Construction Flood Emergency Management Plan

Wentworth Point New High School

Prepared for Roberts Co / 20 October 2022

211266

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Your Partner in Engineering

Contents

1.0 Preamble

As per the 2022/2023 budget papers, this project is now referred to as "Wentworth Point new high school". Future documentation relating to this project, including this document, will be labelled accordingly.

Due to the SSD-11802230 application being submitted as "Sydney Olympic Park new high school", the project name will remain the same on the Planning Portal and future documentation may reference this.

Please also note 'Wentworth Point new high school' is the placeholder name for the school. The school naming will occur closer to opening, following a community consultation process.

2.0 Introduction

Taylor Thomson Whitting (TTW) has been engaged by Roberts Co to prepare a Flood Emergency Management Plan (FEMP) to be implemented during the construction of the proposed Wentworth Point new High School at 7 Burroway Road, Wentworth Point.

TTW and Schools Infrastructure NSW (SINSW) representative Roberts Co have consulted the relevant NSW State Emergency Services (SES) officers in developing an operational plan between 28 July and 04 August 2022. The consultation is also relevant to developing a plan for the construction phase. Minutes of the consultation are appended to this report.

The purpose of this FEMP is to summarise the flood risks within the site during construction, identify preparation measures that should be undertaken, and provide an action plan with steps to be completed during a flood event.

2.1 Reference Documents

The FEMP has been prepared with reference to the following:

- NSW Government Floodplain Development Manual (2005);
- NSW Government Floodplain Risk Management Guidelines;
- NSW State Emergency Service (SES) guidelines, and;
- FloodSafe guidelines and the relative FloodSafe Tool Kits.

2.2 SSDA Conditions of Consent

Item	Condition	Section Reference
B19	The Construction Flood Emergency Management Sub-Plan must address, but not be limited to, the following: (a) Be prepared by a suitably qualified and experienced person(s)	Appendix A
	(b) Address the provisions of *Floodplain Risk Management Guidelines* (EHG)	1.0 – 9.0
	(c) Include details of: i. The flood emergency responses for both construction 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 users/visitors	i. 3.0, 5.0 ii. 2.1 iii. 3.0 iv. 5.0 v. 5.0, 6.0, 7.0 vi. 6.0
B22	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	3.0, 4.0
	(b) Evacuation and refuge protocols	5.0

3.0 Flood Behaviour

The flood analysis within this report has been based on a flood study assessment conducted by Sinclair Knight Merz (SKM) on behalf of Parramatta City Council. The following section provides a summary of the findings of the assessment and TTW's analysis.

3.1 Peak Flood Levels

Design flood levels obtained from the study conducted by SKM for the 5% AEP, 1% AEP and Probable Maximum Flood (PMF) events corresponding to the development area are specified in Table 1.

Table 1 - Design Flood Levels - Extract from Lower Parramatta River Study and Plan (2005)

Flood Event	20% AEP	5% AEP	2% AEP	1% AEP	PMF
Design Flood Level (mAHD)	1.27	1.34	1.39	1.42	2.42

Based on this, the peak flood levels for the site are 1.42m AHD for the 1% Annual Exceedance Probability (AEP) storm event and 2.42m AHD for the Possible Maximum Flood (PMF) event. A minimum Finished Floor Level of 4m AHD has been adopted for the site which exceeds both the flood planning level (1% AEP level + 0.5m freeboard) and the PMF from mainstream riverine flooding from the adjacent Parramatta River.

As the Wentworth Point road network is generally located above the 1% AEP flood level, there is no concern with flood risk in this event. The flood evacuation procedures in the following sections of this report should be followed where flood warnings advise of imminent flooding above the 1% AEP flood level and up to the PMF.

The duration of PMF inundation is likely to be longer than a day as flood levels subside slowly. Therefore, shelter-in-place emergency responses are unsuitable as the primary flood emergency strategy. In the event of a forecasted flood emergency, the contractor shall close the site and advise all workers to stay home.

We note that there is currently no formal response flood warning system in place for the lower Parramatta River. However, the Upper Parramatta river section has a formal flood warning system in place with the closest one being in Silverwater Rd bridge. As per our consultation with SES, the head contractor is to monitor flood warnings from SES, the Bureau of Meteorology (BoM), Parramatta Council, and media outlets (televisions, radio stations) instead as a source of flood warning for the site which is generally received up to 7 days in advance prior to a flood commencing. Consequently, there would be sufficient time prior to a flood event to:

- Prepare for a flood
- Respond when a flood is likely
- Respond during a flood
- Recover after a flood
- Close the site
- Notify workers to stay home

The road network to the south of site is of low hazard as shown in Figure 1 where it is subject to shallow flooding where able-bodied people would be able to wade safely. Trucks could also be used to assist evacuation.

Currently, earthworks are scheduled for a short duration of one month to be undertaken during summer. The risk is therefore low as these conditions are unlikely for flooding.

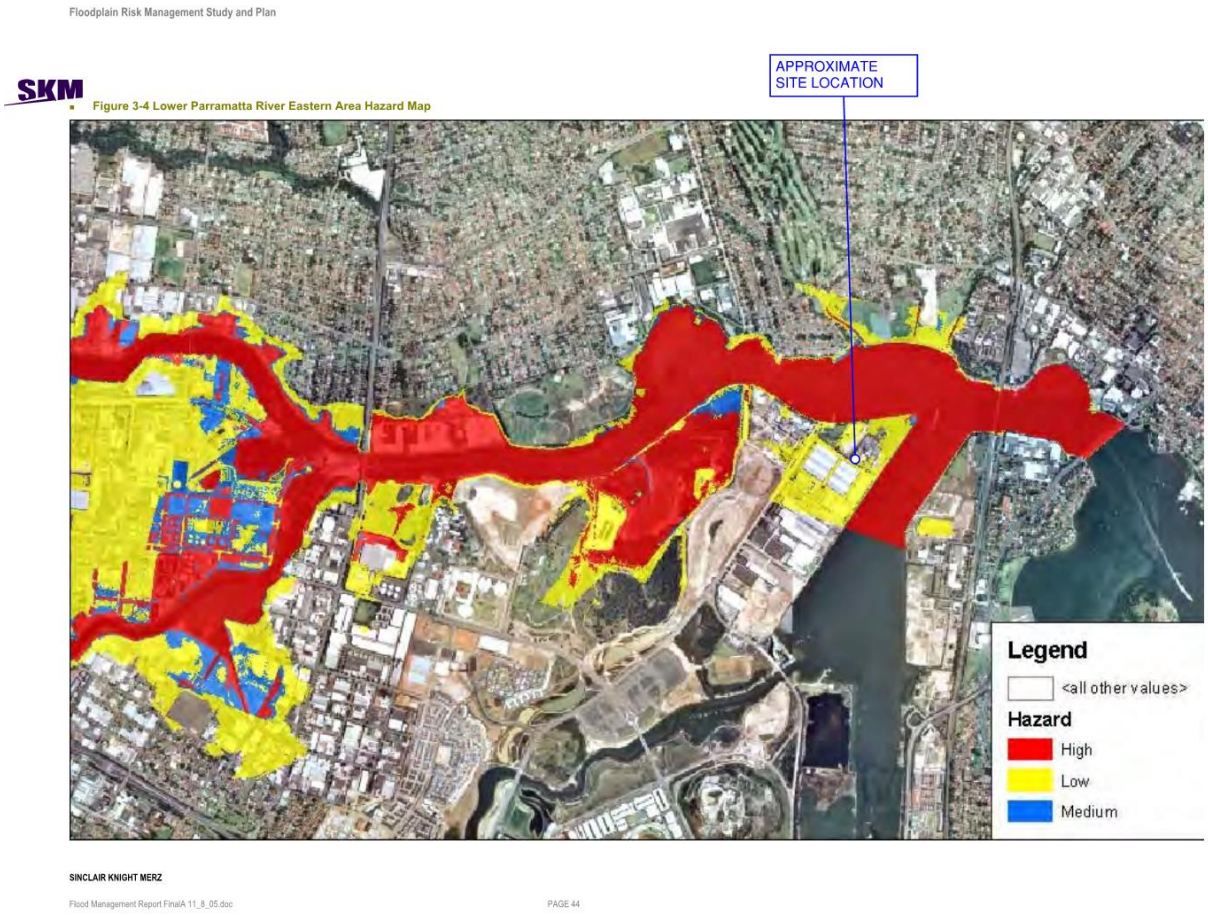

Figure 1 - Flood Hazard Classification (Extract from Lower Parramatta River Study and Plan (2005))

4.0 Flood Warnings and Notifications

4.1 Flood Watches and Warnings

Severe weather and thunderstorm warnings are issued by the Bureau of Meteorology (BoM). These warning are continually updated with descriptions of the likely conditions, including predicted extreme rainfall depths.

Flood warnings are issued by the BoM when flooding is occurring or is expected to occur in an area. Warmings may include specific predictions of flood depths dependent on real-time rainfall and river level data. These warnings are distributed BoM councils, police and the relevant local State Emergency Services (SES), as well as being available on the BoM website.

A **Standard Emergency Warning Signal** (SEWS) will be used by SES to precede all *Top Priority* Flood Warnings and all Evacuation Warnings. Once activated Evacuation Orders are broadcast over the radio stations.

A ***Flood watch*** is issued by the BoM up to four days prior to a flood event. A watch is generally updated daily and may be issued before, during or after rainfall has occurred.

Flood warnings are issued by the BoM when flooding is occurring or expected to occur in a particular area. Warnings may include specific predictions of flood depths dependent on real-time rainfall and river level data. These warnings are distributed to Council, Police and the relevant local SES, as well as being available on the BoM website, through telephone weather warnings and radio broadcasts.

SES Evacuation Warning is a warning message from SES advising the community to prepare for likely evacuation. The warning advises people what to do and what to prepare to take with them.

A ***Flood Evacuation Order*** is a notification to the community, authorised by the SES, when the intent of an Incident Controller is to instruct a community to immediately evacuate in response to an imminent threat. It also advises where people should go and may advise which evacuation route to take.

Visual Observation **-** Site management must visually monitor the flood levels on Burroway Road during severe rainfall events and initiate flood response procedures in the event of flood levels appearing to approach inundation.

4.2 Coordination of Flood Evacuation Warnings and Orders

The overall coordination of the road evacuation routes will be conducted by the SES. The head contractor is to communicate warning messages and orders from the SES to personnel and workers on site.

4.3 Public Address System

The site will have an alert system for workers on site in the event of an emergency. The site will have an Evacuation Procedure with one or multiple assembly points as part of the Emergency Management Plan. As the quadrangle is to be at RL 4.0m AHD, this is a suitable assembly point location. The location of the assembly point is subject to change throughout the course of construction.

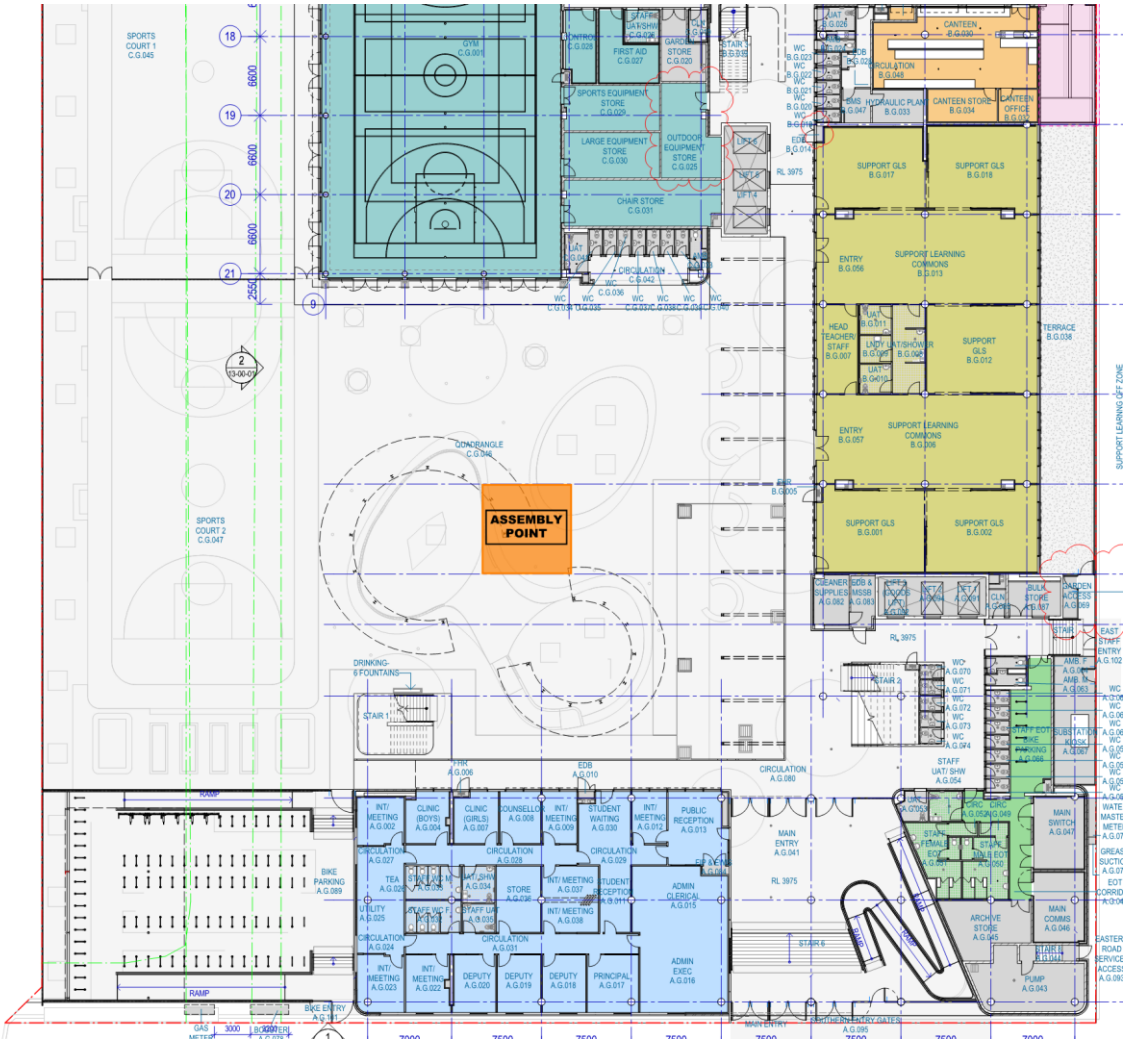

Figure 2 - Quadrangle assembly point

Across the proposed site, the ground floor level has been set at RL 4.00m AHD and majority of external areas are located above the PMF flood level. As such, the assembly point can be anywhere within the site after earthworks have been completed. Before this point, the assembly point shall be set at the high point of the site.

5.0 Flood Response

5.1 Contractor Responsibilities

Once the site is in operation the roles and responsibilities in Table 2 below will need to be delegated to specific personnel. In the event of a severe flood, it is the responsibility of the head contractor to ensure these tasks are undertaken.

Table 2 - Contractor Flood Responsibilities

Role	Location	Responsibilities
Head Contractor **Site Manager / Foreman**	On site	- Inform site personnel of flood risk - Coordinate flood evacuation drills - Decide if evacuation is required prior to warnings from SES - Liaise with SES
Head Contractor **First Aid Officer**	On site	- Coordinate assistance for less able workers and personnel during evacuation - Prepare a Flood Emergency Kit that includes a portable radio, torch, spare batteries, first aid materials, emergency contact numbers, candles, waterproof matches, waterproof bags and required medications.
Head Contractor **Site Personnel**	On site	- Coordinate evacuation of workers and assist in evacuation

5.2 Key Contact Details

In the event of a severe flood, key telephone numbers have been listed in Table 3.0 below.

Table 3 - Key Contact Numbers

IMPORTANT TELEPHONE NUMBERS	
Contractor **Foreman** **Site Office** **First Aid Officer**	**Refer to CEMP for details**
OUTSIDE SITE CONTACTS ***** Ambulance / Fire – Call Office numbers shown above to contact***	
State Emergency Services **Busways** **Burwood Bus Depot** **Concord Hospital** **Police – Ryde**	**132 500** **1300 692 929** **131 500** **9767 5000** **9808 7401**

6.0 Assembly Point and Evacuation Routes

6.1 Emergency Assembly Point

An Emergency Assembly Point will be nominated that is within and central to the site. Before earthworks have been completed on site, the assembly point will be the high point of the site. Once earthworks have been completed, the site will be higher than the PMF level and the assembly point can therefore be nominated anywhere within the site.

As it is intended that the flood evacuation warning will be provided prior to flooding occurring, egress from the site can occur on Burroway Road to the south of the site.

6.2 Evacuation Routes

The following information is provided for information only. For "Flood Response Actions" – refer to Section 7 of this FEMP for details.

As per consultation with SES, if necessary, evacuation to higher ground is the most appropriate route in such proximity to the river. As shown in Figure 1 above and Figure 3 below, all workers or personnel on site are to assemble at the quadrangle and evacuate to higher ground at Bennelong Parkway or across Bennelong Bridge.

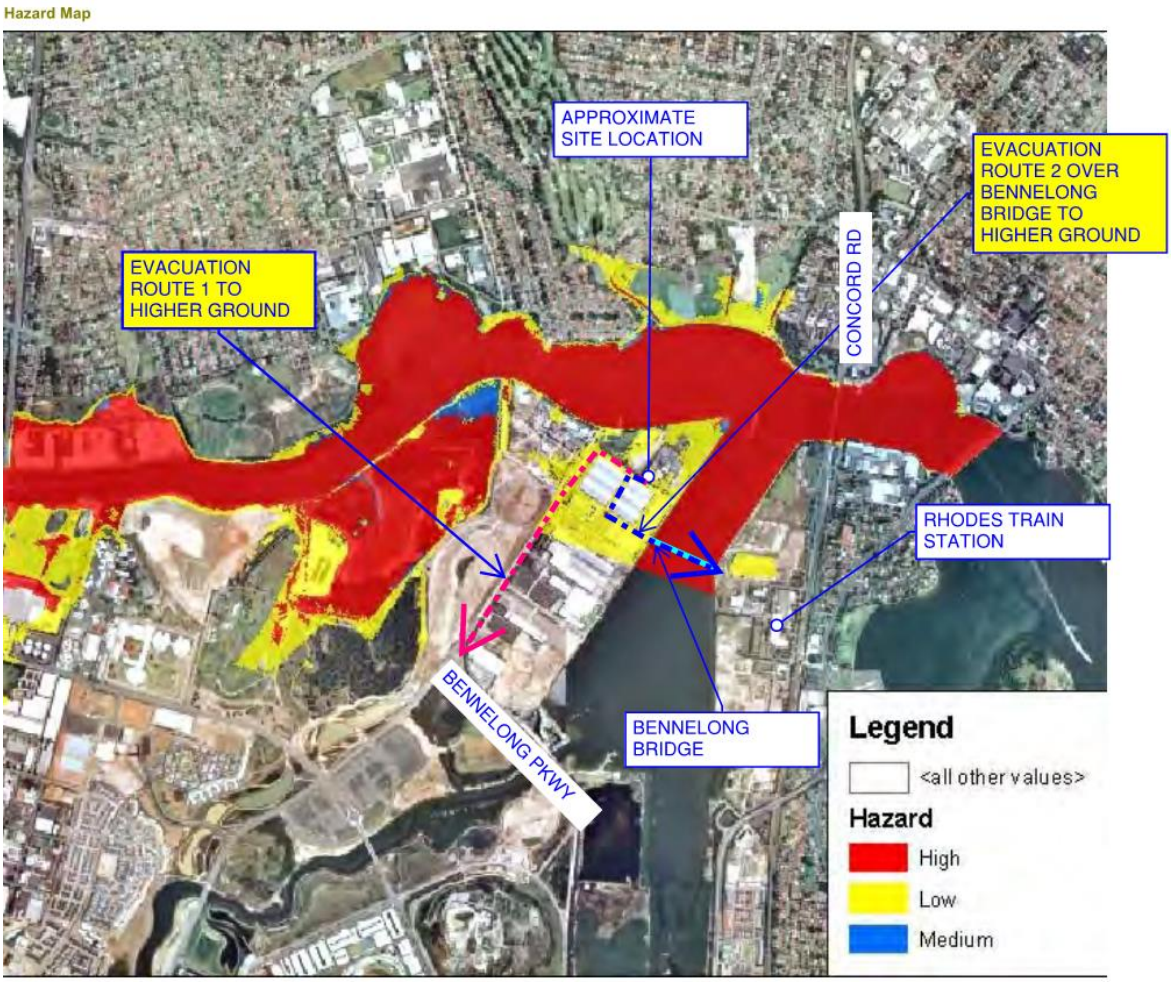

Figure 3 - Evacuation Routes (Extract from Lower Parramatta River Study and Plan (2005))

7.0 Preparation for Flood Response

7.1 Education

7.1.1 Site Personnel

As part of the preparation for a flood event, those with responsibilities within this Plan should review and be familiar with their roles. Inductions should be held to educate personnel on their role during a flood event.

7.1.2 Workers

To increase awareness on site, it is recommended that all inducted workers are made aware of the potential flood risk and actions that will be undertaken during a flood event. Evacuation drills should be undertaken regularly to ensure that all workers are aware of the procedures for evacuation.

7.2 Evacuation Drills

It is recommended that evacuation drills be held at a minimum of twice yearly to ensure all personnel and workers are aware of and familiar with their flood response actions, the sound of the alert and the location of the assembly point.

7.3 Flood Emergency Kit

A Flood Emergency Kit should be prepared prior to a flood event taking place and regularly checked to ensure that supplies within the kit are sufficient and in working condition. This check could occur after the evacuation drill takes place to provide a regular schedule. The Kit should include:

- Radio with spare batteries;
- Torch with spare batteries;
- First aid kit and other medicines;
- Candles and waterproof matches;
- Waterproof bags;
- A copy of the Site Emergency Management Plan; and
- Emergency contact numbers.

This Emergency Kit should be stored in a waterproof container and is the responsibility of the First Aid Officer.

8.0 Flood Response Actions

8.1.1 When A Flood Watch Is Issued

The following actions should be undertaken:

1. Ensure the emergency kit is ready to use.
2. Listen to the local radio station for updates on forecasted flood heights and timings.
3. Call SES for an update and possible evacuation advice.
4. Notify all workers of the flood watch and assist availability of workers to assist with emergency actions if required.
5. Ensure workers are familiar with the safe flood evacuation route.

8.1.2 When A Flood Warning Is Issued

The following actions should be undertaken:

1. Undertake the actions nominated under the “flood watch”.

2. During Site Hours:

    - For life-threatening emergencies phone 000 immediately.
    - Coordinate the safe return of workers in consultation with SES and transport operators to their homes.
    - Call Busway (Bus Operator is to be confirmed) and coordinate the required transport resources for evacuation of non-able-bodied personnel/workers.
    - Send SMS to emergency contacts
    - Direct All workers to the Assembly point within the site before the property is flooded.
    - Evacuate workers and personnel

NOTE: Avoid driving or walking through floodwaters. These are the main causes of death during flooding. Although the site may not be flooded, safe travel arrangements for workers to go home is likely to be disrupted by flooding and/or road closures.

3. Outside of Site Hours:

    - Close the site and notify workers of the temporary closure of the site.

9.0 Limitations and Revision of the Flood Emergency Response Plan

This FEMP only addresses the evacuation strategies during extreme flooding events for workers on site during construction and is considered a guide only. It does not cover individual safe travel for workers when their safe travel arrangements may be disrupted by flooding and/or road closures.

It is the head contractor’s responsibility to ensure this FEMP is current and updated as necessary to be in line with relevant standards, directorate, legislation, and the Regional’s State Emergency Management Plan to ensure the health, safety and welfare of all personnel, workers and others.

10.0 Recommendations

1) Head contractor to liaise with The Transport Services Functional Area for Buses resources allocation and arrangement for non-able-bodied personnel prior to commencing construction on site.

2) Prepare Emergency Management Plan that addresses the recommendations of this FEMP for the ongoing requirements of the site, particularly Section 4.0.

3) Include and update the important telephone numbers in Section 4 of this Report and include in the Emergency Management Plan for the operation of the site.

4) Flood-educate personnel and workers through Education and Evacuation Drills as detailed in the Section 6 of this FEMP.

5) Head contractor to review and update this FEMP as necessary once a year and in accordance with the consent requirements for review of plans, programs and strategies.

6) All personnel and workers to be familiar with Flood Response Actions as detailed in the Section 7 of this FEMP.

Prepared by
TTW (NSW) PTY LTD

WILLIAM BEVER
Graduate Civil Engineer

Reviewed & Authorised By
TTW (NSW) PTY LTD

NEMESIO BIASON JR.
Associate Director

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Appendix A

Consultation Record

Nemesio Biason Jr

From: Nemesio Biason Jr
Sent: Thursday, 4 August 2022 9:41 AM
To: Elspeth O'Shannessy
Cc: David McDonnell; Georgia Sedgmen; Sandra Lim
Subject: RE: Sydney Olympic Park high School

Hi Elle,
As per our latest correspondences, below is the updated minutes of our meeting/consultation.

- *SES Flood data portal flood mapping is based on the Parramatta Council's adopted flood study being the SKM's "Lower Parramatta River Floodplain Risk Management Flood" study 2005*
- *BOM do not provide flash flood warning system but provide potential for flash flooding for a very large scale area as part of their detailed severe thunderstorm warning.*
- *The site is considered Lower risk than other sites that SES has reviewed– The school is elevated high at 4.0mRL and dry, well above the PMF flood level of 2.42mRL.*
- *No current flood warning area that covers Lower Parramatta River catchment. The closest one is at Silverwater Rd Bridge. Department of Education (DoE) is to monitor any flood warnings from SES, BOM, Parramatta Council, Media outlets (television, radio stations) instead as a source of flood warning for the site.*
- *There are risks associated with sheltering in place which is why it is the preferred strategy for schools to close prior to commencing the school day or prior to inundation of the roads. For example secondary emergencies (e.g. fire or medical), complexities with resupply and given the age of the student potential for them or carers to enter the dangerous floodwater.*
- *Primary priority is the closure of school in any road closure within the Precinct and ahead of any major flooding.*
- *Second Priority is school closure upon receiving any flood warning and evacuate out prior to PMF flood*
- *Make sure there is enough time to evacuate, Look at depth and velocity*
- *Evaluate the peak critical PMF storm event which could be hours to a day.*
- *Only need to evacuate if it is a PMF, and students being high school students can self-evacuate or guided by guardians to higher grounds.*
- *In the worst case scenario, or couldn't evacuate – The site is safe as an "On-site refuge" being at 4.0RL being 1.58m above the PMF flood level.*
- *It was suggested to Check Glenwood School's flood emergency response plan.*

Regards
Nemesio

Appendix B

CV

Nemesio Biason

Associate Director

BE CPEng, NER

nemesio.biasonjr@ttw.com.au

Experience

2019 – Current
Associate Director, TTW

2013 – 2019
Associate, TTW

2004 – 2013
Senior Civil Engineer, TTW

2003 – 2004
Design Engineer,
BMD Consulting Pty Ltd

2002 – 2003
Civil Design Engineer,
Cardno Willing Pty Ltd

2001 – 2002
QA/Design Engineer,
Cootamundra Shire Council

Associate Director, Nemesio Biason joined TTW in 2004 as a highly technical civil engineer. He has detailed knowledge of construction projects which spans across commercial, retail, residential, industrial, educational, healthcare and public buildings. Including experience with legal expert witness, water sensitive urban design, stormwater design, flood study, earthworks, pavement and masterplanning.
He brings a practical and adaptive approach to his work, understanding that every project is unique and requires a responsive and collaborative solution. He has a strong network of clients and works cohesively with architect, client and contractors.

Accommodation

Iglu Redfern
233 Johnston Street, Annandale
Block G, Wentworth Point
7-9 Kent Road, Mascot
ILU, Croydon
7 Cremorne Point Road, Cremorne
Trades Hall, Sydney
Zenith Apartments, Kings Cross
7-9 Kent Road, Mascot

Commercial

Balikpapan, Indonesia – Stormwater Design
100 Pacific Highway, North Sydney – Civil Design
16-40 Mount Street, North Sydney – Civil and Public Domain Design for the 5 Green Star Project
Dubai Airport Roof Drainage
7-9 Kent Road, Mascot

Retail

Fairy meadow Shopping Centre Development – Civil Design
Hobart Parliament Square
Charlestown Square North Piazza

Sports + Leisure

Australian Rugby Development Centre, Moore Park – Civil Design
Strathfield Golf Course – Civil Design
Wollongong Leisure Commercial Development – Civil Design
Aerial Rope Park, St Mary's
Moorebank Sports Club extension and Car Park

Art + Culture

Orange Regional Museum – Civil Design (Winner of NSW AIA – NSW Premier's Prize and Sulman Medal)
Anzac Memorial Education and Interpretation Centre – Civil Design ($40m)
Rooty Hill Performing Arts Centre
NSW Art Gallery Storage Facility, Lilyfield – Civil Design
Burelli St, Wollongong (Salvation Army Site) – Civil Design

Education

Macquarie Library, Macquarie University
LEES1 Project, University of Sydney – Civil Design
Wallace Wurth Redevelopment, UNSW – Civil Design
Macquarie University – South Precincts
Danebank Anglican Girls School
North Sydney TAFE, Westbourne Street Entrance
Hurlstone Hawkesbury High School
UNSW Electrical Engineering Building Capital Renewal & modernization Project
St Marks, Stanhope Gardens
Wenona School, North Sydney
Glenfield Agriculture High School
Building Education Revolution (BER) Schools – Leonay, Wyoming, James Erskine, Blaxland, Pymble, Llandlo, Cambridge Park, Ellison, Luddenham and Werrington County Public Schools
Glenfield High School
Danebank School Redevelopment

Healthcare + Research + Aged Care

Sir Moses Montefiore Jewish Home, Randwick
Graythwaite Rehabilitation Centre, Ryde Hospital
Blue Haven Community Centre
Condobolin Retirement Village
Prince of Wales – Neuroscience Research Precinct Stage 2A
BUPA Sutherland
Northshore Private Hospital

Nemesio Biason

What is it about the industry that motivates you?

It motivates me to see the engineering and construction industry thriving in its ability to meet client and community expectations despite working in highly-constrained time and financial parameters, and yet still delivering high-end and innovative projects.

Government + Public

Wynyard Walk, Sydney (Winner of NSW CIA Excellence in Infrastructure Projects)
80 Alfred Street, Milsons Point – Public Domain Works Design

5-11 Meriton Street, Gladesville – Public Domain Works Design

15 Strathford, Cammeray – Public Domain Works Design

Block 8, Central Park – Public Domain Works Design

207-211 Darlinghurst Road, Darlinghurst – Public Domain Works Design

20 Alfred Street, Milson's Point

Willoughby Council Kerb and Gutter and Drainage Design, Castle Cove

Civil

Accessways + Car Parks

Westpoint Shopping Centre, Blacktown – Alpha Street New Carpark Entry/Exit Design

Macquarie University – Gumnut Childcare Car Park – Design and Project Management

Flood Mitigation

Superlot 5, Little Bay – Stormwater, Civil, and Flood Assessment

Merrylands City Central Project – Civil Design and Flood Advice

Bass Hill Plaza – Flood Damage Investigation (Peer Review)

Wynyard Walk, Sydney – Stormwater Expert Witness

434-444 Elizabeth Street, Surry Hills

Roads + Stormwater

Echuca RSL Club – Stormwater Analysis

Stage 1, St. Mary's Leagues Club - Civil and Stormwater Design

18a Bradleys Head Road, Mosman – Stormwater Design

Phoenix Theatre Gallery, Chippendale – Stormwater and Public Domain Works Design

Rooty Hill RSL, Rooty Hill – Civil Design and Flood Study

Civil Continued

Flood Mitigation (Cont'd)

176-184 George Street, Concord – Flood Management

10-20 McEvoy Street, Waterloo – Flood Study

Macquarie Park Cemetery – Stormwater, Prioritisation Analysis 37 ha Catchment

Emirates 6-star Resort Development, Wolgan Valley – Flood Study (18,525ha catchment)

Dunmore Stable, Dunmore – Flood Study (11,500ha catchment)

47& 57 Princes Hwy Albion Park Rail – Flood Study (10,700ha catchment)

Baker Street, Banksmeadow Industrial Development - Flood Study

1 – 3 Dunning Avenue, Roseberry – Flood Study

Railway Parade, Burwood – Stormwater Analysis (11ha catchment)

10-20 McEvoy Street, Waterloo – Flood Expert Witness

New South Head Rd, Double Bay – Flood Study (240ha catchment)

ACT Prison – Catchment and Overland Flowpath Analysis

Jakarta International School – Flood Study (27ha catchment)

Richard Johnson Anglican School – Sites Detention Basin Analysis

Claremont, Nyngan – Flood Analysis

Subdivision + Infrastructure

Berkeley Industrial Subdivision

Burroway Road – Road and Drainage Design

Macquarie University – Campus Wide Infrastructure (Road works, Stormwater, Sewer and Water), Masterplanning for 2031 and Flood Studies

Macquarie University – Balaclava Road Extension and Roundabout Design

697 Anzac Parade, Maroubra – Stormwater Diversion

Blacktown Showground Project – Stormwater Design

Berkeley Road Industrial Subdivision Stage 2, Berkeley – Flood Study (46ha catchment) and Civil Design