

Suite 2, Level 1 33 Herbert Street ST LEONARDS NSW 2065

PO Box 292 ST LEONARDS 1590

T 02 9438 5098

ENGINEERS

MANAGERS

INFRASTRUCTURE PLANNERS

DEVELOPMENT CONSULTANTS

Flood Emergency Response Plan

UNSW Health Translation Hub

Prepared for: Hansen Yuncken Document no: B-ACO-CEC-RPT-0003

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ACOR Consultants Pty Ltd (ACN 079 306 246) (ABN 40 079 306 246)



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Revisions

Revision	Description	Date	Prepared by	Approved by
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Review Panel

Division/ office	Name
Civil	Stephen Naughton

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1 Introduction

ACOR has been engaged by Hansen Yuncken to prepare a Flood Emergency Response Plan (FERP) for the UNSW Health Translation Hub (HTH) at 49 Botany Street, Randwick NSW 2052.

1.1 Client

Hansen Yuncken

1.2 Purpose and Scope of Report

This FERP addresses Condition B22 and Condition B28 of 'Part B Prior to Commencement of Construction' in the Conditions of Consent, which states the following:

Condition B22

A Flood Emergency Response Plan (FERP) must be prepared and must address, but not be limited to, the following:

(a) be prepared by a suitably qualified and experienced person(s) and in consultation with the NSW State Emergency Service;

- (b) be generally consistent with the details provided in the EIS and RtS;
- (c) address the provisions of the Floodplain Risk Management Guidelines (EESG);
- (d) include details of:
- (i) the flood emergency responses for both construction and operation phases of the development;
- (ii) predicted flood levels;
- (iii) flood warning time and flood notification;
- (iv) assembly points and evacuation routes;
- (v) evacuation and refuge protocols; and
- (vi) awareness training for employees and contractors, and students.

Condition B28

Prior to the commencement of construction, the Applicant must prepare and implement for the duration of construction:

- (a) Flood warning and notification procedures for construction workers on site; and
- (b) Evacuation and refuge protocols

It is noted that Condition B28 above requires the Applicant to implement flood warning/ notification procedures, evacuation and refuge protocols for construction workers on site with reference to this document (FERP).



1.3 **Project Description**

Expansion of existing hospital facilities at Randwick Hospitals Campus (RHC) with the partnership between NSW Government and UNSW Sydney to provide additional health education, training and research with acute healthcare services. The UNSW HTH is proposed to include:

- A 15-storey building accommodating research and health education use (incl. one basement level),
- Pedestrian link bridge between UNSW Kensington Campus to RHC via Wallace Wurth Building,
- Education, training and research rooms,
- Clinical schools,
- Ambulatory care clinics,
- Support facilities including retail premises,
- More than 2,500 square metres of landscaping and public domain works for publicly accessible open space for staff, students, patients and the community.

1.4 Approving/ Review Authority

NSW Department of Planning, Industry and Environment (NSW DPIE)

1.5 Preparation of this Plan

This plan was prepared by Shana Cai and reviewed by Stephen Naughton. Details of their qualifications are provided below:

Shana Cai

BE(Civil)BSc, MIEAust

Stephen Naughton

CPEng NER RPEQ MIEAust NSW Design Practitioner NSW Registered Engineer

Consultation with the NSW State Emergency Service (SES) was initiated on 24 February 2023 and a written response with recommendations was received on 9 March 2023. A meeting was held between ACOR, Hansen Yuncken and SES subsequently, on Monday 20 March 2023, to discuss the recommendations received from SES and confirm response strategy for the HTH site. All recommendations discussed and agreed in the meeting have been incorporated into this report (Revision 03).

1.6 Available Data

The following available information was utilised in the preparation of this report.

- Randwick City Council (RCC) Development Control Plan (DCP) & Engineering Guidelines
- NSW Floodplain Development Manual: The Management of Flood Liable Land (NSW DIPNR, 2005)
- NSW DPE Flood Impact Risk Assessment: Flood Risk Management Guide LU01 (NSW DPE, 2022)
- NSW Government Response to the NSW Independent Flood Inquiry (NSW Government, 2022)
- Birds Gully and Bunnerong Road Flood Study (wmawater, 2018)
- RCR Prince of Wales, Randwick Flood and Stormwater Modelling Council Query, PMF Conditions in Botany Street Letter reference mpg:L.B23176.011.Council Query.docx (BMT, 2019)
- Integrated Acute Services building (IASB) Addition Civil Engineering SSDA Report (ACOR, 2019)
- SCH1/ CCCC Flood Modelling Assessment (Meinhardt Bonacci, 2020)



2 Site

2.1 Location

The proposed UNSW HTH (the "Site") is located on the corner of High Street and Botany Street, Randwick, within the Randwick City Council (RCC) Local Government Area (LGA) and forms part of the Randwick Hospital Campus (RHC) expansion.

The Site is bound by High Street (North), Botany Street (West), Sydney Children's Hospital (SCH) Stage 1 & Children's Comprehensive Cancer Centre (CCCC) (East) and Prince of Wales Hospital – Integrated Acute Services Building (IASB) (South).



Figure 1 – Site Location (Source: Sixmaps)

2.2 Property Description

Lot A1, DP1282403



2.3 Topography

The Site generally falls from North-West to South-East and lies within the Birds Gully and Bunnerong Road Catchment area.



Figure 2 – Randwick City Council Flood Study Areas (Source: RCC, 2019)



2.4 Existing Land Use and Vegetation

The existing land use is R2 Low Density Residential and R3 Medium Density Residential with minimal vegetation, see Figure 3 below.



Figure 3 - Land Use Map (Source: NSW ePlanning Spatial Viewer)



3 Flood Behaviour

3.1 External Catchment Area

The external catchment area with potential to drain into the Site includes an area (approximately 14.5 hectares) located North of High Street, which drains toward the South.



Figure 4 - High Street catchment (Source: Elvis - Elevation and Depth - Foundation Spatial data, 2023)



3.2 Pre-Development Conditions

The existing stormwater system capturing runoff toward High Street comprises an underground pit and pipe system and overland flow path to the low point in High Street (between Botany Street & Hospital Road). Water ponds in High Street, to a significant depth during the PMF event.

As part of the SCH Stage 1 & CCCC construction works (staged prior to the HTH Site's proposed works), a temporary flood wall has been designed and constructed to withstand hydrostatic pressures of flooding up (to the PMF event + 500mm freeboard). The flood wall extends along the Northern boundary to prevent external catchment flows from the North (High Street) entering the Site. This protects the site from flooding and overland flow for events up to and including the PMF.

As such, the pre-development conditions for the Site are flood free from external runoff for events up to and including the PMF. The flood wall 'Developed Option' has been included in the flood model produced by BMT for the Prince of Wales Hospital, which shows the entire site being flood free during the PMF event (i.e., 'was wet, now dry' scenario due to constructed flood wall) – refer Figure 5.



Figure 5 - Peak Water Level Impacts during PMF Event - Developed Option (Source: BMT, 2018)



3.3 Construction Conditions

During construction, the flood wall protecting the Site from external flows up to and including the PMF will be maintained. Site works require excavation of a basement which is anticipated to be up to 6 metres deep. As such, the emergency response plan (refer Section 4) is relevant during construction phase for personnel working below ground level, for the low likelihood that a significant storm event up to the PMF occurs during construction. This would result in ponding within the basement area, with associated risk to workers.

3.4 Post-Development (Operational) Conditions

The Site is located within the flood zone where RCC DCP requirements for the Site development's habitable spaces (Critical Infrastructure) is to be above the Probable Maximum Flood (PMF) with an additional 500mm freeboard.

The PMF level on High Street is RL55.738¹, as such, the habitable spaces of the Site are required to be at minimum RL56.238². As the internal floor level is designed at RL56.24, the Site will not be flood affected during the PMF event. There is also an internal podium connection at higher level, facilitating internal accessibility to the adjacent SCH/ CCCC, which then connects to the Prince of Wales hospital thereafter (which are both protected during the PMF event).

¹ Based on BMT flood model developed for Integrated Acute Services Building (IASB)

² RL55.738 + 500mm freeboard = RL56.238



4 Emergency Response Plan

The Site is not affected by external flooding due to the temporary flood wall along the Northern edge of the Site, which provides hydrostatic protection up to and including the PMF event. The critical storm event duration for the PMF was determined in the Birds Gully and Bunnerong Road Flood Study (wmawater, 2018) to be the 1-hour event.

4.1 Construction Phase

4.1.1 Preparation

During the construction phase, it is recommended that a temporary rain gauge with telemetry is installed on High Street to monitor rainfall levels. This will enable the Site Manager to monitor water levels to determine if evacuation is required for personnel working below ground level during a significant storm event up to the 1% AEP and including the PMF event (the existing stormwater culvert system may be unable to convey flows greater than the 1% AEP storm event where surcharge will occur at the South-Western end of the Site).

Daily monitoring of Bureau of Meteorology (BoM) weather forecast/ radar and severe weather warnings issued will increase the level of awareness in the event of a major storm event that may trigger emergency response.

The construction site should be closed as early as possible (where practicable). For instance, due to the short duration of the critical event, if extreme weather warning has been issued in the morning prior to the commencement of the working day, then the construction site should be closed for the day until warnings are cancelled.

The Site foreman and/ or Site Manager is to ensure the temporary rain gauge is regularly monitored on days with forecasted heavy rainfall/ storm events.

4.1.2 Response

4.1.2.1 Flood Warning Time & Flood Notification

The primary strategy is early closure of the construction site (i.e., before the start of the working day), based on the issue of severe/ extreme weather warnings by BOM, where possible.

As aforementioned, the critical storm event duration was determined to be a 1-hour storm event. This is a short duration that would not typically allow adequate response time, however, daily monitoring of weather forecasts/ severe weather warnings in conjunction with a temporary flood gauge at High Street (low point, where water will pond during high-intensity storm events) can increase the level of alert for major storm events that may warrant notification and evacuation of personnel.

For instance, a flood notification alert should be triggered if rainfall depth reaches 30mm in a 20-minute duration or 60mm in a 1-hour duration (or depth of water within 20mm of top of gutter on High Street). This flood notification is to ensure personnel are ready to evacuate if required (i.e., if rainfall intensity continues or increases following flood notification alert issued). Otherwise, evacuation notice will not be issued, although personnel should still remain vigilant in the event the rainfall intensity increases again.

4.1.2.2 Assembly Points and Evacuation Routes

The Foreman and/ or Site Manager is to issue flood evacuation notice for all personnel working below ground to evacuate to a safe location at ground level or above, during a severe/ extreme critical storm event. Construction personnel should remain a safe distance away from batters and stockpiles to minimise risk.



4.1.2.3 Evacuation and Refuge Protocols

Upon issue of evacuation notice, Construction site personnel working below ground are to evacuate to the emergency assembly area nominated within the Site (protected from external catchment flows). The emergency assembly location on site is typically the site accommodation, as it provides shelter above ground level.



Figure 6 – Nominated Emergency Assembly Location on Site (Source: BMT, 2018)

In the event it is not safe to assemble on the construction site, a secondary assembly location via Botany Street (low flood levels of 0-0.15m) is recommended – see Figure 7.

Alternatively, depending on the progress of construction, access to the SCH/ CCCC podium may be available.





Figure 7 - Peak Water Depths during PMF with temporary flood wall (Source: BMT, 2018)

4.1.2.4 Awareness Training

All construction personnel are to undertake mandatory induction and training prior to working on Site. The induction is to include reference to flooding, to ensure flood emergency protocols are followed in the rare event of required evacuation for personnel working in excavation below ground to above ground or higher areas (which will be directed by the Site Manager when warranted).



4.2 Operational Phase

In the event severe weather arises during the day during operational phase, it would be safe for persons to remain on Site (i.e., indoors within the building) as the Site (including finished basement floor level) is not flood affected for events up to and including the PMF with podium connection at high level for accessibility to the adjacent SCH (which connects to adjacent Prince of Wales hospital thereafter; both sites protected during the PMF event), and therefore no evacuation external to the building is required.

Occupants already on the premises would be able to shelter in place in critical storm events and would be able to exit the building to either the adjacent proposed SCH via internal connection (which is also flood free in events up to and including the PMF) or Botany Street (if desired), where flood flows in the PMF event (worst case scenario) are limited to approximately gutter flowing full.

4.2.1 Response

4.2.1.1 Flood Warning Time & Flood Notification

As aforementioned, the critical storm event duration was determined to be a 1-hour storm event. This is a short duration that would not typically allow adequate response time, however, as the Site is protected in the PMF event only flood notification to avoid the affected High Street area is required.

A flood notification alert should be triggered if depth of water is within 20mm of top of gutter on High Street. This flood notification is to ensure staff and visitors are aware of the requirement to shelter in place or exit only via unaffected routes.

4.2.1.2 Assembly Points and Evacuation Routes

During the PMF event, staff and visitors could shelter in place within the building or exit the Site via Botany Street/ podium access to Sydney Children's Hospital.

4.2.1.3 Site Egress and Refuge Protocols

Upon issue of flood notification, staff and visitors should be instructed to remain within the building or leave only via unaffected access routes.

4.2.1.4 Awareness Training

All staff are to undertake mandatory induction and training. The induction is to include reference to flooding, to ensure flood emergency protocols are followed in the rare event of the requirement to take refuge on Site or egress via non-flood affected route.

4.2.1.5 Services Contingency

Recommendation 28 of the NSW Government Response to the NSW Independent Flood Inquiry states the following:

28. Essential Services and Floodplain Infrastructure

That, to minimise disruption to essential services (power, communications, water, sewerage) and to ensure flood infrastructure is fully serviceable before flooding, Government ensure:

- Essential services infrastructure (communications, water, power and sewerage) is situated as much as possible above the flood planning level. And to minimise disruption to medical services, aged care services and the police, Government ensure hospitals, medical centres, nursing homes, aged care facilities and police stations are situated above the probable maximum flood level
- Floodplain infrastructure (drains, levees, flood gates) items are all assigned to an appropriate lead agency which has responsibility for ensuring they are fully maintained and functioning especially when floods are likely.



With reference to the above, all services (power, communications, water, sewerage) is anticipated to be provided above the flood planning level for the HTH development. In the event for existing infrastructure that currently does not align with the above recommendation 28, back up power is to be provided to allow for severe weather events.

5 Ongoing Monitoring and Review

Regular monitoring and review is recommended to be conducted to ensure that this FERP remains current and addresses all risks at the construction works site and on the constructed development (operational phase) thereafter.

6 Implementation of this Plan

As per Condition B28 of the Conditions of Consent outlined in Section 1.2, the Applicant is to implement flood warning/ notification procedures, evacuation and refuge protocols for construction workers on site. These are detailed in Section 4.1.2, specifically Sections 4.1.2.1 and 4.1.2.3, respectively.

Yours faithfully,

Xaust

Stephen Naughton CPEng NER RPEQ

For,

ACOR Consultants Pty Ltd