



# Aspect Industrial Estate – Stage 2 SSD58257960

## Flood Emergency Response Plan Warehouse 2

### Mirvac Industrial Developments

200 George Street  
Sydney NSW 2000

Prepared by:

**SLR Consulting Australia**

SLR Project No.: 630.031249

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Revision: v1.0

## Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
v1.0	9 July 2024	Paul Delaney	Alanna Ryan	
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## Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Mirvac Industrial Developments (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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## 1.0 Introduction

### 1.1 Subject Property

The proposed Aspect Industrial Estate is a warehouse, distribution and industrial centre located at Kemps Creek within the Penrith local government area (LGA) which forms part of the broader Mamre Road Precinct located within the Western Sydney Employment Area (WSEA) (see Figure 1).

The Aspect Industrial Estate is located at 788-882 Mamre Road, Kemps Creek, on the property described as Lot 301 on DP1305254.

This Flood Emergency Response Plan (FERP) is specific to proposed Stage 3 of the Aspect Industrial Estate, which includes Warehouse 2, as per SSD 58257960. This site is called Warehouse 2 in revised concept layout as per SSD -10448 MOD-3.

### 1.2 Purpose

The FERP provides a plan of action that informs what measures should be taken once the threat of a flood is determined to be imminent. This will include requirements for evacuation. It involves planning for extreme events which are greater than those used to derive the Flood Planning Level ie events greater than the 1% AEP (or 100 year) flood.

This site-specific FERP is intended to identify requirements which are specific to the subject property, which supplement the general requirements of the Penrith City Local Flood Emergency Sub-Plan endorsed by the Penrith Local Emergency Management committee on 8<sup>th</sup> February 2022, administered by the NSW State Emergency Service (SES).

The FERP has been developed in consultation with the NSW State Emergency Service (SES) (See Appendix A)

### 1.3 Consent

The development concept for Lot 2 Warehouse has been approved in SSD 58257960, while the concept for the broader AIE is approved in SSD 10448.

The requirement for a FERP is included in the development consent SSD 58257960, condition B24 and B25 reproduced in Table 1.

**Table 1: SSD-582579604 Conditions of Consent**

Condition	Where Addressed in this Document
<b><i>B24. Prior to the commencement of construction of the development, the Applicant must prepare a Flood Emergency Response Plan (FERP) to the satisfaction of the Planning Secretary. The Plan must form part of the CEMP and OEMP required by condition C2 and C5 and must:</i></b>	
be prepared by a suitably qualified and experienced person(s);	Section 9
be prepared in consultation with NSW State Emergency Services (SES);	Section 7
address the provisions of the Flood Risk Management Manual (DPE, 2023) and Support for emergency management planning (DPE, 2023); and	Section 3.4
d) include details of:	Sections 6 & 7



Condition	Where Addressed in this Document
(i) the flood emergency responses for both construction and operation phases of the development;	
(ii) measures to eliminate or reduce downstream flood impact on properties to the west of Mamre Road for all flooding events;	The response to this condition is detailed in Stantec letter provided in Appendix B.
(iii) predicted flood levels;	Section 5 (Stantec reports July 2023 and Feb 2024)
(iv) flood warning time and flood notification;	Section 5.4
(v) assembly points and evacuation routes;	See Figure 5 Figure 5 assembly/ muster point shown
(vi) evacuation and refuge protocol; and	Section 5.4
(vii) awareness training for employees and contractors	Section 5.3
B25. The Applicant must:	
9a) not commence construction until the FERP required by condition B24 is approved by the Planning Secretary; and	Section 7
(b) implement the most recent version of the FERP approved by the Planning Secretary for the duration of the development.	Section 6, 7
C1. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
a) detailed baseline data;	Section 5
b) details of: i. the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 4
ii. any relevant limits or performance measures and criteria; and	Section 8 (requirements for review of FERP)
iii. the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 8 lists factors to be considered in assessing the need for future updates the FERP
c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 3 Section 8
d) a program to monitor and report on the:	
i. impacts and environmental performance of the development; and	Section 8
ii. effectiveness of the management measures set out pursuant to paragraph (c) above;	Section 8
e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 8
f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 8 outlines a review process for the FERP to facilitate improvements over time.
g) a protocol for managing and reporting any: i. incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); i. incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);	CEMP



Condition	Where Addressed in this Document
ii. complaint;	
h) a protocol for periodic review of the plan.	Section 8

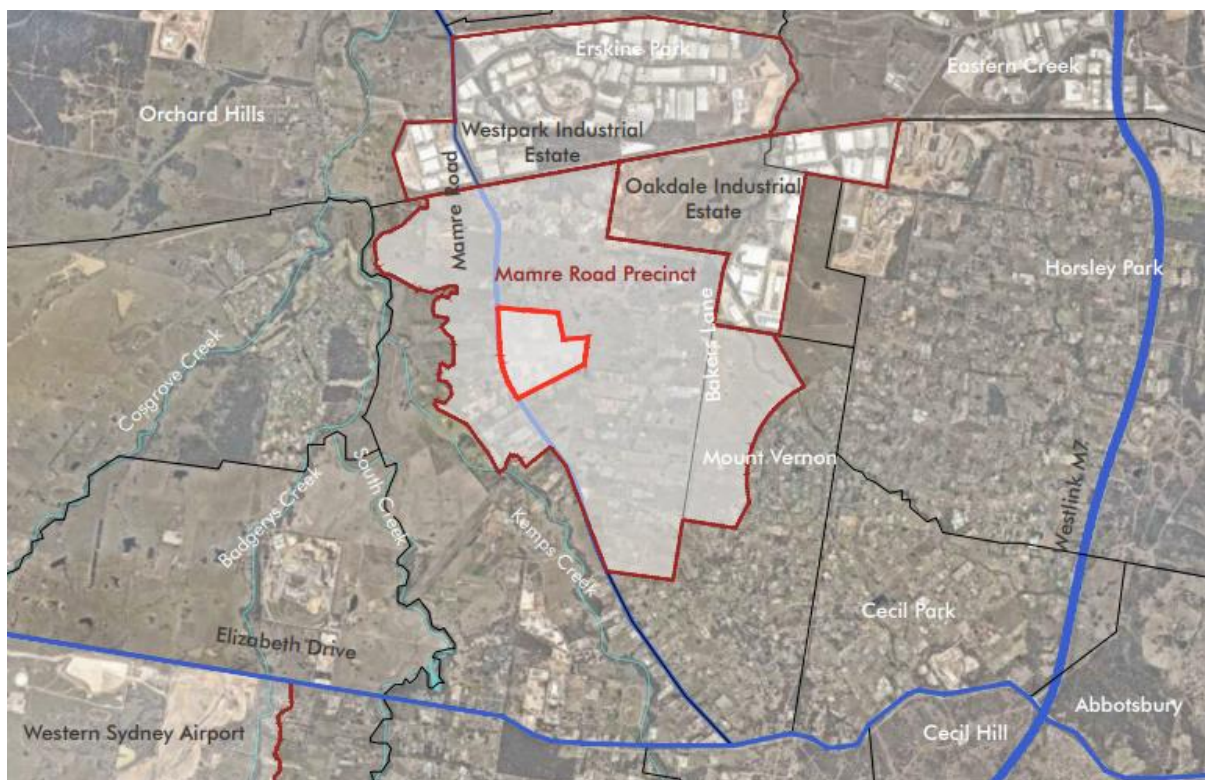
## 2.0 Development Description

### 2.1 Site Location

Aspect Industrial Estate (AIE) is a regional warehouse, distribution and industrial centre located at Kemps Creek within the Penrith local government area (LGA) and forms part of the broader Mamre Road Precinct located within the Western Sydney Employment Area (WSEA) (see Figure 1).

AIE is located east of Mamre Road, Kemps Creek within the Penrith Local Government Area (LGA). The site has approximately 950m of direct frontage to Mamre Road with a proposed intersection providing vehicular access via Mamre Road to the M4 Motorway and Great Western Highway to the north and Elizabeth Drive to the south.

**Figure 1: Locality Plan**



- AIE boundaries
- Precinct boundaries
- Suburb boundaries
- Major link roads



## 2.2 Site Plan and Levels

The context of the site within the broader Aspect Industrial Estate, and the proposed concept site layout are shown on **Figure 2** and **Figure 3**.

The Stage 1 works for the AIE (SSD-10448) included bulk earthworks to lots, estate roadworks, and trunk stormwater. The benched pad across the Warehouse 2 site is created at an RL of 48.20, and an ‘average lowest’ level of 47.60 (Ref: at&I Civil Infrastructure Report, March 2024).

The finished floor level of the proposed warehouse and office buildings on Lot 2 has been set at RL 49.10 (Ref: Updated Architectural Plans, SBA, March 2024)

The proposed carpark north of the warehouse (within Lot 2) is adjacent to the ‘upstream diversion channel’ and has a lowest pavement level of 47.60 (Ref: at&I civil drawings, July 2023)

Road access is via the estate access roads.

## 2.3 Hydrological Context

The AIE is located within the catchment of South Creek. There are two overland flow paths which traverse the AIE generally from east to west, and these have been diverted as part of the estate stormwater works under SSD-10448. These overland flow paths do not affect Lot 2 Warehouse.

**Figure 2: Aspect Industrial Estate as per SSD 46516461 and SSD-10448-MOD-3**

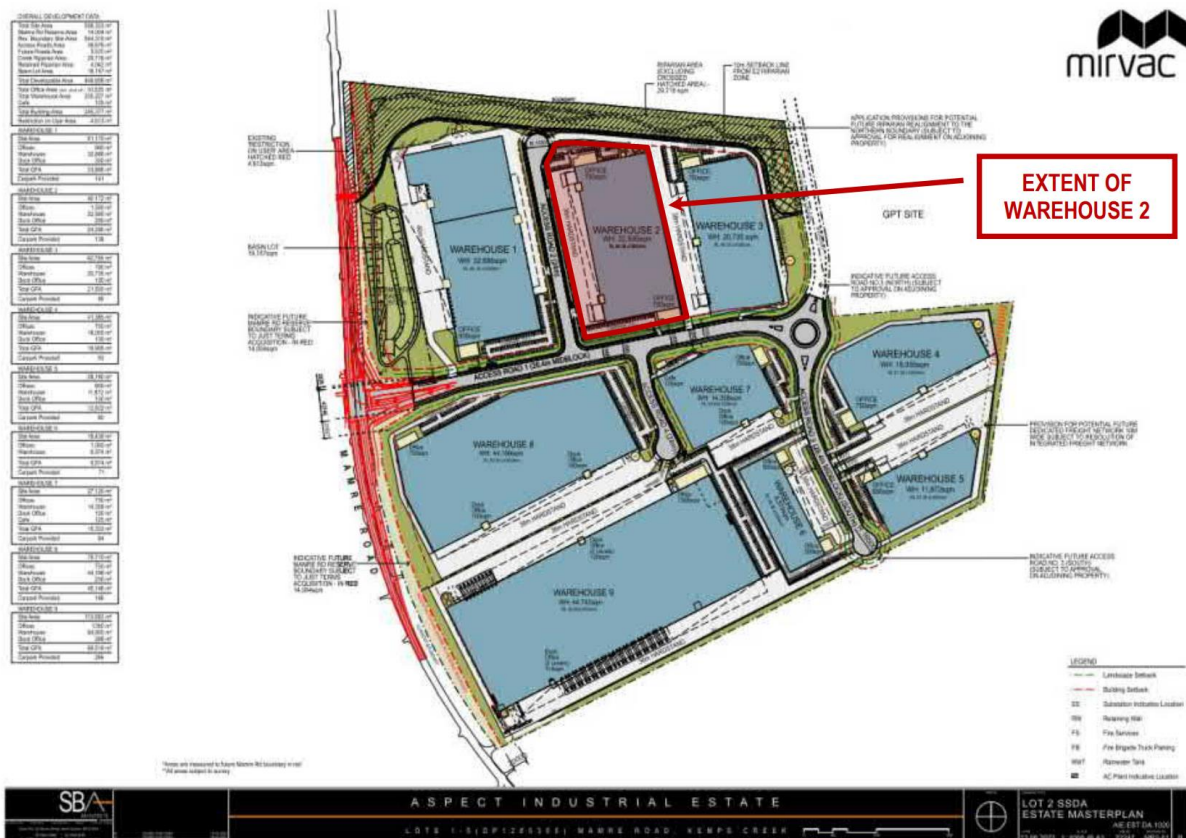
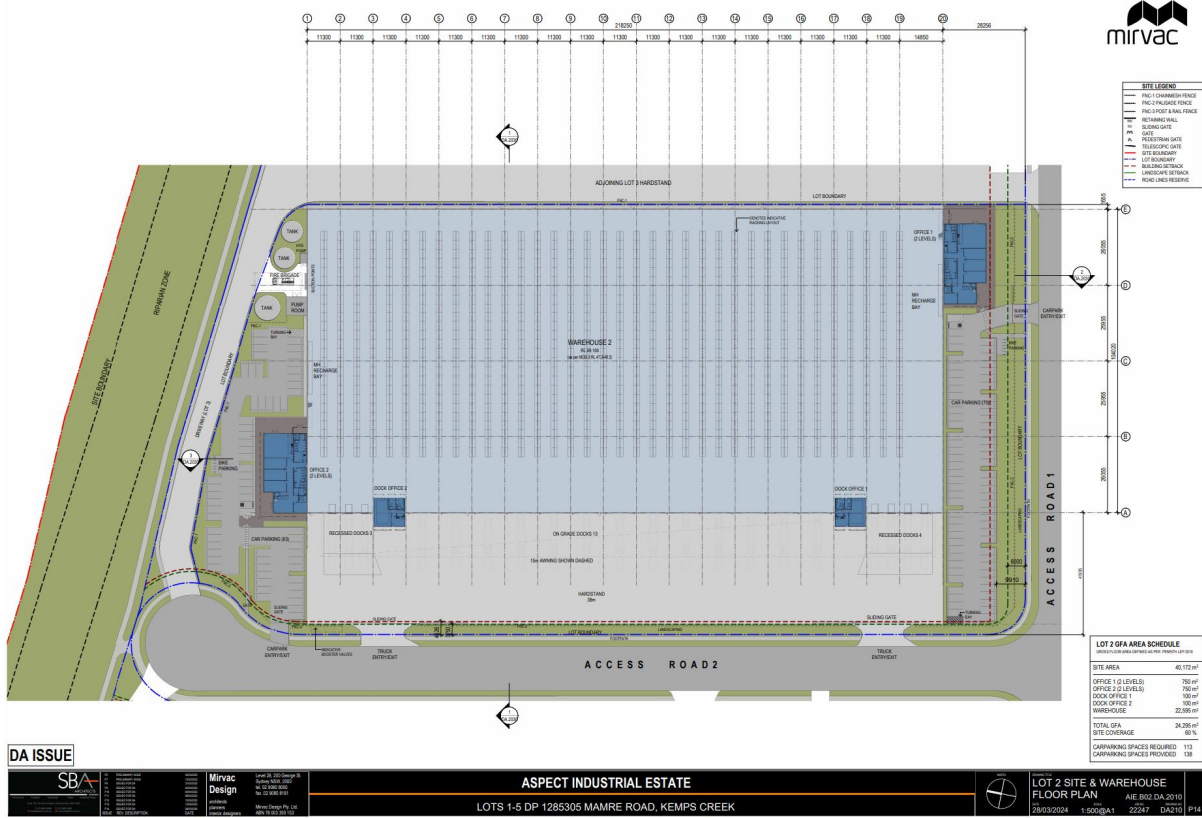


Figure 3: Site Plan – Lot 2 Warehouse as per SSD 58257960



## 3.0 Policy and Guidelines Framework

### 3.1 Principles

Key principles that are applied to emergency management in New South Wales are:

- **Prevention:** to eliminate or reduce the level of the risk or severity of emergencies;
- **Preparation:** to enhance capacity of agencies and communities to cope with the consequences of emergencies;
- **Response:** to ensure the immediate consequences of emergencies to communities are minimised; and
- **Recovery:** measures which support individuals and communities affected by emergencies in the reconstruction of physical infrastructure and restoration of physical, emotional, environmental and economic well-being.

### 3.2 Penrith Local Environmental Plan

The Penrith Local Environmental Plan (LEP) zones the land within the Penrith LGA and imposes standards to control development or implements a state or local policy outcome. The Penrith LEP provides the details of items which the consent authority must satisfy themselves of before providing development consent:

The LEP aims to ensure that the development:

- Is compatible with the flood hazard of the land;
- Is not likely to adversely affect flood behaviour, flow distributions or velocities resulting in detrimental increases in the potential flood affectation of other development or properties or the environment (including stability of waterways and riparian vegetation);
- Is not likely to adversely affect the safe and effective evacuation of the land and the surrounding area;
- Is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding; and
- Manages the risk to life from flood.

#### 3.2.1 Penrith City Local Emergency Sub Plan

The Penrith Flood Emergency Sub Plan is a sub plan of the Penrith Local Emergency Management Plan (EMPLAN). It has been prepared in accordance with the provisions of the *State Emergency Service Act 1989* (NSW) and is endorsed by the Local Emergency Management Committee in accordance with the provisions of the *State Emergency and Rescue Management Act 1989* (NSW).

The plan sets out Penrith City's local arrangements for prevention, preparation, response and initial recovery for flooding in Penrith City LGA.

#### Prevention/Mitigation

The NSW Floodplain Development Manual outlines the NSW Government's Flood Prone Lands Policy and provides guidelines including the concept of a Flood Planning Level for use in land-use planning.

Flood risk at Warehouse 2 is mitigated by:



- The location of Warehouse 2 on land with an elevation above the estimated 100 year, 200 year and 500 year flood events, and with no significant flooding (depths greater than 150mm) during a PMF event; and
- Elevation of ground floor levels well above the estimated PMF flood event.

## Preparation

Preparation includes arrangements or plans to deal with an emergency or the effects of an emergency.

- NSW SES develop, review and maintain Flood Sub Plans;
- Develop and review this FERP as required. Local Flood Plans outline the specific arrangements for management of flood events; and
- Awareness training for workers at Warehouse 9 as to risks associated with flooding.

## Response

### Information and Warnings to the Community – Triggers to start preparing for a flood event

The Bureau of Meteorology issue public weather and flood warnings before and during a flood.

The NSW SES issues: Three levels of warning in accordance with the Australian Warning System:

- Local Flood Advice;
- Three levels of warning in accordance with the Australian Warning System: These are Advice, Watch and Act and Emergency Warning

NSW SES will provide alerts and flood information using a variety of communication methods. These may include:

- Emergency Alert (SMS and voice message alerting system);

Road closure information is provided via Council websites; the Road and Maritime Services 'Live Traffic' website [www.livetraffic.com](http://www.livetraffic.com) or Transport InfoLine 131500 or the 'Hazards Near Me' app.

## 3.3 Floodplain Risk Management Guideline (LFP, 2022)

NSW SES advocates for the recognition of emergency management considerations through participation in the floodplain risk management program. These actions include:

- NSW SES will provide coordinated and consistent emergency management advice to councils and other agencies in relation to the management of land that is subject to flooding or coastal inundation; and
- NSW SES will provide advice, support and technical resources for NSW SES representatives to contribute effectively to local Floodplain Management Committees.

### Australian Rainfall & Runoff 2016/2019

While it is recognised that AR&R2016 provides improved methodologies for flood estimation, and that climate change should be accounted for, the development approval for this site is based on flood studies that utilise rainfall temporal patterns from AR&R 1987. Given the



non-criticality of flooding at this particular site ie, developed site is not inundated in a PMF event) it is recommended that a review of this FERP can be carried out when updated flood levels are available. A review period of 10 years maximum is recommended.

### 3.4 Flood risk management guideline EM01

This guideline provides advice on how the flood risk management (FRM) framework and process described in the Flood risk management manual: the policy and manual for the management of flood liable land (the manual; DPE 2023) can consider and support flood emergency management (EM). It outlines how the NSW State Emergency Service (NSW SES) as the combat agency for flood, storm and tsunami, plans for flooding, as well as the key EM principles and strategies it uses when undertaking EM planning for the community. . The guideline also provides an understanding of:

- how information from the FRM process is used to support flood EM planning
- key EM constraints and how these may impact FRM for communities
- the limitations of flood emergency response strategies and how these can inform decision-making.

The guideline states that one of the key information requirements to support NSW SES emergency management planning, is the Flood Emergency response Classification, or FERCC.

Using this classification the Warehouse 2 site is classified as a '**High Flood Island**', since it is not inundated by a PMF flood, but can be isolated by flooding along the road egress route.

It is also noted that the time of isolation is short (associated with local overland flooding rather than flooding along South Creek), and that occupants will be able to be safe and self sufficient for the duration of flooding (up to and including PMF flood event).



## 4.0 Flood Behaviour

### 4.1 Flooding Abbreviations/Terminology

**FPL** – Flood Planning Level – at Penrith this is the 1% AEP flood level plus an additional 0.50m.

**PMF** - The Probable Maximum Flood – this is the maximum conceivable flood that could occur at any location.

**1% AEP** - The 1 Percentile Annual Exceedance Probability – this is the event that has a 1% chance of being exceeded each year. It is equivalent to the former terminology ‘100-year ARI flood’ event.

**ARI** – Average Return Interval – indicates the average time between events

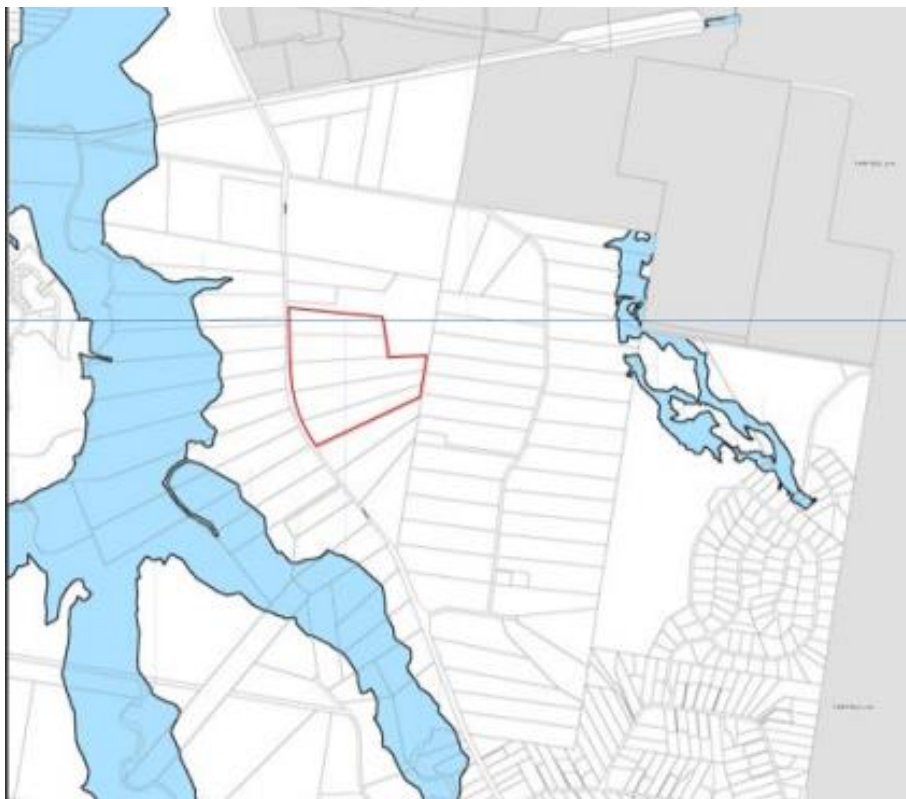
### 4.2 Flooding along South Creek

Flood behaviour along South Creek is well established and described in the Updated South Creek Flood Study, prepared by Worley Parsons in 2015 for Penrith Council. Flood levels predicted in the South Creek Flood Study have a nominated accuracy of 0.2m. The study does not appear to account for climate change impacts on the severity and frequency of extreme events.

The AIE is traversed by two first order watercourses which report to South Creek, but is located outside of the actual floodplain of South Creek.

The subject site is therefore not directly affected by flooding along South Creek, and is outside of the South Creek flood plain identified in the 2010 Local Environmental Plan.

**Figure 4: Extract from Penrith LEP 2010 Flood Planning Area and AIE**



## 4.3 Local Watercourses/Overland Flow

A Flood Risk Assessment was prepared by Stantec Australia in July 2023 for Lot 2. The Stantec study included flood modelling to estimate flood levels and flood hazards across a range of events ranging from a 1 in 5 year event, through to a 1 in 100 year, 1 in 500 year and PMF event.

A supplementary letter report was prepared by Stantec in February 2024, titled 'Responses to EHG Flooding Comments on SSD-58257960, Aspect Industrial Estate, Kemps Creek'. This report includes flood hazard mapping for 2 year through to PMF floods when Warehouse 2 is developed.

### Flooding of Warehouse 2

The Stantec flood modelling (July 2023) indicates that the Warehouse 2 site itself is not flooded in a 100, 200 or 500 year ARI events and is also not flooded during a PMF flood event. PMF flood levels come close to inundating carparks to the north-east and south-east of the warehouse.

The finished floor levels for Warehouse 2 in the updated architectural drawings is identified as RL49.6, which is above the estimated flood levels around the Lot 2 perimeter, indicating that the building floor level will not flood in a PMF event. Areas surrounding the site, including roads, will be inundated in a PMF event.

### Flooding on surrounding road network

The Stantec flood study identifies that Mamre Road is subject to low hazard flooding in 100 year ARI flood events at the creek crossing location north of the proposed AIE intersection, but commences overtopping in a 2 year ARI flood event. This flooding is likely to be short in duration and associated with localised intense rainfall, rather than longer duration flooding as can occur along South Creek.

Mamre Road is also cut by localised flooding at several other locations south of Aspect Industrial Estate. This flooding also occurs due to flash flooding associated with short duration rainfall events. There is no practical warning time for these events.

During a PMF event the Stantec Flood Study identifies that there are numerous locations within estate roads and along Mamre Road that have High Hazard Category.

It is very dangerous to cross any floodwaters in vehicles (even those with low hazard category). It is recommended that:

- Occupants remain on site if advised to do so by the Flood Warden
- If flood waters are encountered along Mamre Road during evacuation, then do not cross them. Either return to site, or remain in a safe location until the flood waters subside.

## 4.4 Flood Warning

### 4.4.1 Flood along South Creek

There are no flood warning gauges along South Creek. Severe weather warnings may provide warnings of imminent severe rainfall, and the need for site occupants to monitor conditions.

Any travel crossing South Creek will require use of Mamre Road, which as noted below, can flood with very little warning.



Warehouse 2 itself will not be inundated by flooding along South Creek.

#### **4.4.2 Flooding of Mamre Road**

Flooding of Mamre road can occur due to localised intense rainfall events, and can therefore occur with no practical warning time.

#### **4.4.3 Mamre Road (evacuation route)**

Mamre Road is subject to localised flooding where creeks cross the road. These flooding events may result from heavy rainfall over short durations and there is no reliable flood warning system. The Flood Warden should monitor Bureau of Meteorology Severe weather warnings which may indicate potential for flooding of Mamre Road, but are unlikely to be a reliable predictor of localised rainfall conditions that cause flooding of Mamre Road.



## 5.0 Flood Emergency Response Plan for Facility – Operational Phase

### 5.1 Use Approved Version

During the operational phase always, *‘implement the most recent version of the Flood Emergency Response Plan approved by the Planning Secretary for the duration of the development’.*

### 5.2 Prevention

Flooding risk at the Facility has been minimised by the land planning process such that the subject site is elevated above the FPL. The proposed floor levels are not flood-prone during the extreme flood events including the estimated PMF event.

The SES has recommended that consideration be given to closing the worksite prior to the start of the day if there is a risk of flooding. This decision would need to be made by the Flood Warden, and endorsed by facility management. Conditions which might warrant this decision would include BOM warnings for extreme rainfall and flash flooding.

### 5.3 Preparation/Training

Site occupants should undergo flood awareness training as part of site induction processes. At a minimum training should include:

- Occupants be made aware of the Flood Emergency Response Plan, and where to find it;
- That the Warehouse 2 site and building floor level are flood-prone;
- The proximity of flood waters to the building perimeter during PMF flood events, including deep water and fast flowing water along the creek diversion channel to the north, and areas of high hazard along estate roads and Mamre Road;
- The muster location in the event of flooding shown by the red dot on **Figure 5**;
- The recommended egress route along Mamre Road, noting the possibility of floodwaters crossing Mamre Road at several locations in events as frequent as a 5% AEP rainfall, and that this overtopping may occur with no practical warning
- The high risks of crossing floodwaters in vehicles or on foot;
- Since the flood response strategy relies heavily on human behaviour, it is important that all occupants understand the importance of complying with instructions from the Flood Warden.

Drills to practice assembly at the Muster point should be carried out annually.

Facility management should ensure that a Flood Warden (or delegate) is present on site at all times when a flood warning is active.

#### **People with a disability:**

The Flood Warden must identify a care or support person if required for people with disabilities to assist them during flood events.



Figure 5: Muster Location (red dot)



Source: Updated Architectural Drawings in SSD-58257960

## 5.4 Response

If a major flood appears likely based on weather forecasts either along South Creek or localised flooding on Mamre Road the situation should be monitored by the Flood Warden, who should advise occupants accordingly.

- **NSW SES Website** – for Flood Bulletins - [www.ses.nsw.gov.au](http://www.ses.nsw.gov.au);
- HazardWatch (NSW SES interactive information and warnings website)
- HazardsNearMe app (a tool to receive flood warnings as part of the Australian Warning System)
- **SES Penrith City Local Headquarters** - phone-in information service including information on river heights, flood behaviour, and road closures - 132 500;
- **The Bureau (of Meteorology) website** for the latest Flood Forecasts and warnings - [bom.gov.au/nsw/](http://bom.gov.au/nsw/); and
- Road Closures at the **Live Traffic website** - [livetraffic.com.au](http://livetraffic.com.au).
- Safest Egress Route
- Listen to your local radio station for local warnings, updates and information:



The building provides extensive floor areas not subject to flooding in a PMF event, so evacuation or egress from the facility to avoid 'threat to life' flooding is not necessary.

An egress route is shown on Figure 6. This route is unlikely to provide a safe route free of floodwaters across the road in any rainfall event of 5 years ARI or above, since localised overland flows events of short duration can result in overtopping of Mamre Road at several locations. Since this flooding may occur with no practical warning this makes Mamre Road an unreliable egress route once severe rainfall events have commenced or are imminent. If flooding or extreme weather is predicted then the Flood Warden should decide:

- If egress can be safely achieved in advance of flooding; or
- If occupants should take refuge in the Warehouse 2 building.

The Flood Warden's decision on whether it is safe to leave the site should be informed by weather warnings and rainfall radar, and road closure information via Council websites, the Road and Maritime Services 'Live Traffic' website [www.livetraffic.com](http://www.livetraffic.com) or Transport InfoLine 131500. If severe rainfall is imminent then evacuation is not recommended.

If any doubt exists then refuge on site within the building is recommended. The threat to life from people unnecessarily crossing flooded roads is far greater than that associated with refuge on site.

In a flood emergency site occupants should assemble at the Muster Point and take direction from the Flood Warden, who will provide direction on the safest refuge location to wait until floodwaters recede.

It is possible that site occupants will wish to move cars parked along external roads. The Flood Warden should advise people that this may be possible only if they do enter flood waters to do so.

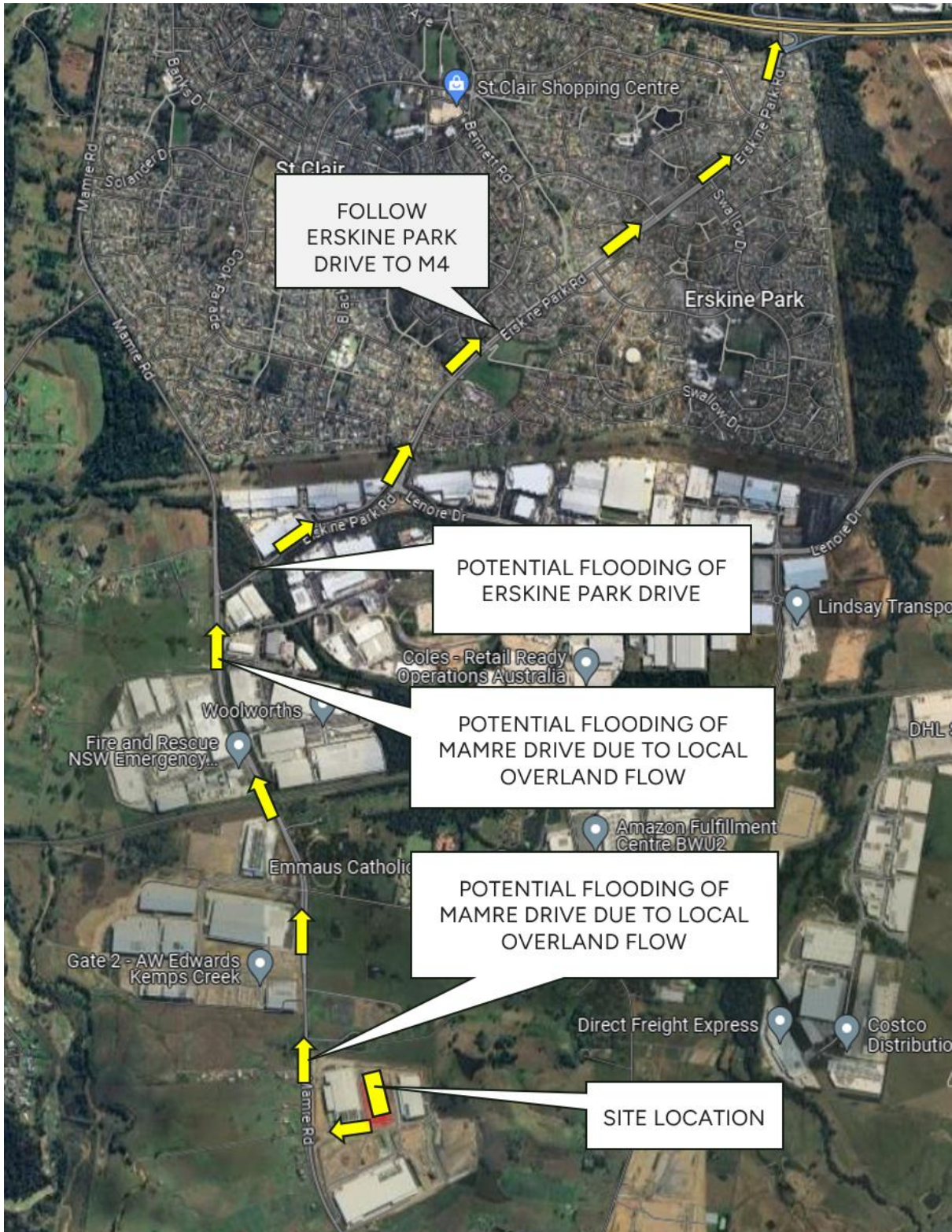
Refuge during flood events will most likely be necessitated by flash flooding events, and accordingly refuge will be necessary for short durations only – most likely less than 3 hours.

If occupants take refuge, they should only leave when advised by the Flood Warden that it is safe to do so. The Flood Warden should monitor road closure advice on the [livetraffic.com.au](http://livetraffic.com.au) website.

The Flood Warden role is very important in informing occupants on the flood risk, and preventing people from leaving site when flooding along local roads has occurred or appears likely. It is important that a Flood Warden be on site during periods of potential flooding, and noting that access to site may be cut off it is recommended that several people be trained to perform this role and delegated this responsibility so that there is always a Flood Warden or delegate on site.



**Figure 6: Evacuation Route**



Emergency phone contacts:

- Police/Ambulance 000
- SES (for life threatening situations call 000) 132500

## 5.5 Recovery

Recovery is the process of returning an affected community to its proper level of functioning after an emergency. It will generally commence simultaneously with the Response phase.

Recovery operations will be initiated and conducted as outlined in the NSW State EMPLAN and as further detailed in the NSW Recovery Supporting Plan.



## 6.0 Flood Emergency Response Plan for Facility – Construction Phase

The conditions of planning approval require that, *‘Prior to the commencement of construction of the Stage 2 Development, the Applicant must prepare a Flood Emergency Response Plan (FERP) to the satisfaction of the Planning Secretary’*

The requirements for construction phase are similar to those for the operational phase.

Actions which must be coordinated by the Flood Warden during the construction of works within Lot 2 include:

- Assessing if site operations can continue safely if any flooding occurs, and as appropriate restricting site works to areas well away from any flooding on site
- If it is unsafe for work to continue on site, then directing workers to retreated to the designated flood refuge
- Monitoring information on regional flooding and road closures and advising if it is safe for workers to depart the site (depending on their planned destinations)

The flood refuge during construction works within Lot 2 will be the southern end of the floor slab.



## **7.0 Consultation with SES**

SES comments on this plan for Warehouse 2 and the responses are provided in Appendix A of this report.



## 8.0 Review and Dissemination of this Plan

### 8.1 Review

The Flood Risk Management Manual 2023 notes flood risk management plans are ‘living documents’ which need to be regularly reviewed to ensure they remain appropriate to address the flood risk to the community, can be practically implemented and consider changing information and lessons learnt from any floods since the last review. Accordingly, this FERP should be reviewed periodically.

An initial review should be carried out if there are any changes to proposed floor levels.

The need for alterations or improvements to the plan should be reviewed by the Flood Warden annually. If the Flood Warden decides that the FERP requires review, then the FERP should be updated by the Flood Warden (and/or a suitably qualified flooding consultant approved by the Flood Warden), and submitted to DPIE for approval of the Planning Secretary. Annual reviews of the need for a flood study must consider any updated flood information available for Kemps Creek, which may be available from Council.

The need for an updated FERP should consider the following factors

- Assess how well site occupants understand the flood risk on site and at nearby roads that flood
- Have there been any changes in predicted flood levels?
- The lessons learnt from the response to any recent flood events
- Incidents or near misses
- Any changes to legislative or best practice requirements

The minimum period for comprehensive review should be every 10 years, or sooner if new flood study information materially affects the flood susceptibility of the site.

Performance of the Plan should also be reviewed following any major flood events, and if necessary amendments should be made to the Plan to capture any identified improvements.

During the construction and operational phases always, *‘implement the most recent version of the Flood Emergency Response Plan approved by the Planning Secretary for the duration of the development’*.

### 8.2 Dissemination

The FERP should be available to all employees and subcontractors on site.

The Flood Warden must keep a hardcopy of the current (approved) FERP on site at all times.



## **9.0 Plan Preparation by Suitably Qualified and Experienced Persons**

This FERP has been prepared by Paul Delaney B. Eng. (Hons) MEA, a Civil Engineer with over 30 years' experience in stormwater management, flood assessment, hydrology and surface water assessments.



## 10.0 References

- NSW Floodplain Development Manual, 2005
- Floodplain Risk Management Guidelines, OEH 2007
- Flood Risk Management Manual, NSW Department of Planning and Environment, 2022
- Support for emergency management planning, Flood risk management guideline EM01, NSW Department of Planning and Environment, June 2023
- SES (2022) - Penrith Local Emergency Management Plan
- Flood Impact Assessment, Aspect Industrial Estate (AIE), Cardno now Stantec (2022) - Final Report, Version 2B.
- Flood Impact Assessment, Aspect Industrial Estate 9AIE – Lot 2 SSDA, Stantec, July 2023
- Supplementary Responses to EHG Flooding Comments on SSD-58257960, Aspect Industrial Estate, Kemps Creek, NSW, Stantec 27 March 2024
- Urbis (2023) Environmental Impact Statement – Warehouse 2 (SSD-58257960) Aspect Industrial Estate





# Appendix A Consultation with SES

## Aspect Industrial Estate – Stage 2 SSD58257960

Flood Emergency Response Plan  
Warehouse 2

Mirvac Industrial Developments

SLR Project No.: 630.031249

7 August 2024

SE

The SES is thanked for their letter dated 06 August 2024 which provides comments on the FERP. This letter is reproduced on the following pages.

The following table provides a record of responses to the SES comments, and the amendments to the FERP.

### Tabulation of Responses to SES Comments dated 6 August 2024

SES Comment	Response
<p><i>[Introductory text]</i></p> <p>The NSW SES also does not have statutory authority to endorse or approve flood emergency response plans, however, provides the following advice based on the principles outlined in the Guidelines as detailed in Attachment A.</p>	Noted
<p><i>[Summary recommendations, page 2]</i></p> <p>Recommend that our advice dated 19 February 2024 in relation to the FERP for Warehouse 9 is considered and incorporated into the FERP for Warehouse 2 as appropriate.</p>	The SES advice for Warehouse 9 has been incorporated into the report for Warehouse 2, where appropriate.
<p><i>[Summary recommendations, page 2]</i></p> <p><b>Recommend</b> the FERP includes as a primary strategy to consider closing the worksite prior to the start of the workday if there is a risk of flooding.</p>	Incorporated into FERP, Section 5.2  'The SES has recommended that consideration be given to closing the worksite prior to the start of the day if there is a risk of flooding. This decision would need to be made by the Flood Warden, and endorsed by facility management. Conditions which might warrant this decision would include BOM warnings for extreme rainfall and flash flooding'
<p><i>[Summary recommendations, page 2]</i></p> <p><b>Recommend</b> several wording changes in the FERP, as detailed in Principle 1 of Attachment A.</p>	Refer to rows at the bottom of this table for individual responses.
<p><i>[Summary recommendations, page 2]</i></p> <p><b>Recommend</b> that the construction aspect of the FERP be prepared to the level of detail in the Stantec letter of the FERP's Appendix B.</p>	Flood Warden actions recommended by Stantec have been included with some rewording to make them specific to works within Lot 2. Refer Section 6.0
<p><i>[Summary recommendations, page 2]</i></p> <p><b>Recommend</b> that the review mechanism in the FERP is revised and responsibilities assigned, and that the document is regularly exercised, similar to building fire evacuation drills.</p>	Review mechanisms updated in Section 8.0. SES recommended annual review. The FERP has been updated to include a requirement for the Flood Warden to annually review the need to update the FERP, and advise facility management in writing of the outcomes of that review. If there is a need to update the FERP then the updated plan must be forwarded to DPIE for approval.
<p><b>Attachment A Comments</b></p>	
<p>Principle 1 – EMS compatible with relevant local or state flood plan or by the SES. Evacuation is the primary strategy for people impacted by flooding.</p>	Noted.



SES Comment	Response
Recommend closing the site prior to start of workday if there is a risk of flooding	Incorporated into FERP, Section 5.2
Reliance on Flood Warden	The FERP includes a recommendation at the end of Section 5.4 for several people to be trained as Flood Wardens, and that there always be a Flood Warden or delegate onsite at all times during working hours.
The current strategy to “take refuge in the Lot 9 warehouse building” would place people’s lives at risk, as there are no flood free routes to this site during flood events greater than a 1 in 500 year ARI event. Evacuation must not require people to drive or walk through flood water.	The intent of this comment is unclear, but it is noted: <ul style="list-style-type: none"> <li>• The proposed refuge strategy minimises risk by preventing evacuation through floodwaters</li> <li>• The building floor is flood free in a PMF event</li> </ul>
Further details to include or update in the FERP	Most of these aspects are already covered in the FERP where relevant to this specific site. It is noted that refuge during flood events would be necessitated by flash flooding events, and accordingly is for short durations only  The following has been added to the FERP: <ul style="list-style-type: none"> <li>• Plan dissemination – added to Section 8.0</li> </ul>
SES recommended changes to wording in the FERP	Changes to wording are incorporated in the FERP
FERPS require regular maintenance and review...at least annually	Review mechanisms updated in Section 8.0. SES recommended annual review. The FERP has been updated to include a requirement for the Flood Warden to annually review the need to update the FERP, and advise facility management in writing of the outcomes of that review. If there is a need to update the FERP then the updated plan must be forwarded to DPIE for approval.
Principle 2 It is recommended that the construction aspect of the FERP be addressed and updated as necessary	Flood Warden actions recommended by Stantec have been included with some rewording to make them specific to construction works within Lot 2. Refer Section 6.0
Principle 3 - We recommend reconsideration of the option at page 14 for occupants to “take refuge in the Lot 9 warehouse building”.	This should have read ‘Warehouse 2’ and has been corrected.
Principle 4 Isolation – There is no known safe period of isolation in a flood, the longer the period of isolation the greater the risk to occupants who are isolated	It is noted that refuge during flood events would be necessitated by flash flooding events, and accordingly is for short durations only. Fire and medical emergencies would follow normal procedures -to the extent possible with limitations on access to site
At this location, consideration should be given to the potential for occupants to enter flood water to move or rescue cars, which can float in as little as 15cm of water	Sentence added to Section 5.4 permitting cars to be moved only if it is possible to do so without entering floodwaters.
Principle 5	



SES Comment	Response
Any Emergency Management strategy needs to consider people and workers using the development. This may include, but is not limited to, the provision of publicly accessible spaces above the PMF to enable people to escape floodwaters safely.	It is noted that there is substantial space within warehouse to enable refuge for additional people.
Principle 6 Advice relating to uncertainty for flood and wether warnings	Noted
Principle 7 Community awareness	SES information via Hazards Near Me app, SES website, and Hazardwatch website have been updated in Section



Our Ref: ID2574

Your Ref:

06 August 2024

Chee Hui Chan  
Level 28, 200 George Street  
Sydney NSW 2000

Via email

email: cheehui.chan@mirvac.com

CC: helen.slater@ses.nsw.gov.au; deana.burn@planning.nsw.gov.au

Dear Chee Hui,

**Flood Emergency Response Plan for Aspect Industrial Estate (SSD-58257960 Condition B24)  
– Flood Emergency Response Plan**

Thank you for the opportunity to provide comment on the Flood Emergency Response Plan (FERP) for the proposed development at Aspect Industrial Estate Warehouse 2.

The NSW State Emergency Service (NSW SES) is the agency responsible for dealing with floods, storms and tsunami in NSW. This role includes, planning for, responding to and coordinating the initial recovery from floods. As such, the NSW SES has an interest in the public safety aspects of the development of flood prone land, particularly the potential for changes to land use to either exacerbate existing flood risk or create new flood risk for communities in NSW.

The NSW SES has reviewed the proposed FERP for Warehouse 2 and the flood risk information (e.g. Penrith Local Flood Plan 2023, Penrith Overland Flood Study 2006, South Creek Floodplain Risk Management Study 2020 etc.) available to the NSW SES, noting the proposed development is at risk of flooding in a Probable Maximum Flood event (PMF)<sup>1</sup> and the adjacent roads may be cut by floodwaters as frequently as a 5% Annual Exceedance Probability (AEP) Event<sup>2</sup>. The building identified as Warehouse 2 is within the PMF extent, and the site becomes isolated by road during events as frequent as a 5% AEP flood event. The Flood Impact Assessment previously provided shows that the site is significantly inundated by overland flows in a local PMF as low hazard flood water surrounds Warehouse 2 and inundates most access roads.

It is the preference of NSW SES that all development follows the application of sound land use planning and flood risk management in accordance with the Flood Prone Land Policy, the Flood Risk Management Manual 2023 (the Manual) and supporting guidelines. The NSW SES

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<sup>1</sup> *Stantec*, Flood Impact Assessment Aspect Industrial Estate, 2022, Figure F31

<sup>2</sup> *Cardno Lawson Treloar Pty Ltd*, Penrith Overland Flow Flood “Overview Study”, 2006, Figure 6.1K

also does not have statutory authority to endorse or approve flood emergency response plans, however, provides the following advice based on the principles outlined in the Guidelines as detailed in Attachment A.

**In summary, we:**

- **Recommend** that our advice dated 19 February 2024 in relation to the FERP for Warehouse 9 is considered and incorporated into the FERP for Warehouse 2 as appropriate.
- **Recommend** the FERP includes as a primary strategy to consider closing the worksite prior to the start of the workday if there is a risk of flooding.
- **Recommend** several wording changes in the FERP, as detailed in Principle 1 of Attachment A.
- **Recommend** that the construction aspect of the FERP be prepared to the level of detail in the Stantec letter of the FERP's Appendix B.
- **Recommend** that the review mechanism in the FERP is revised and responsibilities assigned, and that the document is regularly exercised, similar to building fire evacuation drills.

You may also find the following resources useful:

- [Reducing Vulnerability of Buildings to Flood Damage](#)
- [Emergency Business Continuity Plan](#)

Please feel free to contact Suede Stanton-Drudy via email at [rra@ses.nsw.gov.au](mailto:rra@ses.nsw.gov.au) should you wish to discuss any of the matters raised in this correspondence. The NSW SES would also be interested in receiving future correspondence regarding the outcome of this referral via this email address.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Elspeth O'Shannessy', written over a thin horizontal line.

Elspeth O'Shannessy  
Manager Emergency Risk Assessment  
NSW State Emergency Service

## **ATTACHMENT A: Principles Outlined in the Support for Emergency Management Planning Guideline<sup>3</sup>**

### **Principle 1 Any proposed Emergency Management strategy should be compatible with any existing community Emergency Management strategy.**

Any proposed Emergency Management strategy for an area should be compatible with the evacuation strategies identified in the relevant local or state flood plan or by the NSW SES. As per the NSW State Flood Plan<sup>4</sup>, and the Penrith Local Flood Plan 2023, evacuation is the primary emergency management strategy for people impacted by flooding.

#### **Recommend closing the site prior to start of workday if there is a risk of flooding**

To ensure public safety during a flood event, future occupants should not be onsite in a flood exceeding a 5% AEP, as the area becomes impacted by overland flooding with a short time to onset of flooding<sup>5</sup>, and people onsite will be unable to safely leave the premises along Mamre Road due to overtopping of the road in several locations.<sup>6</sup> We recommend checking the Bureau of Meteorology website prior to the start of the workday for any Severe Weather Warnings and consider closing the worksite prior to the start of the workday if there is a risk of flooding as a primary strategy. As there is little to no warning time available to provide an opportunity to respond to a flood threat in an appropriate manner, buildings must be designed to withstand the full forces of the PMF, and flood risks should be managed as far as practical to reduce the potential risk to life and property.

The FERP provided appears to place a significant reliance on the Flood Warden to mitigate the risks on site due to flooding. The FERP's reliance on Flood Wardens is heavily reliant on human behaviour and complicates the risk management approach. Additionally, as Mamre Road is prone to flash flooding it is possible that a Flood Warden may not be on site at the time of a flood event.

#### **NSW SES is opposed to development strategies that transfer residual risk, in terms of emergency response activities, to NSW SES and/or increase capability requirements of the NSW SES.**

The current strategy to “take refuge in the Lot 9 warehouse building” would place people's lives at risk, as there are no flood free routes to this site during flood events greater than a 1

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<sup>3</sup> NSW Government. 2023. Principles Outlined in the Support for Emergency Management Planning Guideline

<sup>4</sup> NSW Government. 2021. NSW State Flood Plan. Section 1.6 Key Principles, Page 5

<sup>5</sup> *Cardno Lawson Treloar Pty Ltd*, 2006, Penrith Overland Flow Flood “Overview Study”, Section 5.2.6 Estimation of Critical Duration, Page 23

<sup>6</sup> *Cardno Lawson Treloar Pty Ltd*, 2006, Penrith Overland Flow Flood “Overview Study”, Figure 6.1K PMF, 100 Year and 20 Year ARI Flood Extent, Page 82

in 500 year ARI event.<sup>7</sup> Evacuation must not require people to drive or walk through flood water.

We also note that driving through floodwater is the number one cause of flood related fatalities<sup>8</sup>, with more than 100 fatalities across Australia since 2002<sup>9</sup>.

#### **Further details to include or update in the FERP**

Flood emergency management plans should be robust, thorough and address all aspects of a flood emergency including responsibilities, flood forecasting and warning, flood emergency response triggers, alternative shelter in place procedures and capability assessments, flood warden training, notification of occupants, medical emergency, vulnerabilities, plan dissemination and review, and responsibility for implementation of the plan. This list is not exhaustive. The current plan has omitted to address a number of these aspects and would benefit from such detail. In addition, it should be supported by a simple, easy to understand summary to assist implementation during a flood event.

We also recommend several changes to the wording in the FERP, including that we:

- **Request** amending NSW SES communication methods on page 7 to indicate “*These may include*” the listed items. Communication methods vary depending on the event.
- **Request** removal or elaboration of the description of the facility as “*not flood-prone during the extreme flood events including the estimated PMF event*” at page 12 from the FERP, as the Flood Impact Assessment previously provided demonstrates that the site is within the PMF extent.
- **Request** removal of the reference to NSW SES flood “*bulletins*” on page 13, as we now use the Australian Warning System framework.

#### **FERPs require regular maintenance and review**

The Flood Risk Management Manual 2023 notes flood risk management plans are ‘living documents’ which need to be regularly reviewed to ensure they remain appropriate to address the flood risk to the community, can be practically implemented and consider changing information and lessons learnt from any floods since the last review.

We note that the FERP contains a review mechanism if any updated flood information becomes available for Kemps Creek which materially alters predicted flood level, following any major flood events, or after 10 years. The NSW SES recommends exercising the FERP regularly, similar to building fire evacuation drills, and updating the FERP at regular intervals

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<sup>7</sup> Stantec, 2024, Aspect Industrial Estate Stage 3 Development (Warehouse 2), Attachment D – Incremental Flooding Plots Diagrams, Figure F5, page 5

<sup>8</sup> Haynes, et al. 2016. An analysis of human fatalities from floods in Australia 1900-2015, s.l.: Report for the Bushfire and Natural Hazard Cooperative Research Centre

<sup>9</sup> Peden. 2016. Royal Life Saving Drowning Data: Presentation 15 February 2016, Sydney: Royal Life Saving Australia.

and whenever additional flood information is available or highlighted during the drills or flood events. The FERP should be reviewed more frequently than the 10 years recommended in the document at p.10, and at least annually. The FERP should also ascribe responsibility for reviewing the FERP and for monitoring flood information for Kemps Creek.

Although NSW SES encourages homes and businesses to be prepared and has developed a home FloodSafe toolkit and a Business FloodSafe toolkit, even well written plans are dependent on human application and often rely on technical support systems. Most plans will rely on the actions of one or more third parties and all plans require regular maintenance and review, and most importantly an ongoing commitment from all participants. These conditions are difficult to implement and are unlikely to be achieved in a private ownership context where there is no external audit or monitoring.

**Principle 2 Decisions should be informed by understanding the full range of risks to the community.**

Risk assessment should consider the full range of flooding, including events up to the Probable Maximum Flood (PMF).

Appendix B of the FERP contains a letter from Stantec confirming that in May 2022 a detailed construction Flood Emergency Response Plan was prepared for the Aspect Industrial Estate development. This construction FERP described flood behaviour on the site in floods up to a Probable Maximum Flood (PMF) at different stages of the site development, flood risks both on the project site and external to the project site, and an evacuation strategy, measures, procedures, and plan. The construction FERP described the flood risks under the different stages of construction, and addressed an assessment of the safety of continued site operations in a severe weather event. This level of detail is required but absent from the current FERP, which states that the requirements for construction phase are the same as for the operational phase. It is recommended that the construction aspect of the FERP be addressed and updated as necessary.

**Principle 3 Development of the floodplain does not impact on the ability of the existing community to safely and effectively respond to a flood.**

Evacuation must not require people to drive or walk through flood water.

We recommend reconsideration of the option at page 14 for occupants to “take refuge in the Lot 9 warehouse building”, as there is no flood-free access from Warehouse 2 to the Lot 9 Warehouse building in a 500 year Annual Recurrence Interval (ARI) flood event.

Flood waters can include infectious diseases, sewerage, chemical hazards, electrical hazards, displaced wildlife and debris such as glass and metal that can cause injury. We also note that flood depths in a PMF are “more than 0.5m which increases risk to life.”

**Principle 4 Decisions on development within the floodplain does not increase risk to life from flooding.**

Managing risks associated with flood islands requires careful consideration of development type, likely users, and their ability respond to minimise their risks. This includes consideration of:

- Isolation – There is no known safe period of isolation in a flood, the longer the period of isolation the greater the risk to occupants who are isolated.
- Secondary risks – This includes fire and medical emergencies that can impact on the safety of people isolated by floodwater. The potential risk to occupants needs to be considered and managed in decision-making.
- Consideration of human behaviour – The behaviour of individuals such as choosing not to remain isolated from their family or social network in a building on a floor above the PMF for an extended flood duration or attempting to return to a building during a flood, needs to be considered. At this location, consideration should be given to the potential for occupants to enter flood water to move or rescue cars, which can float in as little as 15cm of water<sup>10</sup>.

**Principle 5 Risks faced by the itinerant population need to be managed.**

Any Emergency Management strategy needs to consider people and workers using the development. This may include, but is not limited to, the provision of publicly accessible spaces above the PMF to enable people to escape floodwaters safely.

**Principle 6 Recognise the need for effective flood warning and associated limitations.**

In locations where flood height prediction is not available or is uncertain, adequate flood warnings and response timing becomes difficult. This is particularly evident in areas where flooding occurs in six hours or less, termed flash flood environments. For these environments, Severe Weather Warnings or Thunderstorm Warnings are the existing form of advice.

However, neither the NSW SES nor the Bureau of Meteorology can undertake to provide special individual flood warning services for each business site. Business owners/operators must be weather aware and act early on publicly broadcast severe weather and flood warnings.

**Principle 7 Ongoing community awareness of flooding is critical to assist effective emergency response.**

The flood risk at the site and actions taken to reduce risk to life should be communicated to all site users (includes increasing risk awareness, community connections, preparedness actions,

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<sup>10</sup> <https://www.abc.net.au/news/2016-06-18/research-shows-cars-deadly-in-floodwaters/7522798> accessed 26.07.24

appropriate signage and emergency drills) during and after the construction phase. Users of the proposed development should be made aware of their flood risk, the [Hazards Near Me](#) app (a tool to receive flood warnings as part of the Australian Warning System) and the [NSW SES website](#) which contains comprehensive information for the general community about what to do before, during and after floods as well as in-language resources and HazardWatch (NSW SES interactive information and warnings site).

Development in a floodplain will increase the need for NSW SES to undertake continuous community awareness, preparedness, and response operations.

# **Appendix B    Stantec letter addressing condition B24 d 9ii)**

## **Aspect Industrial Estate – Stage 2 SSD58257960**

### **Flood Emergency Response Plan Warehouse 2**

**Mirvac Industrial Developments**

SLR Project No.: 630.031249

7 August 2024





**Stantec Australia Pty Ltd**

Level 16, 207 Kent Street  
Sydney NSW 2000  
AUSTRALIA  
ABN 17 007 820 322

16 July 2024

Project/File: 304600135

**The Development Manager**

Integrated Investment Portfolio  
Mirvac  
Level 28, 200 George Street  
**SYDNEY NSW 2000**

Attention: Meg Horan  
E: [meg.horan@mirvac.com](mailto:meg.horan@mirvac.com)

**RESPONSE TO CONDITION B24 OF CONSENT FOR SSD-58257960,  
ASPECT INDUSTRIAL ESTATE, KEMPS CREEK, NSW**

Dear Meg,

Development Consent was granted to SSD-5827960 on 5 July 2024 subject to the conditions specified in Part B of the consent.

Conditions relating to flood management include, in part:

*Flood Management*

*B24. Prior to the commencement of construction, the Applicant must prepare a Flood Emergency Response Plan (FERP). The Plan must:*

- (a) *be prepared by a suitably qualified and experienced person(s)*
- (b) *be prepared in consultation with the NSW State Emergency Services (SES);*
- (c) *address the provisions of the Flood Risk Management Manual (DPE, 2023) and Support for emergency management planning (DPE, 2023); and*
- (d) *include details of:*
  - (i) *the flood emergency responses for both construction and operation phases of the development;*
  - (ii) *measures to eliminate or reduce downstream flood impact on properties to the west of Mamre Road for all flooding events;*
  - (iii) *predicted flood levels;*
  - (iv) *flood warning time and flood notification;*
  - (v) *assembly points and evacuation routes;*
  - (vi) *evacuation and refuge protocol; and*
  - (vii) *awareness training for employees and contractors.*

Re: RESPONSE TO CONDITION B24 OF CONSENT FOR SSD-58257960, ASPECT INDUSTRIAL ESTATE, KEMPS CREEK, NSW

## 1. BACKGROUND

On 27 July 2022 Stantec now Cardno prepared a Flood Risk Assessment and Flood Impact Assessment of Modification 3 of the approved Stage 1 development for the Aspect Industrial Estate as well as Modification 3 of the approved Final Masterplan. Modification 3 was approved on 2 March 2023.

On 19 December 2023, the Environment and Heritage Group (EHG) provided comments on the EIS for the Aspect Industrial Estate Warehouse 2 SSDA (SSD-58257960). Responses to the EHG comments were provide in the letter advice prepared by Stantec Australia dated 23 February 2024.

On 20 March 2024 Mirvac advised that further comments were requested on the following comment:

*The FIA shows that in very frequent flood events, there is an adverse impact on the properties adjacent to Mamre Road downstream of the Estate. There is also significant increase in flood depth on Mamre Road. The FIA needs to identify how these impacts can be minimised and managed.*

The additional impact on flood levels of the development proposed under the Warehouse 2 (SSD-58257960) in comparison to the approved Modification 3 Masterplan development were identified in plots of incremental flood level differences for the 2 yr ARI, 5 yr ARI, 100 yr ARI, 200 yr ARI, 500 yr ARI and PMF attached to the letter advice dated 27 March 2024 (Stantec, 2024<sup>1</sup>).

Stantec, 2024 concluded that on adjacent properties west (downstream) of Mamre Road that in comparison with the already approved flood levels:

- (i) There is no increase in flood levels while in the southern side of the flood extents there is a local reduction in the 2 yr ARI, 5 yr ARI, 100 yr ARI, 200 yr ARI flood levels;
- (ii) There are local reductions on the southern side of the 500 yr ARI flood extent and a small zone of minor increase on the northern side of the 500 yr ARI flood extent; and
- (iii) There are zones of local increase and decrease in PMF levels with the areas subject to decrease being far greater than the areas of local increase.

## 2. 2022 FERP – CONSTRUCTION

In May 2022 a detailed Flood Emergency Response Plan (FERP) was prepared for the construction phase of the Aspect Industrial Estate development<sup>2</sup>. This provides a comprehensive template for the operations FERP.

The FERP describes:

- Flood behaviour on the site in floods up to a Probable Maximum Flood (PMF) at different stages of the site development,

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<sup>1</sup> Stantec (2024) "Supplementary Responses To EHG Flooding Comments on SSD-58257960, Aspect Industrial Estate, Kemps Creek, NSW", *Letter Report*, prepared for Mirvac, March, 3 pp.

<sup>2</sup> Cardno now Stantec (2022) "Flood Emergency Response Plan, Aspect Industrial Estate (AIE), Kemps Creek", Revision 2, prepared for Mirvac, May, 33 pp + Apps

Re: RESPONSE TO CONDITION B24 OF CONSENT FOR SSD-58257960, ASPECT INDUSTRIAL ESTATE, KEMPS CREEK, NSW

- A Flood Emergency Response Plan for the construction phase, including:
  - Flood risks both on the project site and external to the project site;
  - Evacuation strategy, measures, procedures, and plan; and
  - A FloodSafe Plan

It identifies that actions that must be co-ordinated by the Flood Wardens.

- Monitoring rainfall and any runoff entering the site and any flooding on the site;
- Assessing if site operations can continue safely during inclement weather;
- Restricting any site operations that continue during inclement weather to areas well away from any flooding on the site;
- If it is unsafe for site operations to continue then directing workers on the site to retreat to the designated flood refuges located in the Site Compound; and
- Monitoring any regional flooding and road closures through Council's Disaster Dashboard and the Live Traffic Website and advising whether it is safe for workers to depart the site depending on their planned destination(s).

The FERP describes flood risks under<sup>3</sup>:

- Current conditions
- Interim Conditions
- Stage 1 Conditions and
- Masterplan Conditions

### 3. **CONDITION B24 (d) (ii)**

The condition requires that the FERP include a description of:

- (ii) *measures to eliminate or reduce downstream flood impact on properties to the west of Mamre Road for all flooding events;*

It is considered that the measures already included in the Lot 2 Masterplan comply with this requirement based on the assessment of downstream impacts.

The Flood Impact Assessment for the Aspect Industrial Estate prepared by Stantec in July 2023<sup>4</sup> described the assessment of the impact of Lot 2 SSDA on the Lot 2 Masterplan.

The AEP of the PMF is 1 in 10,000,000. The PMF was estimated based on centring the PMP ellipses over the centroid of the local catchment not over the centroid of the South Creek catchment.

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<sup>3</sup> Cardno now Stantec (2022) "Flood Emergency Response Plan, Aspect Industrial Estate (AIE), Kemps Creek", Revision 2, prepared for Mirvac, May, 33 pp + Apps

<sup>4</sup> Stantec (2023) "Flood Impact Assessment, Aspect Industrial Estate (AIE) Lot 2 SSDA", Final Report, Version 2, prepared for Mirvac, 23 pp + Apps

Re: RESPONSE TO CONDITION B24 OF CONSENT FOR SSD-58257960, ASPECT INDUSTRIAL ESTATE, KEMPS CREEK, NSW

Under Lot 2 Masterplan Conditions, flood level difference plots disclosed negligible adverse impacts on flood levels downstream of Mamre Road in the 2 yr ARI, 5 yr ARI, 100 yr ARI, 200 yr ARI and 500 yr ARI events. There is some change in the extent of shallow inundation. In a PMF greater decreases in the flood levels are experienced downstream of Mamre Road over a wide extent. There are minor increases downstream of Mamre Road north of the new intersection. There are some small increases upstream of the southern boundary in an existing farm dam which it is expected would be resolved when a drainage corridor is re-established in this area. Overland flows that spilled from the southwest corner of the Estate under Benchmark Conditions have been eliminated in the in the 2 yr ARI, 5 yr ARI, 100 yr ARI, 200 yr ARI, 500 yr ARI events and reduced to a minor overflow only in the PMF event.

Under Lot 2 Masterplan Conditions, flood velocity difference plots disclosed minor impacts in the watercourse downstream of Mamre Road and negligible adverse impacts on flood velocities elsewhere downstream of Mamre Road in the 2 yr ARI, 5 yr ARI, 100 yr ARI, 200 yr ARI and 500 yr ARI events. In a PMF there are localised modest increases in the flood velocities downstream of Mamre Road north of the new intersection. Overland flows that spilled from the southwest corner of the Estate under Benchmark Conditions have been eliminated in the in the 2 yr ARI, 5 yr ARI, 100 yr ARI, 200 yr ARI, 500 yr ARI events and reduced to a minor overflow only in the PMF event.

### Flood Management Measures

The development responds to the flooding risks by separating upstream runoff from local internal runoff and implementing the following measures:

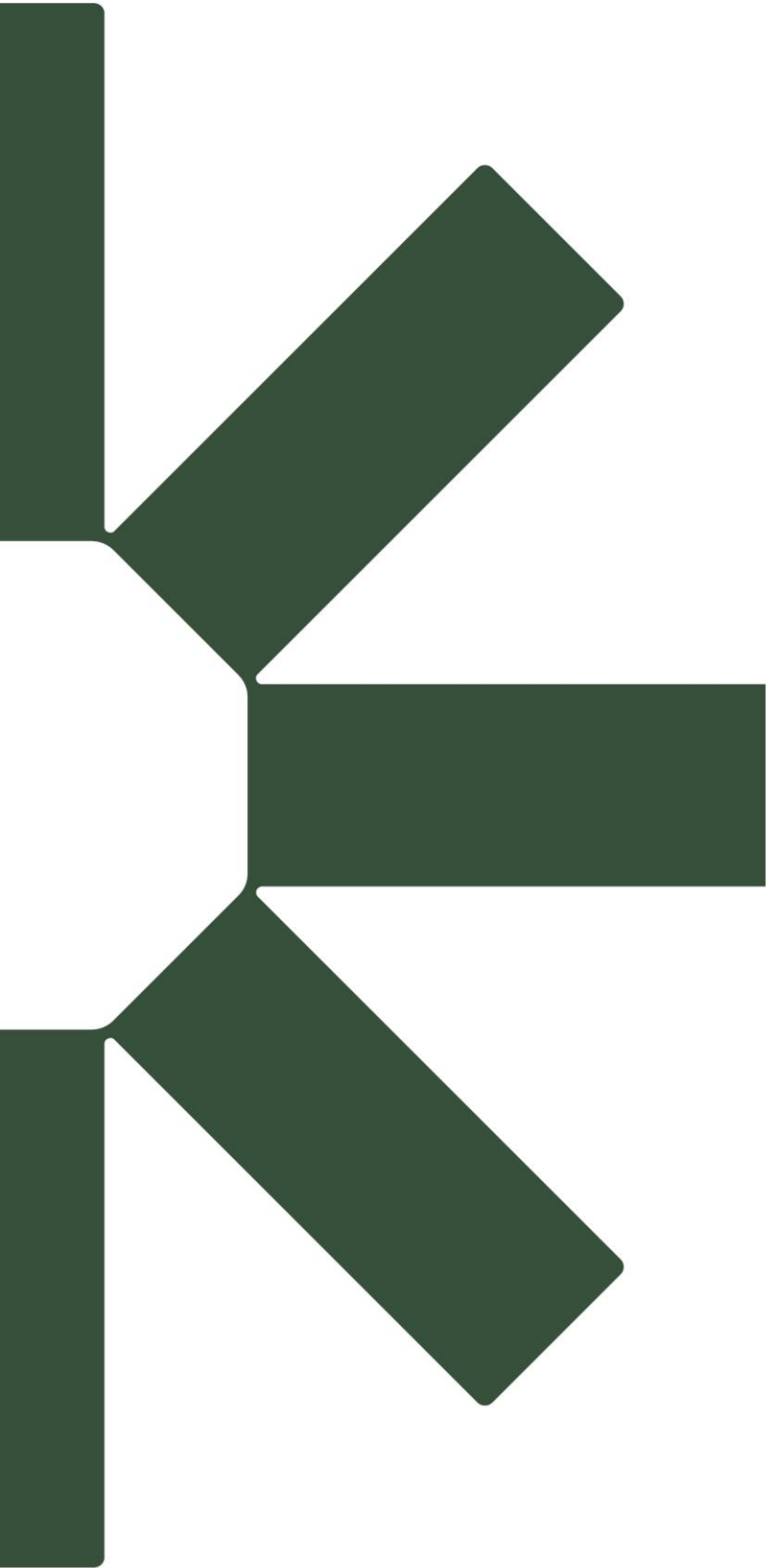
- (i) Capturing upstream runoff just inside the southern site boundary and conveying this via the proposed diversion line comprising a 1500 mm diameter conduit with a 1.5 m x 1.5 m RCBC road crossing to convey upstream runoff to the head of the extended riparian corridor which conveys the combined upstream runoff from the southern and eastern drainage lines to the existing Mamre Road crossing in all events up to the 100 yr ARI event as a minimum; and
- (ii) Directing all runoff from within the development to a dual purpose basin in order to mitigate the impacts on the rate of runoff in all events up to the 100 yr ARI event and to mitigate impacts on stormwater quality. The basin is sized on the masterplan conditions when all stages of development of the industrial estate have been completed.

Yours faithfully,

**STANTEC AUSTRALIA PTY LTD**



**Dr Brett C Phillips** CPEng, NER, RPEQ, D.WRE, FIEAust, F.ASCE, F.EWRI, FTSE  
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Making Sustainability Happen