site is not subject to impacts resulting from future sea level rise.

A comparison of peak flood levels for the baseline and the climate change scenarios above is provided in Table 3. Reporting point locations are shown in Figure 14.

The results indicate the baseline 1% AEP flood levels are predicted to increase due to climate change impacts by:

- Up to 0.07 m under a SSP2 4.5 (Year 2030) scenario
- Up to 0.16 m under a SSP2 4.5 (Year 2100) scenario
- Up to 0.25 m under an SSP3 7.0 (Year 2100) scenario.

In the PMF, peak flood levels are predicted to increase due to climate change by:

- Up to 0.25 m under an SSP 4.5 (Year 2030) scenario
- Up to 0.53 m under an SSP 4.5 (Year 2100) scenario
- Up to 0.81 m under a SSP3 7.0 (Year 2100) scenario.

One finding of the sensitivity analysis is that the ground floor levels across the site area are not predicted to be flooded in the 1% AEP event, even under a SSP3 7.0 (Year 2100) climate change scenario. The lowest ground floor level is within the existing Veriu building at 20.66 m AHD, which is 0.11m above the predicted 1% AEP (SSP3 7.0 Year 2100) flood level. The impacts of climate change on the PMF level are more significant as evidenced by the larger increases in flood levels.

Whilst climate change is required to be considered under the CoS LEP (5.21 Flood Planning), it is assumed that flood planning level requirements in the CoS Interim Floodplain Management Policy refer to baseline flood levels derived from the CoS flood study. This will need to be confirmed with CoS. It is noted that all existing FFL's are above the peak flood levels under a 1% AEP plus climate change (SSP3 7.0 2100) scenario; therefore the site is not at significant risk of flooding in the 1% AEP event, even accounting for future climate change.

Table 3 Comparison of peak water levels under climate change scenarios against baseline

Point	1% AEP							PMF						
	Baseline	CC SSP2 4.5 (2030)	CC SSP2 4.5 (2100)	CC SSP3 7.0 (2100)	SSP2 4.5 (2030) Increase from Baseline	SSP2 4.5 (2100) Increase from Baseline	SSP3 7.0 (2100) Increase from Baseline	Baseline	CC SSP2 4.5 (2030)	CC SSP2 4.5 (2100)	CC SSP3 7.0 (2100)	SSP2 4.5 (2030) Increase from Baseline	SSP2 4.5 (2100) Increase from Baseline	SSP3 7.0 (2100) Increase from Baseline
1	20.30	20.37	20.46	20.54	0.07	0.16	0.25	21.72	21.97	22.26	22.53	0.25	0.53	0.81
2	18.55	18.59	18.65	18.71	0.04	0.10	0.16	19.48	19.73	19.88	20.04	0.25	0.40	0.56
3	Not Flooded	Not Flooded	Not Flooded	Not Flooded	N/A	N/A	N/A	21.72	21.97	22.25	22.53	0.25	0.53	0.81
4	Not Flooded	Not Flooded	Not Flooded	Not Flooded	N/A	N/A	N/A	Not Flooded	Not Flooded	Not Flooded	Not Flooded	N/A	N/A	N/A
5	20.30	20.37	20.46	20.55	0.07	0.16	0.25	21.72	21.97	22.25	22.53	0.25	0.53	0.81

Table 4 Comparison of peak water levels for 1% AEP, 0.2% AEP and 0.05% AEP events

Point	1% AEP				0.2% AEP				0.05% AEP			
	Baseline	CC SSP2 4.5 (2030)	CC SSP2 4.5 (2100)	CC SSP3 7.0 (2100)	Baseline	CC SSP2 4.5 (2030)	CC SSP2 4.5 (2100)	CC SSP3 7.0 (2100)	Baseline	CC SSP2 4.5 (2030)	CC SSP2 4.5 (2100)	CC SSP3 7.0 (2100)
1	20.30	20.37	20.46	20.54	20.46	20.56	20.67	20.78	20.62	20.73	20.86	20.99
2	18.55	18.59	18.65	18.71	18.65	18.71	18.78	18.84	18.74	18.82	18.85	18.96
3	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded
4	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded	Not Flooded
5	20.30	20.37	20.46	20.55	20.46	20.56	20.67	20.77	20.62	20.73	20.85	20.99

4.4 Assessment of 0.2% and 0.05% AEP flood events

To further understand flood risk to the proposed development, the flood model was run for the 0.2% AEP (1 in 500 year) and 0.05% AEP (1 in 2000 year) events to assess the flood immunity for these events. Results of this assessment for the reporting points in Figure 14 are presented in Table 4. The climate change scenarios listed in section 4.3 have also been run for the 0.2% and 0.05% AEP events.

The results indicate:

- Peak flood levels in the 0.05% AEP event are below the FFL for the proposed Life Sciences Tower and Office Block (21.75 m AHD), including when accounting for future climate change
- The ground floor of the Veriu building (20.66 m AHD) is above the peak flood level in the 0.05% AEP event under baseline rainfalls, but is predicted to be 0.07m below the 0.05% AEP flood level under the SSP2 4.5 Year 2030 scenario, and 0.33m below the 0.05% AEP level under a SSP3 7.0 Year 2100 scenario. It is also marginally below the 0.2% AEP flood levels under either a SSP2 4.5 Year 2100 or SSP3 7.0 Year 2100 climate change scenario.
- The locally raised sections of the ground floor in the Veriu Building (FFL 21.60 m AHD) remain above the 0.05% AEP flood level in all climate change scenarios assessed.

Whilst the lower ground floor area of the Veriu Building is predicted to be impacted by flooding in the 0.2% and 0.05% AEP events under future climate change scenarios, the maximum depth of water above the ground floor level (0.33 m) does not present a significant hazard to occupants in these events.

5. Proposed Development

Figure 21 illustrates the planning envelope for the Planning Proposal being prepared for the site. This Planning Proposal seeks approval for the amendment of Floor Space Ratio (FSR) and Height of Buildings in the Sydney Local Environmental Plan 2012. Full details of the proposed amendments are outlined in the Planning Proposal Report prepared by Colliers Urban Planning.

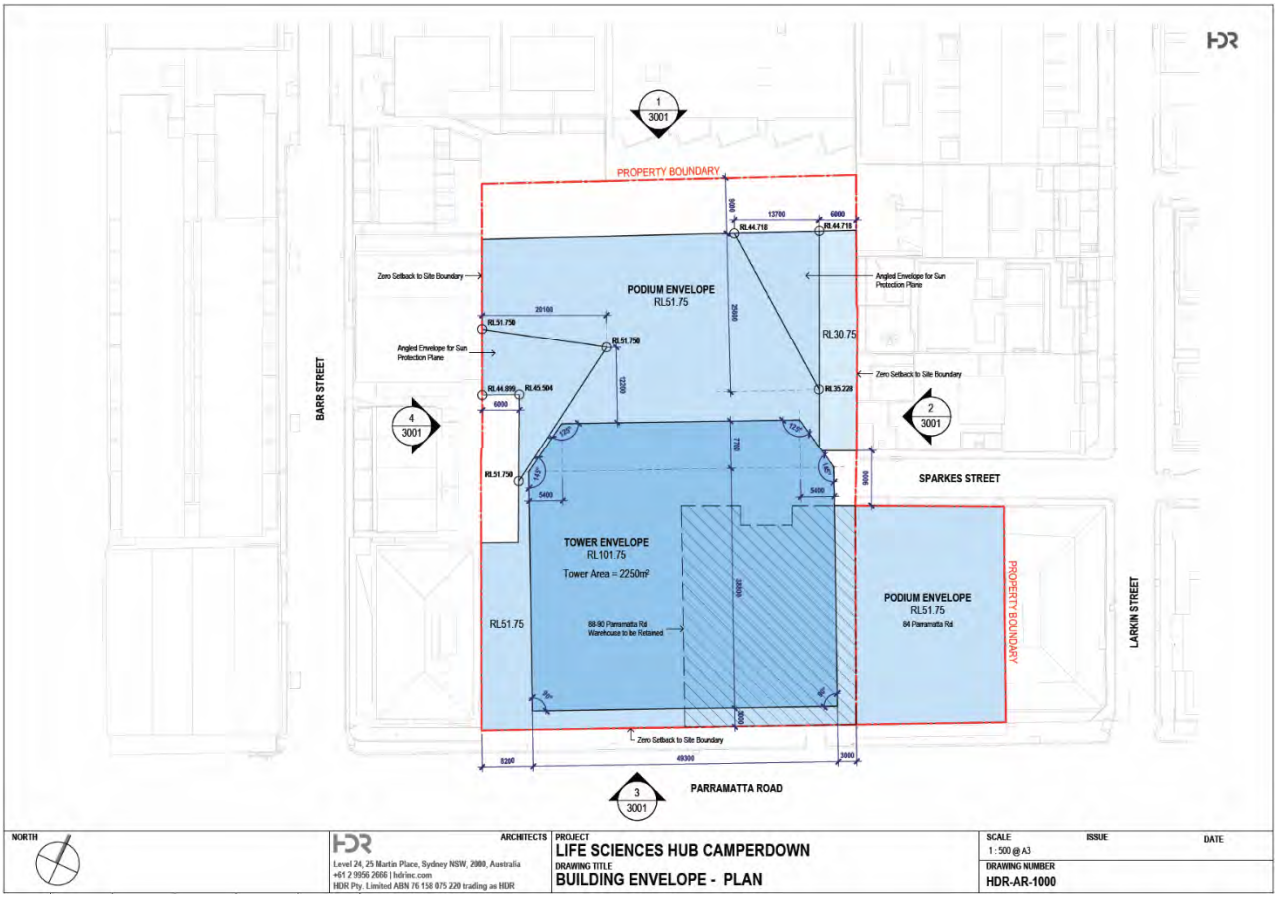


Figure 21 Planning Envelope for proposed development

A reference design developed in line with the planning envelope is illustrated in Figure 22. The development comprises:

- **Life Science Tower Block** - 27,685 m^2 GFA, 15 storeys + 2 plant levels & 3 basement levels (80 m height)
- **Ancillary Life Science Block** – 6,647 m^2 GFA, 8 storeys (29.7 m height)
- **Serviced Apartments Block (Veriu)** – 3,545 m^2 GFA, 9 storeys – 6 existing + 3 additional (29.3 m height)

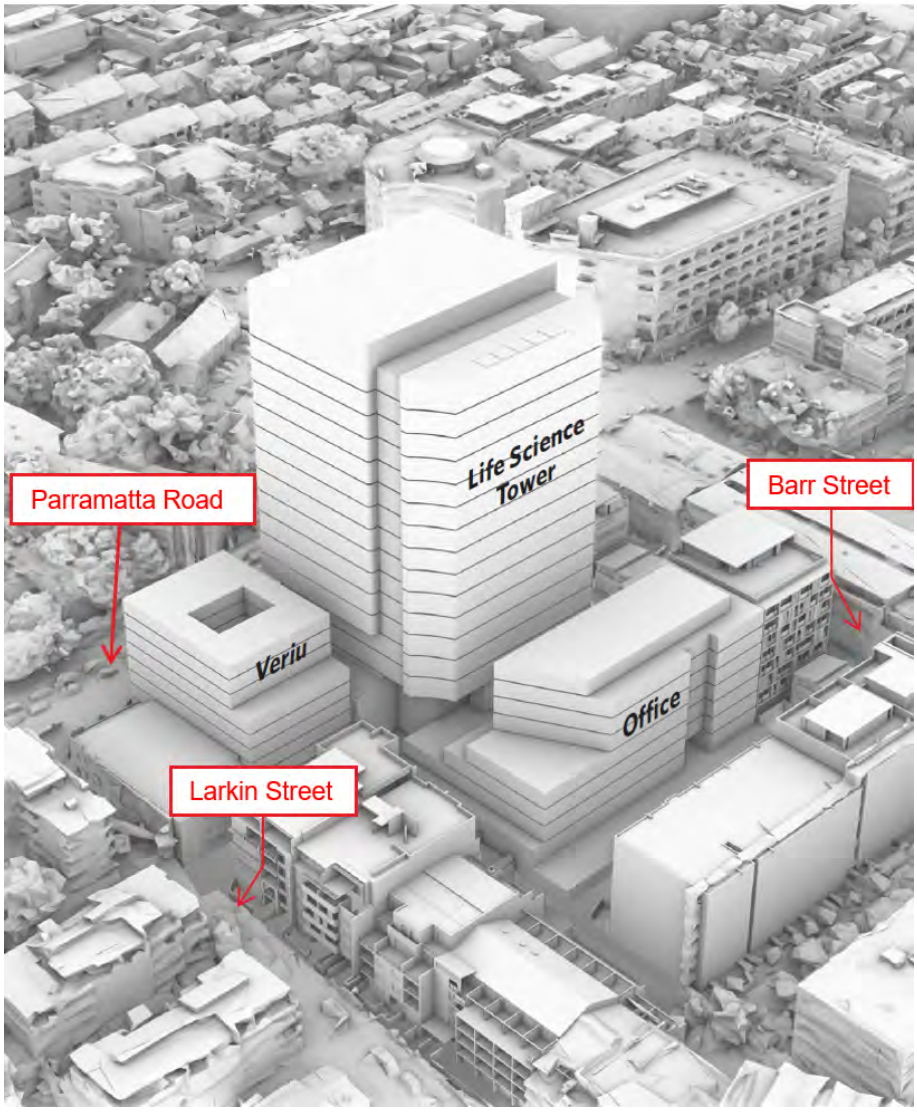


Figure 22 Proposed development - 3D perspective (Source: Wentworth Capital)

For the purpose of this technical memo, finished floor levels have been adopted based on the reference design drawings to assess flood planning level compliance against the CoS Interim Floodplain Management Policy requirements. This provides a means of identifying flooding constraints for the planning envelope and demonstrating a potential means of achieving the CoS flood planning level requirements.

Figure 23 illustrates the ground floor plan of the proposed development, based on the reference design drawings. The following information has been provided with respect to ground floor levels:

- No change is proposed to ground floor levels of the existing Veriu Building
- The ground floor of the existing warehouse at 88 – 90 Parramatta Road is to be retained, with access provided to the elevated internal laneway at the rear of the building
- The proposed elevator within the science building entrance lobby services the upper floors only and does not connect to the basement levels
- The elevators proposed in the retail section of the science lobby can be raised to match the internal walkway level of 21.75 m AHD should there be a risk of floodwater affecting the elevator shafts. The elevators are proposed to connect to the basement floor levels.

The layout of the proposed development is not significantly different to the existing site. As the existing site consists almost entirely of impervious area, it is anticipated there will not be any increased runoff from the proposed development compared with existing conditions. The building frontages adjacent to the floodplain area (along the southern and eastern sides of the site) are also not proposed to change from existing. No new

overland flow paths are proposed as part of the new development (noting the internal walkway is located above the PMF level), and there is no impact of the development on any existing overland flow paths.

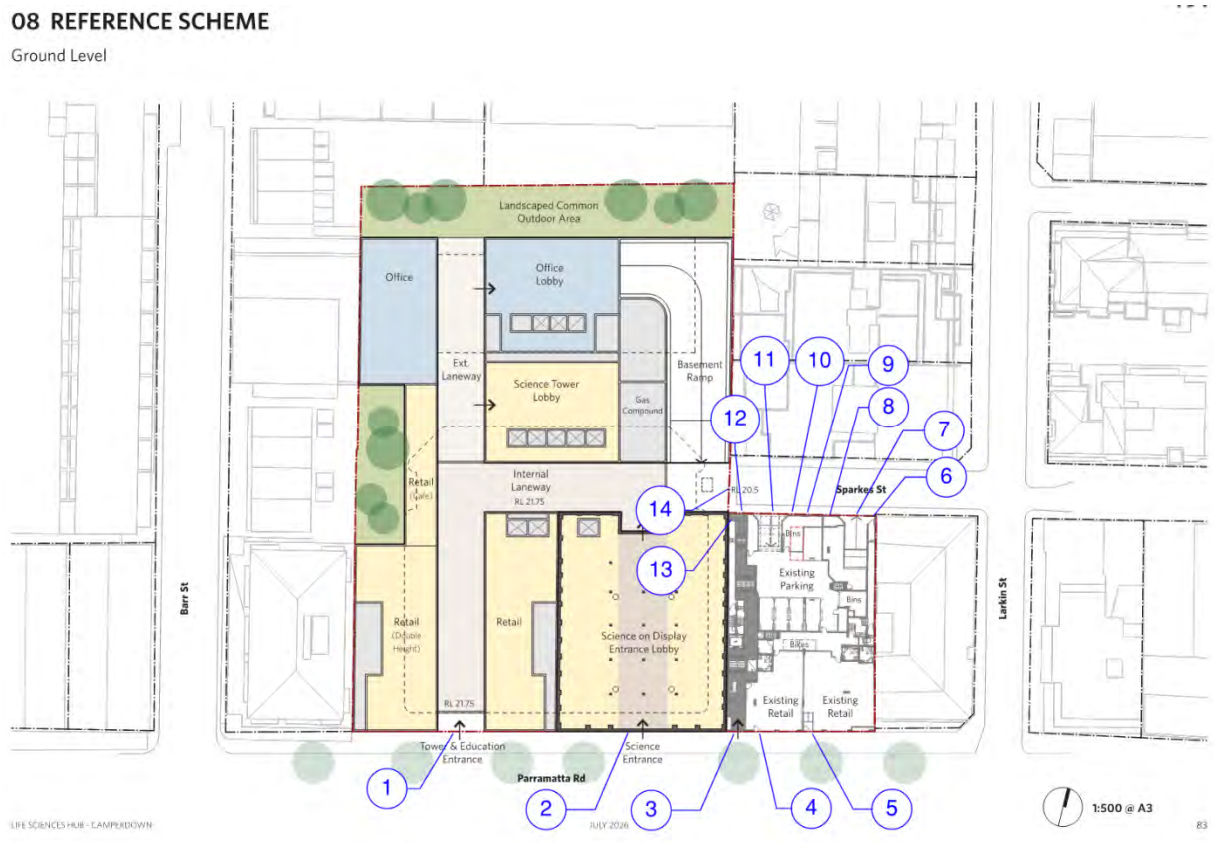


Figure 23 Ground Floor Plan - Life Sciences Hub Camperdown. Entrance locations marked up on plan (Source: Wentworth Capital (Issue July 2026))

6. Flood impact and risk assessment

6.1 Flood impacts

As the proposed Life Sciences Hub reference design is contained to within the existing building footprint, will not increase runoff compared to existing conditions, does not result in any new overland flow paths (noting the internal walkway is located above the PMF level) or block existing overland flow paths, the proposed development will not result in any changes to the flood behaviour in the external catchment. That is, the proposed development does not result in any changes to peak flood levels, or flood hazard outside the site area. Modelling of a proposed case flood model scenario was therefore deemed unnecessary, since flood results will be identical to those under existing conditions, as reported in Section 4.2.

It may be necessary to undertake modelling of the proposed case scenario should there be any alterations to the proposed design, or if any works are proposed to the public domain outside the building footprint.

6.2 Flood planning level requirements

The flood planning level (FPL) refers to the minimum building floor level or threshold level. For below-ground parking or basement levels, the FPL refers to the minimum level at each access point, including ventilation ducts, windows, light wells, lift shaft openings risers, service pits and stairwells.

Table 5 provides a summary of the floor level compliance for the reference design, based on the baseline flood results presented in this assessment.

The table illustrates that all entrances to the new Life Sciences Tower and Life Science Education blocks achieve the requisite flood planning level for the stated purpose of each portion of the development. The internal walkway level of 21.75 m AHD has been positioned at an elevation above the PMF level to help achieve the Flood Planning Level requirements, and can facilitate evacuation of the portions of the development impacted in extreme flood events.

Based on the reference design, it is understood that no lift shafts are proposed to connect to the basement floor levels from the life science lobby, which is subject to flooding in extreme flood events such as the PMF. An elevator proposed within the science lobby is understood to service the upper storeys of the building only and not connect to the basement. A second elevator within the retail area to the west of the science lobby, which is understood to be servicing the basement floors for the development, will need to be raised internally above the PMF level to achieve compliance with the Flood Planning Requirements in the CoS Interim Floodplain Management Policy, concerning ingress points to below-ground car parks.

The entrance threshold level at the new basement car park entrance off Sparkes Street (20.50 m AHD) is over 1 metre above the PMF level emanating from the intersection of Larkin Street and Sparkes Street to the east (19.43 m AHD).

The only entrances which are not compliant with the FPL's in the CoS Interim Floodplain Management Policy are:

- The existing residential entrance to the Veriu building, in which the PMF level exceeds the raised ground floor level for the residential portion of the building by 0.12 m (21.60 m AHD). It is noted that there is lift and stairwell access to the basement level provided from the residential lobby, and
- The fire pump room at Sparkes Street, which has a minor non-compliance to the PMF level (0.01 m).

Further discussion on the flood risk to the Veriu building is in Section 6.3.

Whilst the majority of building entrance levels are located above the PMF, the proposed structure is nonetheless impacted by flooding in very rare to extreme flood events, particularly at the Parramatta Road frontage. Appropriate design measures, including the use of flood-compatible materials, will need to be incorporated in the design of the building.

Note the flood planning assessment is based on the reference design only for the purpose of this Planning Proposal, and greater detail on the placement of lifts and internal building floor levels will be provided once the design has been further developed. The intent of the flood planning level assessment for this Planning Proposal is to demonstrate a potential approach that can be considered for a future DA, and provide a means of demonstrating that compliance with the CoS Interim Floodplain Management Policy can be achieved.

The envelope scheme illustrated in Figure 21 will need to achieve the minimum flood planning levels outlined in Table 5. Note that the flood planning level assessment undertaken for this report is based on the reference scheme provided, and that a more detailed assessment will need to be undertaken prior to DA submission.

Table 5 Flood planning level compliance summary (Locations shown in Figure 23)

Location	Description	FPL Criteria	FFL /Threshold level (m AHD)	1% AEP Level (m AHD)	1% AEP Level + 0.5 m (m AHD)	PMF Level (m AHD)	Compliance with CoS FPL Criteria?	Comments
1	New Life Sciences Building - Internal Walkway	Basement Penetration - greater of 1% AEP + 0.5m or PMF	21.75	Not Flooded	Not Applicable	21.72	Yes	Above PMF level
2	New Life Sciences Building - Entrance Lobby	Ground Level - 1% AEP	21.38^1	Not Flooded	Not Applicable	21.72	Yes	Part of Life Sciences building. Existing floor level assumed retained; no connections to basement levels within retail area.
3	Veriu Building Residential Lobby	Basement Penetration - greater of 1% AEP + 0.5m or PMF	21.60	Not Flooded	Not Applicable	21.72	No	Existing building. Slightly below PMF level. Depth of water above the raised ground floor areas approx. 120 mm. Low risk to building occupants.
4	Veriu Building - Retail Entrance 1	Ground Level - 1% AEP	20.66	Not Flooded	Not Applicable	21.72	Yes	Existing building – assumed to be retained as retail area.
5	Veriu Building - Retail Entrance 2	Ground Level - 1% AEP	20.66	Not Flooded	Not Applicable	21.72	Yes	Existing building – assumed to be retained as retail area.
6	Veriu Building - Fire Egress 1	Basement Penetration - greater of 1% AEP + 0.5m or PMF	20.66	Not Flooded	Not Applicable	19.37	Yes	Entrance at street level - stair up to ground floor within entrance
7	Veriu Building - Car Park Entrance 1	Basement Penetration - greater of 1% AEP + 0.5m or PMF	19.71^1	Not Flooded	Not Applicable	19.42	Yes	Threshold level above PMF level
8	Veriu Building - Fire Pump Room	Basement Penetration - greater of 1% AEP + 0.5m or PMF	19.40^1	Not Flooded	Not Applicable	19.41	No	Minor non-compliance in the PMF event – 0.01m above the FFL. Relatively low risk.

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Location	Description	FPL Criteria	FFL /Threshold level (m AHD)	1% AEP Level (m AHD)	1% AEP Level + 0.5 m (m AHD)	PMF Level (m AHD)	Compliance with CoS FPL Criteria?	Comments
9	Veriu Building – Waste Collection 1	Ground Level - 1% AEP	19.40^1	Not Flooded	Not Applicable	19.43	Yes	Not flooded in 1% AEP; no means for flooding to spill to basement due to internal ramping within ground floor
10	Veriu Building – Waste Collection 2	Ground Level - 1% AEP	19.60^1	Not Flooded	Not Applicable	Not Flooded	Yes	Not flooded in 1% AEP; above PMF level
11	Veriu Building - Car Park Entrance 2	Ground Level - 1% AEP	20.66	Not Flooded	Not Applicable	Not Flooded	Yes	Internal ramp up to ground floor car park - Above PMF level
12	Veriu Building – Pedestrian Entrance	Ground Level - 1% AEP	20.66	Not Flooded	Not Applicable	Not Flooded	Yes	Internal ramp up to ground floor – above PMF level
13	Veriu Building - Fire Egress 2	Basement Penetration - greater of 1% AEP + 0.5m or PMF	20.66	Not Flooded	Not Applicable	Not Flooded	Yes	Internal stair up to ground floor – above PMF level
14	New Life Science Building Basement Car Park Entrance	Basement Penetration - greater of 1% AEP + 0.5m or PMF	20.50	Not Flooded	Not Applicable	Not Flooded	Yes	Outside of floodplain at Sparkes Street - Above PMF level

^1 Estimated based on topographic survey from external footpath levels. Requires verification.

6.3 Veriu building entrance flood risk assessment

The existing Veriu building is proposed to be retained for this Planning Proposal. Flood planning levels (based on historical rainfall inputs) are compliant at all entrances shown in the reference design plans, with the exception of the existing residential entrance to the Veriu building off Parramatta Road, and the fire pump room entrance at Sparkes Street

It is likely the raised portions of the ground floor in the Veriu building were designed to achieve an elevation above the PMF level, based on results presented in the Johnstons Creek flood study report. Updates made to the flood model for this assessment have resulted in the PMF level increasing to 21.72 m AHD, due to the overland flow path through the Veriu site (formerly a vacant lot) being closed off and restricting surface flow draining away from the Parramatta Road sag point. This change results in a flood depth in the PMF of 0.12 m above the raised ground floor areas at the Veriu building.

The ground floor of the Veriu building is not proposed to be altered as part of this Planning Proposal. Since the building has been shown to experience some degree of flooding under the revised assessment, the flood risk to occupants of the building has been reviewed in further detail, including a review of the finished floor levels against peak flood levels under current (Year 2030) and future (Year 2100) climate change scenarios.

A review of flood levels all ingress locations at the existing Veriu building is provided in Table 6. Refer to Appendix A for a plan layout of entrance locations.

The results from this review include:

- The Veriu building is predicted to be immune to flooding in the 1% AEP event under both the SSP2 4.5 and SSP3 7.0 climate change scenarios for current (2030) and future (2100) time horizons.
- The majority of entrances remain compliant with flood planning level requirements under both current and future climate change scenarios when reviewed against the City of Sydney's Interim Floodplain Management Policy. The only exceptions to this are at:
  - The residential lobby entrance at Parramatta Road, which is inundated in PMF events under baseline conditions.
  - The fire pump room entrance at Sparkes Street (treated as a basement entrance), which is predicted to be inundated in the PMF event under both 2030 and 2100 climate change scenarios, and
  - The eastern basement car park entrance at Sparkes Street (closest to the eastern side of the building), which has an estimated raised threshold level of 19.71 m AHD, is compliant under a 2030 climate change scenario, but is predicted to be overtopped under both SSP2 4.5 and SSP3 7.0 Year 2100 climate change scenarios.

Table 6 Veriu building entrance flood risk table

Entrance	FPL Criteria	FFL/ Threshold Level	SSP2 4.5 Year 2030				SSP2 4.5 Year 2100				SSP3 7.0 Year 2100			
			1% AEP	1% AEP + 0.5m	PMF	Compliant	1% AEP	1% AEP + 0.5m	PMF	Compliant	1% AEP	1% AEP + 0.5m	PMF	Compliant
Residential Lobby	Basement Penetration - greater of 1% AEP + 0.5m or PMF	21.60	Not Flooded	Not Applicable	21.96	No	Not Flooded	Not Applicable	22.25	No	Not Flooded	Not Applicable	22.52	No
Retail Entrance 1	Ground Level - 1% AEP	20.66	Not Flooded	Not Applicable	21.96	Yes	Not Flooded	Not Applicable	22.25	Yes	20.56	21.06	22.52	Yes
Retail Entrance 2	Ground Level - 1% AEP	20.66	Not Flooded	Not Applicable	21.96	Yes	20.45	20.95	22.25	Yes	20.55	21.05	22.52	Yes
Fire Egress 1	Basement Penetration - greater of 1% AEP + 0.5m or PMF	20.66	Not Flooded	Not Applicable	19.56	Yes	Not Flooded	Not Applicable	19.76	Yes	Not Flooded	Not Applicable	19.84	Yes
Car Park Entrance 1	Basement Penetration - greater of 1% AEP + 0.5m or PMF	19.71^1	Not Flooded	Not Applicable	19.60	Yes	Not Flooded	Not Applicable	19.79	No	Not Flooded	Not Applicable	19.87	No
Fire Pump Room	Basement Penetration - greater of 1% AEP + 0.5m or PMF	19.40^1	Not Flooded	Not Applicable	19.56	No	Not Flooded	Not Applicable	19.73	No	Not Flooded	Not Applicable	19.83	No
Waste Collection 1	Ground Level - 1% AEP	19.40^1	Not Flooded	Not Applicable	19.53	Yes	Not Flooded	Not Applicable	19.72	Yes	Not Flooded	Not Applicable	19.84	Yes

Entrance	FPL Criteria	FFL/ Threshold Level	SSP2 4.5 Year 2030				SSP2 4.5 Year 2100				SSP3 7.0 Year 2100			
			1% AEP	1% AEP + 0.5m	PMF	Compliant	1% AEP	1% AEP + 0.5m	PMF	Compliant	1% AEP	1% AEP + 0.5m	PMF	Compliant
Waste Collection 2	Ground Level - 1% AEP	19.60^1	Not Flooded	Not Applicable	Not Flooded	Yes	Not Flooded	Not Applicable	19.72	Yes	Not Flooded	Not Applicable	19.86	Yes
Car Park Entrance 2	Basement Penetration - greater of 1% AEP + 0.5m or PMF	20.66	Not Flooded	Not Applicable	Not Flooded	Yes	Not Flooded	Not Applicable	Not Flooded	Yes	Not Flooded	Not Applicable	19.85	Yes
Pedestrian Entrance	Ground Level - 1% AEP	20.66	Not Flooded	Not Applicable	Not Flooded	Yes	Not Flooded	Not Applicable	Not Flooded	Yes	Not Flooded	Not Applicable	Not Flooded	Yes
Fire Egress 2	Basement Penetration - greater of 1% AEP + 0.5m or PMF	20.66	Not Flooded	Not Applicable	Not Flooded	Yes	Not Flooded	Not Applicable	Not Flooded	Yes	Not Flooded	Not Applicable	Not Flooded	Yes

^1 Estimated based on topographic survey from external footpath levels. Requires verification.

The consequences of an extreme flood occurring at the Veriu building include:

- Potential risk to life of building occupants (residents, plus any staff or visitors in the building, including in the retail areas)
- Damage to the building and any equipment stored on the ground floor.

The flood risk to the Veriu building is an existing risk (that is, exists regardless of the proposed development). Flood modelling undertaken provides the following insights regarding flood risk at the existing site:

- The baseline 1% AEP flood level in Parramatta Road is 20.30 m AHD, which is approximately 0.36 m below the general ground floor level (20.66 m AHD) and 1.30 m below the locally raised ground floor areas (21.60 m AHD).
- Under the most severe climate change scenario (SSP3 7.0 Year 2100) simulated for this assessment, the 1% AEP flood level is 20.55 m AHD; approximately 0.11 m below the general ground floor level (20.66 m AHD), and 1.05 m below locally raised ground floor areas (21.60 m AHD) within the building.
- Under a SSP2 4.5 Year 2100 climate change scenario, flood depths above the general ground floor level (20.66 m AHD) are predicted to be 0.01 m in the 0.2% AEP event, and 0.20 m in the 0.05% AEP event. The raised portions of the ground floor (21.60 m AHD) are predicted to be 0.74 m above the 0.05% AEP level under a SSP2 4.5 Year 2100 climate change scenario
- Under a SSP3 7.0 Year 2100 climate change scenario, flood depths above the general ground floor level (20.66m AHD) are predicted to be 0.12 m in the 0.2% AEP event, and 0.33 m in the 0.05% AEP event. The raised portions of the ground floor (21.60 m AHD) are predicted to be 0.61 m above the 0.05% AEP level under a SSP3 7.0 Year 2100 climate change scenario
- Under a baseline PMF scenario, the peak flood level is approximately 0.12 m above the locally raised portions of the ground floor of the building. This depth of water would not result in a significant hazard to users in the absence of any significant velocity (effectively in the H1 category under the general flood hazard categorisation). Peak velocity within the Parramatta Road corridor is less than 1 m/s in the PMF event.
- Under a SSP2 4.5 Year 2100 PMF scenario, the peak flood level is approximately 0.66 m above the locally raised portions of the ground floor of the building; whilst in the SSP3 7.0 Year 2100 PMF scenario the peak flood level is approximately 0.93 m above the locally raised portions of the ground floor of the building. This depth of water would be classified as H3 (unsafe for vehicles, children and the elderly) in the absence of any significant velocity.
- The time from the onset of rainfall to the peak PMF level is approximately 1.5 hours for the critical duration storm.
- The duration of flooding within Parramatta Road in the PMF is similar to the duration of the rainfall event (that is, the Parramatta Road sag drains out relatively quickly once rainfall has ceased in the catchment).

Given the low probability of flooding affecting the raised ground floor areas of the Veriu building (flood immunity of greater than the 0.05% AEP event), it is anticipated that flood risk to the existing Veriu building can be addressed through operational and emergency risk management plans for the building. This plan could consider evacuation to higher flood levels within the building and restrictions on what can be stored in the areas of the building subject to flooding. Note that the increase in the number of occupants within the Veriu building resulting from the proposal will not materially change the means by which the building responds to flood risk, compared to the existing conditions.

7. Flood Emergency Management and Evacuation

The proposed life sciences research facility (comprising the life sciences tower and life science education blocks) is largely unaffected by flooding based on the revised baseline model results prepared for this assessment. The ground floor level of the new buildings is set above the PMF level emanating from the trapped sag point at Parramatta Road. However as portions of the development are flood-affected in extreme flood events, suitable consideration will need to be given to flood emergency management in line with guidance in the *Support for Emergency Planning* (EM01) guideline.

The guideline notes there are two flood evacuation responses available for the site:

- Evacuation of the building to an off-site location; and
- Shelter-in-Place within a building (i.e. vertical evacuation).

Off-site evacuation is preferable to shelter-in-place if the evacuation can be safely executed for a given site. However a shelter-in-place strategy may be a suitable option under certain conditions, particularly where available warning time to evacuate off-site is limited, and conducting an off-site evacuation may expose occupants to more risk compared with remaining within the building at a refuge area above the PMF level.

For the life sciences tower and life science education portions of the development, should the need to evacuate arise, occupants can evacuate via the internal walkway to Parramatta Road, then move off the site towards the intersection of Parramatta Road and Lyons Road. This evacuation route provides a continuously rising route away from the site.

The life sciences lobby and retail areas, which utilise the existing warehouse building, are predicted to be impacted in extreme flood events, such as the PMF. For this portion of the development, evacuation can be achieved through directing occupants to leave via the rear of the warehouse building and up to the internal walkway level (of 21.75 m AHD), which is above the PMF level. Occupants may then exit the facility and away from the site west along Parramatta Road as described above.

Flood emergency management for the Veriu building may be treated separately from the remainder of the proposed development, since ground floor of the building is predicted to be impacted by flooding in extreme events, and there is no route available away from the building should the peak PMF level be reached. Evacuation off-site could be a feasible option, since there is rising road access away from the Veriu building to a safe refuge location west of the site. This can be investigated prior to the future SSDA submission since this is the preferred flood evacuation option.

However, a shelter-in-place flood response strategy may be more suitable for the Veriu building, noting the majority of occupants will be in the residential areas above the ground floor, and conducting an off-site evacuation may expose occupants to a greater risk compared with taking refuge in the apartments, or within common areas on level 01 or above. In such a scenario, ground floor occupants within the retail spaces would need to evacuate vertically up the internal staircases to reach Level 01 before sheltering in place.

Should a shelter in place strategy be considered for the Veriu building, the requirements set out in the *Shelter in Place Guideline for Flash Flooding* (DPHI, 2025) should be reviewed and any implications for the design of the building should be established. However, with reference to the consideration in the shelter in place guideline, the proposed development:

- Does not contain any sensitive or critical facilities which are incompatible with a shelter in place flood emergency response strategy
- Is a brownfield site (i.e. an existing building within a floodplain)
- Is not in a location where developed flood warning systems exist for the wider catchment
- Flood behaviour at the site meets the definition of flash flooding, in that flooding occurs within 6 hours from the onset of rainfall, and the isolation period is less than 12 hours
- All floor above the ground floor (level 01 and above) are above the PMF level, and there is access available from floors below the PMF to level 01 by internal stairwells.

- The GFA above the ground floor level (assumed to be inundated in a PMF) is approximately 3,160 m^2. This is sufficient space to accommodate the anticipated occupants of the building should the need to shelter in place arise (noting the guideline requires a minimum of 2 m^2 per person). Note the proposal incorporates an additional 910 m^2 of floor area, entirely above the PMF level, and the increase in occupancy of the Veriu building (due to the additional 3 storeys) will not change or impact the ability for a shelter in place flood emergency response to be conducted, compared with the existing condition.
- The proposed vertical expansion of the Veriu Building is entirely above the PMF level

Structural soundness for the PMF will need to be reviewed, however it is anticipated the building will be structurally sound in the PMF given the scale and construction of the existing building, and the relatively low flood velocities.

Some design measures may need to be incorporated to into the development to facilitate a shelter in place response strategy. However both the existing Veriu building and the proposed vertical extension will contain sufficient floor space above the PMF level for the number of occupants of the building, protection from weather and suitable personal hygiene facilities.

Further assessment of flood emergency management and evacuation will be required as the design progresses. In particular, it should be noted that the revised peak flood levels for the PMF in the Parramatta Road corridor may have implications for the flood emergency management response, since the PMF level from the original Council flood study is predicted to be 0.12 m higher in the revised baseline flood model, and up to 0.93 m under the SSP3 7.0 Year 2100 climate change scenario. A Flood Emergency Response Plan (FERP) can be prepared at a later design stage in accordance with the NSW Flood Risk Management Manual and other relevant guidelines (particularly the *Support for Emergency Planning* (EM01)), outlining the flood emergency response procedure for the building.

For the purpose of the planning proposal, the commentary above (based on the reference scheme) demonstrates that feasible emergency management strategies can be implemented to manage flood risk for extreme flood events at the site.

8. Conclusion

This flood and risk assessment technical memo has been undertaken based on the flood model utilised for the Johnstons Creek Catchment Flood Study, completed by WMAwater in September 2015 on behalf of the CoS. Arup has made updates to the flood model following review to establish revised baseline flood levels for the site which are in line with the present-day site conditions. A reference design consistent with the planning envelope shown in Figure 21 has been reviewed and assessed against the flood planning criteria in the CoS Interim Floodplain Management Policy.

For the purpose of the planning proposal, the flood assessment has resulted in the following conclusions:

- Peak flood levels at the site for in the 1% AEP event were relatively similar to those reported in the Johnstons Creek Catchment Flood Study report, prepared for CoS.
- The existing buildings within the site area are not impacted by the 1% AEP flood level.
- The PMF has been shown to not be impacting the existing basement car park entrance at Sparkes Street, due to the overland flow path through the Veriu building site being blocked in the revised baseline flood model.
- The peak flood level for the PMF event within the Parramatta Road corridor is approximately 0.17 m higher than reported in the Johnstons Creek Catchment Flood Study. The revised PMF level in Parramatta Road predicted to be 21.72 m AHD, which has increased due to removal of the overland flow path through the Veriu building site.
- As the proposed Life Sciences Hub development is contained to within the existing building envelope, will not increase runoff compared to existing conditions, and no new overland flow paths are created or

blocked, the proposed development will not result in any changes to the flood behaviour (that is, will not result in impacts to peak flood levels or hazard) outside the extent of the site area.

- The assessment indicates that all entrances to the new Life Sciences Tower and Life Sciences Education blocks (but excluding the Veriu building) achieve the flood planning level requirements in the CoS Interim Floodplain Management Policy. The internal walkway level of 21.75 m AHD has been positioned at an elevation above the PMF level to help achieve the Flood Planning Level requirements. It is understood the new lift connecting the ground floor of the warehouse building to the basement floors will be raised above the PMF flood level to achieve the Flood Planning Requirements; this will be considered in further detail at future design stages.
- The only entrances not compliant with the CoS FPL requirements is the existing residential entrance to the Veriu building, in which the PMF level (21.72 m AHD) is above the raised ground floor level for the residential portion of the building (21.60 m AHD), and the fire pump room at Sparkes Street, which has a minor non-compliance to the PMF level (0.01 m).
- Given the low probability of flooding affecting the raised ground floor areas of the Veriu building (flood immunity of greater than the 0.05% AEP event), it is anticipated that flood risk to the Veriu building can be addressed through operational and emergency risk management plans for the building.
- Flood emergency management for the portions of the site affected by flooding (which are areas retaining the existing ground levels) will need to be considered in further detail at future stages. Where off-site evacuation is feasible, this should be the preferred flood emergency response strategy.
- A shelter-in-place flood emergency response strategy may be appropriate for the Veriu Building. Should a shelter-in-place strategy be considered for the Veriu building, the requirements in the *Shelter in Place Guideline for Flash Flooding* (DPHI, 2025) should be reviewed and any implications for the design of the building should be established. However shelter in place is likely to be a suitable flood evacuation response for the Veriu building given there is sufficient space available within the upper floors of the building including the proposed expansion, to safely accommodate the occupants of the building (The GFA above the ground floor level is approximately 3,160 m^2).
- It is assumed that flood planning level requirements in the CoS Interim Floodplain Management Policy refer to baseline flood levels from the CoS flood model (i.e. do not require climate change impacts to be incorporated into the FPL estimates). Sensitivity testing undertaken for this assessment indicates the 1% AEP flood level does not impact the proposed floor levels under an SSP3 7.0 Year 2100 climate change scenario, and therefore the site is not at significant risk of flooding in the 1% AEP event due to future climate change impacts. It is noted that significant increases in the PMF level are predicted under climate change scenarios.

Based on the assessment of the reference design, the following recommendations have been provided with regards to the future design of the proposed development:

- Ground Floor levels for the Life Science Tower and Life Science Education blocks should be set above the PMF level (excluding the existing warehouse building which is being retained). This will allow for compliance with the CoS Interim Floodplain Management Policy to basement entrances, allow for a flood-free evacuation route from the development in the PMF, and avoid creating any new overland flow paths.
- The entrance to the basement car park of Sparkes Street should remain above the PMF level to achieve compliance with the CoS Interim Floodplain Management Policy
- For the existing warehouse building, access to a flood-free level (i.e. above the PMF level) should be provided through the rear of the building to allow for evacuation of occupants in extreme flood events.
- Flood emergency response requirements for the existing Veriu building should be reviewed at later stages to understand implications for the design of the redevelopment of the building.

Appendix A

Veriu building entrance – flood level plan

New Life Science Building Basement Car Park Entrance

FFL	20.50
Criteria	Basement Penetration - greater of 1% AEP + 0.5m or PMF

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	Not Flooded	Yes
SSP2 4.5 2030	Not Flooded	Not Flooded	Yes
SSP2 4.5 2100	Not Flooded	Not Flooded	Yes
SSP3 7.0 2100	Not Flooded	Not Flooded	Yes

Waste Collection 2

FFL	19.60
Criteria	Ground Level - 1% AEP

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	Not Flooded	Yes
SSP2 4.5 2030	Not Flooded	Not Flooded	Yes
SSP2 4.5 2100	Not Flooded	19.72	Yes
SSP3 7.0 2100	Not Flooded	19.86	Yes

Waste Collection 1

FFL	19.40
Criteria	Ground Level - 1% AEP

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	19.43	Yes
SSP2 4.5 2030	Not Flooded	19.53	Yes
SSP2 4.5 2100	Not Flooded	19.72	Yes
SSP3 7.0 2100	Not Flooded	19.84	Yes

Refer to Condition 2

SPARKES STREET

Fire Pump Room

FFL	19.40
Criteria	Basement Penetration - greater of 1% AEP + 0.5m or PMF

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	19.41	No
SSP2 4.5 2030	Not Flooded	19.56	No
SSP2 4.5 2100	Not Flooded	19.73	No
SSP3 7.0 2100	Not Flooded	19.83	No

Veriu Basement Car Park Entrance 2

FFL	20.66
Criteria	Ground Level - 1% AEP

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	Not Flooded	Yes
SSP2 4.5 2030	Not Flooded	Not Flooded	Yes
SSP2 4.5 2100	Not Flooded	Not Flooded	Yes
SSP3 7.0 2100	Not Flooded	19.85	Yes

Fire Egress 1

FFL	20.66
Criteria	Basement Penetration - greater of 1% AEP + 0.5m or PMF

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	19.37	Yes
SSP2 4.5 2030	Not Flooded	19.56	Yes
SSP2 4.5 2100	Not Flooded	19.76	Yes
SSP3 7.0 2100	Not Flooded	19.84	Yes

Pedestrian Entrance

FFL	20.66
Criteria	Ground Level - 1% AEP

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	Not Flooded	Yes
SSP2 4.5 2030	Not Flooded	Not Flooded	Yes
SSP2 4.5 2100	Not Flooded	Not Flooded	Yes
SSP3 7.0 2100	Not Flooded	Not Flooded	Yes

Veriu Basement Car Park Entrance 1

FFL	19.71
Criteria	Basement Penetration - greater of 1% AEP + 0.5m or PMF

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	19.42	Yes
SSP2 4.5 2030	Not Flooded	19.60	Yes
SSP2 4.5 2100	Not Flooded	19.79	No
SSP3 7.0 2100	Not Flooded	19.87	No

Fire Egress 2

FFL	20.66
Criteria	Basement Penetration - greater of 1% AEP + 0.5m or PMF

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	Not Flooded	Yes
SSP2 4.5 2030	Not Flooded	Not Flooded	Yes
SSP2 4.5 2100	Not Flooded	Not Flooded	Yes
SSP3 7.0 2100	Not Flooded	Not Flooded	Yes

Veriu Apartment Residential Lobby

FFL	21.60
Criteria	Basement Penetration - greater of 1% AEP + 0.5m or PMF

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	21.72	No
SSP2 4.5 2030	Not Flooded	21.96	No
SSP2 4.5 2100	Not Flooded	22.25	No
SSP3 7.0 2100	Not Flooded	22.52	No

Retail Entrance 1

FFL	20.66
Criteria	Ground Level - 1% AEP

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	21.72	Yes
SSP2 4.5 2030	Not Flooded	21.96	Yes
SSP2 4.5 2100	Not Flooded	22.25	Yes
SSP3 7.0 2100	20.56	22.52	Yes

Retail Entrance 2

FFL	20.66
Criteria	Ground Level - 1% AEP

	1% AEP	PMF	FPL Compliance
Historical	Not Flooded	21.72	Yes
SSP2 4.5 2030	Not Flooded	21.96	Yes
SSP2 4.5 2100	20.45	22.25	Yes
SSP3 7.0 2100	20.55	22.52	Yes

NOTES:
FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED READINGS "IF IN DOUBT, ASK"

Issue	Amendment	Date
P	Serviced Apartment DA	10.6.2015

CITY OF SYDNEY
PLANNING DIVISION

APPROVAL

D/2015/961
22/09/2015
These plans should be read in conjunction with the decision notice

84 - 86 PARRAMATTA RD, CAMPERDOWN

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CLIENT
SASCO DEVELOPMENTS
Proposed Change of Use:
Residential Units to Serviced Apartments

DRAWING
84-86 PARRAMATTA RD
GROUND FLOOR PLAN

SCALE 1:100 @ A1 DATE 10.6.2015
PROJECT 873 ISSUE DATE 10.6.2015
STAGE DA2 A020 REVISION P