COSTIN ROE CONSULTING

CIVIL ENGINEERING REPORT INCORPORATING
WATER CYCLE MANAGEMENT STRATEGY

SSDA-65924461

49-61 STEPHEN ROAD BANKSMEADOW 2019

Prepared for:

ESR Australia Pty Ltd
Level 24, 88 Phillip Street
Sydney, NSW, 2000

Prepared by:

Costin Roe Consulting Pty Ltd
Level 4, 8 Windmill Street
Millers Point, NSW, 2000

Document Verification	
Project	49-61 Stephen Road, Banksmeadow
Document Title	Engineering Assessment & Construction Management Report
Project Number	14950.01
Description	Engineering Assessment & Construction Management Report for SSDA
File Name	CO14950.01-03c.rpt

	Name	Title
Prepared by	Xavier Cure	Senior Associate Director – Civil
Checked by	Daniel Soliman	Associate Director – Civil

Document History		
Date	**Revision**	**Issued to**
22 Oct 2024	DRAFT1_A	Ms Grace Macdonald, ESR Group Limited
22 Nov 2024	DRAFT2_A	Ms Grace Macdonald, ESR Group Limited
10 Nov 2024	A	Ms Grace Macdonald, ESR Group Limited
31 Jan. 2025	B	Mr Will Dwyer, ESR Group Limited
24 Mar. 2026	C (Draft)	Ms Grace Macdonald, ESR Group Limited
10 Apr 2026	C	Ms Grace Macdonald, ESR Group Limited
21 Apr 2026	D	Ms Grace Macdonald, ESR Group Limited
12 June 2026	E	Mr Gannon Cuneo ESR Group Limited

TABLE OF CONTENTS

Executive Summary 5
Proposal Overview 5
Purpose of this Assessment 5
Construction Impacts 6
Operational Impacts 6
Conclusion 6
1 Introduction & Scope 7
1.1 Introduction 7
1.2 Consultation 7
1.3 SEARS Response 8
1.4 Agency Response Items 12
1.5 Responses to Submissions Items 19
2 Development Site 27
2.1 Location 27
2.2 Existing Site Description 27
2.3 Proposed Development 28
3 Site Works 31
3.1 Soil and Geological Conditions 31
3.2 Bulk Earthworks 31
3.3 Retaining Walls 32
3.4 Embankment Stability 32
3.5 Groundwater 33
3.6 Acid Sulphate Soils and Salinity 33
4 Water Cycle Management Strategy & Drainage Methodology 34
4.1 Key Areas and Objectives 34
4.2 Existing Site Drainage 36
4.3 Proposed Surface Water Drainage System 37
4.4 Hydrological Modelling & Analysis 38
4.5 Runoff Models 38
4.6 Hydraulics 39
5 Water Quantity Management 40
5.1 General Design Principles 40
5.2 Proposed Stormwater Quantity Management 40
6 Stormwater Quality, Reuse And Maintenance 43

6.1 Stormwater Quality Objectives 43
6.2 Proposed Stormwater Treatment System 43
6.3 Stormwater Quality Modelling 44
6.4 Stormwater Harvesting 45
6.5 Maintenance and Monitoring 46
7 Flooding And Overland Flow 47
7.1 Introduction 47
7.2 Bayside Council Flood Advice Certificate (FA-2024/211) / Springvale and Floodvale Drain Flood Study (R.S1282.003.01.docx) 48
7.3 Existing Overland Flow/Flood Behaviour 54
7.4 Proposed Upstream Catchment Flow Management Strategy 55
7.5 Costin Roe Consulting Modelling 57
7.6 Floodplain Management Considerations 67
7.7 Confirmation of Floodplain Management Requirements & Development Strategy 72
7.8 Flood Assessment Conclusion 72
8 Construction Soil And Water Management 73
8.1 Soil and Water Management General 73
8.2 Typical Management Measures 73
8.3 Other Management Measures 74
9 Conclusion 75
10 References 76
11 Appendices 77
Appendix A 78
Appendix B 79
Appendix C 80
Appendix D 88
Appendix E 92
Appendix F 93
Appendix G 94
Appendix H 95

EXECUTIVE SUMMARY

ESR Australia Pty Ltd are seeking to establish a multi-level industrial development located at 49-61 Stephen Road, Banksmeadow.

This Civil Engineering Report has been prepared by Costin Roe Consulting to accompany a detailed State Significant Development Application (**SSDA**) for a two-storey warehouse and distribution centre development proposal at 49-61 Stephen Road, Banksmeadow. The site is legally described as Lot A in Deposited Plan 190526, Lot 1 Deposited Plan 1095110, and Lot 1 Deposited Plan 311767.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (**SEARs**) issued for the project (**SSD-65924461**).

Revision C of the report has been prepared to address the Responses to Submissions following the exhibition phase of the SSD process. We note that **Revision C** of the report incorporates the revised proposed development to address the Department's concern regarding the bulk and scale of the development along with various agency comments/queries as listed in **Table 1.3**.

This report concludes that the proposed two-storey warehouse and distribution centre is suitable and warrants approval subject to the implementation of the following mitigation measures.

- Ground and Water Conditions
- Stormwater Quality and Quantity Management
- Flooding Risk

Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

Proposal Overview

The proposed development is for a multi-story multi-unit warehouse facility with associated lobby and office spaces over a 4.82ha parcel of land. The proposed development is for ESR Australia Pty Ltd. Works will include demolition of existing buildings, pavements and crossovers, determination of erosion and sediment controls, finished surface levels & surface grading, stormwater drainage (including drainage layout and management of quality and quantity in accordance with Bayside Council's Engineering Guideline), retaining walls and batter treatment. The existing site is noted to be occupied by a two-storey office building adjacent to Stephens Road, with several single-storey warehouses and industrial and manufacturing plants distributed across the site with concrete pavements between them.

Purpose of this Assessment

This Water and Hydrology Impact Assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) as they related to water and hydrology, including:

- Soils and Water Management
- Water Management
- Flooding

Construction Impacts

During the construction phase, a Sediment and Erosion Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

Operational Impacts

During the operational phase of the development, the proposed stormwater quality treatment system incorporates the combination of pit basket inserts and proprietary filter cartridges and is proposed to mitigate any increase in stormwater pollutant load generated by the development. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental the receiving environment.

Further, it has been confirmed that the conveyance of stormwater runoff from an upstream catchment (west of the property) is required within a new drainage pipe system and associated easement adjacent to the southern boundary. This system is currently drained by an in-ground drainage system which is proposed to have a minor relocation as part of the proposed development. This has been confirmed through modelling to have no impact upstream and downstream of the development site. The development and relocation of the council drainage has been confirmed to be consistent with pre-development conditions, therefore does not increase runoff or flow frequency, as such, the site discharge will not adversely affect any downstream properties or watercourses as a result of the development.

Conclusion

The hydrological assessment of the local site drainage confirms that recommended water quality and quantity measures will ensure that no adverse impacts result on receiving waterways as a result of the development.

The detail contained in this report provides sufficient information to show the consent authority that legal points of discharge and a suitable stormwater management strategy is available for the development and the requirements associated with the strategy. It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

1 INTRODUCTION & SCOPE

1.1 Introduction

This report has been prepared to accompany an Environmental Impact Statement (EIS) for seeking consent for the construction and operation of a two-storey warehouse and distribution centre development at 49-61 Stephen Road, Banksmeadow (SSD-65924461) as further described in **Section 2.3**.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 30 January 2024 and issued for the SSDA (SSD-65924461).

Revision C of this report has been revised to address the Responses to Submissions received following the exhibition phase of the SSDA.

Specifically, this report has been prepared to respond to the SEARs requirements specified in **Section 1.3,** the Agency items specified in **Section 1.4** and the RtS items specified in **Section 1.4** of this report.

An engineering assessment of the property at 49-61 Stephen Road, Banksmeadow is made in the Civil Engineering Report incorporate Water Cycle Management. This report provides an assessment of the civil engineering characteristics of the development site and technical considerations of the following aspects:

- Earthworks & geotechnical considerations;
- Water Cycle Management Strategy (WCMS).

The WCMS comprises several key areas of stormwater and water management which are provided below. These key areas have been established with the aim to reduce impacts from the development on the surrounding environment and neighbouring properties. The water cycle management strategy identifies management measures required to meet the targets set. The key water cycle management areas assessed in this report are:

- Storm Water Quantity;
- Storm Water Quality;
- Water Supply and Reuse;
- Flooding and overland flow; and
- Erosion and Sediment Control

1.2 Consultation

Consideration of the various stakeholders has been made in relation to the development, including Council and Sydney Water, during the assessment period.

- Consultation with Bayside Council has included a *Flood Advice Letter* (refer **Appendix F**)

1.3 SEARS Response

This report supports the EIS for the proposal and to address the NSW Department of Planning and Environment SEARS letter dated 30 January 2024, reference SSD-65924461.

We note the below "key issues and documentation" assessments are based on the standard Warehouse and Distribution Centre SEAR's document recently implemented (October 2021) by DPIE and following key areas in the document:

- Soils
- Water Management
- Flooding

Further reference to the EIS prepared by Urbis should be made for confirmation of how the SEAR's have been addressed for non-civil engineering related items.

Table 1.1 provides a summary of the SEARs General Requirements which relate to water and hydrology, and where these have been addressed in this report.

We note **Table 1.2** in **Section 1.4** provides comments on the Agency Response Items which formed part of the SEAR's for the development.

We note **Table 1.3** in **Section 1.5** provides comments on the RtS Items.

Table 1.1 - SEAR's Response

SEARS Key Item	Response and Where Addressed
Soils	
An assessment of potential impacts on soil resources and riparian land on and near the site, including: • Impacts on soil erosion, salinity and acid sulfate soils • Details of earthworks, including cut and fill volumes • Description of the proposed erosion and sediment control during construction	Refer to **Section 3** and geotechnical assessments by **Douglas Partners** for confirmation of soil resources and potential impacts. The existing site is occupied by multiple single and multi-storey factory/warehouses across the site with ancillary office buildings, carparking, truck circulation zones, hardstand areas, sprinkler tanks, switch rooms and a first flush basin adjacent to Coal Pier Road on the east. Existing retaining walls are present all along the site boundary, fronting existing industrial sites and Stephen Road. The site is noted to be located within an established industrial precinct. The proposed works will involve demolition of the existing buildings and infrastructure, removal of building demolition spoil, site remediation and bulk earthworks. The maximum elevation noted on site is RL 13.00 mAHD at the western entry from Stephen Rd and minimum is RL 5.07 mAHD on Coal Pier Rd. It is noted that the lower

	levels are within the first flush basin adjacent to Coal Pier Road. Generally, levels on the site, throughout the current buildings developments, are at RL11.9m. There are no riparian lands located within the property boundary. The site is located approximately 1.1km north of Botany Bay and 1.8km south of Botany Dams. The site is located within an area with low acid sulfate soil occurrence. Laboratory testing shows that confirms that underlying soils are not anticipated to contain acid sulfate soils however highly localised occurrences may occur. Excavation will be required to facilitate bulk earthworks on site including provision of piles. The primary drivers for bulk earthworks will be to achieve cut-to-fill balance to minimise disturbance to subsoil material. The site earthworks are anticipated to be mostly be in fill, minimising the disturbance on subsoils. During construction, erosion and sediment control measures will be implemented in accordance with the guidelines outlined in *Minimising Urban Stormwater – Soils and Construction (Landcom 3rd Edition March 2004 – 'The Blue Book')* to minimised impact to existing soil resources and soils. Works will also maximise tree retention to minimise disturbance.
Water Management	
An integrated water management strategy, including: • Surface and groundwater discharge assessment in accordance with relevant EPA guidelines, including an assessment of potential impacts on watercourses, riparian areas, groundwater and groundwater-dependent communities nearby • Detail how water sensitive urban design has been incorporated into the development • A detailed site water balance including a description of the water demands and breakdown of water supplies,	Refer to **Section 4, 5 & 6** for assessment of water resources and hydrology (including water quality and quantity). The existing site comprises of industrial facilities with significant remnant impervious surfaces. The redevelopment of the land will not result in unacceptable impacts to any resources noting similar water quantity discharge, reduced peak flow discharge and improved stormwater quality. Discharge from the site will be made via the existing drainage infrastructure at Coal Pier Road along the eastern boundary of the site. No riparian lands or watercourses are located within the property boundary or within 100m from the perimeter of the site.

and any water licensing requirements • Details of the proposed stormwater/wastewater drainage design including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water • An assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby • Description of measures to minimise water use • Characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria using a MUSIC water quality model • Details of any surface or groundwater mitigation, management and monitoring activities and methodologies	It is noted that a dam is located approximately 1.8km north of the site and Botany Bay is located approximately 1km south of the site. Trunk drainage systems associated with the Springvale and Floodvale Drains are also noted to be east of the property, though not within 40m, and these systems are generally concrete lined and as such not subject to riparian requirements. The proposed development does not propose to utilise surface or groundwater resources. An assessment of the impact on these items is therefore not relevant for the proposed development. It could be expected that groundwater may be experienced at depths greater than 3m during construction works. However limited excavation is required for the development and hence impact on groundwater systems is considered negligible. Refer to **Section 3** of the report for further discussion pertaining to groundwater affectation. A surface water runoff assessment including water quality, water quantity and water reuse has been completed. The key stormwater objectives, based on relevant water sensitive urban design criteria, have been set out in **Section 4, 5** and **6** of this report. MUSIC and DRAINS modelling has been completed to confirm that the requirements and objectives of council are met including the provision of an on-site detention system. Refer to **Section 8** for soil and water management measures during construction, drawings in **Appendix A** for associated erosion and sediment control drawings, and **Appendix C** for a Draft Soil and Water Management Plan. Report **Section 8, Appendix C** and the ESCP drawings in **Appendix A** show proposed measures, based on the Landcom document Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book')(Landcom, 2004), are proposed during the construction of the development. Measures proposed will limit potential for offsite impact associated

	with water runoff and soils during construction. Consideration to management of acid sulfate soils has been made based on the recommendations of the geotechnical investigations and noted Landcom document.
Flooding	
A flood risk assessment, that includes a detailed flooding assessment that satisfies the objectives and any relevant provisions of the NSW Floodplain Development Manual (2023) and Council's requirements.	Detailed assessments of existing flood behaviour and surface water runoff has been made in **Section 7** of this document and summarised below. Review of Council's Flood Advice Letter (Ref. **FA-2024/211** in **Appendix F**) and Council's adopted flood study for the region indicate the site to be impacted in the 1% AEP and PMF events. Scrutiny of the mapping, local topography and surrounding catchments however shows that the majority of mapped floodwater on the site could be attributed to modelling noise, and modelled areas of the site which have been modelled via "rain on grid" without the inclusion of private drainage systems. Noting there are no major contributing catchments (other than the local council flow path from Stephen Road) upstream of the property, the shallow and low velocity flooding shown within the site will be collected and managed within a new drainage system. The council flood mapping also shows deeper and more substantial "flooding" at the east of the site which aligns with the first flush basin, and an internal chemical management basin. Both of these systems form part of the internal site operations and existing drainage systems, and are not considered to be areas of flood affectation. These systems will be made redundant as part of the new development. As noted, conveyance of a local catchment from Stephen Road is required. This is managed by an inground drainage system, associated easement and an overland flow path.

	The development floor level is set above the 1% AEP flood level with an addition 500mm freeboard. The existing overland flow path is maintained through provision of retaining walls and engineered structures along the proposed drainage easement. Refer to **Appendix A** for location of the proposed drainage easement and relocated alignment of council drainage infrastructure. Safe refuge is available site via evacuation or shelter in place. The requirements of council and NSW Floodplain Development Manual are therefore met for this development. Refer to **Section 7** of this document for further details on flooding and overland flow management.

1.4 Agency Response Items

As noted, **Table 1.2** provides comments on the Agency Response Items which formed part of the SEAR's for the development.

Table 1.2 – Agency Response Items

Bayside Council (REF. F23/1098)
Traffic, Parking and Access 14. *A Longitudinal Driveway Profile for both vehicular access is to be prepared by a qualified Civil Engineer shall be submitted to Council for assessment. The profile shall start in the centre of the road and be along the critical edge (worst case) of the driveway. Gradients and transitions shall be in accordance with AS/NZS 2890.1&AS/NZS2890.2. The profile shall include all relevant levels, grades (%), headroom clearances and lengths. The existing boundary levels shall be clearly shown on the profile, any change to the existing boundary levels requires approval from Bayside Council.* 15. *A Longitudinal Section prepared by a qualified Civil Engineer plotting headroom clearance along the travel path of the B-double using the curved ramp vehicle to be provided. It must be demonstrated that a safe headroom clearance achieved along the entire travel path, parking and manoeuvring areas of the B-double within the site.* 16. *An assessment to be provided demonstrating that the curved ramp is designed in compliance with AS/NZS2890.1&AS/NZS2890.2* <u>Response</u> A vertical clearance check has been completed and shown in drawing **Co14950.01-SSDA554** for the proposed vehicular access points and compliant with

AS/NZS2890.1&AS/NZS2890.2. A headroom clearance check has also been completed for the curved ramp for B-double vehicles along the travel path, parking and manoeuvring areas. However, we note that the final levels are subject to change during detailed design with consideration to final geotechnical cut to fill on the estate, allowances for spoil generation, access from properties to roadways, drainage and wastewater design and other unknown elements.

Stormwater Management

17. *A detailed Stormwater Management Plan and design certification must be prepared by a suitably qualified Civil Engineer in accordance with Bayside Technical Specification Stormwater Management.*
18. *An On-Site Detention (OSD) system is to be designed as per Section 6 of the Bayside Technical Specification Stormwater Management. All relevant calculations for the OSD sizing to be provided including the DRAINS Model.*
19. *A concept Water Sensitive Urban Design (WSUD) Catchment Plan to be provided highlighting the impervious and pervious areas for water quality treatment and areas which bypass the treatment system as well. MUSIC Model is to be submitted to Council's for further assessment.*
20. *A concept Catchment Plan is to be provided highlighting the impervious (roof and hardstand) and pervious areas draining into the OSD as well the bypass area. The maximum bypass allowed is 15% of the total site area.*
21. *A concept Roof Drainage Plan is to be provided.*
22. *A Civil Stormwater Management Report is to be provided addressing the stormwater management, Water Sensitive Urban Design (WSUD), flooding, services, sediment and erosion control, and earthworks.*
23. *A concept Sediment and Erosion Control Plan to be provided. Sediment basin calculations are to be shown (if applicable).*
24. *A concept Site Grading Plan is to be provided showing the existing levels, Finished Floor Level (FFL), finished surface level, retaining wall levels, crossfall, crest level and contours.*
25. *The rainwater tank to be designed and sized as per Section 7.2 of the Bayside Technical Specification Stormwater Guidelines and the rainwater tank to be connected for internal non-potable stormwater re-use including connections to all ground level toilets, landscape irrigation. Only non-trafficable roof areas to drain into the rainwater tank. The re-use calculations to be provided using MUSIC.*
26. *An oil separator to be provided prior to the surface run-off entering the OSD.*
27. *The DRAINS Model is to be submitted for the HGL analysis and is to include a tailwater condition as per Bayside Technical Specification Stormwater Guidelines.*
28. *The development requires the use of a Water Sensitive Urban Design Approach (WSUD) to the design of the drainage system. Bayside Technical Specification Stormwater Guidelines requires development to confirm the targets for the stormwater pollution reduction and to justify the target by an analysis using MUSIC. All manufacturers' details for the WSUD products to be provided.*

Response

Refer to **Section 4 & 5** and drawing **Co14950.01-SSDA400** for discussion pertaining to stormwater quantity management incorporating WSUD and on-site detention requirements as per Section 6 of *Bayside Technical Specifications – Stormwater Management*. DRAINS modelling has been completed as part of the assessment for all storms events (20%, 10%, 5%, 2% and 1% AEP) for pre-development and post-development flows. Refer to Drawing **Co14950.01-SSDA480** for the concept catchment plan.

A DRAINS HGL assessment (with tailwater conditions) has been completed for the overland flow conveyed by the in-ground council drainage system, associated easement and overland flow path along the southern boundary from Stephen Road to Coal Pier Road for the 1% AEP storm event. A CCTV assessment has also been completed for the existing stormwater drainage line. Refer to **Section 7** for discussion of flooding and overland flow. A DRAINS model has been provided as part of the submission. Design certification is noted to be a post approval requirement and would form part of the Construction Certificate design stage of the project.

Stormwater assessment including surface water runoff, water quality and water quantity has been completed. Refer to **Section 4** for key stormwater quality objectives as required of the *Bayside Technical Specifications – Stormwater Management*. Refer to **Section 6** for water quality management incorporating WSUD and drawing **Co14950.01-SSDA480** for the concept MUSIC modelling catchment plan. Rainwater tank sizing has been completed as part of the WSUD requirements and detailed in **Section 6.4**. A MUSIC model has been completed as part of the assessment and provided as part of the submission. Refer to **Section 6** and **Appendix B** for discussion of MUSIC modelling and MUSIC model configuration. Refer to **Appendix G** for stormwater quality device manufacturer details.

We note that oil and hydrocarbon capture has been achieved within the OSD tank in conjunction with the overall stormwater management and filtration system. As separate oil and water separator prior to the OSD system is not required based on the provided measures. The method of capture (via an oil baffle within the OSD) is industry accepted and deemed to comply method in other council LGA's such as Blacktown, Penrith and Liverpool.

Refer to **Section 8** for soil and water management measures during construction, drawings in **Appendix A** for associated erosion and sediment control drawings, and **Appendix C** for a Draft Soil and Water Management Plan. Report **Section 8, Appendix C** and the ESCP drawings in **Appendix A** show proposed measures, based on the Landcom document Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book')(Landcom, 2004), are proposed during the construction of the development. Measures proposed will limit potential for offsite impact associated with water runoff and soils during construction. Refer to drawing **Co14950.01-SSDA200** for erosion and sediment control plan and sediment basin calculations.

Refer to drawing **Co14950.01-SSDA500, 501, 502 & 503** for finished levels.

Flooding

29. *Council systems indicate that the site is flood affected. The development's habitable and non-habitable areas will need to be physically protected*

from inundation during the flooding event (including any basement and fire stairs). Furthermore, the flood impacts of the development footprint on the floodplain need to be assessed using a 2D flood model through a recognised computer software. The development is to comply with Bayside DCP 2022 Section 3.10.

30. *A comprehensive Flood Study is to be provided demonstrating no adverse flood impacts of this development on the surrounding properties and the existing floodplain in this area. The Flood Study report is to demonstrate compliance of this development with relevant guidelines and requirements, including Bayside DCP2022, NSW Government's Flood Prone Land Policy, Flood Risk Management Manual and Section 9.1 Direction, as well as any other relevant policy or guideline.*

Response

Review of Council's Flood Advice Letter (Ref. **FA-2024/211** in **Appendix F**) and Council's adopted flood study for the region indicate the site to be impacted in the 1% AEP and PMF events.

Scrutiny of the mapping, local topography and surrounding catchments however shows that the majority of mapped floodwater on the site could be attributed to modelling noise, and modelled areas of the site which have been modelled via "rain on grid" without the inclusion of private drainage systems. Noting there are no major contributing catchments (other than the local council flow path from Stephen Road) upstream of the property, the shallow and low velocity flooding shown within the site will be collected and managed within a new drainage system.

The council flood mapping also shows deeper and more substantial "flooding" at the east of the site which aligns with the first flush basin, and an internal chemical management basin. Both of these systems form part of the internal site operations and existing drainage systems and are not considered to be areas of flood affectation. These systems will be made redundant as part of the new development.

As noted, conveyance of a local catchment from Stephen Road is required. This is managed by an inground drainage system, associated easement and an overland flow path. A HGL assessment has been completed for the relocated council drainage infrastructure in accordance with the requirements in *Bayside Technical Specification – Stormwater Management*. The assessment shows the relocated drainage line will not increase the HGL of the existing drainage system during the 1% AEP flood event.

The development floor level is set above the 1% AEP flood level with an addition 500mm freeboard. The existing overland flow path is maintained through provision of retaining walls and engineered structures along the proposed drainage easement. Refer to **Appendix A** for location of the proposed drainage easement and relocated alignment of council drainage infrastructure.

Hence, the proposed development is compliant with the requirements in *Bayside DCP2022, NSW Government's Flood Prone Land Policy, Flood Risk Management Manual and Section 9.1 Direction*. The need or detailed two-dimensional flooding is not warranted based on the assessed flood behaviour and the scrutiny of Councils adopted flood study.

Refer to **Section 7** of this document for further discussion on flooding and overland flow management.

Department of Planning and Environment – EHG Environmental Assessment Requirements

Flooding

6. *The EIS shall include a flood impact and risk assessment (FIRA). As a minimum the FIRA must:*
    - *Consider the relevant provisions of the NSW Floodplain Development Manual and associated guides, and existing council and government studies, information and requirements.*
    - *Identify and describe existing flood behaviour and flood constraints on the site and its surrounding areas for the full range of events, including 5% AEP, 1% AEP, PMF and 0.5% AEP or 0.2% AEP and provide an assessment of the compatibility of the development and its users with flood behaviour. This may require flood modelling where existing flood information is not available.*
    - *Determine and describe changes in post development flood behaviour, impacts of flooding on existing community and on the development and its future community or full range of events, 5% AEP, 1% AEP, PMF and 0.5% AEP or 0.2% AEP. This may require flood modelling.*
    - *Consider impacts of climate change due to both:*
        - *Sea level rise considering relevant Council and government advice.*
        - *Increase in rainfall intensities. The 0.5% AEP or 0.2% AEP events can be used to provide an understanding of the scale of change of flood behaviour relative to the 1% AEP event*
    - *Propose and assess the effectiveness of management measures required to minimise the impacts and risks of flooding to the development (including any basement car parking) and its users and existing community.*

**Flood modelling is to be undertaken by a suitably qualified engineer consistent with Council's requirements and Australian Rainfall and Runoff.*

**Flood behaviour includes flood volume, extent, depth, level, velocity, duration, rate of rise, flood function and hazard.*

**Impacts include changes to flood behaviour and risks to the community including emergency management response for the community.*

Response

Refer to response above and **Section 7** for flooding and overland flow. As discussed, a desktop review of the detailed survey, mapping and surrounding catchments shows that floodwaters shown in Council's flood mapping can be attributed to modelling noise and without provision of internal drainage systems. Ponding of water on the flood mapping is associated with low point in the topography which would have been drained by internal in-ground drainage infrastructure. Furthermore, it has been determined that the "flooding" identified in council's flood mapping aligns with the location of the first flush basin, which is to be made redundant as part of the proposed development. Both of these

systems form part of the internal site operations and existing drainage systems and are not considered to be areas of flood affectation. These systems will be made redundant as part of the new development.

In addition, conveyance of a local catchment along Stephen Road at the southern boundary is provisioned via inground drainage and retaining walls which conveys overland flow during the 1% AEP storm event in accordance with the requirements of the *NSW Floodplain Development Manual*. A HGL assessment has been carried out and provided as part of the submission.

Review of the *Springvale and Floodvale Drain Flood Study (referenced **R.S1282.003.01.docx**)* completed by **BMT** on behalf of Bayside Council in 2014 shows an assessment of the impacts of climate change relating to sea level rise and increase in rainfall intensities. The assessment confirms there will be no adverse impactions to adjoining properties, no increase in flows of velocity as a result of the development during 1% AEP storm events. Refer to **Section 7.5** for discussion on climate change considerations.

Safe refuge is available site via evacuation or shelter in place. The first floor of the proposed multi-level warehouse is set at R.L 20.9 mAHD approximately 11m above the PMF flood level. Furthermore, council's flood mapping shows the shallow and low velocity flooding shown within site can be collected and managed within a new drainage system. The requirements of council and *NSW Floodplain Development Manual* are therefore met for this development.

As such a detailed FIRA has not been carried out as part of the approval. **Section 7** of the report provides further details on flood behaviour and floodplain management as per the *NSW Floodplain Development Manual*.

Water and Soils

7. *The EIS must map the following features relevant to water and soils including:*
    - *Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Sil Planning Map).*
    - *Rivers, streams, wetlands, estuaries (as described in 24.2 of the Biodiversity Assessment Method).*
    - *Wetlands as described n s4.2 of the Biodiversity Assessment Method.*
    - *Groundwater*
    - *Groundwater dependent ecosystems.*
    - *Proposed intake and discharge locations.*
8. *The EIS must describe background conditions for any water resource likely to be affected by the development, including:*
    - *Existing surface and groundwater.*
    - *Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.*
    - *Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community uses and values or the receiving waters.*
    - *Indicators and trigger vales/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines*

for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.

- *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning*

9. *The EIS must assess the impact of the development on hydrology, including:*
   - *Water balance including quantity, quality and source.*
   - *Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.*
   - *Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.*
   - *Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).*
   - *Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of water.*
   - *Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.*
   - *Identification or proposed monitoring of hydrological attributes.*

Response

Refer to **Section 1.3** on Soils, **Section 3** and geotechnical assessments by **Douglas Partners** for confirmation of soil resources and potential impacts.

The site is noted to be located within an established industrial precinct. The proposed works will involve demolition of the existing buildings and infrastructure, removal of building demolition spoil, site remediation and bulk earthworks.

There are no riparian lands located within the property boundary. The site is located approximately 1.1km north of Botany Bay and 1.8km south of Botany Dams.

The site is located within an area with low acid sulfate soil occurrence. Laboratory testing shows that confirms that underlying soils are not anticipated to contain acid sulfate soils however highly localised occurrences may occur.

The development does not propose to utilise surface of groundwater resources. An assessment of the impact of these items is therefore not relevant for the proposed development.

Stormwater runoff is managed through an inground drainage system and provision of retaining walls for conveyance of runoff for a local catchment within Stephen Road. An on-site detention system has been provided as part of the proposed development to match pre-development flows in accordance with *Bayside Technical Specification – Stormwater Management prior to discharge into council's stormwater system*. **Section 5 & 6** provides demonstration of the key

criteria being met for council's WSUD requirements based on DRAINS and MUSIC modelling as outlined in **Section 4** of the report. Configuration of the proposed measures are shown in Costin Roe drawings in **Appendix A**.

There are no activities currently proposed that would require water licensing.

Reference to reporting by **Douglas Partners** should be made pertaining to groundwater and any associated groundwater mitigation measures.

During construction, surface water management, including conveyance of surface runoff, management of water quantity and water quality (using WSUD principles and best practice pollution reduction objective) has been proposed in the design. Refer to drawing **Co14950.01-SSDA200** for the proposed erosion and sediment control during construction and **Appendix D** for the draft soil and water management plan during operation.

NSW EPA (REF. DOC23/1099618-4)_

Water

10. *Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.*
11. *Details of the site drainage and any natural or artificial waters within or adjacent to the development must be identified and where applicable measures proposed to mitigate potential impacts of the development on these waters.*

Response

Stormwater runoff is managed through an inground drainage system and provision of retaining walls for conveyance of runoff for a local catchment within Stephen Road. An on-site detention system has been provided as part of the proposed development to match pre-development flows in accordance with *Bayside Technical Specification – Stormwater Management prior to discharge into council's stormwater system*. **Section 5 & 6** provides demonstration of the key criteria being met for council's WSUD requirements based on DRAINS and MUSIC modelling as outlined in **Section 4** of the report. Configuration of the proposed measures are shown in Costin Roe drawings in **Appendix A**.

1.5 Responses to Submissions Items

As noted, **Table 1.3** provides comments on the Agency Response Items which formed part of the SEAR's for the development.

Table 1.3 – RtS Items

Conservation Programs, Heritage and Regulation (REF. DOC25/195256)

Flooding

CPHR notes the subject site is located within a designated Flood Planning Area. It is not identified as a floodway and is only affected by a minor, shallow overland

flow path coming from a small upstream catchment near Stephen Road. During a 1% Annual Exceedance Probability (AEP) event, the subject site experiences shallow overland flooding predicted only during the Probable Maximum Flood (PMF) event. CPHR notes that flood hazard mapping indicates the area surrounding the subject site is generally classified as H1, consistent with low hazard conditions. The source and extent of flooding are primarily from the minor upstream catchment, that experiences low hazard conditions. The flood afflux for the 1% AEP event with 30% increase in rainfall intensity and +0.9 m sea level rise is -0.02 m to +0.05 m.

1. *The Bayside Development Control Plan 2022 (DCP), requires:*

   • habitable floor levels must be set at least 500 mm above the 1% AEP flood level

   • non-habitable floor levels, such as for garages or storage areas, must be at least 300 mm above the 1% AEP flood level.

   Recommended action:

   CPHR recommends the proponent confirms the proposed finished floor levels will comply with the DCP.

Response

Refer to **Section 7** for flooding and overland flow.

We confirm the development will be sited in accordance with the Bayside DCP 2022 which required habitable floor levels to be at least 500mm above the 1% AEP flood level and non-habitable floor levels to be at least 300mm above the 1% AEP flood level.

The 1% AEP flood level is noted to be RL10.13 at location 2 and location 7 per the Bayside Council Flood Advice Certificate (Ref: FA-2024/211) dated 19 September 2024.

Flood Information

Location	1% AEP Flood Level (m AHD)	PMF Level (m AHD)
1	10.03	10.26
2	10.13	10.26
3	9.9	10.12
4	9.44	10.0
5	10.11	10.25
6	10.02	10.12
7	10.13	10.22
8	9.87	9.94
9	5.20	5.39
10	5.92	6.05
11	6.35	6.41

The proposed development will be sited at RL11.90 which achieves more than the required 500mm freeboard above the 1% AEP flood level.

Bayside Council (REF. SSD-2025/1)
Engineering *21. Floodplain Management* *a) The submitted Civil Engineering Report includes only a limited desktop analysis of flooding and overland flow which is not supported and does not allow any understanding of the development's impact on floodplain behaviour. The site is flood affected and a thorough analysis and 2D modelling of floodwater behaviour is required. A Flood Study shall be provided that assesses the flooding impacts of the development with 2D flood modelling as per the flood controls in the Bayside DCP Section 3.10 & Section 9.5.4, including the NSW Government's Flood Prone Land Policy & Flood Risk Management Manual.* Response Refer to **Section 8** of this report for 2D flood modelling results and floodwater behaviour. *b) The 2D modelling to include the site drainage including the OSD draining and the Council pipe realignment.* Response Refer to **Section 8** of this report for 2D flood modelling results and floodwater behaviour. The site drainage and Council pipe realignment has been included in the model. *c) The Flood Study shall fully comply with Bayside DCP 2022 Section 3.10 and Section 9.5. Two-dimensional (2D) flood modelling shall be submitted demonstrating that the development will have less than or equal to 10mm impact (afflux) on surrounding properties (including the road reserve) in the 1% AEP flood event (including 1% AEP climate change and 1% AEP sea level rise flood event) and, less than or equal to 50mm impact (afflux) in the PMF flood event. Existing flood hazard shall not be increased on surrounding properties (including the road reserve) because of the development for all flood events up to the PMF.* Response Refer to **Section 8** of this report for 2D flood modelling results and floodwater behaviour. *d) Accurate pre and post development 2D flood modelling demonstrating that the development complies with the abovementioned controls shall be submitted. If a flood mitigation measure is required, it must be demonstrated through 2D flood modelling that any flood mitigation measure proposed will result in compliant flood afflux in the post development scenario for the 1% AEP & PMF flood events.* Response No flood mitigation measures are proposed nor required for this development. *e) All relevant flood maps as per Bayside DCP Section 3.10 and 9.5 to be provided including commentary on the tailwater, blockage factors etc, and any proposed flood mitigation measures.* Response

Refer to **Section 8** of this report for 2D flood modelling results and floodwater behaviour.

f) A soft copy of the 2D flood modelling (TUFLOW) is to be submitted.

Response

Soft copy of the 2D flood modelling can be submitted via download link.

g) A Flood Planning level assessment has not been undertaken for the development (i.e. no assessment was made of the proposed finished floor levels on the architectural plans in relation to the adjacent flood levels). Section 7.6.1 of the Civil Engineering Report is inadequate. It must be confirmed that all habitable areas and non-habitable areas are sufficiently protected from floodwaters. A comprehensive review of all non-habitable and habitable floors on the ground level with the highest flood level (spot levels) taken adjacent to these floors from the post development flood modelling to determine the adequacy of the adopted floor level. Habitable floor levels need to be physically protected to the 1% AEP flood level + 500mm freeboard.

Response

The 1% AEP flood level is noted to be RL10.13 at location 2 and location 7 per the Bayside Council Flood Advice Certificate (Ref: FA-2024/211) dated 19 September 2024.

Flood Information

Location	1% AEP Flood Level (m AHD)	PMF Level (m AHD)
1	10.03	10.26
2	10.13	10.26
3	9.9	10.12
4	9.44	10.0
5	10.11	10.25
6	10.02	10.12
7	10.13	10.22
8	9.87	9.94
9	5.20	5.39
10	5.92	6.05
11	6.35	6.41

The proposed development will be sited at RL11.90 which achieves more than the required 500mm freeboard above the 1% AEP flood level.

22. Council Stormwater Realignment

a) Council does not have any records of Council stormwater pipe traversing through the site; however, the submitted information indicates there is a Council stormwater pipe present that mainly drains Stephen Road to Coal Pier Road. There is an existing easement over the general location of the stormwater pipe and full details of all easements benefitting and burdening the site shall be submitted to

Council for review. Full terms of all easements to be submitted. No consultation was made regarding the realignment of the Council stormwater pipe.

Response

Terms of easements can be provided by the surveyor.

b) The proposed realignment of Council's stormwater pipe is not supported. The proposed realignment proposes additional bends in comparison to the existing alignment which causes inefficient flows and head loss in the Council pipe which is not supported. The Council pipe realignment must be revised to remove the sharp bends.

Response

The bends in the proposed pipe realignment has been incorporated into the design to maintain existing trees located at the south-west corner of the development site fronting Coal Pier Road.

The pipe realignment (including bends) has been assessed in DRAINS using Hydraulic Grade Line (HGL) analysis to confirm the pipe can convey the peak flows with the head loss as a result of the bends.

c) A full and accurate survey of the existing Council stormwater pipe traversing though the site shall be submitted. The Survey Plan does not properly indicate the exact location of the Council stormwater pipe and, the existing alignment of the stormwater pipe is only shown by the CRE plans and appears to be an assumed location. Furthermore, a survey of the Council drainage system of the downstream and upstream of the stormwater pipe realignment is to be provided (i.e. survey of Council drainage in Stephen Road and Coal Pier Road) including the pipe size and pipe invert level. This shall include Council has limited data on the discharge on Coal Pier Road and full drainage survey of Coal pier road to be submitted.

Response

Refer to response letter prepared by the surveyor.

d) The proposed stormwater pipe realignment is not within the proposed Council drainage easement. This is not supported. The new Council stormwater pipe realignment must be within the proposed Council drainage easement as per Section 8 of the Bayside Technical Specification Stormwater Management.

Response

As noted in item b) above, the pipe realignment is proposed to be provided clear of existing trees to be retained. The existing easement will be required to be redefined to matches the proposed pipe realignment.

d) The width of the proposed easement over the Council stormwater pipe realignment is not shown on the plans, the width of the easement is to be as per Section 8 of the Bayside Technical Specification Stormwater Management.

Response

Proposed easement to be 3m wide.

e) The Council stormwater pipe realignment cannot be used to capture the run-off from the development. All run-off from the development (5% AEP and 1% AEP) is to be directed into the internal drainage system. Surface flows in the major

event (1% AEP) for the internal drainage system shall be designed not to be directed into the Council stormwater pipe.

Response

Noted.

f) The DRAINS Model is to be revised for the stormwater pipe realignment and must include a DRAINS catchment plan showing the catchment draining into each pit.

Response

There are no catchments for the individual pits. No site runoff from the adjacent roadway will drain through the pits provided for the Council pipe realignment.

DRAINS model can be provided via download link.

23. Internal Stormwater Drainage

a) The Civil Plans do not show a legal point of discharge. This is not supported. The plans show a pit at the boundary which does not drain anywhere. Council has limited details of the existing drainage on Coal Pier Road. The development has not provided any method of drainage connection into Coal Pier Road.

Response

Refer to survey showing existing discharge point to Coal Pier Road.

b) The required pollution reduction targets as per Bayside Technical Specification Stormwater Management Section 7 are not met in the stormwater design and are shown to be significantly lower than the required pollution reduction targets, which is not supported. An 85% reduction is to be met for the total suspended solids and currently shows only a 3.7% reduction which is wholly inadequate. Furthermore, the gross pollutants are to be a minimum 90% reduction target whilst the table shows only 45.7%. The development must be revised to ensure the targets are met. A MUSIC screenshot of the pollution reduction targets is to be provided. A revised MUSIC Catchment Plan is to be submitted, which is to be coordinated with architectural plans and the MUSIC Model.

Response

Refer to revised modelling in **Section 7**.

c) The submitted DRAINS Modelling is incorrect for the OSD, as it does not model the bypass and does not include the tailwater condition. The pre to post development flows modelling is not supported as it shows the post development exceeds the pre-development flows. The OSD is designed incorrectly. The development must be revised to comply with Bayside Technical Specification Stormwater Management Section 6.

Response

Refer to revised modelling in **Section 5**.

d) An OSD Catchment Plan is to be provided showing the impervious (roof and hardstand) and pervious area draining into the OSD system. Also show the bypass area. If there is OSD bypass, the OSD storage is to be modified as per Section 6.5. the OSD bypass is not to exceed 15% of the total site area (If the bypass exceeds 15% then the PSD for the total site area shall not exceed the pre-development

flows for the state of nature for all storms). The OSD Catchment Plan and the WSUD Catchment Plan are to be coordinated with each other, including the bypass.

Response

Refer to drawing SSDA410 for catchment plan.

e) The catchment areas in the DRAINS Modelling and the MUSIC Model do not add up to the total site area. This is not supported and does not correctly model the whole site drainage system. All the catchment areas in the OSD and WSUD Catchment Plan shall be revised to add up to the total site area of 4.816ha. The current DRAINS Model must be revised to add up to the total site area and include a tailwater condition in relation to the legal point of discharge either the 1% AEP flood level or the surface level of the grate, whichever is higher. The MUSIC Catchment Plan is incorrect as it does not show the elevated ramp which sits above the car park, sprinkler tank and OSD, the cat landscape bypass and the OSD bypass are shown as 0% impervious which is incorrect, given there is an elevated ramp.

Response

Refer revised MUSIC and DRAINS model.

f) An HGL analysis for all internal drainage lines into the OSD is to be provided. Given the significant size of the site and its position upstream in the catchment, all the minor and major flows shall drain into the OSD. It must be demonstrated that all surface flow paths are drained into the OSD to ensure that all major flows are captured and detained with the OSD. If it is not possible to capture the major flows via surface drainage, then the inground drainage is to be upsized to capture the 1% AEP flows and must be demonstrated on the HGL.

Response

Refer DRAINS model provided.

g) An HGL analysis for the drainage discharging from the OSD is to be provided including the bypass drainage and the discharge into the existing drainage in Coal Pier Road shall be provided. Compliance with Section 3.2.5 Bayside Technical Specification Stormwater Management must be demonstrated. An upgrade of the existing drainage in Coal Pier Road is likely required, as the report notes the existing stormwater drainage is drained into a 3 three phase oil and sediment separator with a 600m3 first flush basin, which is then all pumped through a neighbouring property that drains to a different catchment other than Coal Pier Road. This means the existing drainage in Coal Pier Road may not be sufficient to accommodate the run-off from this development.

Response

TBC.

h) A pit schedule is to be provided showing the pits fitted with the Oceanguards.

Response

Refer to drawing SSDA for pit schedule.

i) The rainwater tank size is to be a minimum 120kl as per Bayside Technical Specification Stormwater Management Section 7.2.1, and is to maximise the

catchment of the roof draining into the rainwater tank. The current rainwater tank (shown as 70kL on the stormwater plans) is incorrectly sized. As per Section 7.2.1 e) of the Bayside Technical Specifications Stormwater Management the rainwater tank is to be a minimum of 120kL, and must be connected for re-use for the toilet flushing for all floors and landscape irrigation. The MUSIC model is to include the 120kl rainwater tank.

Response

Refer to drawing SSDA400 showing 120kL rainwater tank.

j) The hydrant tank to be separated from the OSD.

Response

Refer to drawing SSDA460 showing the hydrant tank separated from the OSD with a dividing wall.

2 DEVELOPMENT SITE

2.1 Location

The property 49-61 Stephen Road, Banksmeadow is located within the Bayside Council local government area (LGA), as shown in **Figure 2.1.**



Figure 2.1 - Locality Map (Source: Nearmap, September 2024)

2.2 Existing Site Description

The subject site is located at 49-61 Stephen Road, Banksmeadow, within the Bayside local government area (**LGA**). The site is legally described as Lot A in Deposited Plan 190526, Lot 1 Deposited Plan 1095110, and Lot 1 Deposited Plan 311767.

The site is located in the Banksmeadow Industrial Precinct, approximately 10km from Sydney CBD, 1.5 kilometres from Port Botany and 3km from Sydney Airport. The site is surrounded predominantly by a mix of industrial warehouse and distribution uses to the north, east and south, and residential land uses to the west. The site is located in close proximity to existing employment and industrial areas including the Botany Port and Sydney Domestic and International Airports.

The site has been developed and currently accommodates the Allnex Resins manufacturing site. The site presents a two-storey office building towards the Stephen Road frontage, with 20 separate warehouse and ancillary use buildings as well as numerous chemical storage tanks.

Due to the current use of the site and the handling and manufacturing of chemical products, the site is considered contaminated and is subject to Environmental Protection Agency (EPA) notification. As part of site contamination management, a

stormwater retention/remediation treatment pond is located along the Coal Pier Road frontage along the eastern boundary.

Existing planted vegetation is located along the site's boundaries predominately along the western and northern setback areas assisting in screening the development from Stephen Road and the Southgate Industrial Estate development to the north. A cleared grassed area is located to the rear of the site beside a stormwater retention and treatment pond.

Existing attributes of the subject site are noted as follows:

- The subject site is located in the suburb of Banksmeadow and has a total area of 4.82ha.
- Vehicular access to the site is facilitated through access points on Stephen Road for cars and Coal Pier Road to the east for truck access.
- The site is currently occupied by Allnex for the production of industrial coatings, resins and chemicals used for painting, adhesives and other similar use. The existing site comprises of a variety of single and multi-storey buildings and structures as part of the current land use.
- Several easements are noted to be present on the site including access easements, drainage easement and electrical easements. The stormwater easement located along the southern boundary of the site drains stormwater runoff from Stephen Road and Upstream areas through the site to Coal Pier Road and ultimately to Floodvale drain.

2.3 Proposed Development

The proposal involves the construction and operation of two two-storey warehouses with each storey housing multiple warehouse units at 49-61 Stephen Road, Banksmeadow, which includes:

- Demolition of all existing built form.
- Site preparation works, bulk earthworks and infrastructure/service provisions and/or augmentation.
- Extensive remediation of the site.
- Construction and operation of two two-storey warehouse and distribution centre buildings including the following key components:
    - Approximately 45,896m2 of total GFA comprising:
        - 41,702m^2 of warehouse area.
        - 4,024m^2 of office area.
- Two warehouse buildings of two storeys containing:
    - Six (6) units within Warehouse 1 (2 levels).
    - Four (4) units within Warehouse 2 (2 levels).
- 240 car spaces.
- 16 motorbike parking spaces.
- End of trip facilities.

- Site landscaping works totalling 5,566m2 (10.2% of the site), and
- Provision of building/business identification signage.

The layout of the proposal prepared by SBA Architects is shown in **Figure 2.2** to **Figure 2.7.**

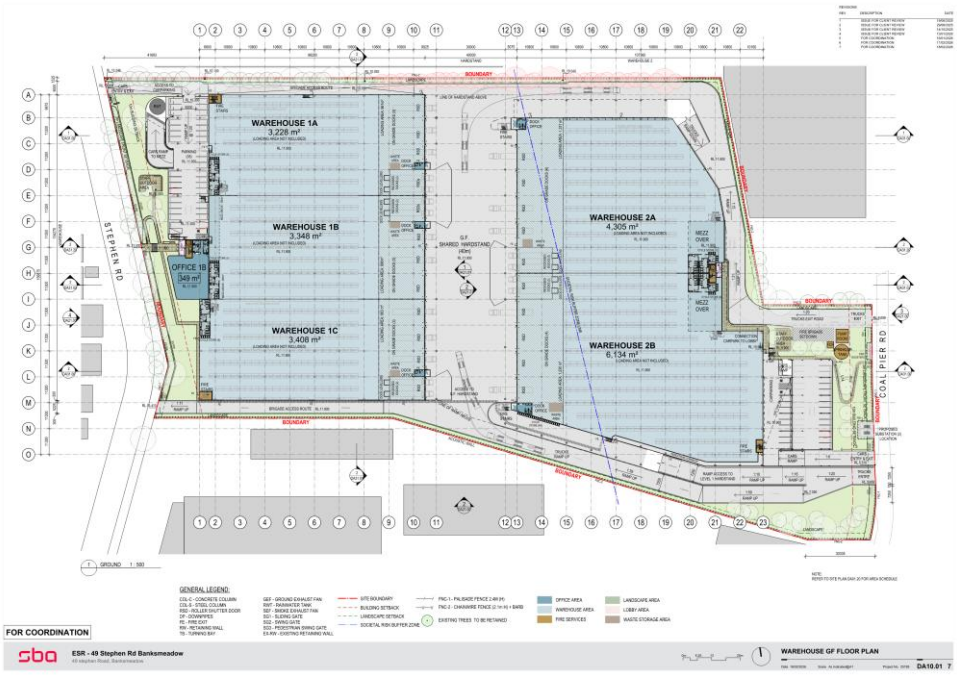


Figure 2.2 - Proposed Development (Ground Level) – Concept Layout Plan

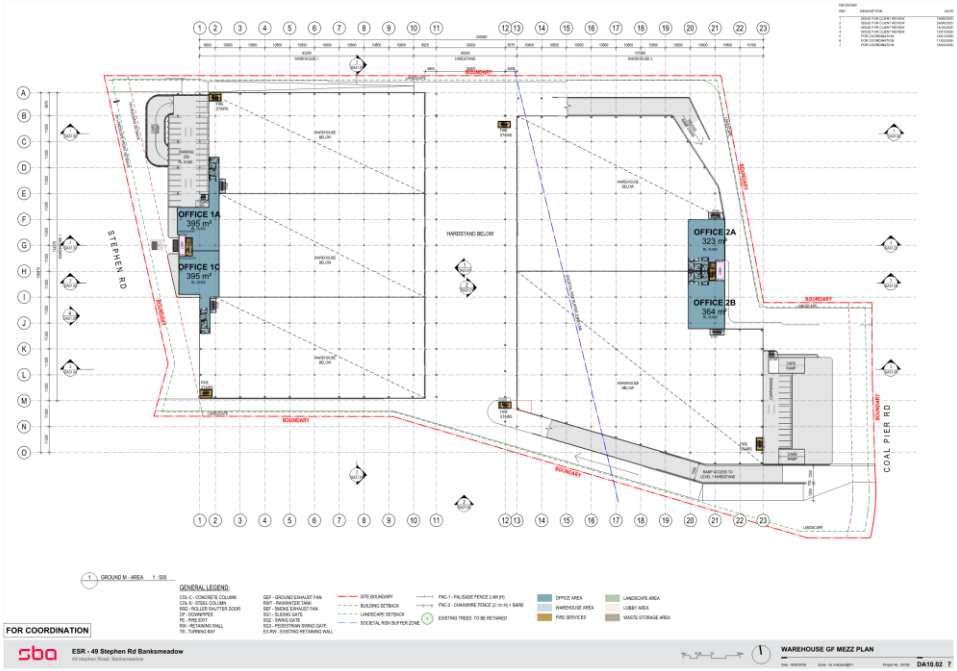


Figure 2.3 - Proposed Development (Ground Floor Mezzanine) – Concept Layout Plan

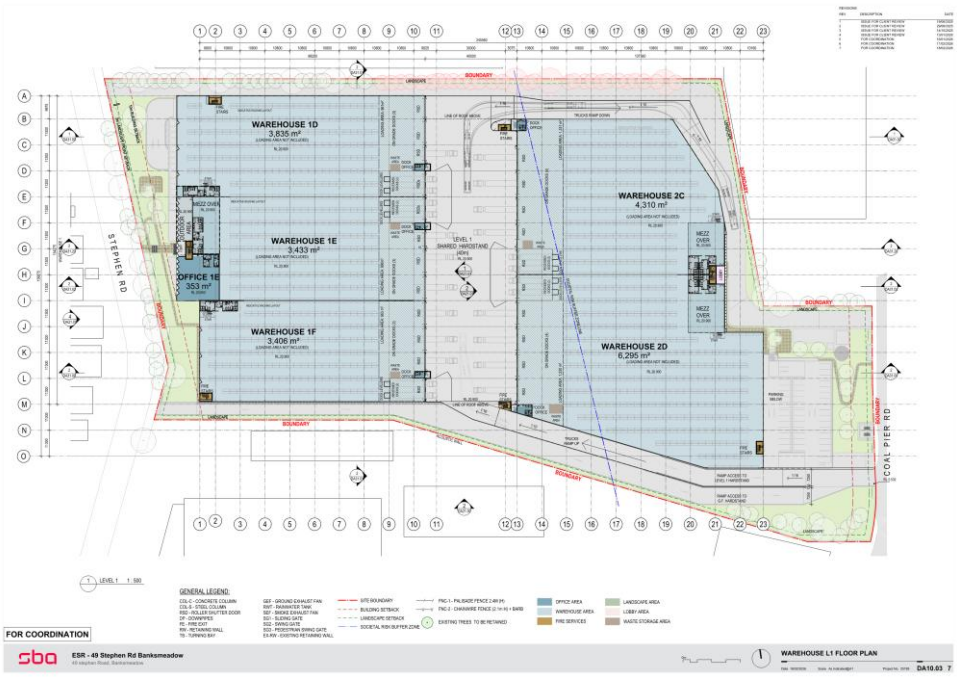


Figure 2.4 - Proposed Development (Level 1 Floor) – Concept Layout Plan

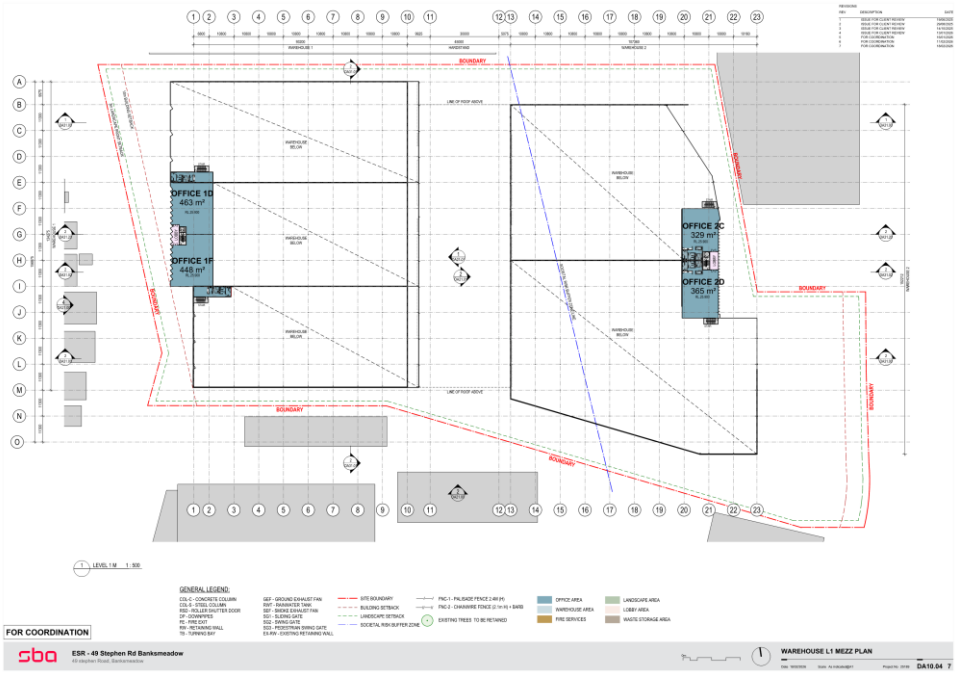


Figure 2.5 - Proposed Development (Level 1 Mezzanine) – Concept Layout Plan

3 SITE WORKS

3.1 Soil and Geological Conditions

Assessment relating to soil have been undertaken by **Douglas Partners (DP)** (*Geotechnical investigation Report* – Referenced **219609.02 R.001.Rev0** dated December 2023).

As referenced in the investigation by DP the 1:100 000 Geological Series Sydney Geological Map indicates that the site is predominantly underlain by aeolian Tuggerah soils for most of the site area with the eastern portion mapped as being underlain by disturbed terrain. These materials are expected to be underlain by coast deposits and dune facies, comprised of fine to medium marine sand with podsols of Quaternary age.

DP states that Botany Bay is the closest surface water receptor to the site and based on the local topography, groundwater is anticipated to flow to the south-east towards Botany Bay.

The DP Geotechnical report confirms the subsurface profile as sand-based fill typically 1-2m thick across the site, increasing to around 7m of depth towards the east of the site at Coal Pier Road. Natural soils lie below the fill, comprising of fine to medium sands and moist with some weakly cemented bands occasional bands of peaty clay and clay, overlying the bedrock at depths of 30m or deeper.

3.2 Bulk Earthworks

Bulk earthworks will be required to facilitate the development of the site for the proposed multi-storey industrial use. The earthworks will be undertaken to provide a two large flat building pad, hardstand area, a car parking area and a ring road around the site. A high-level earthwork volume estimate assessment has been completed for the site. The estimated volumes are shown on the Costin Roe drawings in **Appendix A**.

The earthworks analysis has been completed to a level of detail to enable general pad levels to be set and to obtain an order of magnitude cut and fill volume estimate. Given the preliminary nature of the assessment, an upper and lower bound of earthworks volumes has been included to allow for contingency in the final detail designs.

A detailed assessment of the earthworks level will be completed during detailed design stage and some adjustment to the final pad and building floor levels (within +/-500mm). A variance in the final adopted floor levels is provided to provide some flexibility in the final detail design to ensure that the concept estimates provide suitable earthworks import outcome when detail design and all factors are known. This includes variance for final geotechnical cut to fill on the estate, allowances for spoil generation, access from properties to roadways, drainage and wastewater design and other unknown elements. The intent would be, where possible to maintain the nominated floor level with minimal differences to the nominated level.

The primary drivers for the proposed earthworks and building levels are to ensure at least 1m of clean capping material over the contaminated site, and secondary to achieving the required flood planning levels as well as creating a pad at a level

allowing satisfactory overland flow drainage, sufficient cover above the underground stormwater pipelines.

The earthworks volume estimates are included in **Table 3.1.**

Table 3.1 - Earthworks Volume Estimates

	Lower Bound (-15%)	Apparent Volume	Upper Bound (+15%)
Cut (m3)	-1,445 m^3	-1,700 m^3	-1,955 m^3
Fill (m3)	65,620 m^3	77,200 m^3	88,780 m^3
Detail Excavation (@ 2,000m^3 / Ha)	-8,194 m^3	-9,640 m^3	-11,086 m^3
OSD Excavation	-870 m^3	-1,020 m^3	-1,170 m^3
Difference (m3)	+64,175 m^3	+75,500 m^3	+86,825 m^3

3.3 Retaining Walls

The civil engineering objective is to minimise retaining walls within the constraints of the masterplan layout, allowable grading to suit industrial development and batters in landscaped areas where possible

Retaining will be required along a significant length of the northern, western, eastern and southern boundary, as well as the carparking area for provision of a ramp up to upper levels of the proposed warehouse. Retaining walls to the west and southwest will match existing levels on site and interface with existing retaining walls for retention purposes. Existing retaining walls to the north and east will be retained.

The proposed retaining walls will comprise of a modular masonry block system (Keystone) with no-fines concrete backfill or similar for walls up to 2.5m in height, and reinforced earth retaining walls greater than 2.5m in height.

Location and indicative heights of retaining walls are also shown on drawings **CO14950.01-SSDA500**.

3.4 Embankment Stability

The subject site is mostly underlain by Botany sand up to a depth of 9m. To assist in maintaining embankment stability permanent batters in sand will be no steeper than 2 horizontal to 1 vertical while temporary batters will be no steeper than 1.5 horizontal to 1 vertical.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 8** and **Appendix C** of this report

3.5 Groundwater

Groundwater was identified by **DP** at depths greater than 3m below ground level. As the site will generally be in fill and there is limited excavation required for the development, impact from groundwater and on groundwater systems are considered negligible.

Surface water management, including conveyance of surface runoff, management of water quantity and water quality (using WSUD principles and best practice pollution reduction objective) has been proposed in the design.

Where groundwater is encountered, the following control measures are to be implemented to manage and mitigate the impacts of salinity and sodicity on the environment:

- Implementation of erosion and sediment control during construction in accordance with the guidelines outlined in Managing Urban Stormwater – Soils and Construction (Landcom 3rd Edition March 2004 ('The Blue Book').
- Minimising cut and fill and minimising exposure and disturbance of saline subsoil material during earthworks;
- Maintain good site drainage at areas of existing salinity and likely discharge areas; and
- Retaining significant native vegetation where practical.

It is noted that the earthwork quantities may change subject to site conditions and changes to design in later stages.

3.6 Acid Sulphate Soils and Salinity

An assessment of the potential for salinity and acid sulphate soils has been requested as part of the SEAR's requirements. A Detailed Site Investigation report (Referenced **219609.02 R.001.Rev0** dated December 2023) as well as a Contamination Investigation Report (Referenced **219609.02 R.001.Rev0** dated September 2024) was completed by **DP**. The report identifies that there is a low occurrence probability for acid sulphate soils to be present on site however may still be present in highly localised areas within the site.

The **DP** report states no evidence of soil salinity was identified on site during the site investigation.

4 WATER CYCLE MANAGEMENT STRATEGY & DRAINAGE METHODOLOGY

4.1 Key Areas and Objectives

Water Cycle Management (WCM) is a holistic approach that addresses competing demands placed on a region's water resources, whilst optimising the social and economic benefits of development in addition to enhancing and protecting the environmental values of receiving waters.

Developing a WCMS at the SSD stage of the land development process provides guidance on urban water management issues. This WCMS has been prepared to inform DPIE, and relevant stakeholders, that the development is able to provide and integrate WCM measures into the stormwater management strategy for the development.

The key WCM targets which have been adopted in the design are included in **Table 4.1** following, and included in the drawings found in **Appendix A.**

Table 4.1 – WCM Target

Element	Target	Reference
Water Quantity	Maintaining or reducing runoff volume of stormwater and peak flows and minimising impact of flooding to the natural environment and build-up areas.	Bayside Technical Specification Stormwater Management
Water Quality	For large redevelopments, the conformance to the targets for stormwater pollution reduction shall be justified by an analysis using MUSIC, using the parameters for Bayside Council. Gross Pollutants 90% Total Suspended Solids 85% Total Phosphorus 60% Total Nitrogen 45%	Bayside Technical Specification Stormwater Management
Flooding	Minimise the impact of flooding to the natural environment and built-up areas.	Bayside Technical Specification Stormwater Management
Water Supply	Reduce demand on potable water supply. Provide min. 10,000L rainwater tank per development and	Bayside Technical Specification Stormwater Management

	cumulative for every additional 2500m^2 of roofed areas.	
Construction Stormwater Management & Erosion and Sediment Control	A construction stormwater management plan and appropriate associated erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts to surrounding properties.	Landcom Blue Book Council DPHI

A summary of the how each of the WCM objectives will be achieved are described below. Reference to the relevant sections of the report should be made for further and technical details relating to the WCM measures:

- Stormwater Quantity Management (Refer **Section 5**)

  The intent of this criterion is to reduce the impact of urban development on existing drainage system by limiting post-development discharge within the receiving waters to the pre-development peak, and to ensure no affectation of upstream, downstream or adjacent properties.

  Attenuation of stormwater runoff from the development is required as per Council's *Bayside Technical Specification – Stormwater Management Section 6* and is proposed to be managed via in ground on-site detention tank. The OSD is provided at the downstream end of the lot prior to discharge into council's stormwater system.

  Refer to **Section 5** of the document for further discussion pertaining to water quantity management.

- Stormwater Quality Management (Refer **Section 6**)

  There is a need to target pollutants that are present in stormwater runoff to minimise the adverse impact these pollutants could have on downstream receiving waters.

  The required pollutant reductions are included in **Table 6.1** of this document and MUSIC modelling has been completed to confirm the reduction objectives can be met for the development.

  A series of Stormwater quality improvement devices (SQID's) have been incorporated in the design of the development. The proposed management strategy will include the following measures:

  - Primary treatment of external areas will be made via pit inserts.
  - Tertiary treatment of the development will be made via Ocean Protect Stormfilters to be provided in a combined stormwater quantity and quality tank prior to discharge into Council's stormwater system. Refer to drawing **CO14950.01-SSDA400.**
  - Some treatment will also be present by provision of rainwater reuse tanks on development sites through reuse and settlement within the tanks. Reference to **Section 6** of this document should be made for detailed Stormwater Quality modelling and measures.

- Flood Management (refer **Section 7**)

  The proposed development contemplated flooding and overland flow during large rainfall events in relation to runoff generated from a small upstream catchment. This catchment a subcatchment of the Springvale Drain and Floodvale Drain catchments.

  Consideration to flood requirements has been made per Council Flood Management Policy. Refer **Section 7** for details.

  The site has been assessed to be generally flood free from major overland flow paths, including those associated with the Springvale Drain and Floodvale Drains.

  Conveyance of a local subcatchment from Stephen Road is required as part of the management measures for the development. This is managed by an inground drainage system, associated easement and an overland flow path.

  The following measures have been incorporated in the design:

  - Relocation of the existing stormwater drainage line and associated 2.5m wide easement along the southern boundary.
  - All buildings are sited 500mm above the 1% AEP design flood level of local flow paths.
  - Overland flow paths to manage runoff in large storm events have been made following the existing pathway including achieving at least 500mm freeboard to building levels from the flow paths, noting that a greater level of flood immunity is provided to the building than that required by planning to ensure an appropriate level of risk to the building for the intended use.

- Water Demand Reduction/ Rainwater Reuse (refer **Section 6.4)**

  Rainwater reuse measures will be provided as part of this development design. Rainwater reuse will be required to reduce demand on non-potable uses by 50-70%.

  The reduction in demand will target non-potable uses such as toilet flushing and irrigation. Refer **Section 6.**

- Stormwater Management During Construction (refer **Section 8)**

  A construction stormwater management plan and associated erosion and sediment control measures is proposed based on Landcom Blue Book and Council requirements.

  The management measures take a staged approach from initial site establishment, construction stages and the period between the completion of the proposed infrastructure works and development of site.

4.2 Existing Site Drainage

The site is currently used as a solvent manufacturing facility by Allnex.

There is formal drainage currently on the site which would need to be made redundant as part of demolition works.

The site discharge is noted on the eastern boundary at the northern junction of this frontage with Coal Pier Road (refer **Appendix A**). Site runoff is currently directed to a three-phase oil and sediment separator, then to a circa 600m3 first flush basin. We understand that following testing and treatment of stormwater water, discharge is

then made via a pumped system to a pipe in Coal Pier Road, then via an easement to the Floodvale Drain in the Goodman site to the east (former Mobil property). Confirmation of the existing discharge pipe details are required to be made via survey. It is expected, based on the diameter of the inlet pipes measured on site, that the outlet will be circa 675mm in diameter. Discharge from the site is currently controlled by the EPA under an EPL. Details of the EPL should be investigated by ESR as part of their due diligence assessment.

Also as noted earlier in the report, the site also contains an easement to drain and in-ground drainage system which manages an upstream residential catchment west of Stephen Road, and from Stephen Road. The Council drain, located on the southern boundary of the property will need to be maintained (though relocated) as part of the development. It is noted that further investigations are required to determine the exact location and size of the existing line, and its interaction with existing retaining walls adjacent to the boundary.

The site is clear of influence of flooding from the Springvale Drain, however is influenced on the far east and local to Coal Pier Road by the Floodvale Drain.

4.3 Proposed Surface Water Drainage System

As per general engineering practice and the guidelines of Council, the proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the standards of PCC and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (2019Edition), Volumes 1 and 2 (AR&R).

Water quality and re-use are to be considered in the design to ensure that any increase in the detrimental effects of pollution is mitigated, Council Water Quality Objectives are met and that the demand on potable water resources is reduced.

The legal point of discharge is a point specified by Council where stormwater from a property can be discharged. The legal point of discharge is usually Council's stormwater infrastructure (where available), the street kerb and channel for smaller developments or downstream receiving waters like an existing stream or gully, lake, pond or waterbody. Legal discharge for this site is via the existing Council drainage system located on Coal Pier Road.

With reference to the drawings in **Appendix A**, the drainage system proposed can be described as follows:

- In-ground piped drainage system designed to the 5% AEP (1 in 20yr ARI).
- Site discharge via the existing street drainage on Coal Pier Road.
- An OSD tank sized according to council requirements.
- Treatment of stormwater of a portion of surface and roof water via the in-ground piped drainage system and the combined OSD and water quality treatment tank.
- Treatment of stormwater via a proprietary filtration systems.
- Conveyance of overland flow through the site from Stephen Road to Coal Pier Road via the drainage easement along the southern boundary.

4.4 Hydrological Modelling & Analysis

4.4.1 Rainfall Data

Rainfall intensity Frequency Duration (IFD) data used as a basis for DRAINS modelling and initial pipe sizing based on rational method assessments for the 2 to 100 Year ARI events, was taken from The Bureau of Meteorology Online IFD Tool.

4.5 Runoff Models

In accordance with the recommendations and standards of Council, the calculation of the runoff from storms of the design ARI will be calculated with the catchment modelling software DRAINS for internal drainage only as part of future detail designs. Detailed hydraulic assessment of the internal drainage system will be calculated at detail/ construction certificate stage.

The design parameters for the DRAINS model are to be based on the recommendations as defined by council and parameters for the area and are as follows:

Table 4.2 – DRAINS Parameters

Model	Model for Design and Analysis Run	Parameter	
	Rainfall Data	ARR2019	
	Soil Type-Normal	3.0	
	Paved (Impervious) Area Depression Storage	1	mm
	Supplementary Area Depression Storage	1	mm
	Grassed (Pervious) Area Depression Storage	5	mm
AMC	Antecedent Moisture Condition (ARI=1-5 years)	2.5	

AMC	Antecedent Moisture Condition (ARI=10-20 years)	3.0	
AMC	Antecedent Moisture Condition (ARI=50-100 years)	3.5	
	Sag Pit Blocking Factor (Minor Systems)	0	
	On Grade Pit Blocking Factor (Minor Systems)	0	
	Sag Pit Blocking Factor (Major Systems)	0.5	
	On Grade Pit Blocking Factor (Major Systems)	0.2	

4.6 Hydraulics

4.6.1 General Requirements

Hydraulic calculations will be carried out utilising DRAINS modelling software during the detail design stage to ensure that all surface and subsurface drainage systems perform to or exceed the required standard.

4.6.2 Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground/ grate level, for the peak runoff from the Minor System runoff.

The calculated water surface for the peak runoff from the Major System runoff will not exceed a freeboard level of 500mm below the finished floor level of the building.

4.6.3 Public Safety

For all areas subject to pedestrian traffic, the product (dV) of the depth of flow d (in metres) and the velocity of flow V (in metres per second) will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

4.6.4 Inlet Pit Spacing

The spacing of inlets throughout the site will be such that the depth of flow, for the Major System design storm runoff, will not exceed the top of the kerb (150mm above gutter invert).

4.6.5 Overland Flow (locally within the development site)

Dedicated flow paths have been designed to convey all storms up to and including the100-year ARI. These flow paths will convey stormwater from the site to the stormwater management systems prior to discharge.

5 WATER QUANTITY MANAGEMENT

5.1 General Design Principles

Bayside Council requires consideration of stormwater quality management to areas in low absorption or where other physical limitations prevent effective absorption. As the site discharges into the existing council drainage system, it is subject to the capacity of the 2-year ARI storm that the council drainage system has been designed to carry. As such, the maximum Permissible Site Discharge (PSD) and corresponding minimum storage volumes shall be determined for the 50-year ARI event as depicted in section 6.2 of the Stormwater Management Technical Specification 2011). The 50-year ARI control pit shall limit the discharge through an orifice protected by a maximesh screen and silt trap.

Section 6 of the *Bayside Stormwater Management Technical Guidelines 2022* outlines the design requirements and specifications for OSD systems. Item 6.1 (b) states that "*The Permissible Site Discharge (PSD) from the site shall be designed to restrict the discharge to the predeveloped runoff in the "state of nature/greenfield" condition (Predeveloped site must be assumed as 100% pervious (i.e. the site is totally grassed/turfed) for the 20%, 10%, 5%, 2%, and 1% AEP storm events for all typical durations from 10 minutes to 2 hours*". Hydraulic modelling using DRAINS was undertaken to design the OSD system to meet Council requirements.

5.2 Proposed Stormwater Quantity Management

A hydrological analysis was undertaken to estimate the impact of the development of the site on peak flows at the downstream extent of the site. Attenuation of stormwater runoff from the development is proposed to be managed through an OSD tank, with an active detention volume of 1020m^3.

The OSD tank is proposed to be located in the carpark at the southeastern corner of the site. The sizing of the development lot detention system is noted to accounted for the landscaping catchments remaining unattenuated such that the total post development runoff from the whole of the development site is less than or equal to pre-development runoff as per required in Council's DCP.

Refer to drawings in **Appendix A** for the location and general arrangement of the detention system, and **Table 5.1** below which shows the calculated peak flow rates from the site from DRAINS modelling.

Table 5.1. Pre and post-development (with attenuation) peak flow rates

ARI	Design Storm Duration	Peak Flow (m^3/s)		
		Pre-Developed	Post-Development (No Attenuation)	Post-Development (Attenuation)
5	10 mins	0.40	0.94	0.39
	15 mins	0.52	1.13	0.44
	20 mins	0.59	1.25	0.46
	25 min	0.65	1.29	0.48
	30 min	0.67	1.22	0.49
	45 mins	0.68	1.11	0.50
	1 hr	0.71	1.16	0.51
	2 hr	0.73	1.02	0.50
10	10 mins	0.51	1.08	0.42
	15 mins	0.66	1.30	0.47
	20 mins	0.75	1.43	0.50
	25 min	0.82	1.48	0.53
	30 min	0.85	1.41	0.54
	45 mins	0.84	1.27	0.54
	1 hr	0.88	1.33	0.56
	2 hr	0.89	1.18	0.55
20	10 mins	0.64	1.25	0.46
	15 mins	0.81	1.49	0.51
	20 mins	0.93	1.63	0.54
	25 min	1.01	1.70	0.57
	30 min	1.03	1.61	0.59
	45 mins	1.02	1.45	0.60

	1 hr	1.06	1.52	0.62
	2 hr	1.09	1.36	0.61
50	10 mins	0.80	1.46	0.50
	15 mins	1.00	1.73	0.56
	20 mins	1.16	1.87	0.60
	25 min	1.23	1.84	0.71
	30 min	1.22	1.76	0.75
	45 mins	1.20	1.62	0.81
	1 hr	1.25	1.68	1.03
	2 hr	1.25	1.51	0.98
100	10 mins	0.92	1.62	0.53
	15 mins	1.16	1.93	0.59
	20 mins	1.33	2.06	0.98
	25 min	1.40	2.04	1.21
	30 min	1.37	1.94	1.17
	45 mins	1.35	1.79	1.15
	1 hr	1.43	1.87	1.41
	2 hr	1.42	1.68	1.42

6 STORMWATER QUALITY, REUSE AND MAINTENANCE

6.1 Stormwater Quality Objectives

There is a need to provide a design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by Council.

Bayside Council has nominated, in *Section 7.1.1* of their *Botany Bay Stormwater Management Technical Specifications 2022*, the requirements for stormwater quality to be provided for all new developments with reference to such documents as the Botany Bay & Catchment Water Quality Improvement Plan and relevant Australian Standards.

Bayside Council's DCP has nominated the requirements for stormwater quality prior to discharge to a Sydney Water asset as per the Table 6.1 below.

Table 6.1 – Storwmater Pollution Reduction Targets

Pollutant	% Reduction
Gross Pollutant	90
Total Suspended Solids (TSS)	85
Total Phosphorus (TP)	60
Total Nitrogen (TN)	45

6.2 Proposed Stormwater Treatment System

Developed impervious areas including roof, hardstand, car parking, roads and other extensive impervious areas are required to be treated by the Stormwater Treatment Measures (STM's). The STM's shall be sized according to the whole catchment area of the development. The STM's for the development shall be based on a treatment train approach to ensure that all the objectives above are met.

Components of the treatment train for the development are as follows:

- Primary treatment to the parking, roof, and hardstand areas is to be performed via the provision of pit inserts to all grated pits;
- Tertiary treatment of the development of stormwater using proprietary filter cartridges within the proposed OSD tank;
- A portion of the roof will also be treated via rainwater reuse and settlement within the rainwater tank.

6.3 Stormwater Quality Modelling

The MUSIC model was chosen to model water quality. By simulating the performance of stormwater management systems, MUSIC can be used to predict if the proposed systems and changes to land use are appropriate for their catchments and capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC, of relevance to this report, include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

The pollutant retention criteria set as required by Council and nominated in **Section 4.1** of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The parameters used in the MUSIC model are presented in **Appendix B. Figure 6.1** below shows the MUSIC model layout.

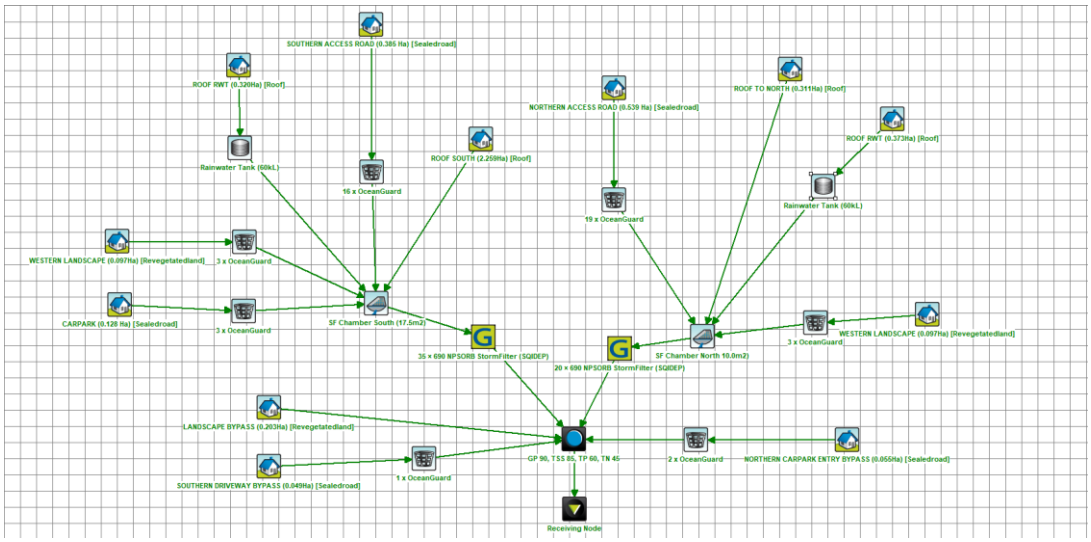


Figure 6.1 – MUSIC Model Configuration

Table 6.2 shows the results of the MUSIC analysis. The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment.

Table 6.1 – Pollution Reduction Targets

	Source Load	Residual Load	% Reduction Achieved
Total Suspended Solids (kg/yr)	5650	711	87.4
Total Phosphorus (kg/yr)	14	5.43	61.3
Total Nitrogen (kg/yr)	123	57.3	53.4
Gross Pollutants (kg/yr)	1300	0	100.0

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains and to ensure that the pollutant retention requirements of Council have been met.

The MUSIC modelling has shown that the proposed treatment train of STM will provide stormwater treatment which will meet Council's and Sydney Waters reduction objective requirements in an effective and economical manner.

6.4 Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the developments internal stormwater drainage system for re-use in non-potable applications. Stormwater from the stormwater drainage system can be classified as either rainwater where the flow is from roof areas, or stormwater where the flow is from all areas of the development.

For the purposes of this development, we refer to a rainwater harvesting system, where benefits of collected stormwater from roof areas over a stormwater harvesting system can be made as rainwater is generally less polluted than stormwater drainage.

Rainwater harvesting is proposed for this development with re-use for non-potable applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the water demand for the development by 50-70%, subject to detail design.

In general terms the rainwater harvesting system will be an in-line tank for the collection and storage of rainwater. At times when the rainwater storage tank is full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system. This however would be subject to future detail design.

Rainwater tanks have been designed, using MUSIC software to balance the supply and demand, based on the below base water demands and to provide 50-70% reduction in non-potable water demand. Rainwater tank reuse demands were calculated based on typical water demands of toilets and irrigation of landscaped areas. Water demands for toilets was calculated using 0.1kL/day/ toilet. Water demands for irrigation of landscaped areas was calculated using 0.4kL/year/m2.

The above rates result in the following internal non-potable demand:

Toilets (Warehouse 1)	6.4 kL/day
Toilets (Warehouse 2)	5.2 kL/day

The above regime for the landscaped area for the site gives the following yearly outdoor water demand:

Irrigated Area (Warehouse 1) (0.4kL/year/m2)	1,940m2	776 kL/year
Irrigated Area (Warehouse 1) (0.4kL/year/m2)	2,030m2	816 kL/year

6.4.1 Rainwater Tank Sizing

The use of rainwater reduces the mains water demand and the amount of stormwater runoff. By collecting the rainwater run-off from roof areas, rainwater tanks provide a valuable water source suitable for flushing toilets and landscape irrigation.

Rainwater tanks have been designed, using MUSIC software to balance the supply and demand, based on the calculated base water demands and proposed roof catchment areas. Allowances in the MUSIC model have been made for high flow bypass which will be managed by 300mm downpipe roofwater collection configuration along a portion of the northern elevation of the warehouse.

Table 6.2 – Rainwater Reuse Requirements

Warehouse 1 Rainwater Tank

Roof Catchment (m^2)	Highflow Bypass (m3/s)	Tank Size in MUSIC (kL)	Predicted Demand Reduction (%)	Provided Tank (kL)
3,730	100	60	56.08	60

Warehouse 2 Rainwater tank

Roof Catchment (m^2)	Highflow Bypass (m3/s)	Tank Size in MUSIC (kL)	Predicted Demand Reduction (%)	Provided Tank (kL)
3,200	100	60	57.80	60

The MUSIC model, results summarised in **Table 6.2**, predicts that the reuse demands of 50-70% will be met for the development with the provision of two 60kL tanks, one for each warehouse.

We note that the final configuration and sizing of the rainwater tanks is subject to detail design considerations and optimum site utilisation.

6.5 Maintenance and Monitoring

It is important that each component of the stormwater system and water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared and included as **Appendix D** to assist in the effective operation and maintenance of the various water quality components.

Inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the nominated frequency, it is recommended that inspections are made following large storm events.

7 FLOODING AND OVERLAND FLOW

7.1 Introduction

A review of overland flow and flooding in relation to the proposed development, and confirmation of that the requirements of **Bayside Council's DCP** and assessments as required of the SEAR's have been met. This report:

- Identifies any flood risk on-site with regard to adopted flood studies for the development site.
- Considers any relevant provisions of the NSW Floodplain Development Manual and the potential effects of climate change, sea level rise and an increase in rainfall intensity.
- Assesses the impacts of the development, including any changes to flood risk on-site or off-site, and detail design solutions to mitigate flood risk where required.

CRC conducted its desktop review and assessment by thoroughly examining the detailed site survey, the proposed development plans, and performing a comprehensive desktop evaluation of the site in relation to the flood modelling data and documented flood behaviour maps provided by Bayside Council. This information is sourced from the flood advice certificate (referenced ***FA – 2024/211*** *dated 19 September 2024*) – refer to **Appendix H**. The basis of the provided flood advice certificate is the *Springvale and Floodvale Drain Flood Study (referenced* ***R.S1282.003.01.docx****)* completed by **BMT** on behalf of Bayside Council in 2014.

The site is located within the study area of the Springvale Drain and Floodvale Drain, noting that the site is located approximately 140m west of the Floodvale Drain. The Floodvale Drain travels south Coal Pier Road towards Botany Bay. The site is affected by an existing Council easement, and anticipated local overland flow, from upstream catchments west of Stephen Road. The Council drain, located on the southern boundary of the property will need to be maintained as part of the development. The site is also influenced on the far east and local to Coal Pier Road by the Floodvale Drain.

An overland flow assessment and two dimensional flood model (TUFLOW) has been completed in relation to the overland flow path and Floodvale Drain in its existing and proposed relocation conditions. The following sections of the report describe the catchment description, flood description and proposed flood management.

Detailed technical information pertaining to the TUFLOW modelling and output completed by our office is included in **Appendix H**.

The site has existing formal in-ground drainage systems, with the site discharge noted to be on the eastern boundary at the northern junction of this frontage with Coal Pier Road. Site runoff is currently directed to a three-phase oil and sediment separator, then to a circa 600m^3 first flush basin. We understand that following testing and treatment of stormwater water, discharge is then made via a pumped system to a pipe in Coal Pier Road, then via an easement to the Floodvale Drain in the Goodman site to the east (former Mobil property).

A desktop overland flood assessment has been completed in relation to the overland flow path conveyed through the existing drainage easement along the southern site

boundary. As discussed extensively throughout the SEAR's and Agency Response Sections 1.3 & 1.4, scrutiny of Councils flood modelling shows the property to be generally flood free in the 1% AEP event and only marginally impacted in the PMF event. As further described in the following sections, the regional scale of Councils Rain on Grid flood model results in flood output shown in areas which will be drained by existing private drainage systems and have limited or no contributing catchments. A detailed assessment shows how the site can be developed without impacting or being impacted by any existing flood behaviours.

We have included the following items as part of our review:

- Bayside Council's Flood Advice Certificate for 49 Stephen Road, Banksmeadow (FA – 2024/211). Refer to **Appendix F.**
- Review of Council's Floodplain management Policy in relation not the development including review of potential impacts of the development on existing flooding, and potential impacts on the development from flooding.

7.2 Bayside Council Flood Advice Certificate (FA-2024/211) / Springvale and Floodvale Drain Flood Study (R.S1282.003.01.docx)

The flood letters received from Council reviews available information from the *Springvale Drain and Floodvale Drain Study* prepared by **BMT** in January 2014. The study involved a hydrological and hydraulic assessment of the catchments at a regional level via a Direct Rainfall (or Rain on Grid – RoG) modelling approach.

Excerpts associated with the 1% AEP storm event from the Flood Advice Certificate are presented in **Figure 7.1** and **Figure 7.2** to provide a localised overview of the flood conditions over the development site. **Figure 7.1** shows an excerpt of the 1% AEP flood extent and **Figure 7.2** shows the 1% AEP flood hazard. The PMF event is shown in **Figure 7.3.**

Further, excerpts of flooding associated with the 1% AEP storm event from the regional flood study are provided in **Figure 7., Figure 7.,** and **Figure 7.** below. **Figure 7.** is noted to be an excerpt of the 1% AEP Flood Levels; **Figure 7.** is noted to be an excerpt of the 1% AEP Flood Depths; **Figure 7.** is noted to be an excerpt of the 1% AEP Flood Velocity.

Council's GIS information identifies a stormwater drainage pipe within Coal Pier Road, near the Southwest corner of the site. This pipe, identified as Asset SP1234, does not have an identified pipe diameter. It is noted that the pipe size is to be confirmed on site prior to commencement of works.

Discussion on flood behaviour is made in **Section 7.3.**

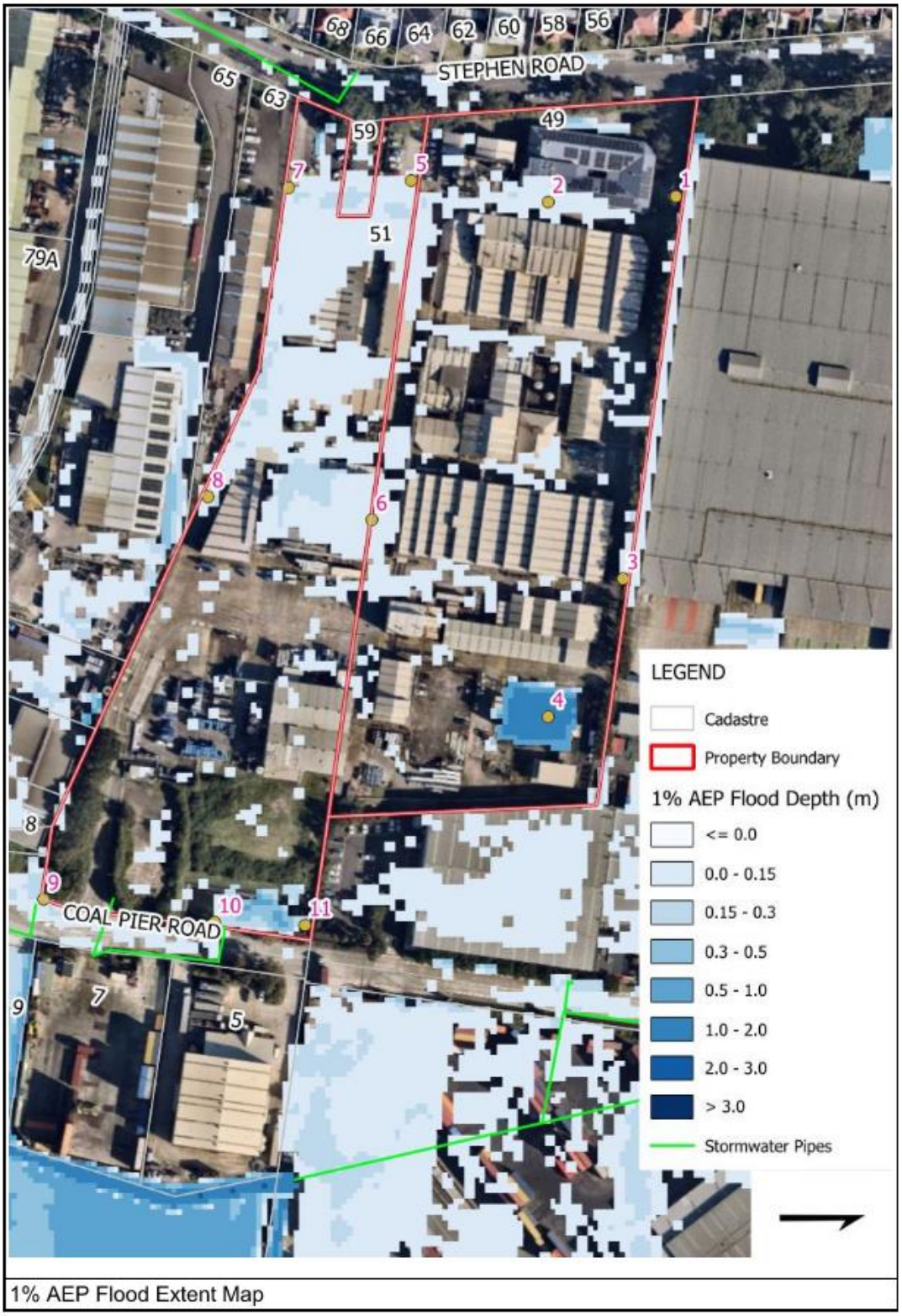


Figure 7.1 – Council Flood Certificate – 1% AEP Extent

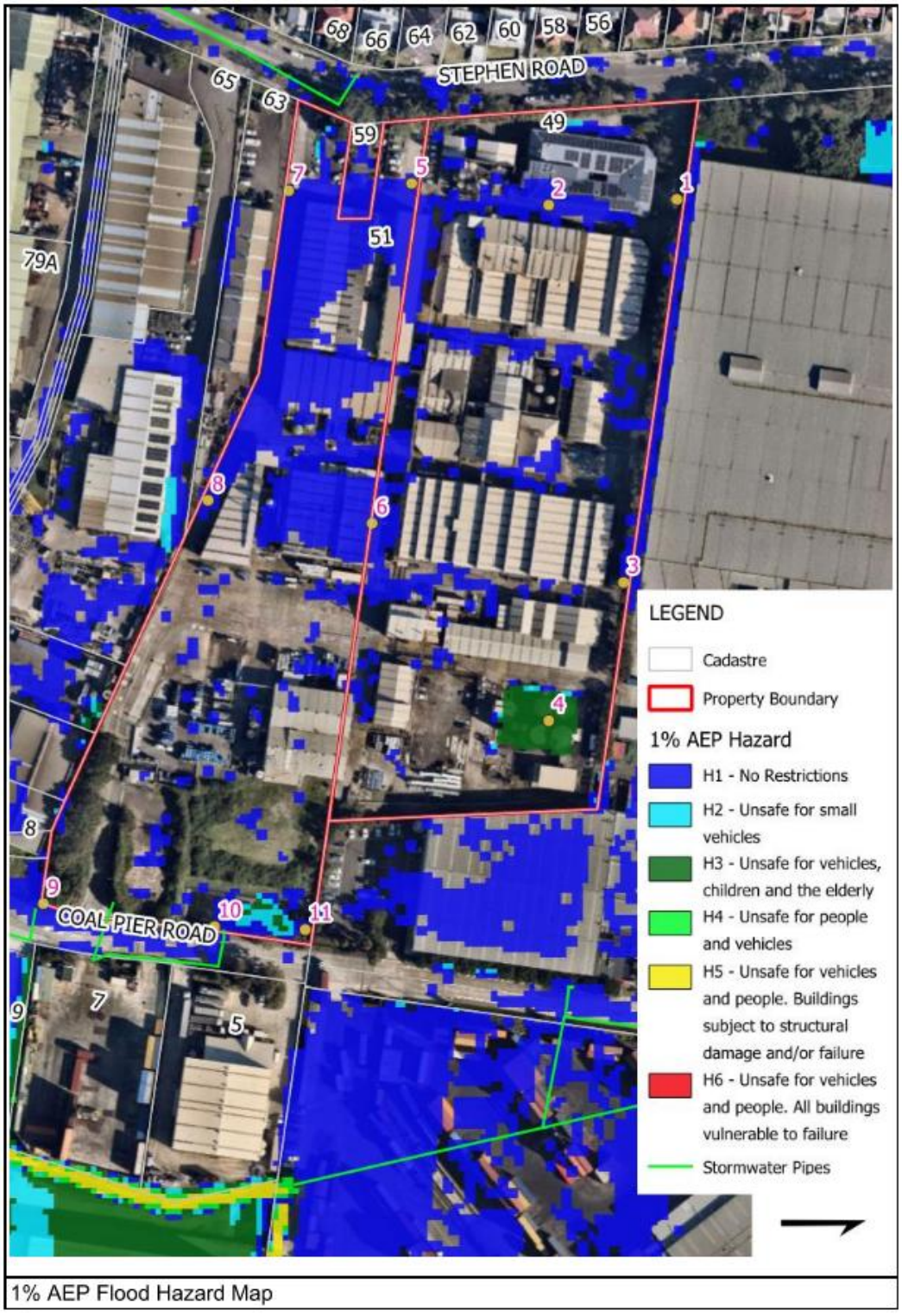


Figure 7.2 – Council Flood Certificate – 1% AEP Flood Hazard Map

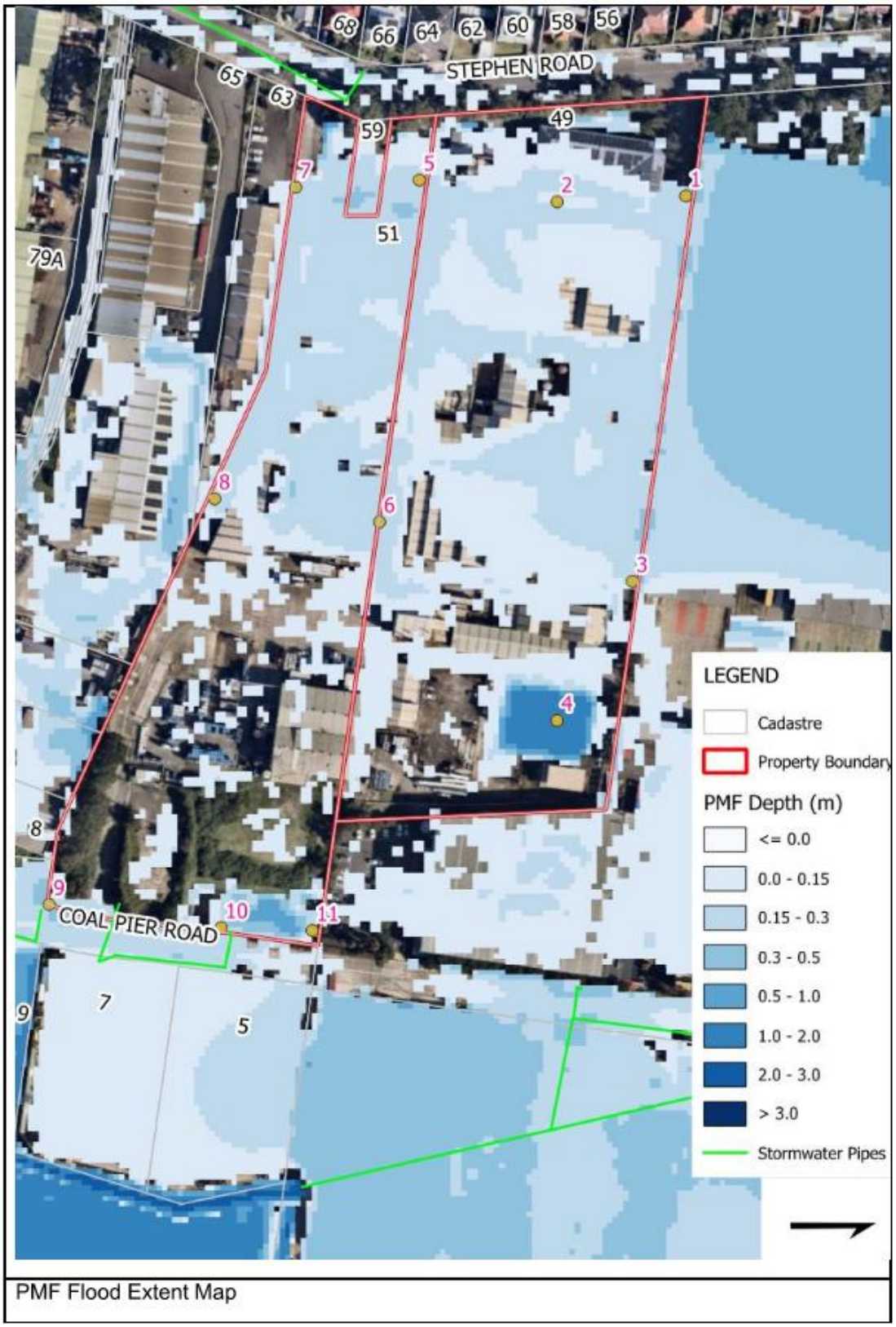


Figure 7.3 – Council Flood Certificate – PMF Flood Extent

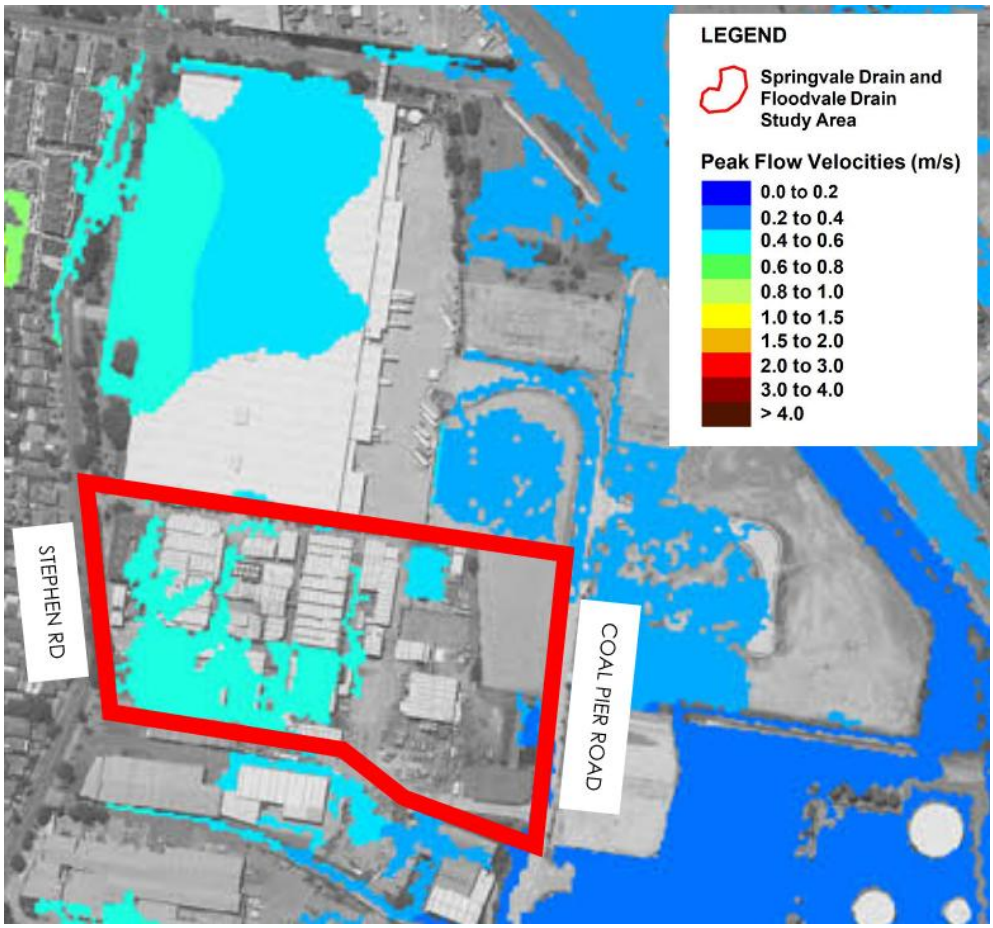


Figure 7.4 – Springvale and Floodvale Drain Flood Study - 1% AEP Flood Levels

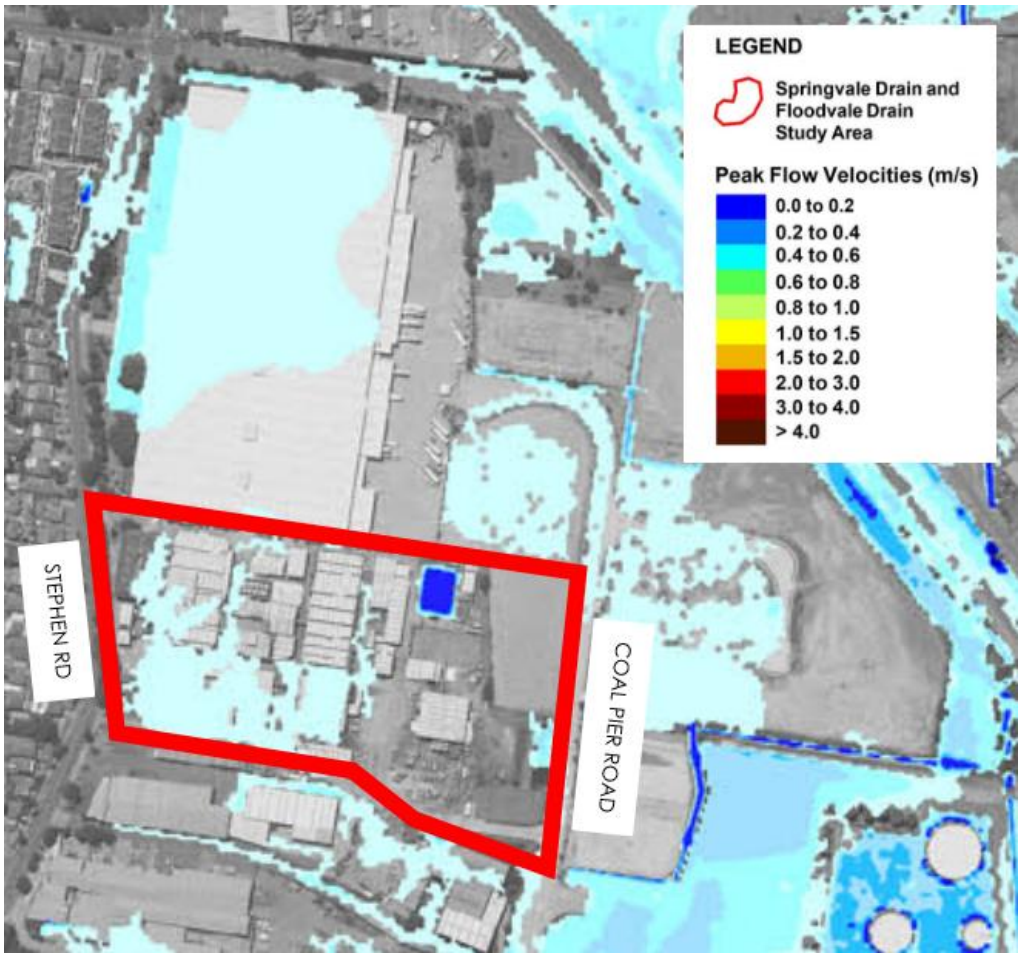


Figure 7.5 – Springvale and Floodvale Drain Flood Study – 1% AEP Flood Depths

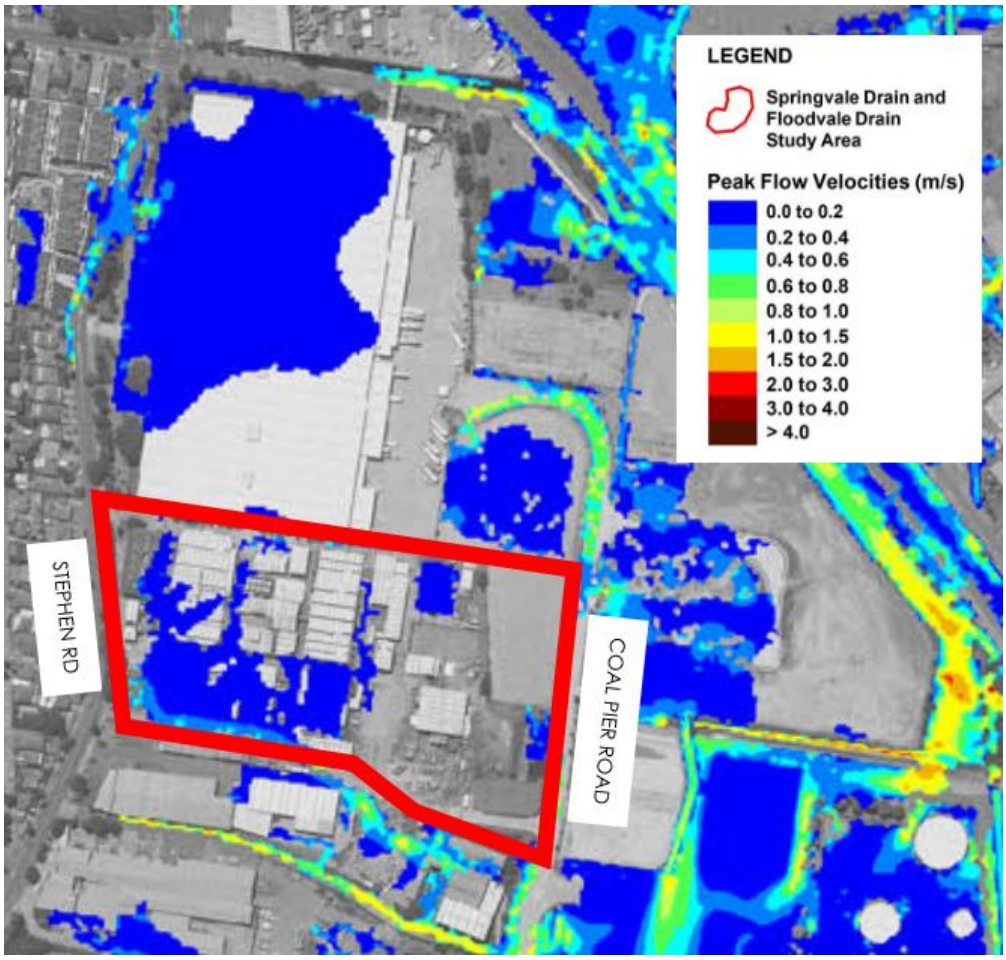


Figure 7.6 – Springvale and Floodvale Drain Flood Study – 1% AEP Flood Velocities

7.3 Existing Overland Flow/Flood Behaviour

Council's flood assessment shows that the site is affected by overland flow from Stephen Road, which drains through the site to the Floodvale drain on the far east and local to Coal Pier Road. Additionally, council categorises flooding over the site as flood fringe.

The majority of identified flood impacted areas on site are generally of H1 to H2 categorization, with H3 categorization located southeast of the site at first flush basin east of Coal Pier Road. H3 categorization is deemed unsafe for vehicles, children and the elderly, though the identified H3 areas are outside existing paved areas.

As seen in **Figure 7.**4, flood water around the site is generally within a peak depth range of 0 – 0.3m, with deeper peak depths of around 0.5-1.0 m locally at the first flush basin. **Figure 7.6** shows peak flow velocities on the site to be generally between 0-0.2m/s with the exception of the overland flow path over the easement, where velocities locally are up to 0.6m/s.

Scrutiny of the mapping, local topography and surrounding catchments however shows that the majority of mapped floodwater on the site could be attributed to modelling noise, and modelled areas of the site which have been modelled via Direct Rainfall or "rain on grid" without the inclusion of private drainage systems.

Noting there are no major contributing catchments (other than the local council flow path from Stephen Road) upstream of the property, the shallow and low velocity flooding shown within the site will be collected and managed within a new drainage system.

The council flood mapping also shows deeper and more substantial "flooding" at the east of the site which aligns with the first flush basin, and an internal chemical management basin. Both of these systems form part of the internal site operations and existing drainage systems, and are not considered to be areas of flood affectation. These systems will be made redundant as part of the new development.

Given the above, the site is generally considered to be flood free and, following development the flooding which is shown to be impacted by flooding during the 1% AEP and in more intense storm events, will be adequately managed through the proposed surface water drainage system. The existing development conveys overland flow via an existing overland flow channel from Stephen Road to Coal Pier Road as well as in ground pipes drainage within the drainage easement along the southern boundary discharging into Coal Pier Road and ultimately into Floodvale Drain.

As noted, conveyance of a local catchment from Stephen Road is required. This is managed by an inground drainage system, associated easement and an overland flow path as discussed in **Section 7.4**.

7.4 Proposed Upstream Catchment Flow Management Strategy

Conveyance of the local catchment upstream of and from Stephen Road is required. The existing drainage pipe and easement is positioned on the southern boundary of the development. Noting that the proposed development will require demolition of existing retaining walls and reconstruction of new, higher, retaining walls. It is proposed to demolish and reconstruct the existing drainage pipe and easement in a new alignment (c3m offset from southern boundary), to convey those upstream flows.

Figure 7.7 shows the existing upstream catchment as being 2.5Ha and approximately 75-80% impervious.

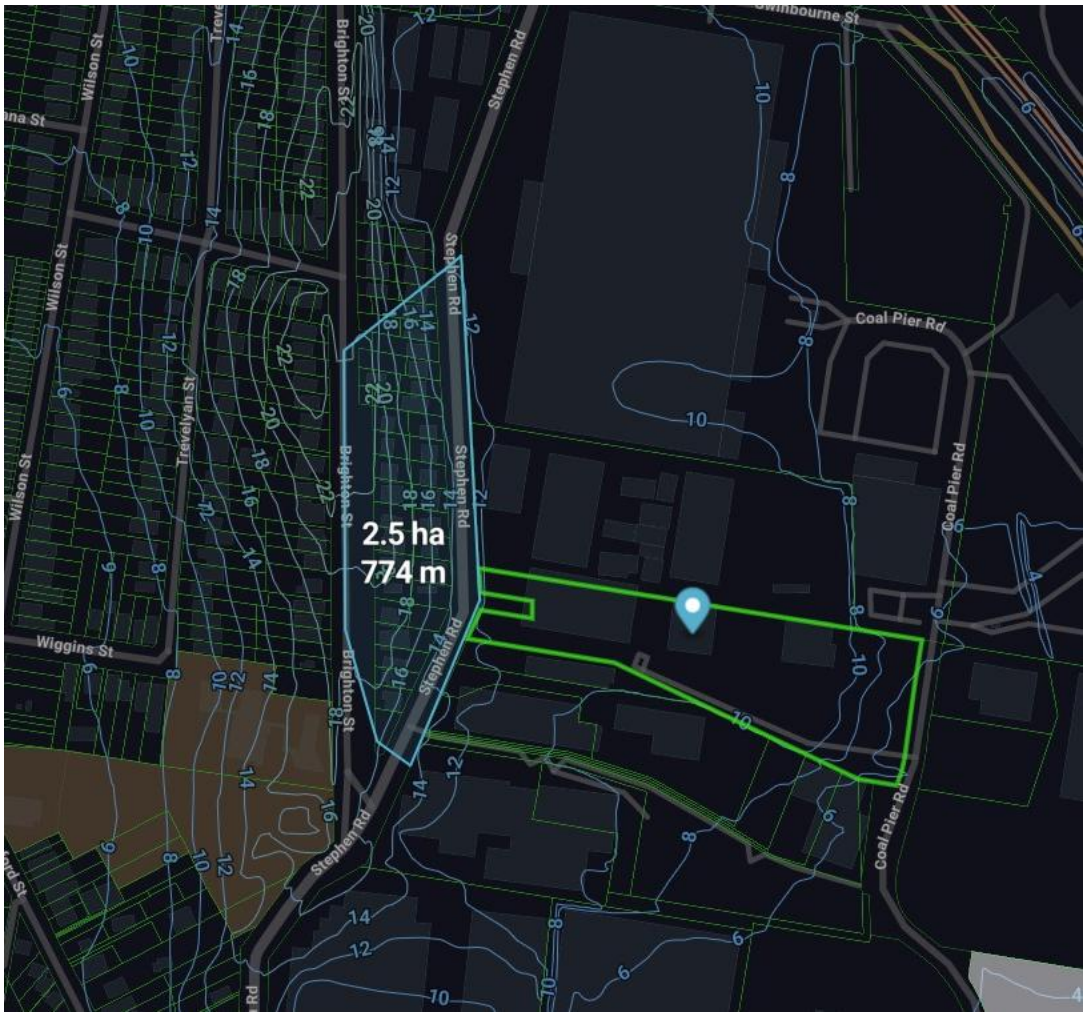


Figure 7.7. Upstream Catchment

This catchment is proposed to be managed by an inground drainage system, associated easement and inground drainage system. The capacity has been assessed for the 1% AEP and an allowance for an emergency overland flow path has also been made. As part of the SEAR's requirements, a detailed assessment of the pre and post development conditions for the 5% and 1% AEP storm events for the relocated pipe and easement is required. Further than the overland flow from the upstream catchment is able to be conveyed through the site without affection of upstream, downstream or adjacent properties in the 1% AEP.

We note that the existing site comprises of mainly impervious areas and provides an overland flow channel and inground drainage which conveys overland flow from upstream catchments into Coal Pier Road. The proposed development does not significantly increase the total impervious areas and retains the existing overland flow path. The council drainage along the southern boundary has been relocated for provision of retaining walls along the Southern boundary, approximately 0.5m higher than road levels to safely convey overland flows without affecting downstream developments or operation of the site. As such, there will be no significant increase in peak runoff from pre- to post-development. This has been confirmed via DRAINS modelling and shown in drawing **CO14950.01-SSDA400 & SSDA420**.

7.5 Costin Roe Consulting Modelling

7.5.1 Introduction

A detailed site specific TUFLOW model of the pre and post development conditions has been completed by Costin Roe Consulting. The assessment being completed with consideration to Bayside Council policy and the *NSW Floodplain Development Manual*. Technical parameters and detail included in the TUFLOW model are included as **Appendix I.**

The pre-developed model has been prepared utilising the Springvale Drain and Floodvale Drain Catchment Flood Model completed by BMT WBM in 2014 and provided by Bayside Council. Post development modelling has been completed with the introduction of the proposed development. It should be noted that minor variations are expected due to factors such as inclusion of detailed site drainage as identified by survey and adjustment of modelling surfaces and material.

The changes to the pre-development flood modelling are:

- Introduction of detailed site survey
- Blockouts of surrounding buildings and existing on site buildings
- Existing basins shown as filled
- Inclusion of council's stormwater network
- HPC solution scheme and GPU Hardware
- Neighbouring drainage where surveyed

Pre-Development 1% AEP

Reference to **Figure 7.7** shows the pre-developed 1% AEP output for depth and levels. **Figure 7.8** shows velocity and **Figure 7.9** show true hazard categorisation.

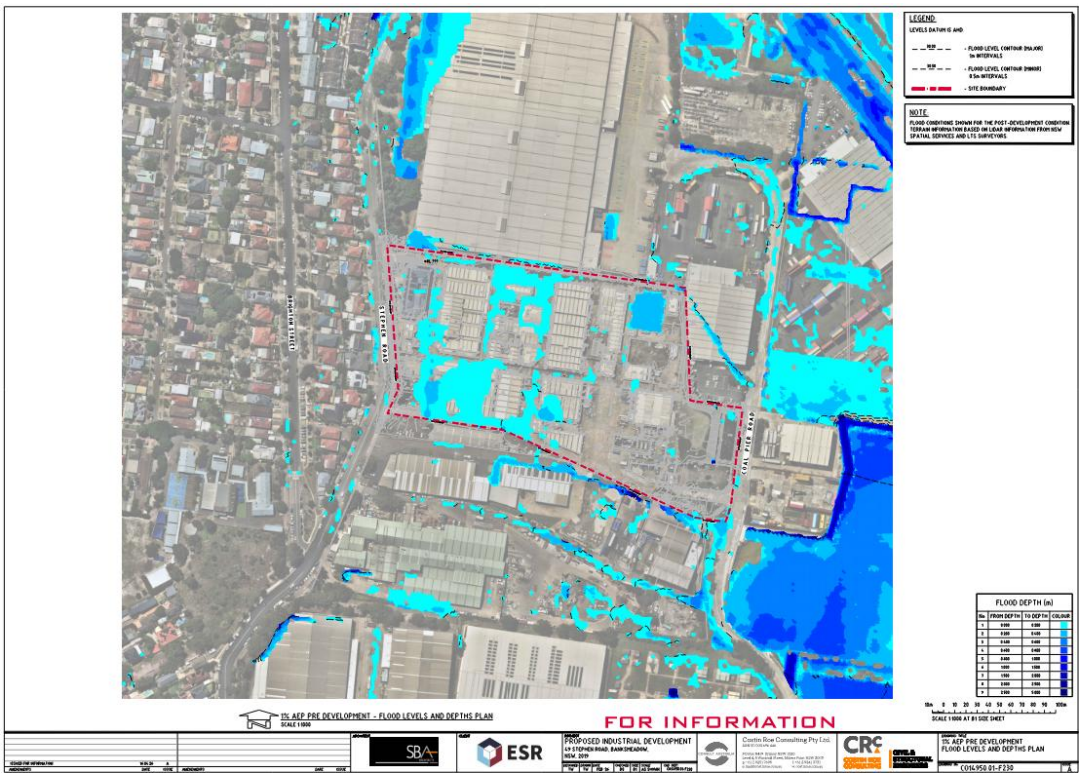


Figure 7.7: 1% AEP Pre-developed Level and Depth Output

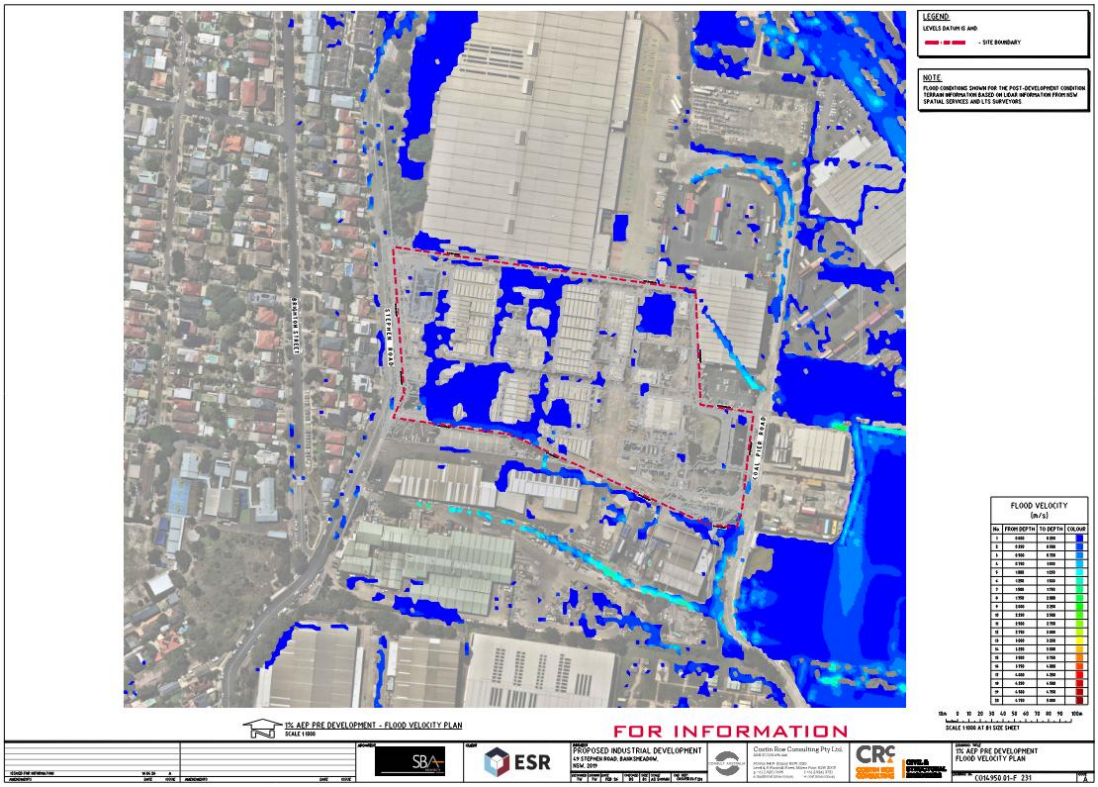


Figure 7.8: 1% AEP Pre-developed Velocity

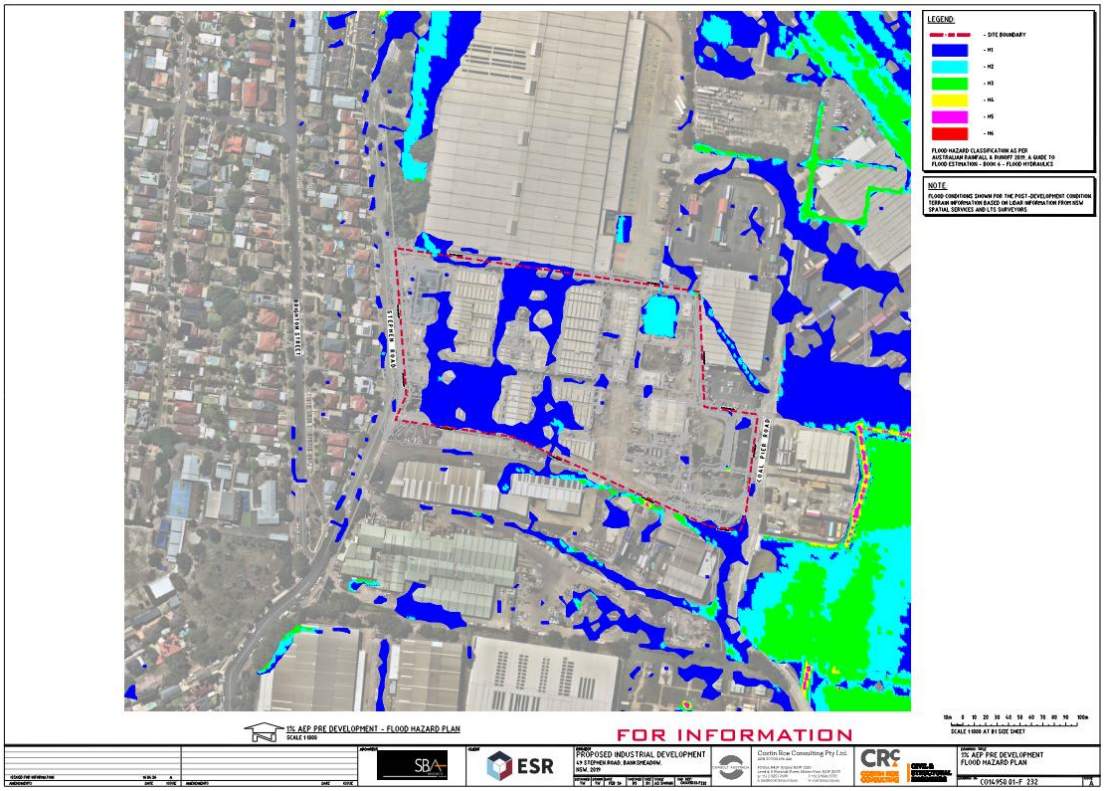


Figure 7.9: 1% AEP Pre-developed Flood Hazard Categorisation

Post-Development 1% AEP

Reference to **Figure 7.10** shows the post-developed 1% AEP output for depth and levels. **Figure 7.11** shows velocity and **Figure 7.12** show true hazard categorisation.

The changes to the post-development flood modelling are:

- Detailed site survey
- Blockouts of surrounding buildings and proposed on site buildings
- Private on site drainage and council stormwater network captured as per survey
- HPC solution scheme and GPU Hardware
- Neighbouring drainage where surveyed

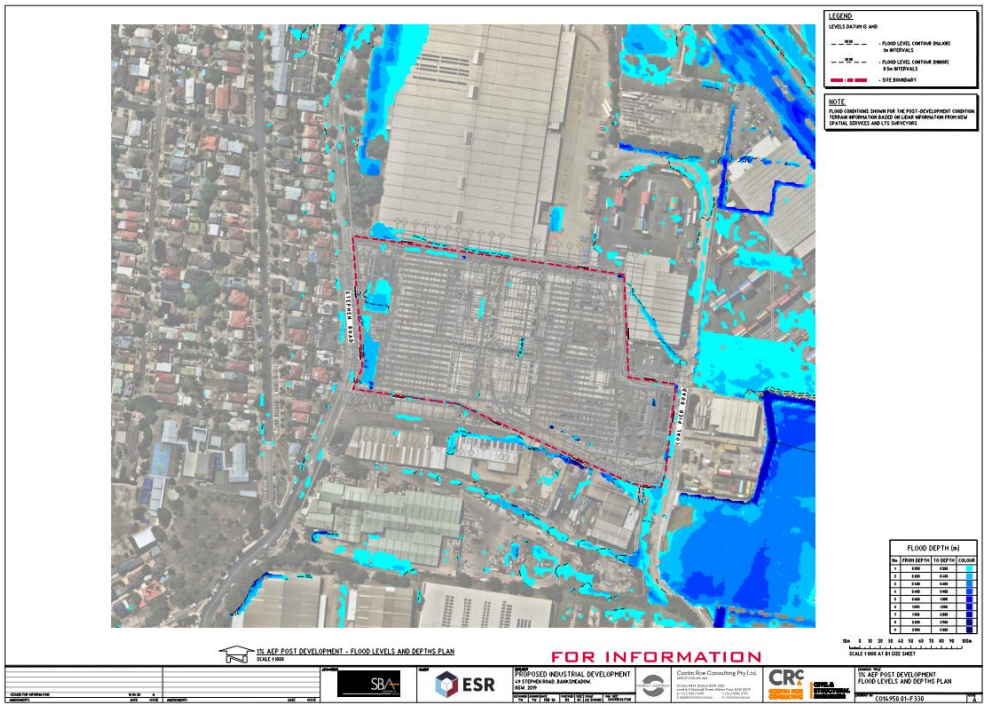


Figure 7.10: 1% AEP Post-developed Level and Depth Output

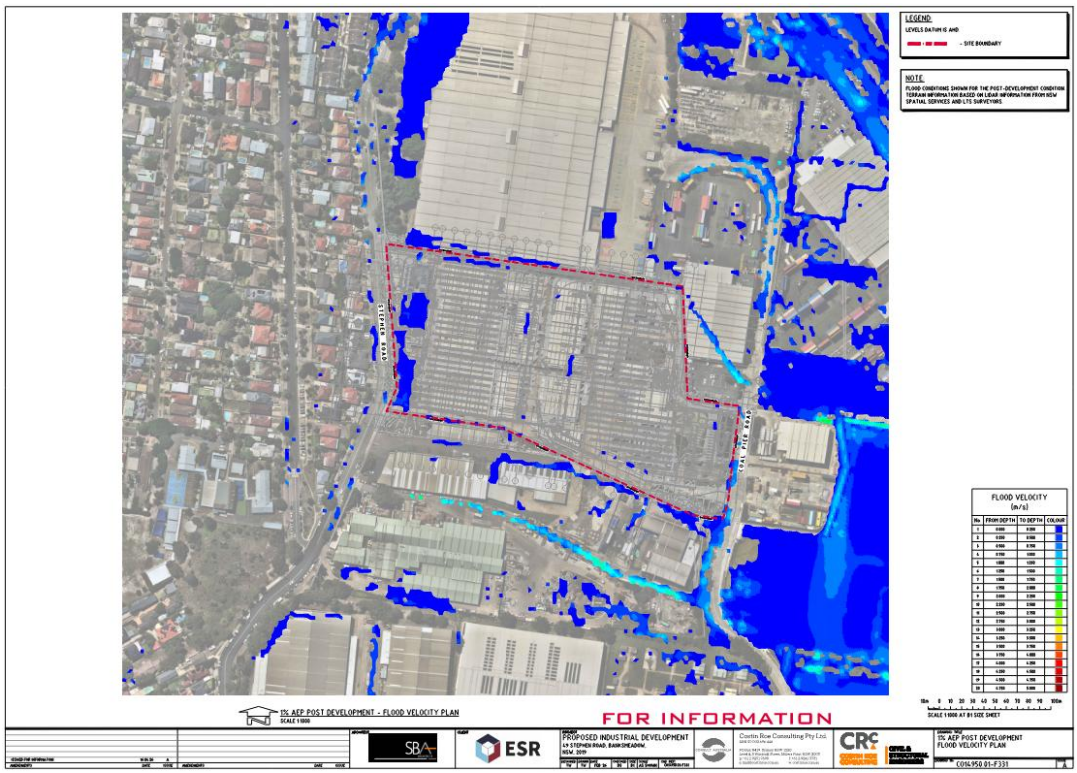


Figure 7.11: 1% AEP Post-developed Velocity

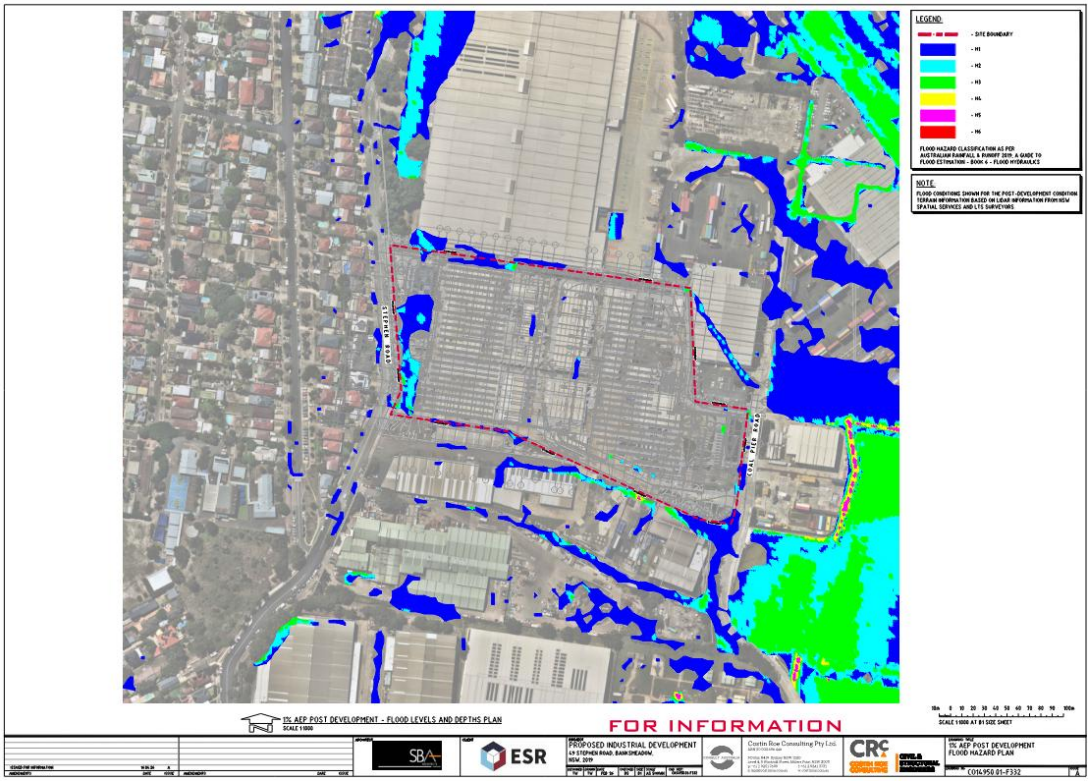


Figure 7.12: 1% AEP Post-developed Flood Hazard Categorisation

1% AEP Comparison

Figure 7.13 shows the 1% AEP flood level afflux (flood level difference) and **Figure 7.14** shows the 1% AEP velocity afflux, associated with the development.

The output for the 1% AEP storm event shows that:

- There is no upstream change to flood levels for any of the flow paths which enter the site;
- Flows within the site are able to be conveyed to Coal Pier Road through the proposed flood conveyance structures;
- Minor afflux is experienced around the site boundary. We note this is likely a function of the flood modelling software and has no impacts upstream or downstream of the site.

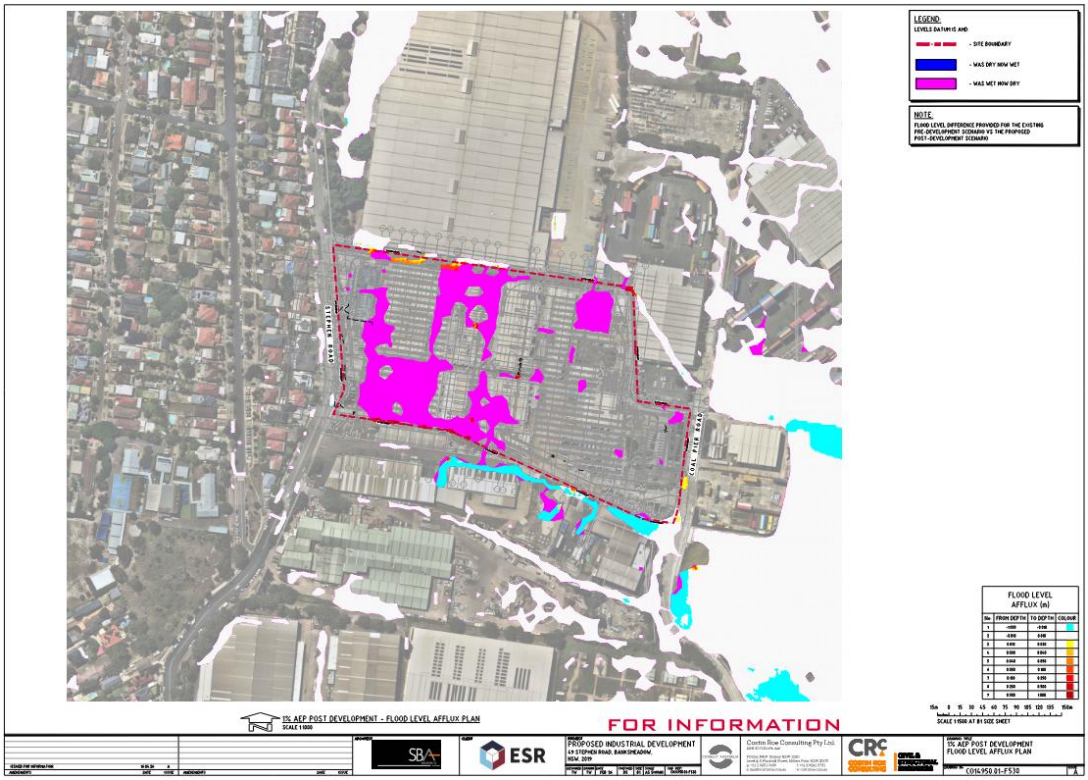


Figure 7.13: 1% AEP Post Developed Flood Level Afflux

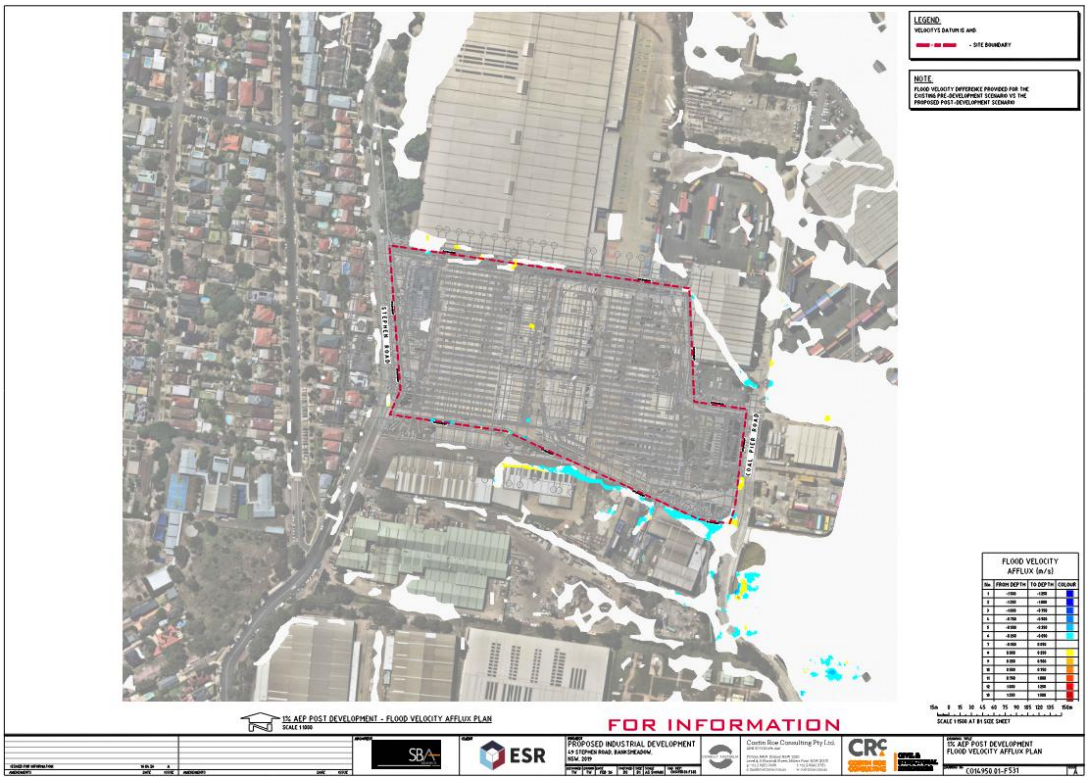


Figure 7.14: 1% AEP Post Developed Flood Velocity Afflux

Pre-Development PMF

Reference to **Figure 7.15** shows the pre-developed PMF output for depth and levels. **Figure 7.16** show true hazard categorisation.

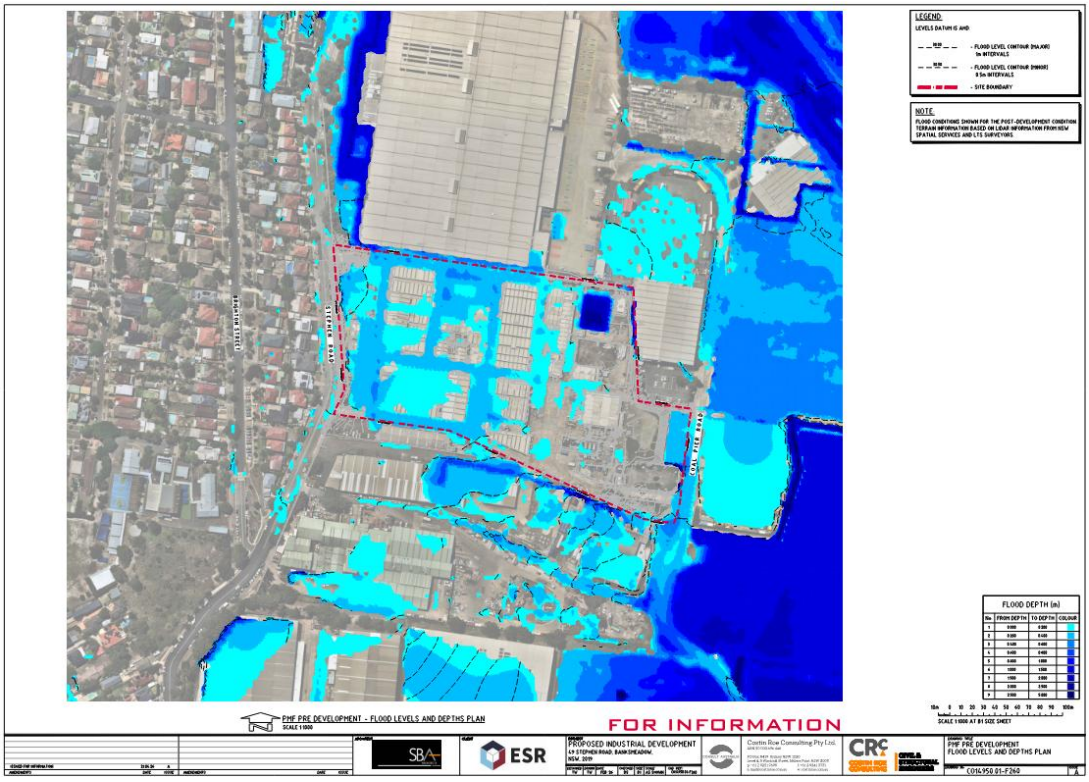


Figure 7.15: PMF Pre-developed Level and Depth Output

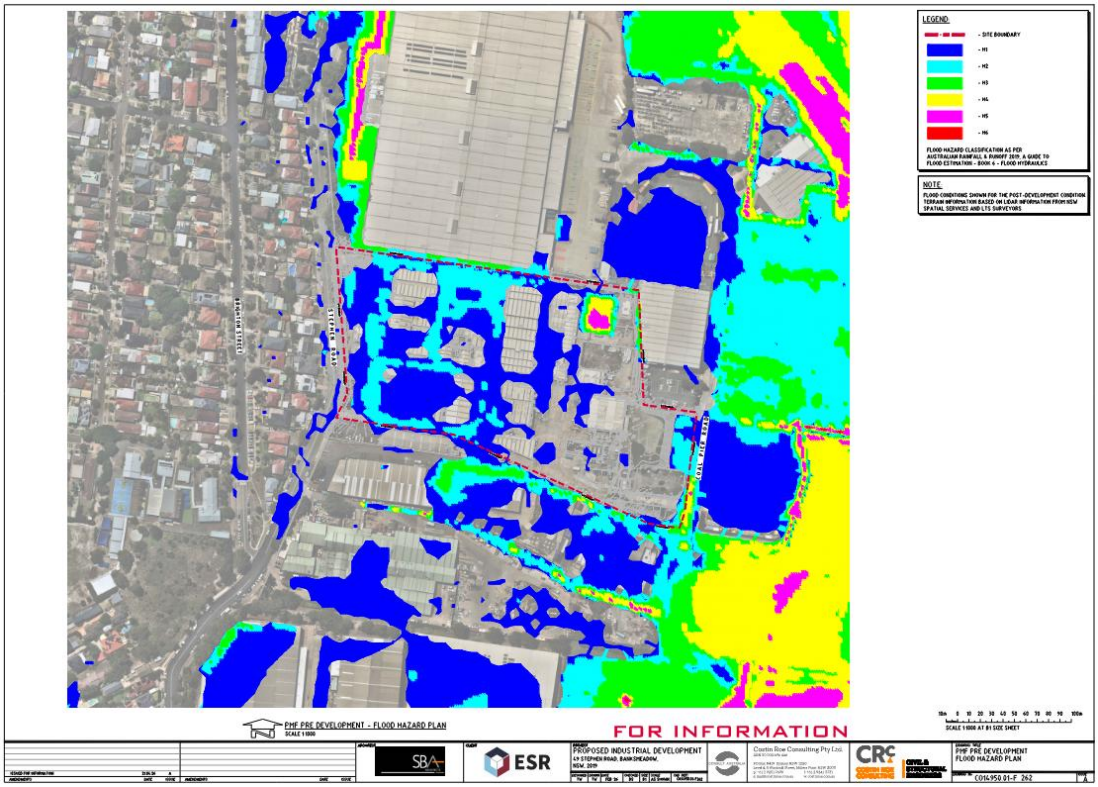


Figure 7.16: PMF Pre-developed Flood Hazard Categorisation

Post-Development PMF

Reference to **Figure 7.17** shows the pre-developed PMF output for depth and levels. **Figure 7.18** show true hazard categorisation.

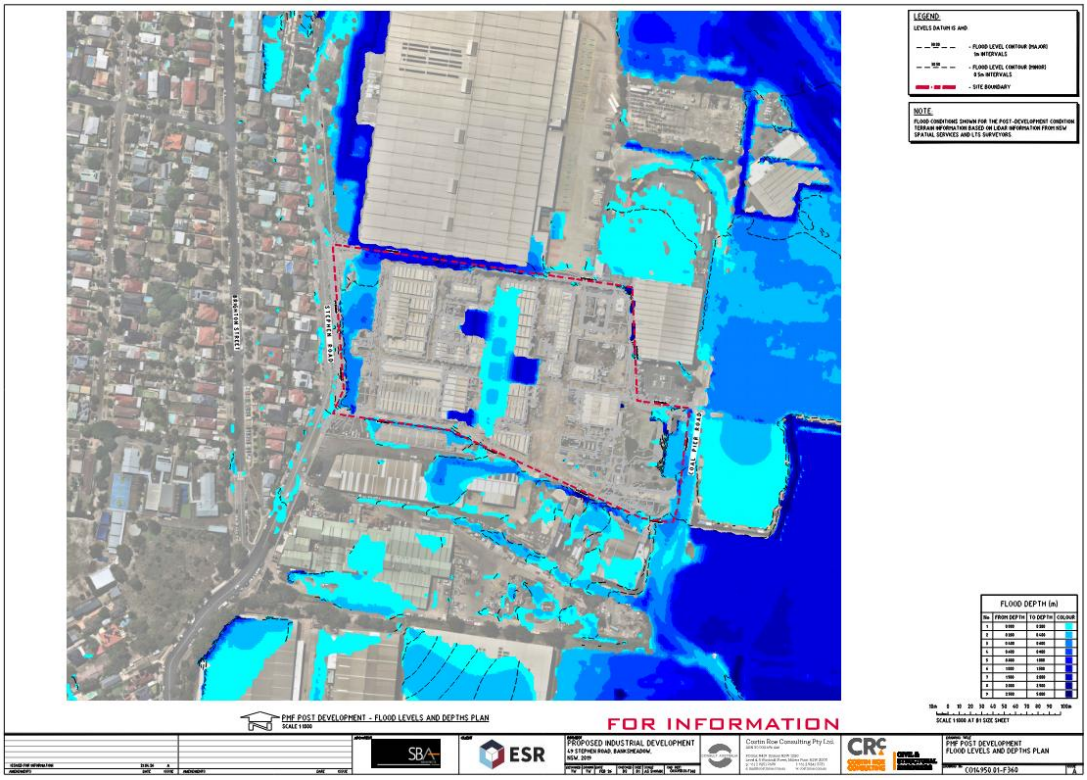


Figure 7.17: PMF Post-developed Level and Depth Output

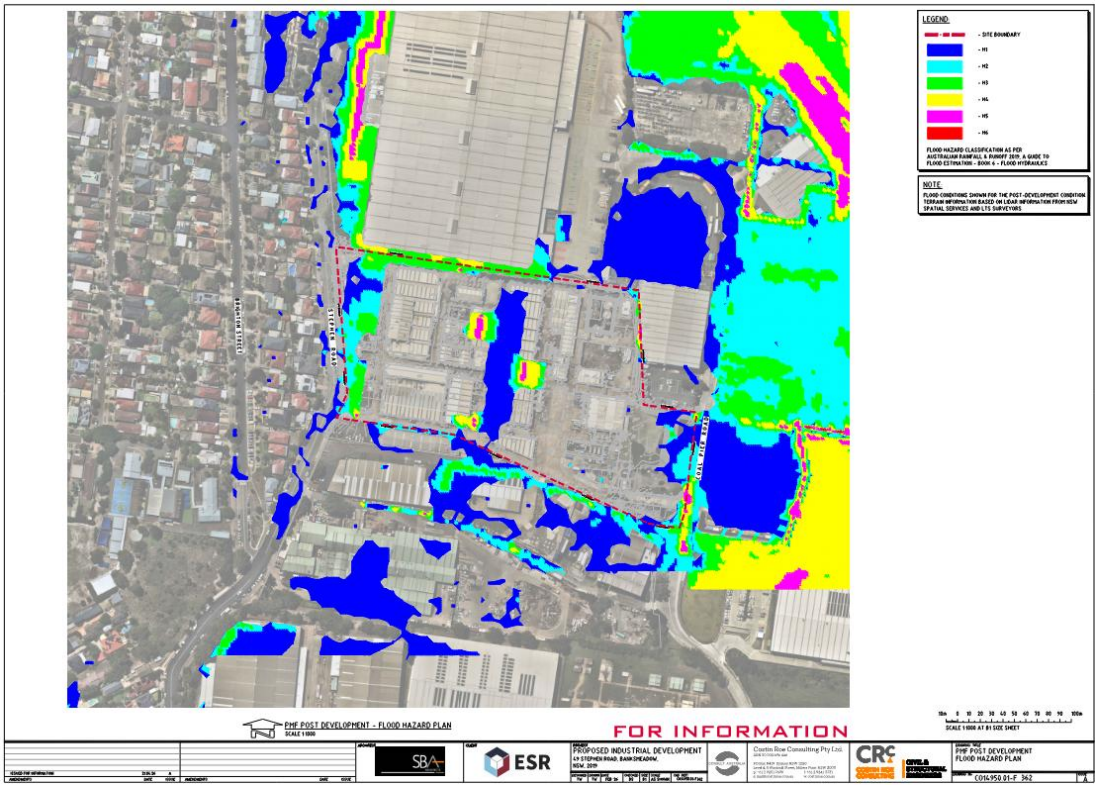


Figure 7.18: PMF Post-developed Flood Hazard Categorisation

Post-Development PMF

Figure 7.19 shows the PMF flood level afflux (flood level difference) associated with the development.

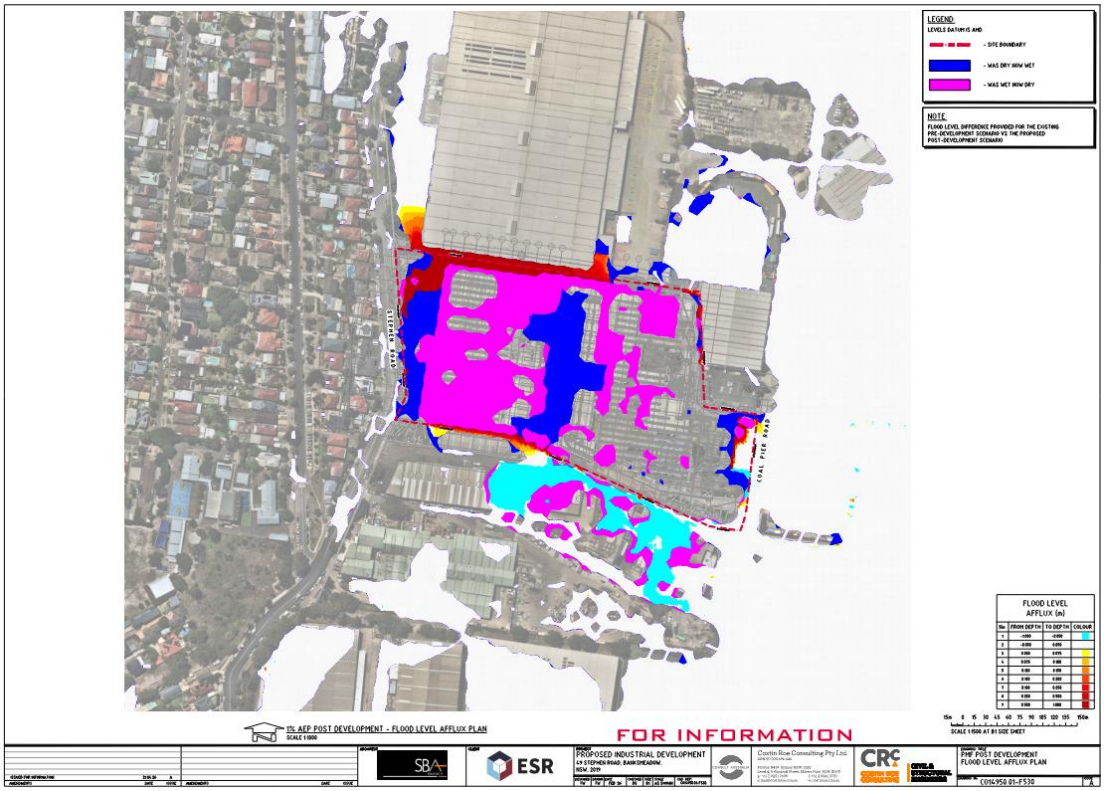


Figure 7.19: PMF Post-developed Flood Level Afflux

7.5.2 Climate Change Consideration

Additional flood modelling has been completed to simulate the effects of climate change on flood conditions. The approach used was to simulate increased rainfall that is associated with climate change by increasing the rainfall intensity by 30% and adding a 0.4m Sea Level Rise in the downstream tailwater conditions. Refer to flood plans in **Appendix H.**

7.5.3 Flood Modelling Discussion

It is noted that the precinct is affected by Pluvial flooding (being flood caused by inadequate urban drainage capacity) or flash-flooding.

The results of the Costin Roe flood study support the conclusion from **Section 7.3.8** – that the flooding shown on the development in the Costin Roe model is a result of the rain-on-grid modelling approach, and that the omission of internal drainage results in trapped low points that are unable to drain by conventional means. The results of the modelling demonstrate that inclusion of the site drainage in the pre-development modelling significantly reduces the flooding experienced on site, and that the site is not flood affected in storms up to the 1% AEP.

It should be noted that in all modelling scenarios, the Council drainage infrastructure in Coal Pier Road and beyond has been modelled per the Council GIS map with an appropriate tailwater constraint. The flood modelling indicates that the local stormwater network is capable of conveying flows to the Floodvale Drain and is not unreasonably overloaded to the extent that the site cannot drain under normal operation – The modelling from both CRC & WBM/BMT concur in this regard.

The modelling also demonstrates that the site will not result in any significant increase in flooding on neighbouring sites nor the sites serviced by the Council pipeline. The resultant ponding observed on site in the pre-development condition will be reasonably catered for with the proposed site drainage.

There is minor afflux observed at the site boundaries during the 1% AEP storm event however this is understood to be a modelling anomaly resulting from a trapped low point in the DTM surface that is not located over a drainage pit.

In the PMF storm, which is generally used as a bookend scenario for the worst possible flooding event, the development and surrounding properties are inundated. The flood model has been set up to show buildings as blockouts, which are not capable of displaying flooding. It should be noted that in the PMF storm, it is expected that these buildings will be flood affected. There is afflux shown as a result of meshing differences between the detailed survey and council's digital elevation model and the lack of neighbouring drainage data that would eliminate the flooding through the trapped low points adjacent to the buildings.

7.6 Floodplain Management Considerations

7.6.1 Flood Planning Level

The introduction of a Flood Planning Level (FPL) is an important flood risk management measure. FPLs are derived from a combination of a designated flood event, which can either be a historic flood or a design flood of a certain recurrence interval, plus a nominated freeboard depth.

The *NSW Floodplain Development Manual, 2005* recommends that the FPL generally be based on the 100-year ARI event. It suggests that, whilst this event can be varied, it should only be done in exceptional circumstances. It is considered appropriate to adopt the 1% AEP event for the proposed industrial development.

The freeboard component of an FPL is the difference between the flood level that the level is based upon and the FPL itself. Freeboard is designed to provide reasonable certainty that the reduced risk exposure provided by the chosen FPL is warranted, taking into account factors such as:

- Uncertainties in the estimate of flood levels;
- Differences in water levels across the floodplain;
- Wave action resulting from wind and vehicular/marine traffic during the flood event;
- Changes in rainfall patterns due to climate change;
- The cumulative effect of subsequent infill development on existing zoned land.

The *Floodplain Development Manual* recommends a freeboard of 0.5m for most new industrial developments and it is considered appropriate that this recommended freeboard be for adopted for the proposed development. Spot levels of the flood RL have been taken in the post-development flood model to determine the adequacy of the adopted floor level as shown below in **Figure 7.20** and **Table 7.1.**

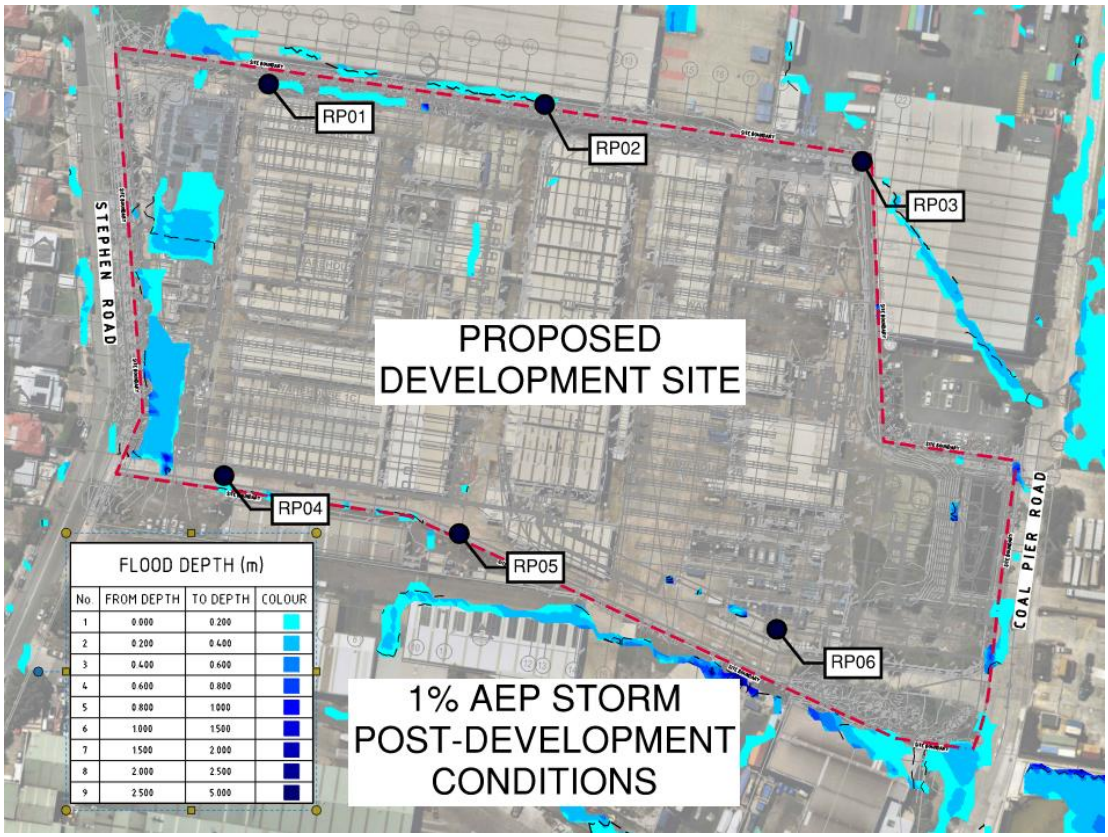


Figure 7.20: Reporting Point Location for 1% AEP Post Developed Flood Event

Table 7.1 – Reporting Point Flood Heights

Reporting Point	1 % RL AHD (m)	PMF RL AHD (m)
RP01	10.16	11.17
RP02	9.97	10.78
RP03	7.57	8.79
RP04	10.56	10.60
RP05	10.36	10.5
RP06	7.20	7.31

The highest recorded flood height is at RL 10.56m AHD, and is compliant with the floor level of RL 11.90 AHD.

The FPL defined in the *Floodplain Development Manual* is noted to be consistent with that of Bayside Council.

7.6.2 Hydraulic and Hazard Categorisation

Floodwaters can vary significantly, both in time and place across the floodplain. They can flow fast and deep at some locations and slow and shallow at other locations. This can result in large variations to the personal danger and physical property damage resulting from the flood.

The Floodplain Development Manual recognises three hydraulic categories of flood prone land, these being floodway, flood storage and flood fringe. These are then further separated into two hazard categories, high hazard and low hazard.

Floodways

Floodways are those areas where a significant volume of water flows during floods and are often aligned with natural channels. They are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, which could adversely affect other areas. They can also be areas with deeper and higher velocity flow.

Flood Storage

Flood storage areas are the parts of the floodplain that provide temporary storage for floodwaters during the passage of a flood. If a reduction in the flood storage area is experienced due to the filling of land or construction of a levee bank, it can result in adverse effects on the flood levels and peak flow rates in other areas.

Flood Fringe

Flood fringe areas are the remaining area of land affected by flooding. The development of flood fringe land does not generally have any major impact on the pattern of flood flows and/or levels.

The preparation of a flood study is almost always required in the determination of hydraulic categories. This is so that peak depths, velocities and the extent of flooding can be determined across the catchment.

Hazard Categories

Flood hazard categories are broken down into high and low hazard for each hydraulic category. High hazard areas are defined as those where there is a possible danger to personal safety and the potential for significant structural damage. Able-bodied adults would have difficulty in wading to safety. With low hazard areas, should it be necessary, a truck could evacuate people and their possessions, and able-bodied adults would have little difficulty in wading to safety.

Flood hazard criteria within the site has been defined as H1 in relation to the overland flow path on site.

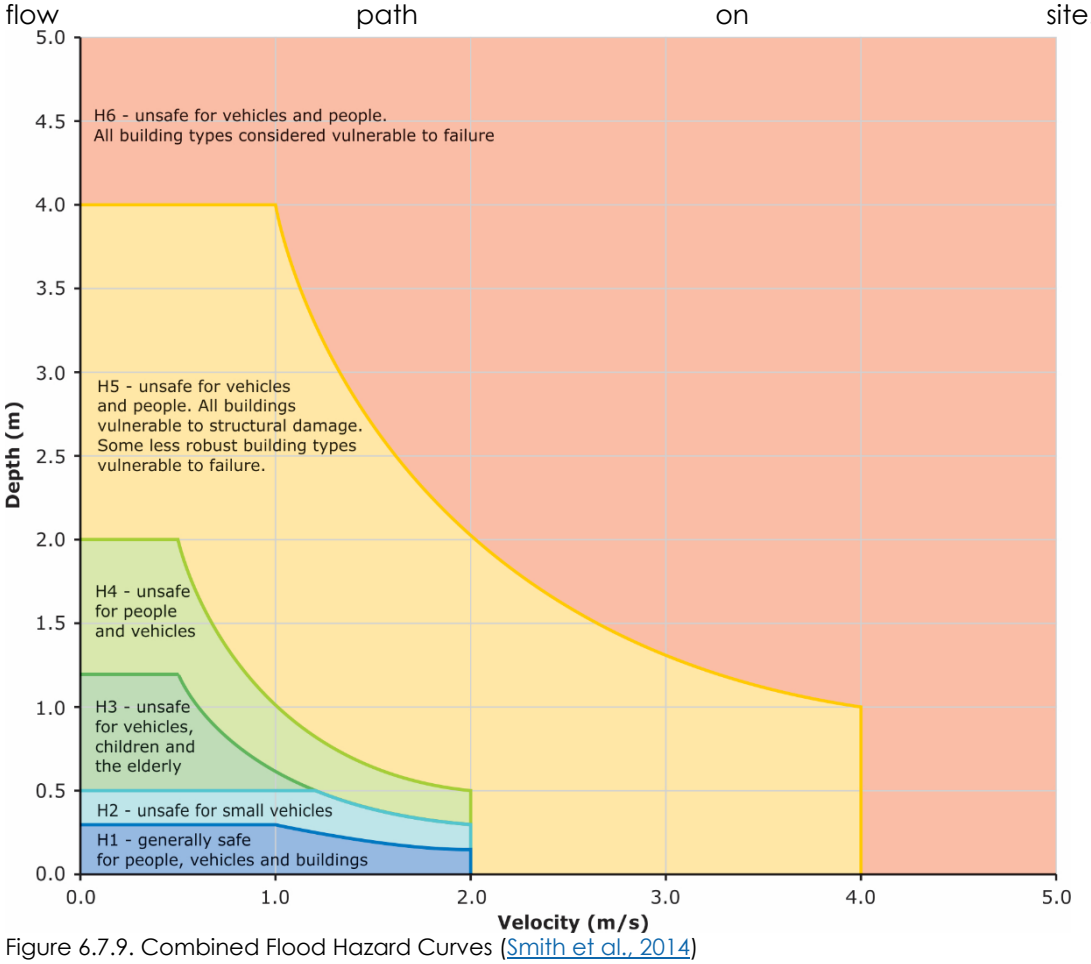


Figure 6.7.9. Combined Flood Hazard Curves (Smith et al., 2014)

Table 6.7.3. Combined Hazard Curves - Vulnerability Thresholds (Smith et al., 2014)

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

Table 6.7.4. Combined Hazard Curves - Vulnerability Thresholds Classification Limits (Smith et al., 2014)

Hazard Vulnerability Classification	Classification Limit (D and V in combination)	Limiting Still Water Depth (D)	Limiting Velocity (V)
H1	D*V ≤ 0.3	0.3	2.0
H2	D*V ≤ 0.6	0.5	2.0
H3	D*V ≤ 0.6	1.2	2.0
H4	D*V ≤ 1.0	2.0	2.0
H5	D*V ≤ 4.0	4.0	4.0
H6	D*V > 4.0	-	-

Figure 7.14. Adopted Hazard Criteria and Provisional Flood Hazard Chart (Australian Rainfall and Runoff 2019)

7.6.3 Flood Damages

Damage caused by floods is generally categorised as either tangible or intangible. Tangible damages are financial in nature and can be readily measured in monetary terms. They include direct damages such as damage or loss caused by floodwaters wetting goods and property, and indirect damages such as lost wages incurred during clean-up periods after the flood event. Intangible damage includes emotional stress and even mental and physical illness caused by the flood. It is difficult, if not impossible to quantify intangible damages in financial terms.

From a flood planning perspective, it is important to consider the following direct damage categories:

- Contents Damage – refers to damage to the contents of buildings, including carpets and furniture etc.;
- Structural Damage – refers to damage to the structural fabric of buildings, such as foundations, walls floors, windows, and built-in fittings; and
- External Damage – includes damage to all items external to buildings, including cars, landscaping etc.

As there is no way to prevent a flood from occurring, and it is unrealistic to exclude all development within flood-prone areas, the intent of establishing a FPL is to minimise the risk of direct damage when a flood occurs. By minimising the direct damage, there is a carry-on effect, whereby other associated indirect tangible damages and intangible damages are also minimised.

7.6.4 Emergency Response Planning

Flood planning refers to the preparation of a formal community-based plan of action to deal with the threat, onset and aftermath of flooding. It involves planning for an event equal to, or greater than the event used to derive the FPL.

The plan of action should include an on-site response plan that addresses what measures should be undertaken once the threat of a flood is determined to be imminent. A flood evacuation strategy should also be included so that all persons within the precinct are familiar with the processes required if a flood occurs.

7.7 Confirmation of Floodplain Management Requirements & Development Strategy

Council's Floodplain Management Policy provides relevant policy requirements relating to development in and around identified flood affected development sites.

The intent of the document is to ensure that new developments do not experience undue flood risk and that existing development is not adversely flood affected through increased damage or hazard as a result of new development.

The flood planning level (FPL) for business/ industrial to be at or above the 1% AEP (1 in 100-year ARI) flood level plus 0.5m freeboard as noted in **Section 7.5**. It is noted per the council flood letter (Reference: **FA – 2024/211**) An FPL for this development is not relevant noting the flooding shown in councils flood letter is associated with surface water runoff that will be managed within the new stormwater system.

The PMF or extreme event provides an upper limit of flooding and associated consequences for the problem being investigated. It is used for emergency response planning purposes to address the safety of people.

Overall flood risk for the development and from the development is considered low to negligible. Therefore, the development meets current council flood policy.

7.8 Flood Assessment Conclusion

A review of available flood study extracts, Council's Flood Advice Letter and site specific flood modelling has been made to determine flood behaviours in relation to the proposal.

Review of the available information, including council's adopted flood study, shows the site is classified as a low flood hazard site during the 1% AEP flood event. The site is affected by an upstream catchment that requires conveyance of local runoff from Stephen Road to Coal Pier Road via a relocated inter-allotment drain.

Safe refuge is not required, however is available on the site for users during an extreme flood event if surrounding areas downstream of the site (around the Springvale and Floodvale drains). The existing inter-allotment drainage path and easement between Stephen Road and Coal Pier Road has been maintained and provisions for a H1 Hazard Categorization.

Based on the assessment and management strategy proposed, the development meets current council flood policy and shows acceptable impacts in relation to flooding and flood safety.

8 CONSTRUCTION SOIL AND WATER MANAGEMENT

8.1 Soil and Water Management General

Without any mitigation measures and during typical construction activities, site runoff would be expected to convey a significant sediment load. A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP), or equivalent, would be implemented for the construction of the Proposal. The SWMP and ESCPs would be developed in accordance with the principles and requirements of Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book')(Landcom, 2004) with a staged approach.

In accordance with the principles included in the Blue Book, a number of controls have been incorporated into a preliminary ESCP (refer to accompanying Drawings in Appendix A) and draft SWMP in Appendix C. The ESCP considers initial site establishment, requirements during construction of the development, and completion of development works.

Section 1 provides a summary of the construction works for the Proposal. While all construction activities have the potential to impact on water quality, the key activities are:

- Erosion and sediment control installation.
- Grading of existing earthworks to suit building layout, drainage layout and pavements.
- Stormwater and drainage works.
- Service installation works.
- Building construction works.

The sections below outline the proposed controls for management of erosion and sedimentation during construction of the Proposal. The approach is noted to consider initial site establishment, construction of the development and the completion of the development, as included in the ESCP drawings **Appendix A**.

8.2 Typical Management Measures

Sediment Basins

Sediment basins have been sized (based on 5-days, 85th percentile rainfall) and located to ensure sediment concentrations in site runoff are within acceptable limits. Preliminary basin sizes have been calculated in accordance with the Blue Book and are based on 'Type D' soils. These soils contain a significant proportion of fine (<0.005mm) "dispersible" materials that will never settle unless flocculated.

Sediment basins for 'Type D' soils are typically wet basins which are pumped out following a rainfall event when suspended solids concentrations of less than 50 mg/L have been achieved.

Sediment Fences and Diversion Drains

Sediment fences and diversion drains are located along the northern, southern, and western boundary of the site to ensure no untreated runoff leaves the site. They have also been located around the proposed stockpiles on the site.

Stabilised Site Access

For the proposal, stabilised site access is proposed at one location at the entry to the works area. This will limit the risk of sediment being transported onto Stephen Road and Coal Pier Road and other public roads.

8.3 Other Management Measures

Other management measures that will be employed are expected to include:

- Minimising the extent of disturbed areas across the site at any one time.
- Progressive stabilisation of disturbed areas or previously completed earthworks to suit the proposal once trimming works are complete.
- Regular monitoring and implementation of remedial works to maintain the efficiency of all controls.

It is noted that the controls included in the preliminary ESCP are expected to be reviewed and updated as the design, staging and construction methodology is further developed for the Proposal.

9 CONCLUSION

This Civil Engineering Report has been prepared to support the State Significant Development Application for two two-storey warehouses at 49-61 Stephen Road, Banksmeadow.

A civil engineering strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed development layout. Within this strategy a stormwater quantity and quality management strategy has been developed to consider peak flows and reduce pollutant loads in stormwater leaving this site. The stormwater management for the development has been designed in accordance with Bayside Council and Sydney Water requirements and ensuring acceptable impacts relating to the development.

The hydrological assessment shows local post-development flows from the site will be consistent with pre-development flows and demonstrates that the site discharge will not adversely affect any land, drainage systems or watercourse as a result of the development.

During the construction phase, a Sediment and Erosion Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

During the operational phase of the development, a treatment train incorporating the use of pit filter baskets and proprietary filter cartridges is proposed to mitigate any increase in stormwater pollutant load generated by the development. MUSIC modelling results indicate that the proposed STM are effective in reducing pollutant loads in stormwater discharging from the site and meet the requirements of Council's pollution reduction targets. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental to the receiving environment.

It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

10 REFERENCES

- Bayside Council (2022). Botany Bay Development
- Bayside Council Flood Advice Certificate (FA-202/103)
- BMT (2014). Springvale Drain and Floodvale Drain Flood Study
- NSW Government (2023). *Flood Risk Development Manual*.
- Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);
- Managing Urban Stormwater: Source Control – 1998 (NSW EPA);
- Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);
- Landcom (2004). *Managing Urban Stormwater – Soils and Construction – 4th Edition*

11 APPENDICES

APPENDIX A

COSTIN ROE CONSULTING DRAWINGS

PROPOSED MULTI-LEVEL INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW 2019
STATE SIGNIGICANT DEVELOPMENT APPLICATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C014950.01-SSDA 100	DRAWING LIST & SITE LOCATION
C014950.01-SSDA 150	EXISTING SITE FEATURES & SERVICES
C014950.01-SSDA 200	EROSION AND SEDIMENT CONTROL PLAN
C014950.01-SSDA 251	EROSION AND SEDIMENT CONTROL DETAILS - SHEET 1
C014950.01-SSDA 252	EROSION AND SEDIMENT CONTROL DETAILS - SHEET 2
C014950.01-SSDA 300	BULK EARTHWORKS PLAN
C014950.01-SSDA 301	CUT/FILL PLAN
C014950.01-SSDA 351	BULK EARTHWORKS SECTIONS - SHEET 1
C014950.01-SSDA 352	BULK EARTHWORKS SECTIONS - SHEET 2
C014950.01-SSDA 400	STORMWATER DRAINAGE PLAN - GROUND FLOOR
C014950.01-SSDA 401	STORMWATER DRAINAGE PLAN - LEVEL 1
C014950.01-SSDA 420	EXISTING STORMWATER LINE - LONGITUDINAL SECTIONS
C014950.01-SSDA 421	COUNCIL STORMWATER LINE RELOCATION - LONGITUDINAL SECTIONS
C014950.01-SSDA 451	STORMWATER DRAINAGE DETAILS - SHEET 1
C014950.01-SSDA 452	STORMWATER DRAINAGE DETAILS - SHEET 2
C014950.01-SSDA 453	STORMWATER DRAINAGE DETAILS - SHEET 3
C014950.01-SSDA 460	OSD HYDRAULIC DETAILS - SHEET 1
C014950.01-SSDA 461	OSD HYDRAULIC DETAILS - SHEET 2
C014950.01-SSDA 480	MUSIC MODELING CATCHMENT PLAN
C014950.01-SSDA 481	STORAGE CATCHMENT PLAN
C014950.01-SSDA 500	FINISHED LEVELS PLAN - GROUND FLOOR
C014950.01-SSDA 501	FINISHED LEVELS PLAN - LEVEL 1
C014950.01-SSDA 551	TYPICAL SECTIONS - SHEET 1
C014950.01-SSDA 552	TYPICAL SECTIONS - SHEET 2
C014950.01-SSDA 553	TYPICAL SECTIONS - SHEET 3
C014950.01-SSDA 554	TYPICAL SECTIONS - SHEET 4
C014950.01-SSDA 555	TYPICAL SECTIONS - SHEET 5

GENERAL NOTES:

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
3. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE.
   ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
   ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT.
   REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.
4. DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
5. UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
6. ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.



LOCALITY PLAN
NTS

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	04.03.26	F
ISSUED FOR SSDA	19.12.25	E
ISSUED FOR SSDA	31.01.25	D
ISSUED FOR SSDA	09.12.24	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	12.06.26	I
ISSUED FOR SSDA	27.03.26	G

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA100

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: DRAWING LIST & GENERAL NOTES

DRAWING No: C014950.01-SSDA100

ISSUE: I

CONSTRUCTION OF NEW CROSSOVERS TO BE COORDINATED WITH EXISTING SERVICES.

EXISTING CONCRETE ENCASED SEWER. LOCATION TO BE CONFIRMED PRIOR TO CONSTRUCTION OF RETAINING WALLS ALONG NORTHERN BOUNDARY. APPLICANT TO COMPLETE ALL WORKS WITHIN THE ZOI OF THE SEWER IN ACCORDANCE WITH SYDNEY WATER REQUIREMENTS, AND ANY SPECIALIST ASSESSMENTS AS NECESSARY.

CONSTRUCTION OF NEW CROSSOVERS TO BE COORDINATED WITH EXISTING SERVICES.

EXISTING COUNCIL DRAINAGE TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION OF RETAINING WALLS ALONG SOUTHERN BOUNDARY

LEGEND:

- Bench Mark
- Comms Pit/Manhole
- Comms Pillar
- Drainage Manhole
- Drainage Grated Pit
- Drainage Kerb Inlet Pit
- Electrical Pit
- Electrical Power Pole
- Electrical Light Pole
- Miscellaneous Manhole
- Road Bollard
- Sewer Manhole
- Sign Post
- Tree (Canopy spread, trunk diameter,height) S:8 D:0.4 H:5
- Water Meter
- Water Stop Valve
- Water Hydrant
- Fire Hydrant

UNDERGROUND SERVICE LINES:

- SEWERMAIN
- WATERMAIN
- TELECOMMUNICATION LINE
- ELECTRICITY CABLES

(CLASSIFICATION SHOWN ON LINE AS PER UTILITY CLASSIFICATION TABLE)

EXISTING DRAINAGE EASEMENT

EXISTING SERVICES NOTES:

1. DURING THE EXECUTION OF WORKS, THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF EXISTING SERVICES. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED TO THE EXISTING SERVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE RELEVANT SERVICE AUTHORITY, AT NO COST TO THE PRINCIPAL.
2. WHERE IT IS NECESSARY TO REMOVE, DIVERT OR CUT INTO ANY EXISTING SERVICE, THE CONTRACTOR SHALL GIVE AT LEAST THREE (3) DAYS NOTICE OF ITS REQUIREMENTS TO THE SUPERINTENDENT, WHO WILL ADVISE WHAT ARRANGEMENTS SHOULD BE MADE FOR THE ALTERATION OF SUCH EXISTING WORKS.
3. EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA. THE ACCURACY IS NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORK. ALL CLEARANCES AND APPROVALS SHALL ALSO BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL NEW AND EXHUMED SERVICES THAT CROSS EXISTING AND FUTURE ROADS/PAVEMENTS WITHIN THE SITE SHALL BE BACKFILLED WITH DGB20 MATERIAL TO SUBGRADE LEVEL AND COMPACTED TO 98% STANDARD DENSITY RATIO. SUBJECT TO PRIOR APPROVAL FROM RELEVANT AUTHORITY.
5. ON COMPLETION OF SERVICES INSTALLATION. ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AREAS, GRASSED AREAS AND ROAD PAVEMENTS.
6. CARE TO BE TAKEN WHEN EXCAVATING NEAR UTILITY SERVICES. NO MECHANICAL EXCAVATION TO BE UNDERTAKEN OVER SERVICES. LIAISE WITH RELEVANT AUTHORITY.
7. THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL IF REQUIRED OF ALL EXISTING SERVICES IN AREAS AFFECTED BY THE WORKS WITHIN THE CONTRACT AREA AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT. ALL TO REGULATORY AUTHORITY STANDARDS AND APPROVAL.
8. THE CONTRACTOR IS TO MAINTAIN EXISTING STORMWATER DRAINAGE FLOWS THROUGH THE ROADS AT ALL TIMES. MAKE DUE ALLOWANCE FOR ALL SUCH FLOWS AT ALL TIMES.
9. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN THE SUPERINTENDENT'S APPROVAL OF THE PROGRAM FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
10. CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES AS REQUIRED TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
11. INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE OR DAMAGE TO THE ADJACENT RESIDENCES. CONTRACTOR TO GAIN APPROVAL OF THE SUPERINTENDENT FOR TIME OF INTERRUPTION.
12. THE CONTRACTOR SHALL UNDERTAKE A DIAL BEFORE YOU DIG (DBYD 1100) SERVICES SEARCH BEFORE THE COMMENCEMENT OF ANY WORKS.

EXISTING SITE FEATURES & SERVICES

SCALE 1:500

5m 0 10 20 30 40 50m

SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	E
ISSUED FOR INFORMATION	04.03.26	D
ISSUED FOR SSDA	19.12.25	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA150

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: EXISTING SITE FEATURES & SERVICES

DRAWING No: C014950.01-SSDA150 ISSUE: E

STABILISED CONSTRUCTION ENTRY. REFER TO DRAWING SSDA251 FOR DETAILS

EXISTING SEWER LINE

SITE BOUNDARY

SILT FENCE ONLY

1
251

NOMINAL STOCKPILE LOCATION

SITE BOUNDARY

STEPHEN ROAD

DENOTES APPROXIMATE OVERLAND FLOW DIRECTION TYPICAL

EXISTING COUNCIL DRAINAGE LINE TO REMAIN ACTIVE AND PROTECTED THROUGHOUT WORKS. ENSURE ALL SEDIMENT LADEN RUNOFF IS CLEAR OF THE DIVERTED AWAY FROM THE COUNCIL DRAINAGE SYSTEM

SITE BOUNDARY

DIVERSION DRAIN. REFER TO DRAWING SSDA251 FOR DETAILS

SITE BOUNDARY

CLEAN WATER PUMP OUT VIA EXISTING DISCHARGE OUTLET TO PROPOSED DISCHARGE POINT. T.B.C ON SITE.

EXISTING POND TO BE MODIFIED FOR PROVISION OF SEDIMENT BASIN TO EXTENT SHOWN

PROPOSED SEDIMENT BASIN. ALL DISTURBED WATER TO BE DIRECTED TO THE SEDIMENT BASIN FOR TREATMENT PRIOR TO DISCHARGE FROM SITE

COAL PIER ROAD

STABILISED CONSTRUCTION ENTRY. REFER TO DRAWING SSDA251 FOR DETAILS

1
251

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.
TYPICAL (N.S.O.P.)

- DENOTES DIVERSION DRAIN
- DENOTES EXISTING COUNCIL DRAINAGE LINE
- DENOTES EXISTING SEWER
- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES SILT FENCE ONLY
- DENOTES CONSTRUCTION ENTRY
- DENOTES OVERLAND FLOW PATH
- EXISTING DRAINAGE EASEMENT

EROSION CONTROL NOTES:

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200mm.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C014950.01-SSDA251 & SSDA252.
SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF LANDCOM "BLUE BOOK". CAPACITY BASED ON 5-DAY RAINFALL DEPTHS AT 85th PERCENTILE INTENSITY (38.8mm) IN THE CATCHMENT AREA.

APPROXIMATE AREA OF DISTURBED SITE = 4.82Ha

SEDIMENT BASIN:
CATCHMENT AREA = 4.82Ha
REQUIRED BASIN VOLUME = 1,800m³
BASE DIMENSIONS (L X W) = 50.0 x 25.0m
TOP DIMENSIONS (L X W) = 59.0 x 34.0m
MAX SIDE SLOPE = 1V:3H
DEPTH = 1.5m
PROVIDED BASIN VOLUME = 2,420m³

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

EROSION AND SEDIMENT CONTROL PLAN
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	E
ISSUED FOR INFORMATION	04.03.26	D
ISSUED FOR SSDA	19.12.25	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A

AMENDMENTS DATE ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA200

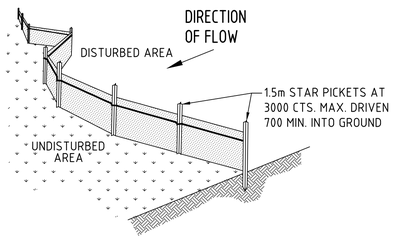
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN

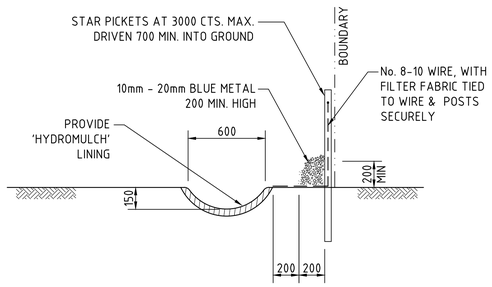
DRAWING No: C014950.01-SSDA200 ISSUE: E



TYPICAL SILT FENCE DETAIL

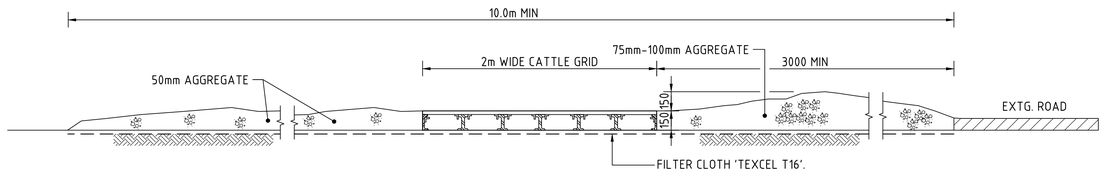
N.T.S

NOTE: PROVIDE 1m RETURNS AT 30m INTERVALS. TYPICAL

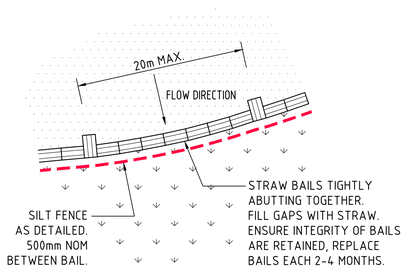


TYPICAL OPEN DRAIN & SILT FENCE

SCALE 1:20

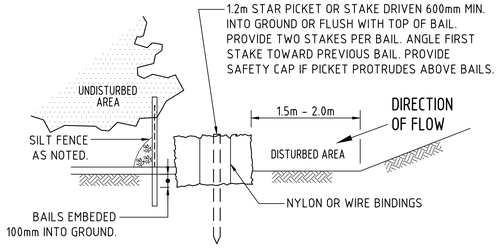


SECTION 1:20 1/200 : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'



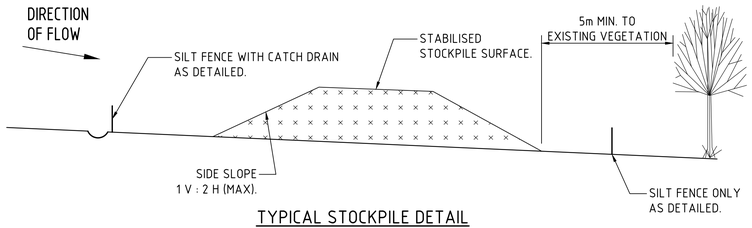
SILT FENCE WITH HAY BAIL PLAN

N.T.S



SILT FENCE WITH HAY BAIL DETAIL

N.T.S

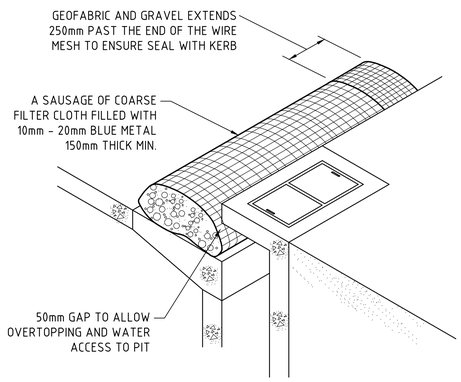


TYPICAL STOCKPILE DETAIL

N.T.S

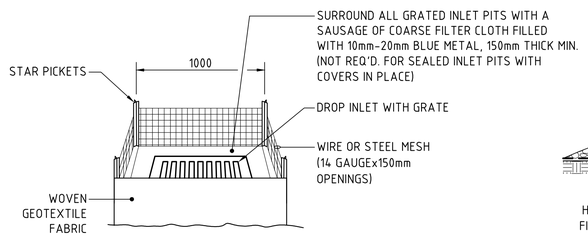
STOCKPILE NOTES

1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.



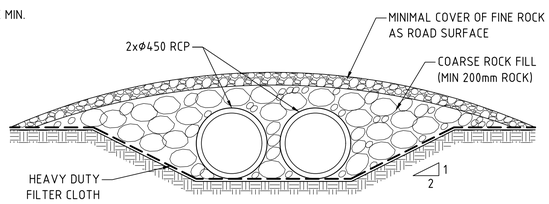
KERB INLET CONTROL

N.T.S



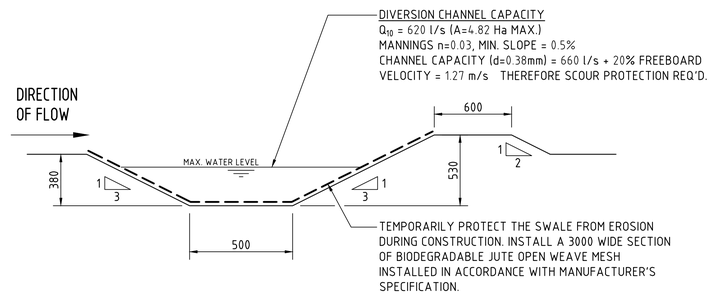
GRATED INLET PIT FILTER DETAIL

N.T.S



TYPICAL CROSSING OVER DIVERSION CHANNEL

SCALE 1:20



DIVERSION DRAIN SECTION

SCALE 1:20

NOTE :
ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	E
ISSUED FOR INFORMATION	04.03.26	D
ISSUED FOR SSDA	19.12.25	C
ISSUED FOR INFORMATION	18.10.24	B
PRELMINARY ONLY	08.10.24	A

AMENDMENTS DATE ISSUE

ARCHITECT SBA ARCHITECTS

CLIENT ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA 251

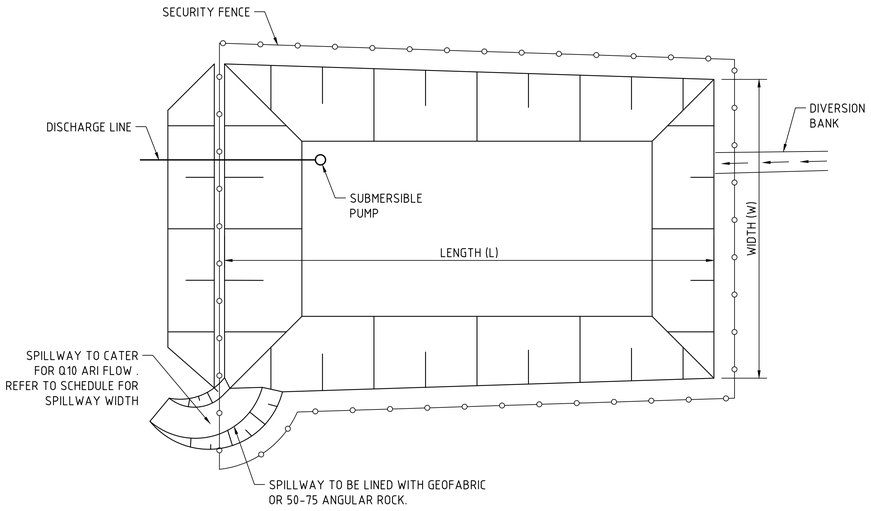
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

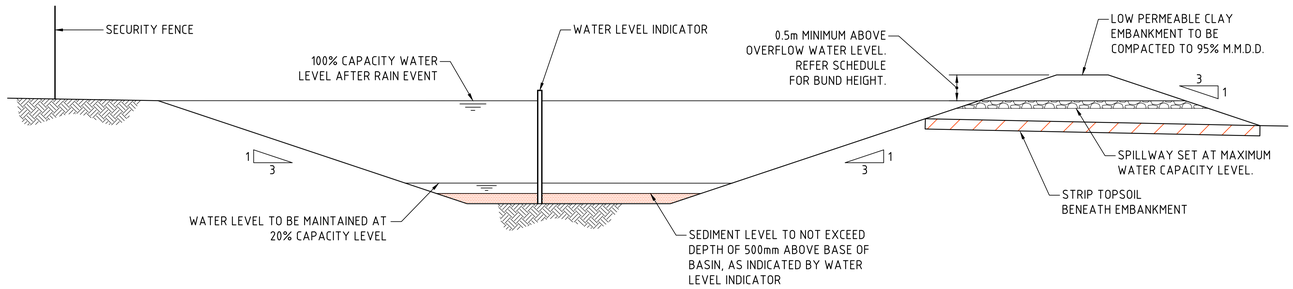
DRAWING TITLE
EROSION AND SEDIMENT CONTROL DETAILS SHEET 1

DRAWING No C014950.01-SSDA 251

ISSUE E

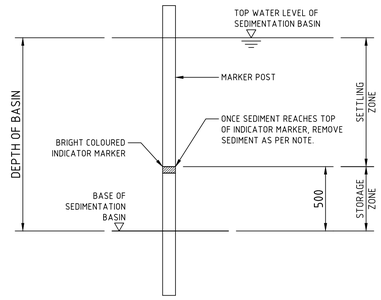


TYPICAL SEDIMENT CONTROL POND PLAN
SCALE 1:250



TYPICAL SEDIMENT CONTROL BASIN SECTION
SCALE 1:50

SPILLWAY DETAIL & SCHEDULE					
CATCHMENT (Ha)	FLOW (m^3/s)	WIDTH (mm)	FLOW DEPTH (mm)	ROCK SIZE (mm)	BUND HEIGHT ABOVE SPILLWAY (mm)
0.20	0.14	1000	200	–	600
0.5	0.2	2000	200	–	600
1	0.3	2000	200	–	700
2	0.6	4000	200	–	700
5	1.4	5000	300	200	800
10	2.8	8000	350	200	850



SEDIMENT STORAGE MARKER
SCALE 1:20

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

500mm 0 1 2 3 4 5m
SCALE 1:50 AT B1 SIZE SHEET

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	E
ISSUED FOR INFORMATION	04.03.26	D
ISSUED FOR SSDA	19.12.25	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A

AMENDMENTS DATE ISSUE

ARCHITECT SBA ARCHITECTS

CLIENT ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA252

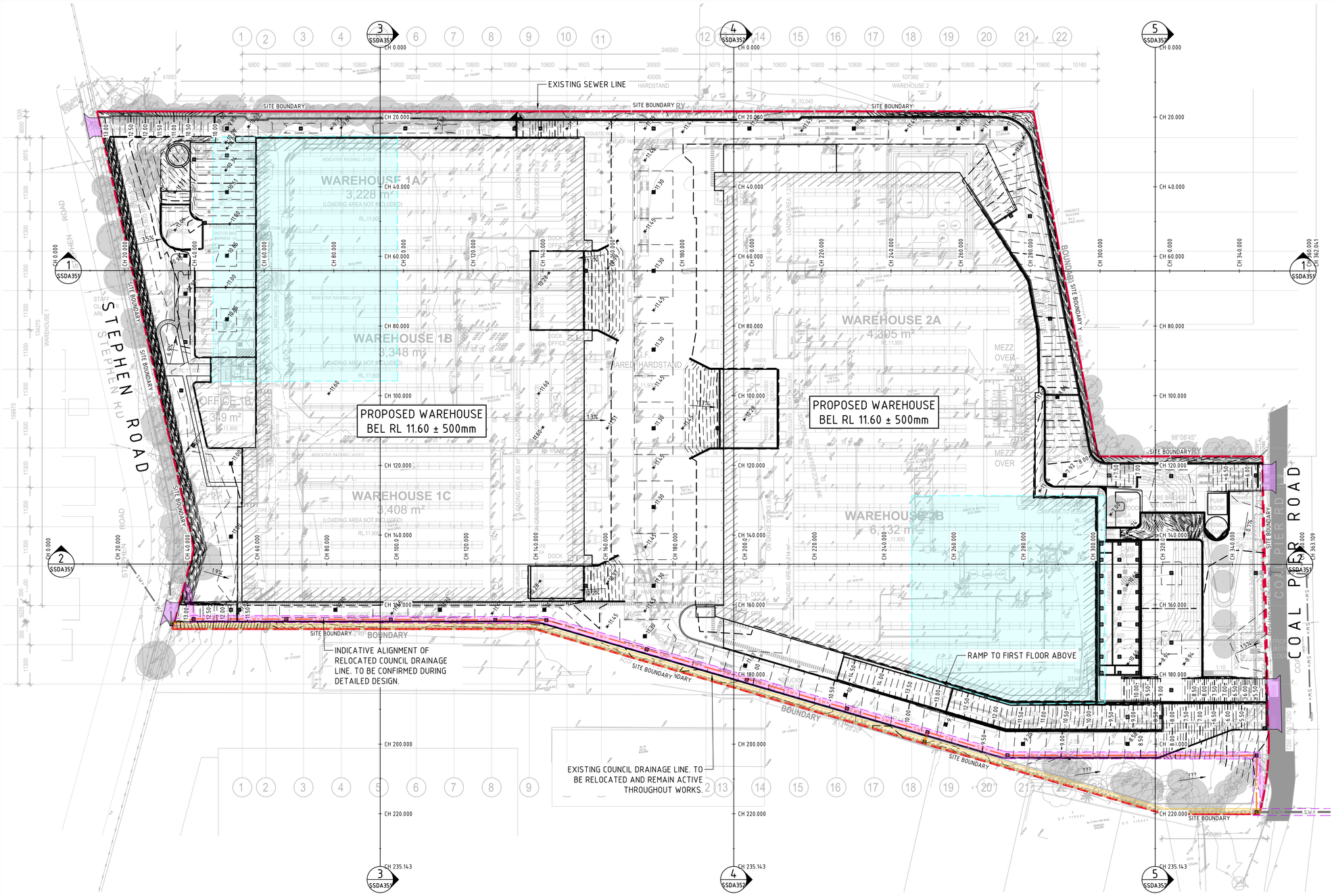
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
EROSION AND SEDIMENT CONTROL DETAILS SHEET 2

DRAWING No C014950.01-SSDA 252 ISSUE F



BULK EARTHWORKS PLAN
SCALE 1:500

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL REPORT 219609.02.R.001.Rev0 PROVIDED BY DOUGLAS PARTNERS DATED 21/12/23.
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY BEVERIDGE WILLIAMS TITLED 2201113_DET_REV A DATED 14/12/22.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED. TOPSOIL BLENDING IS NOT ACCEPTABLE. ANY BLENDING PROPOSAL IS TO BE REFERRED TO THE ENGINEER.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION. WHERE EXPOSED ROCK (WEATHERED SHALE OR SANDSTONE) IS ENCOUNTERED AT CUT SUBGRADE LEVEL, THE EARTHWORKS CONTRACTOR IS TO ALLOW TO RIP THE SURFACE TO A NOMINAL 0.3-0.4m DEPTH AND RECOMPACT (PER THE ENGINEERING SPEC) AS REQUIRED.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 mm SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 mm SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 mm SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION.
10. ALL EARTHWORKS SHALL BE COMPLETED UNDER LEVEL 1 CONTROL IN ACCORDANCE WITH AS 3798-2007.
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.
15. DURING EARTHWORKS THE CONTRACTOR IS TO ENSURE ALL AREAS ARE FREE DRAINING & WILL NOT RETAIN WATER DURING RAINFALL. PROVIDE TEMPORARY MEASURES AS REQUIRED TO ENSURE FREE FLOWING RUNOFF THROUGH MANAGED DRAINAGE PATHS, DIVERSION DRAINS OR OTHER SUITABLE DISPOSAL METHOD AS AGREED DURING THE WORKS. REFER ANY CONCERNS TO THE ENGINEER. REFER TO EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES.

EARTHWORK ESTIMATES

SITE AREA	= 4.82 Ha
TOPSOIL STRIP (200mm OVER 4.82 Ha)	=(-9,640m³) (TO BE EXPORTED)
CUT	= -1,700m³
FILL	= +77,200m³
ALLOWANCES	
DETAILED EXCAVATION (2,000m³/Ha)	= -9,640m³
OSD TANK	= -1,020m³
DIFFERENCE	= +75,500m³ (i.e. FILL OVER CUT)

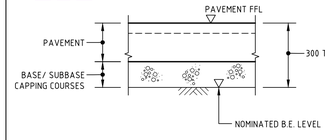
NOTE:
VOLUMES BASED ON 200mm SITE STRIP (INCLUDING EXISTING SLABS AND TOPSOIL).
EARTHWORKS VOLUMES ARE APPROXIMATE ONLY.
NO ALLOWANCE HAS BEEN MADE FOR DELETERIOUS MATERIAL, EROSION AND SEDIMENT CONTROL, BULKING OR COMPACTION OF FILLED SOILS, THE REMOVAL OF UNCONTROLLED OR CONTAMINATED MATERIAL OR ANY OTHER UNSPECIFIED EXCAVATION RELATED TO CONSTRUCTION ACTIVITIES. DETAILED EXCAVATION ALLOWANCE IS APPROXIMATE ONLY AND ACCOUNTS FOR STORMWATER/SERVICES TRENCHING AND FOUNDATIONS. THE DETAILED EXCAVATION VOLUMES ARE TO BE CONFIRMED BY THE CONTRACTOR. REFER ANY CONCERNS TO ENGINEER.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY BEVERIDGE WILLIAMS DATED 14.12.22.

- 50.00 — EXISTING CONTOUR (0.2m INTERVAL)
- 50.00 — B.E.L. CONTOUR (MAJOR 1.0m)
- 50.10 — B.E.L. CONTOUR (MINOR 0.25m)
- ×50.00 — B.E.L. SPOT LEVEL
- EXISTING DRAINAGE EASEMENT
- PROPOSED DRAINAGE EASEMENT



NOMINATED B.E.L. DETAIL
NTS

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

CONTAMINATION NOTE:

CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS SHALL BE MANAGED IN ACCORDANCE WITH THE CONTAMINATION MANAGEMENT PLAN, WHICH FORMS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN. A CAPPING LAYER CONSISTING OF CLEAN COMPACTED CLAY FILL (VENM ONLY) TO A MINIMUM DEPTH OF 1000mm IS TO BE PROVIDED OVER THE SITE SUBJECT TO ADVICE FROM ENVIRONMENTAL/CONTAMINATION SPECIALIST. CONTAMINATED MATERIAL CAN NOT BE REMOVED FOR OFF-SITE DISPOSAL.

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	04.03.26	F
ISSUED FOR SSDA	03.02.26	E
ISSUED FOR SSDA	31.01.25	D
ISSUED FOR SSDA	09.12.24	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A
ISSUED FOR SSDA	27.03.26	G

ARCHITECT: SBA ARCHITECTS
CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

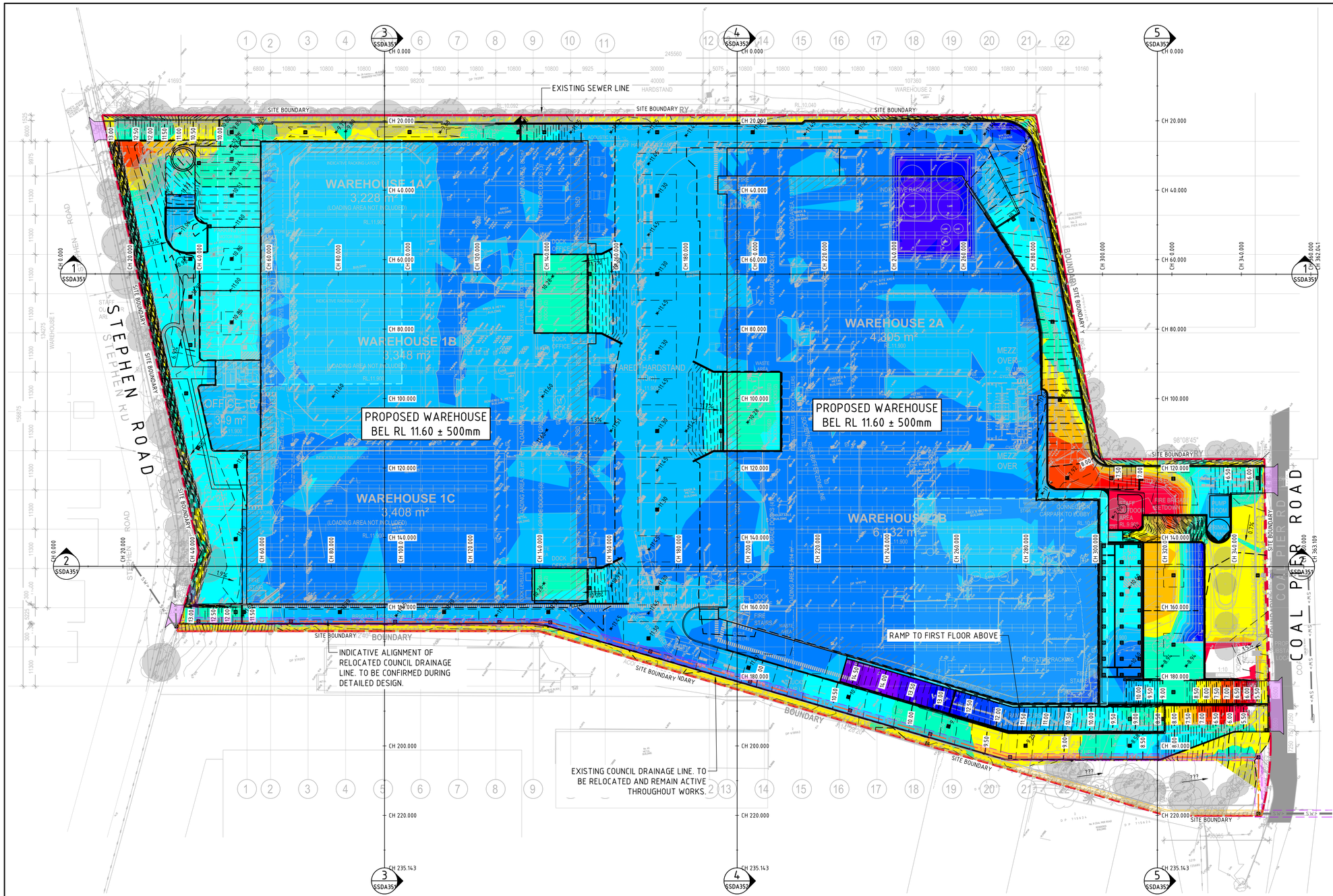
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA300

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
BULK EARTHWORKS PLAN

DRAWING No C014950.01-SSDA300
ISSUE G



CUT/FILL PLAN
SCALE 1:500

DEPTH RANGE				
	No.	FROM DEPTH	TO DEPTH	COLOUR
CUT	1	-3.000	-2.400	
	2	-2.400	-1.800	
	3	-1.800	-1.200	
	4	-1.200	-0.600	
	5	-0.600	0.000	
FILL	6	0.000	0.600	
	7	0.600	1.200	
	8	1.200	1.800	
	9	1.800	2.400	
	10	2.400	3.000	
	11	3.000	3.600	
	12	3.600	4.200	
	13	4.200	4.800	
	14	4.800	5.400	
	15	5.400	6.000	

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

CONTAMINATION NOTE:

CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS SHALL BE MANAGED IN ACCORDANCE WITH THE CONTAMINATION MANAGEMENT PLAN, WHICH FORMS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN. A CAPPING LAYER CONSISTING OF CLEAN COMPACTED CLAY FILL (VENM ONLY) TO A MINIMUM DEPTH OF 1000mm IS TO BE PROVIDED OVER THE SITE SUBJECT TO ADVICE FROM ENVIRONMENTAL/CONTAMINATION SPECIALIST. CONTAMINATED MATERIAL CAN NOT BE REMOVED FOR OFF-SITE DISPOSAL.

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	04.03.26	F
ISSUED FOR SSDA	03.02.26	E
ISSUED FOR SSDA	31.01.25	D
ISSUED FOR SSDA	09.12.24	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A
ISSUED FOR SSDA	27.03.26	G

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

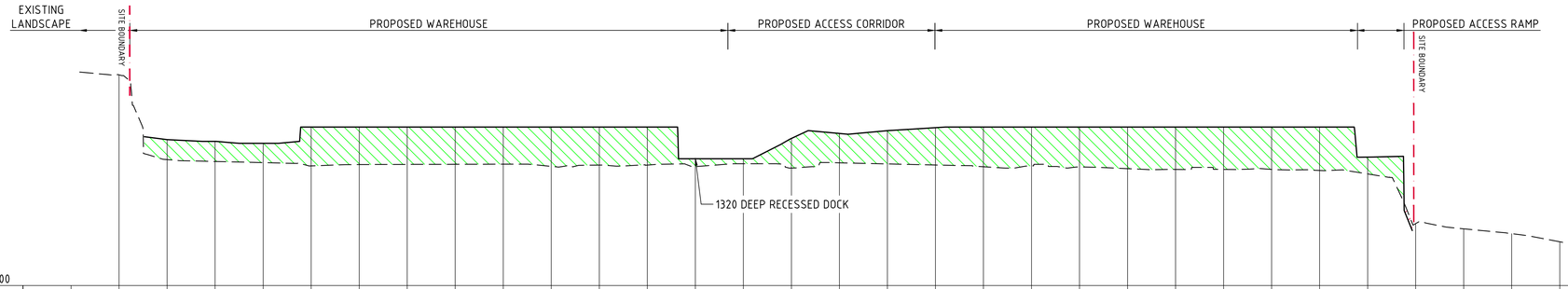
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA301

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: CUT/FILL PLAN

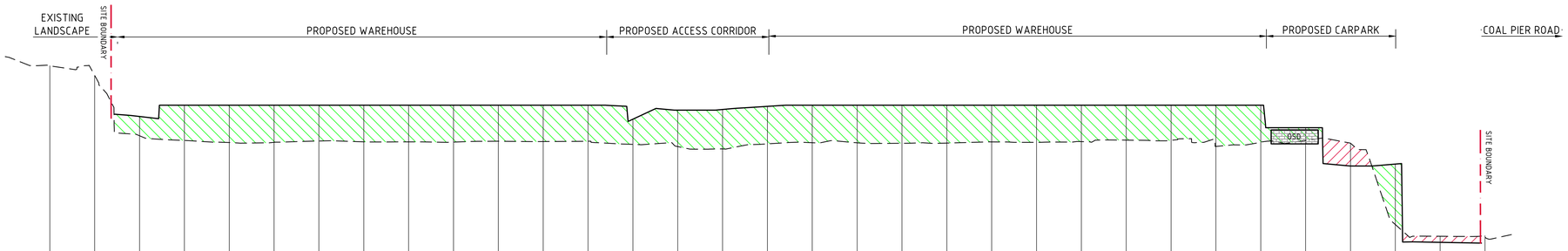
DRAWING No: C014950.01-SSDA301 ISSUE: G



DATUM 5.00

CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000	362.041
CUT/FILL DEPTH				0.831	0.836	0.804	1.621	1.564	1.557	1.552	1.547	1.638	1.586	1.585	0.330	0.210	1.232	1.223	1.384	1.557	1.656	1.620	1.663	1.733	1.767	1.765	1.765	1.811	0.700									
BULK EARTHWORKS LEVEL				11.074	11.000	10.921	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	10.280	10.280	11.123	11.333	11.448	11.574	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	10.347									
EXISTING SURFACE LEVEL			13.772	10.243	10.164	10.117	9.979	10.036	10.043	10.048	10.053	9.962	10.014	10.015	9.950	10.070	9.891	10.110	10.063	10.017	9.944	9.980	9.937	9.867	9.833	9.835	9.835	9.789	9.647	7.578	7.361	7.159	6.822				

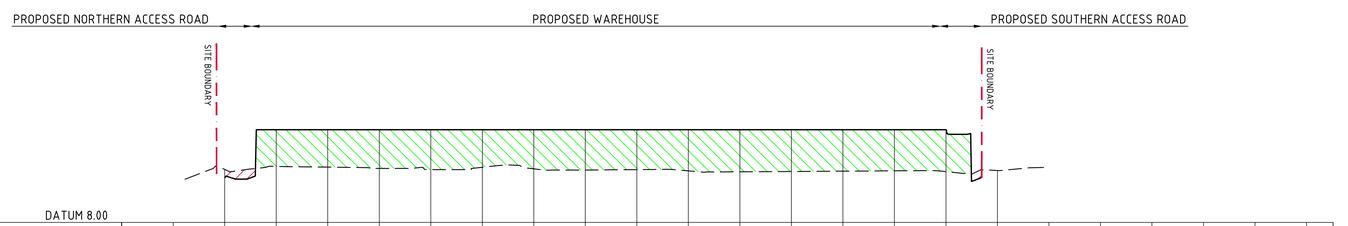
SECTION 1
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



DATUM 4.00

CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000	363.109
CUT/FILL DEPTH						0.858	1.569	1.661	1.652	1.594	1.631	1.634	1.643	1.604	1.618	1.605	1.117	1.625	1.756	1.671	1.668	1.674	1.695	1.687	1.632	1.654	1.620	1.556	1.565	1.837	1.641	0.570	-1.015	2.690	-0.269				
BULK EARTHWORKS LEVEL						11.099	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	10.976	11.383	11.411	11.549	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	10.600	8.894	8.977	5.472				
EXISTING SURFACE LEVEL				13.358	12.927	10.240	10.031	9.939	9.948	10.006	9.969	9.966	9.957	9.996	9.982	9.995	9.858	9.758	9.656	9.878	9.932	9.926	9.905	9.913	9.868	9.946	9.980	10.044	10.035	9.763	9.959	10.030	9.909	6.287	5.761	5.787			

SECTION 2
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



DATUM 8.00

CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	235.143
CUT/FILL DEPTH				1.425	1.454	1.503	1.551	1.460	1.522	1.568	1.551	1.600	1.635	1.623	1.610	1.598	1.627								
BULK EARTHWORKS LEVEL				11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600								
EXISTING SURFACE LEVEL			10.059	10.175	10.146	10.097	10.049	10.140	10.078	10.032	10.049	10.000	9.965	9.977	9.990	10.002	9.973	10.015							

SECTION 3
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

LEGEND:

- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT B1 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	E
ISSUED FOR INFORMATION	04.03.26	D
ISSUED FOR SSDA	03.02.26	C
ISSUED FOR SSDA	09.12.24	B
ISSUED FOR INFORMATION	18.10.24	A

AMENDMENTS DATE ISSUE

ARCHITECT SBA ARCHITECTS

CLIENT ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA351

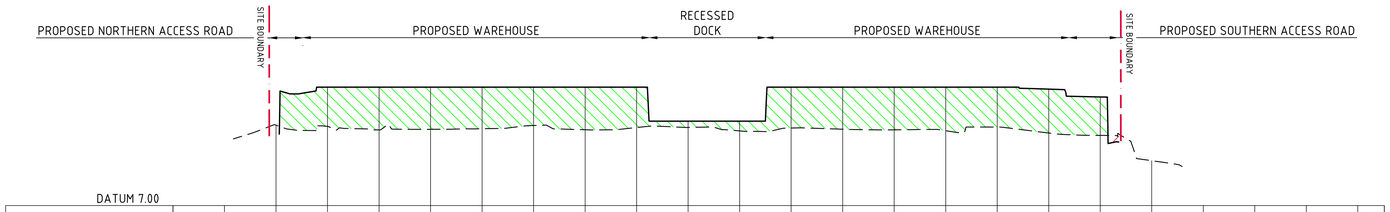
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

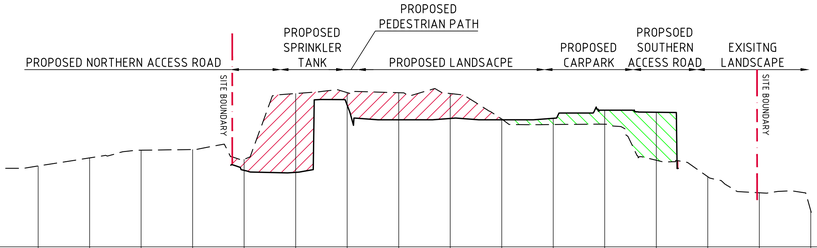
DRAWING TITLE
BULK EARTHWORKS SECTIONS - SHEET 1

DRAWING No C014950.01-SSDA351 ISSUE F



DATUM 7.00																									
CUT/FILL DEPTH			1.524	1.659	1.637	1.614	1.489	1.655	1.569	0.245	0.378	1.589	1.633	1.658	1.691	1.549	1.702	1.490						
BULK EARTHWORKS LEVEL			11.600	11.600	11.600	11.600	11.600	11.600	11.600	10.280	10.280	11.600	11.600	11.600	11.600	11.600	11.522	11.217						
EXISTING SURFACE LEVEL		10.124	10.076	9.941	9.963	9.986	10.111	9.945	10.031	10.035	9.902	10.011	9.967	9.942	9.909	10.051	9.820	9.727	8.744						
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	235.143

SECTION 4
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



DATUM 4.00																									
CUT/FILL DEPTH												-0.429	-3.962	-0.489	-1.052	-0.969	-0.032	0.240	0.542	1.864					
BULK EARTHWORKS LEVEL												6.969	6.891	9.500	8.931	8.984	8.931	8.990	9.305	9.224					
EXISTING SURFACE LEVEL						6.897	7.050	7.139	7.452	7.752	7.778	7.398	9.954	9.989	9.983	9.952	8.963	8.750	8.762	7.360	6.722	6.100	5.395		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	235.143

SECTION 5
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

LEGEND:

- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT B1 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	E
ISSUED FOR INFORMATION	04.03.26	D
ISSUED FOR SSDA	03.02.26	C
ISSUED FOR SSDA	09.12.24	B
ISSUED FOR INFORMATION	18.10.24	A

AMENDMENTS DATE ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA352

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
BULK EARTHWORKS SECTIONS - SHEET 2

DRAWING No C014950.01-SSDA352 ISSUE E

PROPOSED CROSSOVER IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS. ALL EXISTING SERVICES ALIGNMENT, FITTINGS AND DEPTHS TO BE CONFIRMED VIA POTHOLING PRIOR TO COMMENCEMENT OF WORKS.

PROPOSED RAINWATER TANK UNDER RAMP MIN. VOL. REQUIRED = 60m³

PROPOSED RETAINING WALL ALONG NORTHERN ELEVATION

EXISTING SEWER LINE

PROPOSED RETAINING WALL ALONG EASTERN BOUNDARY

RAMP WITH MAX GRADE AS SHOWN AND TRANSITIONS TOP AND BOTTOM PER NOTE 7

PROPOSED ROOF CATCHMENT TO RWT = 0.37 Ha

PROPOSED WAREHOUSE FFL RL 11.90

PROPOSED OFFICE BEL RL 11.90

1320 DEEP RECESSED DOCK

ROOFWATER LINES TO HAVE NOMINAL 0.5% FALL TO PITS. ENSURE 600 COVER IS MAINTAINED TO ALL PIPES. REFER ALL CONCERN TO ENGINEER. MIN Ø225 uPVC AND Ø300 WHEN MAX 3 DPs ARE CONNECTED U.N.O ON PLAN TYPICAL

PROPOSED WAREHOUSE FFL RL 11.90

PROPOSED CROSSOVER IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS. ALL EXISTING SERVICES ALIGNMENT, FITTINGS AND DEPTHS TO BE CONFIRMED VIA POTHOLING PRIOR TO COMMENCEMENT OF WORKS.

PROPOSED SPRINKLER TANK

PROPOSED PUMP ROOM

PROPOSED ROOF CATCHMENT TO RWT = 0.31 Ha

COMBINED OSD/WATER QUALITY TREATMENT TANK
OSD VOLUME REQUIRED = 1,000m³ MIN.
PROVIDE 55 x 690 OCEAN PROTECT NPSORB STORMFILTER CARTRIDGES
TANK DIMENSIONS = 38.6L x 11.3W x 4.7H
PROVIDE OIL BAFFLE PRIOR TO DISCHARGE

PROPOSED RAINWATER TANK MIN. VOL. REQUIRED = 60m³

LETTERBOX PIT TO ALLOW SURCHARGE TO KERB AND GUTTER NETWORK IN COAL PIER ROAD

INDICATIVE ALIGNMENT OF RELOCATED COUNCIL DRAINAGE LINE. TO BE CONFIRMED DURING DETAILED DESIGN.

PROPOSED NEW RETAINING WALL TO BE CONSTRUCTED ALONG ALONG THE SOUTHERN BOUNDARY. EXISTING WALLS TO BE REMOVED AS REQUIRED TO ALLOW FOR THE CONSTRUCTION OF THE NEW RETAINING WALLS.

PROPOSED CROSSOVER IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS. ALL EXISTING SERVICES ALIGNMENT, FITTINGS AND DEPTHS TO BE CONFIRMED VIA POTHOLING PRIOR TO COMMENCEMENT OF WORKS.

EXISTING COUNCIL DRAINAGE LINE. TO BE RELOCATED AND REMAIN ACTIVE THROUGHOUT WORKS.

EASEMENT MIN WIDTH = 2m

PROPOSED HYDRANT TANK INCLUDED IN OSD TANK
MIN VOL. REQUIRED = 500m³
TANK DIMENSIONS = 30.4L x 3.5W x 4.7H
BOTTOM OF TANK = R.L 5.90

INTERCEPT EXISTING Ø450 STORMWATER LINE FROM NEIGHBOURING AT EXISTING PIT AT IL 6.41 AND CONNECT TO RELOCATED COUNCIL DRAINAGE LINE AT PIT R11. MAKE GOOD THE CONNECTION. CONFIRM THE INVERT LEVEL PRIOR TO CONSTRUCTION AND REFER ANY CONCERNS TO THE ENGINEER.

RELOCATED COUNCIL DRAINAGE PIPE TO CONNECT TO EXISTING Ø525 PIPE AT IL 3.51. MAKE GOOD THE CONNECTIONS. CONFIRM INVERT PRIOR TO COMMENCEMENT OF CONSTRUCTION & REFER ANY CONCERNS TO THE ENGINEER
Ø525 PIPE DISCHARGES TO FLOODVALE DRAIN AT I.L 2.86

STORMWATER DRAINAGE PLAN - GROUND FLOOR
SCALE 1:500

LEGEND:
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY BEVERIDGE WILLIAMS DATED 23.12.22.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- SW> - PROPOSED DRAINAGE LINE
- SW> - EXISTING DRAINAGE LINE TO REMAIN
- SW> - PROPOSED COUNCIL PIPE REALIGNMENT
- DP - ROOFWATER DOWNPIPE (INDICATIVE)
- RW> - ROOFWATER LINE
- SS> - SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- 50.00 - FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 - FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- EXISTING DRAINAGE EASEMENT
- PROPOSED DRAINAGE EASEMENT

SITE DISCHARGE POINT
SITE DISCHARGE POINT TO EXISTING ROAD DRAINAGE IN COAL PIER ROAD AT APPROX. I.L. 4.60. TO BE CONFIRMED ON SITE.
MAKE GOOD THE CONNECTION.
CONFIRM INVERT PRIOR TO COMMENCEMENT OF WORKS AND REFER ANY CONCERNS TO THE ENGINEER

STORMWATER DRAINAGE NOTES:
STORMWATER DRAINAGE NOTES ARE APPLICABLE FOR PRIVATE INTERNAL STORMWATER DRAINAGE WORKS ONLY, REFERENCE SHOULD BE MADE TO THE RELEVANT COUNCIL/ ROADS AUTHORITY GUIDELINES AND SPECIFICATIONS FOR ALL STORMWATER DRAINAGE WORKS NOT PART OF THE PRIVATE INTERNAL WORKS.

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS SSDA500.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c=25 MPa. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 9 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. WHERE SUBSOIL DRAINAGE PASSES UNDER A PAVEMENT OR A SLAB, UNSLOTTED UPVC ARE TO BE PROVIDED UNLESS NOTED OTHERWISE.
16. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
17. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
18. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
19. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY'. WHERE FORKLIFT USE IS REQUIRED EXTERNAL TO THE BUILDING PIT COVERS SHALL BE MIN. CLASS E. PIT COVERS IN CONTAINER PAVEMENTS ARE TO BE MIN. CLASS G. REFER TO ENGINEER FOR SPECIAL DETAILS. THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
20. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
21. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
22. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.
23. WHERE CONNECTION TO EXISTING INGROUND DRAINAGE SYSTEMS, OPEN SWALES, CHANNELS OR ANY OTHER EXISTING SYSTEM, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION AND INVERT ON SITE AT THE BEGINNING OF THE CONSTRUCTION PERIOD. REFER ANY VARIANCE FROM DOCUMENTATION OR SURVEYS TO THE ENGINEER FOR CLARIFICATION.

LEVELS NOTE:
LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

CONTAMINATION NOTE:
CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS SHALL BE MANAGED IN ACCORDANCE WITH THE CONTAMINATION MANAGEMENT PLAN, WHICH FORMS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN. A CAPPING LAYER CONSISTING OF CLEAN COMPACTED CLAY FILL (VENM ONLY) TO A MINIMUM DEPTH OF 1000mm IS TO BE PROVIDED OVER THE SITE SUBJECT TO ADVICE FROM ENVIRONMENTAL/CONTAMINATION SPECIALIST. CONTAMINATED MATERIAL CAN NOT BE REMOVED FOR OFF-SITE DISPOSAL.

NOTE:
ALL SURFACE INLET PITS TO BE FITTED WITH OCEAN PROTECT OG200 OCEANGUARD PIT INSERT OR SIMILAR APPROVED.

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	03.02.26	F
ISSUED FOR SSDA	19.12.25	E
ISSUED FOR SSDA	31.01.25	D
ISSUED FOR SSDA	09.12.24	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	12.06.26	I
ISSUED FOR SSDA	27.03.26	H
ISSUED FOR INFORMATION	04.03.26	G

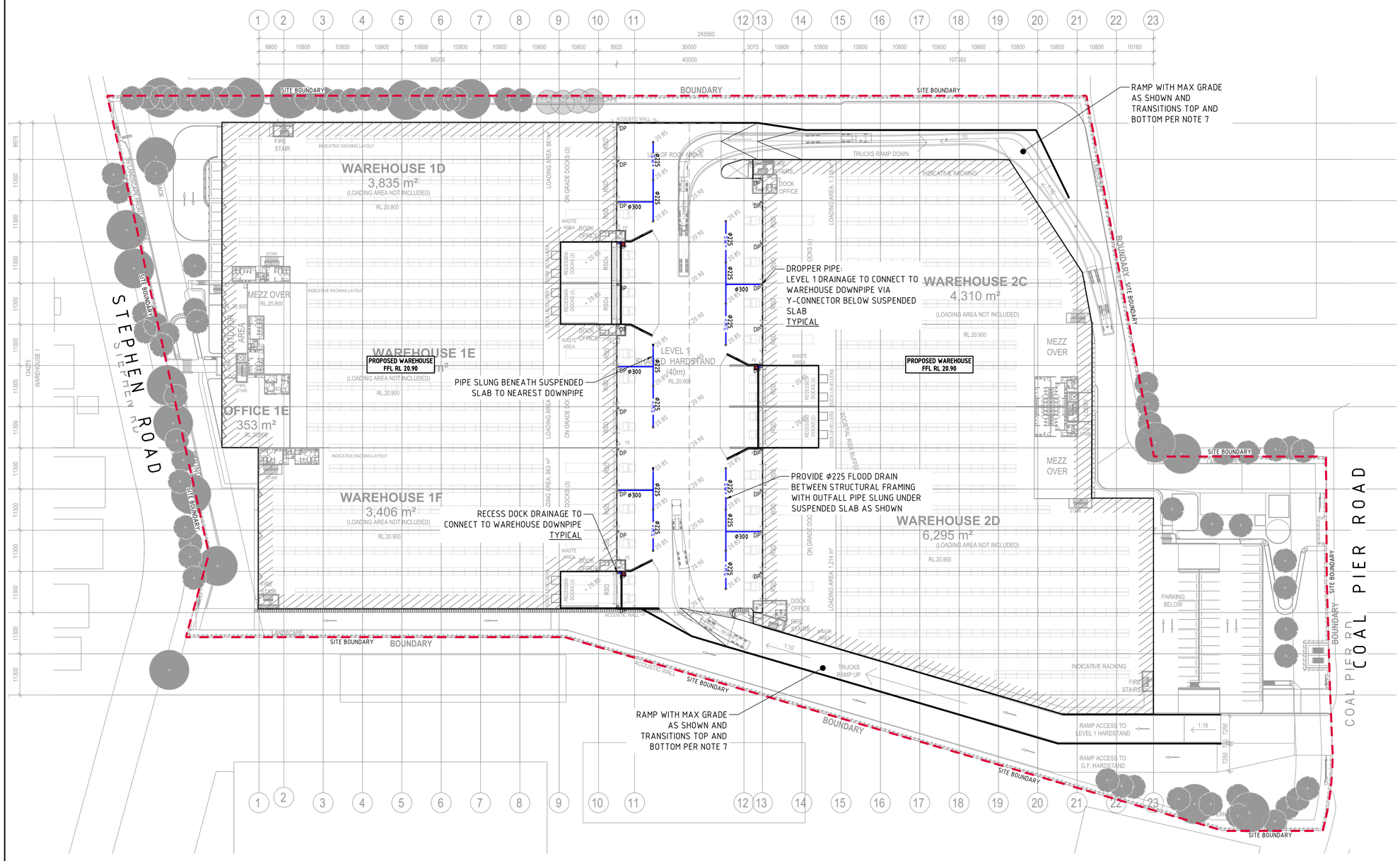
ARCHITECT: SBA ARCHITECTS
CLIENT: ESR
PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA400

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: STORMWATER DRAINAGE PLAN GROUND FLOOR
DRAWING No: C014950.01-SSDA400
ISSUE: I



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY BEVERIDGE WILLIAMS DATED 23.12.22.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- SW> - PROPOSED DRAINAGE LINE
- SW> - EXISTING DRAINAGE LINE
- DP - ROOFWATER DOWNPIPE (INDICATIVE)
- RW> - ROOFWATER LINE
- SS> - SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- 50.00 - FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 - FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- EXISTING DRAINAGE EASEMENT
- PROPOSED DRAINAGE EASEMENT

STORMWATER DRAINAGE NOTES:

STORMWATER DRAINAGE NOTES ARE APPLICABLE FOR PRIVATE INTERNAL STORMWATER DRAINAGE WORKS ONLY, REFERENCE SHOULD BE MADE TO THE RELEVANT COUNCIL/ ROADS AUTHORITY GUIDELINES AND SPECIFICATIONS FOR ALL STORMWATER DRAINAGE WORKS NOT PART OF THE PRIVATE INTERNAL WORKS.

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS SSDA500.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c=25 MPa. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 9 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. WHERE SUBSOIL DRAINAGE PASSES UNDER A PAVEMENT OR A SLAB, UNSLOTTED UPVC ARE TO BE PROVIDED UNLESS NOTED OTHERWISE.
16. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
17. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
18. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
19. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY'. WHERE FORKLIFT USE IS REQUIRED EXTERNAL TO THE BUILDING PIT COVERS SHALL BE MIN. CLASS E. PIT COVERS IN CONTAINER PAVEMENTS ARE TO BE MIN. CLASS G. REFER TO ENGINEER FOR SPECIAL DETAILS. THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
20. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
21. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
22. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.
23. WHERE CONNECTION TO EXISTING INGROUND DRAINAGE SYSTEMS, OPEN SWALES, CHANNELS OR ANY OTHER EXISTING SYSTEM, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION AND INVERT ON SITE AT THE BEGINNING OF THE CONSTRUCTION PERIOD. REFER ANY VARIANCE FROM DOCUMENTATION OR SURVEYS TO THE ENGINEER FOR CLARIFICATION.

NOTE:

ALL SURFACE INLET PITS TO BE FITTED WITH OCEAN PROTECT OG200 OCEANGUARD PIT INSERT OR SIMILAR APPROVED.

STORMWATER DRAINAGE PLAN - FIRST FLOOR

SCALE 1:500

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

CONTAMINATION NOTE:

CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS SHALL BE MANAGED IN ACCORDANCE WITH THE CONTAMINATION MANAGEMENT PLAN, WHICH FORMS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN. A CAPPING LAYER CONSISTING OF CLEAN COMPACTED CLAY FILL (VENM ONLY) TO A MINIMUM DEPTH OF 1000mm IS TO BE PROVIDED OVER THE SITE SUBJECT TO ADVICE FROM ENVIRONMENTAL/CONTAMINATION SPECIALIST. CONTAMINATED MATERIAL CAN NOT BE REMOVED FOR OFF-SITE DISPOSAL.

5m 0 10 20 30 40 50m

SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	D
ISSUED FOR INFORMATION	04.03.26	C
ISSUED FOR SSDA	09.12.24	B
ISSUED FOR INFORMATION	18.10.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA401

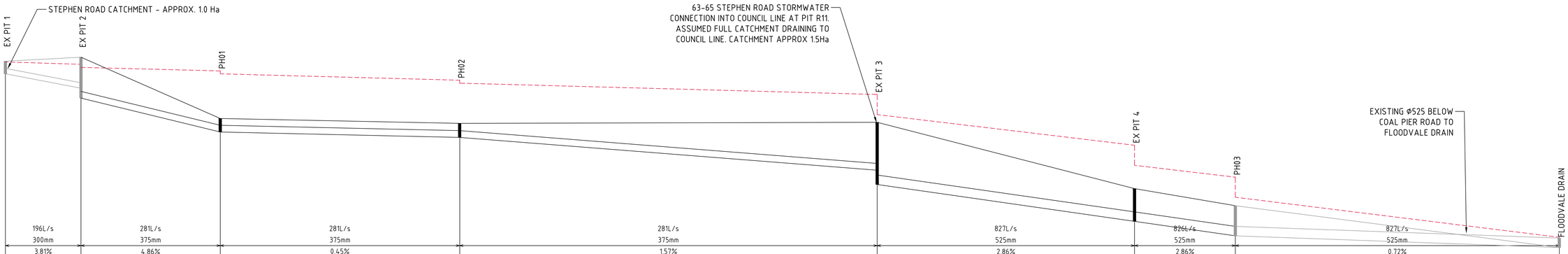
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

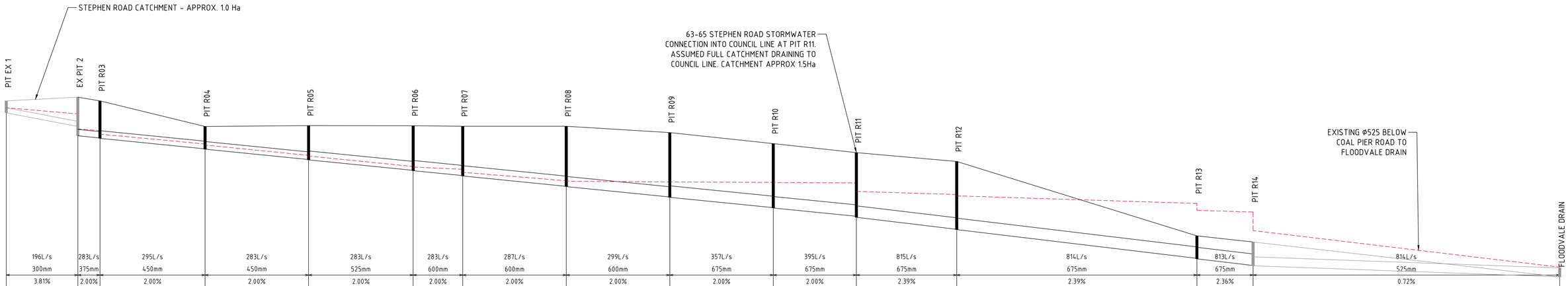
COSTIN ROE CONSULTING — CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: STORMWATER DRAINAGE PLAN FIRST FLOOR

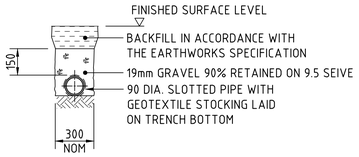
DRAWING No: C014950.01-SSDA401 ISSUE: D


STEPHEN ROAD CATCHMENT - APPROX. 1.0 Ha
63-65 STEPHEN ROAD STORMWATER CONNECTION INTO COUNCIL LINE AT PIT R11. ASSUMED FULL CATCHMENT DRAINING TO COUNCIL LINE. CATCHMENT APPROX 1.5Ha
EXISTING Ø525 BELOW COAL PIER ROAD TO FLOODVALE DRAIN
EX PIT 1
EX PIT 2
PH01
PH02
EX PIT 3
EX PIT 4
PH03
FLOODVALE DRAIN
196L/s 300mm 3.81%
281L/s 375mm 4.86%
281L/s 375mm 0.45%
281L/s 375mm 1.57%
827L/s 525mm 2.86%
826L/s 525mm 2.86%
827L/s 525mm 0.72%
Datum El. 2

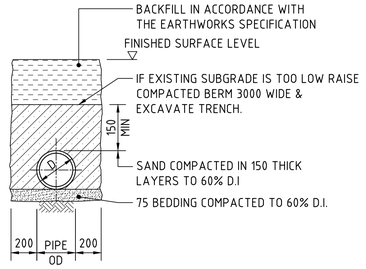
| | | |


STEPHEN ROAD CATCHMENT - APPROX. 1.0 Ha
63-65 STEPHEN ROAD STORMWATER CONNECTION INTO COUNCIL LINE AT PIT R11. ASSUMED FULL CATCHMENT DRAINING TO COUNCIL LINE. CATCHMENT APPROX 1.5Ha
EXISTING Ø525 BELOW COAL PIER ROAD TO FLOODVALE DRAIN
PIT EX 1
EX PIT 2
PIT R03
PIT R04
PIT R05
PIT R06
PIT R07
PIT R08
PIT R09
PIT R10
PIT R11
PIT R12
PIT R13
PIT R14
FLOODVALE DRAIN
196L/s 300mm 3.81%
283L/s 375mm 2.00%
295L/s 450mm 2.00%
283L/s 450mm 2.00%
283L/s 525mm 2.00%
283L/s 600mm 2.00%
287L/s 600mm 2.00%
299L/s 600mm 2.00%
357L/s 675mm 2.00%
395L/s 675mm 2.00%
815L/s 675mm 2.39%
814L/s 675mm 2.39%
813L/s 675mm 2.36%
814L/s 525mm 0.72%
Datum El. 2

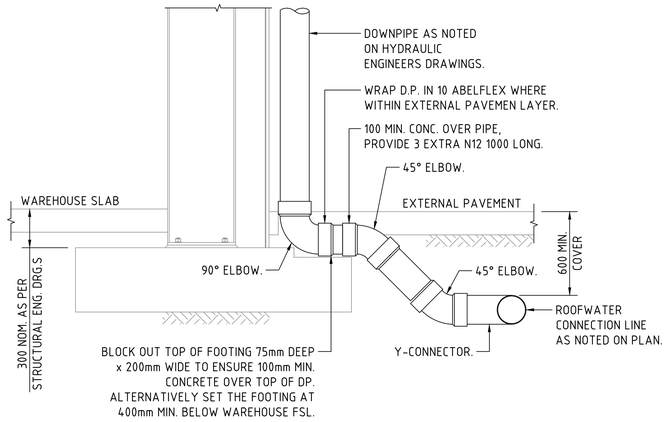
| | | |



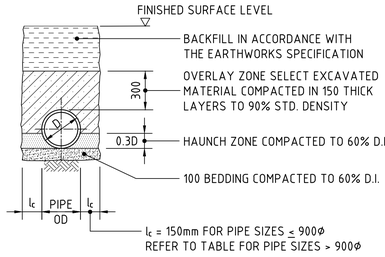
SUPPORT TO AGRICULTURAL DRAIN
SCALE 1:20



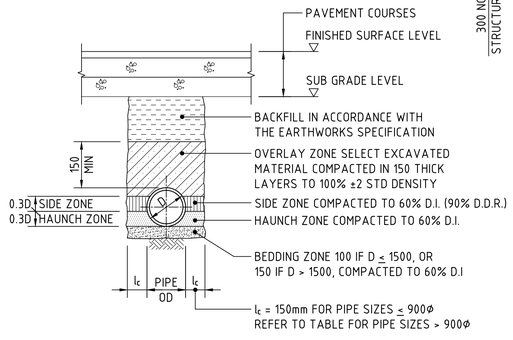
SUPPORT TO uPVC PIPES
SCALE 1:20



DOWNPIPE TURN-UP DETAIL A
(AT FOOTING LOCATION)
SCALE 1:20



TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS
SCALE 1:20

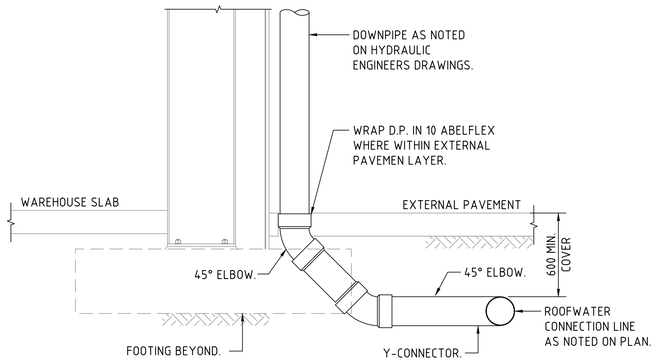


TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT
SCALE 1:20
D ≤ 1350, MAX FILL = 4.0m
D > 1350, MAX FILL = 3.0m

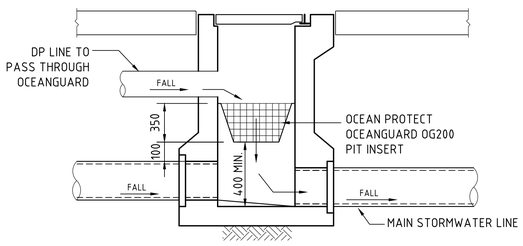
SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
75.0	100
9.5	100 TO 50
2.36	100 TO 30
0.60	50 TO 15
0.075	25 TO 0
SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725	

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 20
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

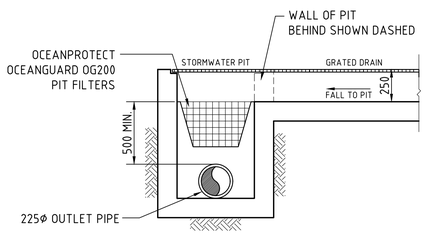
SIDE ZONE WIDTH	
PIPE SIZE (mm)	l_c (mm)
≤ 900Ø	150
1050Ø	175
1200Ø	200
1350Ø	225
1500Ø	250
1650Ø	275
1800Ø	300
ENGINEER TO SPECIFY TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800Ø	



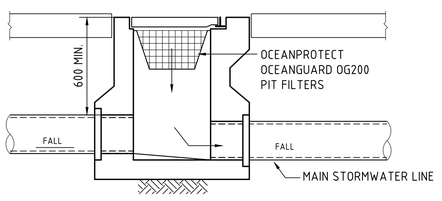
DOWNPIPE TURN-UP DETAIL B
(CLEAR OF FOOTING)
SCALE 1:20



ROOFWATER/STORMWATER PIT WITH OCEANGUARD CONFIGURATION
SCALE 1:20



GRATED DRAIN/STORMWATER PIT WITH OCEANPROTECT OCEANGUARD OG200 PIT CONFIGURATION
SCALE 1:20



STORMWATER PIT WITH OCEANPROTECT OCEANGUARD OG200 PIT CONFIGURATION
SCALE 1:20

OCEANGUARD OG200 PIT CONFIGURATION

PIT SCHEDULE - NETWORK				
PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT A01	11.41	SGGP	900X900	◇
PIT A02	11.30	SGGP	900X900	◇
PIT A03	11.34	SGGP	900X900	◇
PIT A04	12.00	SJP	900X900	
PIT A05	11.75	GD	300X5000	◇
PIT A06	11.60	SGGP	900X900	◇
PIT A07	11.60	SGGP	900X900	◇
PIT A08	11.60	SGGP	900X900	◇
PIT A09	11.60	SGGP	900X900	◇
PIT A10	11.48	SGGP	900X900	◇
PIT A11	10.99	SGGP	900X900	◇
PIT A12	10.51	SGGP	900X900	◇
PIT A13	10.14	SGGP	900X900	◇
PIT A14	9.65	SGGP	900X900	◇
PIT A15	10.07	SJP	900X900	
PIT A15-A	9.50	GD	300X7250	◇
PIT B01	11.60	SGGP	900X900	◇
PIT B02	11.60	SGGP	900X900	◇
PIT B02-A	10.58	GD	300X22600	
PIT B03	11.60	SGGP	900X900	◇
PIT B04	11.60	SGGP	900X900	◇
PIT B04-A	10.58	GD	300X22600	
PIT B05	11.60	SGGP	900X900	◇
PIT B06	11.60	SGGP	900X900	◇
PIT B06-A	10.58	GD	300X10580	
PIT C01	11.15	SGGP	900X900	
PIT C02	11.15	SGGP	900X900	
PIT C02-A	11.35	SGGP	900X900	◇
PIT C02-B	11.34	SGGP	900X900	◇
PIT C02-C	11.30	SGGP	900X900	◇
PIT C03	11.00	SGGP	900X900	
PIT C03-A	11.30	SGGP	900X900	
PIT C04	10.46	SGGP	900X900	
PIT C04-A	10.40	SGGP	900X900	
PIT C05	10.15	SGGP	900X900	◇
PIT C05-A	10.30	GD	300X6000	◇
PIT C06	9.90	SGGP	900X900	◇
PIT C07	9.90	SGGP	900X900	◇
PIT C08	10.10	SGGP	900X900	◇
PIT C09	11.00	SGGP	900X900	◇
PIT C10	11.60	SGGP	900X900	◇
PIT C11	11.60	SGGP	900X900	◇
PIT C12	11.60	SGGP	900X900	◇
PIT C13	11.60	SGGP	900X900	◇
PIT C14	11.60	SGGP	900X900	◇
PIT C15	11.05	SGGP	900X900	◇
PIT C15-A	11.03	GD	300X8000	◇
PIT C16	10.28	SGGP	900X900	◇
PIT C17	9.71	GD	300X10000	◇
PIT C18	8.22	SGGP	900X900	
PIT C19	8.00	SGGP	900X900	
PIT C19-A	7.30	GD	300X6000	
PIT D01	9.25	SGGP	900X900	◇
PIT D02	9.15	SGGP	900X900	◇
PIT D03	9.15	SGGP	900X900	◇
PIT D04	5.75	LETTERBOX	900X900	◇
				◇
PIT E01	5.45	GD	200X14500	
PIT E02	5.27	SJP	900X900	
PIT F01	7.30	GD	300X6000	◇
PIT F02	7.10	SGGP	900X900	◇
PIT F03	6.19	GD	300X6000	

PIT SCHEDULE - COUNCIL DRAINAGE RELAIGNMENT				
PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT R03	13.20	SJP	900X900	
PIT R04	11.70	SJP	900X900	
PIT R05	11.75	SJP	900X900	
PIT R06	11.74	SJP	900X900	
PIT R07	11.71	SJP	900X900	
PIT R08	11.71	SJP	900X900	
PIT R09	11.34	SJP	900X900	
PIT R10	10.69	SJP	900X900	
PIT R11	10.16	SJP	900X900	
PIT R12	9.64	SJP	900X900	
PIT R13	5.27	SJP	900X900	
PIT R14	4.91	SJP	900X900	

NOTES:
1. ALL PITS WITH ◇ TO BE FITTED WITH OCEAN GUARD OG200 PIT INSERTS

FOR SSDA

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE SHEET

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	12.06.26	D
ISSUED FOR SSDA	27.03.26	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A

AMENDMENTS	DATE	ISSUE

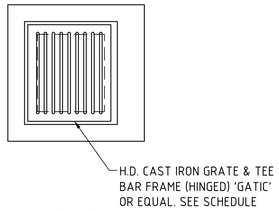
ARCHITECT: SBA ARCHITECTS
CLIENT: ESR
PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA451

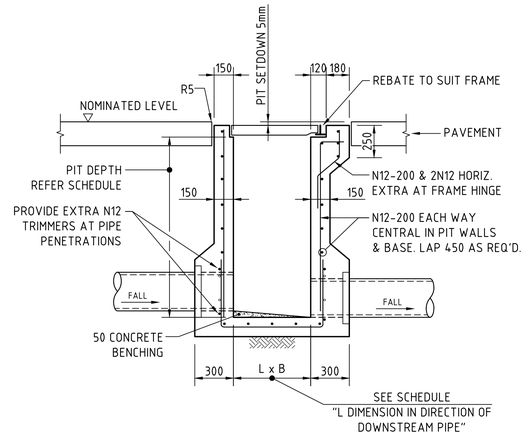
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: STORMWATER DRAINAGE DETAILS SHEET 1
DRAWING No: C014950.01-SSDA 451
ISSUE: D

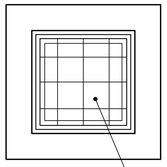


PLAN
SCALE 1:20

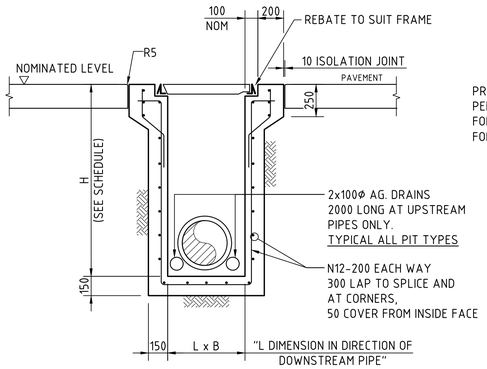


SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP

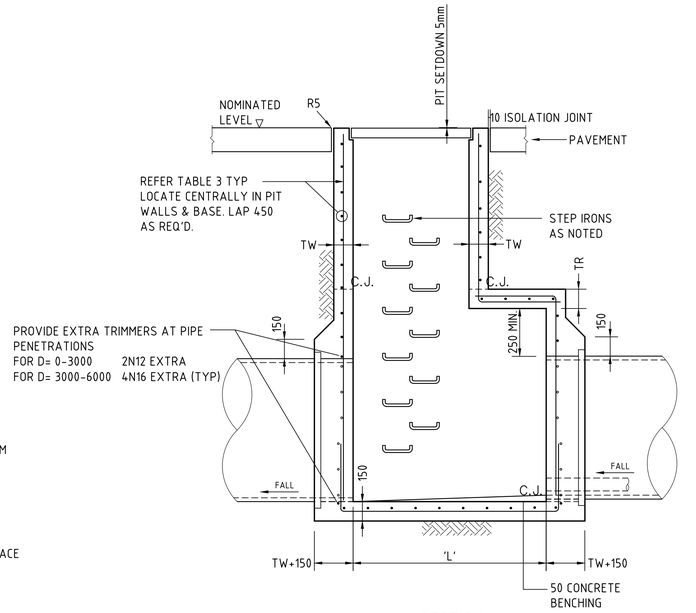


PLAN
SCALE 1:20

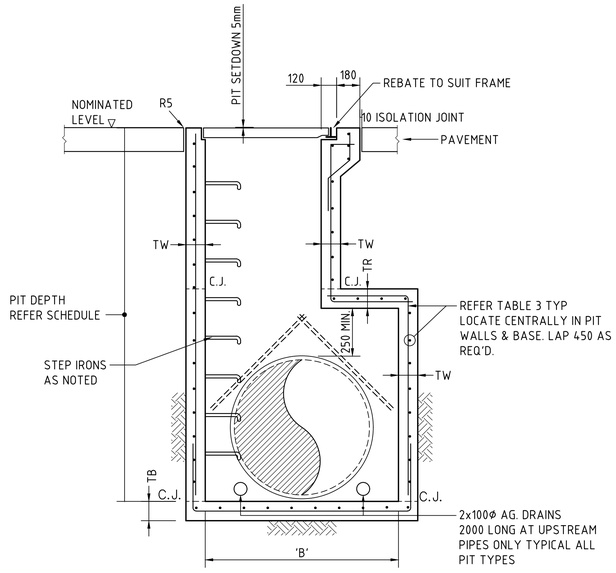


SECTION
SCALE 1:20

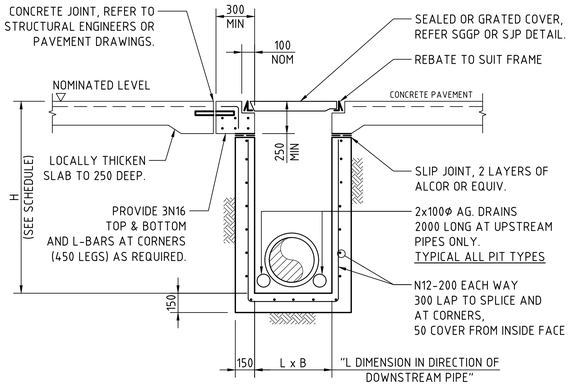
SEALED JUNCTION PIT - SJP



SECTION
SCALE 1:20



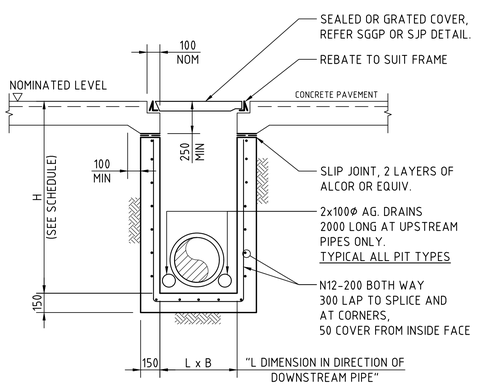
SECTION
SCALE 1:20



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL
GRATE/COVER SUPPORT
CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's,
WHERE PITS ARE LOCATED IN THE CORNER OF SLAB
PANELS OR ADJACENT TO SLAB PANEL JOINTS)



SECTION
SCALE 1:20

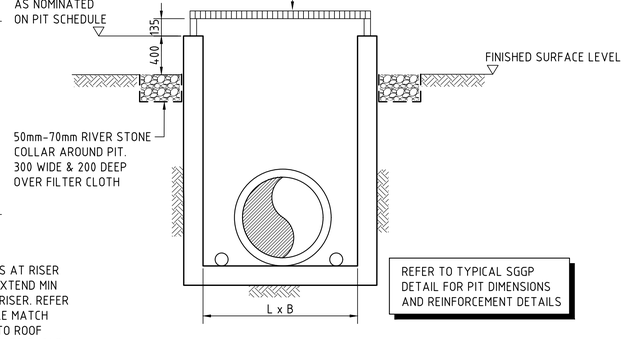
SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL
GRATE/COVER SUPPORT
CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENTS FOR SGGP's & SJP's, WHERE
JOINTS ARE NOT LOCATED WITHIN PROXIMITY OF THE GRATE)

PLAN
SCALE 1:20

TAPERED SINGLE GRATED GULLY PIT - SGGP

SUBSOIL NOT SHOWN
FOR CLARITY.



LETTERBOX PIT DETAIL
SCALE 1:20

TABLE 3 - TAPERED CLASS D PIT
REINFORCEMENT & WALL THICKNESS

DEPTH 'H'	WALL THICKNESS 'TW'	WALL REINFORCEMENT	ROOF THICKNESS 'TR'	ROOF REINFORCEMENT	BASE THICKNESS 'TB'	BASE REINFORCEMENT
<1.5m	150mm	N12-200 EACH WAY	150mm	N12-200 EACH WAY	150mm	N12-200 EACH WAY
1.5m-3.0m	150mm	N12-200 EACH WAY	150mm	N12-200 EACH WAY	150mm	N12-200 EACH WAY
3.0m-4.5m	200mm	N16-200 EACH WAY	200mm	N16-200 EACH WAY	200mm	N12-200 EACH WAY
4.5-6.0	250mm	N16-200 EACH WAY	250mm	N16-200 EACH WAY	250mm	N16-200 EACH WAY

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	12.06.26	D
ISSUED FOR SSDA	27.03.26	C
ISSUED FOR INFORMATION	18.10.24	B
PRELIMINARY ONLY	08.10.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

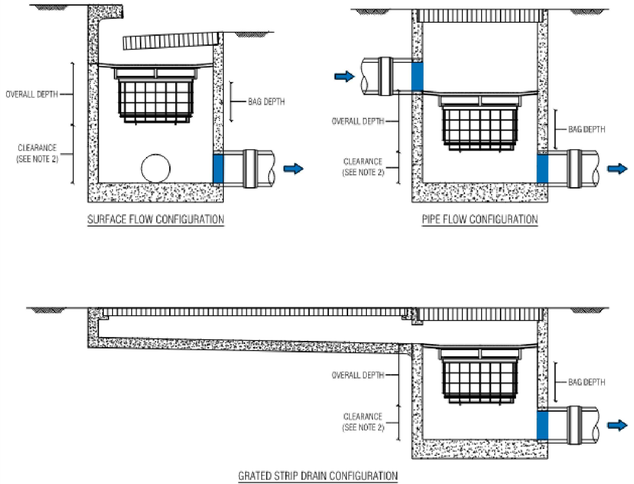
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA 452

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
STORMWATER DRAINAGE DETAILS
SHEET 2

DRAWING No C014950.01-SSDA 452 ISSUE D



GRATED STRIP DRAIN CONFIGURATION

PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

DEPTH ID	BAG DEPTH	OVERALL DEPTH
1	170	270
2	300	450
3	600	700

PLAN ID	DEPTH ID 1	DEPTH ID 2	DEPTH ID 3
S	■		
M	■	■	
L	■	■	■
XL	■	■	■



GENERAL NOTES

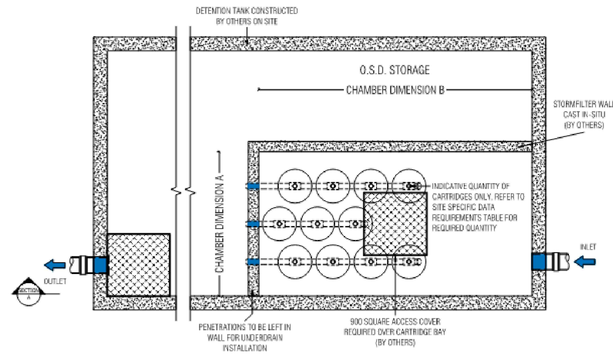
1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
2. CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
3. OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:- 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
4. DRAWINGS NOT TO SCALE.

OCEAN PROTECT
PHONE: 1300 354 722 www.oceanprotect.com.au

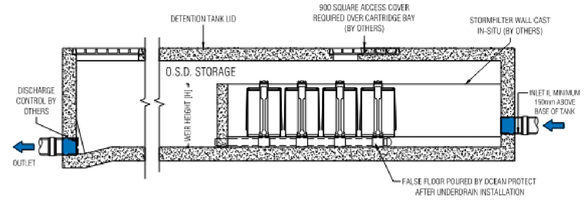
OCEAN PROTECT
OCEANGUARD
TYPCIAL ARRANGEMENTS
SPECIFICATION DRAWING

LAST MODIFIED: 18.02.19

CONSTRUCTION NOT FOR



PLAN LAYOUT

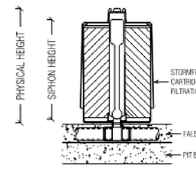


SECTION A

STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.

CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
TYPICAL WEIR HEIGHT [H] (mm)	920	690	540
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39



STORMFILTER CARTRIDGE DETAIL

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	[ ]
NUMBER OF CARTRIDGES REQ'D	[ ]
SIPHON HEIGHT (310 / 460 / 690)	[ ]
MEDIA TYPE (ZPG / PSORB)	[ ]
WATER QUALITY FLOW RATE (L/S)	[ ]
DIMENSION A	[ ]
DIMENSION B	[ ]

TOTAL CARTRIDGE BAY AREA (A x B) TO MATCH AREA REQUIRED BY MUSIC MODELLING OR COUNCIL SPECIFIC REQUIREMENTS

GENERAL NOTES

1. INLET AND OUTLET PIPES TO BE IN ACCORDANCE WITH APPROVED PLANS.
2. A HIGH FLOW BYPASS ARRANGEMENT OR DISSIPATION STRUCTURE MAY BE REQUIRED TO MINIMISE RE-SUSPENSION OF SOLIDS OR ANY SIGNIFICANT INERTIAL FORCES ON THE CARTRIDGES.
3. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
4. SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
5. THE INVERT LEVEL OF THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER.
6. CONCRETE STRUCTURE AND ACCESS COVERS DESIGNED AND PROVIDED BY OTHERS. ACCESS COVERS TO BE A MINIMUM 900 X 900 ABOVE CARTRIDGES. OH&S REGARDING ACCESS COVERS AND TANK ACCESS TO BE ASSESSED BY OTHERS ON SITE.
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES.
8. DRAWINGS NOT TO SCALE.

INSTALLATION NOTES

1. UNDERDRAIN AND FALSE FLOOR INSTALLED BY OCEAN PROTECT.

OCEAN PROTECT
PHONE: 1300 354 722 www.oceanprotect.com.au

OCEAN PROTECT
STORMFILTER SYSTEM
DETENTION TANK ARRANGEMENT
SPECIFICATION DRAWING

LAST MODIFIED: 07.03.19

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE SHEET

FOR SSDA

ISSUED FOR SSDA	12.06.26	A
AMENDMENTS	DATE	ISSUE

AMENDMENTS	DATE	ISSUE

ARCHITECT SBA ARCHITECTS

CLIENT ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA 453

CONSULT AUSTRALIA

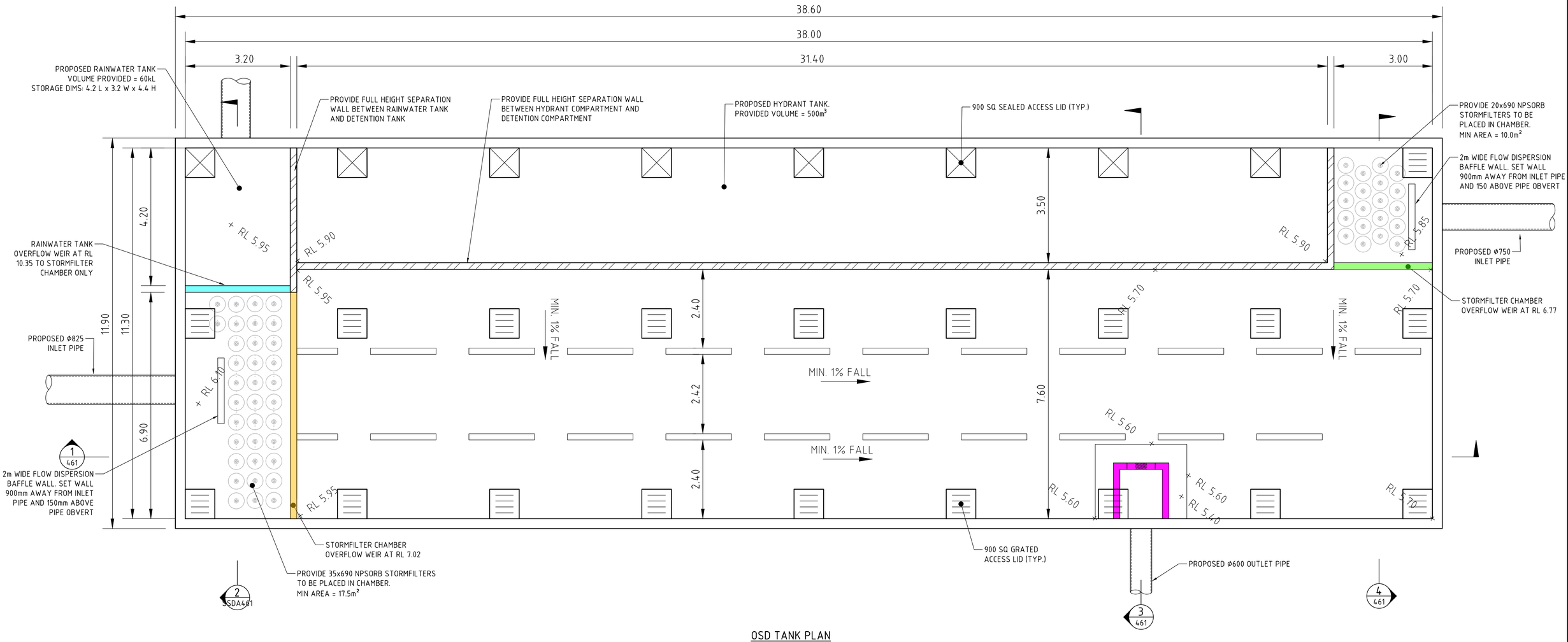
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 6 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

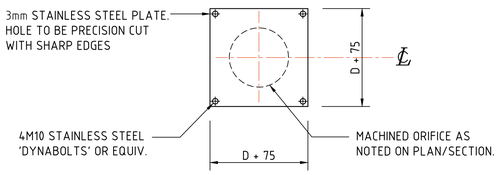
DRAWING TITLE
STORMWATER DRAINAGE DETAILS SHEET 3

DRAWING No C014950.01-SSDA 453

ISSUE A



OSD TANK PLAN
SCALE 1:50



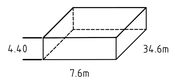
ORIFICE PLATE 1 DETAIL
SCALE 1:10

OSD TANK DETAILS

TOTAL CATCHMENT AREA	48,160m²
TOTAL SITE AREA DRAINING TO STORAGE (7% BYPASS)	45,090m²

STORAGE

ORIFICE Ø	370mm
ORIFICE ℄ =	RL 5.60
VOLUME PROVIDED (OSD ONLY)	1,160m³



DISCHARGE FLOW (m³/s)		
STORM	PRE-DEVELOPMENT	POST-DEVELOPMENT
Q5	0.732	0.515
Q10	0.894	0.564
Q20	1.090	0.617
Q50	1.250	1.050
Q100	1.429	1.429

100mm 0 200 400 600 800 1000mm
SCALE 1:10 AT A0 SIZE SHEET

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	12.06.26	E
ISSUED FOR SSDA	27.03.26	D
ISSUED FOR INFORMATION	04.03.26	C
ISSUED FOR SSDA	31.01.25	B
ISSUED FOR SSDA	09.12.24	A

AMENDMENTS | DATE | ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA460

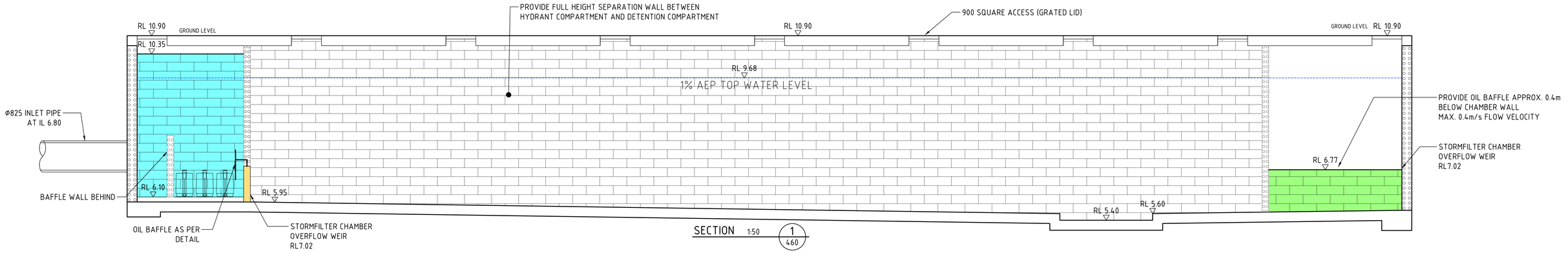
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

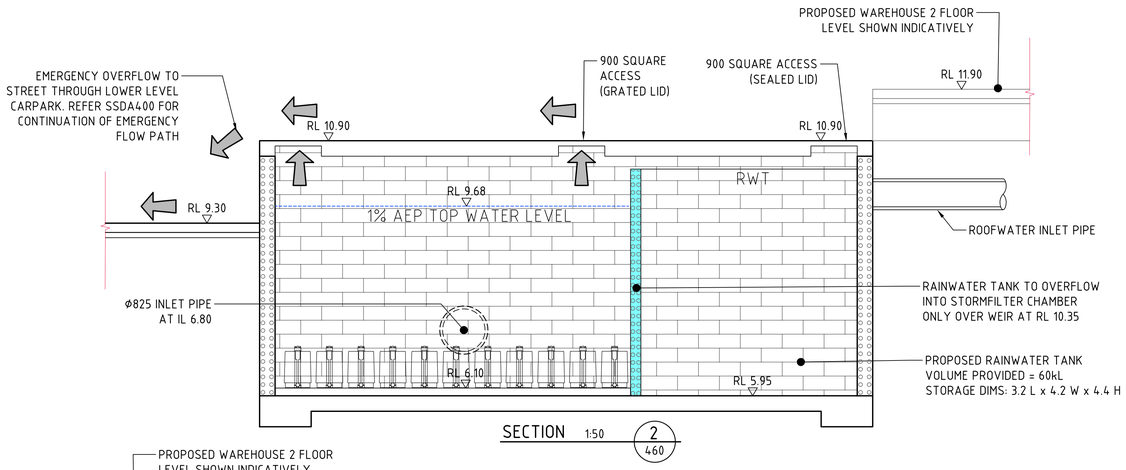
DRAWING TITLE: OSD HYDRAULIC DETAILS SHEET 1

DRAWING No: C014950.01-SSDA 460

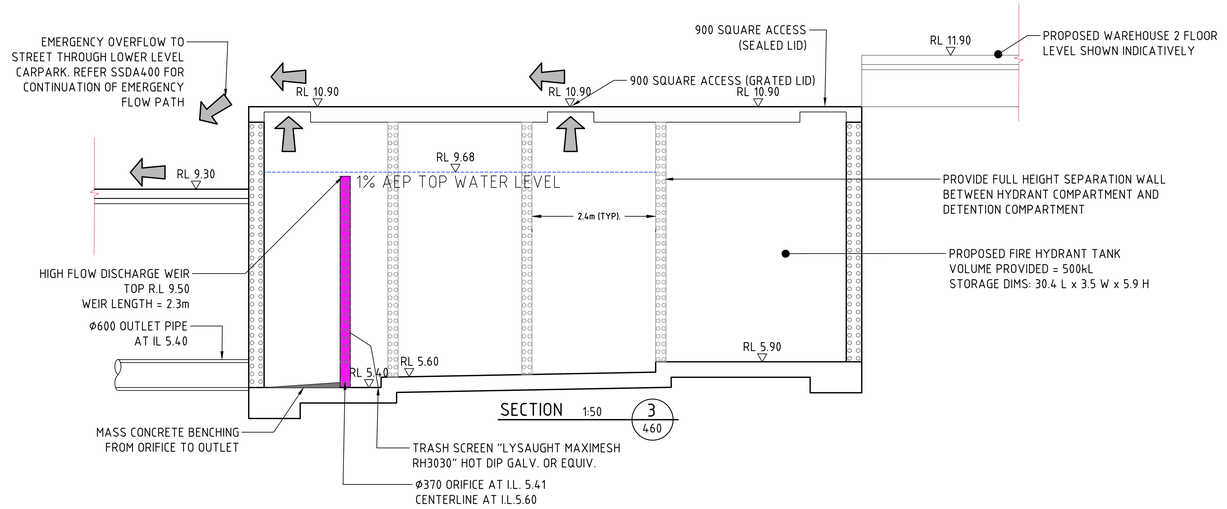
ISSUE: E



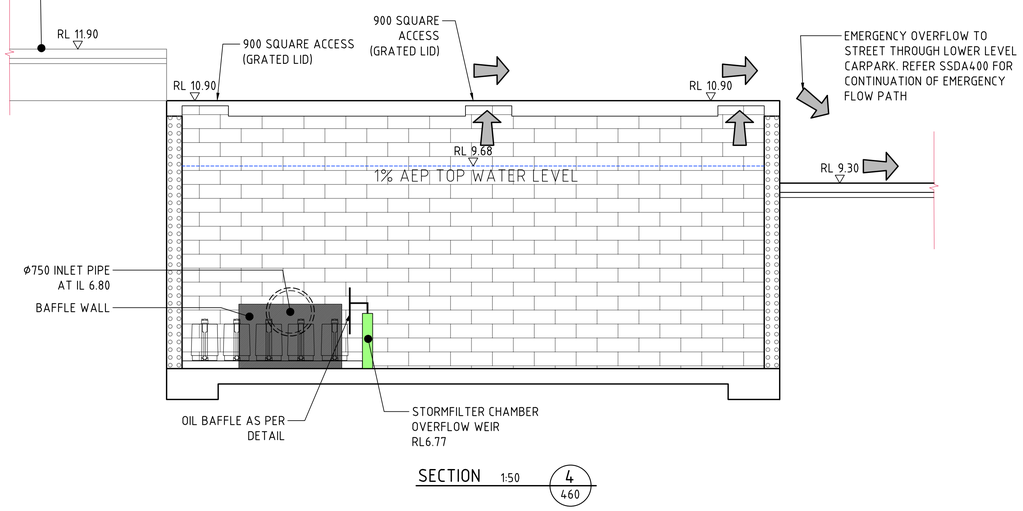
SECTION 1:50 (1/460)



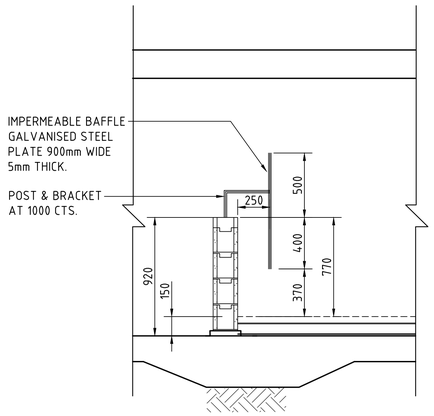
SECTION 1:50 (2/460)



SECTION 1:50 (3/460)



SECTION 1:50 (4/460)



STORMWATER QUALITY DEVICE BAFFLE DETAILS

SCALE 1:20

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE SHEET

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SIZE SHEET

FOR SSDA

ISSUED FOR SSDA	12.06.26	A
AMENDMENTS	DATE	ISSUE

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

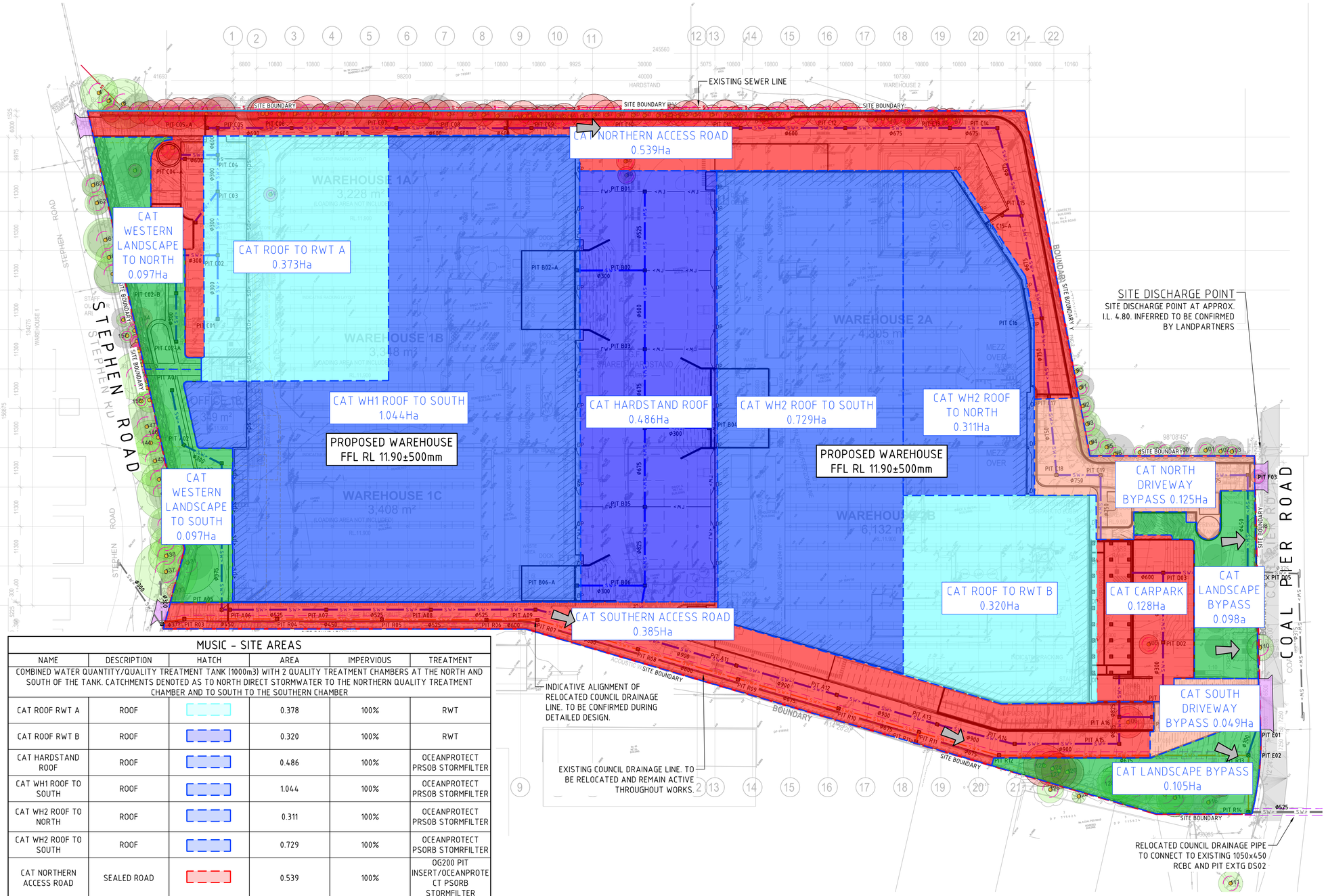
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA461

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: OSD HYDRAULIC DETAILS SHEET 2

DRAWING No: C014950.01-SSDA 461 | ISSUE: A



SITE DISCHARGE POINT

SITE DISCHARGE POINT AT APPROX. I.L. 4.80. INFERRED TO BE CONFIRMED BY LANDPARTNERS

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY BEVERIDGE WILLIAMS DATED 23.12.22.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- SW> – PROPOSED DRAINAGE LINE
- SW> – EXISTING DRAINAGE LINE
- DP – ROOFWATER DOWNPIPE (INDICATIVE)
- RW> – ROOFWATER LINE
- SS> – SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

MUSIC - SITE AREAS

NAME	DESCRIPTION	HATCH	AREA	IMPERVIOUS	TREATMENT
COMBINED WATER QUANTITY/QUALITY TREATMENT TANK (1000m3) WITH 2 QUALITY TREATMENT CHAMBERS AT THE NORTH AND SOUTH OF THE TANK. CATCHMENTS DENOTED AS TO NORTH DIRECT STORMWATER TO THE NORTHERN QUALITY TREATMENT CHAMBER AND TO SOUTH TO THE SOUTHERN CHAMBER					
CAT ROOF RWT A	ROOF		0.378	100%	RWT
CAT ROOF RWT B	ROOF		0.320	100%	RWT
CAT HARDSTAND ROOF	ROOF		0.486	100%	OCEANPROTECT PRSOB STORMFILTER
CAT WH1 ROOF TO SOUTH	ROOF		1.044	100%	OCEANPROTECT PRSOB STORMFILTER
CAT WH2 ROOF TO NORTH	ROOF		0.311	100%	OCEANPROTECT PRSOB STORMFILTER
CAT WH2 ROOF TO SOUTH	ROOF		0.729	100%	OCEANPROTECT PSORB STOMRFILTER
CAT NORTHERN ACCESS ROAD	SEALED ROAD		0.539	100%	OG200 PIT INSERT/OCEANPROTECT PSORB STORMFILTER
CAT SOUTHERN ACCESS ROAD	SEALED ROAD		0.385	100%	OG200 PIT INSERT/OCEANPROTECT PSORB STORMFILTER
CAT WESTERN LANDSCAPE TO NORTH	LANDSCAPE		0.097	0%	OG200 PIT INSERT/OCEANPROTECT PSORB STORMFILTER
CAT WESTERN LANDSCAPE TO SOUTH	LANDSCAPE		0.097	0%	OG200 OUT INSERT/OCEARNPTOE CT PSORB STORMFILET
CAT LANDSCAPE BYPASS	LANDSCAPE		0.098	0%	-
CAT LANDSCAPE BYPASS	LANDSCAPE		0.105	0%	-
CAT SOUTH DRIVEWAY (BYPASS)	SEALED ROAD		0.049	100%	-
CAT NORTH DRIVEWAY (BYPASS)	SEALED ROAD		0.125	100%	-

MUSIC MODELLING CATCHMENT PLAN

SCALE 1:500

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

CONTAMINATION NOTE:

CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS SHALL BE MANAGED IN ACCORDANCE WITH THE CONTAMINATION MANAGEMENT PLAN, WHICH FORMS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN. A CAPPING LAYER CONSISTING OF CLEAN COMPACTED CLAY FILL (VENM ONLY) TO A MINIMUM DEPTH OF 1000mm IS TO BE PROVIDED OVER THE SITE SUBJECT TO ADVICE FROM ENVIRONMENTAL/CONTAMINATION SPECIALIST. CONTAMINATED MATERIAL CAN NOT BE REMOVED FOR OFF-SITE DISPOSAL.

5m 0 10 20 30 40 50m

SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	B
ISSUED FOR INFORMATION	31.01.25	A

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA480

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: MUSIC MODELLING CATCHEMENT PLAN

DRAWING No: C014950.01-SSDA480 ISSUE: B

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY BEVERIDGE WILLIAMS DATED 23.12.22.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- SW> – PROPOSED DRAINAGE LINE
- SW> – EXISTING DRAINAGE LINE
- DP – ROOFWATER DOWNPIPE (INDICATIVE)
- RW> – ROOFWATER LINE
- SS> – SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

EXISTING SEWER LINE

SITE DISCHARGE POINT
SITE DISCHARGE POINT AT APPROX. I.L. 4.80. TO BE CONFIRMED ON SITE

PROPOSED WAREHOUSE FFL RL 11.90±500mm

PROPOSED WAREHOUSE FFL RL 11.90±500mm

OSD CAT 4.509Ha

BYPASS CAT 0.375Ha

COMBINED OSD/WATER QUALITY TREATMENT TANK
OSD VOLUME REQUIRED = 1,000m³ MIN.

INDICATIVE ALIGNMENT OF RELOCATED COUNCIL DRAINAGE LINE. TO BE CONFIRMED DURING DETAILED DESIGN.

EXISTING COUNCIL DRAINAGE LINE. TO BE RELOCATED AND REMAIN ACTIVE THROUGHOUT WORKS.

RELOCATED COUNCIL DRAINAGE PIPE TO CONNECT TO EXISTING 1050x450 RCBC AND PIT EXTG DS02

STEPHEN ROAD

COAL PIER ROAD

STORAGE - SITE AREAS

NAME	DESCRIPTION	HATCH	AREA	IMPERVIOUS	TREATMENT
COMBINED WATER QUANTITY/QUALITY TREATMENT TANK (1000m3) WITH 2 QUALITY TREATMENT CHAMBERS AT THE NORTH AND SOUTH OF THE TANK. CATCHMENTS DENOTED AS TO NORTH DIRECT STORMWATER TO THE NORTHERN QUALITY TREATMENT CHAMBER AND TO SOUTH TO THE SOUTHERN CHAMBER					
OSD CAT	LANDSCAPE, ROOF AND HARDSTAND		4.509	95%	OCEAN PROTECT PSORB STORMFILTER
BYPASS CATCHMENT	LANDSCAPE AND SEALED ROAD		0.375	46%	NONE

STORAGE CATCHMENT PLAN
SCALE 1:500

LEVELS NOTE:
LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

CONTAMINATION NOTE:
CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS SHALL BE MANAGED IN ACCORDANCE WITH THE CONTAMINATION MANAGEMENT PLAN, WHICH FORMS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN. A CAPPING LAYER CONSISTING OF CLEAN COMPACTED CLAY FILL (VENM ONLY) TO A MINIMUM DEPTH OF 1000mm IS TO BE PROVIDED OVER THE SITE SUBJECT TO ADVICE FROM ENVIRONMENTAL/CONTAMINATION SPECIALIST. CONTAMINATED MATERIAL CAN NOT BE REMOVED FOR OFF-SITE DISPOSAL.

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	A

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

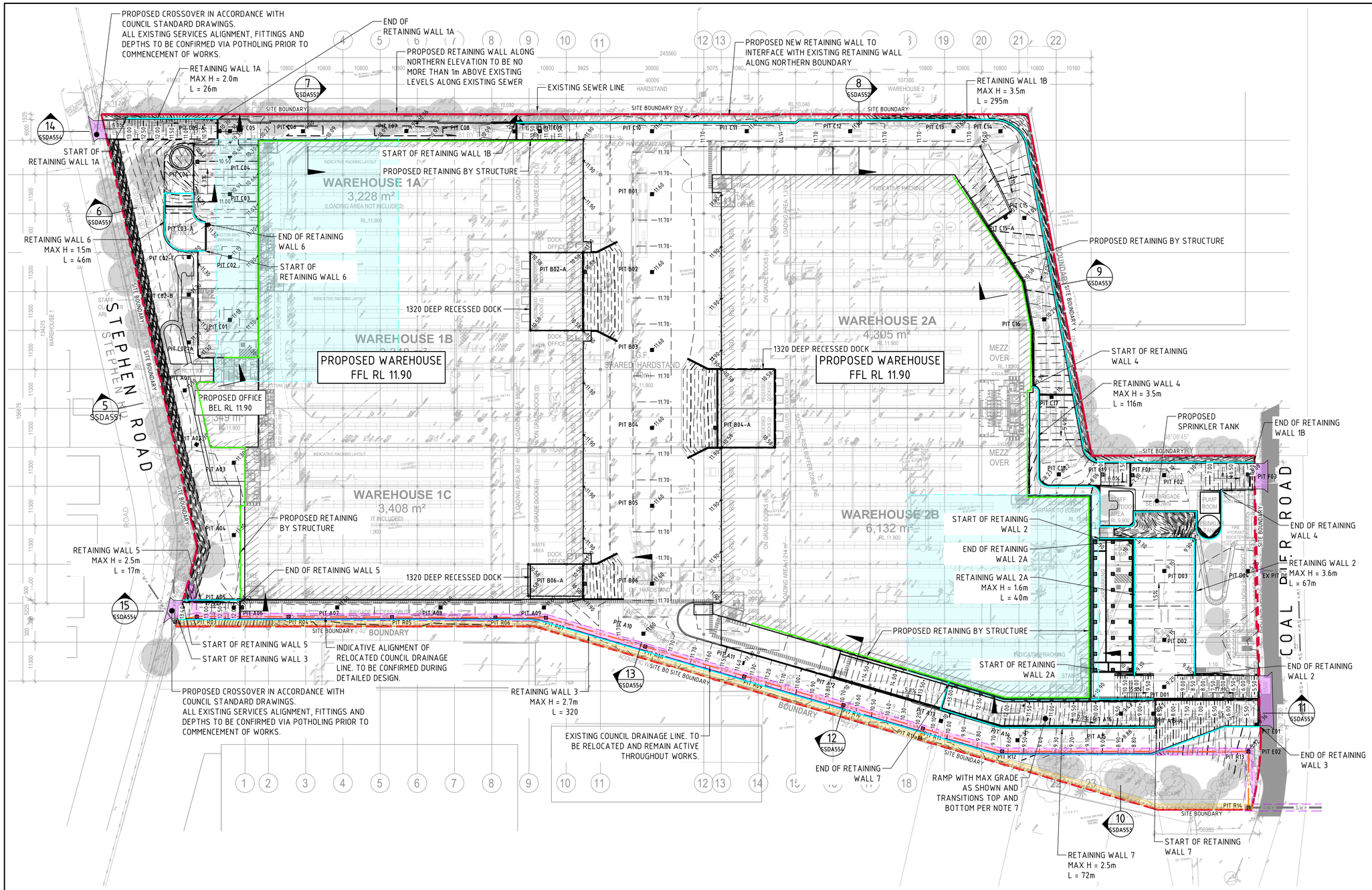
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA480

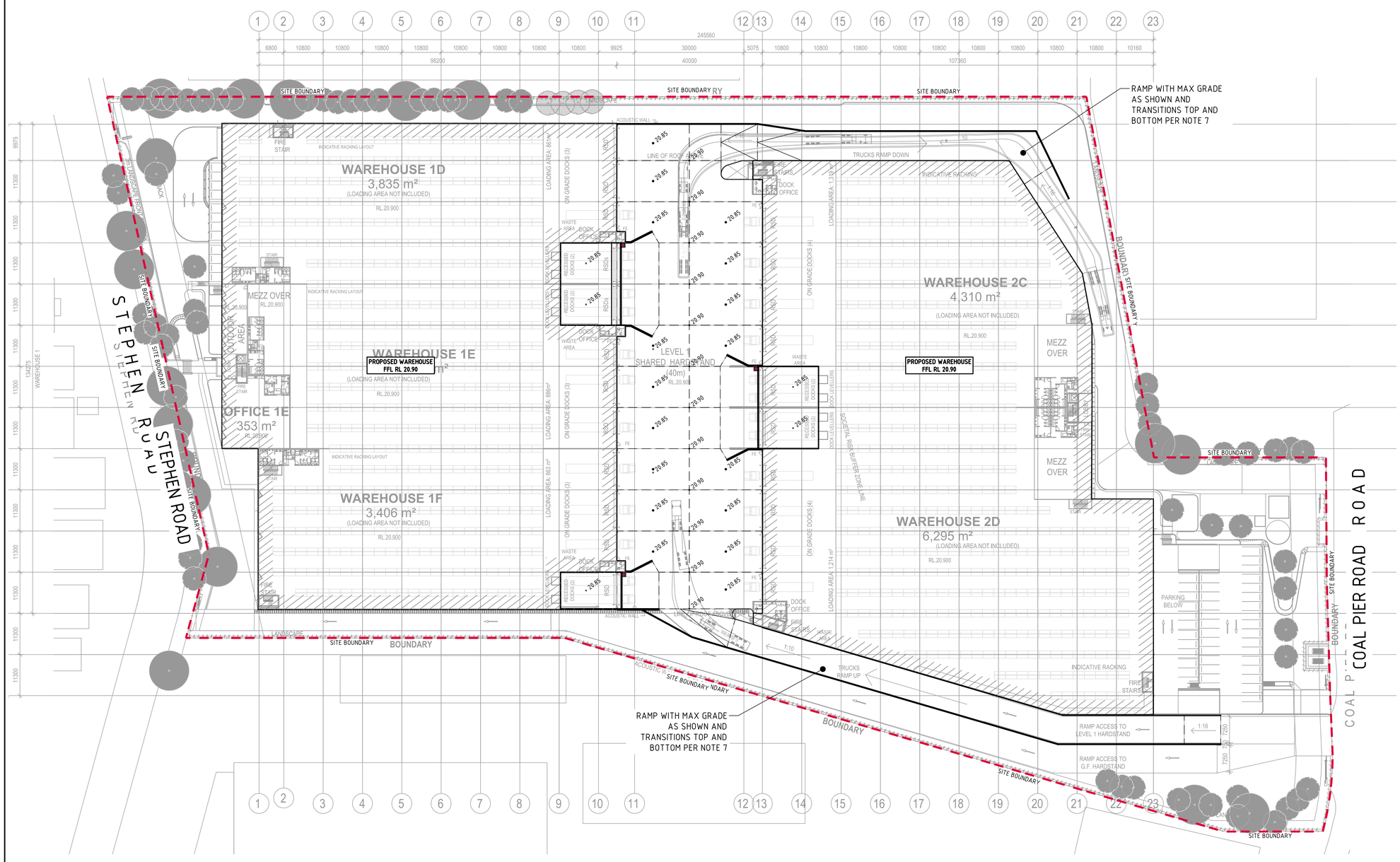
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: STORAGE CATCHMENT PLAN

DRAWING No: C014950.01-SSDA481 ISSUE: A


PROPOSED CROSSOVER IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS. ALL EXISTING SERVICES ALIGNMENT, FITTINGS AND DEPTHS TO BE CONFIRMED VIA POTHOLING PRIOR TO COMMENCEMENT OF WORKS.
END OF RETAINING WALL 1A
PROPOSED RETAINING WALL ALONG NORTHERN ELEVATION TO BE NO MORE THAN 1m ABOVE EXISTING LEVELS ALONG EXISTING SEWER
EXISTING SEWER LINE
PROPOSED NEW RETAINING WALL TO INTERFACE WITH EXISTING RETAINING WALL ALONG NORTHERN BOUNDARY
RETAINING WALL 1A MAX H = 2.0m L = 26m
RETAINING WALL 1B MAX H = 3.5m L = 295m
START OF RETAINING WALL 1A
START OF RETAINING WALL 1B
PROPOSED RETAINING BY STRUCTURE
WAREHOUSE 1A 3,228 m² (LOADING AREA NOT INCLUDED)
WAREHOUSE 1B
WAREHOUSE 1C 3,408 m²
WAREHOUSE 2A 4,305 m²
WAREHOUSE 2B 6,132 m²
PROPOSED WAREHOUSE FFL RL 11.90
PROPOSED OFFICE BEL RL 11.90 349 m²
1320 DEEP RECESSED DOCK
RETAINING WALL 6 MAX H = 1.5m L = 46m
END OF RETAINING WALL 6
START OF RETAINING WALL 6
RETAINING WALL 5 MAX H = 2.5m L = 17m
END OF RETAINING WALL 5
START OF RETAINING WALL 5
START OF RETAINING WALL 3
INDICATIVE ALIGNMENT OF RELOCATED COUNCIL DRAINAGE LINE. TO BE CONFIRMED DURING DETAILED DESIGN.
RETAINING WALL 3 MAX H = 2.7m L = 320
EXISTING COUNCIL DRAINAGE LINE. TO BE RELOCATED AND REMAIN ACTIVE THROUGHOUT WORKS.
END OF RETAINING WALL 7
RAMP WITH MAX GRADE AS SHOWN AND TRANSITIONS TOP AND BOTTOM PER NOTE 7
RETAINING WALL 7 MAX H = 2.5m L = 72m
START OF RETAINING WALL 7
START OF RETAINING WALL 2
END OF RETAINING WALL 2A
RETAINING WALL 2A MAX H = 1.6m L = 40m
START OF RETAINING WALL 2A
PROPOSED RETAINING BY STRUCTURE
PROPOSED SPRINKLER TANK
END OF RETAINING WALL 1B
START OF RETAINING WALL 4
RETAINING WALL 4 MAX H = 3.5m L = 116m
END OF RETAINING WALL 4
RETAINING WALL 2 MAX H = 3.6m L = 67m
END OF RETAINING WALL 2
END OF RETAINING WALL 3
PROPOSED CROSSOVER IN ACCORDANCE WITH COUNCIL STANDARD DRAWINGS. ALL EXISTING SERVICES ALIGNMENT, FITTINGS AND DEPTHS TO BE CONFIRMED VIA POTHOLING PRIOR TO COMMENCEMENT OF WORKS.
STEPHEN ROAD
COAL PIER ROAD
SITE BOUNDARY
BOUNDARY
INDICATIVE RACKING LAYOUT
ON GRADE DOCKS
DOCK LEVELLERS
DOCK OFFICE
WASTE AREA
STAIRS
LIFT
FIRE BRIGADE ACCESS ROUTE
SHARED HARDSTAND
MEZZ OVER
CONNECTION CARPARK TO LOBBY
OFF DOCK AREA
FIRE BRIGADE
PUMP ROOM
RING TANK
LANDSCAPE
S.W.
PIT A01
PIT A02
PIT A03
PIT A04
PIT A05
PIT A06
PIT A07
PIT A08
PIT A09
PIT A10
PIT A11
PIT A12
PIT A13
PIT A14
PIT A15
PIT A16
PIT A17
PIT A18
PIT B01
PIT B02
PIT B02-A
PIT B03
PIT B04
PIT B04-A
PIT B05
PIT B06
PIT B06-A
PIT C01
PIT C02
PIT C02-A
PIT C02-B
PIT C02-C
PIT C03
PIT C03-A
PIT C04
PIT C05
PIT C06
PIT C07
PIT C08
PIT C09
PIT C10
PIT C11
PIT C12
PIT C13
PIT C14
PIT C15
PIT C15-A
PIT C16
PIT C17
PIT C18
PIT D01
PIT D02
PIT D03
PIT D04
PIT E01
PIT E02
PIT F01
PIT F02
PIT F03
PIT R01
PIT R02
PIT R03
PIT R04
PIT R05
PIT R06
PIT R07
PIT R08
PIT R09
PIT R10
PIT R11
PIT R12
PIT R13
PIT R14
PIT R15
PIT R16
PIT R17
PIT R18
PIT R19
PIT R20
PIT



LEGEND:

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- 50.00 — FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 — FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- EXISTING DRAINAGE EASEMENT
- PROPOSED DRAINAGE EASEMENT

FINISHED LEVELS PLAN NOTES:

1. LEVELS DATUM IS AUSTRALIAN HEIGHT DATUM (A.H.D.).
2. GRADING REQUIREMENTS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS2890.1, AS2890.2 AND AS2890.6.
3. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
4. CONTOUR INTERVALS
   - THE MINOR CONTOUR INTERVAL IS 0.1m.
   - THE MAJOR CONTOUR INTERVAL IS 0.5m.
5. HARDSTAND GRADING
   - MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
   - GRADING OF ON-GRADE DOCKS TO BE 1:100 (1%) FALL AWAY FROM THE DOCK FACE FOR A LENGTH OF 15m U.N.O.
   - GRADING OF TRUCK CIRCULATION ZONES TO BE MINIMUM AS NOTED ABOVE, 3-4% NOMINAL AND MAX. 5%
6. CAR PARKING AREA GRADES
   - MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%), DESIRABLE MINIMUM GRADE 1:50 (2%).
   - MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) N CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
   - DISABLED ACCESS PARKING ZONES AND SHARED SPACE TO BE MAXIMUM OF 1:33 (3%) IN ASPHALT PAVEMENT AND MAXIMUM OF 1:40 (2.5%) IN CONCRETE PAVEMENT.
   - CARPARK RAMP GRADES TO BE MAX 1:5 WITH 2.5m SMOOTH TRANSITION AT TOP AND BOTTOM U.N.O.
7. TRUCK RAMP GRADES
   - MAXIMUM B-DOUBLE OR 19.0m AV RAMP GRADES ARE TO BE 1:8.3 (12%) U.N.O. ON PLAN
   - PROVIDE MINIMUM 4.0m LONG TRANSITION WHERE CHANGES OF GRADE EXCEED 1:20 (5%) AT A CREST U.N.O.
   - PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGE OF GRADE EXCEED 1:20 (5%) AT A SAG U.N.O.
   - TRANSITIONS ARE TO PROVIDE A SMOOTH CONTINOUS CIRCULAR AND TANGENTIAL CHANGE IN GRADE TO ENSURE NO SHARP OR ACUTE CHANGES IN GRADE ARE PRESENT.
8. WHERE FIRE BRIGADE ACCESS IS REQUIRED, MAXIMUM RAMP GRADIENTS ARE TO BE 1:6 (16.6%), DESIRABLE RAMP GRADIENTS ARE TO BE 1:8 (12.5%) WITH 7m TRANSITION TOP AND BOTTOM U.N.O. ON PLAN.
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H U.N.O. BASED ON GEOTECHNICAL ASSESSMENT. PROVIDE MINIMUM 0.5m BERM BETWEEN THE BACK OF KERB OR PAVEMENT EDGES AND THE TOP OR TOE OF A BATTER.
10. ALL BATTER SLOPE WITH GRADES AT OR EXCEEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL GRADE.
12. ALL PAVEMENTS ARE TO BE SET AT 30mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS. PROVIDE LOCAL FEATHERING AT DOORWAYS OR ROLLER SHUTTERS TO PROVIDE FLUSH FINISH AS REQUIRED.
13. WHERE NEW AND EXISTING INTERFACING IS REQUIRED, MATCH EXISTING LEVELS AND PROVIDE SMOOTH INTERFACE BETWEEN NEW AND EXISTING GRADIENTS. REFER ANY CONCERNS TO THE ENGINEER.

FINISHED LEVELS PLAN - FIRST FLOOR
SCALE 1:500

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

CONTAMINATION NOTE:

CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS SHALL BE MANAGED IN ACCORDANCE WITH THE CONTAMINATION MANAGEMENT PLAN, WHICH FORMS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN. A CAPPING LAYER CONSISTING OF CLEAN COMPACTED CLAY FILL (VENM ONLY) TO A MINIMUM DEPTH OF 1000mm IS TO BE PROVIDED OVER THE SITE. CONTAMINATED MATERIAL CAN NOT BE REMOVED FOR OFF-SITE DISPOSAL.

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	D
ISSUED FOR INFORMATION	04.03.26	C
ISSUED FOR SSDA	09.12.24	B
ISSUED FOR INFORMATION	18.10.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

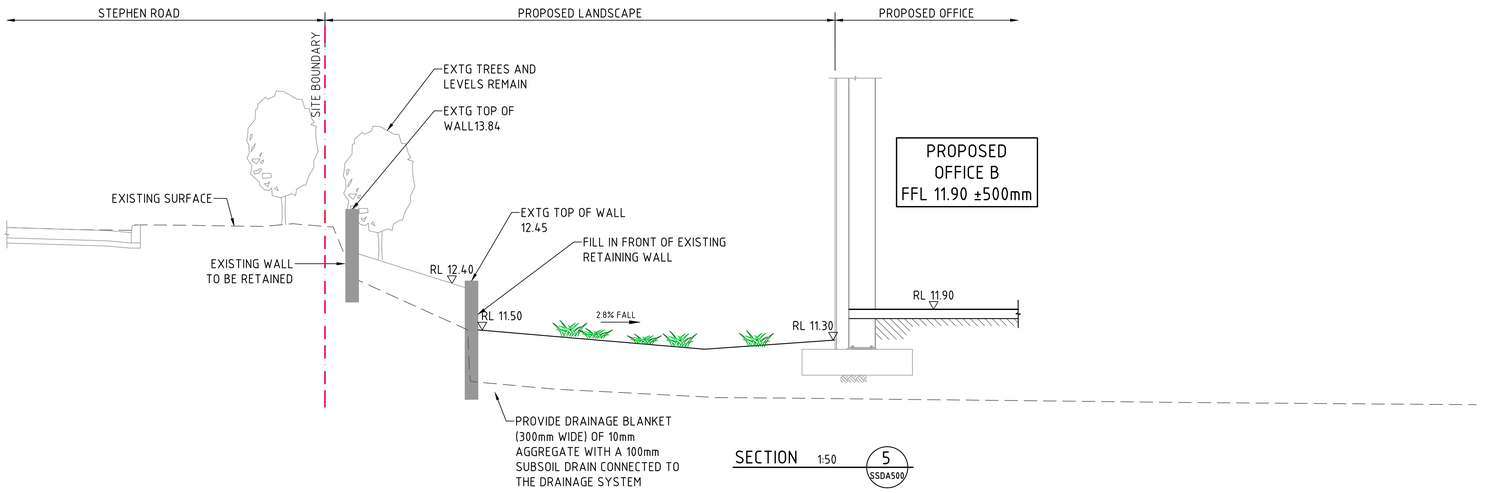
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA501

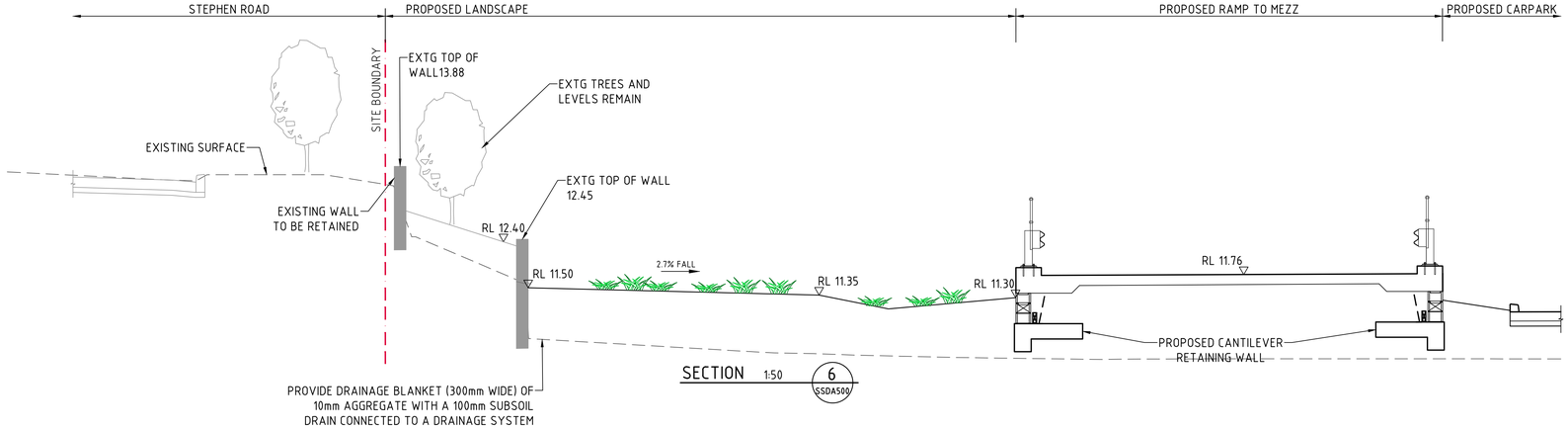
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
FINISHED LEVELS PLAN
FIRST FLOOR

DRAWING No C014950.01-SSDA501
ISSUE D





500mm 0 1 2 3 4 5m

SCALE 1:50 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	D
ISSUED FOR INFORMATION	04.03.26	C
ISSUED FOR SSDA	09.12.24	B
ISSUED FOR INFORMATION	18.10.24	A

AMENDMENTS	DATE	ISSUE

ARCHITECT
SBA ARCHITECTS

CLIENT
ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA551

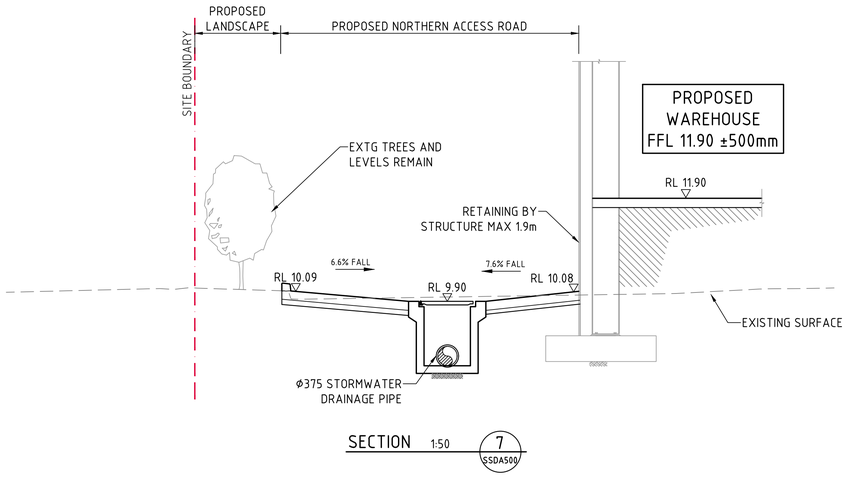
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

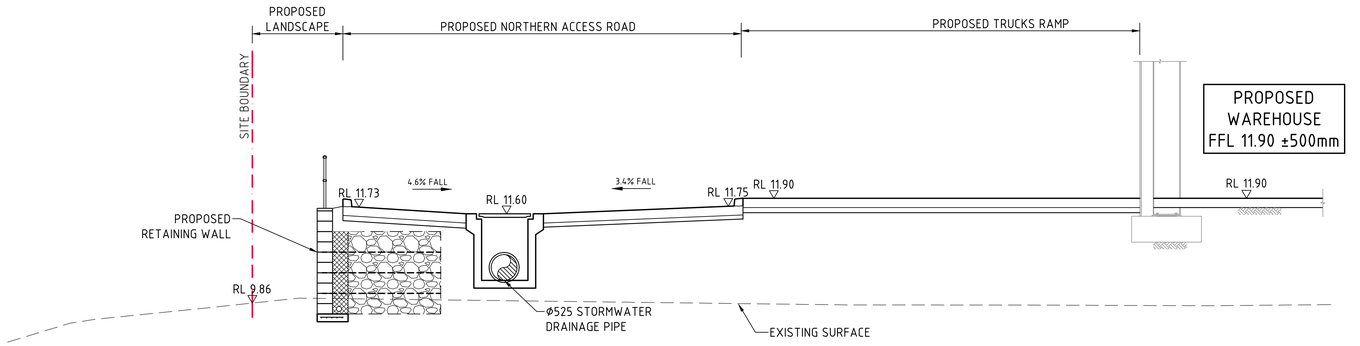
DRAWING TITLE
TYPICAL SECTIONS
SHEET 1

DRAWING No C014950.01-SSDA 551

ISSUE D



SECTION 1:50 7 SSDA500



SECTION 1:50 8 SSDA500

EXISTING Ø225 CONCRETE
ENCASED SEWER AT
APPROX. I.L 3.02

EXISTING Ø225 CONCRETE
ENCASED SEWER AT APPROX.
I.L 2.72

500mm 0 1 2 3 4 5m

SCALE 1:50 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	C
ISSUED FOR INFORMATION	04.03.26	B
ISSUED FOR SSDA	09.12.24	A

AMENDMENTS DATE ISSUE

ARCHITECT SBA ARCHITECTS

CLIENT ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

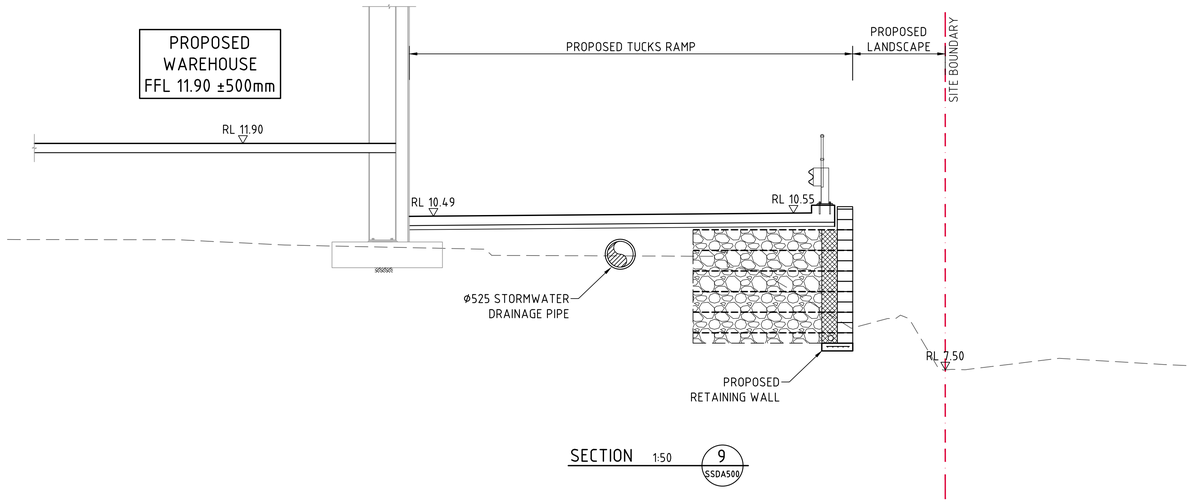
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA552

CONSULT AUSTRALIA

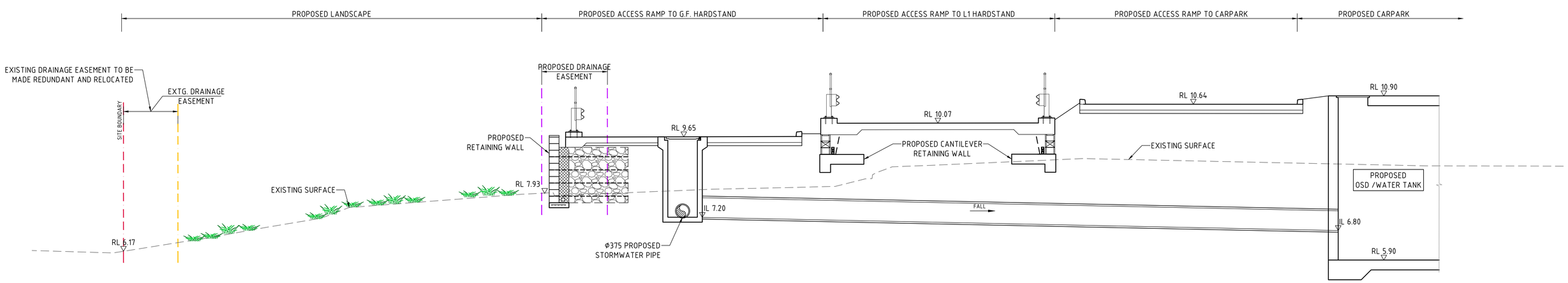
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
TYPICAL SECTIONS
SHEET 2

DRAWING No C014950.01-SSDA552 ISSUE C



SECTION 1:50 — 9 SSDA500



INDICATIVE EXTG. PIPE IN EASEMENT SHOWN THUS. DETAILS (INCL. SIZE AND LOCATION TO BE CONFIRMED VIA CCTV

SECTION 1:50 — 10 SSDA500

500mm 0 1 2 3 4 5m

SCALE 1:50 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	27.03.26	C
ISSUED FOR INFORMATION	04.03.26	B
ISSUED FOR SSDA	09.12.24	A

AMENDMENTS DATE ISSUE

ARCHITECT SBA ARCHITECTS

CLIENT ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA553

CONSULT AUSTRALIA

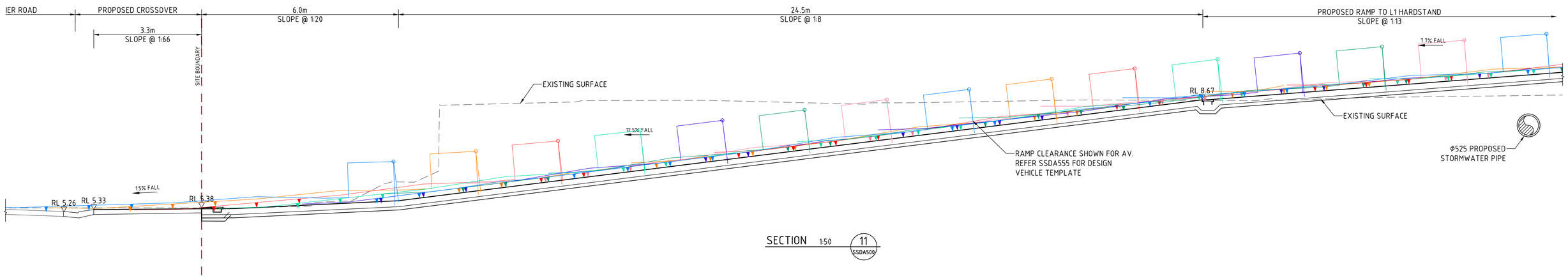
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

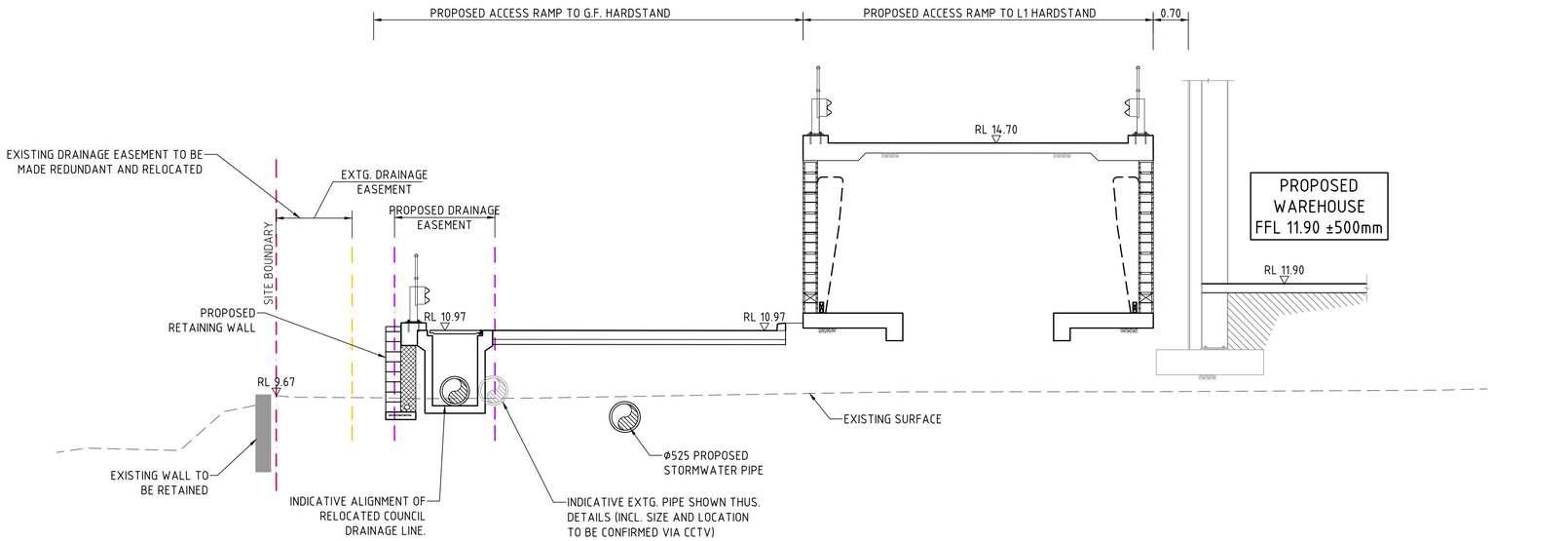
DRAWING TITLE
TYPICAL SECTIONS
SHEET 3

DRAWING No C014950.01-SSDA553

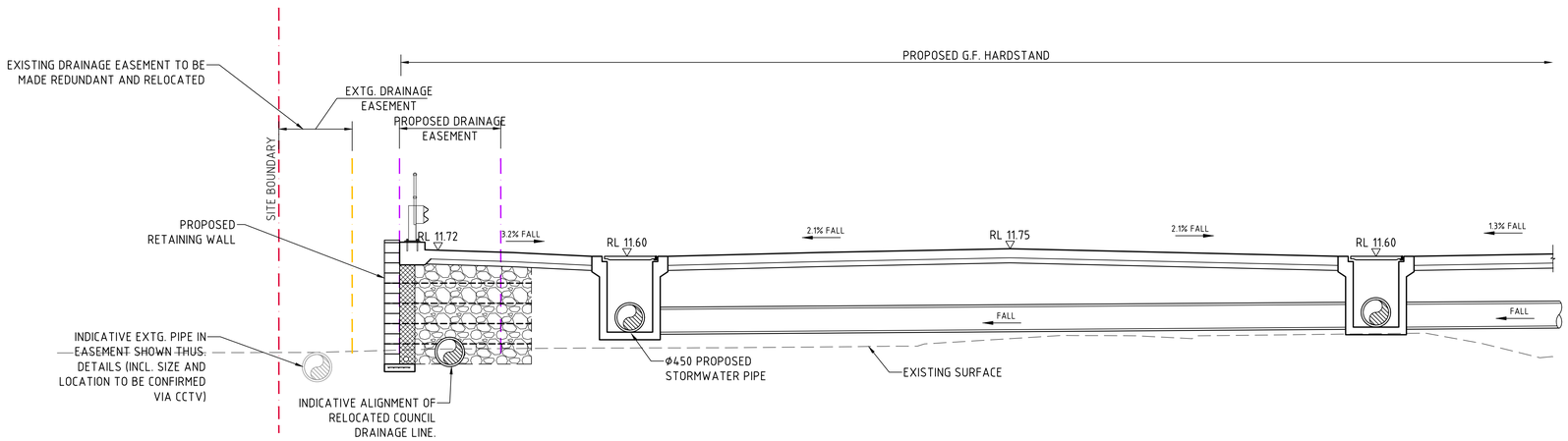
ISSUE C



SECTION 1:50 — 11 / SSDA500



SECTION 1:50 — 12 / SSDA500



SECTION 1:50 — 13 / SSDA500

500mm 0 1 2 3 4 5m

SCALE 1:50 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	12.06.26	E
ISSUED FOR SSDA	27.03.26	D
ISSUED FOR INFORMATION	04.03.26	C
ISSUED FOR SSDA	31.01.25	B
ISSUED FOR SSDA	09.12.24	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA554

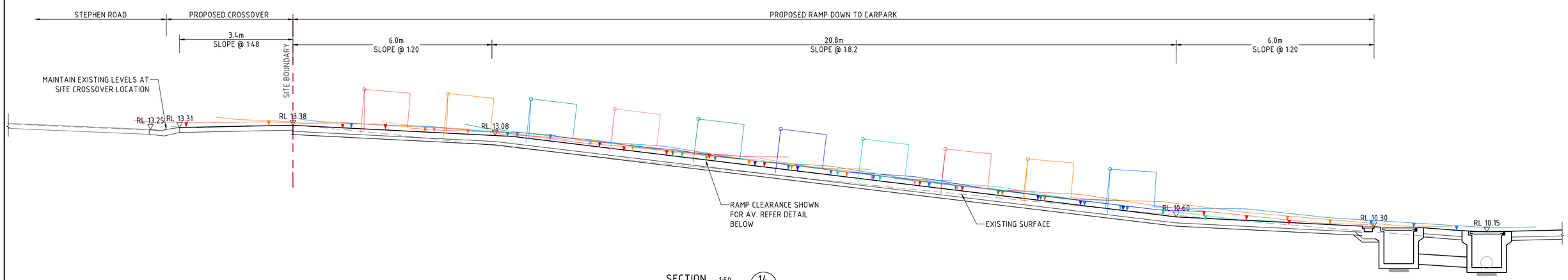
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

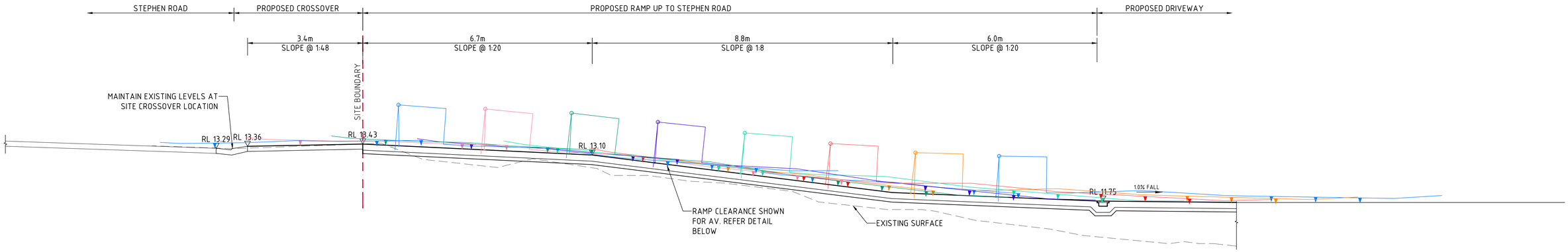
DRAWING TITLE
TYPICAL SECTIONS
SHEET 4

DRAWING No: C014950.01-SSDA 554

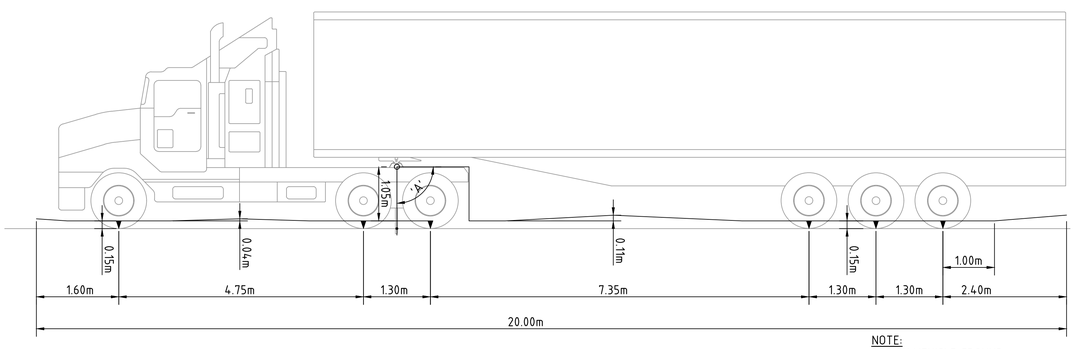
ISSUE: E



SECTION 1:50 (14 / SSDA500)



SECTION 1:50 (15 / SSDA500)



ARTICULATED VEHICLE GROUND CLEARANCE DETAIL
SCALE 1:50

NOTE:
DESIGN VEHICLE GROUND CLEARANCE DIAGRAMS BASED ON AS2890.2 APPENDIX A FIGURE A1.

500mm 0 1 2 3 4 5m
SCALE 1:50 AT B1 SIZE SHEET

FOR SSDA

AMENDMENTS	DATE	ISSUE
ISSUED FOR SSDA	12.06.26	C
ISSUED FOR SSDA	27.03.26	B
ISSUED FOR INFORMATION	04.03.26	A

ARCHITECT: SBA ARCHITECTS
CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
CC	JB	SEP '24	DS	B1	AS SHOWN	C014950.01-SSDA555

CONSULT AUSTRALIA

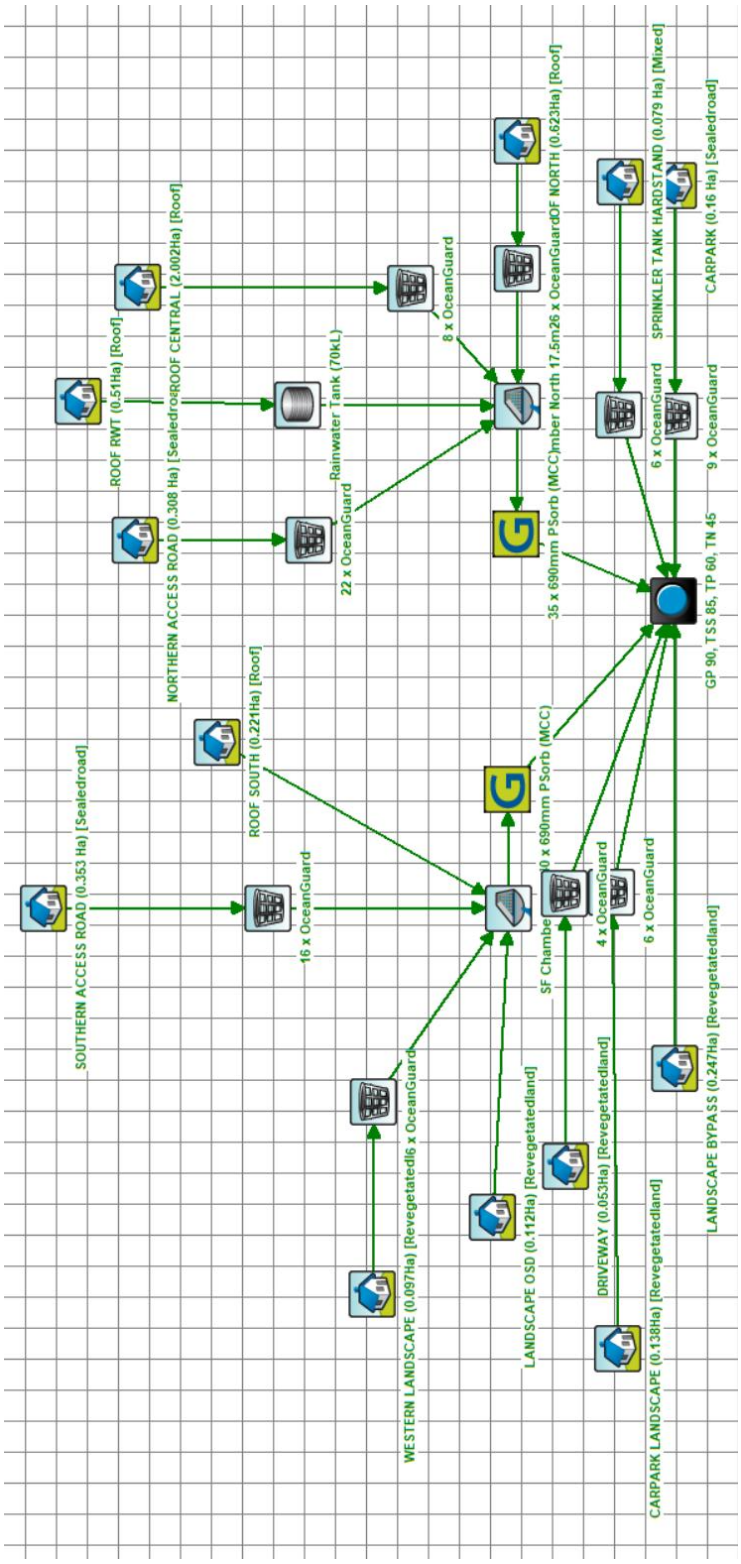
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
TYPICAL SECTIONS
SHEET 5

DRAWING No C014950.01-SSDA555
ISSUE C

APPENDIX B

MUSIC MODEL CONFIGURATION AND PARAMETERS



APPENDIX C

DRAFT SOIL AND WATER MANAGEMENT PLAN

C.1 Introduction

An erosion and sediment control plan (ESCP) is shown on drawing **CO14950.01-SSDA200** with details on **SSDA251** & **SSDA252**. These are conceptual plans only providing sufficient detail to clearly show that the works can proceed without undue pollution to receiving waters. A detailed plan will be prepared once consent is given and before works start.

The Staged ESCP considers initial site establishment, requirements during construction of the development, and completion of development.

C.2 General Conditions

1. The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in *Managing Urban Stormwater, Soils and Construction (2004) "The Blue Book"* and Blacktown City Council specifications.
3. All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in Table C.1.

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands	Entry prohibited except for essential management works	

Table C.1 Limitations to access

C.3 Erosion Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on the plan and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils remain on the surface at the completion of works.
3. Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:
    - 2H:1V where slope length is less than 7 metres
    - 2.5H:1V where slope length is between 7 and 10 metres
    - 3H:1V where slope length is between 10 and 12 metres
    - 4H:1V where slope length is between 12 and 18 metres
    - 5H:1V where slope length is between 18 and 27 metres
    - 6H:1V where slope length is greater than 27 metres
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used or the surface will be left in a cloddy state that resists removal by wind.

C.4 Pollution Control Conditions

1. Stockpiles will not be located within 5 metres of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways. Silt/ sediment fences and appropriate stabilisation of stockpiles are to be provided as detailed on the drawings.

2. Sediment fences will:

   a) Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.

   b) Have a catchment area not exceeding 720 square meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and

   c) Provide a return of 1 metre upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20-year t_c discharge.

3. Sediment removed from any trapping device will be disposed in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.

4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.

5. Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

C.5 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

C.6 Site Inspection and Maintenance

0. A self-auditing program will be established based on a Check Sheet. A site inspection using the Check Sheet will be made by the site manager:

   - At least weekly.
   - Immediately before site closure.
   - Immediately following rainfall events in excess of 5mm in any 24-hour period.

   The self-audit will include:

   - Recording the condition of every sediment control device

- Recording maintenance requirements (if any) for each sediment control device
- Recording the volumes of sediment removed from sediment retention systems, where applicable
- Recording the site where sediment is disposed
- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information

1. In addition, a suitably qualified person will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report. The responsible person will ensure that:

    - The plan is being implemented correctly
    - Repairs are undertaken as required
    - Essential modifications are made to the plan if and when necessary

    The report shall carry a certificate that works have been carried out in accordance with the plan.

2. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.

3. Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,

    - No low points exist that can overtop in a large storm event
    - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams of installing additional diversion upslope.
    - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).

4. Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include and areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.

5. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.

6. Excessive vegetation growth will be controlled through mowing or slashing.

7. All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:

    a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them

    b) Degradable products to ensure they are replaced as required, and

    c) Sediment removal, to ensure the design capacity or less remains in the settling zone.

8. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.
9. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.
10. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised
11. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

EROSION AND SEDIMENT CONTROL

WEEKLY SITE INSPECTION SHEET

LOCATION . . . . . .

INSPECTION OFFICER . . . . . **DATE** . . . . . .

SIGNATURE . . . . . .

Legend: □ OK □ Not OK N/A Not applicable

Item	Consideration	Assessment
1	Public roadways clear of sediment.	. . . . .
2	Entry/exit pads clear of excessive sediment deposition.	. . . . .
3	Entry/exit pads have adequate void spacing to trap sediment.	. . . . .
4	The construction site is clear of litter and unconfined rubbish.	. . . . .
5	Adequate stockpiles of emergency ESC materials exist on site.	. . . . .
6	Site dust is being adequately controlled.	. . . . .
7	Appropriate drainage and sediment controls have been installed prior to new areas being cleared or disturbed.	. . . . .
8	Up-slope "clean" water is being appropriately diverted around/through the site.	. . . . .
9	Drainage lines are free of soil scour and sediment deposition.	. . . . .
10	No areas of exposed soil are in need of erosion control.	. . . . .
11	Earth batters are free of "rill" erosion.	. . . . .
12	Erosion control mulch is not being displaced by wind or water.	. . . . .
13	Long-term soil stockpiles are protected from wind, rain and stormwater flow with appropriate drainage and erosion controls.	. . . . .
14	Sediment fences are free from damage.	. . . . .
15	Sediment-laden stormwater is not simply flowing "around" the sediment fences or other sediment traps.	. . . . .
16	Sediment controls placed up-slope/around stormwater inlets are appropriate for the type of inlet structure.	. . . . .
17	All sediment traps are free of excessive sediment deposition.	. . . . .
18	The settled sediment layer within a sediment basin is clearly visible through the supernatant prior to discharge such water.	. . . . .

19	All reasonable and practicable measures are being taken to control sediment runoff from the site.	. . . . .
20	All soil surfaces are being appropriately prepared (i.e. pH, nutrients, roughness and density) prior to revegetation.	. . . . .
21	Stabilised surfaces have a minimum 70% soil coverage.	. . . . .
22	The site is adequately prepared for imminent storms.	. . . . .
23	All ESC measures are in proper working order.	. . . . .

APPENDIX D

STORMWATER SYSTEM

DRAFT MAINTENANCE SCHDULE

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
INLET & JUNCTION PITS			
Inside of pits	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of pits	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment,

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
			debris, litter and vegetation.
PROPRIETARY TREATMENT DEVICES			
Refer to Manufacturers Operation and Maintenance Manuel	Annually	Maintenance Contractor	Refer to Manufacturers Operation and Maintenance Manuel
RAINWATER TANK			
Check for any clogging and blockage of the first flush device	Monthly	Maintenance Contractor	First flush device to be cleaned out
Check for any clogging and blockage of the tank inlet -leaf/litter screen	Six monthly	Maintenance Contractor	Leaves and debris to be removed from the inlet leaf/litter screen
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable depth as specified by the hydraulic consultant
STORMWATER SYSTEM			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.
TANKS			
Inspect and remove any blockage from orifice	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen to inspect orifice.
Inspect trash screen and clean	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen if required to clean it.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Inspect flap valve and remove any blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate. Ensure flap valve moves freely and remove any blockages or debris.
Inspect pit sump for damage or blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate & screen. Remove sediment/ sludge build up and check orifice and flap valve are clear.
Inspect storage areas and remove debris/ mulch/ litter etc likely to block screens/ grates.	Six Monthly	Maintenance Contractor/ Owner	Remove debris and floatable materials.
Check attachment of orifice plate and screen to wall of pit	Annually	Maintenance Contractor	Remove grate and screen. Ensure plate or screen mounted securely, tighten fixings if required. Seal gaps if required.
Check orifice diameter is correct and retains sharp edge.	Five yearly	Maintenance Contractor	Compare diameter to design (see Work-as-Executed) and ensure edge is not pitted or damaged.
Check screen for corrosion	Annually	Maintenance Contractor	Remove grate and screen and examine for rust or corrosion, especially at corners or welds.
Inspect overflow weir and remove any blockage	Six monthly	Maintenance Contractor/ Owner	Ensure weir is free of blockage.
Inspect walls for cracks or spalling	Annually	Maintenance Contractor	Remove grate to inspect internal walls, repair as necessary.
Check step irons	Annually	Maintenance Contractor	Ensure fixings are secure and irons are free from corrosion.

APPENDIX E

PLANNING SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

SSD-65924461

Planning Secretary's Environmental Assessment Requirements

Stephen Road Multi-level Warehouse, Banksmeadow

Application Number	SSD-65924461
Project Name	Stephen Road Multi-level Warehouse, Banksmeadow
Development	Remediation of site and construction and operation of a multi-level warehouse.
Location	49-61 Stephen Road, Banksmeadow within Bayside Local Government Area
Applicant	ESR Developments (Australia) Pty Ltd
Date of Issue	30 January 2024
General Requirements	The Environmental Impact Statement (EIS) for the development must • comply with these assessment requirements • meet the form and content requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021 (the Regulation) • have regard to the Department's *State Significant Development Guidelines (2022)*. In addition, the EIS must include: • a clear comprehensive description of the proposal for the site, including details of all activities and processes proposed to be carried out as part of the development • consideration of issues discussed in the public authority responses to request for key issues (see **Attachment 2**) • a detailed assessment of the key issues specified below, including: – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages and activities that form part of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes – a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage significant risks to the environment. The EIS must also be accompanied by: • high quality files of maps and figures of the subject site and proposal • a report providing a detailed calculation of the capital investment value (CIV) (as defined in Schedule 7 of the Regulation) of the proposal. The CIV report must: – be prepared by an AIQS Certified Quantity Surveyor or RICS Chartered Quantity Surveyor – include details of all assumptions and components from which the CIV calculation is derived – include certification from the Quantity Surveyor that the report has been prepared having regard to the Department's Planning Circular PS 21-020 'Calculation of capital investment value' and all components costed are consistent with the project description and all proposed works for which consent is being sought as described in the EIS. • an estimate of the retained and new jobs that would be created during the construction and operational phases of the development, including details of the methodology to determine the figures provided • certification that the information provided is accurate at the date of preparation • a declaration from a Registered Environmental Assessment Practitioner that your EIS includes the information specified in the Department's *Registered Environmental Assessment Practitioner Guidelines*.
Key issues	The EIS must address the following specific matters: • **Statutory and Strategic Context** – including: – justification for the proposal and the suitability of the site – detailed justification that the proposed land use is permissible with consent – details of any proposed consolidation or subdivision of land

- a detailed description of the history of the site, including the relationship between the proposed development and all development consents and approved plans previously and/or currently applicable to the site
- demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. This includes, but is not limited to:
  - State Environmental Planning Policy (Biodiversity and Conservation) 2021
  - State Environmental Planning Policy (Industry and Employment) 2021
  - State Environmental Planning Policy (Planning Systems) 2021
  - State Environmental Planning Policy (Resilience and Hazards) 2021
  - State Environmental Planning Policy (Sustainable Buildings) 2022
  - State Environmental Planning Policy (Transport and Infrastructure) 2021 (including Chapter 5 – Three Ports)
  - Bayside Local Environmental Plan 2021
  - Greater Sydney Region Plan: A Metropolis of Three Cities
  - Eastern City District Plan
  - Our Greater Sydney 2056: Central City District Plan
  - Future Transport Strategy 2056.

- **Suitability of the Site** – including:
  - a detailed justification for the proposal and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints.
- **Community and Stakeholder Engagement** – a community and stakeholder engagement strategy consistent with the Department's *Undertaking Engagement Guidelines for State Significant Projects* for all stages of the development, including (but not limited to):
  - details of how issues raised, and feedback provided during engagement activities have been considered and responded to in the development
  - details of the proposed approach to future community and stakeholder engagement based on the results of consultation.
- **Contamination** – a site contamination assessment in accordance with the Managing Land Contamination Planning Guidelines: SEPP 55 – Remediation of Land (DUAP, 1998), including:
  - assessment of the extent and nature of any contamination of the soil, groundwater and soil vapour including the potential risks to human health and the environmental receptors near the site
  - the engagement of a Site Auditor accredited under the *Contaminated Land Management Act 1997* NSW Site Auditor Scheme
  - a remedial action plan (RAP) detailing the measures that will be undertaken to remediate and manage contamination identified at the site
  - a statement from a NSW Site Auditor, certifying site suitability for the intended use subject to the implementation of the submitted RAP
  - details of any required long term management of the site
  - how the development will integrate with any Voluntary Management Proposal applying to the site.
- **Traffic and Transport** – a quantitative traffic impact assessment prepared in accordance with relevant Roads and Maritime Services and Austroads guidelines, that includes:
  - details of all daily and peak traffic volumes likely to be generated during all key stages of construction and operation, including a description of key access / haul routes, vehicle types and potential queuing impacts
  - an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts on existing performance levels of nearby intersections (including maximum queue length), using a calibrated and validated SIDRA (or similar) traffic model (see TfNSW comments in Attachment 2)
  - swept path diagrams demonstrating that the largest vehicle accessing the site can manoeuvre surrounding key intersections.
  - plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network

- details and plans of the proposed internal road network, loading docks, pedestrian and cycling facilities and on-site parking in accordance with the relevant Australian Standards
- consideration of any parking that is required for a café use
- details of the largest vehicle anticipated to access and move within the site, including swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site
- details of road upgrades, infrastructure works or new roads or access points required for the development if necessary.

- **Air Quality and Odour** – an assessment of the potential air quality, dust and odour impacts of the development (remediation, construction and operation) on surrounding landowners, businesses and sensitive receptors, in accordance with relevant Environment Protection Authority guidelines, including details of proposed mitigation, management and monitoring measures.
- **Soils** – an assessment of potential impacts on soil resources and riparian land on and near the site, including:
  - impacts on soil erosion, salinity and acid sulfate soils
  - details of earthworks, including cut and fill volumes
  - description of the proposed erosion and sediment controls during construction.
- **Water Management** – an integrated water management strategy, including:
  - a surface and groundwater water discharge assessment in accordance with relevant EPA guidelines, including an assessment of potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby
  - detail how water sensitive urban design has been incorporated into the development
  - a detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements
  - details of the proposed stormwater/wastewater drainage design including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water
  - an assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby
  - description of the measures to minimise water use
  - characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria using a MUSIC water quality model
  - details of any surface or groundwater mitigation, management and monitoring activities and methodologies.
- **Flooding** – a flood risk assessment, that includes a detailed flooding assessment that satisfies the objectives and any relevant provisions of the NSW Floodplain Development Manual (2023) and Council's requirements.
- **Noise and Vibration** – a quantitative noise and vibration impact assessment undertaken by a suitably qualified acoustic consultant in accordance with the relevant Environment Protection Authority guidelines and Australian Standards which includes:
  - the identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours and a detailed sleep disturbance assessment
  - details of noise monitoring survey, background noise levels, noise source inventory and 'worst case' noise emission scenarios
  - consideration of noise generated from a potential café onsite
  - consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area
  - consideration of vehicle's usage of ramps
  - a cumulative impact assessment inclusive of impacts from other developments
  - details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration following application of mitigation these measures and details of any proposed compliance monitoring programs.

- **Urban Design and Visual, including:**
  - demonstration of how the development will achieve design excellence in accordance with any relevant EPI provisions and the objectives for good design in Better Placed (Government Architect NSW, 2017)
  - consideration of building orientation (including office space orientation) and impact on Stephen Road
  - consideration of interface with Stephens Road, including large height differences between the proposal and low density residential across Stephens Road
  - a response to all urban design matters raised by Bayside Council (Attachment 2)
  - a visual impact assessment (including photomontages and perspectives) of the development layout and design (buildings and storage areas), including:
    - details of staging, site coverage, setbacks, open space, landscaping, height, colour, scale, building materials and finishes, façade design, signage and lighting, particularly in terms of potential impacts on:
      - nearby public and private receivers
      - significant vantage points in the broader public domain
    - consideration of the layout and design of the development having regard to the surrounding vehicular, pedestrian and cycling networks
  - detailed plans showing suitable landscaping which incorporates endemic species as well as how it maximises opportunities for green infrastructure, consistent with Greener Places (Government Architect NSW, 2020) and consideration of retention of existing vegetation
  - assessment of shading, privacy and light nuisance impacts on residences across Stephens Road
  - plans demonstrating height and extent of any retaining walls proposed.
- **Infrastructure Requirements** – an infrastructure delivery, management and staging plan that includes:
  - an assessment of impacts of the development on existing utility infrastructure and service provider assets surrounding the site
  - a detailed written and/or graphical description of infrastructure required on the site, including any electrical substation/s and on-site switch yard/s
  - details of the existing capacity of the site to service the proposed development and any extension or augmentation, property tenure or staging requirements for the provision of utilities, including arrangements for electrical network requirements, drinking water, wastewater and recycled water
  - a description of how any upgrades will be co-ordinated, funded and delivered on time and be maintained to facilitate the development
  - identification of any existing infrastructure or easements on or off the site which may be impacted by construction or operation of the development and details of measures to be implemented to address any impacts.
- **Hazards and Risk** – including:
  - a preliminary risk screening completed in accordance with *State Environmental Planning Policy (Resilience and Hazards) 2021* and Applying SEPP 33 (DoP, 2011), that includes:
    - a clear indication of class, storage and handling quantities and location of all dangerous goods and hazardous materials associated with the development
  - a Preliminary Hazard Analysis (PHA) prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011), should the preliminary risk screening indicate that the project is "potentially hazardous".
  - an evaluation and assessment of the risks posed by the Botany Industrial Park (BIP) complex on the development and demonstrate that the development complies with the risk criteria for development in the vicinity of potentially hazardous facilities published in Hazardous Industry Planning Advisory Paper No. 10 – Land Use Safety Planning (DoP, 2011). The assessment must be undertaken in consultation with BIP, must be based on the most recently available data and must demonstrate that the development would not result in any increase of the overall societal risk in the area
  - consultation with APA Group regarding proximity to the Moomba Sydney Pipeline
  - consideration of any impacts associated with Sydney Airport.
- **Aboriginal Cultural Heritage** – an Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the Code of Practice for Archaeological Investigation in NSW (DECCW 2010), and guided by the Guide to Investigating,

	Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales (OEH 2011). The ACHAR must: – identify, describe and assess impacts on the Aboriginal cultural heritage values that exist across the development site – provide evidence and details of consultation with Aboriginal people in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010) – include results of a surface survey and any test excavations and an unexpected finds protocol. • **Non-Aboriginal Cultural Heritage** – a non-Aboriginal cultural heritage assessment (including both cultural and archaeological significance) which must detail potential impacts on heritage assets and any proposed management and mitigation measures. • **Biodiversity** – an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted. • **Waste** – including: – details of the quantities and classification of all waste streams to be generated on site during the development – details of waste storage, handling and disposal during the development – details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW *Waste and Sustainable Materials Strategy 2041*. • **Social** – including a social impact assessment in accordance with the Department's *Social Impact Assessment Guideline* • **Bush Fire Risk** – if the development is on mapped bush fire prone land, or a bush fire threat is identified on or adjoining the site, provide a bush fire assessment that details proposed bush fire protection measures and demonstrates compliance with Planning for Bush Fire Protection • **Ecologically Sustainable Development** – including: – identification of how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development – demonstration of how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards – demonstration of how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources – if Chapter 3 of State Environmental Planning Policy (Sustainable Buildings) 2022 applies: o demonstrate how the development has been designed to address the provisions set out in in Chapter 3.2(1) o provide a NABERS Embodied Emissions Material Form to disclose the amount of embodied emissions attributable to the development in accordance with section 35BA of the EP&A Regulation. • **Planning Agreement/Development Contributions** – including consideration of any applicable State and local development contributions, Housing and Productivity Contribution and/or draft contributions plan(s).
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Bayside Council • Department of Climate Change, Energy, the Environment and Water, specifically the: o Environment Protection Authority • Transport for NSW • Fire & Rescue NSW • Sydney Water • surrounding local landowners, businesses and stakeholders • local and regional community and environmental groups • Local Aboriginal Land Council

	• Sydney Airport • AirServices Australia • APA Group • Civil Aviation Safety Authority • any other public transport, utilities or community service providers.
SEARs Expiry	SEARs will expire two years after the date of issue (or the date they were last modified).
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, **Attachment 1** contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

ATTACHMENT 1

Technical and Policy Guidelines

The following guidelines may assist in the preparation of the environmental impact statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines
http://www.australia.gov.au/publications
http://www.epa.nsw.gov.au/
http://www.environment.nsw.gov.au/
http://www.dpi.nsw.gov.au/

Policies, Guidelines & Plans

Aspect	Policy / Methodology
State Significant Development Guidelines	
	State Significant Assessment Guidelines (DPIE, 2021)
	Undertaking Engagement Guide – Guidance for State Significant Projects (DPE, 2022)
	Cumulative Impact Assessment Guidelines for State Significant Projects (DPE, 2022)
Air Quality	
Air Quality	Protection of the Environment Operations (Clean Air) Regulation 2022
	Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (EPA, 2022)
	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2022)
Odour	Assessment and Management of Odour from Stationary Sources in NSW (DEC 2006)
Greenhouse Gas	AGO Factors and Methods Workbook (AGO, 2018)
	Guidelines for Energy Savings Action Plans (DEUS, 2005)
	National Greenhouse and Energy Reporting Scheme Measurement, Technical Guidelines for the estimation of emissions by facilities in Australia (Department of the Environment and Energy (DoEE), 2017)
	National Greenhouse Accounts Factors (DoEE, 2019)
Biodiversity	
	Biodiversity Conservation Act 2016
	Biodiversity Assessment Method (EES, 2021)
	Guidelines for Controlled Activities on Waterfront Land (NRAR, 2018)
	Developments adjacent to National Parks and Wildlife Service lands (DPIE, 2020)
Bush Fire	
	Planning for Bush Fire Protection (RFS, 2019)
Climate Change	
	EPA Climate Change Policy (EPA, 2023)
	Net Zero Plan Stage 1: 2020-2030 (DPIE, 2020)
Design Quality	
	Greener Places (Government Architect NSW, 2020)
	Better Placed (Government Architect NSW, 2017)
Fire Safety	
	Fire Safety Guidelines – Fire Safety in Waste Facilities (FRNSW, 2020)
Flooding	

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Flood Impact and Risk Assessment Flood Risk Management Guide (LU01) (DPE, 2022)
	Department of Climate Change, Energy, Environment and Water Flood Risk Management Toolkit – https://www.environment.nsw.gov.au/topics/water/floodplains/floodplain-guidelines
Hazards and Risk	
	State Environmental Planning Policy (Resilience and Hazards) 2021
	Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DoP, 2011)
	Assessment Guideline: Multi-level Risk Assessment (Planning and Infrastructure, 2011)
Heritage	
Non-Aboriginal Heritage	*Heritage Act 1977*
	NSW Heritage Manual (HO and DUAP, 1996)
	The Burra Charter (ICOMOS Australia, 2013)
	Statements of Heritage Impact (HO and DUAP, 2002)
Aboriginal Heritage	Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)
	Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, 2010)
Human Health Risk	
	Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards (enHealth, 2012)
Noise and Vibration	
	Approved methods for measurement and analysis of environmental noise in NSW (EPA, 2022)
	Acoustics – Description and measurement of environmental noise (AS1055:2018)
	Noise Policy for Industry (EPA, 2017)
	NSW Road Noise Policy (DECCW, 2011)
	Noise Criteria Guideline (RMS, 2015)
	Noise Mitigation Guideline (RMS, 2015)
	Interim Construction Noise Guideline (DECC, 2009)
	Assessing Vibration: A Technical Guide (DEC, 2006)
	Noise Guide for Local Government (EPA, 2013)
Social	
	Social Impact Assessment Guideline for State Significant Projects (DPIE, 2021)
Soils and Water	
Erosion and Sediment	Managing Urban Stormwater: Soils & Construction (Landcom, 2004)
	Soil and Landscape Issues in Environmental Impact Assessment (DLWC, 2000)
	Wind Erosion – 2nd Edition (DIPNR, 2003)
Groundwater	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC, 2000)
	NSW State Groundwater Policy Framework Document (DLWC, 1997)
	NSW Aquifer Interference Policy (NOW, 2012)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources (NOW, 2011)
	Storing and Handling Liquids: Environmental Protection (DECC, 2007)
Stormwater	Managing Urban Stormwater: Strategic Framework. Draft (EPA, 1996)
	Managing Urban Stormwater: Council Handbook. Draft (EPA, 1997)
	Managing Urban Stormwater: Treatment Techniques (DEC, 2006)
	Managing Urban Stormwater: Source Control. Draft (EPA, 1998)
	Managing Urban Stormwater: Harvesting and Reuse (DEC, 2006)
Wastewater	National Water Quality Management Strategy: Guidelines for Sewerage Systems – Effluent Management (ARMCANZ/ANZECC, 1997)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems – Use of Reclaimed Water (ARMCANZ/ANZECC, 2000)
	National Water Quality Management Strategy – Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) (EPHC, NRMMC & AHMC, 2006)
	National Water Quality Management Strategy – Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) (EPHC, NRMMC & AHMC, 2009)
Contamination	State Environmental Planning Policy (Resilience and Hazards) 2021
	Managing Land Contamination Planning Guidelines, SEPP 55 – Remediation of Land (DUAP & EPA, 1998)
	Consultants reporting on contaminated land: Contaminated Land Guidelines (EPA, 2020)
Traffic, Transport and Access	
	Roads Act 1993
	State Environmental Planning Policy (Transport and Infrastructure) 2021
	Guide to Traffic Generating Development (RTA, 2002 as updated)
	Road Design Guide (RMS, 2015-2017)
	Guide to Traffic Management – Pt 12: Traffic Impacts of Development (Austroads, 2016)
	Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas (Austroads, 2014)
	Bicycle Parking Facilities: Guidelines for Design and Installation (AS 2890.3:2015)
	Integrated Public Transport Service Planning Guidelines: Sydney Metropolitan Area (TfNSW, 2013)
	Future Transport Strategy 2056 (TfNSW, 2018)
	Greater Sydney Services and Infrastructure Plan (TfNSW, 2018)
	NSW Freight & Ports Plan 2018-2023 (TfNSW, 2018)
Visual	
	Control of Obtrusive Effects of Outdoor Lighting (AS 2482)
Waste	
	NSW Waste and Sustainable Material Strategy 2041 (EPA, 2021)
	NSW Plastics Action Plan (EPA, 2021)
	NSW Energy from Waste Policy Statement (EPA, 2021)
	NSW Energy from Waste Infrastructure Plan (2021)
	The National Waste Policy: Less Waste More Resources 2018
	Waste Classification Guidelines (EPA, 2014)
	Environmental guidelines: Composting and Related Organics Processing Facilities (DEC, 2004)
	Environmental guidelines: Use and Disposal of Biosolid Products (EPA, 1997)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Composts, soil conditioners and mulches (Standards Australia, AS 4454)
	Standards for Managing Construction Waste in NSW (EPA, 2018)

APPENDIX F

FLOOD ADVICE LETTER

REFERENCE FA-2024/211 DATED 19 SEPTEMBER 2024

Thursday 19 September 2024

Our Ref: FA – 2024/211
Costin Roe Consulting
Level 4, 8 Windwill Street
MILLERS POINT NSW 2000

Flood Advice Certificate for "49 STEPHEN ROAD BANKSMEADOW","51 STEPHEN ROAD BANKSMEADOW"

This certificate is automatically generated from the information provided from the flood study identified below. Council cannot comment on the accuracy of the result.

This certificate has been generated from the following study:

Springvale Drain and Floodvale Drain Flood Study, BMT WBM Pty Ltd, 2014

The information provided can be used to assist in understanding the extent of flooding affecting this property and can be used to assist in preparation of a development application and associated flood reports. It is recommended that the information in this report be interpreted by a suitably qualified professional.

The information is provided in good faith and in accordance with the provisions of s.733 of the Local Government Act.

For the purposes of complying development, this certificate identifies if the property is:

a) A flood storage area
b) A floodway area
c) A high hazard area

Flood maps are provided below. A suitably qualified engineer should be engaged to determine whether the property is:

d) A flow path
e) A high risk area

Is this property affected during the 1% AEP Flood Event?	**Yes**
Is this property affected during the PMF Event?	**Yes**
1% AEP Flood Hazard Note Council considers flooding H3-H6 as high hazard. See below for more information.	**H5**
1% AEP Flood Function	**N/A**
1% AEP Flood Level (maximum level for property)	**13.94**

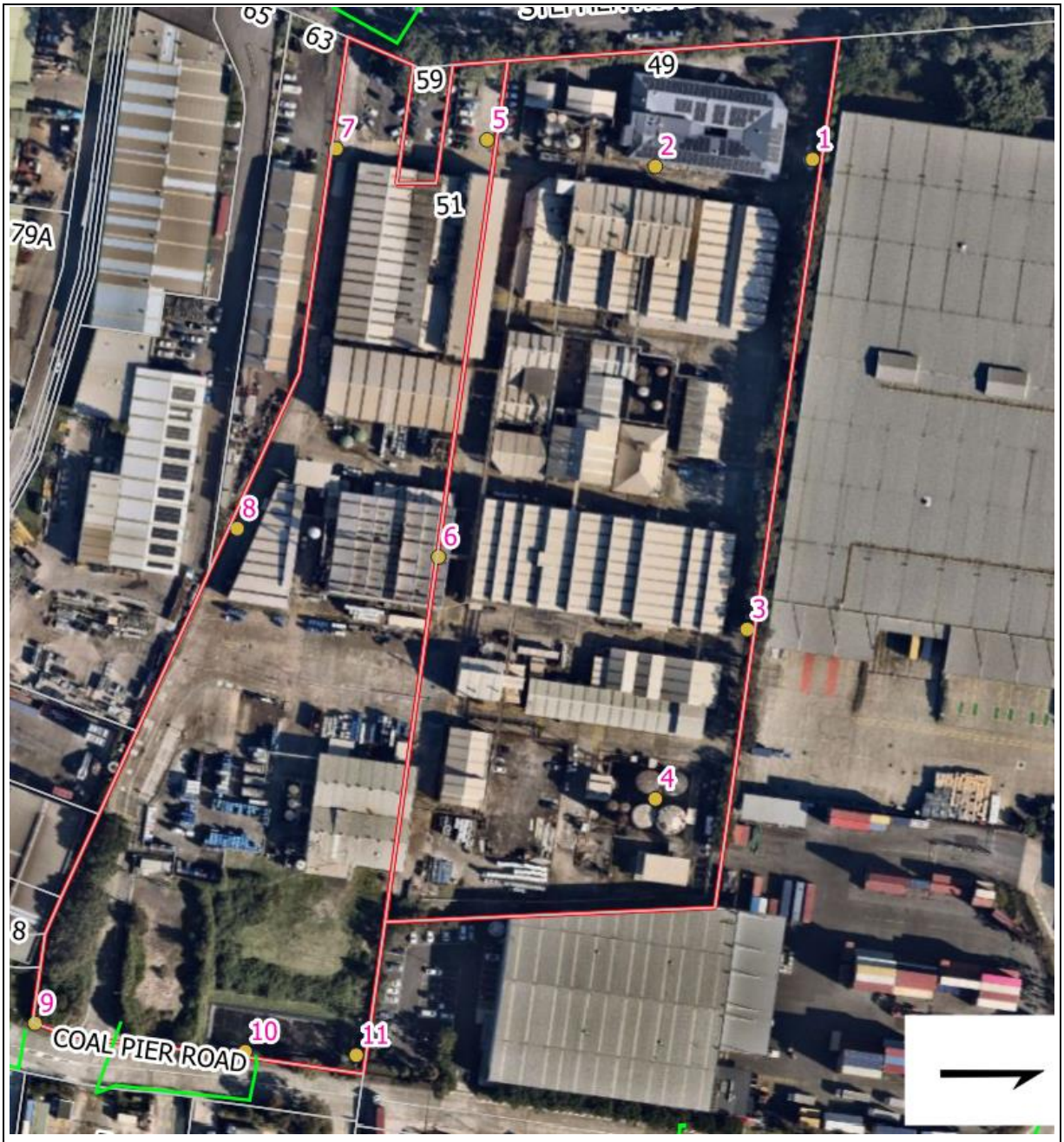
Flood related development controls are provided in Bayside Council Development Control Plan 2022, Section 3.10, and Section 9.5. Use the following link to download: https://www.bayside.nsw.gov.au/services/planning-and-building/development-approvals/planning-controls-and-constraints

Should you require advice regarding specific development controls related to your development proposal, please contact Council's Development Engineers at devengreferrals@bayside.nsw.gov.au.

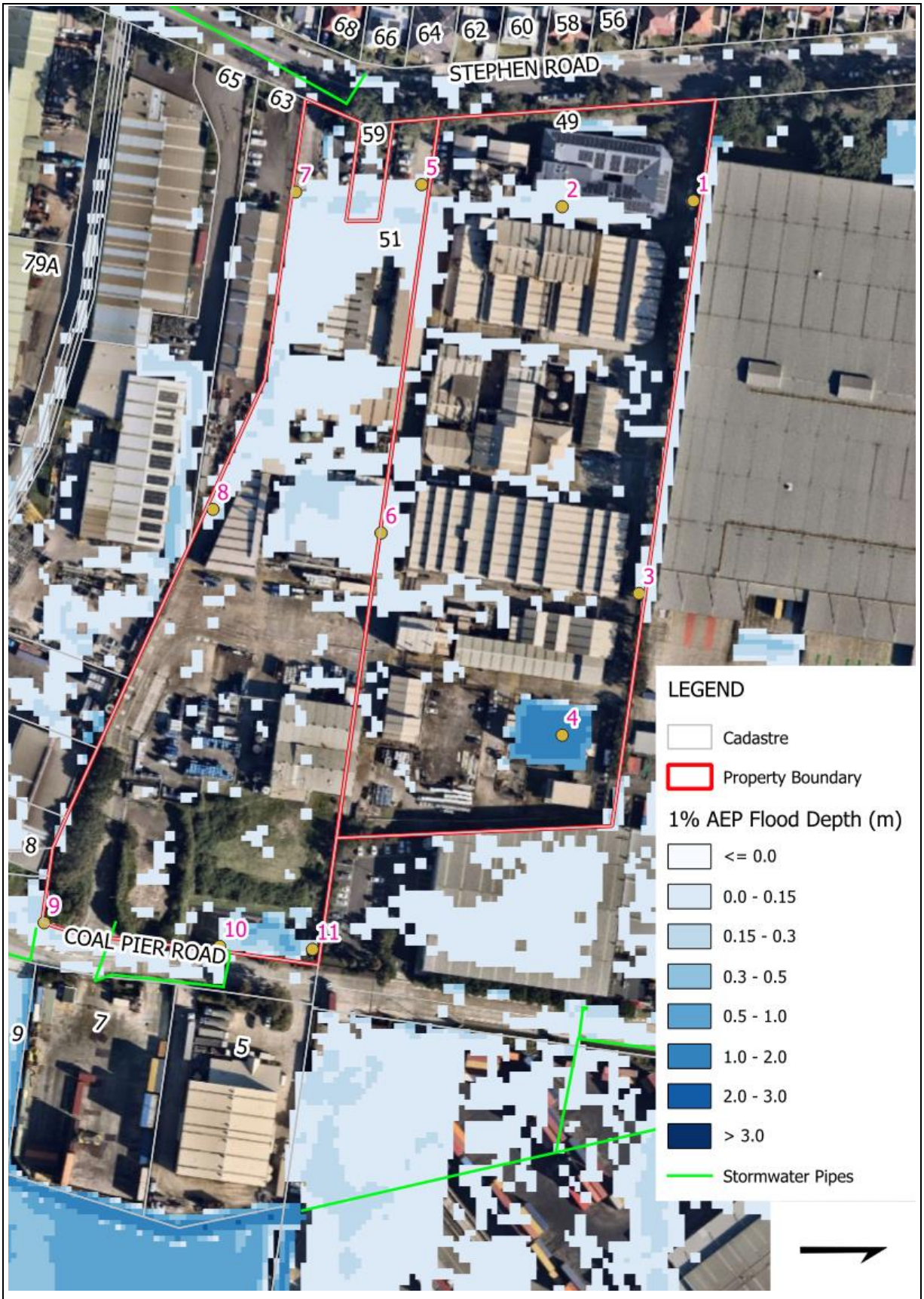
Should you require additional information regarding flooding, please contact Council's Stormwater and Floodplain Engineer, Aaron Biffin, on 02 9366 3840.

Flood Information

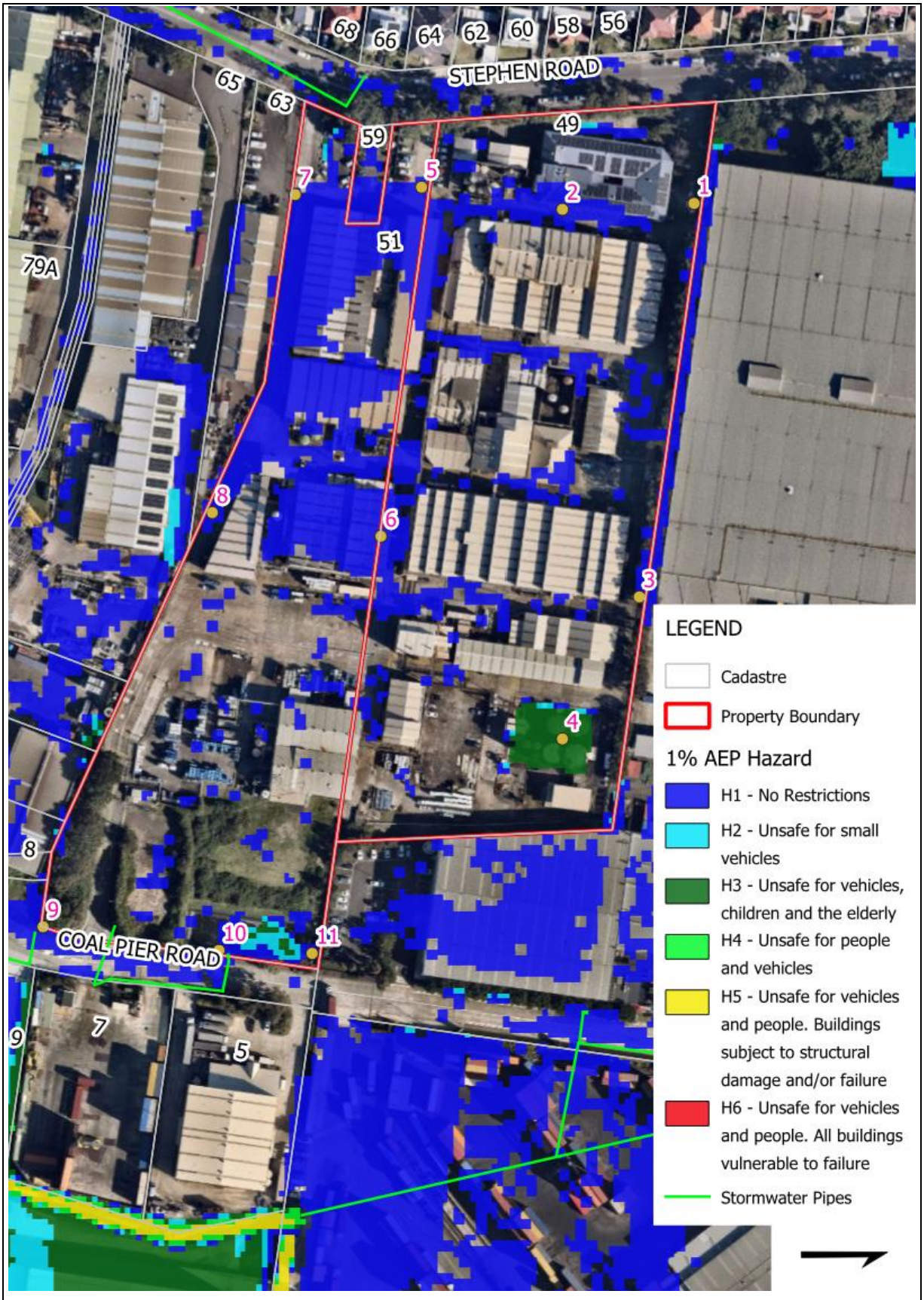
Location	1% AEP Flood Level (m AHD)	PMF Level (m AHD)
1	10.03	10.26
2	10.13	10.26
3	9.9	10.12
4	9.44	10.0
5	10.11	10.25
6	10.02	10.12
7	10.13	10.22
8	9.87	9.94
9	5.20	5.39
10	5.92	6.05
11	6.35	6.41



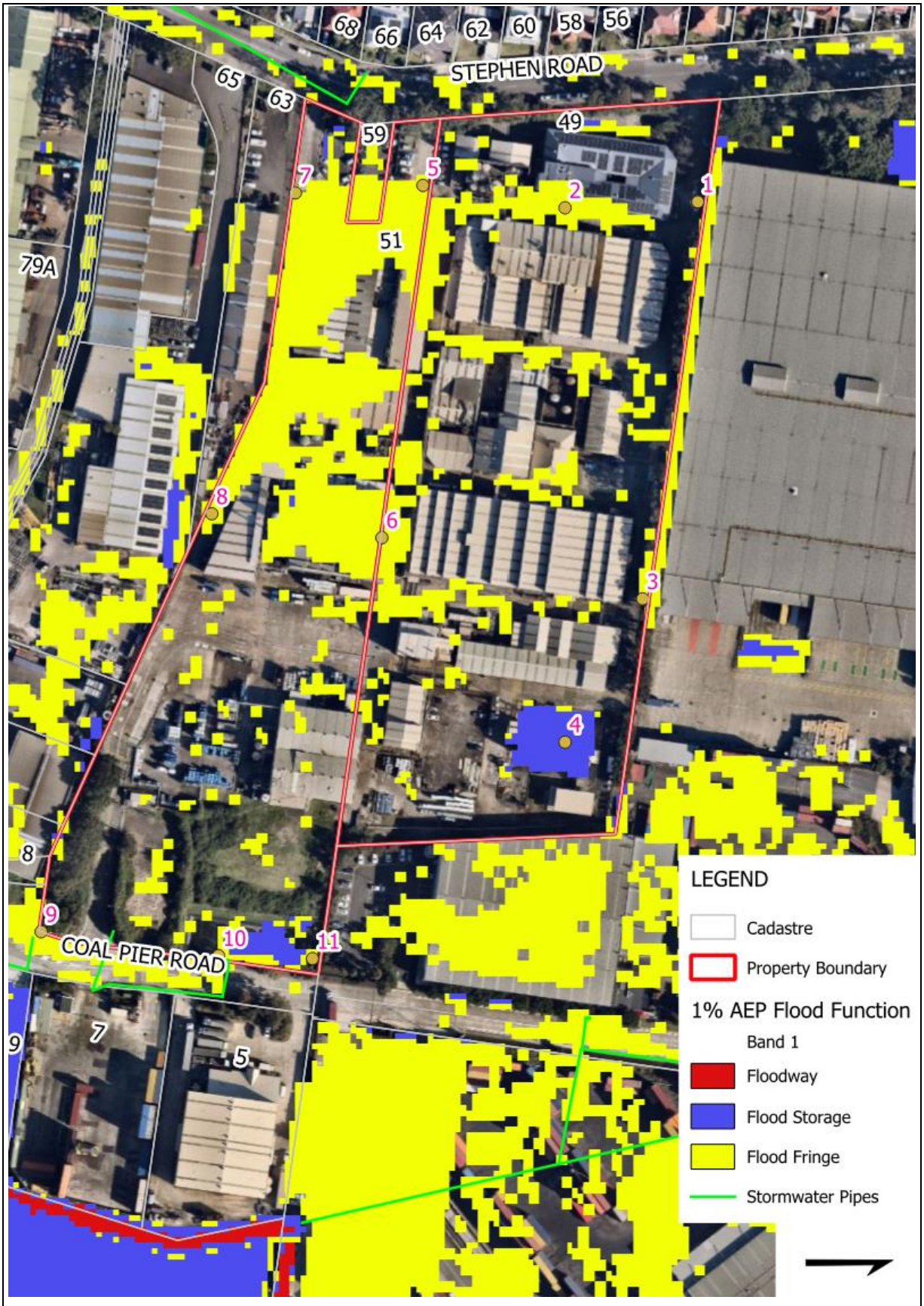
Flood Information Points	Property Boundary
	Stormwater Pipe



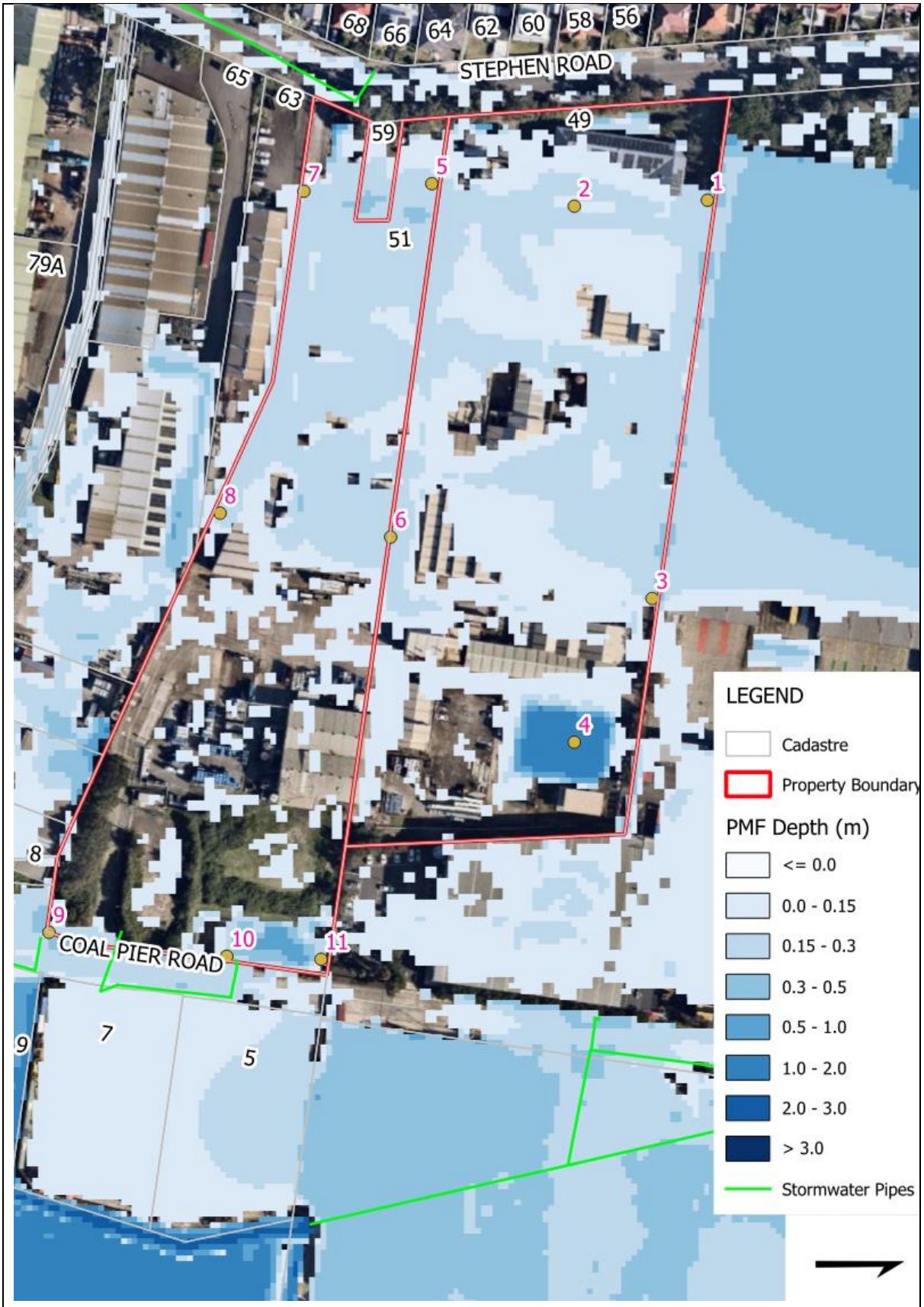
1% AEP Flood Extent Map



1% AEP Flood Hazard Map



1% AEP Flood Function Map



PMF Flood Extent Map

APPENDIX G

AGENCY COMMENTS – DEPARTMENT OF PLANNING AND ENVIRONMENT

REF. DOC23/1108977

22 January 2024

Our Ref: F23/1098
Our Contact: Christopher Lazaro (02) 9562 1627

Thomas Bertwistle
Industry Assessments
Department of Planning and Environment
Locked Bag 5022
PARRAMATTA NSW 2124

Dear Mr Bertwistle,

Re: Request for Advice – SEARs: 49-61 Stephen Road, Banksmeadow – Multi-Level Warehouse

Thank you for the opportunity to provide comments on the Planning Secretary's Environmental Assessment Requirements (SEARs) for the proposed Multi-Level Warehouse at 49-61 Stephen Road, Banksmeadow.

The Proposal

Council has reviewed the following Project-Specific SEARs for the State Significant Development Application (SSDA) at 49-61 Stephen Road, Banksmeadow. The SSDA consists of the following:

- Demolition of the existing building, remediation of the site and construction and operation of two warehouse buildings, including the following key components:
    - 80,456 sqm total building area:
        - 72,392 sqm of warehouse area;
        - 1,633 sqm of warehouse corridor;
        - 6,246 sqm of mezzanine office area;
        - 186 sqm café.
    - Two warehouse buildings of three storeys containing:
        - Twelve (12) units within Warehouse A (3 levels);
        - Twelve (12) units within Warehouse B (3 levels).
    - 243 car spaces provided on the level 2 carparking area
    - Building height of 31.7m (3 storeys) (RL 43.6m at the roof ridge)
    - Vehicle access provided via Stephen Road for cars and Coal Pier Road for larger vehicles including trucks.
    - Bicycle and end of trip facilities
- CIV of $280,000,000

Bayside Council General Comments

Council requests that the following matters are addressed in any Environmental Impact Statement (EIS) for this proposal:

- **Strategic and Statutory Planning Framework**

  Port Botany industrial area is a critical component of the International Trade Gateway and key employment land within the Eastern City District. The employment opportunities associated with the proposed development are consistent with the Greater Sydney Region Plan, Eastern City District Plan, and Future Transport 2056.

  The EIS should demonstrate that the development proposal is generally consistent with all relevant planning strategies, plans and Environmental Planning Instruments, including:

  - Greater Sydney Region Plan – A Metropolis of Three Cities;
  - Eastern City District Plan;
  - Future Transport 2056;
  - Chapter 5 Three Ports: SEPP (Transport and Infrastructure) 2021;
  - Chapter 3 Hazardous and Offensive Development: SEPP (Resilience and Hazards) 2021; and
  - Chapter 4 Remediation of land: SEPP (Resilience and Hazards) 2021.

- **SEPP (Transport and Infrastructure) 2021**

  The subject site is located within Port Botany area under Chapter 5 of the State Environmental Planning Policy (Transport and Infrastructure) 2021, which is the prevailing EPI. This area is characterised by uses dependent on the Port, such as logistics and heavy manufacturing uses. The site is located on the western periphery, which adjoins more sensitive land uses, such as residential buildings and Pagewood Public School.

  The site is identified within the IN1 General Industrial zone and partially benefits from an Additional Permitted Use (APU) for the purposes of Business or Office Premises, as per Clause 5.21 of SEPP (Transport and Infrastructure) 2021. The proposal includes a Café fronting Stephen Road, which is permitted in the IN1 zone. The objectives of the IN1 zone are as follows:

  - *To provide a wide range of industrial and warehouse land uses.*
  - *To encourage employment opportunities.*
  - *To minimise any adverse effect of industry on other land uses.*
  - *To facilitate and encourage port related industries that will contribute to the growth and diversification of trade through the port.*
  - *To enable development for the purposes of business premises or office premises associated with, and ancillary to, port facilities or industries.*
  - *To encourage ecologically sustainable development.*

  The proposal is consistent with the objectives of the zone. Specifically, it facilitates and encourages Port-related industries that will contribute to the growth of trade through the Port.

Bayside Council Technical Comments

- **Built Form**

1. The subject site is located on the western boundary of the Port Botany industrial area and is adjacent to low-density residential housing. The concept scheme proposes a Multi-Level Warehouse with height of approximately 30m. The proposed built form raises the following issues:

    a. Buildings at the periphery of the Port Botany industrial area are typically designed match the height controls of the neighbouring areas to ensure an appropriate scale and transition. The proposed building has a 150m width along the east elevation (Stephen Road) and is approximately 30m high. The built form is substantially more significant than the R2-zoned residential housing across the road and the nearby industrial development within the Port Botany precinct.

    b. The side setbacks must be increased to allow for retention of existing trees, additional canopy tree planting, and to be proportionate with the scale of the building.

    c. The circulation ramp adjacent to Stephen Road should be relocated to avoid adverse acoustic impacts to the neighbouring residential properties.

    d. Further urban design work is required to guide the built form more appropriately. This should include:

        i. A contextual analysis of the surrounding neighbourhoods (R2 residential). The analysis must consider topography, vegetation, movement, views and vistas, infrastructure, heritage, and built form.

        ii. A movement framework, distribution of open space and built form (heights, setbacks, building separations, scale).

        iii. Design principles that prioritise sustainability and minimise the impact on the surrounding low-density residential development.

        iv. Design options, recommendations, and rationale. Each option should highlight its pros and cons.

        v. Detailed sections of Stephen Road, highlighting the average front setbacks of the R2-zoned houses, and provide visual analysis on how the change in scale of the proposed development impacts the overall visual quality of Stephen Road.

        vi. Shadow diagrams to illustrate the potential impact of the proposed development on the surrounding area.

        vii. A Visual Impact Assessment assessing the visual amenity of the streetscape is required.

- **Landscaping**

2. All existing trees along the periphery of the site must be retained. Greater building setbacks are required, particularly along the northern side boundary to retain the existing trees. Any trees that are removed must be offset on the site at a ratio of 3:1 (meaning that three similar trees to the one removed must be planted to offset the tree removal).

3. An Arborist Report including a Tree Management Plan of all trees within the site and within 5 metres on the site, or others affected by the development proposal shall be provided.

4. At least 10% of the total site area must be landscaped in addition to the 3m wide landscaping setback along the frontage as per Control 13 of the Bayside DCP 2022. Large trees capable of reaching a minimum mature height of 12 to 15 metres shall be planted in a tree pit of minimum 6 x 6 meters along both frontages.

5. The proposal disconnects the existing and proposed landscaped areas and green corridors. This does not achieve Bayside LEP and DCP objectives to promote connectivity and green corridors for environmental reasons, provide on-site amenity, and to enhance the streetscape (C2 Part 6.4 Bayside DCP 2022). The southern and northern side setbacks shall be increased to provide better links between the front and rear landscaping areas.

6. The proposal shall incorporate Water Sensitive Urban Design (WSUD) elements to reduce the runoff and compensate for the large hard surface area.

7. An outdoor staff area shall be included in within the landscape area. If this is within the landscape setback, the setback must be increased by 1 metre (C6 and C7 Part 6.4 of Bayside DCP 2022).

8. Fire egress paths are to be included in the proposal to assess areas capable to cater for trees and to comply with regulations.

- **Traffic, Parking and Access**

9. A Traffic Engineer shall prepare a Traffic Report and shall include the following, but not limited to:

    a. Details of site access, road signs, pedestrian safety etc.

    b. Signal/warning system and passing bay requirement at vehicle intersection areas.

    c. Parking & manoeuvring of vehicles. The report should address adequacy of site and parking layout for the largest vehicle and the passenger vehicle to be accessing the site.

    d. The Traffic Engineer shall certify the parking layout, aisle width and dead end aisle, ramp grades and access and visibility requirement for the proposed parking facility in accordance with the Australian Standards AS/NZS 2890.1:2004, AS2890.2:2018, AS2890.3:2015 & AS/NZS 2890.6:2009.

e. Specify user class for the parking modules.

f. Submit details of all heavy vehicular (truck) parking areas, turning circles and manoeuvring areas.

g. Safe pedestrian pathways through the site.

h. Proposed signage and line marking to safely direct all vehicles in and out of the site.

i. Details of the Traffic consultant and author of the report must be included.

10. All passenger vehicle (B99) access to be via Stephen Road and all heavy vehicular (truck) access to be via Coal Pier Road.

11. Swept Path Analysis diagrams (using Autoturn software or similar) shall be prepared by a qualified Civil Engineer and provided for the passenger vehicle (B99) entering and exiting the site from Stephen Road in a forward motion.

12. Swept Path Analysis diagrams (using Autoturn software or similar) prepared by a qualified Civil Engineer shall be provided for the largest service vehicle (B-double 26m long) accessing the site and demonstrate the area required to manoeuvre vehicle around the site and exit in a forward direction.

13. An assessment and certificate from a qualified Traffic Engineer shall be provided demonstrating compliance with Australian Standards AS2890 series for parking facility design, layout and access to the site.

14. A Longitudinal Driveway Profile for both vehicular access is to be prepared by a qualified Civil Engineer shall be submitted to Council for assessment. The profile shall start in the centre of the road and be along the critical edge (worst case) of the driveway. Gradients and transitions shall be in accordance with AS/NZS 2890.1&AS/NZS2890.2. The profile shall include all relevant levels, grades (%), headroom clearances and lengths. The existing boundary levels shall be clearly shown on the profile, any change to the existing boundary levels requires approval from Bayside Council.

15. A Longitudinal Section prepared by a qualified Civil Engineer plotting headroom clearance along the travel path of the B-double using the curved ramp vehicle to be provided. It must be demonstrated that a safe headroom clearance achieved along the entire travel path, parking and manoeuvring areas of the B-double within the site.

16. An assessment to be provided demonstrating that the curved ramp is designed in compliance with AS/NZS2890.1&AS/NZS2890.2 .

- **Stormwater Management**

17. A detailed Stormwater Management Plan and design certification must be prepared by a suitably qualified Civil Engineer in accordance with Bayside Technical Specification Stormwater Management.

18. An On-Site Detention (OSD) system is to be designed as per Section 6 of the Bayside Technical Specification Stormwater Management. All relevant calculations for the OSD sizing to be provided including the DRAINS Model.

19. A concept Water Sensitive Urban Design (WSUD) Catchment Plan to be provided highlighting the impervious and pervious areas for water quality treatment and areas which bypass the treatment system as well. MUSIC Model is to be submitted to Council's for further assessment.

20. A concept Catchment Plan is to be provided highlighting the impervious (roof and hardstand) and pervious areas draining into the OSD as well the bypass area. The maximum bypass allowed is 15% of the total site area.

21. A concept Roof Drainage Plan is to be provided.

22. A Civil Stormwater Management Report is to be provided addressing the stormwater management, Water Sensitive Urban Design (WSUD), flooding, services, sediment and erosion control, and earthworks.

23. A concept Sediment and Erosion Control Plan to be provided. Sediment basin calculations are to be shown (if applicable).

24. A concept Site Grading Plan is to be provided showing the existing levels, Finished Floor Level (FFL), finished surface level, retaining wall levels, crossfall, crest level and contours.

25. The rainwater tank to be designed and sized as per Section 7.2 of the Bayside Technical Specification Stormwater Guidelines and the rainwater tank to be connected for internal non-potable stormwater re-use including connections to all ground level toilets, landscape irrigation. Only non-trafficable roof areas to drain into the rainwater tank. The re-use calculations to be provided using MUSIC.

26. An oil separator to be provided prior to the surface run-off entering the OSD.

27. The DRAINS Model is to be submitted for the HGL analysis and is to include a tailwater condition as per Bayside Technical Specification Stormwater Guidelines.

28. The development requires the use of a Water Sensitive Urban Design Approach (WSUD) to the design of the drainage system. Bayside Technical Specification Stormwater Guidelines requires development to confirm the targets for the stormwater pollution reduction and to justify the target by an analysis using MUSIC. All manufacturers' details for the WSUD products to be provided.

- **Flooding**

29. Council systems indicate that the site is flood affected. The development's habitable and non-habitable areas will need to be physically protected from inundation during the flooding event (including any basement and fire stairs). Furthermore, the flood impacts of the development footprint on the floodplain need to be assessed using a 2D flood model through a recognised computer software. The development is to comply with Bayside DCP 2022 Section 3.10.

30. A comprehensive Flood Study is to be provided demonstrating no adverse flood impacts of this development on the surrounding properties and the existing

floodplain in this area. The Flood Study report is to demonstrate compliance of this development with relevant guidelines and requirements, including Bayside DCP 2022, NSW Government's Flood Prone Land Policy, Flood Risk Management Manual and Section 9.1 Direction, as well as any other relevant policy or guideline.

- **Amenity impacts**

31. The proposed development has the potential to create adverse amenity impacts with regards to noise and light. Noise generating activities shall be positioned away from sensitive land uses such as the low-density residential dwellings on the western side of Stephen Road. Additionally, the incorporation of acoustically treated building elements shall be considered to help alleviate noise related impacts.

    Similarly, lighting from the premises shall not give rise adverse amenity impacts to nearby residential buildings. A Noise Impact Assessment and Lighting Impact Assessment shall accompany any future EIS.

32. The subject site is located within the Botany Industrial Park referral zone. As such, any future development requires a referral to the Department of Planning, Housing and Infrastructure's (DPHI) Hazards branch, and may require the preparation of a Hazards and Risk Assessment Report.

- **Environmental Impacts**

33. The site is subject to a Significantly Contaminated Land Declaration (SCLD) from the NSW EPA. The site is also located within a Groundwater Exclusion Zone due to the contamination of the Botany Sands Aquifer. In this regard, subsurface development is likely to be impacted by the presence of contamination. Council officers advise that a Detailed Site Investigation (DSI) and subsequent Remediation Action Plan (RAP) shall accompany any future EIS.

    Chapter 4 Remediation of Land of SEPP (Resilience and Hazards) 2021, applies to the development, and must be considered in its assessment. The consent authority must be satisfied that the land is suitable, either in its contaminated state or after remediation, for the proposed use.

34. The subject site is located within the notification zone for the Moomba Sydney Ethane Pipeline, managed by APA Group. A notification to this organisation is required for any future application(s) for development on this site.

We trust that the Department will carefully consider Council's input in preparing the final SEARs for this project.

If you require any further information please do not hesitate to contact Christopher Lazaro, Senior Urban Planner on (02) 9562 1627 or via email: christopher.lazaro@bayside.nsw.gov.au.

Yours sincerely



Josh Ford
Acting Manager Strategic Planning

Department of Planning and Environment

Our ref: DOC23/1108977
Your ref: SSD-65924461

Thomas Bertwhistle
Senior Environmental Assessment Officer
Department of Planning and Environment
4 Parramatta Square, 12 Darcy Street
PARRAMATTA NSW 2150

20 December 2023

Subject: Request for advice on SEARs - Stephen Road Multi-level Warehouse, Banksmeadow (SSD-65924461) (Bayside)

Dear Thomas,

Thank you for your request of 15 December 2023 for input from Environment and Heritage Group (EHG) on the Planning Secretary's environmental assessment requirements (SEARs) for the proposed Multi-level Warehouse at 49-61 Stephen Road, Banksmeadow (SSD-65924461). EHG has reviewed the Scoping Report prepared by Urbis (13 December 2023) and recommends the proponent address the attached requirements as well as the below biodiversity requirements.

Biodiversity

Please note the Biodiversity Development Assessment Report (BDAR) requirements under point (1), must meet the minimum information and spatial data requirements set out in Tables 24 and 25 of the Biodiversity Assessment Method (BAM), and as required more broadly by the revised BAM 2020. Other requirements, such as those relating to the BAM Calculator and Biodiversity Offsets and Agreements Management System (BOAMS), are detailed in various guidelines, practice notes, updates and other advice issued by EHG to BAM accredited assessors.

Should a waiver to the requirement for a BDAR be sought, it must be clearly demonstrated that the proposed development is not likely to have any significant impact on biodiversity values. Development that requires clearing of native vegetation or additional biodiversity impacts as prescribed by clause 6.1 of the *Biodiversity Conservation Regulation 2017* is likely to require a BDAR.

Any request for a BDAR waiver is to include the information requirements set out in Tables 1 and 2 of the DPIE guidelines on How to apply for a biodiversity development assessment report waiver for a Major Project Application. The proponent can find further information on the BDAR waiver process on the Department's Biodiversity development assessment report waiver webpage.

Should you have any queries regarding this matter, please contact Liz Peterson, Senior Conservation Planning Officer via elizabeth.peterson@environment.nsw.gov.au.

Yours sincerely

S. Harrison

Susan Harrison
Senior Team Leader Planning
Greater Sydney Branch
Biodiversity and Conservation

EHG Environmental Assessment Requirements - Stephen Road Multi-level Warehouse, Banksmeadow (SSD-65924461) (Bayside)

Biodiversity
1. Biodiversity impacts related to the proposed development are to be assessed in accordance with Section 7.9 of the Biodiversity Conservation Act 2016 the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and *Biodiversity Assessment Method 2020*, including an assessment of the impacts of the proposal (including an assessment of impacts prescribed by the regulations). 2. The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method 2020. 3. The BDAR must include details of the measures proposed to address the offset obligation as follows: • The total number and classes of biodiversity credits required to be retired for the development/project; • The number and classes of like-for-like biodiversity credits proposed to be retired; • The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules; • Any proposal to fund a biodiversity conservation action; • Any proposal to conduct ecological rehabilitation (if a mining project); • Any proposal to make a payment to the Biodiversity Conservation Fund. If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits. 4. The BDAR must be submitted with all spatial data associated with the survey and assessment as per the BAM. 5. The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the *Biodiversity Conservation Act 2016*.
Flooding
6. The EIS shall include a flood impact and risk assessment (FIRA). As a minimum the FIRA must: • Consider the relevant provisions of the NSW Floodplain Development Manual and associated guides, and existing council and government studies, information and requirements. • Identify and describe existing flood behaviour and flood constraints on the site and its surrounding areas for the full range of events, including 5% AEP, 1% AEP, PMF and 0.5% AEP or 0.2% AEP and provide an assessment of the compatibility of the

development and its users with flood behaviour. This may require flood modelling where existing flood information is not available.

- Determine and describe changes in post development flood behaviour, impacts of flooding on existing community and on the development and its future community for full range of events, 5% AEP, 1% AEP, PMF and 0.5% AEP or 0.2%AEP. This may require flood modelling.
- Consider impacts of climate change due to both:
    - sea level rise considering relevant Council and government advice.
    - increase in rainfall intensities. The 0.5% AEP or 0.2% AEP events can be used to provide an understanding of the scale of change of flood behaviour relative to the 1% AEP event.
- Propose and assess the effectiveness of management measures required to minimise the impacts and risks of flooding to the development (including any basement car parking) and its users and existing community.

* Flood modelling is to be undertaken by a suitably qualified engineer consistent with Council's requirements and Australian Rainfall and Runoff.
* Flood behaviour includes flood volume, extent, depth, level, velocity, duration, rate of rise, flood function and hazard.
* Impacts include changes to flood behaviour and risks to the community including emergency management response for the community.

Water and soils

7. The EIS must map the following features relevant to water and soils including:
   a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map).
   b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
   c. Wetlands as described in s4.2 of the Biodiversity Assessment Method.
   d. Groundwater.
   e. Groundwater dependent ecosystems.
   f. Proposed intake and discharge locations.

8. The EIS must describe background conditions for any water resource likely to be affected by the development, including:
   - Existing surface and groundwater.
   - Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.
   - Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters.
   - Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.
   - Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning

9. The EIS must assess the impact of the development on hydrology, including:
   a. Water balance including quantity, quality and source.
   b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.
   c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.
   d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
   e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.
   f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.
   g. Identification of proposed monitoring of hydrological attributes.

End of Submission

Department of Climate Change, Energy, the Environment and Water

Our ref: DOC24/19016

Your ref: SSD-65924461

Thomas Bertwistle

Senior Environmental Assessment Officer

Department of Planning, Housing and Infrastructure

Thomas.Bertwistle@planning.nsw.gov.au

Letter uploaded to the Major Projects Planning Portal

Input to SEARs – State Significant Development

Proposal: Stephen Road Multi-Level Warehouse

Major Project reference: SSD-65924461

Received: 15 December 2023

Dear Tom

Thank you for your referral seeking input to the Secretary's Environmental Assessment Requirements for the above State Significant Development proposal. In preparing this advice Heritage NSW has reviewed the document entitled Scoping Report 46-91 Stephen Road, Banksmeadow prepared by Urbis Pty Ltd and dated 13 December 2023.

Heritage NSW recommends that the following SEARs be included with respect to Aboriginal cultural heritage in relation to SSD-65924461:

- The Environmental Impact Statement should be informed by an Aboriginal Cultural Heritage Assessment Report, prepared in accordance with relevant policy and guidelines to identify, describe and assess any impacts to Aboriginal cultural heritage sites or values associated with the project. The Aboriginal Cultural Heritage Assessment Report must be prepared in accordance with the Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (2011) and the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (2010), including results of archaeological survey and test excavations (where required) undertaken in accordance with the relevant standards and requirements;
- Include evidence of adequate and continuous consultation with Aboriginal parties in relation to determining and assessing impacts, identifying and selecting options for avoidance of Aboriginal cultural heritage and identifying appropriate mitigation measures (including the final proposed measures) in substantial compliance with the consultation process outlined in the Aboriginal cultural heritage consultation requirements for proponents 2010

Please note that the above comments relate only to Aboriginal cultural heritage regulation matters. If you have any questions regarding these comments, please contact me on 9228 6424 or nicola.roche@evironment.nsw.gov.au.

Yours sincerely

Nicola Roche

Nicola Roche
Principal Assessments Officer
Heritage NSW
Department of Climate Change, Energy, the Environment and Water
As Delegate under National Parks and Wildlife Act 1974
11 January 2024

15 January 2024

ATT: Thomas Bertwistle
Environmental Assessment Officer
Department of Planning and Environment

24-28 Campbell St
Sydney NSW 2000
All mail to
GPO Box 4009
Sydney NSW 2001
T +61 2 13 13 65
ausgrid.com.au

Dear Thomas,

In reference to Stephen Road Multi-level Warehouse SSD-65924461

Ausgrid would like to thank you for seeking input and feedback regarding the advice for SEAR's

Ausgrid recommends the addition of the following to the SEARS under Utilities:

In consultation with relevant agencies prepare a services and utilities impact assessment which:

- assesses the capacity of existing services and utilities and identify any upgrades required to facilitate the development
- assesses the impacts of the proposal on existing utility infrastructure and service provider assets and describe how any potential impacts would be managed.

Please do not hesitate to contact me for further information.
Regards,

Paul Nakhle - Portfolio Manager - Asset Protection | Transmission Services
02 9269 7587 | 0419 631 174

Connecting communities,
empowering lives

For Official use only

File Ref. No: FRN23/4032 BFS23/7489 8000032776
TRIM Doc. No: D23/145872
Contact: Station Officer Richard Jay

21 December 2023

Thomas Bertwistle
NSW Department of Planning and Environment
Locked Bag 5022
PARRAMATTA NSW 2124

Dear Thomas,

Re: Advice on Secretary's Environmental Assessment Requirements (SEARs) – Stephen Road Multi-level Warehouse, Banksmeadow (SSD-65924461)

Fire and Rescue NSW (FRNSW) acknowledge correspondence received on 21 December 2023, requesting input into the preparation of the SEARs for the STEPHEN ROAD MULTI-LEVEL WAREHOUSE, BANKSMEADOW (SSD-65924461). FRNSW have reviewed the SEARs along with the Scoping Report with particular focus to Section 6.1.2, Hazards and Risks.

There is currently insufficient information available regarding the fire safety and emergency response management aspects of the project. FRNSW requests to be consulted and given the opportunity to review and provide comment regarding the proposed fire and life safety systems at the preliminary and final design phases of the project.

For further information please contact the Operational Liaison and Special Hazards Unit, referencing FRNSW file number BFS23/7489. Please ensure that all correspondence in relation to this matter is submitted electronically to firesafety@fire.nsw.gov.au.

Yours sincerely,

Superintendent James O'Carroll
Manager
Operational and Liaison and Special Hazards Unit

Cc: Thomas.Bertwistle@planning.nsw.gov.au

Transport for NSW

16 January 2024

TfNSW Reference: SYD22/01604/02
DPHI Reference: SSD-65924461

Ms Kiersten Fishburn
Secretary
Department of Planning Housing and Infrastructure
Locked Bag 5022
PARRAMATTA NSW 2124

Attention: Thomas Bertwistle

ADVICE ON SEARS FOR WAREHOUSE & DISTRIBUTION CENTRE
49-61 STEPHEN ROAD, BANKSMEADOW

Dear Mr Bertwistle,

Reference is made to Department of Planning Housing and Infrastructure's (**DPHI**)'s correspondence dated 15 December 2023, regarding the abovementioned Application which was referred to Transport for NSW (**TfNSW**) for comment.

TfNSW has reviewed the standard Planning Secretary's Environmental Assessment Requirements for warehouses and distribution centres[1] and advises that in addition to the standard requirements, we request the following to be assessed by the Applicant:

- Details of the existing/previous site traffic generation (B-Doubles, Semis, HVs etc / lights) across a typical busy day.
- Details of the proposed development traffic generation (B-Doubles, Semis, HVs etc / lights) across a typical busy day.
- Modelling of the existing and post development traffic during the weekday AM and PM peak hour at the following intersections:
    - Botany Road and Foreshore Road
    - Botany Road and Stephen Road
    - Botany Road / Hills Street
    - Stephen Road and Swinbourne Street
- Weekly tube surveys on Stephen Road and Botany Road to understand the change in heavy and light vehicle volumes / percentages between the existing conditions and post development.
- Detailed traffic volume distribution data showing the change in heavy and light vehicle traffic at intersections surrounding the proposed development.

Should you have any further inquiries in relation to this matter, please contact Matthew Houlden by email at development.sydney@transport.nsw.gov.au.

Yours sincerely,

V Naidu

Vic Naidu
A/Senior Land Use Planner
Land Use Assessment Eastern
Planning and Programs, Greater Sydney Division

1 https://www.planning.nsw.gov.au/sites/default/files/2023-03/sears-warehouses-and-distribution-centres.pdf - Accessed 16/1/24

4 Parramatta Square, 12 Darcy Street Parramatta NSW 2150
PO Box 973 Parramatta CBD NSW 2124
W transport.nsw.gov.au

Our Ref: DOC23/1099618-4

Thomas Bertwistle
Senior Environmental Assessment Officer
Department of Planning

Via Major Projects Portal

12 January 2024

Dear Mr Bertwistle

Advice on Secretary's Environmental Assessment Requirements –
Stephen Road Multi-level Warehouse, Banksmeadow (SSD-65924461)

Thank you for the request for advice received via electronic mail on the 15 December (2023) to the Environment Protection Authority (EPA) seeking the requirements for the preparation of an Environmental Impact Statement (EIS) for the Stephen Road Multi-level Warehouse located at 49-61 Stephen Road, Banksmeadow (the site).

The proposal will involve:

- Demolition of all onsite buildings;
- Site preparation works, bulk earthworks and infrastructure;
- Extensive site remediation works; and
- Construction and operation of a three-storey warehouse and distribution centre with ancillary office facilities, car parking and landscaping.

The EPA has reviewed the document titled 'Scoping Report 49-61 Stephen Road, Banksmeadow produced by URBIS December 2023' and provides the following Secretary's Environmental Assessment Requirements (SEARs).

The EIS must address the following specific matters:

- Noise and Vibration Impacts;
- Water Quality Impacts;
- Site Contamination & Rehabilitation; and
- Waste Management, Hazardous Substances, and Chemical Waste.

The information required to assess these issues to be included in the Environmental Impact Statement (EIS) in included in **Attachment A**.

In carrying out the assessment, the Proponent should also refer to the relevant guidelines as listed in **Attachment B**, any relevant industry codes of practice and best practice management guidelines.

Phone 131 555
Phone +61 2 9995 5555
(from outside NSW)

TTY 133 677
ABN 43 692 285 758

Locked Bag 5022
Parramatta
NSW 2124 Australia

4 Parramatta Square
12 Darcy St, Parramatta
NSW 2150 Australia

info@epa.nsw.gov.au
www.epa.nsw.gov.au

The Proponent should be made aware that any commitments made in the EA may be formalised as approval conditions and may also be placed as formal licence conditions.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* (the Act) the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and be required as a condition of an Environment Protection Licence (EPL) if the project is approved.

If you have any further enquiries about this matter, please contact Jenny Gustafson on 9585 6471 or environmentprotection.planning@epa.nsw.gov.au.

Yours sincerely



DARREN WALLETT
Manager – Environment Protection Planning
NSW Environment Protection Authority

ATTACHMENT A: EIS REQUIREMENTS FOR STEPHEN ROAD MULTI-LEVEL WAREHOUSE (SSD-65924461)

How to use these requirements

The EPA requirements have been structured as follows.

A. Executive summary

B. The proposal

C. The location

D. Identification and prioritisation of issues

E. The environmental issues

F. List of approvals and licences

G. Compilation of mitigation measures

H. Justification for the proposal

A Executive summary

The executive summary should include a brief discussion of the extent to which the proposal achieves identified environmental outcomes.

B The proposal

1. Objectives of the proposal

- The objectives of the proposal should be clearly stated and refer to:
  a) the size and type of the operation, the nature of the processes and the products, by-products and wastes produced
  b) a life cycle approach to the production, use or disposal of products
  c) the anticipated level of performance in meeting required environmental standards and cleaner production principles
  d) the staging and timing of the proposal and any plans for future expansion
  e) the proposal's relationship to any other industry or facility.

2. Description of the proposal

General

- Outline the production process including:
  a) the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations (sewer, stormwater, atmosphere, recycling, landfill etc)
  b) any life-cycle strategies for the products.
- Outline cleaner production actions, including:
  a) measures to minimise waste (typically through addressing source reduction)
  b) proposals for use or recycling of by-products
  c) proposed disposal methods for solid and liquid waste
  d) air management systems including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points
  e) water management system including all potential sources of water pollution, proposals for re-use, treatment etc, emission levels of any wastewater discharged, discharge points, summary of options explored to avoid a discharge, reduce its frequency or reduce its impacts, and rationale for selection of option to discharge.
  f) soil contamination treatment and prevention systems.
- Outline construction works including:
  a) actions to address any existing soil contamination
  b) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on-site)
  c) construction timetable and staging; hours of construction; proposed construction methods
  d) environment protection measures, including noise mitigation measures, dust control measures and erosion and sediment control measures.

- Include a site diagram showing the site layout and location of environmental controls.

Air

- Identify all sources or potential sources of air emissions from the development.

Note: emissions can be classed as either:

- point (e.g. emissions from stack or vent) or

- fugitive (from wind erosion, leakages or spillages, associated with loading or unloading, conveyors, storage facilities, plant and yard operation, vehicle movements (dust from road, exhausts, loss from load), land clearing and construction works).

- Provide details of the project that are essential for predicting and assessing air impacts including:
  a) the quantities and physio-chemical parameters (e.g. concentration, moisture content, bulk density, particle sizes etc) of materials to be used, transported, produced or stored
  b) an outline of procedures for handling, transport, production and storage
  c) the management of solid, liquid and gaseous waste streams with potential to generate emissions to air.

Noise and vibration

- Identify all noise sources or potential sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.
- Specify the times of operation for all phases of the development and for all noise producing activities.
- For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be to a scale sufficient to delineate individual residential blocks.

Water

- Provide details of the project that are essential for predicting and assessing impacts to waters including:
  a) the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (see https://www.environment.nsw.gov.au/ieo/) using technical criteria derived from *the Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, ANZECC 2000)
  b) the management of discharges with potential for water impacts
  c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.
- Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts e.g. effluent ponds) and showing potential areas of modification of contours, drainage etc.
- Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm

and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.

- Details of the site drainage and any natural or artificial waters within or adjacent to the development must be identified and where applicable measures proposed to mitigate potential impacts of the development on these waters.

- The EIS should provide details of any water management systems for the site to ensure surface and ground waters are protected from contaminants.

Waste and chemicals

Provide details of the quantity and type of both liquid waste and non-liquid waste generated, handled, processed or disposed of at the premises. Waste must be classified according to the EPA's *Waste Classification Guidelines 2014 (as amended from time to time)*

- Provide details of liquid waste and non-liquid waste management at the facility, including:
  a) the transportation, assessment and handling of waste arriving at or generated at the site
  b) any stockpiling of wastes or recovered materials at the site
  c) any waste processing related to the facility, including reuse, recycling, reprocessing (including composting) or treatment both on- and off-site
  d) the method for disposing of all wastes or recovered materials at the facility
  e) the emissions arising from the handling, storage, processing and reprocessing of waste at the facility
  f) the proposed controls for managing the environmental impacts of these activities.
- Provide details of spoil disposal with particular attention to:
  a) the quantity of spoil material likely to be generated
  b) proposed strategies for the handling, stockpiling, reuse/recycling and disposal of spoil
  c) the need to maximise reuse of spoil material in the construction industry
  d) identification of the history of spoil material and whether there is any likelihood of contaminated material, and if so, measures for the management of any contaminated material
  e) designation of transportation routes for transport of spoil.
- Provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of at the site, in addition to the requirements for liquid and non-liquid wastes.
- Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.
- Reference should be made to the guidelines: EPA's *Waste Classification Guidelines 2014* (as amended from time to time)
- Spill management measures, including items such as bunding, and emergency procedures should be clearly outlined.

Environmental Sustainable Development (ESD)

- Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD, including:
  a) an assessment of a range of options available for use of the resource, including the benefits of each option to future generations
  b) proper valuation and pricing of environmental resources

c) identification of who will bear the environmental costs of the proposal.

3. Rehabilitation

- Outline considerations of site maintenance, and proposed plans for the final condition of the site (ensuring its suitability for future uses).

4. Consideration of alternatives and justification for the proposal

- Consider the environmental consequences of adopting alternatives, including alternative:
  a) sites and site layouts
  b) access modes and routes
  c) materials handling and production processes
  d) waste and water management
  e) impact mitigation measures
  f) energy sources
- Selection of the preferred option should be justified in terms of:
  a) ability to satisfy the objectives of the proposal
  b) relative environmental and other costs of each alternative
  c) acceptability of environmental impacts and contribution to identified environmental objectives
  d) acceptability of any environmental risks or uncertainties
  e) reliability of proposed environmental impact mitigation measures
  f) efficient use (including maximising re-use) of land, raw materials, energy and other resources.

C The location

1. General

- Provide an overview of the affected environment to place the proposal in its local and regional environmental context including:
  a) meteorological data (e.g. rainfall, temperature and evaporation, wind speed and direction)
  b) topography (landform element, slope type, gradient and length)
  c) surrounding land uses (potential synergies and conflicts)
  d) geomorphology (rates of landform change and current erosion and deposition processes)
  e) soil types and properties (including erodibility; engineering and structural properties; dispersibility; permeability; presence of acid sulfate soils and potential acid sulfate soils)
  f) ecological information (water system habitat, vegetation, fauna)
  g) availability of services and the accessibility of the site for passenger and freight transport.

2. Air

- Describe the topography and surrounding land uses. Provide details of the exact locations of dwellings, schools and hospitals. Where appropriate provide a perspective view of the study area such as the terrain file used in dispersion models.
- Describe surrounding buildings that may affect plume dispersion.
- Provide and analyse site representative data on following meteorological parameters:
  a) temperature and humidity
  b) rainfall, evaporation and cloud cover
  c) wind speed and direction
  d) atmospheric stability class
  e) mixing height (the height that emissions will be ultimately mixed in the atmosphere)
  f) katabatic air drainage
  g) air re-circulation.

3. Noise and vibration

- Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically, the location of any noise sensitive locations in relation to the site should be included on a map of the locality.
- Identify the land use zoning of the site and the immediate vicinity and the potentially affected areas.

4. Water

- Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: https://www.environment.nsw.gov.au/ieo/ should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.

5. Soil Contamination Issues

- Provide details of site history – if earthworks are proposed, this needs to be considered with regard to possible soil contamination, for example if the site was previously a landfill site or if irrigation of effluent has occurred.

D Identification and prioritisation of issues / scoping of impact assessment

- Provide an overview of the methodology used to identify and prioritise issues. The methodology should take into account:
  a) relevant NSW government guidelines
  b) industry guidelines
  c) EISs for similar projects
  d) relevant research and reference material
  e) relevant preliminary studies or reports for the proposal
  f) consultation with stakeholders.
- Provide a summary of the outcomes of the process including:
  a) all issues identified including local, regional and global impacts (e.g. increased/ decreased greenhouse emissions)
  b) key issues which will require a full analysis (including comprehensive baseline assessment)
  c) issues not needing full analysis though they may be addressed in the mitigation strategy
  d) justification for the level of analysis proposed (the capacity of the proposal to give rise to high concentrations of pollution compared with the ambient environment or environmental outcomes is an important factor in setting the level of assessment).

E The environmental issues

General

- The potential impacts identified in the scoping study need to be assessed to determine their significance, particularly in terms of achieving environmental outcomes, and minimising environmental pollution.
- Identify gaps in information and data relevant to significant impacts of the proposal and any actions proposed to fill those information gaps so as to enable development of appropriate management and mitigation measures. This is in accordance with ESD requirements.

Note: The level of detail should match the level of importance of the issue in decision making which is dependent on the environmental risk.

Describe baseline conditions

- Provide a description of existing environmental conditions for any potential impacts.

Assess impacts

- For any potential impacts relevant for the assessment of the proposal provide a detailed analysis of the impacts of the proposal on the environment including the cumulative impact of the proposal on the receiving environment especially where there are sensitive receivers.
- Describe the methodology used and assumptions made in undertaking this analysis (including any modelling or monitoring undertaken) and indicate the level of confidence in the predicted outcomes and the resilience of the environment to cope with the predicted impacts.
- The analysis should also make linkages between different areas of assessment where necessary to enable a full assessment of environmental impacts e.g. assessment of impacts on air quality will often need to draw on the analysis of traffic, health, social, soil and/or ecological systems impacts; etc.
- The assessment needs to consider impacts at all phases of the project cycle including: exploration (if relevant or significant), construction, routine operation, start-up operations, upset operations and decommissioning if relevant.
- The level of assessment should be commensurate with the risk to the environment.

Describe management and mitigation measures

- Describe any mitigation measures and management options proposed to prevent, control, abate or mitigate identified environmental impacts associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.
- Proponents are expected to implement a ‘reasonable level of performance’ to minimise environmental impacts. The proponent must indicate how the proposal meets reasonable levels of performance. For example, reference technology based criteria if available, or identify good practice for this type of activity or development. A ‘reasonable level of performance’ involves adopting and implementing technology and management practices to achieve certain pollutant emissions levels in economically viable operations. Technology-based criteria evolve gradually over time as technologies and practices change.
- Use environmental impacts as key criteria in selecting between alternative sites, designs and technologies, and to avoid options having the highest environmental impacts.
- Outline any proposed approach (such as an Environmental Management Plan) that will demonstrate how commitments made in the EIS will be implemented. Areas that should be described include:

  a) operational procedures to manage environmental impacts
  b) monitoring procedures
  c) training programs
  d) community consultation
  e) complaint mechanisms including site contacts
  f) strategies to use monitoring information to improve performance
  g) strategies to achieve acceptable environmental impacts and to respond in event of exceedences.

1. Air

Describe baseline conditions

- Provide a description of existing air quality and meteorology, using existing information and site representative ambient monitoring data.

Assess impacts

- Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.
- Estimate the resulting ground level concentrations of all pollutants. Where necessary (e.g. potentially significant impacts and complex terrain effects), use an appropriate dispersion model to estimate ambient pollutant concentrations. Discuss choice of model and parameters with the EPA.
- Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards or goals.
- Describe the contribution that the development will make to regional and global pollution, particularly in sensitive locations.
- For potentially odorous emissions provide the emission rates in terms of odour units (determined by techniques compatible with EPA procedures). Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.

Note: With dust and odour, it may be possible to use data from existing similar activities to generate emission rates.

- Reference should be made to
  - *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA 2022)
  - *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* (EPA 2022)
  - *Assessment and Management of Odour from Stationary Sources in NSW* (DEC 2006)
  - *Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW* (DEC 2006);
  - *Load Calculation Protocol for use by holders of NSW Environment Protection Licences when calculating Assessable Pollutant Loads* (DECC, 2009).

Describe management and mitigation measures

- Outline specifications of pollution control equipment (including manufacturer's performance guarantees where available) and management protocols for both point and fugitive emissions. Where possible, this should include cleaner production processes.

2. Human Health Risk Assessment

- A human health risk assessment must be undertaken in conjunction with the air quality and odour impact assessment.
- The human health risk assessment must be undertaken in accordance with *Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards* (enHealth) and must include:

- the inhalation of criteria pollutants and exposure from all pathways i.e., inhalation, ingestion and dermal to specific air toxics;

3. Noise and vibration

Describe baseline conditions

- Determine the existing background (LA90) and ambient (LAeq) noise levels, as relevant, in accordance with the *NSW Noise Policy for Industry (EPA 2017)*.
- Determine the existing road traffic noise levels in accordance with the *NSW Road Noise Policy (EPA 2011)*, where road traffic noise impacts may occur.
- The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including:
  a) details of equipment used for the measurements
  b) a brief description of where the equipment was positioned
  c) a statement justifying the choice of monitoring site(s), including the procedure used to choose the site(s), having regards to Fact Sheets A and B of the *NSW Noise Policy for Industry.*
  d) details of the exact location of the monitoring site and a description of land uses in surrounding areas
  e) a description of the dominant and background noise sources at the site
  f) day, evening and night assessment background levels for each day of the monitoring period
  g) the final Rating Background Level (RBL) value
  h) graphs of the measured noise levels for each day should be provided
  i) a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring.

Assess impacts

- Determine the project noise trigger levels for the site. For each identified potentially affected receiver, this should include:
  a) determination of the project intrusive noise level for each identified potentially affected receiver
  b) selection and justification of the appropriate amenity category for each identified potentially affected receiver
  c) determination of the project amenity noise level for each receiver
  d) determination of the appropriate maximum noise level event assessment (sleep disturbance) trigger level.
- Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible affects on sleep. Determine expected noise level and noise character likely to be generated from noise sources during:

a) site establishment
b) construction
c) operational phases
d) transport including traffic noise generated by the proposal
e) other services.

Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).

- Determine the noise levels likely to be received at the reasonably most affected location(s) (these may vary for different activities at each phase of the development).
- The noise impact assessment report should include:
  a) a plan showing the assumed location of each noise source for each prediction scenario
  b) a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions on the site
  c) any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or barriers, etc
  d) methods used to predict noise impacts including identification of any noise models used.
  e) the weather conditions considered for the noise predictions
  f) the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario
  g) for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived
  h) an assessment of the need to include modification factors as detailed in Fact Sheet C of the *NSW Noise Policy for Industry*.
- Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional feasible and reasonable mitigation measures.
- The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.
  a) Where relevant noise/vibration levels cannot be met after application of all feasible and reasonable mitigation measures the residual level of noise impact needs to be quantified
- For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.

Describe management and mitigation measures

- Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc.
- For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential

problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include:

a) use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage
b) control of traffic (eg: limiting times of access or speed limitations)
c) resurfacing of the road using a quiet surface
d) use of (additional) noise barriers or bunds
e) treatment of the façade to reduce internal noise levels buildings where the night-time criteria is a major concern
f) more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension
g) driver education
h) appropriate truck routes
i) limit usage of exhaust brakes
j) use of premium muffles on trucks
k) reducing speed limits for trucks
l) ongoing community liaison and monitoring of complaints
m) phasing in the increased road use.

5. Water

Describe baseline conditions

- Describe existing surface and groundwater quality – an assessment needs to be undertaken for any water resource likely to be affected by the proposal and for all conditions (e.g. a wet weather sampling program is needed if runoff events may cause impacts).

Note: Methods of sampling and analysis need to conform with an accepted standard (e.g. Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (EPA 2022) *or be approved and analyses undertaken by accredited laboratories).*

- Provide site drainage details and surface runoff yield.
- State the ambient Water Quality and River Flow Objectives for the receiving waters. These refer to the community's agreed environmental values and human uses endorsed by the Government as goals for the ambient waters. These environmental values are published on the website: https://www.environment.nsw.gov.au/ieo/. The EIS should state the environmental values listed for the catchment and waterway type relevant to your proposal. NB: A consolidated and approved list of environmental values are not available for groundwater resources. Where groundwater may be affected the EIS should identify appropriate groundwater environmental values and justify the choice.
- State the indicators and associated trigger values or criteria for the identified environmental values. This information should be sourced from the ANZECC 2000 *Guidelines for Fresh and Marine Water Quality* (http://www.environment.gov.au/water/publications/quality/nwqms-guidelines-4-vol1.html) (Note that, as at 2004, the NSW Water Quality Objectives booklets and website contain technical criteria derived from the 1992 version of the ANZECC Guidelines. The Water Quality Objectives remain as Government Policy, reflecting the community's environmental values and long-term goals, but the technical criteria are replaced by the more recent ANZECC 2000 Guidelines). NB: While specific guidelines for groundwater are not available, the ANCECC 2000 Guidelines endorse the application of the trigger values and decision trees as a tool to assess risk to environmental values in groundwater.

- Where site specific studies are proposed to revise the trigger values supporting the ambient Water Quality and River Flow Objectives, and the results are to be used for regulatory purposes (e.g. to assess whether a licensed discharge impacts on water quality objectives), then prior agreement from the EPA on the approach and study design must be obtained.
- Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives (i.e. are Water Quality and River Flow Objectives being achieved?). Proponents are generally only expected to source available data and information. However, proponents of large or high risk developments may be required to collect some ambient water quality / river flow / groundwater data to enable a suitable level of impact assessment. Issues to include in the description of the receiving waters could include:
  a) lake or estuary flushing characteristics
  b) specific human uses (e.g. exact location of drinking water offtake)
  c) sensitive ecosystems or species conservation values
  d) a description of the condition of the local catchment e.g. erosion levels, soils, vegetation cover, etc
  e) an outline of baseline groundwater information, including, but not restricted to, depth to water table, flow direction and gradient, groundwater quality, reliance on groundwater by surrounding users and by the environment
  f) historic river flow data where available for the catchment.

Assess impacts

- No proposal should breach clause 120 of the *Protection of the Environment Operations Act* 1997 (i.e. pollution of waters is prohibited unless undertaken in accordance with relevant regulations).
- Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point including residual discharges after mitigation measures are implemented.
- Include a rationale, along with relevant calculations, supporting the prediction of the discharges.
- Describe the effects and significance of any pollutant loads on the receiving environment. This should include impacts of residual discharges through modelling, monitoring or both, depending on the scale of the proposal. Determine changes to hydrology (including drainage patterns, surface runoff yield, flow regimes, wetland hydrologic regimes and groundwater).
- Describe water quality impacts resulting from changes to hydrologic flow regimes (such as nutrient enrichment or turbidity resulting from changes in frequency and magnitude of stream flow).
- Identify any potential impacts on quality or quantity of groundwater describing their source.
- Identify potential impacts associated with geomorphological activities with potential to increase surface water and sediment runoff or to reduce surface runoff and sediment transport. Also consider possible impacts such as bed lowering, bank lowering, instream siltation, floodplain erosion and floodplain siltation.
- Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.
- Containment of spills and leaks shall be in accordance with EPA's guidelines section '*Storing and Handling Liquids*' at https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/compliance-audit-program/chemical-storage-handling-and-spill-management

and the most recent versions of the Australian Standards referred to in the Guidelines. Containment should be designed for no-discharge.

- The significance of the impacts listed above should be predicted. When doing this it is important to predict the ambient water quality and river flow outcomes associated with the proposal and to demonstrate whether these are acceptable in terms of achieving protection of the Water Quality and River Flow Objectives. In particular the following questions should be answered:
  a) will the proposal protect Water Quality and River Flow Objectives where they are currently achieved in the ambient waters; and
  b) will the proposal contribute towards the achievement of Water Quality and River Flow Objectives over time, where they are not currently achieved in the ambient waters.
- Consult with the EPA as soon as possible if a mixing zone is proposed (a mixing zone could exist where effluent is discharged into a receiving water body, where the quality of the water being discharged does not immediately meet water quality objectives. The mixing zone could result in dilution, assimilation and decay of the effluent to allow water quality objectives to be met further downstream, at the edge of the mixing zone). The EPA will advise the proponent under what conditions a mixing zone will and will not be acceptable, as well as the information and modelling requirements for assessment.

Note: The assessment of water quality impacts needs to be undertaken in a total catchment management context to provide a wide perspective on development impacts, in particular cumulative impacts.

- Where a licensed discharge is proposed, provide the rationale as to why it cannot be avoided through application of a reasonable level of performance, using available technology, management practice and industry guidelines.
- Where a licensed discharge is proposed, provide the rationale as to why it represents the best environmental outcome and what measures can be taken to reduce its environmental impact.
- Reference should be made to
  - *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004),
  - *Guidelines for Fresh and Marine Water Quality* (ANZECC 2000),
  - *Environmental Guidelines: Use of effluent by Irrigation* (DEC, 2004).

Describe management and mitigation measures

- Outline stormwater management to control pollutants at the source and contain them within the site. Also describe measures for maintaining and monitoring any stormwater controls.
- Outline erosion and sediment control measures directed at minimising disturbance of land, minimising water flow through the site and filtering, trapping or detaining sediment. Also include measures to maintain and monitor controls as well as rehabilitation strategies.
- Describe waste water treatment measures that are appropriate to the type and volume of waste water and are based on a hierarchy of avoiding generation of waste water; capturing all contaminated water (including stormwater) on the site; reusing/recycling waste water; and treating any unavoidable discharge from the site to meet specified water quality requirements.
- Outline pollution control measures relating to storage of materials, possibility of accidental spills (e.g. preparation of contingency plans), appropriate disposal methods, and generation of leachate.

- Describe hydrological impact mitigation measures including:
  a) site selection (avoiding sites prone to flooding and waterlogging, actively eroding or affected by deposition)
  b) minimising runoff
  c) minimising reductions or modifications to flow regimes
  d) avoiding modifications to groundwater.
- Describe groundwater impact mitigation measures including:
  a) site selection
  b) retention of native vegetation and revegetation
  c) artificial recharge
  d) providing surface storages with impervious linings
  e) monitoring program.
- Describe geomorphological impact mitigation measures including:
  a) site selection
  b) erosion and sediment controls
  c) minimising instream works
  d) treating existing accelerated erosion and deposition
  e) monitoring program.
- Any proposed monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (EPA 2022).

6. Soils and contamination

Describe baseline conditions

- Provide any details (in addition to those provided in the location description - Section C) that are needed to describe the existing situation in terms of soil types and properties and soil contamination.

Assess impacts

- Identify any likely impacts resulting from the construction or operation of the proposal, including the likelihood of:
  a) disturbing any existing contaminated soil
  b) contamination of soil by operation of the activity
  c) subsidence or instability
  d) soil erosion
  e) disturbing acid sulfate or potential acid sulfate soils.
- Reference should be made to
  - *Consultants reporting on Contaminated Land (EPA* 2020);
  - *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997* (EPA, 2015)

Describe management and mitigation measures

- Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including:
  a) erosion and sediment control measures
  b) proposals for site remediation – see *State Environmental Planning Policy (Resilience and Hazards) 2021* and other supporting guidelines including the *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
  c) proposals for the management of these soils – see *Acid Sulfate Soil Manual* (Acid Sulfate Soil Advisory Committee 1998) and *Acid Sulfate Soils Assessment Guidelines* (Acid Sulfate Soil Advisory Committee 1998).

7. Waste and chemicals

Describe baseline conditions

- Describe any existing waste or chemicals operations related to the proposal.

Assess impacts

- Assess the adequacy of proposed measures to minimise natural resource consumption and minimise impacts from the handling, transporting, storage, processing and reprocessing of waste and/or chemicals.
- Reference should be made to: the EPA's *Waste Classification Guidelines 2014 (as in force from time to time)*
- If the proposal is an energy from waste facility it must:
  - demonstrate that the proposed operation will comply with *the NSW EPA's Energy from Waste Policy Statement*;
  - describe of the classes and quantities of waste that would be thermally treated at the facility;
  - demonstrate that waste used as a feedstock in the waste to energy plant would be the residual from a resource recovery process that maximises the recovery of material;
  - detail procedures that would be implemented to control the inputs to the waste to energy plant, including contingency measures that would be implemented if inappropriate materials are identified;
  - detail the location and size of stockpiles of unprocessed and processed recycled waste at the site;
  - demonstrate any waste material (e.g. biochar, ash) produced from the waste to energy facility for land application is fit-for-purpose and poses minimal risk of harm to the environment in order to meet the requirements for consideration of a resource recovery order and /or exemption by the EPA;
  - detail procedures for the management of other solid, liquid and gaseous waste streams;
  - describe how waste would be treated, stored, used, disposed and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future offsite waste disposal methods; and
  - identify the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste and Sustainable Materials Strategy 2041*.

Describe management and mitigation measures

- Outline measures to minimise the consumption of natural resources.
- Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.
- Outline measures to support any approved regional or industry waste plans.

8. Cumulative impacts

- Identify the extent that the receiving environment is already stressed by existing development and background levels of emissions to which this proposal will contribute.
- Assess the impact of the proposal against the long term air, noise and water quality objectives for the area or region.
- Identify infrastructure requirements flowing from the proposal (e.g. water and sewerage services, transport infrastructure upgrades).
- Assess likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts (e.g. travel demand management strategies).

F. List of approvals and licences

- Identify all approvals and licences required under environment protection legislation including details of all scheduled activities, types of ancillary activities and types of discharges (to air, land, water).

G. Compilation of mitigation measures

- Outline how the proposal and its environmental protection measures would be implemented and managed in an integrated manner so as to demonstrate that the proposal is capable of complying with statutory obligations under EPA licences or approvals (e.g. outline of an environmental management plan).
- The mitigation strategy should include the environmental management and cleaner production principles which would be followed when planning, designing, establishing and operating the proposal. It should include two sections, one setting out the program for managing the proposal and the other outlining the monitoring program with a feedback loop to the management program.

H. Justification for the Proposal

- Reasons should be included which justify undertaking the proposal in the manner proposed, having regard to the potential environmental impacts.

ATTACHMENT B: GUIDANCE MATERIAL

Title	Web address
Relevant Legislation	
Contaminated Land Management Act 1997	http://www.legislation.nsw.gov.au/#/view/act/1997/140
Environmentally Hazardous Chemicals Act 1985	http://www.legislation.nsw.gov.au/#/view/act/1985/14
Environmental Planning and Assessment Act 1979	http://www.legislation.nsw.gov.au/#/view/act/1979/203
Protection of the Environment Operations Act 1997	http://www.legislation.nsw.gov.au/#/view/act/1997/156
Water Management Act 2000	http://www.legislation.nsw.gov.au/#/view/act/2000/92
Licensing	
Guide to Licensing	www.epa.nsw.gov.au/licensing/licenceguide.htm
Air Issues	
Air Quality	
Approved methods for modelling and assessment of air pollutants in NSW (2022)	https://www.epa.nsw.gov.au/your-environment/air/industrial-emissions/approved-methods-for-the-modelling-and-assessment-of-air-pollutants https://www.epa.nsw.gov.au/resources/epa/approved-methods-for-modelling-and-assessment-of-air-pollutants-in-NSW-160666.pdf
POEO (Clean Air) Regulation 2021	https://legislation.nsw.gov.au/view/html/inforce/current/sl-2021-0485
Noise and Vibration	
NSW Noise Policy for Industry (2017)	http://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)
Interim Construction Noise Guideline (DECC, 2009)	http://www.epa.nsw.gov.au/noise/constructnoise.htm
Assessing Vibration: a technical guideline (DEC, 2006)	http://www.epa.nsw.gov.au/noise/vibrationguide.htm
NSW Road Noise Policy (DECCW, 2011)	https://www.epa.nsw.gov.au/resources/noise/2011236nswroadnoisepolicy.pdf
Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZEC 1990)	https://www.epa.nsw.gov.au/~/media/EPA/Corporate%20Site/resources/noise/ANZECBlasting.ashx
NSW Rail Infrastructure Noise Guideline (EPA, 2013)	https://www.epa.nsw.gov.au/resources/noise/20130018eparing.pdf

Human Health Risk Assessment	
Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards (enHealth, 2012)	http://www.eh.org.au/documents/item/916
Waste, Chemicals and Hazardous Materials and Radiation	
Waste	
Environmental Guidelines: Solid Waste Landfills (EPA, 2016)	https://www.epa.nsw.gov.au/your-environment/waste/waste-facilities/landfill-sites
Managing industrial waste	https://www.epa.nsw.gov.au/your-environment/waste/industrial-waste
EPA's Waste Classification Guidelines 2014	http://www.epa.nsw.gov.au/wasteregulation/classify-guidelines.htm
Resource recovery orders and exemptions	https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/current-orders-and-exemption
EPA's Energy from Waste Policy Statement	http://www.epa.nsw.gov.au/wastestrategy/energy-from-waste.htm
NSW Waste Avoidance and Resource Recovery Strategy 2014-2021	http://www.epa.nsw.gov.au/wastestrategy/warr.htm
Chemicals subject to Chemical Control Orders	
Chemical Control Orders (regulated through the EHC Act)	http://www.epa.nsw.gov.au/pesticides/CCOs.htm
National Protocol - Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
National Protocol for Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes - July 1994	Available in libraries
Water and Soils	
Acid sulphate soils	
Coastal acid sulfate soils guidance material	https://www.environment.nsw.gov.au/research-and-publications/publications-search/acid-sulfate-soils-remediation-guidelines-for-coastal-floodplains-in-nsw and http://www.epa.nsw.gov.au/mao/acidsulfatesoils.htm
Acid Sulfate Soils Planning Maps	https://datasets.seed.nsw.gov.au/dataset/acid-sulfate-soils-risk0196c
Contaminated Sites Assessment and Remediation	
State Environmental Planning Policy (Resilience and Hazards) 2021	https://www.epa.nsw.gov.au/your-environment/contaminated-land
Consultants Reporting on Contaminated Land (EPA, 2020)	https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/contaminated-land/20p2233-consultants-reporting-on-contaminated-land-guidelines.pdf

Guidelines for the NSW Site Auditor Scheme – 3rd edition (EPA, 2017)	https://www.epa.nsw.gov.au/your-environment/contaminated-land/site-auditor-scheme
Sampling Design Guidelines (EPA, 2022)	https://yoursay.epa.nsw.gov.au/sampling-design-guidelines
National Environment Protection (Assessment of Site Contamination) Measure 1999 (or update)	https://www.nepc.gov.au/nepms/assessment-site-contamination

Soils – general	
Managing land and soil	https://www.environment.nsw.gov.au/topics/land-and-soil/managing-land-and-soil
Managing Urban Stormwater: Soils and construction	https://www.environment.nsw.gov.au/research-and-publications/publications-search/managing-urban-stormwater-soils-and-construction-volume-1-4th-editon
Landslide risk management guidelines	
Site Investigations for Urban Salinity (DLWC, 2002)	https://www.environment.nsw.gov.au/research-and-publications/publications-search/site-investigations-for-urban-salinity
Local Government Salinity Initiative Booklets	https://www.environment.nsw.gov.au/research-and-publications/publications-search/local-government-salinity-initiative-introduction-to-urban-salinity
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
Australian and New Zealand guidelines for fresh and marine water quality	https://www.waterquality.gov.au/guidelines/anz-fresh-marine
Applying Goals for Ambient Water Quality Guidance for Operations Officers - Mixing Zones	Contact the EPA on 131555
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2022)	https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/licensing-under-poeo-act-1997/licensing-to-regulate-water-pollution/approved-methods-for-sampling-and-analysing-water-pollutants

This concludes the EPA's submission.

APPENDIX H

FLOOD ASSESSMENT

H.1 Introduction

This Appendix is provided to confirm technical parameters adopted in the *Overland Flow Assessment*, as summarised in **Section 7** of this report, for the proposed industrial estate development. The *Study Area* has been identified by Bayside Council as being affected by overland flow in their flood study of the Floodvale Drain and Springvale Drain Catchment.

The scope and primary objectives of the overland flow assessment, are as follows:

- Determine the design flows generated by the contributing external catchments for the 1% AEP & PMF;
- Assess the pre-development overland flow path through the development site for the 1% AEP storm event;
- Confirm that there is no adverse impact to upstream, downstream and adjacent properties as a result of the development; and
- Confirm flood planning levels applicable to the development.

The former Botany City Council (now part of Bayside City Council) commissioned BMT WBM in 2014 to complete a detailed flood assessment for the Floodvale Drain and Springvale Drain catchment. As report by BMT WBM:

> *The Springvale Drain and Floodvale Drain catchment encompasses an area of approximately 3.75km2 located within the City of Botany Bay LGA in south-eastern Sydney. This includes the suburbs of Pagewood, Eastgardens, Botany and Banksmeadow.*
>
> *The catchment is heavily urbanised and is predominantly comprised of industrial development with a large proportion of residential development in the upper catchment.*
>
> *The natural drainage systems have been heavily modified and most of the study area is now drained by a stormwater pipe network; there are some open channel reaches in the southern area of the catchment. When the capacity of this stormwater drainage network is exceeded, overland flow will occur along the alignments of the original drains or gullies. Many of the old drainage gully alignments are now located through developed properties which presents a significant flood risk.*

A detailed site specific TUFLOW model of the pre and post development conditions has been completed by Costin Roe Consulting. The assessment being completed with consideration to Bayside Council policy and the *NSW Floodplain Development Manual*. Technical parameters and detail included in the TUFLOW model are consistent with those adopted by Councils model (used as the base case), other than inclusion of private drainage within the subject property, and detailed survey where available.

Appendix H provides technical detail to the summary and conclusions discussed in the **Section 7** of this report.

H.1.1 Survey/DTM

Survey is required to define the physical attributes of the floodplain topography including the channel cross sections and the associated floodplain levels.

The pre-development scenario survey has been compiled based on a detail site survey for areas within the site, and for areas external to the site where detail survey is not available, digital terrain information has been obtained through government sources in the form of ALS survey. The on-ground survey information was completed

in and around the study area to properly define the existing overland flow path cross section and features.

For assessment of the post-development scenario, the proposed development levels and drainage system (where appropriate) were then added to the pre-developed survey surface to create a post developed surface to use in the TUFLOW model and scenario modelling. This DTM was imported to the TUFLOW model to simulate land filling and proposed compensation areas in and around the flood affected land.

The surveys and design surfaces were used as the basis for the digital terrain model (DTM) used in the hydraulic modelling of the pre and post development scenario respectively.

H.2 Proposed Overland Flow Management Strategy

Flows from within the development sites have been only considered in the sizing of the stormwater system and erosion control for the development sites. The proposed buildings will be set at the 1% AEP level plus 0.5m freeboard per council policy.

Bayside Council require that overland flows from the upstream catchment to be conveyed through the site. Council also requires proof that the proposed development does not increase the flood risk to the surrounding properties. Further, the TUFLOW modelling and assessment confirms there is negligible impact on upstream, downstream and/ or adjoining sites as a result of the proposed developments.

H.3 Model Output

Model output for pre and post development conditions for the Catchment flooding events on site as discussed in earlier sections have been included in the following Figures.

We note the below figures represent predicted values at the peak of each event. The figures represent predicted values at the peak of the 1% AEP.

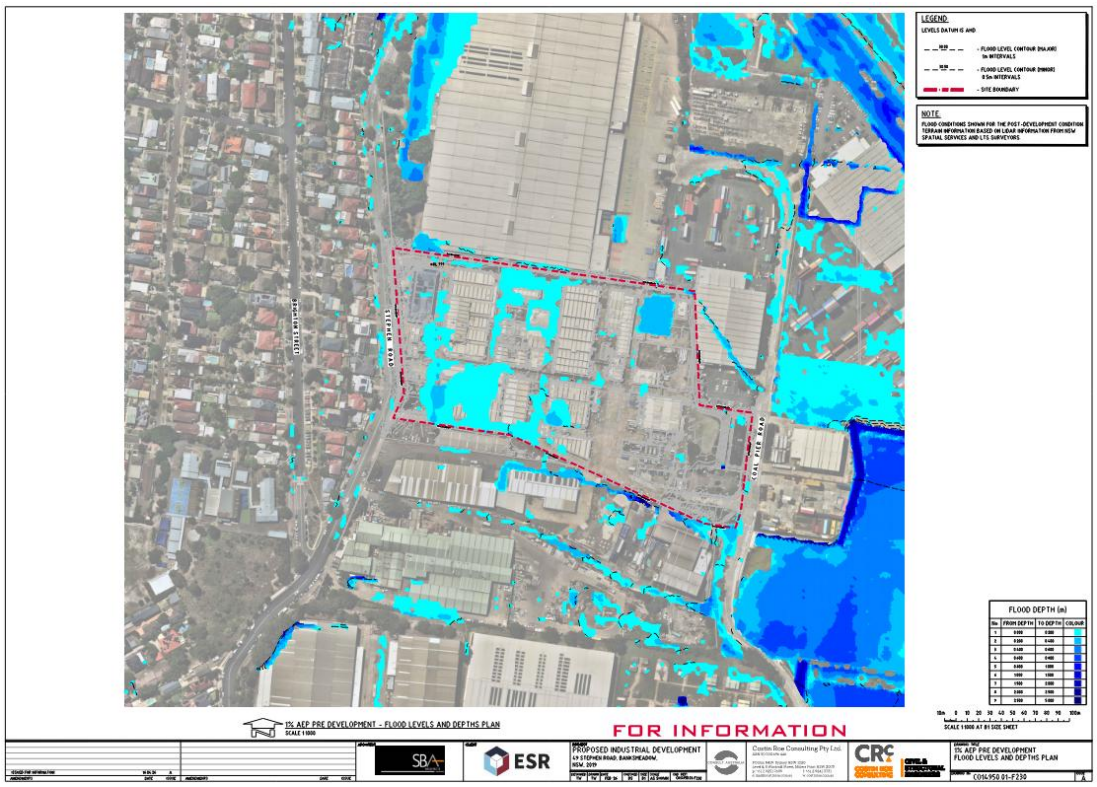


Figure H4.1: 1% AEP Flood Depths – Pre-Development

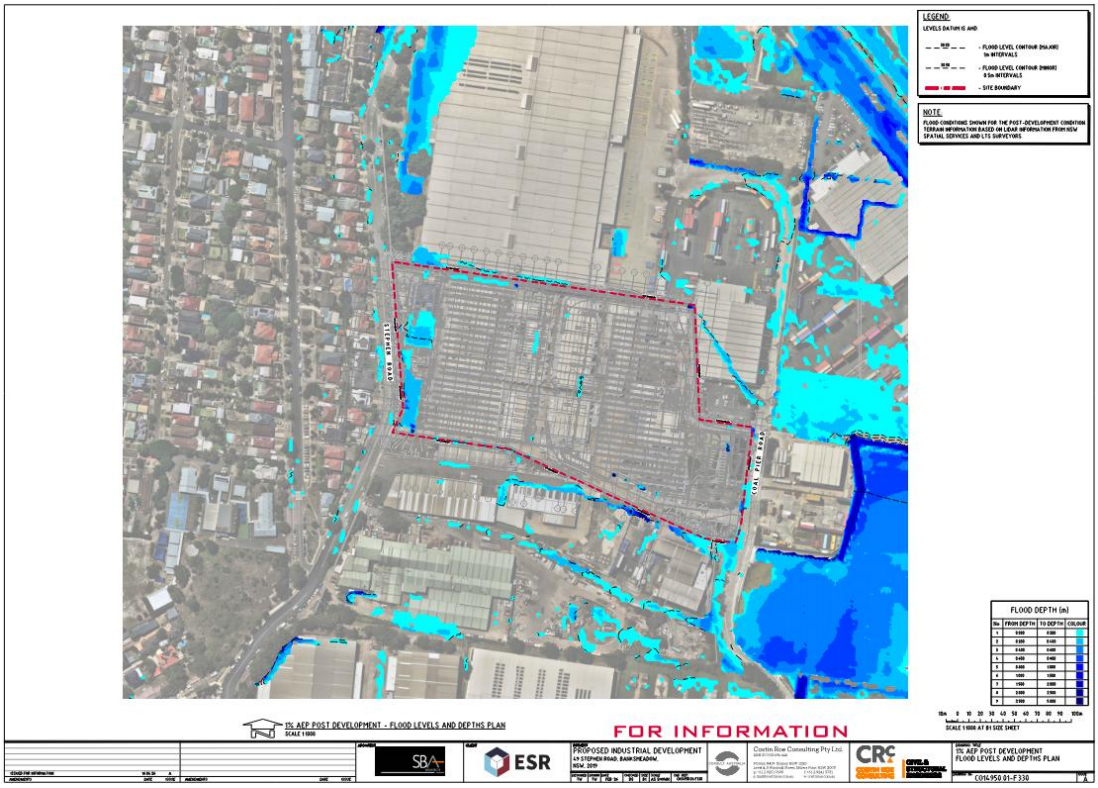


Figure H4.2: 1% AEP Flood Depths – Post Development

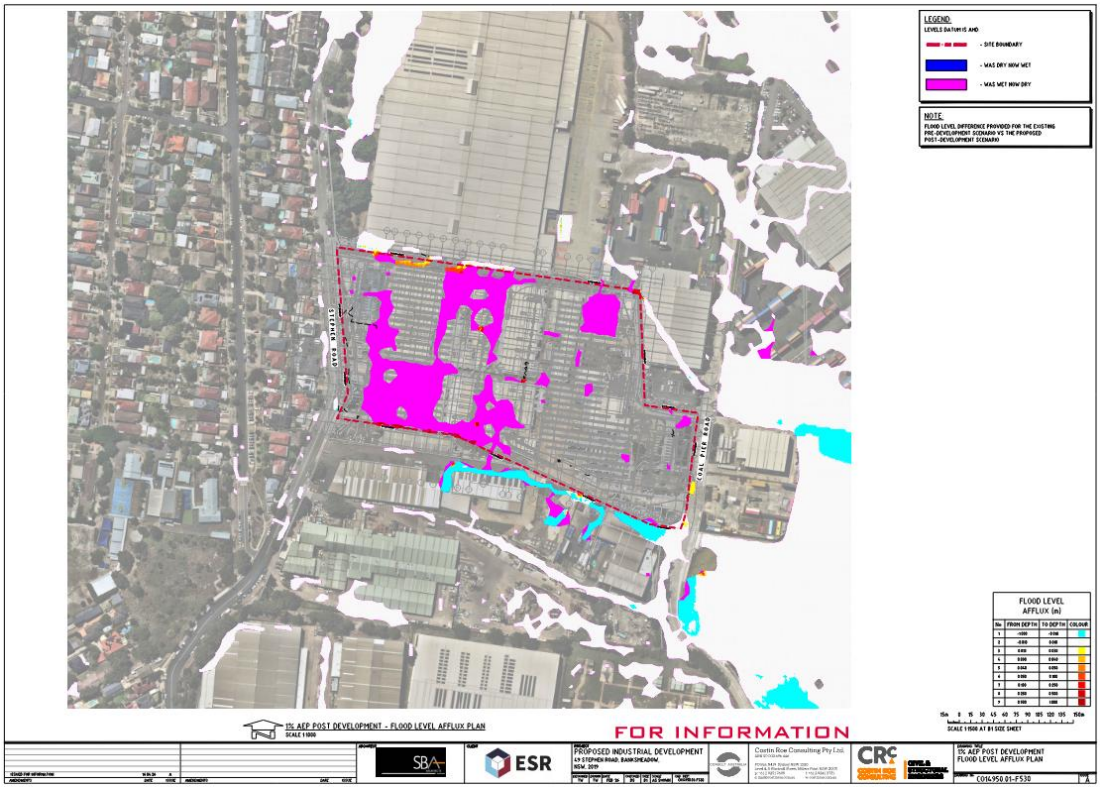


Figure H4.3: 1% AEP Flood Afflux Plan

H.4 Flood Assessment Discussion

This Appendix to the *Civil Engineering Report* for 49 Stephen Road, Banksmeadow, NSW, has been prepared to assess the effect of flooding on the proposed development, and also to confirm no affectation on upstream downstream or adjoining properties. Further the assessment was also completed to ensure that sufficient flood conveyance is available, post development, during the 1% AEP and PMF flood event.

A TUFLOW hydrodynamic flood model has been completed and the pre and post development flood events assessed for the 1% AEP rainfall event.

This Appendix confirms the technical input and detailed output completed as part of the assessment. **Appendix H** is to be read in conjunction with **Section 7** of this report.

Appendix H2

FLOOD ASSESSMENT FIGURES

PROPOSED MULTI-LEVEL INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW 2019
STATE SIGNIGICANT DEVELOPMENT APPLICATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C014950.01-F100	DRAWING LIST & SITE LOCATION

PRE-DEVELOPMENT FLOODING

C014950.01-F230	1% AEP PRE-DEVELOPMENT LEVELS AND DEPTHS
C014950.01-F231	1% AEP PRE-DEVELOPMENT VELOCITY
C014950.01-F232	1% AEP PRE-DEVELOPMENT HAZARD
C014950.01-F250	1% AEP PRE-DEVELOPMENT WITH 2100 SLR AND CC LEVELS AND DEPTHS
C014950.01-F260	PMF PRE-DEVELOPMENT LEVELS AND DEPTHS
C014950.01-F261	PMF PRE-DEVELOPMENT VELOCITY
C014950.01-F262	PMF PRE-DEVELOPMENT HAZARD

POST-DEVELOPMENT FLOODING

C014950.01-F330	1% AEP POST-DEVELOPMENT LEVELS AND DEPTHS
C014950.01-F331	1% AEP POST-DEVELOPMENT VELOCITY
C014950.01-F332	1% AEP POST-DEVELOPMENT HAZARD
C014950.01-F350	1% AEP POST-DEVELOPMENT WITH 2100 SLR AND CC LEVELS AND DEPTHS
C014950.01-F360	PMF POST-DEVELOPMENT LEVELS AND DEPTHS
C014950.01-F361	PMF POST-DEVELOPMENT VELOCITY
C014950.01-F362	PMF POST-DEVELOPMENT HAZARD

FLOOD AFFLUX MAPPING

C014950.01-F530	1% AEP POST-DEVELOPMENT FLOOD LEVELS AFFLUX PLAN
C014950.01-F531	1% AEP POST-DEVELOPMENT FLOOD VELOCITY AFFLUX PLAN
C014950.01-F550	1% AEP POST-DEVELOPMENT WITH 2100 SLR AND CC FLOOD LEVELS AFFLUX PLAN
C014950.01-F560	PMF POST-DEVELOPMENT FLOOD LEVELS AFFLUX PLAN
C014950.01-F561	PMF POST-DEVELOPMENT FLOOD VELOCITY AFFLUX PLAN

GENERAL NOTES:

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
3. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE.
   ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
   ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT.
   REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.
4. DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
5. UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
6. ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.



LOCALITY PLAN
NTS

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
PRELIMINARY ONLY	16.04.26	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F100

CONSULT AUSTRALIA

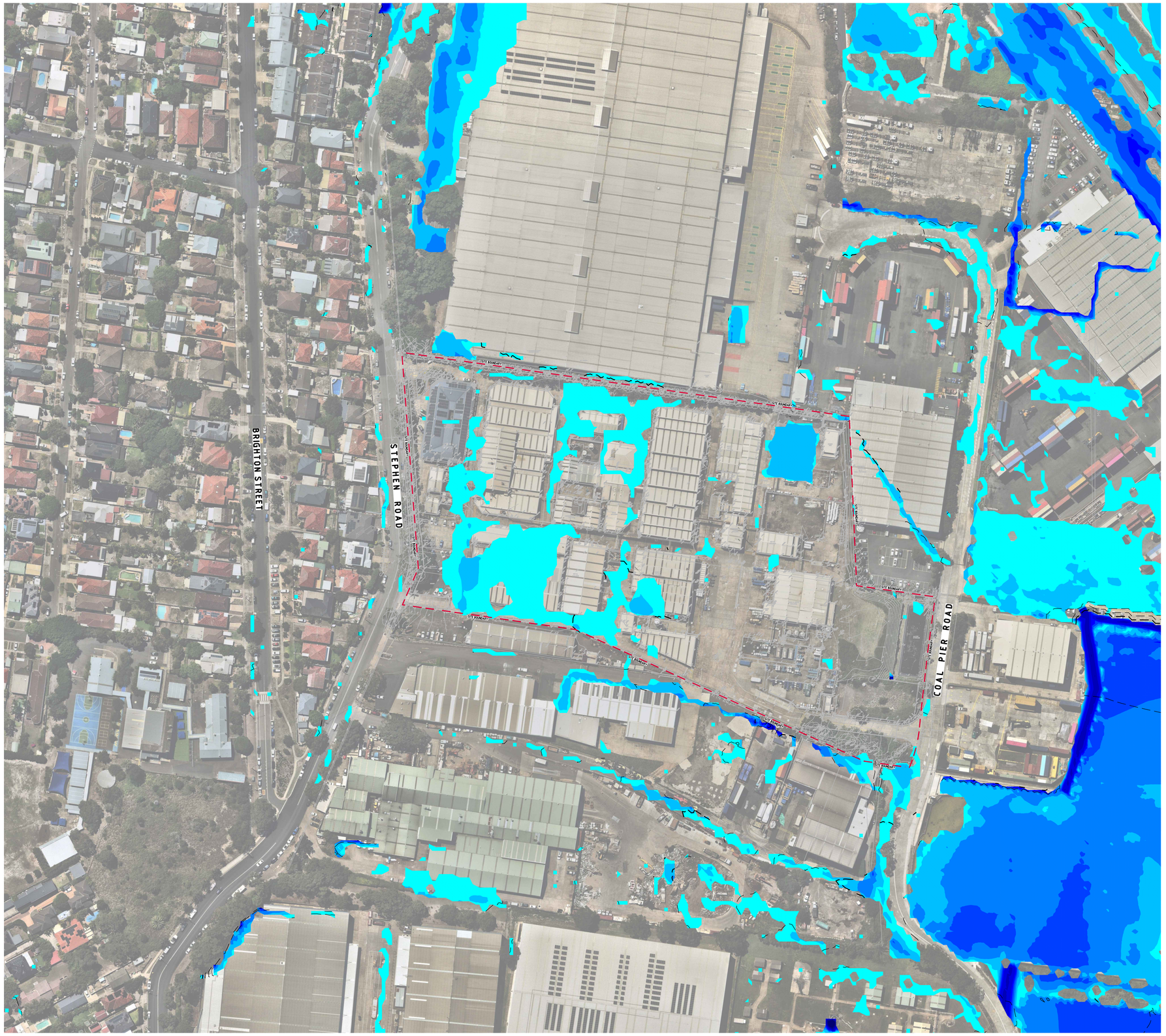
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: DRAWING LIST & GENERAL NOTES

DRAWING No: C014950.01-F100

ISSUE: A



LEGEND:

LEVELS DATUM IS AHD.

- 30.00 – FLOOD LEVEL CONTOUR (MAJOR) 1m INTERVALS
- 30.50 – FLOOD LEVEL CONTOUR (MINOR) 0.5m INTERVALS
- SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD DEPTH (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.200	
2	0.200	0.400	
3	0.400	0.600	
4	0.600	0.800	
5	0.800	1.000	
6	1.000	1.500	
7	1.500	2.000	
8	2.000	2.500	
9	2.500	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP PRE DEVELOPMENT - FLOOD LEVELS AND DEPTHS PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	16.04.26	A

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F230

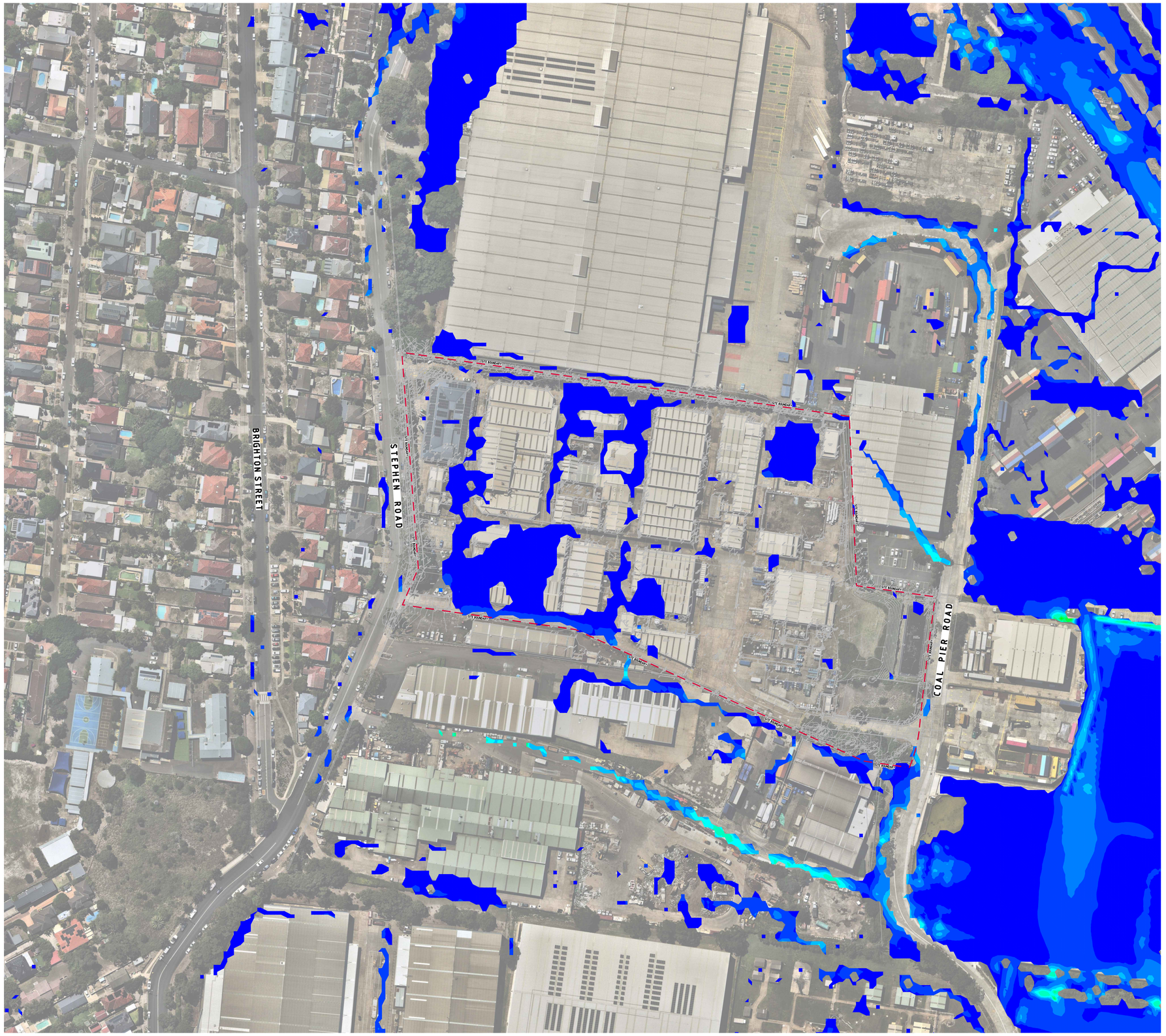
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
CRC COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
1% AEP PRE DEVELOPMENT
FLOOD LEVELS AND DEPTHS PLAN

DRAWING No: C014950.01-F230

ISSUE: B



LEGEND:

LEVELS DATUM IS AHD.

– SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD VELOCITY (m/s)

No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.250	
6	1.250	1.500	
7	1.500	1.750	
8	1.750	2.000	
9	2.000	2.250	
10	2.250	2.500	
11	2.500	2.750	
12	2.750	3.000	
13	3.000	3.250	
14	3.250	3.500	
15	3.500	3.750	
16	3.750	4.000	
17	4.000	4.250	
18	4.250	4.500	
19	4.500	4.750	
20	4.750	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP PRE DEVELOPMENT - FLOOD VELOCITY PLAN

SCALE 1:1000

FOR INFORMATION

ISSUE	DATE	AMENDMENTS
A	16.04.26	ISSUED FOR INFORMATION

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F 231

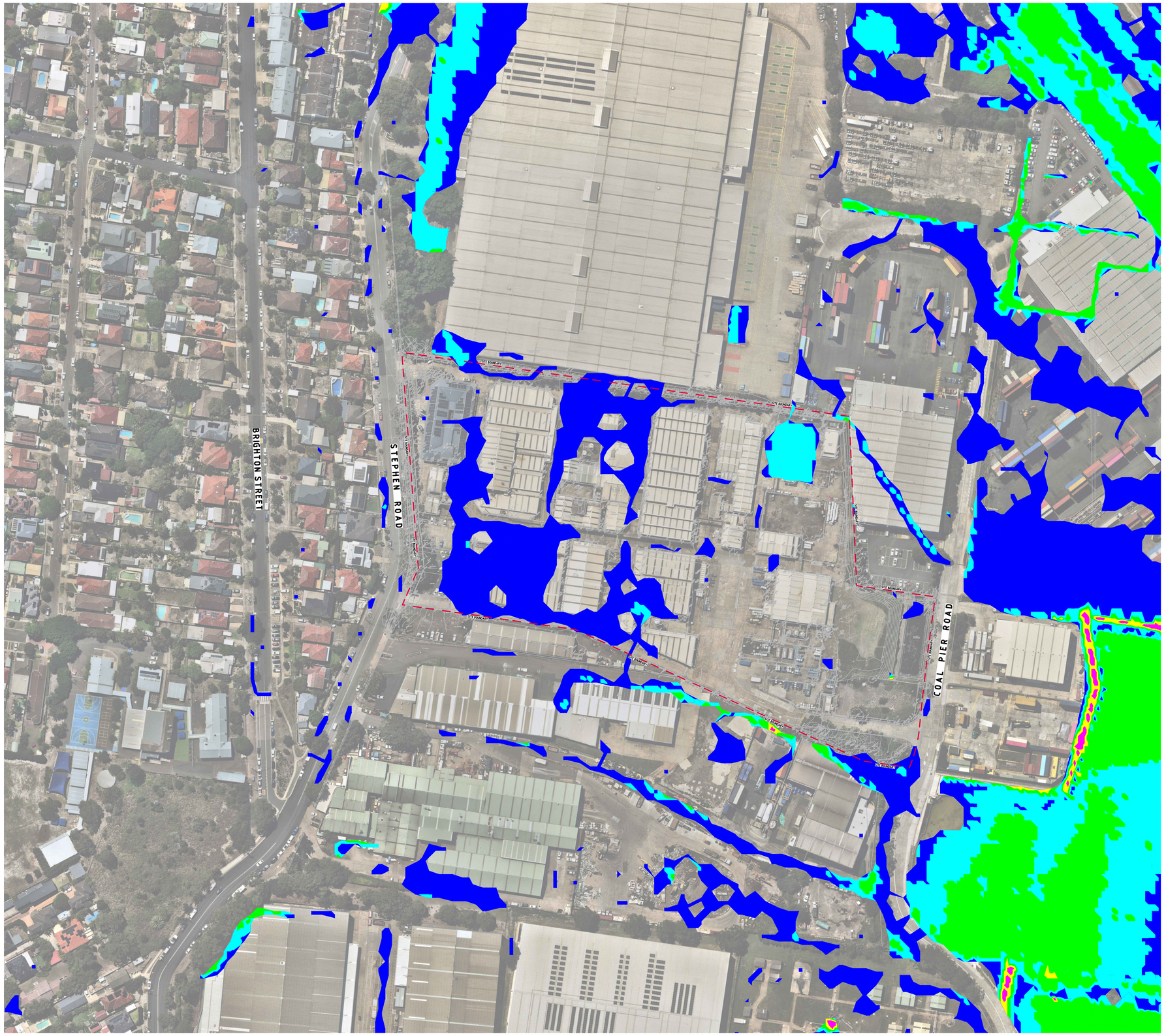
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: 1% AEP PRE DEVELOPMENT FLOOD VELOCITY PLAN

DRAWING No: C014950.01-F 231

ISSUE: A



LEGEND:

- SITE BOUNDARY
- H1
- H2
- H3
- H4
- H5
- H6

FLOOD HAZARD CLASSIFICATION AS PER AUSTRALIAN RAINFALL & RUNOFF 2019, A GUIDE TO FLOOD ESTIMATION - BOOK 6 - FLOOD HYDRAULICS

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

1% AEP PRE DEVELOPMENT - FLOOD HAZARD PLAN
SCALE 1:1000

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT B1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	16.04.26	A			
AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F232

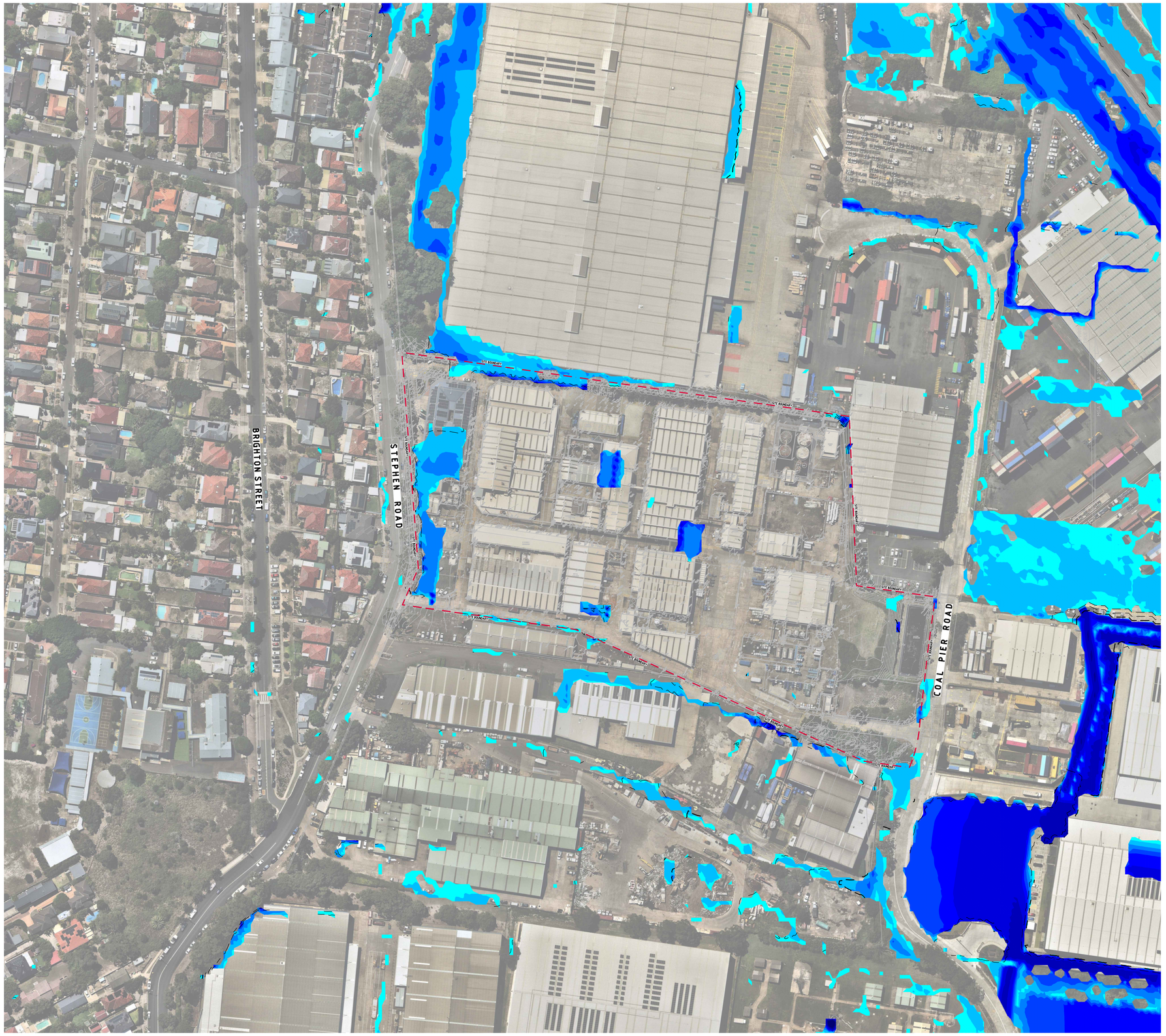
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
1% AEP PRE DEVELOPMENT
FLOOD HAZARD PLAN

DRAWING No C014950.01-F 232
ISSUE A



LEGEND:

LEVELS DATUM IS AHD.

- 30.00 – FLOOD LEVEL CONTOUR (MAJOR) 1m INTERVALS
- 30.50 – FLOOD LEVEL CONTOUR (MINOR) 0.5m INTERVALS
- SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD DEPTH (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.200	
2	0.200	0.400	
3	0.400	0.600	
4	0.600	0.800	
5	0.800	1.000	
6	1.000	1.500	
7	1.500	2.000	
8	2.000	2.500	
9	2.500	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP PRE DEVELOPMENT WITH 200 SLR AND CLIMATE CHANGE - FLOOD LEVELS AND DEPTHS PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	16.04.26	A

AMENDMENTS DATE ISSUE

ARCHITECT SBA ARCHITECTS

CLIENT ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F250

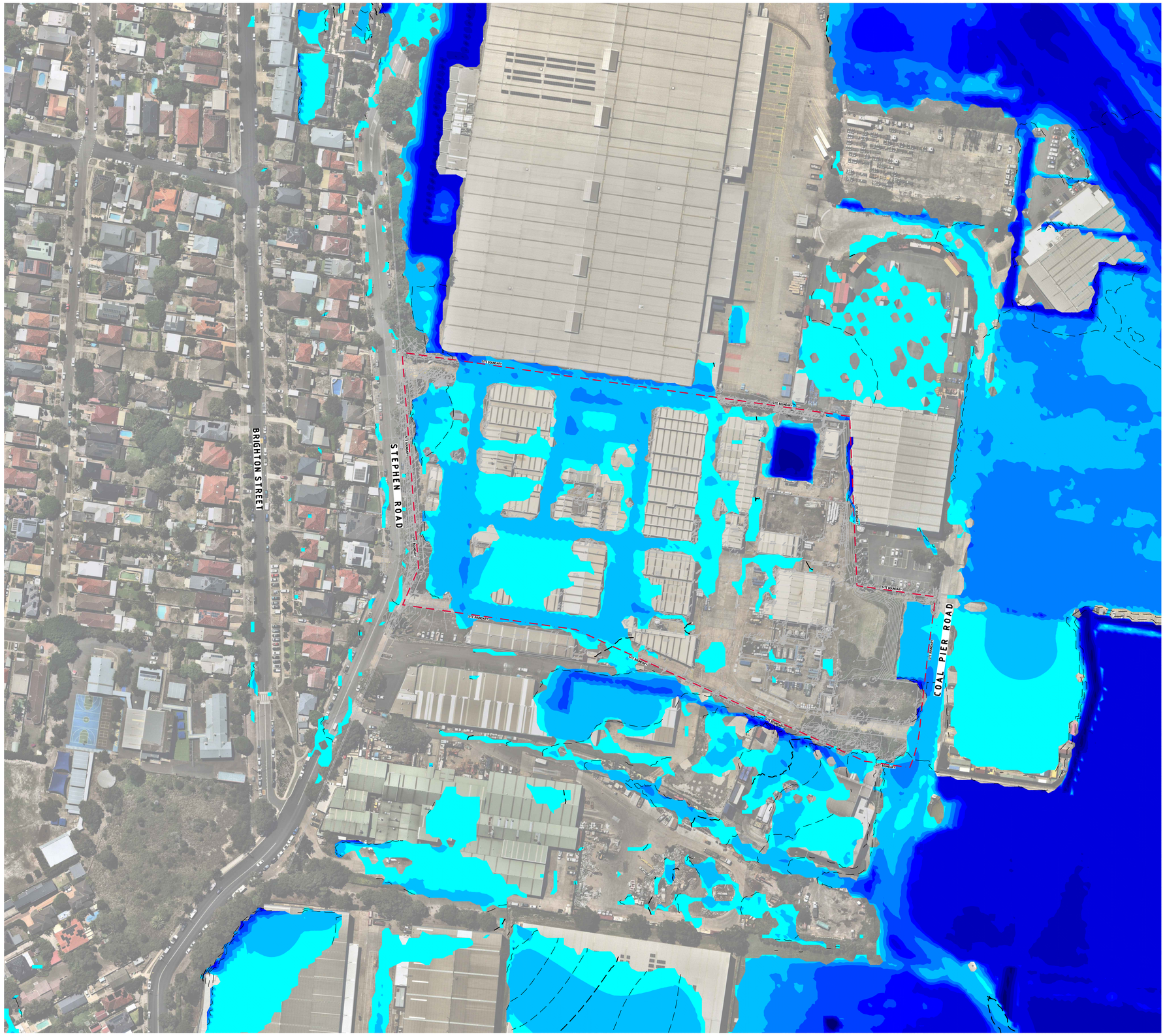
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
1% AEP PRE DEVELOPMENT WITH 2100 SEA LEVEL RISE AND CLIMATE CHANGE FLOOD LEVELS AND DEPTHS PLAN

DRAWING No C014950.01-F250

ISSUE B



LEGEND:

LEVELS DATUM IS AHD.

- 30.00 – FLOOD LEVEL CONTOUR (MAJOR) 1m INTERVALS
- 30.50 – FLOOD LEVEL CONTOUR (MINOR) 0.5m INTERVALS
- SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD DEPTH (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.200	
2	0.200	0.400	
3	0.400	0.600	
4	0.600	0.800	
5	0.800	1.000	
6	1.000	1.500	
7	1.500	2.000	
8	2.000	2.500	
9	2.500	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

PMF PRE DEVELOPMENT - FLOOD LEVELS AND DEPTHS PLAN
SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	21.04.26	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F260

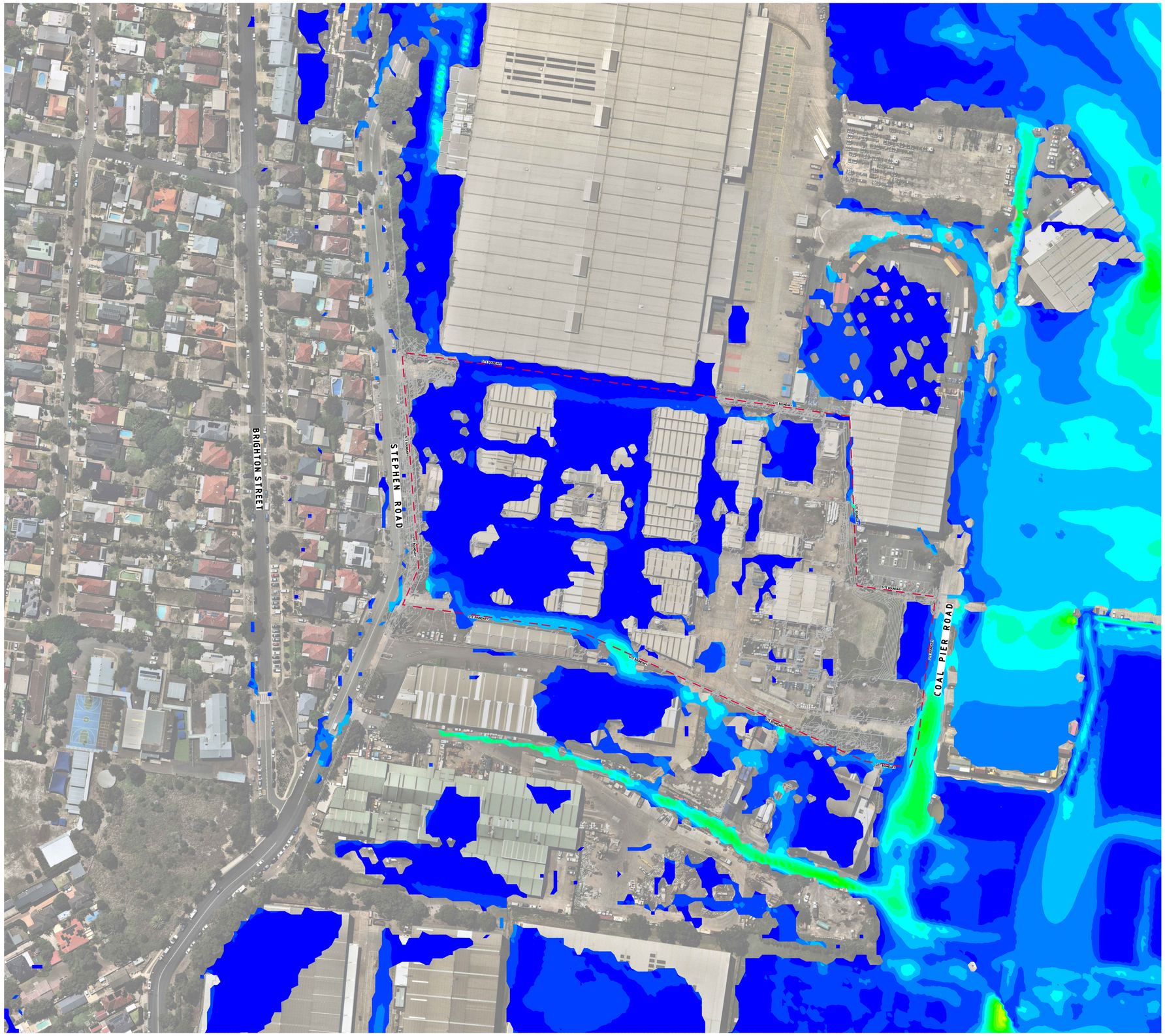
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
PMF PRE DEVELOPMENT
FLOOD LEVELS AND DEPTHS PLAN

DRAWING No C014950.01-F260 | ISSUE A



LEGEND:

LEVELS DATUM IS AHD.

– SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD VELOCITY (m/s)

No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.250	
6	1.250	1.500	
7	1.500	1.750	
8	1.750	2.000	
9	2.000	2.250	
10	2.250	2.500	
11	2.500	2.750	
12	2.750	3.000	
13	3.000	3.250	
14	3.250	3.500	
15	3.500	3.750	
16	3.750	4.000	
17	4.000	4.250	
18	4.250	4.500	
19	4.500	4.750	
20	4.750	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

PMF PRE DEVELOPMENT - FLOOD VELOCITY PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	21.04.26	A

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F261

CONSULT AUSTRALIA

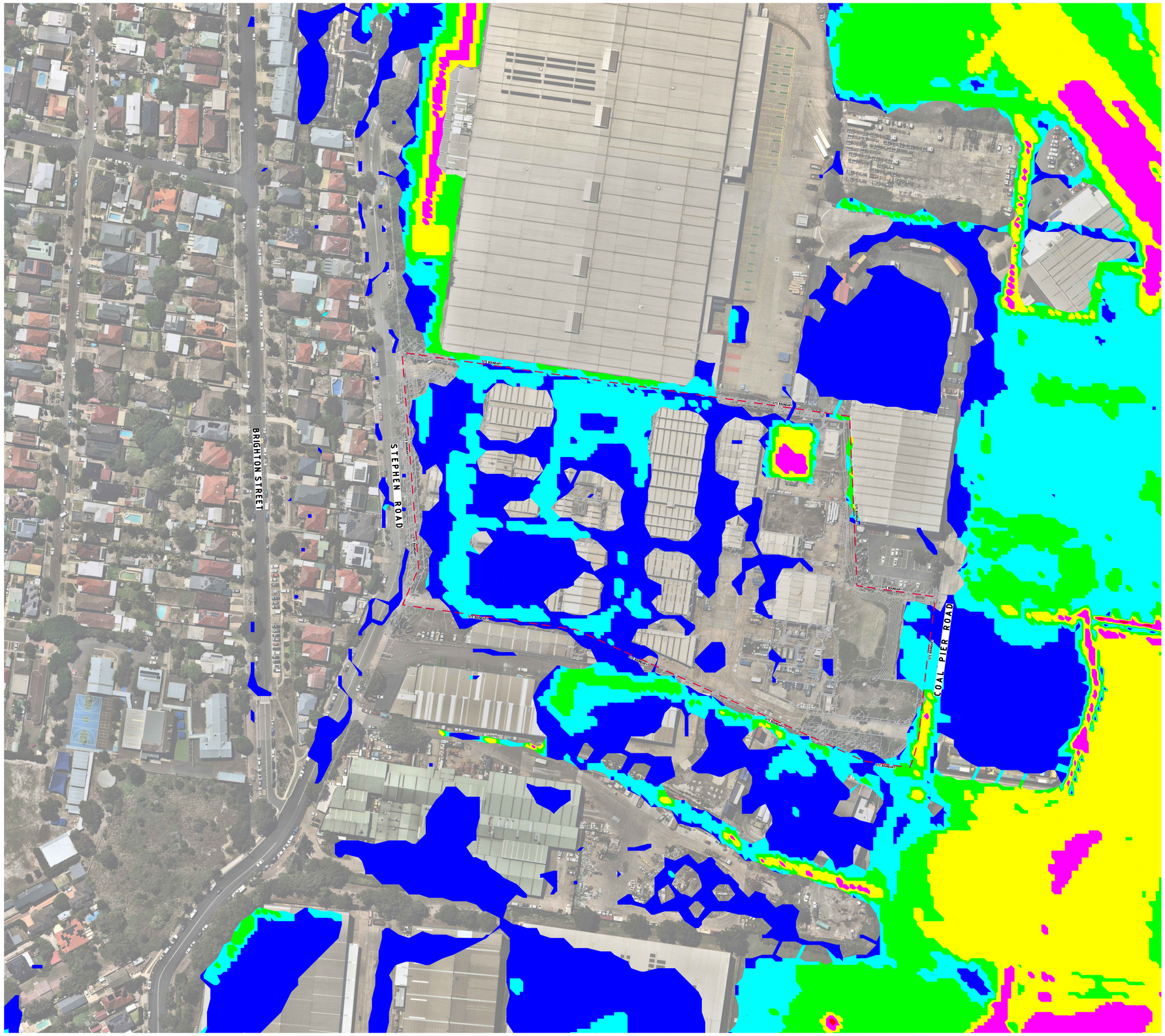
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: PMF PRE DEVELOPMENT FLOOD VELOCITY PLAN

DRAWING No: C014950.01-F261

ISSUE: B



LEGEND:

- SITE BOUNDARY
- H1
- H2
- H3
- H4
- H5
- H6

FLOOD HAZARD CLASSIFICATION AS PER
AUSTRALIAN RAINFALL & RUNOFF 2019, A GUIDE TO
FLOOD ESTIMATION - BOOK 6 - FLOOD HYDRAULICS

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION.
TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW
SPATIAL SERVICES AND LTS SURVEYORS.

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

PMF PRE DEVELOPMENT - FLOOD HAZARD PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	21.04.26	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F262

CONSULT AUSTRALIA

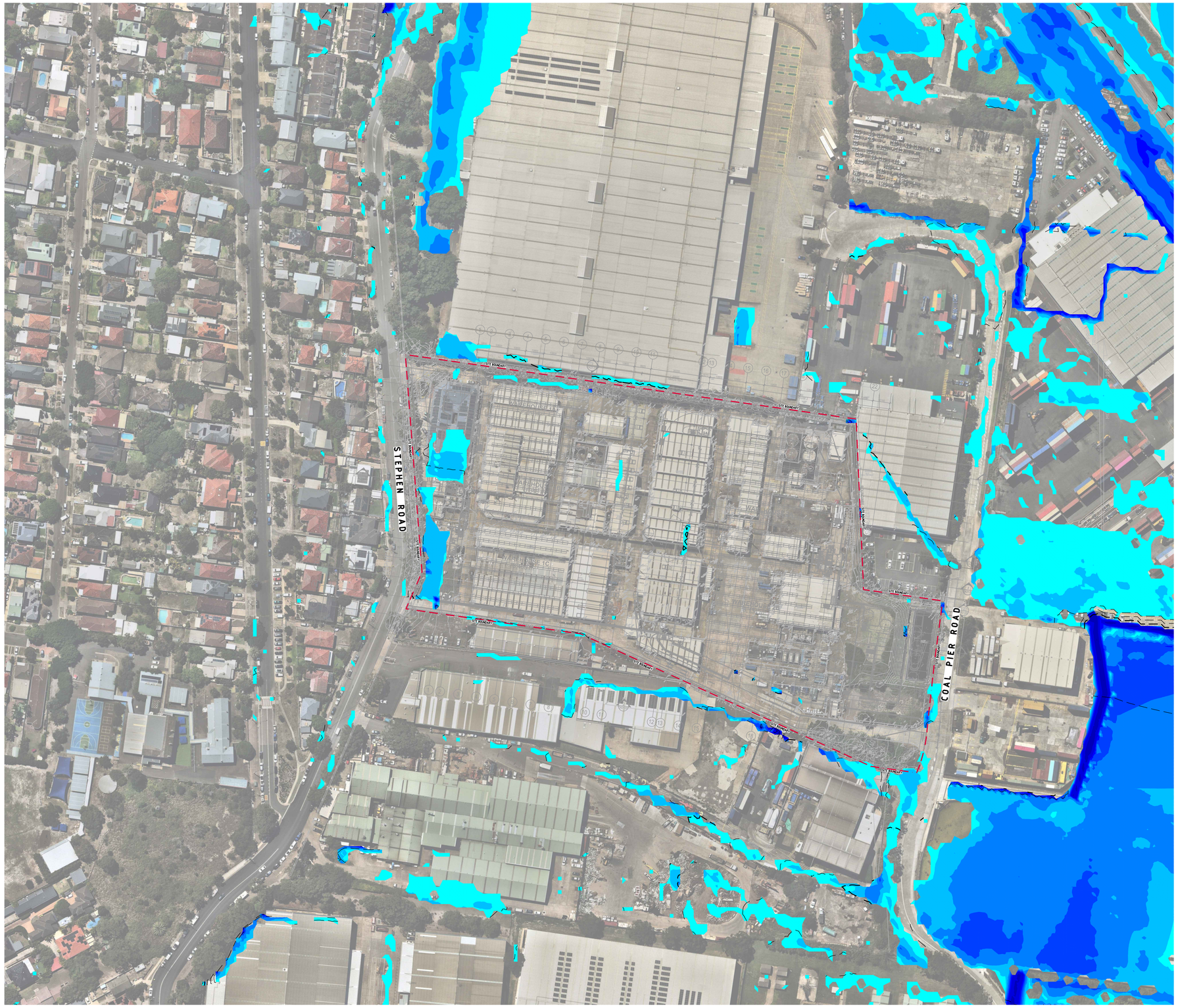
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
PMF PRE DEVELOPMENT
FLOOD HAZARD PLAN

DRAWING No: C014950.01-F262

ISSUE: B



LEGEND:

LEVELS DATUM IS AHD.

- 30.00 – FLOOD LEVEL CONTOUR (MAJOR) 1m INTERVALS
- 30.50 – FLOOD LEVEL CONTOUR (MINOR) 0.5m INTERVALS
- SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD DEPTH (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.200	
2	0.200	0.400	
3	0.400	0.600	
4	0.600	0.800	
5	0.800	1.000	
6	1.000	1.500	
7	1.500	2.000	
8	2.000	2.500	
9	2.500	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT - FLOOD LEVELS AND DEPTHS PLAN

SCALE 1:1000

FOR INFORMATION

ISSUED FOR INFORMATION	16.04.26	A
AMENDMENTS	DATE	ISSUE

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F330

CONSULT AUSTRALIA

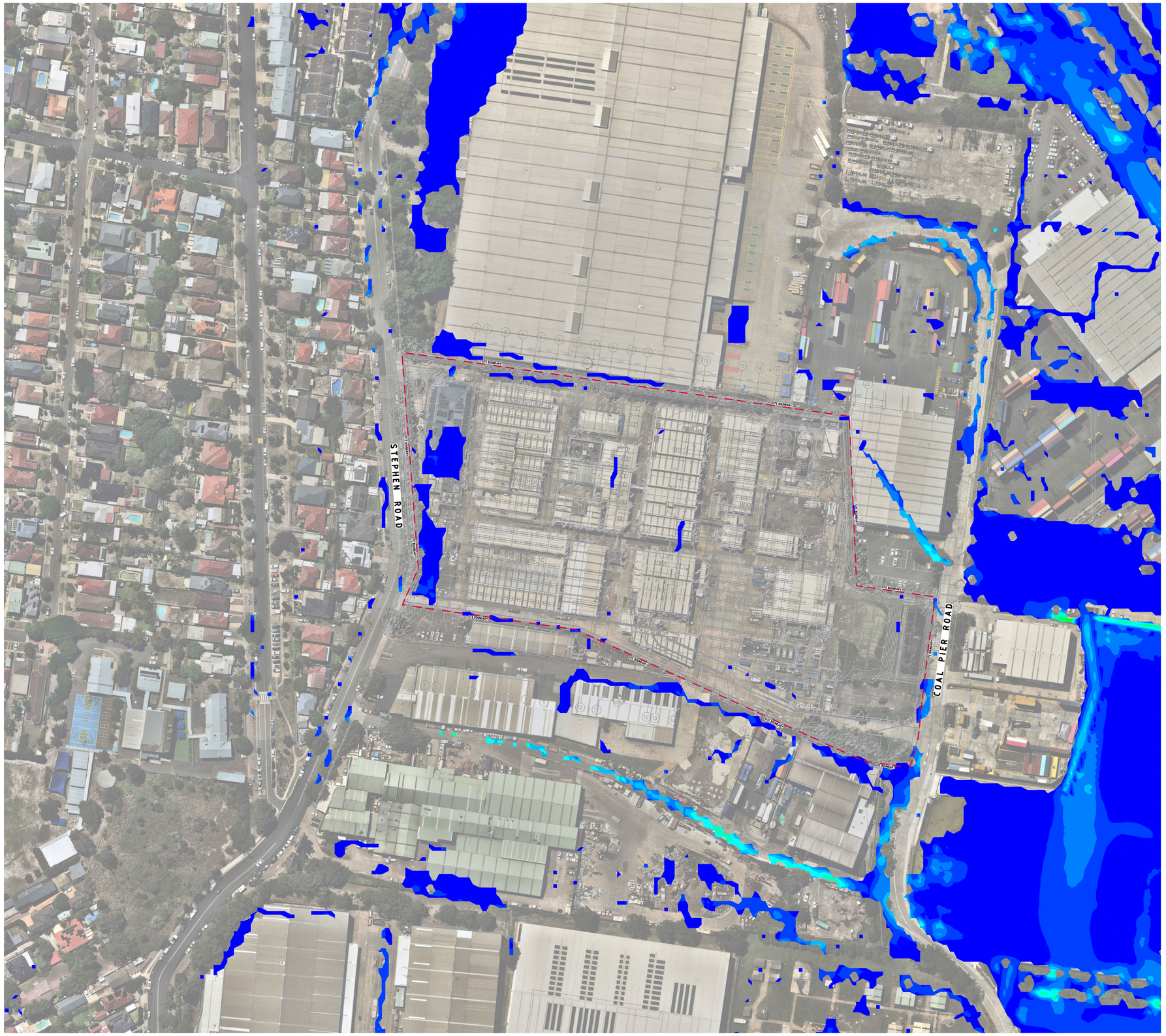
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
1% AEP POST DEVELOPMENT
FLOOD LEVELS AND DEPTHS PLAN

DRAWING No C014950.01-F330

ISSUE A



LEGEND:

LEVELS DATUM IS AHD.

– SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD VELOCITY (m/s)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.250	
6	1.250	1.500	
7	1.500	1.750	
8	1.750	2.000	
9	2.000	2.250	
10	2.250	2.500	
11	2.500	2.750	
12	2.750	3.000	
13	3.000	3.250	
14	3.250	3.500	
15	3.500	3.750	
16	3.750	4.000	
17	4.000	4.250	
18	4.250	4.500	
19	4.500	4.750	
20	4.750	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT - FLOOD VELOCITY PLAN

SCALE 1:1000

FOR INFORMATION

ISSUED FOR INFORMATION	16.04.26	A
AMENDMENTS	DATE	ISSUE

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F331

CONSULT AUSTRALIA

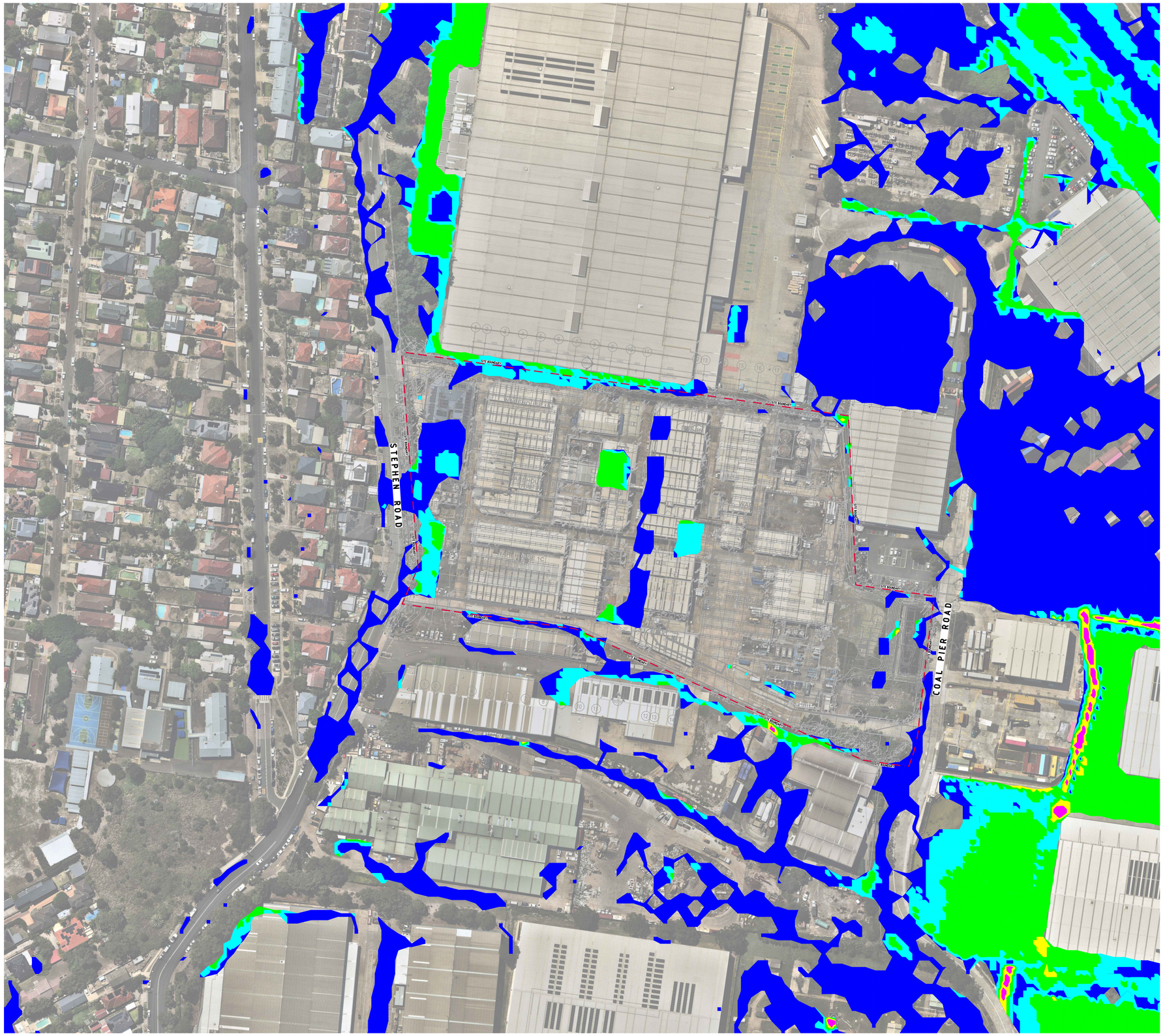
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
1% AEP POST DEVELOPMENT
FLOOD VELOCITY PLAN

DRAWING No C014950.01-F331

ISSUE A



LEGEND:

- SITE BOUNDARY
- H1
- H2
- H3
- H4
- H5
- H6

FLOOD HAZARD CLASSIFICATION AS PER AUSTRALIAN RAINFALL & RUNOFF 2019, A GUIDE TO FLOOD ESTIMATION - BOOK 6 - FLOOD HYDRAULICS

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT - FLOOD LEVELS AND DEPTHS PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	16.04.26	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F332

CONSULT AUSTRALIA

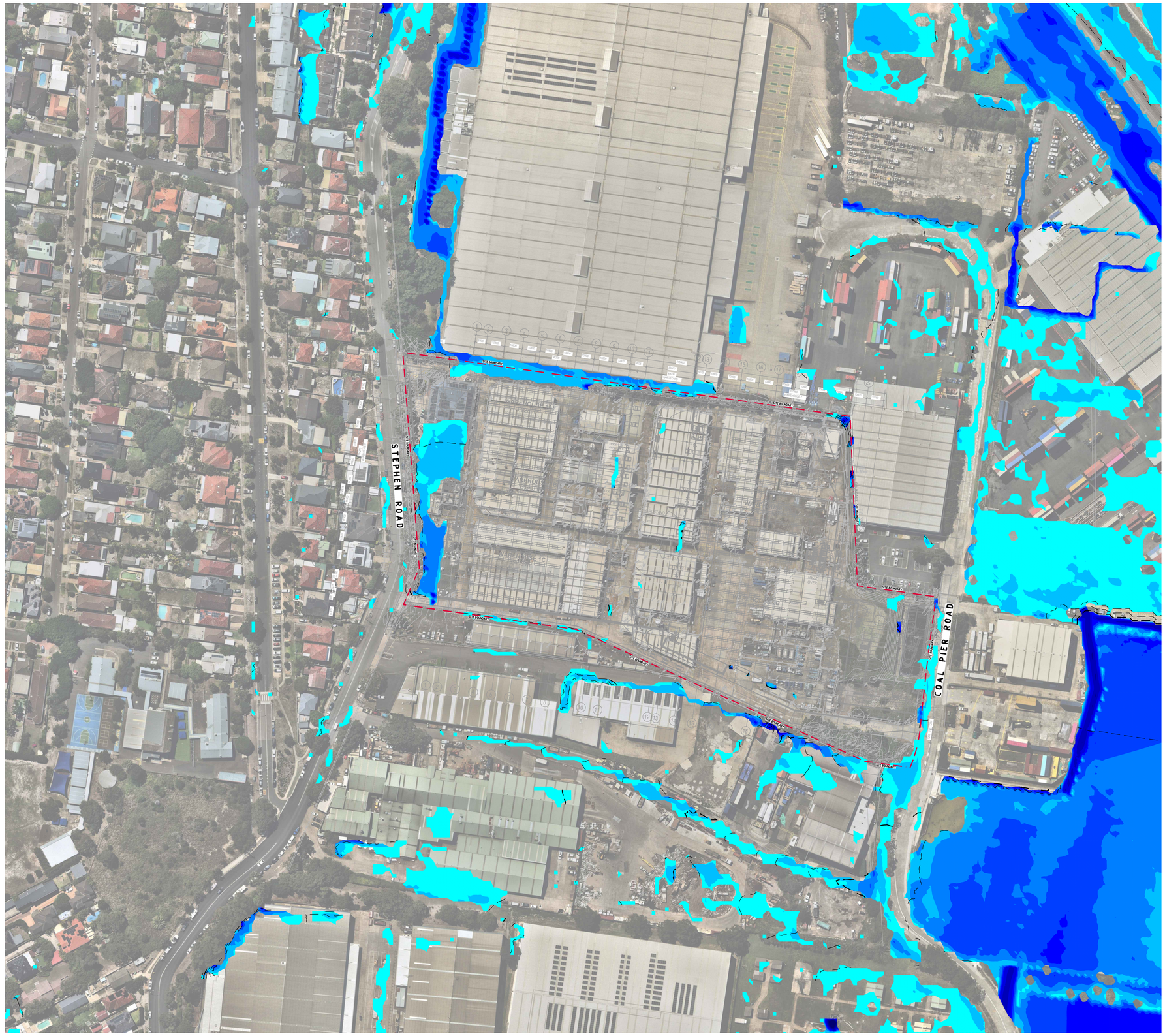
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
1% AEP POST DEVELOPMENT
FLOOD HAZARD PLAN

DRAWING No C014950.01-F332

ISSUE A



LEGEND:

LEVELS DATUM IS AHD.

- 30.00 – FLOOD LEVEL CONTOUR (MAJOR) 1m INTERVALS
- 30.50 – FLOOD LEVEL CONTOUR (MINOR) 0.5m INTERVALS
- SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD DEPTH (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.200	
2	0.200	0.400	
3	0.400	0.600	
4	0.600	0.800	
5	0.800	1.000	
6	1.000	1.500	
7	1.500	2.000	
8	2.000	2.500	
9	2.500	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT WITH 200 SLR AND CLIMATE CHANGE - FLOOD LEVELS AND DEPTHS PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	16.04.26	A

AMENDMENTS	DATE	ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F350

CONSULT AUSTRALIA

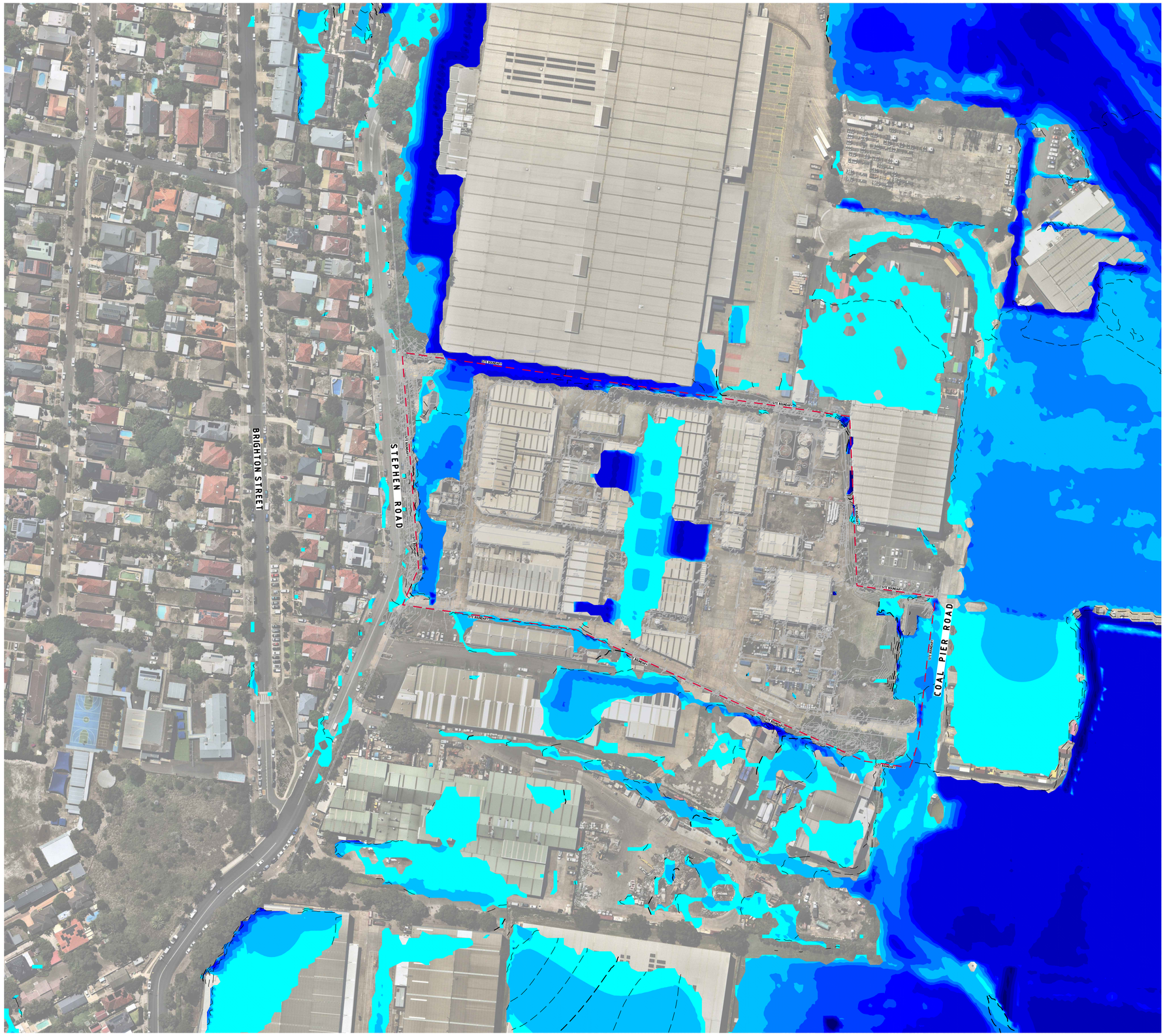
Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: 1% AEP POST DEVELOPMENT WITH 2100 SEA LEVEL RISE AND CLIMATE CHANGE FLOOD LEVELS AND DEPTHS PLAN

DRAWING No: C014950.01-F350

ISSUE: B



LEGEND:

LEVELS DATUM IS AHD.

- 30.00 – FLOOD LEVEL CONTOUR (MAJOR) 1m INTERVALS
- 30.50 – FLOOD LEVEL CONTOUR (MINOR) 0.5m INTERVALS
- SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

PMF POST DEVELOPMENT - FLOOD LEVELS AND DEPTHS PLAN
SCALE 1:1000

FOR INFORMATION

FLOOD DEPTH (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.200	
2	0.200	0.400	
3	0.400	0.600	
4	0.600	0.800	
5	0.800	1.000	
6	1.000	1.500	
7	1.500	2.000	
8	2.000	2.500	
9	2.500	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT B1 SIZE SHEET

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	21.04.26	A

AMENDMENTS DATE ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F360

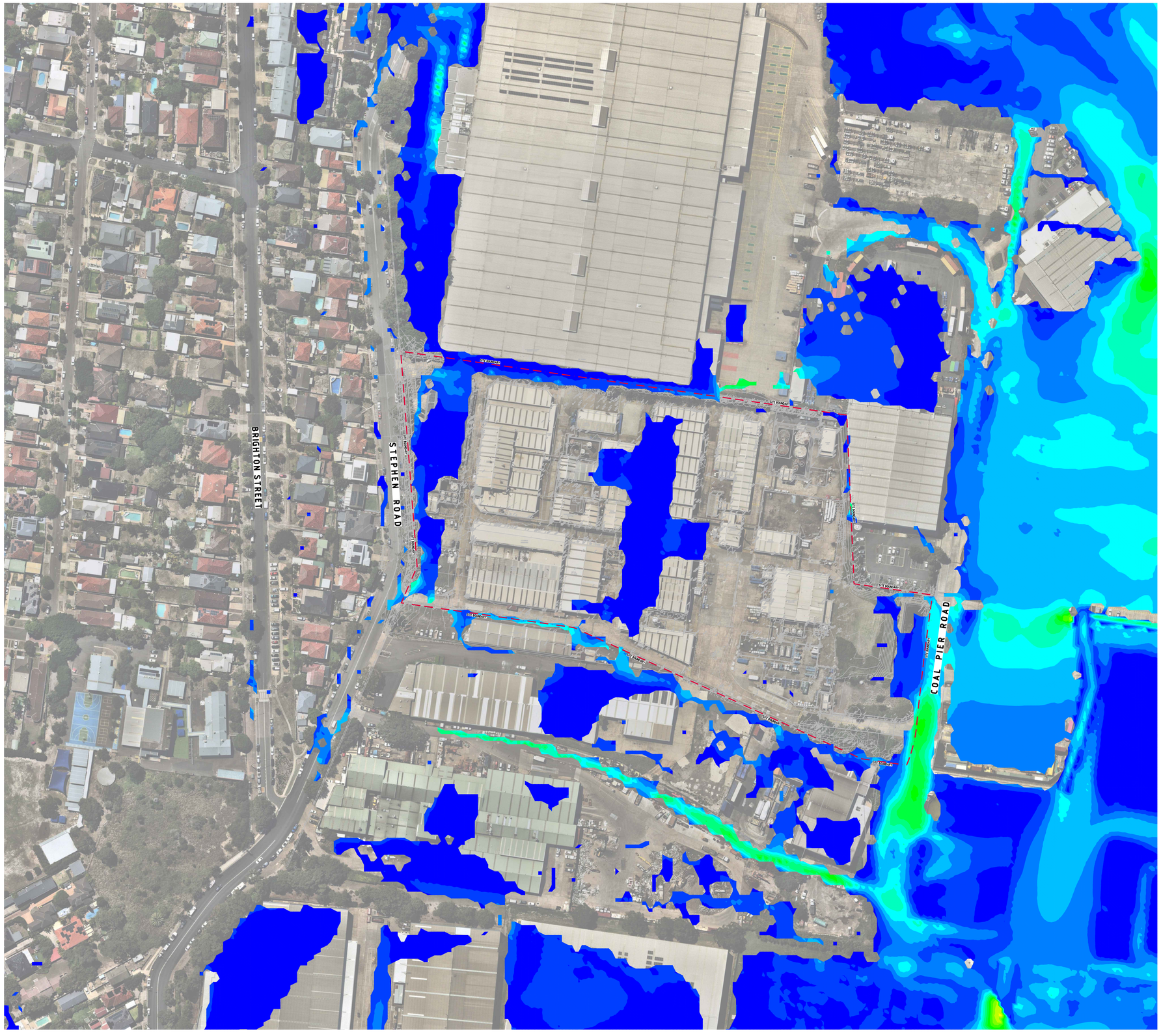
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
PMF POST DEVELOPMENT
FLOOD LEVELS AND DEPTHS PLAN

DRAWING No C014950.01-F360 ISSUE A



LEGEND:

LEVELS DATUM IS AHD.

– SITE BOUNDARY

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

FLOOD VELOCITY (m/s)

No.	FROM DEPTH	TO DEPTH	COLOUR
1	0.000	0.250	
2	0.250	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.250	
6	1.250	1.500	
7	1.500	1.750	
8	1.750	2.000	
9	2.000	2.250	
10	2.250	2.500	
11	2.500	2.750	
12	2.750	3.000	
13	3.000	3.250	
14	3.250	3.500	
15	3.500	3.750	
16	3.750	4.000	
17	4.000	4.250	
18	4.250	4.500	
19	4.500	4.750	
20	4.750	5.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

PMF POST DEVELOPMENT – FLOOD VELOCITY PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	21.04.26	A

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F361

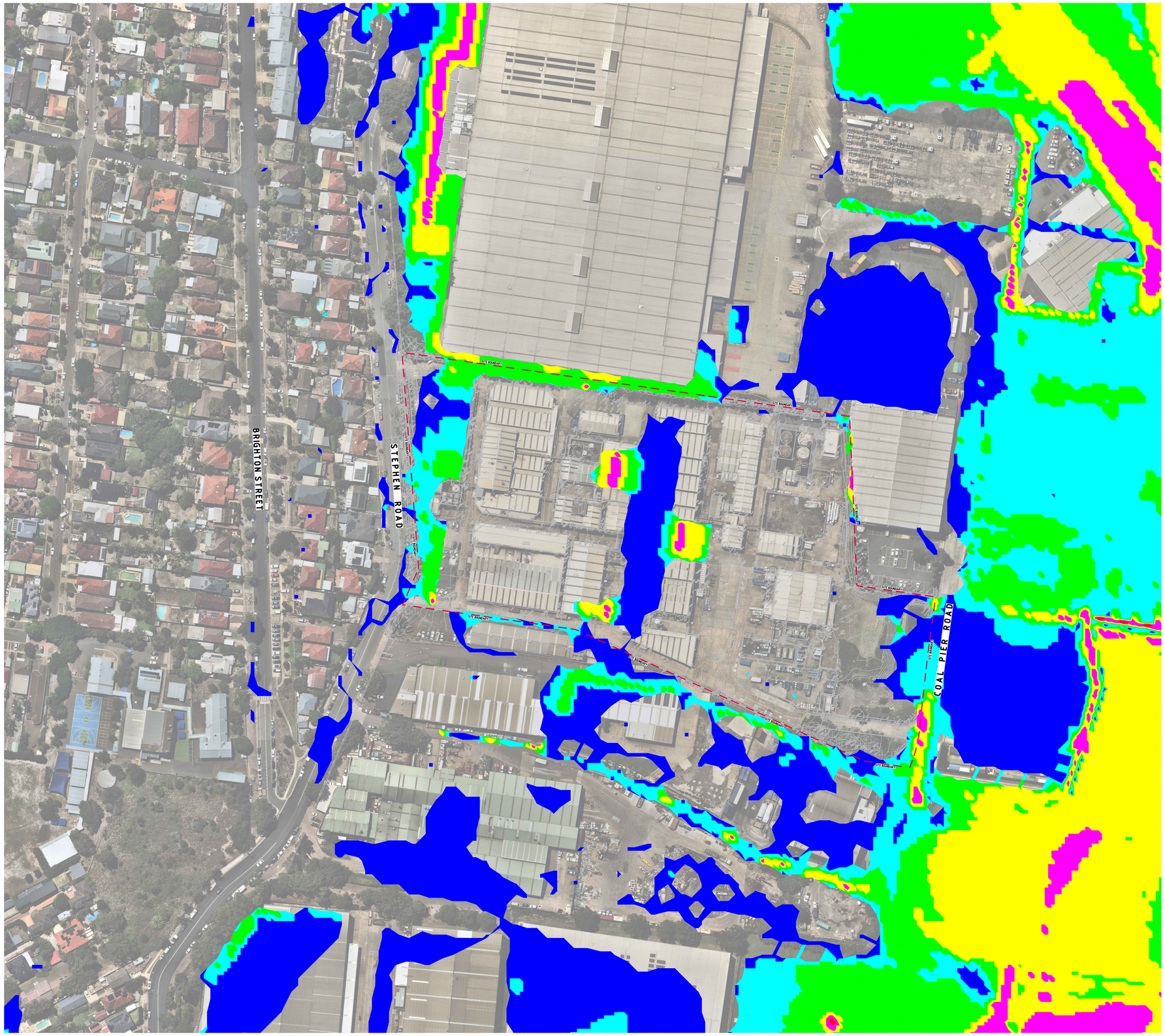
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: PMF POST DEVELOPMENT FLOOD VELOCITY PLAN

DRAWING No: C014950.01-F361 ISSUE: B



LEGEND:

- SITE BOUNDARY
- H1
- H2
- H3
- H4
- H5
- H6

FLOOD HAZARD CLASSIFICATION AS PER AUSTRALIAN RAINFALL & RUNOFF 2019, A GUIDE TO FLOOD ESTIMATION - BOOK 6 - FLOOD HYDRAULICS

NOTE:

FLOOD CONDITIONS SHOWN FOR THE POST-DEVELOPMENT CONDITION. TERRAIN INFORMATION BASED ON LIDAR INFORMATION FROM NSW SPATIAL SERVICES AND LTS SURVEYORS.

PMF POST DEVELOPMENT - FLOOD HAZARD PLAN
SCALE 1:1000

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT B1 SIZE SHEET

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	21.04.26	A

AMENDMENTS DATE ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

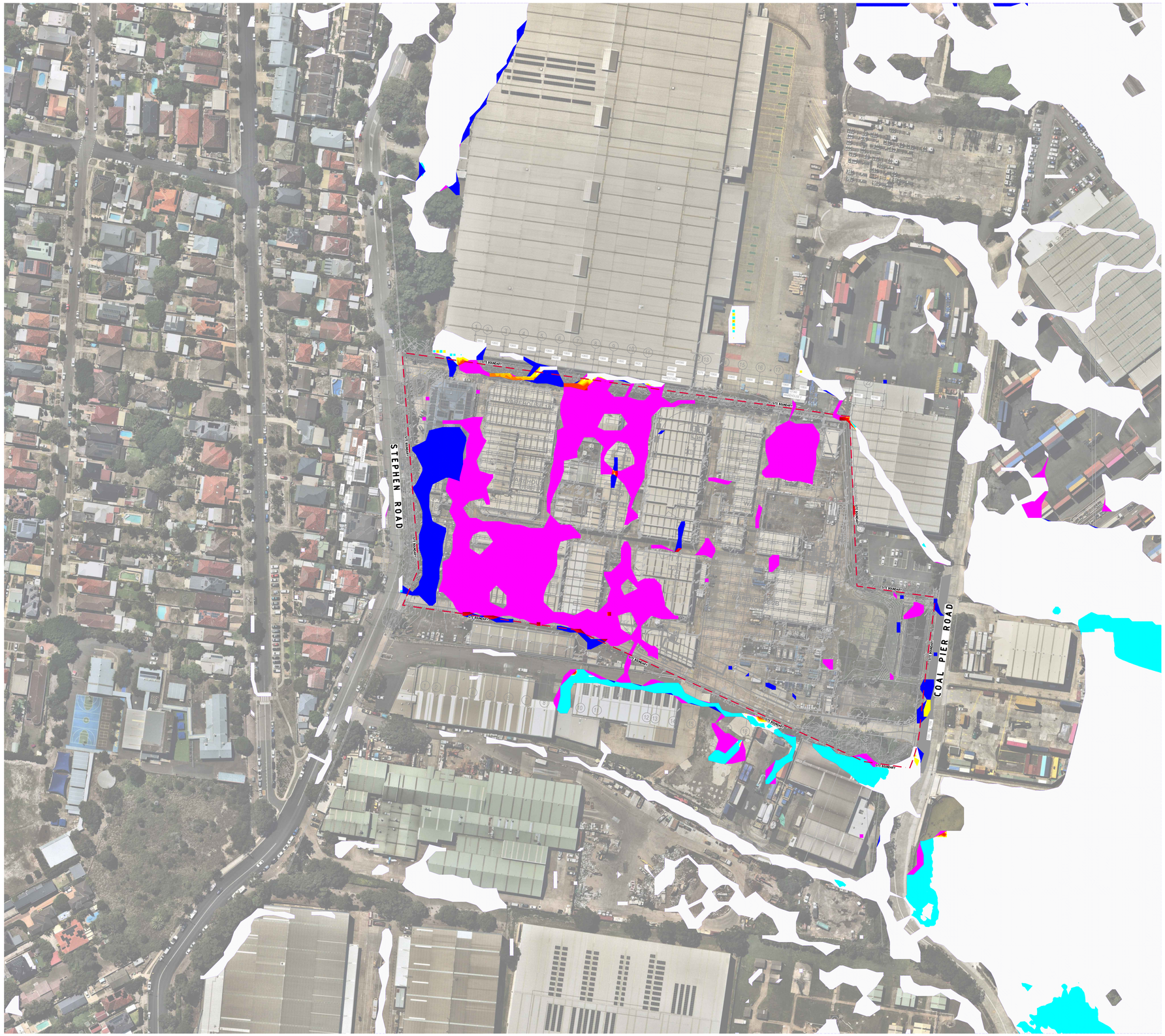
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F362

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
PMF POST DEVELOPMENT
FLOOD HAZARD PLAN

DRAWING No C014950.01-F362 ISSUE B



LEGEND:

LEVELS DATUM IS AHD.

- SITE BOUNDARY
- WAS DRY NOW WET
- WAS WET NOW DRY

NOTE:

FLOOD LEVEL DIFFERENCE PROVIDED FOR THE EXISTING PRE-DEVELOPMENT SCENARIO VS THE PROPOSED POST-DEVELOPMENT SCENARIO

FLOOD LEVEL AFFLUX (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	-1.000	-0.010	
2	-0.010	0.010	
3	0.010	0.030	
4	0.030	0.040	
5	0.040	0.050	
6	0.050	0.100	
7	0.100	0.250	
8	0.250	0.500	
9	0.500	1.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT - FLOOD LEVEL AFFLUX PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	16.04.26	A

AMENDMENTS DATE ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F530

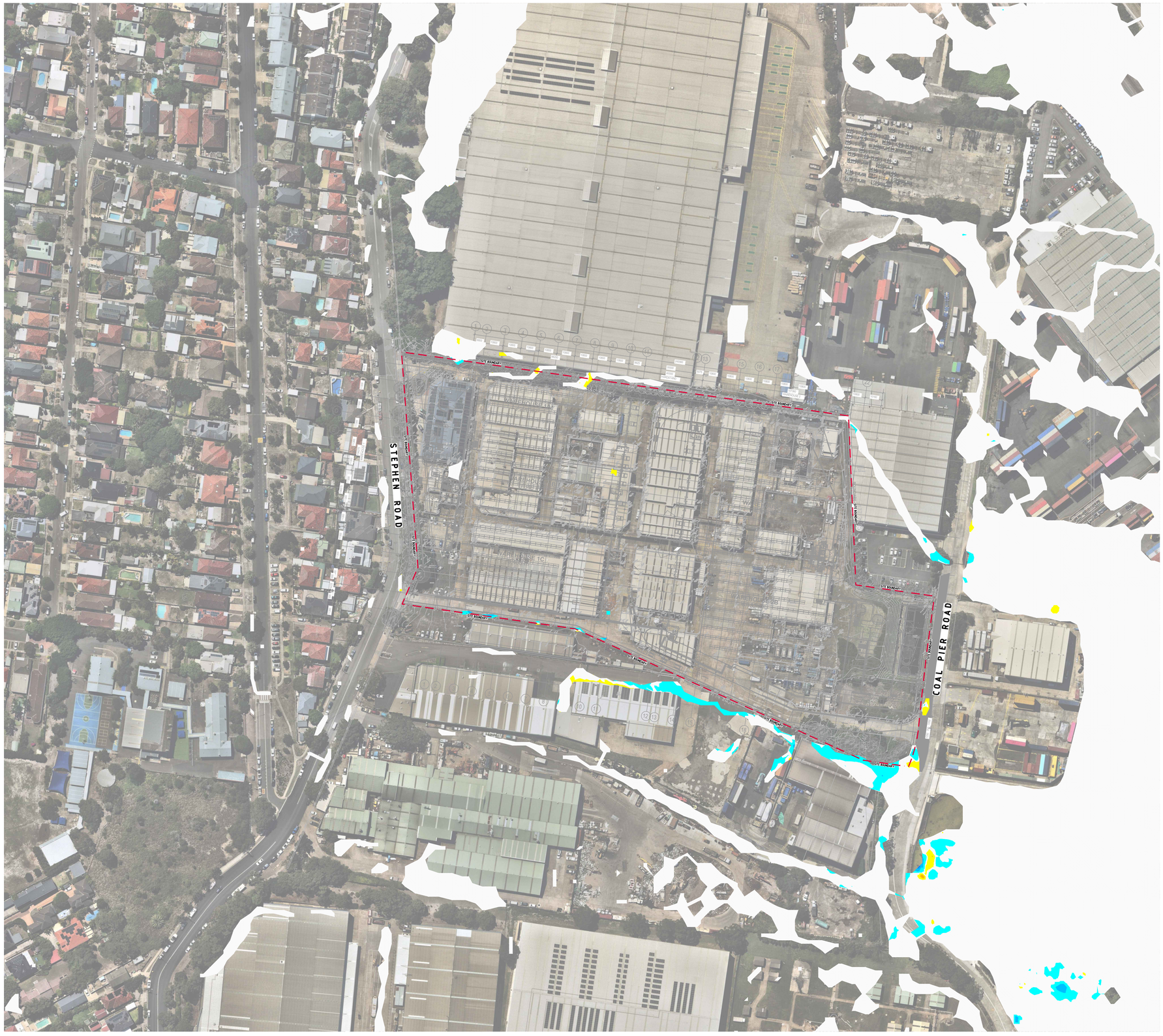
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: 1% AEP POST DEVELOPMENT FLOOD LEVEL AFFLUX PLAN

DRAWING No C014950.01-F530 ISSUE B



LEGEND:

VELOCITYS DATUM IS AHD.

– SITE BOUNDARY

NOTE:

FLOOD VELOCITY DIFFERENCE PROVIDED FOR THE EXISTING PRE-DEVELOPMENT SCENARIO VS THE PROPOSED POST-DEVELOPMENT SCENARIO

FLOOD VELOCITY AFFLUX (m/s)

No.	FROM DEPTH	TO DEPTH	COLOUR
1	-1.500	-1.250	
2	-1.250	-1.000	
3	-1.000	-0.750	
4	-0.750	-0.500	
5	-0.500	-0.250	
6	-0.250	-0.050	
7	-0.050	0.050	
8	0.050	0.250	
9	0.250	0.500	
10	0.500	0.750	
11	0.750	1.000	
12	1.000	1.250	
13	1.250	1.500	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT - FLOOD VELOCITY AFFLUX PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	16.04.26	A

AMENDMENTS DATE ISSUE

ARCHITECT SBA ARCHITECTS

CLIENT ESR

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F330

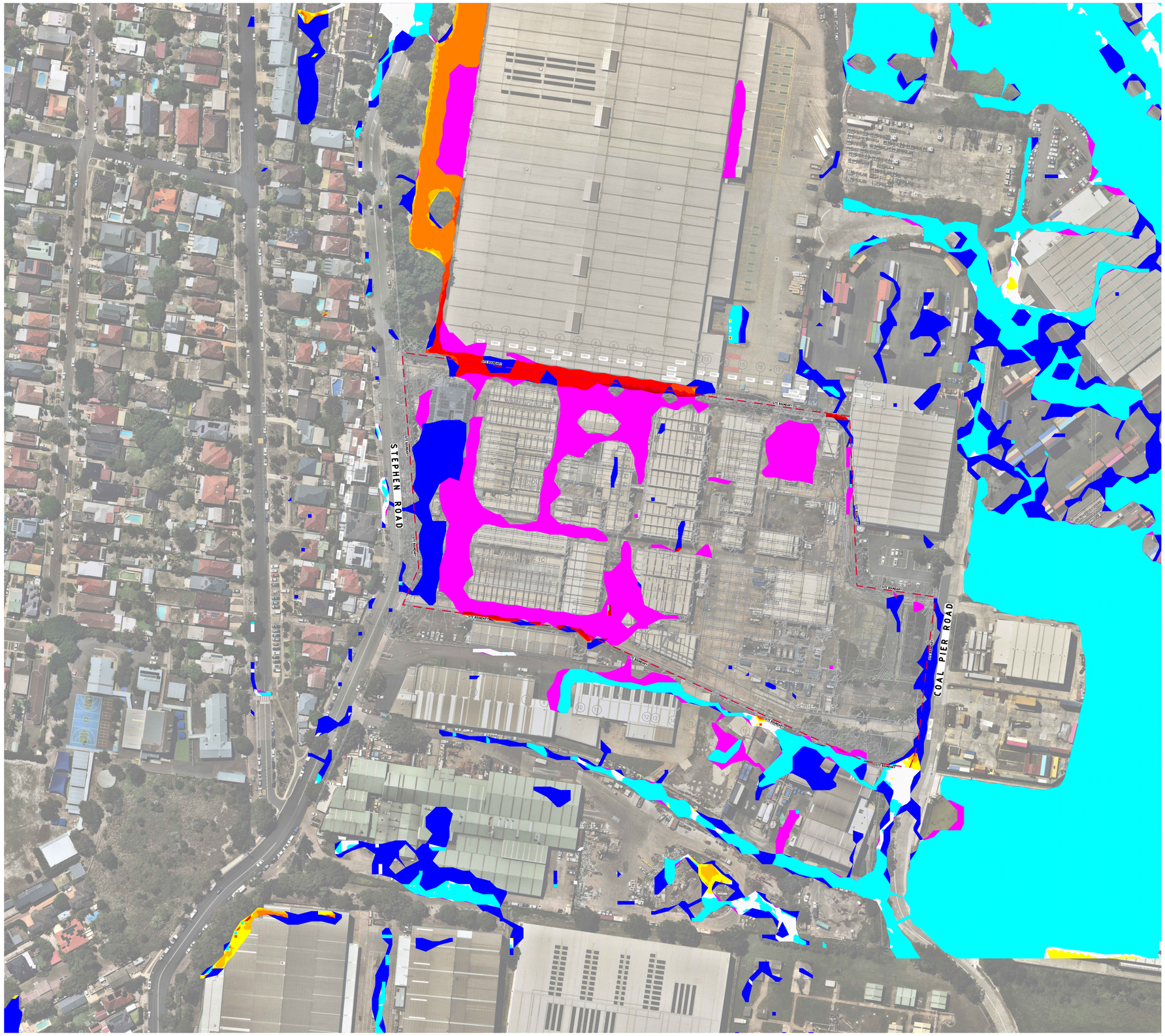
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE
1% AEP POST DEVELOPMENT
FLOOD VELOCITY AFFLUX PLAN

DRAWING No C014950.01-F531 ISSUE B



LEGEND:

LEVELS DATUM IS AHD.

- SITE BOUNDARY
- WAS DRY NOW WET
- WAS WET NOW DRY

NOTE:

FLOOD LEVEL DIFFERENCE PROVIDED FOR THE EXISTING PRE-DEVELOPMENT SCENARIO VS THE PROPOSED POST-DEVELOPMENT SCENARIO

FLOOD LEVEL AFFLUX (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	-1.000	-0.010	
2	-0.010	0.010	
3	0.010	0.030	
4	0.030	0.040	
5	0.040	0.050	
6	0.050	0.100	
7	0.100	0.250	
8	0.250	0.500	
9	0.500	1.000	

15m 0 15 30 45 60 75 90 105 120 135 150m

SCALE 1:1500 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT - FLOOD LEVEL AFFLUX PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	16.04.26	A

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F550

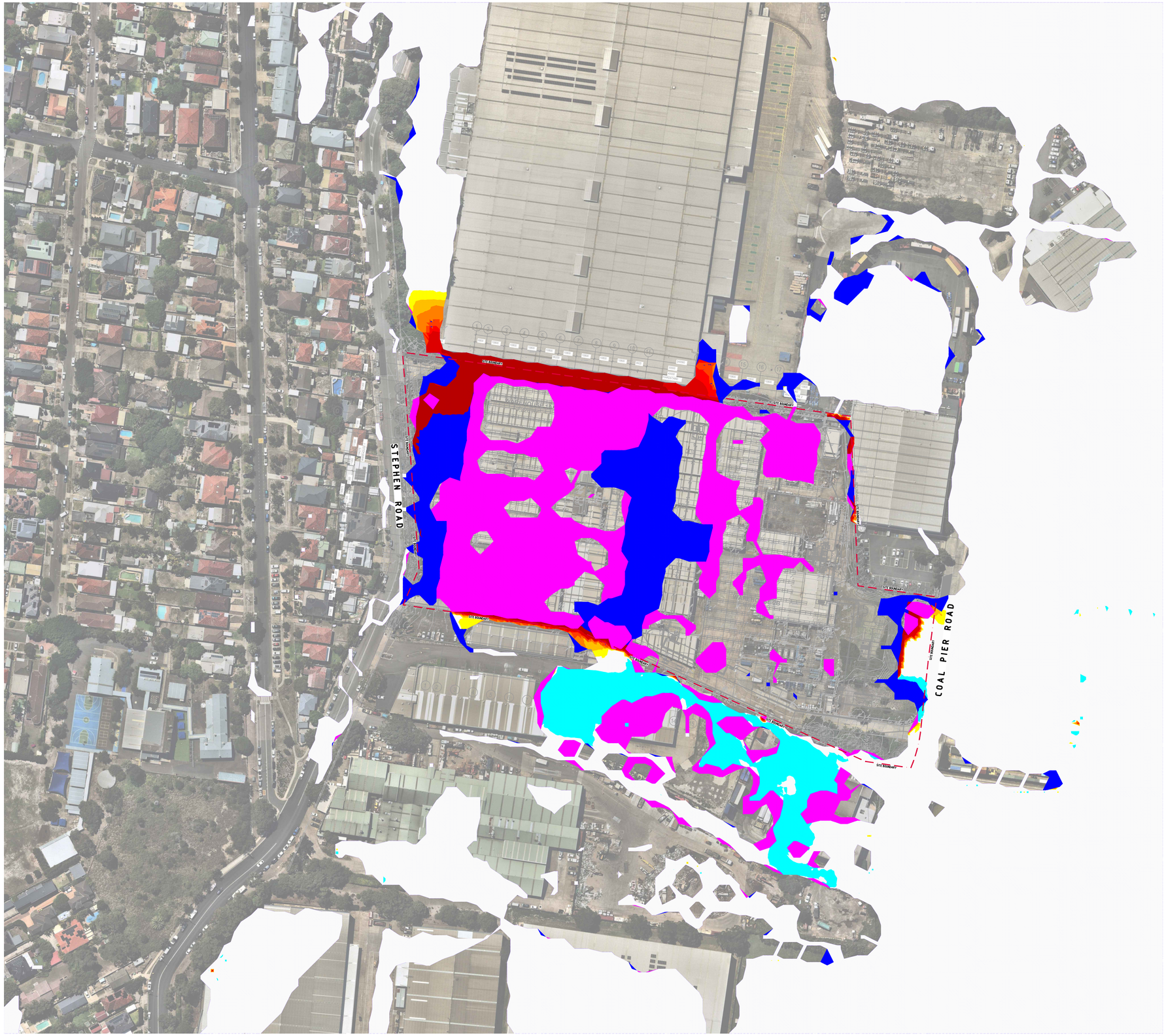
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au
CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: 1% AEP POST-DEVELOPMENT WITH 2100 SLR AND CC FLOOD LEVELS AFFLUX PLAN

DRAWING No: C014950.01-F550

ISSUE: B



LEGEND:

LEVELS DATUM IS AHD.

- SITE BOUNDARY
- WAS DRY NOW WET
- WAS WET NOW DRY

NOTE:

FLOOD LEVEL DIFFERENCE PROVIDED FOR THE EXISTING PRE-DEVELOPMENT SCENARIO VS THE PROPOSED POST-DEVELOPMENT SCENARIO

FLOOD LEVEL AFFLUX (m)			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	-1.000	-0.050	
2	-0.050	0.050	
3	0.050	0.075	
4	0.075	0.100	
5	0.100	0.150	
6	0.150	0.200	
7	0.100	0.250	
8	0.250	0.500	
9	0.500	1.000	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT - FLOOD LEVEL AFFLUX PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	21.04.26	A

AMENDMENTS DATE ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW,
NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F560

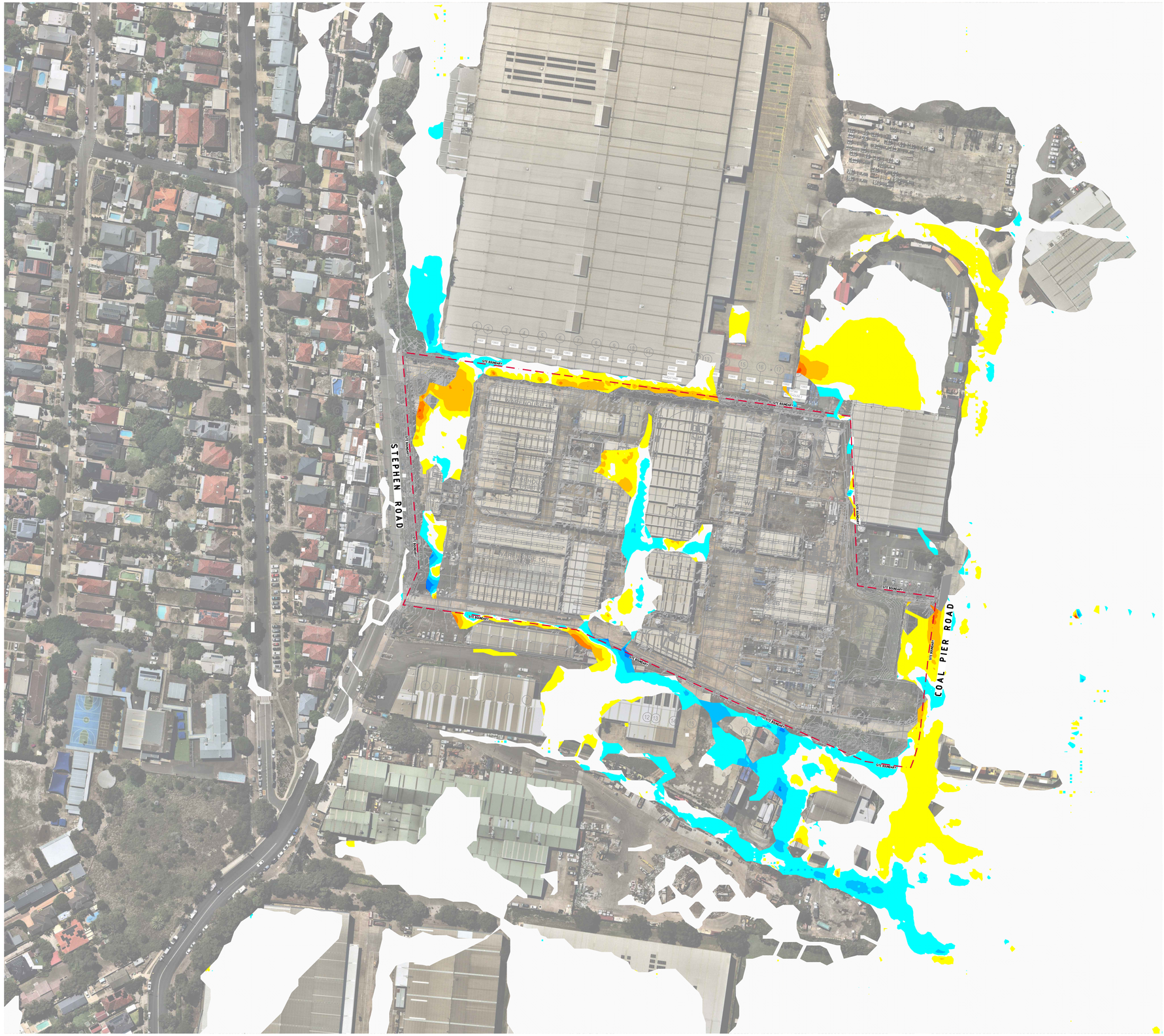
CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 6 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: PMF POST DEVELOPMENT FLOOD LEVEL AFFLUX PLAN

DRAWING No: C014950.01-F560 ISSUE: B



LEGEND:

VELOCITYS DATUM IS AHD.

- SITE BOUNDARY

NOTE:

FLOOD VELOCITY DIFFERENCE PROVIDED FOR THE EXISTING PRE-DEVELOPMENT SCENARIO VS THE PROPOSED POST-DEVELOPMENT SCENARIO

FLOOD VELOCITY AFFLUX (m/s)

No.	FROM DEPTH	TO DEPTH	COLOUR
1	-1.500	-1.250	
2	-1.250	-1.000	
3	-1.000	-0.750	
4	-0.750	-0.500	
5	-0.500	-0.250	
6	-0.250	-0.050	
7	-0.050	0.050	
8	0.050	0.250	
9	0.250	0.500	
10	0.500	0.750	
11	0.750	1.000	
12	1.000	1.250	
13	1.250	1.500	

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT B1 SIZE SHEET

1% AEP POST DEVELOPMENT - FLOOD VELOCITY AFFLUX PLAN

SCALE 1:1000

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.06.26	B
ISSUED FOR INFORMATION	21.04.26	A

AMENDMENTS DATE ISSUE

ARCHITECT: SBA ARCHITECTS

CLIENT: ESR

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
49 STEPHEN ROAD, BANKSMEADOW, NSW, 2019

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	FEB '26	DS	B1	AS SHOWN	C014950.01-F561

CONSULT AUSTRALIA

Costin Roe Consulting Pty Ltd.
ABN 50 003 696 446
PO Box N419 Sydney NSW 1220
Level 4, 8 Windmill Street, Millers Point NSW 2000
p: +61 2 9251 7699 f: +61 2 9241 3731
e: mail@costinroe.com.au w: costinroe.com.au

CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: PMF POST DEVELOPMENT FLOOD VELOCITY AFFLUX PLAN

DRAWING No: C014950.01-F561 ISSUE: B


COSTIN ROE
CONSULTING