Bradfield Development Authority

Building Two Advanced Manufacturing Research Facility

Section 4.55 Modification Report
Appendix G – Amended Integrated Water Management Plan

21 November 2025

Western Parkland City Authority (WPCA)

Building Two Advanced Manufacturing Research Facility (AMRF2)

Integrated Water Management Plan

Reference: AMRFB2-ARU-REP-CI-000001

05 | 21 November 2025

Job number 295398

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1. Introduction

Development consent SSD-58591961 for the Advanced Manufacturing Research Facility Building Two (AMRF2) was granted on 7 April 2025 by the Minister for Planning and Public Spaces. The approved development comprises the construction and operation of a five-storey advanced manufacturing ("high technology industry") facility incorporating a café, parking, and landscaping. The site is located at Lot 3101 DP 1282964, 215 Badgerys Creek Road, Bradfield, within the Liverpool Local Government Area and the Western Sydney Aerotropolis (the Aerotropolis).

This Section 4.55(1A) modification seeks removal of a basement level, deletion of basement car parking, introduction of staged delivery of the development into two stages and minor design changes resulting from staging and ongoing design development.

1.1 Report Content

The report captures an update to the Integrated Water Management Plan (IWMP) to reflect the current project design intent at the completion of Stage 2. It provides a qualitative assessment of the implications upon the IWMP in the interim Stage 1 scenario.

1.2 Project Background

The subject site is 5,996sqm within the Bradfield City Centre, south-east of the new Western Sydney International (Nancy-Bird Walton) airport at the intersection of Badgerys Creek Road and the Northern Road within the Liverpool Council Local Government Area (LGA).

Bradfield City Centre will foster the innovation, industry and technology needed to sustain the broader Aerotropolis and fast track economic prosperity across the Western Parkland City. The nation's newest city centre will be a 24-hour global metropolis with facilities for research, innovation and advanced manufacturing, education and housing.

This SSDA seeks consent for the construction, fit out and use of the AMRF2 building for the purpose of advanced manufacturing ("high technology industry"), including site preparation works, site access, utilities infrastructure, landscaping/ public domain works, basement carpark, signage and other ancillary works.

The Advanced Manufacturing Research Facility business will be the key occupant of the building. The Western Parkland City Authority (WPCA) is anticipating interest from research and education organisations as additional occupants for the building.

AMRF2 will be operated in conjunction with the approved AMRF1 and will serve to expand the manufacturing and research potential of the precinct. Focused on advanced semiconductor and electronics manufacturing for defence, aerospace, and SMEs, the Full-Scale Advanced Manufacturing Research Facility will catalyse growth of emerging industries. It will be an exemplar of Industry 4.0 through the unrivalled combination of functions in a single facility.

AMRF2 will provide services, specialist equipment and workspaces for small to medium enterprises (SMES) and start-ups, large multinational companies (such as defence primes), government and research institutions to collaboratively develop and commercialise projects and products that can be supplied to key emerging sectors, such as defence, space and cleantech.

This report has addressed the following matters within the Secretary's Environmental Assessment Requirements (SEARs) issued for the SSDA on 14 June 2023 (see Table 1).

Table 1 – Relevant SEARs

Item	SEARs Item	Relevant Report Section
Soil and Water	• An assessment of potential impacts on soil resources and riparian land on and near the site, including soil erosion, salinity and acid sulfate soils.	Refer Section 6 of this report for erosion and sediment control. Refer Geotechnical Report for groundwater items.
Soil and 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	Refer Section 5 of this report for surface water items. Refer to Geotechnical Report for groundwater items.
Soil and Water	• A detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements	Refer Section 8 of this report.
Soil and Water	• 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	Refer Section 5.2 of this report for surface water items. Refer Section 8.2 of this report for wastewater items.
Soil and Water	• Details of how the proposed stormwater drainage system will connect to Sydney Water's regional stormwater system, including details of any interim stormwater management solutions, consistent with the Department's 'Technical guidance for achieving Wianamatta–South Creek stormwater management targets' (NSW Government, 2022)	Refer Section 5.2 of this report.
Soil and Water	• Where water and drainage infrastructure works are required that would be handed over to the local council, or other drainage or water authority, provide full hydraulic details and detailed plans and specification of proposed works that have been prepared in consultation with, and comply with the relevant standards, the local council or other drainage or water authority	Refer Section 5.2 of this report.
Soil and Water	• Description of the measures to minimise water use - detailed flooding assessment that satisfies the objectives and provisions contained with the Aerotropolis Phase 2 DCP (Section 2.5.1 - Flood Management).	Refer Section 7 of this report.

2. Acronym Definition

Acronym	Definition
AEP	Annual Exceedance Probability
AMRF	Advanced Manufacturing Research Facility
AMRF1	Advanced Manufacturing Research Facility Building 1
AMRF2	Advanced Manufacturing Research Facility Building 2
ARI	Average Recurrence Interval
DCP	Development Control Plan
DDA	Disability Discrimination Act
FPL	Flood Planning Level
GPT	Gross Pollutant Trap
H&F	Hydraulic and Fire
mAHD	Metres above Australian Height Datum
NSW	New South Wales
OSD	On-Site Detention
PMF	Probable Maximum Flood
SQID	Stormwater Quality Improvement Device
SSD	State Significant Development
SSDA	State Significant Development Application
SWC	Sydney Water Corporation
SWMP	Soil and Water Management Plan
WPCA	Western Parkland City Authority
WQT	Water Quality Treatment
WSUD	Water Sensitive Urban Design

3. Understanding of the Site

3.1 Site Definition

The precinct, or 'super lot', for the Full AMRF is framed by four roads of graduated scale and use. The AMRF super lot is defined to the:

- East – 60 metre wide transport infrastructure corridor (Metro, Light Rail);
- South – low traffic road opposite the CSIRO site;
- West – medium traffic road is envisaged (possible dual carriageway) that is mainly for commuter access to the Bradfield City Centre; and
- North – dual carriageway road.

Within the 'super lot' are:

1. First building (AMRF1) and Park in the north west corner and is currently under construction;
2. Buildings 4 & 5 (future stages) will occupy the eastern side of the super lot; and
3. AMRF2 building (project "Site") in the south west corner.

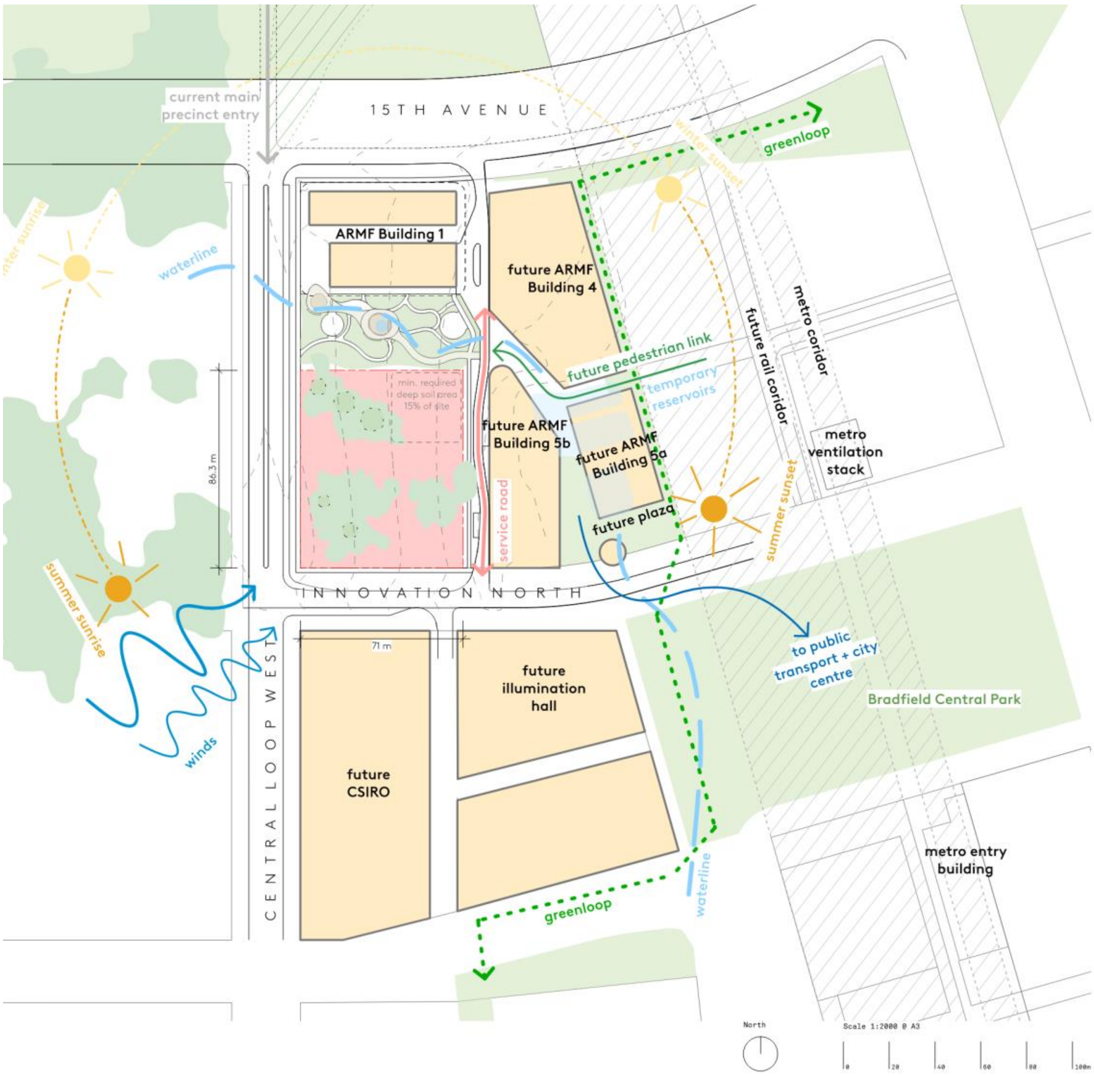


Figure 1 – Site Plan from "AMRF2 Draft Concept Design Report" by Aileen Sage – 21.04.2023

WPCA have confirmed that the Bradfield City Centre road network adjacent to the Site and the First Building and AMRF Park will have completed construction ahead of AMRF2. For the purposes of the preparation of this report, the design for these interfacing works/ projects are considered the basis of "existing conditions". The documents listed in Table 2 have been used to inform the existing conditions.

Table 2 – Civil Design Inputs to Inform "Existing Conditions"

Reference/ Author	Version/ Date	Title
AECOM	November 2022, V01, Draft	Master Plan Application for Bradfield City Centre, Integrated Water Cycle Management
AECOM	15/8/23	Drawings Bradfield City Centre, Stage 1A, AMRF First Building, Preliminary Design, For Construction drawings
SMEC	14/7/23	Drawings Bradfield City Centre, Civil Design for Review of Environmental Factors (REF), Stage 1, Issued for Information
SMEC	27/9/23	Drawings Bradfield City Centre, Civil Design for Review of Environmental Factors, Stage 2 Enabling Works – REF 2(a), Stage 2 – REF 2(a) Issue drawings
SMEC	2/2/24	Drawings Bradfield City Centre, Civil Design for Stage 2A, Issue for Tender

4. Authority Requirements, Standards and Guidelines

The relevant authority requirements, legislation, standards and guidelines as identified in Table 3.

Table 3 – Relevant Authority Requirements, Legislation, Standards and Guidelines

Reference/ Author	Version/ Date	Title
Australian Rainfall and Runoff (AR&R)	2019	Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia
AS3500.3	2021	Plumbing and Drainage Part 3: Stormwater Drainage
Department of Planning Environment	2022	Technical guidance for achieving Wianamatta–South Creek stormwater management targets
Department of Planning Environment	November 2022	Western Sydney Aerotropolis Development Control Plan – Phase 2
Landcom	Volume 1, March 2004	Soil and Construction Manual (commonly known as the Blue Book)
Liverpool Council Engineering Guidelines	2006	Liverpool Council Engineering Guidelines for Development and Subdivision Works
NSW Government	2021	Western Sydney Parkland SEPP
Western Sydney Planning Partnership	PCG_02	Western Sydney Engineering Design Manual

5. Stormwater Drainage

5.1 Existing Conditions

Stormwater networks are proposed in the three adjacent roads interfacing with AMRF2 as documented in the Bradfield City Centre precinct and First Building designs. This network is indicated in Figure 2.

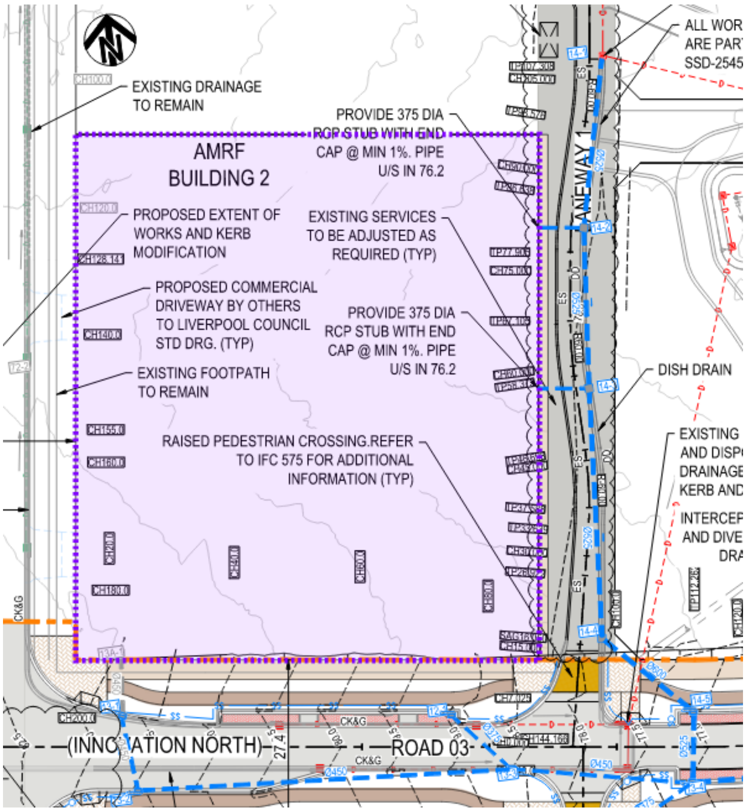


Figure 2 – Existing Stormwater Infrastructure (Extract of Bradfield City Centre, Civil Design for Stage 2A, Issue for Construction)

The stormwater drainage strategy for the Bradfield City Centre is documented in the *"Master Plan Application for Bradfield City Centre, Integrated Water Cycle Management"*, November 2022, V01, Draft, prepared by AECOM for WPCA and the *"Civil Design for Review of Environmental Factors, Stage 2 Enabling Works – REF 2(a), Stage 2 – REF 2(a)"* drawings. The report indicates that the water sensitive urban design (WSUD) strategy, including on-site detention (OSD) and water quality treatment (WQT) has been considered at precinct level with the site for AMRF2 being located in Precinct 2. The key dates advised by WPCA used to inform the basis of design are as follows:

- REF submission is currently in the approval stage; and
- Construction forecast for completion in mid-2025.

Both above milestones are in advanced of the planned construction of AMRF2 which is currently forecast for completion end 2027. Therefore, the precinct-level provisions for detention and water quality treatment can be utilised for AMRF2 and avoid the requirement for interim measures.

5.2 Proposed Stormwater Drainage

The proposed stormwater drainage is designed to capture and convey surface water runoff from the proposed AMRF2 building to precinct drainage in Road 03 (Innovation North) and the East Laneway (refer). The proposed stormwater network has been coordinated with precinct drainage to ensure suitable invert levels and grades have been adopted.

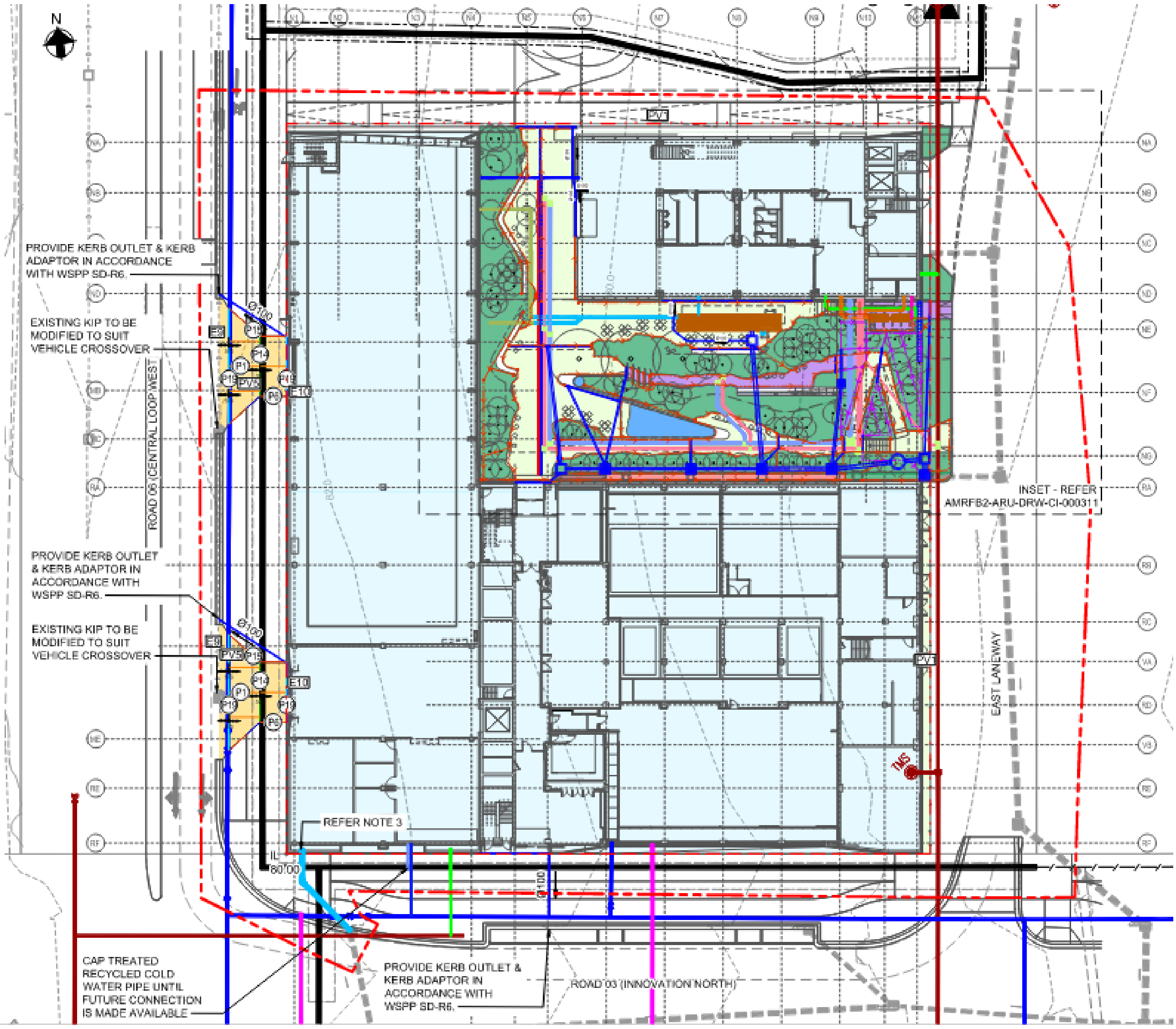


Figure 3 – Proposed Site Stormwater Connections

The site has been divided into three main catchments

- The north-eastern catchment (C-1) comprises of roof drainage from the office building, lab building and link bridge. This catchment connects to a 30kL in-ground rainwater tank within the internal courtyard with a 375mm overflow pipe to an adjacent civil stormwater pit.
- The internal courtyard catchment (C-2) is collected via a series of linear drains, subsoil drains and a vegetated swale with pits, discharging to the precinct drainage via a 375mm RCP stub within the East Laneway.
- The south-western roof catchment (C-3) discharges via a 450mm pipe to a civil drainage pit in Road 03 (Innovation North).

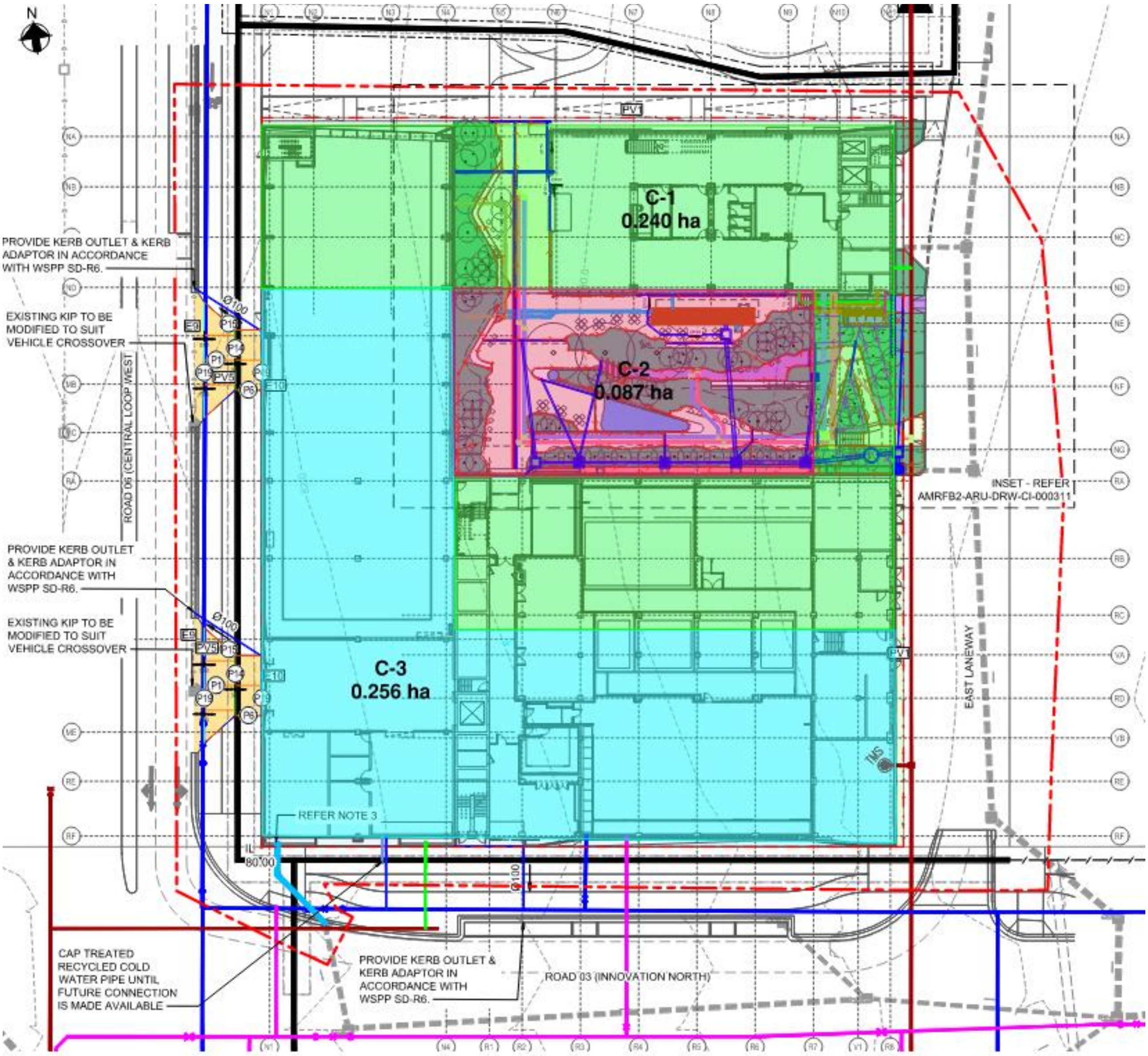


Figure 4 – Catchment Plan

The connections from the building hydraulic network will match the internal design standard of the 1% annual exceedance probability (AEP) + 10% climate change (CC) which likely exceeds the capacity of the precinct network (5% AEP + 10% CC). Hydraulic design checks for the 1% AEP ensure surcharge occurs at the most upstream grated pit, with an overland flow path towards the East Laneway Precinct drainage system mitigating localised flooding within the site.

The proposed layout of the site stormwater discharge is indicated in the civil drawings included in Appendix A; with an extract provided in Figure 3. The catchment areas for each of connections is indicated in Figure 4 and the estimated flow rates in the 5% and 1% AEP are provided in Table 4.

Table 4 – Catchment Hydraulic Flows for Minor and Major Design Storm Events

Catchment ID	Diameter (mm)	Invert Level (Site Boundary)	5% AEP + CC (L/s)	1% AEP + CC(L/s)
C-1 + C-2	375	76.227	181	222
C-3	450	79.900	100	201

5.2.1 Water Sensitive Urban Design (WSUD)

WSUD requirements are outlined in the DPE "Technical guidance for achieving Wianamatta–South Creek stormwater management targets". As per the *"Master Plan Application for Bradfield City Centre, Integrated Water Cycle Management"*, November 2022, V01, Draft, prepared by AECOM, on-site detention and water quality treatment has been proposed at a precinct-level. However, to adhere to best practice guidelines, a gross pollutant trap (GPT) has been proposed to provide site-specific treatment prior to discharge to the wider precinct drainage network.

5.2.2 Minimum Site Perviousness

Outcome P08 of Section 2.3.2 Stormwater Management and Water Sensitive Urban Design in the *"Western Sydney Aerotropolis Development Control Plan 2022"* requires that lots achieve minimum perviousness to meet stormwater management requirements and green and cooling objectives. The DCP specifies a minimum site perviousness of 30% for land with floor space ratio (FSR) over 2:1. However, WPCA has advised that through the Master planning process, a Bradfield City Centre specific Development Control Plan will amend the perviousness targets. It is anticipated that through this approach, the development sites would have a perviousness target of 18%. Given that this figure is preliminary, it is recommended by WPCA that AMRF Building 2 adopt a 20% perviousness target until the Masterplan is finalised.

The site perviousness assessment has adopted indexed rates for various finishes. A summary of the indexed rates and the source which has been applied is summarised in Table 5.

Table 5 – Pervious Indexes

Finish	Index	Source
Deep soil (one metre or more in depth, connected to subsoil)	100%	*"Western Sydney Aerotropolis Development Control Plan 2022"*
Shallow soil (less than one metre in depth, not connected to subsoil)	75%	*"Western Sydney Aerotropolis Development Control Plan 2022"*
Permeable pavement	50%	*"Western Sydney Aerotropolis Development Control Plan 2022"*
Hardstand	0%	*"Western Sydney Aerotropolis Development Control Plan 2022"*
Green roof (>100mm soil depth)	50%	Consistent with: - Sydney Water https://www.sydneywater.com.au/content/dam/sydneywater/documents/Greeninfrastructurevolumeperformance.pdf - https://www.melbourne.vic.gov.au/SiteCollectionDocuments/growing-green-guide.pdf

The proposed finishes have been prepared by the landscape architect. An extract of the site porosity plan and porosity assessment is included in Table 6. The plan indicates an area of planted undercroft to the east of the site (adjacent to the Eastern Laneway) which typically would not be included in the porosity assessment. Courtyard stormwater low-flows are to be collected in a pit and reticulated to a subsoil system reticulated throughout this space to provide passive irrigation of the deep soil zone. Based on this approach, this area of planted undercroft has been included in the site porosity assessment and assigned 100% perviousness.

The porosity assessment indicates that the site achieves 23.7% site perviousness at the completion of Stage 2. This site porosity value meets the anticipated 18% requirement of the Bradfield City Centre DCP and achieves the conservative value of 20% recommended by WPCA.

Table 6 – Site Porosity Assessment Stage 2 (Source: Tyrell Studios SSDA Report)

AMRF2 LANDSCAPE AREA SCHEDULE: STAGE 2
20.11.2025

SITE POROSITY SCHEDULE

Zone	Area (sqm)	Porosity Factor (%)	Porous Factor Area (sqm)	Notes
AMRF2 Site Area	5996			
Courtyard				
Planting Areas				
Planting Over Deep Soil	347	100%	347	all planting areas other than water features
Planted Building Setback Edges Over Deep Soil	51	100%	51	none in stage 2
Planting In Undercroft Over Deep Soil	214	100%	214	none in stage 2
Planting Over Structure	0	50%	0	none in stage 2
Planted Water Feature	23	0%	0	water feature
Paving Areas				
Paving Over Structure/On Slab	32	0%	0	none in stage 2
Unit Paving Over Ground	510	50%	255	all unit paving areas
Permeable Paving Over Deep Soil Zones	34	50%	17	bonded aggregate and deco paving areas
Permeable Paving In Undercroft Over Deep Soil Zones	51	50%	26	none in stage 2
Paved Building Setback Areas	64	50%	32	gap between building edge and site boundary line along northern edge
Rooftops				
Biosolar Roof Planting	964	50%	482	
Total Porous Area (sqm)			1423	
Site Porosity (%)			23.7%	
Total Open Space Area (sqm) (not incl. roof)	1326			
Open Space Area Percentage of Site (%)	22.1%			

5.2.3 Groundwater

The geotechnical report hydrological data interprets the ground water monitoring within bore holes to suggest the water table sits at an average of RL 72.5 with seasonal fluxes monitored up to RL 74.4. Douglas partners have recommended a design water table of RL 76.

The project consists of a single-story basement at RL 76.9, above the design water table and over part of the footprint of the building. The base slab of the basement will be provided on top of a free draining layer and damp-proof membrane to manage ground dampness and surface water. Local services pits or lift pits within the basement below the water design water table will be provided as fully tanked and design for water pressure loads.

The perimeter basement walls are not designed for water pressure load. Basement soiler pile and shotcrete infills are provided with spoon drains at base of wall to capture surface water flow and seepage though the wall. For traditional reinforced concrete retailing walls subsoil drainage is provided at the base of the wall to collect and drain water away from behind the wall.

6. Soil and Water Management Plan

Erosion and sediment control measures are designed to minimise the risk of scour, erosion, sedimentation and impacts to water quality, watercourses and riparian areas. The design has been provided in accordance with the Department of Planning and Environment's *"Western Sydney Aerotropolis Development Control Plan – Phase 2" and "Technical Guidance for achieving Wianamatta–South Creek stormwater management targets*" and Landcom's *"Soil and Construction Manual"* (commonly known as the Blue Book), Volume 1, March 2004.

The basement excavation introduces potential for sediment laden runoff to accumulate in the base of the excavation/s. During construction, the basement will require grading for surface water runoff and collection in a local sump/s for temporary storage, setting of sediment and testing for pH prior to pumped discharge. It is anticipated that this sump/ s will progressively be adjusted to suit the staging of excavation activities.

During dry windy weather, dust from unsealed roads (eg driveway) and other exposed surfaces, such as unprotected earth or stockpiles, can become airborne and contribute to erosion. Upon settling, the eroded material may also contribute to sediment runoff. Consequently, during the construction process, dust control measures must be implemented.

Dust control measures include, but are not limited to:

- Application of dust suppression measures such as promptly watering exposed areas when dust is observed. Surfaces must be kept moist rather than wet;
- Pave and water access road/ driveway;
- Installation of wind fences where feasible and appropriate;
- Covering temporary stockpiles and locate away from stormwater pits/waterways; and
- Washing vehicles' wheels before they leave the construction site.

During the construction process the inspection and monitoring of the dust control measures should be included in the site monitoring process.

A concept soil and water management plan for the site has been developed in accordance with the Blue Book and the DPE *"Technical Guidance for achieving Wianamatta–South Creek stormwater management targets"*. The annual soil loss as determined using the RUSLE method from the Blue Book, indicates less than 150m^3 of soil loss per year. Therefore, a basin can be considered unnecessary. It is intended that an excavation/ basement sump will provide temporary storage and the settling of suspended solids and testing for water pH until such time as compliance with the water quality requirements are met. The volume has been based upon temporarily storing the 5-day storm in the 80th percentile. It is the contractor's responsibility to manage the operation and maintenance of the pumps and confirming the sump volume with due consideration for pre-treatment storage requirements and the risk management of the pump performance. The contractor will also be required to manage the site runoff during the initial stage/s of site clearing to achieve water quality targets until such time as the excavation/ basement sump is established.

The proposed soil and water management control strategy is indicated in the Tender drawings included in Appendix A; with an extract provided in Figure 5.

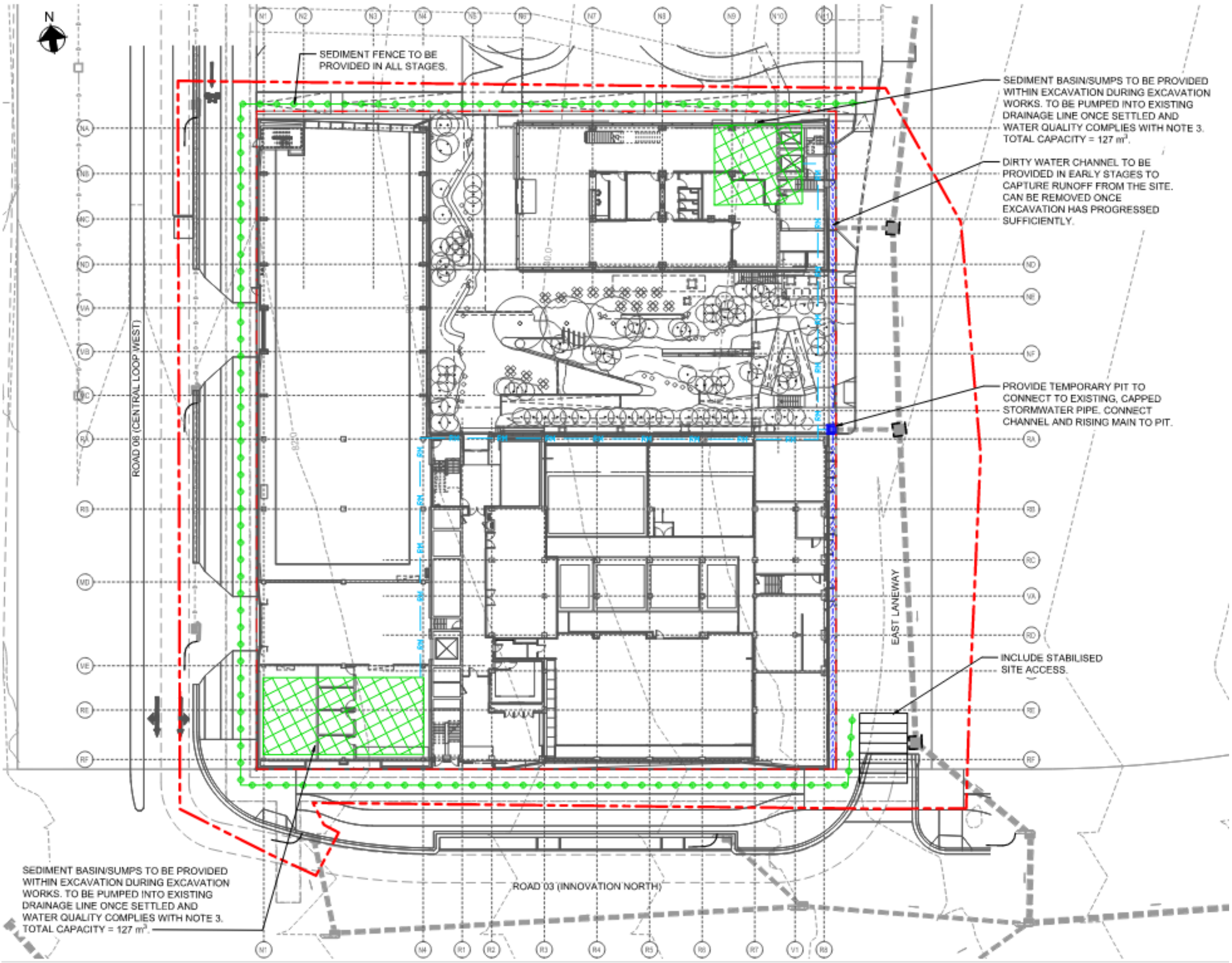


Figure 5 – Proposed Soil and Water Management Plan

The erosion and sediment control measures that have been proposed will need to be reviewed during the construction process and adjusted for various staging requirements.

7. Flooding

An extract of the relevant flood planning map from the Western Sydney Parkland SEPP 2021 is shown in Figure 6, with the proposed Bradfield City Centre Masterplan Boundary and the AMRF2 site overlaid (extents are indicative only). The proposed AMRF2 is located well away from the Flood Planning Area as illustrated in Figure 6.

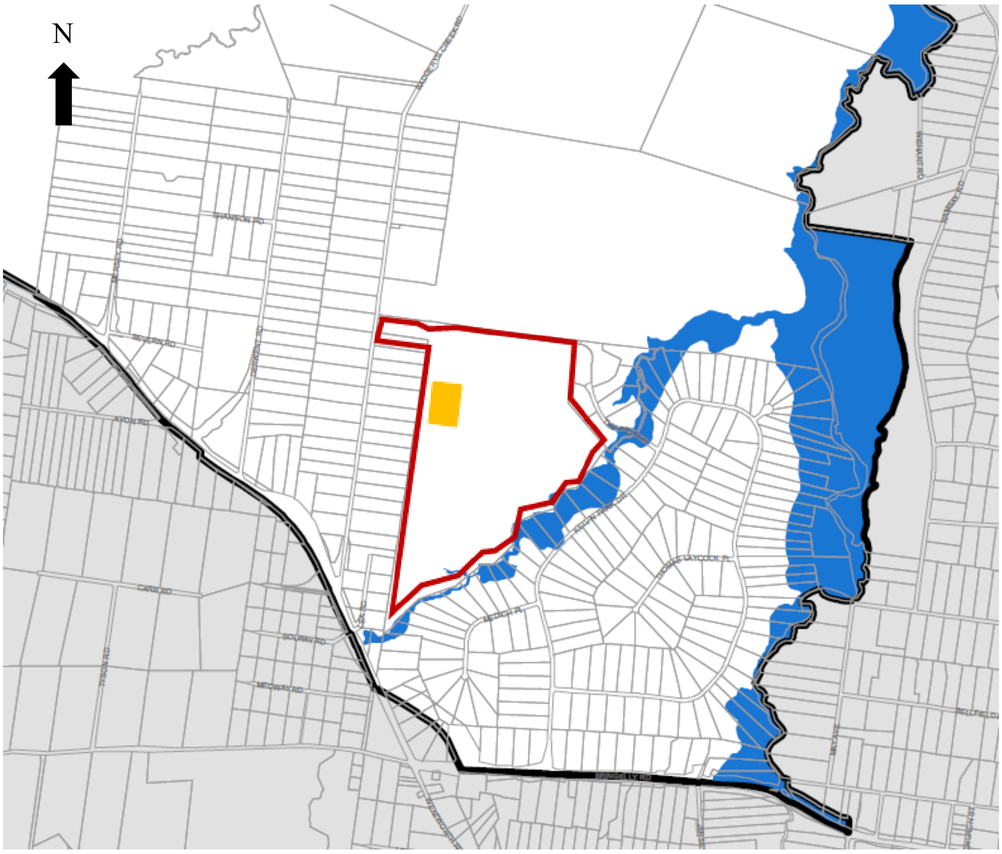


Figure 6 – Location of AMRF2 site with Respect to the Flood Planning Area Defined by the DCP

Flood mapping available in the Wianamatta South Creek Flood Study Existing Conditions Report (Advisian, May 2022) has also been reviewed to confirm the ARMF2 site is located outside of the PMF flood extent.

Therefore, as the AMRF2 site is located outside of both the Flood Planning Area, and the floodplain as defined by the DCP, the flood planning controls in the DCP will not apply to the AMRF2 site, and that the objectives of the DCP are therefore satisfied.

The residual flood risk relates to shallow overland flows and stormwater travelling in the kerb and gutter, and this risk can be managed through the provision of suitable drainage infrastructure and overland flow paths, consistent with those illustrated in the "*Bradfield City Centre Masterplan Flood Impact Assessment*".

8. Water Balance

This section outlines the proposed potable water supply/consumption, rainwater harvesting and sanitary fixtures/taps and water saving ESD initiatives for the proposed development.

8.1 Water Supply and Consumption

Both domestic cold water (DCW) and Recycled Water (NPCW) mains supply the AMRF2 development and will be provided via connections to the future Ø200mm Sydney Water mains within Innovation North Road. The incoming water supplies will pass through a new authority water meter located within the cold-water pump room. Reduced pressure zone device valves (RPZD's) will be installed immediately downstream of the site master water meters to provide site containment protection.

A dedicated domestic cold water (DCW) plant room located in the Mezzanine plant area will house the authority water main, DCW water meter, RPZD, booster pumps and automatic inline filtration. The DCW supply system will provide water to fixtures, fittings, hose taps, labs, manufacturing equipment requiring potable water, fire protection systems, and to the specialist laboratory water plant.

The DCW supplied to high use areas will be individually metered via pulse type water meters and monitored by the building management and control system (BMCS). This will provide a detailed understanding of water consumption over time and inform any future initiatives to further reduce water consumption.

A reverse osmosis and deionization filtration plant with associated storage tank and booster pump sets will be located within a dedicated plantroom in the Mezzanine plant area, to serve the clean rooms and lab areas with type 1/type 2 water.

The fire protection system will include provisions to reduce test water discharge. This will include recirculating pump test water through the dedicated fire tank and the installation of zone-check devices for flow switch testing.

Flow control regulators will be provided, where required, to limit water consumption.

Recycled water (NPCW) will be supplied to fixtures requiring non-potable water only. Recycled water will be primarily supplied from the onsite rainwater harvesting system and supplemented with a mains connection to the future 200mm treated recycled water (TRW) main at Innovation North Road. The TRW connection will similarly be provided with the authority water meter, RPZD, booster pumps and automatic filtration in the DCW plant room.

Table 7 summarises the anticipated hydraulic demands for water services. Noting these values are estimated and will be developed in further design stages.

Table 7 – Preliminary Domestic Cold Water Demands

Type of use	Estimated Average Daily Use (kL/day)
Potable Water (Fixture Usage)	15 (TBC)
Recycled Water (Fixture Usage / Irrigation)	10 (TBC)
Recycled Water (Mechanical Usage)	175 (TBC)
Laboratory Water	18 (TBC)
Total	**218**

8.2 Sewer and Sanitary Plumbing

Two new connections to the authority sewer network for the AMRF2 facility are proposed to the south-west and north-east corners of the site. The current proposal is to connect into a new sewer utility service (by WPCA / Sydney Water) at Innovation North Road and Service Road, however this concept requires confirmation from BDA Infrastructure team. Final approval is subject to Water Services Coordinator application to Sydney Water and Section 73 requirements.

8.2.1 Trade Waste Plumbing and Drainage

A commercial café kitchen and events kitchen are proposed in the office building and link bridge respectively. A 2000L in-ground grease arrestor is provisioned to serve the two kitchens, located within the paved area of the courtyard with vehicle access via Service Road. Wastewater from kitchens producing hot food shall be collected via a dedicated gravity trade waste drainage system and pass through the grease treatment device prior to connection to the Sydney Water infrastructure.

8.2.2 Specialised Trade Waste

The specialised trade waste system including the acid neutralisation plant and collected hazardous waste store has been space proofed by the specialist laboratory consultant based on the proposed processes associated with the industrial manufacturing space and laboratories and research component of the building.

The capture of etching fluids (soluble acids) from wet / etch benches and the rinsing process with ultrapure water to capture silicate and rare earth metals has been space proofed for phase 2 and 3 laboratory installation. It is currently an assumption that acid/hazardous waste will be captured via dedicated pumped drainage lines to the acid neutralisation plant and hazardous waste store or collected manually via a suitable operator.

Drainage from all other fixtures in laboratory zones and drainage from mechanical scrubbers is captured via a dedicated trade waste drain line and directed to the acid neutralisation plant before discharging to the sewer system.

The following assumptions have been adopted to inform high level demands expected for the development.

Table 8 – Preliminary Sewer Flows

Estimated Average Daily Use (kL/day)	50 (TBC)

8.3 Rainwater Drainage

The building will be provided with roof drainage design consisting of gravity and/or siphonic drainage systems and full flow emergency overflows discharging to a visible place via the facade.

Rainwater will be collected from roof gutters and a green roof drainage system via gravity flow or siphonic rainwater downpipe systems. Multiple locations of rainwater downpipe risers are required to afford full coverage.

Where rainwater is collected for reuse, it will be directed to the rainwater harvesting tank, otherwise rainwater will connect directly to the external stormwater drainage network (by Civil) via stormwater pits.

Table 9 – Rainfall Catchment Area and Expected Flow Rate (1%AEP (L/s))

Civil Connection	Area Name	Effective Catchment Area (m2)	Flow Rate at 1%AEP (L/s)
Pit 02-2 via Rainwater Tank	Office Roof	1230	95
Freely drains into courtyard	Butterfly Roof (Waterfall)	80	5.8
Pit 02-2 via Rainwater Tank	Butterfly Roof (Piped)	240	18
Direct connection to stormwater utility in Innovation North Road	Manufacturing Hall Roof	1500	110
Pit 02-2 via Rainwater Tank	Laboratory Building (North)	820	67
Direct connection to stormwater utility in Innovation North Road	Laboratory Building (South)	1280	90

8.4 Rainwater Harvesting & Recycled Non-Potable Water

The building will be provided with a rainwater harvesting system, to capture and treat rainwater landing on the building's roof areas. Recycled non-potable water will be provided to serve the following systems:

- WC/urinal flushing.
- Mechanical system top-up (i.e. cooling towers).
- Landscape irrigation.

Water collected in the in-ground rainwater harvesting tank in the courtyard is to be pressurised by a variable speed duplex duty/standby booster pump set and treated via a 4-stage filtration system comprised of 3 off auto backwash sediment filters (100 micron, 50 micron, 5 micron) and ultraviolet light disinfection and connect to the buildings recycled water reticulation network. The rainwater harvesting pumps and treatment system is proposed to be located in a dedicated rainwater treatment plantroom in basement 1 of the office building. The treatment train shall be provided with pressure gauges at the inlets and outlets to facilitate monitoring of the plant operation via the BMCS.

Spatial provisions have been made to allow a 30kL rainwater tank. The size of the rainwater tank harvesting system and the collected roof areas will be confirmed in line with Greenstar requirements to maximise water re-use within the design criteria of the building.

In the event of significant rainfall, overflow from the rainwater tank will discharge into the external stormwater infrastructure to ensure safe management of this water to downstream areas.

The building will also be provided with a connection to the future authority treated recycled water main (by others). This will serve as top up to the rainwater re-use system, to minimise the use of potable water, where possible

8.5 Sanitary Fixtures and Taps

Sanitary fixtures and tapware throughout the new building will be prepared by Architect in line with Greenstar and User Group requirements. Where possible, they will be water efficient to minimise potable water usage.

8.6 ESD Initiatives

This section provides a brief description of the environmental aspirations proposed for the hydraulic and fire systems. They are subject to development of the overall ESD and sustainability strategy for the building as outlined in the Ecologically Sustainable Development Report (AMRFB2-ARU-REP-ES-00-00-01)

The hydraulic and fire systems design will embrace water conservation measures and sustainable initiatives which include:

- Reducing town main water supply by 45% as per Greenstar targets, by:
- Reuse / recirculation of fire test drain water.
- Harvest and reuse building rainwater for irrigation and/or cooling tower supply.
- Connection to authority recycled water main for the most appropriate combination of irrigation, cooling towers and flushing.
- Reducing water usage at fixtures and fittings where possible, including consideration of low flow fixtures and fitting.
- Reducing water usage across the site by using:
- Smart metering and monitoring of water use throughout the building
- Pressure reducing devices on system reticulation.
- Using sustainable materials where appropriate to the project.

9. Impacts of Construction Staging

The AMRF2 site will be constructed in two main stages as shown in Figure 7, each stage comprising of the following elements:

- Stage 1: Includes construction of the advanced manufacturing hall (AMH), lab building, internal courtyard and temporary mounded landscaping and trees within the Stage 2 office building extents.
- Stage 2: Includes removal of temporary landscaping and construction of office building and minor adjustment to the Stage 1 internal courtyard elements.

This section provides additional considerations to accommodate the staged construction of the site, specifically impacts to drainage provisions.

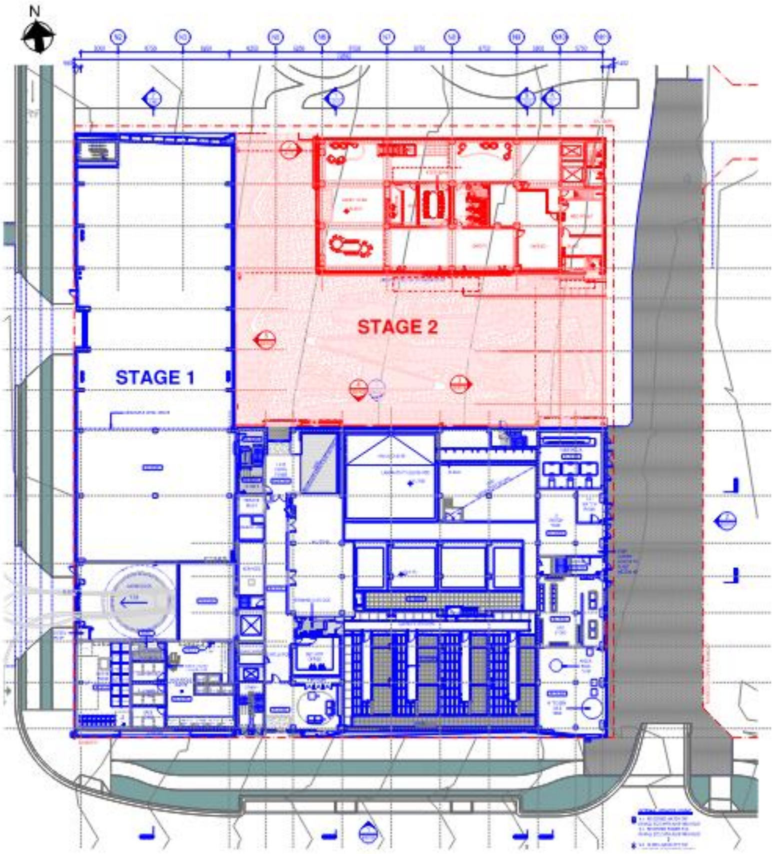


Figure 7 – AMRF2 Site Construction Staging

9.1 Stormwater Drainage Staging

Appropriate drainage provisions are to be provided for both Stage 1 and Stage 2 of the building construction.

9.1.1 Stage 1 Drainage

A concept-level stormwater drainage design for the interim Stage 1 scenario has been provided in Figure 8. The intent is that the Design and Construct (D&C) contractor will complete the design in accordance with the design intent. Key features of the Stage 1 drainage provisions include:

- permanent trunk drainage along the southern side of the internal courtyard with connection to the precinct drainage network within the mid-section of the East Laneway.

- Linear drainage infrastructure is provided for the capture of surface runoff. The linear drain located in the north west corner of the courtyard forms the permanent Stage 2 infrastructure. In Stage 2, the drain receives indirect runoff from wind driven rain and a small upstream catchment. During Stage 1, the linear drain is exposed to direct rainfall and therefore a larger design flow rate. It is anticipated that it will need resizing by the D&C contractor for the Stage 1 runoff.
- Interim drainage is to be provided within the temporary mounded landscape zone in the form of linear drain connections to intercept run-off prior to runoff exiting the site. Temporary drainage can be connected to the constructed 375mm pipe stub at the northern end of the Eastern Laneway.
- Landscape subsoil drainage, as required by the landscape architect.
- Rainwater tank installation in the courtyard.
- Pavement subsoil drainage is anticipated to be installed for both permanent and temporary pavements. Note: for clarity, this is not indicated in Figure 8.
- Site porosity of 33.6% is achieved at the completion of Stage 1 (refer Table 10 for extract from landscape report).

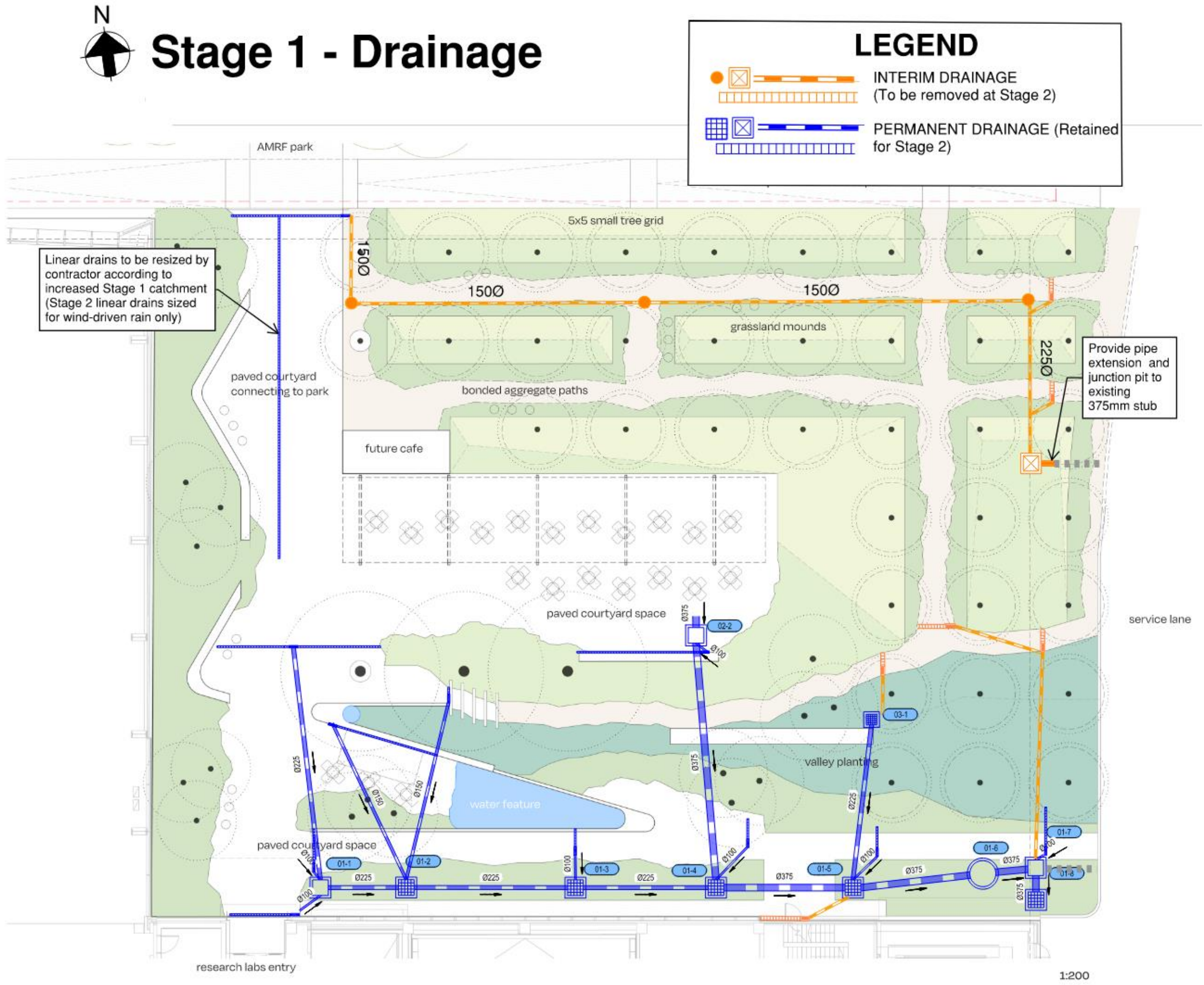


Figure 8 – Stage 1 Drainage Provisions

Table 10 – Site Porosity Assessment Stage 1 (Source: Tyrell Studios SSDA Report)

AMRF2 LANDSCAPE AREA SCHEDULE: STAGE 1
20.11.2025

SITE POROSITY SCHEDULE

Zone	Area (sqm)	Porosity Factor (%)	Porous Factor Area (sqm)	Notes
AMRF2 Site Area	5996			
Courtyard				
Planting Areas				
Planting Over Deep Soil	1097	100%	1097	all planting areas other than water features
Planted Building Setback Edges Over Deep Soil	0	100%	0	none in stage 1
Planting In Undercroft Over Deep Soil	0	100%	0	none in stage 1
Planting Over Structure	0	50%	0	none in stage 1
Planted Water Feature	23	0%	0	water feature
Paving Areas				
Paving Over Structure/On Slab	9	0%	0	
Unit Paving Over Ground	560	50%	280	all unit paving areas
Permeable Paving Over Deep Soil Zones	292	50%	146	bonded aggregate and deco paving areas
Permeable Paving In Undercroft Over Deep Soil Zones	0	50%	0	none in stage 1
Paved Building Setback Areas	21	50%	11	gap between building edge and site boundary line
Rooftops				
Biosolar Roof Planting	964	50%	482	
Total Porous Area (sqm)			2016	
Site Porosity (%)			33.6%	
Total Open Space Area (sqm) (not incl. roof)	2002			
Open Space Area Percentage of Site (%)	33.4%			

9.1.2 Stage 2 Drainage

Stage 2 drainage provisions are indicated in Figure 9 and includes:

- The completion of the courtyard drainage network with additional linear drain connections for Stage 2 landscape elements.
- Passive irrigation system proposed under the link bridge.
- Drainage pit lids to be adjusted according to final surface design levels on completion of Stage 2.

The proposed final stormwater layout is indicated in the tender drawings included in Appendix A.

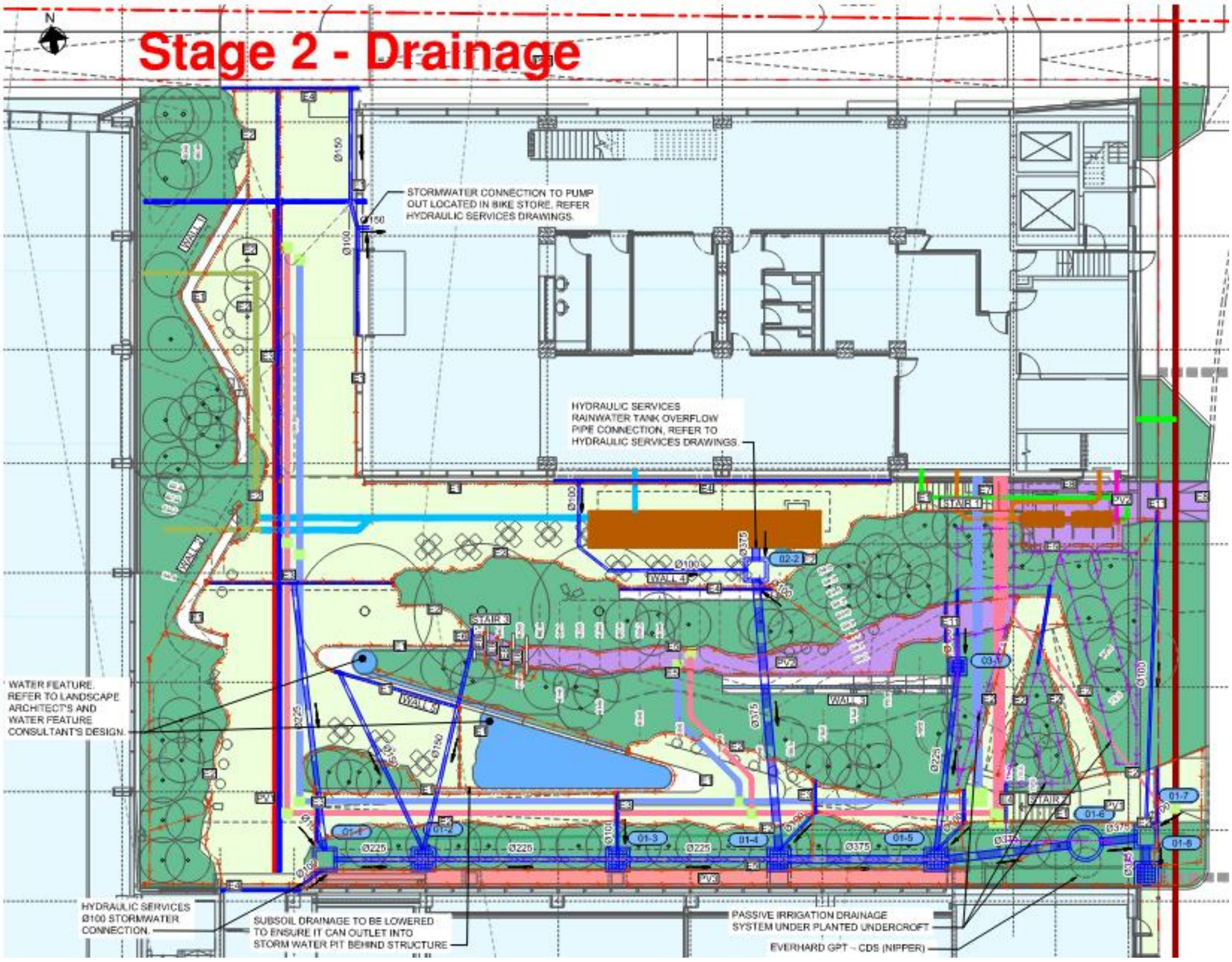


Figure 9 – Stage 2 Drainage Provisions

9.2 Impact to Water Balance

The estimated building water demands, and sewer flows outlined in Section 8 are based on the Hydraulic Services tender design as of the 29th August 2025. The proposed construction stages will impact the expected water balance due to the changes to the building fixture layouts and reduced building area and subsequent population and mechanical demands. The hydraulic and mechanical contractors shall provide an updated water balance based on the final Stage 1 construction design with provision for the additional Stage 2 demands.

9.3 Impact to Rainwater Harvesting Strategy

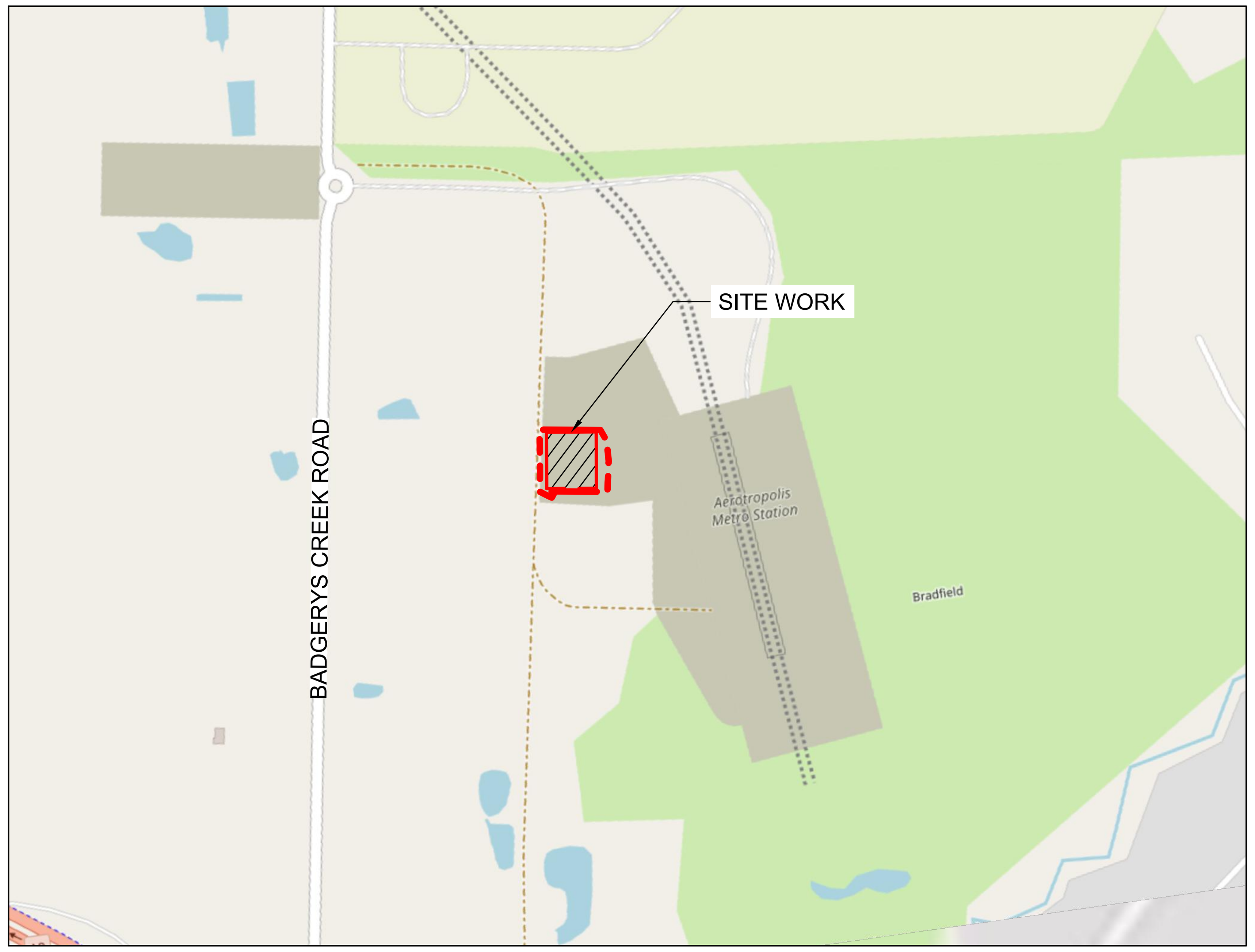
The rainwater treatment plantroom was proposed to be located in basement 1 of the office building and as such will need to be relocated for rainwater harvesting to be included in the Stage 1 construction. Additionally, the office building roof was proposed as part of the catchment area directed to the rainwater tank for capture. For Stage 1 construction, the rainwater harvesting plantroom and rainwater tank will be relocated with updated water balance and system design to be provided by the hydraulic contractor. The Stage 1 location of the rainwater tank may impact the proposed civil design or cause repeat works if the tank needs to be moved with further development of the courtyard in Stage 2. The reduced catchment area able to be captured by the rainwater tank due to the building envelope reduction may also impact the Green Star pathway.

Appendix A

Tender Drawings

BUILDING TWO ADVANCED MANUFACTURING RESEARCH FACILITY (AMRF2)

CIVIL ENGINEERING



©2023 OPENSTREETMAP DATA

LOCALITY PLAN
NOT TO SCALE

DRAWING NUMBER	DRAWING TITLE
AMRFB2-ARU-DRW-CI-000001	COVER SHEET, LOCALITY PLAN AND DRAWING REGISTER
AMRFB2-ARU-DRW-CI-000006	GENERAL NOTES SHEET 1 OF 3
AMRFB2-ARU-DRW-CI-000007	GENERAL NOTES SHEET 2 OF 3
AMRFB2-ARU-DRW-CI-000008	GENERAL NOTES SHEET 3 OF 3
AMRFB2-ARU-DRW-CI-000011	GENERAL LEGEND
AMRFB2-ARU-DRW-CI-000101	SOIL AND WATER MANAGEMENT PLAN
AMRFB2-ARU-DRW-CI-000191	SOIL AND WATER MANAGEMENT DETAILS SHEET 1 OF 3
AMRFB2-ARU-DRW-CI-000192	SOIL AND WATER MANAGEMENT DETAILS SHEET 2 OF 3
AMRFB2-ARU-DRW-CI-000193	SOIL AND WATER MANAGEMENT DETAILS SHEET 3 OF 3
AMRFB2-ARU-DRW-CI-000201	BULK EARTHWORKS PLAN
AMRFB2-ARU-DRW-CI-000241	BULK EARTHWORKS SITE SECTIONS
AMRFB2-ARU-DRW-CI-000301	CIVIL WORKS PLAN
AMRFB2-ARU-DRW-CI-000311	CIVIL WORKS COURTYARD PLAN
AMRFB2-ARU-DRW-CI-000381	CIVIL WORKS DETAILS
AMRFB2-ARU-DRW-CI-000641	STORMWATER LONGITUDINAL SECTIONS
AMRFB2-ARU-DRW-CI-000651	STORMWATER DETAILS
AMRFB2-ARU-DRW-CI-000791	PAVEMENT PROFILES
AMRFB2-ARU-DRW-CI-000795	PAVEMENT DETAILS SHEET 1 OF 2
AMRFB2-ARU-DRW-CI-000796	PAVEMENT DETAILS SHEET 2 OF 2
AMRFB2-ARU-DRW-CI-000798	PAVEMENT EDGE AND INTERFACE DETAILS SHEET 1 OF 2
AMRFB2-ARU-DRW-CI-000799	PAVEMENT EDGE AND INTERFACE DETAILS SHEET 2 OF 2

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd
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	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P07	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			
P06	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1: NOT TO SCALE
Discipline: CIVIL

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Drawing Title
COVER SHEET, LOCALITY PLAN AND DRAWING REGISTER

Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000001	T02

Do not scale

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GENERAL

1. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH NSW GOVERNMENT, DEPARTMENT OF PLANNING AND ENVIRONMENT, AEROTROPOLIS PHASE 2 DCP, STANDARDS AND DRAWINGS.

2. SHOULD ANY AMBIGUITY, ERROR, OMISSION, DISCREPANCY, INCONSISTENCY OR OTHER FAULT EXIST OR SEEM TO EXIST IN THE DOCUMENTS, IMMEDIATELY NOTIFY THE PRINCIPAL OR PRINCIPAL'S ENGINEER.

3. DRAWINGS TO BE READ IN CONJUNCTION WITH OTHER CONSULTANT DRAWINGS AND SPECIFICATIONS, INCLUDING ARCHITECTURAL DOCUMENTATION.

4. ALL DIMENSIONS ARE IN METRES AND ALL LEVELS ARE IN METRES AHD UNO.

5. NO DIMENSIONS ARE TO BE OBTAINED BY SCALING FROM DRAWINGS.

6. IN PREPARING THESE DRAWINGS ARUP HAS RELIED ON THE ACCURACY AND COMPLETENESS OF INFORMATION PROVIDED BY THE UTILITY PROVIDERS AND SURVEYORS REGARDING ONSITE LOCATION OF ASSETS. ARUP ACCEPTS NO LIABILITY FOR ANY ERROR OR OMISSION IN THESE DRAWINGS TO THE EXTENT THE SAME RESULTS FROM ERROR OR OMISSION IN THE INFORMATION PROVIDED.

7. ANY DISCREPANCIES OR OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE PRINCIPAL PRIOR TO PROCEEDING WITH THE WORKS.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STABILITY OF THE WORKS AND SURROUNDING AREA UNTIL PROJECT COMPLETION AND SHALL ENSURE THAT NO PART OF THE WORKS ARE OVERSTRESSED BY CONSTRUCTION LOADING.

9. ALL TESTING IS TO BE CARRIED OUT BY A NATA REGISTERED LABORATORY. TESTING METHODS ARE TO BE IN ACCORDANCE WITH THE APPLICABLE AUSTRALIAN STANDARD.

10. ON COMPLETION OF THE WORKS THE CONTRACTOR SHALL PROVIDE AN AS-CONSTRUCTED SURVEY OF THE SITE.

11. WHERE PROPRIETARY PRODUCTS ARE SPECIFIED ON THE DRAWINGS, THE CONTRACTOR MAY PROPOSE AN ALTERNATIVE PRODUCT TO THE PRINCIPAL FOR APPROVAL. THE CONTRACTOR SHALL PROVIDE SUFFICIENT INFORMATION TO DEMONSTRATE TO THE PRINCIPAL'S SATISFACTION THAT THE ALTERNATIVE PROPOSED IS OF EQUIVALENT QUALITY TO THE PRODUCT SPECIFIED.

12. THE CONTRACTOR SHALL:
    a. OBTAIN ALL LEVELS FROM ESTABLISHED BENCHMARKS ONLY AS SUPPLIED BY A REGISTERED SURVEYOR
    b. LOCATE ALL EXISTING STRUCTURES, SERVICES AND UTILITIES PRIOR TO COMMENCEMENT OF WORKS. LOCATIONS OF EXISTING SERVICES SHOWN ON PLANS ARE INDICATIVE ONLY AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT. THE RESPONSIBILITY FOR LOCATION, AVOIDANCE AND TEMPORARY PROTECTION (WHERE NECESSARY) IS THE CONTRACTOR'S. ANY DAMAGE IS TO BE REPORTED TO THE SUPERINTENDENT IMMEDIATELY.
    c. VERIFY ALL DIMENSIONS, EXISTING LEVELS AND PROPOSED SET-OUT ON SITE PRIOR TO COMMENCEMENT OF WORKS.
    d. PROVIDE WORKS AS-EXECUTED DRAWINGS OF THE SITE ON COMPLETION OF WORKS

13. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND CODES OF PRACTICE EXCEPT WHERE VARIED BY THE DRAWINGS. THE APPLICABLE STANDARDS SHALL BE THE REFERENCED STANDARDS CURRENT AT DATE OF DRAWING ISSUE.

14. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED OUT BY OTHERS, (E.G. ADJUSTMENT OF SERVICES) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF ANY THIRD PARTY WORKS.

15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STABILITY OF THE WORKS AND SURROUNDING AREA UNTIL PROJECT COMPLETION AND SHALL ENSURE THAT NO PART OF THE WORKS ARE OVERSTRESSED BY CONSTRUCTION LOADING.

16. ALL EARTHWORKS AND WATER QUALITY TESTING IS TO BE CARRIED OUT BY A NATA REGISTERED LABORATORY. TESTING METHODS ARE TO BE IN ACCORDANCE WITH THE APPLICABLE AUSTRALIAN STANDARD.

17. WHERE PROPRIETARY PRODUCTS ARE SPECIFIED ON THE DRAWINGS, THE CONTRACTOR MAY PROPOSE AN ALTERNATIVE PRODUCT TO THE PRINCIPAL FOR APPROVAL. THE CONTRACTOR SHALL PROVIDE SUFFICIENT INFORMATION TO DEMONSTRATE TO THE NOMINATED AUTHORITY'S SATISFACTION THAT THE ALTERNATIVE PROPOSED IS OF EQUIVALENT QUALITY TO THE PRODUCT SPECIFIED.

EROSION AND SEDIMENT

1. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE IN ACCORDANCE WITH LANDCOM "SOILS AND CONSTRUCTION MANUAL VOLUME 1, MARCH 2004", AEROTROPOLIS PHASE 2 DCP, STANDARDS AND DRAWINGS.

2. WORKS SHALL BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
    a. INSTALL EROSION AND SEDIMENT CONTROLS.
    b. STRIP AND STOCKPILE TOP 300 mm OF TOPSOIL AND CARRY OUT ALL BULK EARTHWORKS.
    c. ADD 300 mm TOPSOIL AND REHABILITATE BULK EARTHWORK AREAS IMMEDIATELY UPON COMPLETION.
    d. UNDERTAKE REMAINING SITE WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS.
    e. REMOVE SOIL AND WATER MANAGEMENT CONTROLS NOT REQUIRED FOR OTHER STAGES OF CONSTRUCTION ONCE UPSTREAM SURFACES ARE STABILISED TO THE SATISFACTION OF DPE.

3. WORKS ARE TO ENSURE 80% OF ALL FLOWS LEAVING THE CONSTRUCTION SITE ACHIEVES TOTAL SUSPENDED SOLIDS OF 50MG/L OR LESS AND A PH OF 6.5-8.5DURING THE CONSTUCTION PHASES UNTIL TH ESITE IS STABLISIED AND LANDSCAPED. THE CONTRACTOR IS RESPONSIBLE FOR MONITORING DISCHARGE FOR COMPLIANCE.

EROSION CONTROL MEASURES

1. CONTROLS AFFECTED BY WORKS ARE TO BE RE-ESTABLISHED PRIOR TO THE COMPLETION OF EACH DAYS WORK.

2. NO DISTURBANCE OF SITE OTHER THAN THE IMMEDIATE AREA OF THE WORKS.

3. THE CONTRACTOR IS TO STABILISE TOPSOIL STOCKPILE AND BARE AREAS AS SOON AS THEY REACH FINAL LEVELS. STABILISATION TO BE BY HYDROSEEDING OR OTHER METHOD APPROVED BY DPE. ALL SEEDED AREAS TO BE WATERED TWICE WEEKLY UNTIL GRASS IS ESTABLISHED OR COVERED WITH BITUMEN STRAW MULCH. SEED MIXTURE FOR FOOTWAYS AND EMBANKMENTS TO BE IN ACCORDANCE WITH THE FOLLOWING:

    • A RECOMMENDED LIST OF PLANT SPECIES FOR TEMPORARY COVER IS:
      - JAPANESE MILLET 25 kg/ha : SPRING
      - OATS (RYECORN) 25 kg/ha : SUMMER
      - JAPANESE MILLET 10 kg/ha : AUTUMN
      - OATS (RYECORN) 30 kg/ha : WINTER

    GYPSUM AND MULTIGROW / ENRICH FERTILIZER AT RATES TO BE DETERMINED BY SUBSOIL AND TOPSOIL TESTING.

4. CONTRACTOR SHALL REFER TO LANDSCAPE DRAWINGS FOR DETAILS OF PERMANENT PLANTING.

5. DUST CONTROL MEASURES SHALL BE IMPLEMENTED CONTINUOUSLY DURING CONSTRUCTION WORKS THROUGH REGULAR WATERING.

6. TOPSOIL SHALL BE RESPREAD AND STABILISED AS SOON AS POSSIBLE. DISTURBED AREAS SHALL BE LEFT WITH A SCARIFIED SURFACE TO ENCOURAGE WATER INFILTRATION AND ASSIST KEYING IN TOPSOIL.

7. THE CONTRACTOR SHALL TEMPORARILY REHABILITATE ANY DISTURBED AREAS WITHIN 14 DAYS. WHERE FINAL SHAPING HAS OCCURRED THE CONTRACTOR SHALL PROVIDE FINAL REHABILITATION WITHIN 7 DAYS.

8. THE AREA OVER ALL STORMWATER AND SEWER LINES NOT IN STREETS IS TO BE MULCHED AND SEEDED AS SOON AS POSSIBLE BUT NO LATER THAN WITHIN 14 DAYS AFTER BACKFILL.

9. NO MORE THAN 50 m OF TRENCH IS TO BE OPEN AT ANY ONE TIME.

10. AREAS OVER ELECTRICITY POWER, TELEPHONE AND GAS SUPPLY TRENCHES ARE TO BE SEEDED AND MULCHED AS SOON AS POSSIBLE BUT NO LATER THAN WITHIN 14 DAYS AFTER BACKFILL.

11. ALL TEMPORARY EARTH BERMS, DIVERSION AND SEDIMENT BASIN EMBANKMENTS ARE TO BE TRACK ROLLED, SEEDED OR MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.

12. ESTABLISHMENT OF FIRE BREAKS SHALL BE CARRIED OUT IN CONSULTATION WITH A FIRE CONTROL OFFICER.

13. PRIOR TO COMPLETION OF WORKS FOR THE DEVELOPMENT, AND PRIOR TO REMOVAL OF SEDIMENT CONTROLS, ALL SITE SURFACES MUST BE EFFECTIVELY STABILISED INCLUDING ALL DRAINAGE SYSTEMS.

SEDIMENT CONTROL MEASURES

1. DURING EARTHWORKS, TEMPORARY DIVERSION BANKS SHOULD BE CONSTRUCTED TO LIMIT SLOPE LENGTH, WHERE POSSIBLE, IN ACCORDANCE WITH THE FOLLOWING:

2. ALL STORMWATER PITS TO BE COVERED OR DROP INLET SEDIMENT TRAPS PROVIDED IN ACCORDANCE WITH LANDCOM "SOILS AND CONSTRUCTION MANUAL VOLUME 1, MARCH 2004". KERB INLET SEDIMENT TRAPS ARE TO BE INSTALLED AFTER COMPLETION OF PAVING.

3. SEDIMENT TRAPS ARE TO BE MAINTAINED SUCH THAT:
    a. SEDIMENT IS REMOVED SUCH THAT NO LESS THAN 70% OF THE DESIGN CAPACITY REMAINS AT ANY ONE TIME.
    b. MATERIALS ARE REPLACED OR REPAIRED AS REQUIRED TO ENSURE SERVICEABILITY OF BOTH THE ELEMENT AND THE TRAP.

4. PERMANENT DRAINAGE STRUCTURES INCLUDING PIPES AND PITS ARE TO BE HANDED OVER IN A CLEAN CONDITION AT THE COMPLETION OF THE CONTRACT MAINTENANCE PERIOD.

5. FOLLOWING COMPLETION AND RESTORATION OF SITE, REMOVE ALL MATERIALS AND FILL DIVERSION DRAINS, WATERWAYS AND SEDIMENT TRAPS. COMPACT IN ACCORDANCE WITH SPECIFICATION TO MATCH LEVELS OF THE PREVIOUSLY COMPLETED WORKS. PROVIDE 150 mm TOPSOIL AND HYDROSEED.

6. STRIP TOPSOIL OVER THE SITE TO AN AVERAGE DEPTH OF 300 mm. TOP SOIL STOCKPILES SHALL NOT EXCEED 2 m IN HEIGHT AND BATTER SLOPES TO BE 3H:1V MAXIMUM.

7. AN ACCESS POINT TO ALLOW MACHINE ENTRY / EXIT ARE TO INCLUDE A ROUNDED EARTH MOUND 0.3 m HIGH WITH 10H:1V BATTERS.

8. "NO TRAFFIC AREA" TO BE ENCLOSED WITH "BARRICADE WEBBING" FENCE TO MAINTAIN EXISTING PASTURE DOWNSLOPE FROM SEDIMENT CONTROL - LEVEL SPREADER. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR DISTURB ANY AREAS OUTSIDE THE CATCHMENT AREA.

9. THE CONTRACTOR SHALL PROVIDE A 0.4 m WIDE TURF STRIP BEHIND ALL KERB AND GUTTER AT COMPLETION OF FOOTPATH FORMATION AND 1.0 m WIDE AROUND ALL SURFACE INLET PITS.

10. THE CONTRACTOR SHALL MAINTAIN A LOG BOOK DETAILING:
    - RECORDS OF ALL RAINFALL
    - CONDITION OF SOIL AND WATER MANAGEMENT STRUCTURES
    - ANY ADDITIONAL REMEDIAL WORKS REQUIRED

    THE LOG BOOK SHALL BE MAINTAINED ON A DAILY BASIS AND BE MADE AVAILABLE TO ANY AUTHORISED PERSON UPON REQUEST. THE ORIGINAL LOG BOOK SHALL BE ISSUED TO THE PRINCIPAL AT THE COMPLETION OF THE WORKS.

11. THE CONTRACTOR SHALL AT ALL TIMES RESTRICT CONSTRUCTION EQUIPMENT MOVEMENT TO THE ESSENTIAL CONSTRUCTION AREAS. THE CONTRACTOR SHALL NOT EXTEND LAND DISTURBANCE BEYOND 2 m FROM THE EDGE OF ANY ESSENTIAL CONSTRUCTION ACTIVITY.

12. THE CONTRACTOR SHALL PROVIDE CATCH DRAINS AT THE BOTTOM OF ALL BATTERS AND DIVERT THE CATCH DRAINS AND ANY TAIL OUT DRAINS TO DRAIN TO THE NEAREST STORMWATER PIT.

GEOTECHNICAL INSPECTION AND TESTING

1. IT IS INCUMBENT ON THE CONTRACTOR TO ENSURE ALL EARTHWORKS INCLUDING PLACING AND COMPACTION OF FILL ARE UNDERTAKEN UNDER LEVEL 1 GEOTECHNICAL INSPECTION AND TESTING SUPERVISION AS DEFINED IN AS 3798-2007. ALL COSTS SHALL BE BOURNE BY THE CONTRACTOR.

2. THE LEVEL 1 GEOTECHNICAL AND TESTING AUTHORITY (GITA) SHALL PROVIDE A REPORT DETAILING ALL THE INSPECTIONS, SAMPLING AND TESTING IT HAS CARRIED OUT TOGETHER WITH PLAN LOCATIONS AND A SUMMARY OF RESULTS.

3. FOR GENERAL FILL AND EARTH MOVING REQUIREMENTS AND SPECIFICATIONS, REFER TO THE GITA/GEOTECHNICAL RECOMMENDATIONS. ANY MATERIAL ON SITE PROPOSED TO BE REUSED AS FILL MATERIAL SHALL BE ASSESSED AND CONFIRMED BY THE GITA/GEOTECHNICAL ENGINEER.

LANDSCAPE RETAINING WALLS

1. ASSUME 40 MPa CONCRETE AND REINFORCEMENT RATE OF 2% FOR RETAINING WALLS < 1.0 m HEIGHT. REINFORCEMENT DETAILING TO BE PROVIDED IN DETAILED DESIGN.

2. MINIMUM 0.5 m OF NON-REACTIVE MATERIAL (E.G. CRUSHED SANDSTONE) REQUIRED UNDER RETAINING WALL 1, 2, 3, 4 AND STAIR 1 AND 2 FOOTINGS TO ACCOUNT FOR POTENTIAL SHRINK SWELL MOVEMENTS.

3. ALLOWABLE BEARING CAPACITY OF FOUNDING MATERIAL TO MEET OR EXCEED THE PARAMETERS FOR ‘CONTROLLED FILL OR RESIDUAL STIFF CLAY’ SPECIFIED IN TABLE 13 OF ‘REPORT ON GEOTECHNICAL INVESTIGATION’, REVISION 0.

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd
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	FOR TENDER			
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	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P07	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			
P06	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD,
BRADFIELD

Scale at A1: NOT TO SCALE
Discipline: CIVIL

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Drawing Title
GENERAL NOTES
SHEET 1 OF 3

Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000006	T02

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DRAINAGE

1. STORMWATER PIT CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 32 MPa AT 28 DAYS U.N.O.

2. ALL PITS TO BE IN ACCORDANCE WITH WESTERN SYDNEY PLANNING PARTNERSHIP STANDARD DRAWINGS.

3. ALL PIPES TO BE INSTALLED TO TYPE HS3 TRENCH SUPPORT, BACKFILLED AND COMPACTED IN ACCORDANCE WITH AS 3725.

4. ALL PIPES > Ø225 ARE TO BE REINFORCED CONCRETE PIPES (RCP) OR FIBRE REINFORCED CONCRETE PIPES (FRCP) TO BE CLASS 4 RUBBER RING JOINTED (RRJ) COMPLYING WITH AS 4058 UNLESS NOTED OTHERWISE. THE CONTRACTOR IS RESPONSIBLE FOR CHECKING THE CONSTRUCTION LOAD CONDITIONS AND ADJUSTING THE PIPE CLASS IF NECESSARY.ALL PIPES TO BE INSTALLED WITH SOCKET FACING UPSTREAM AND ALL CONSTRUCTION TO COMMENCE AT THE OUTLET END OF EACH LINE.

5. ALL CONCRETE PIPES ≤750 mm TO EMPLOY FIBRE REINFORCED CEMENT OR ALTERNATIVES OUTLINED IN THE "REPORT ON SALINITY INVESTIGATION, PROPOSED ADVANCED MANUFACTURING RESEARCH FACILITY, BUILDING 2, BADGERYS CREEK ROAD, BRINGELLY", DOUGLAS PARTNERS.

6. PRIOR TO THE FINAL INSPECTION A CCTV INSPECTION AND REPORT IS TO BE UNDERTAKEN FOR ALL STORMWATER PIPES AND CULVERTS THAT ARE PART OF THE DRAINAGE SYSTEM.

7. ALL EXISTING STORMWATER DRAINAGE TO REMAIN MUST BE INSPECTED AND CLEANED. ANY DAMAGE IS TO BE REPORTED TO PRINCIPAL FOR FUTHER DIRECTION.

8. CONTRACTOR MUST PROTECT PIPES FROM DAMAGE DUE TO CONSTRUCTION LOADING.

9. ALL PIPES TO HAVE A MINIMUM 1% GRADE. U.N.O.

10. ALL PIPES ≤ Ø225 TO BE PVC-U, SEWER GRADE, RUBBER RING JOINTED.

11. PIPE JOINT TO BE PROVIDED 600 mm FROM EXTERNAL FACE OF STORMWATER PITS FOR PIPES ≤ Ø450. FOR PIPES > Ø450, PIPE JOINT IS TO BE PROVIDED 1200 mm FROM FACE OF STORMWATER PITS.

12. PROVIDE Ø100 SLOTTED SUBSOIL PIPE CONNECTION TO UPSTREAM FACE OF STORMWATER PITS. THE PIPE IS TO BE 3.0 m LONG ENCLOSED IN TUBULAR FILTER FABRIC AND LAID ADJACENT TO INLET PIPE/S IN ACCORDANCE WITH COS STANDARDS.

13. ALL EXISTING REDUNDANT PITS AND PIPES WHICH ARE NO LONGER REQUIRED ARE TO BE GROUT FILLED UNLESS NOTED OTHERWISE.

14. ALL DRAINAGE TRENCHES WHERE PITS AND PIPES ARE REMOVED ARE TO BE BACKFILLED AND COMPACTED WITH CLEAN MATERIAL WHICH COMPLIES WITH THE SPECIFICATIONS AND IN ACCORDANCE TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.

15. STEP IRONS TO BE PROVIDED TO ALL STORMWATER PITS IN ACCORDANCE WITH AS 1657, UNO.

16. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF ALL TEMPORARY DRAINAGE NECESSARY TO DRAIN THE SITE DURING CONSTRUCTION INCLUDING TEMPORARY DIVERSIONS OF TRUNK MAINS TO ENABLE PERMANENT WORKS.

17. PASSIVE IRRIGATION PIPE IS A Ø100 CORRUGATED PERFORATED PIPE INSTALLED IN A MIN. 300 mm x 300 mm TRENCH OF NOM 20 mm COARSE FILTER MATERIAL (BLUE METAL OR SIMILAR), WRAPPED IN GEOTEXTILE FILTER FABRIC (BIDIM A24 OR APPROVED EQUIVALENT).

18. ALL PITS TO BE ORIENTED PARALLEL WITH PAVERS AND/ OR ADJACENT STRUCTURES AND FEATURES. PAVERS LOCATED IN PV1 PERMEABLE PAVEMENT WITH PAVERS ARE TO HAVE COVERS ALIGNED WITH PAVER JOINTS.

19. ALL PIT COVERS TO BE RECESSED AND IN-FILLED TO SUIT SURROUNDING FINISH.

EARTHWORKS

1. THE CONTRACTOR IS RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH RECOMMENDATIONS OF THE FOLLOWING REPORTS:
   - "REPORT ON GEOTECHNICAL INVESTIGATION, PROPOSED ADVANCED MANUFACTURING RESEARCH FACILITY, BUILDING 2, BADGERYS CREEK ROAD, BRINGELLY", DOUGLAS PARTNERS.
   - FACTUAL REPORT ON GEOTECHNICAL INVESTIGATION, PROPOSED ADVANCED MANUFACTURING RESEARCH FACILITY, BUILDING 2, BADGERYS CREEK ROAD, BRINGELLY", DOUGLAS PARTNERS.
   - "REPORT ON SALINITY INVESTIGATION, PROPOSED ADVANCED MANUFACTURING RESEARCH FACILITY, BUILDING 2, BADGERYS CREEK ROAD, BRINGELLY", DOUGLAS PARTNERS.

2. EARTHWORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE PROJECT EARTH MOVING SPECIFICATION. UNSUITABLE MATERIALS NOT IN ACCORDANCE WITH THE SPECIFICATION ARE TO BE REMOVED FROM ROADS AND BUILDING AREAS PRIOR TO FILLING. ALL TESTING OF EARTHWORKS SHALL BE UNDERTAKEN BY THE GEOTECHNICAL INSPECTION AND TESTING AUTHORITY APPOINTED BY THE PRINCIPAL CONTRACTOR.

3. SITE PREPARATION IS TO INCLUDE THE STRIPPING OF VEGETATION, TOPSOILS AND ANY OTHER DELETERIOUS MATERIALS.

4. STRIPPED SURFACE IS TO BE INSPECTED BY A GEOTECHNICAL ENGINEER, THEN ROLLING OF THE EXPOSED SURFACE USING AT LEAST OF 6 PASSES OF A 12 TONNE MINIMUM DEAD WEIGHT ROLLER, WITH THE LAST PASS IN THE PRESENCE OF A GEOTECHNICAL ENGINEER. WHERE WEAK OR HEAVING AREAS ARE IDENTIFIED, THEY SHOULD BE EXCAVATED AND THEN BACKFILLED USING A SUITABLE GRANULAR MATERIAL.

5. ALL FILLING SHOULD BE PLACED IN 250 mm (LOOSE THICKNESS) LAYERS AND COMPACTED TO A RELATIVE DENSITY RATIO OF 98% WHEN COMPARED TO STANDARD MAXIMUM DRY DENSITY (SMDD) WITH PLACEMENT MOISTURE CONTENTS WITHIN 2% STANDARD OPTIMUM MOISTURE CONTENT (OMC). BENEATH PAVEMENTS AND GROUND SLABS, THE UPPER 0.5 M OF FILL SHOULD BE COMPACTED TO 100% SMDD.

6. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY WORKS INCLUDING SHORING AND BATTERS. ALL TEMPORARY WORKS ARE TO BE DESIGNED IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND CODES OF PRACTICE BY A SUITABLY QUALIFIED ENGINEER.

7. EXCAVATED MATERIAL MAY BE USED AS STRUCTURAL FILL PROVIDED IT COMPLIES WITH THE SPECIFICATION FOR FILL MATERIAL, INCLUDING THEY DO NOT CONTAIN PARTICLES GREATER THAN 100 mm IN SIZE, AND THE PLACEMENT MOISTURE CONTENT COMPLIES WITH GEOTECHNICAL CONSULTANTS UNO. REQUIREMENTS, AND ALLOWS FILLING TO BE PLACED AND PROOFROLLED IN ACCORDANCE WITH THE SPECIFICATION.

8. ANY EXCAVATED MATERIAL TO BE REMOVED FROM THE SITE IS TO BE ASSESSED, CLASSIFIED, TRANSPORTED AND DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE'S (DECC) 'WASTE CLASSIFICATION GUIDELINES PART 1: CLASSIFYING WASTE' AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE SUPERINTENDENT.

9. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING SITE RISKS ASSOCIATED WITH FALLS FROM HEIGHT INCLUDING INSTALLING SAFETY BARRIERS AROUND EXCAVATIONS WHERE APPROPRIATE.

10. SELECTED MATERIAL FOR USE AS GENERAL FILL SHALL BE UNIFORM IN CLASSIFICATION, WELL GRADED, COARSE, GRANULAR, FREE DRAINING AND APPROVED BY THE GEOTECHNICAL CONSULTANT PRIOR TO DELIVERY TO SITE. HIGHLY REACTIVE CLAY FILLING SHOULD BE AVOIDED. MAX PARTICLE SIZE 75mm. COMPACTED IN 150 mm MAX LAYERS TO OBTAIN 100% SMDD AS DETERMINED BY TEST AS 1289.5.1.1.

11. ALL EARTHWORKS MUST BE ROLLED AT THE END OF EACH DAY TO RESTRICT WATER INGRESS.

STRUCTURAL DETAILING AND CONCRETE WORKS

1. MINIMUM CONCRETE GRADE FOR UNREINFORCED CONCRETE N25, FOR REINFORCED CONCRETE N40, UNO.
2. ALL CONCRETE WORKS TO BE IN ACCORDANCE WITH AS 3600.
3. ALL FORMWORK TO BE IN ACCORDANCE WITH AS 3610.
4. MINIMUM COVER TO REINFORCEMENT TO BE 50 mm UNO.
5. ALL PITS FOR DEPTHS 2.0-3.0 m MAX TO BE FORMED INSIDE AND OUT IN ACCORDANCE WITH AS 3610.
6. EDGES SHALL BE CHAMFERED 20 x 20 AND RE-ENTRANT ANGLES FILLETED 20 x 20 UNO.
7. LAPS NOT SHOWN ON THE DRAWINGS SHALL BE STAGGERED SO THAT NO MORE THAN 50% OF BARS ARE LAPPED IN ANY ONE CROSS SECTION.
8. CONCRETE DURIABILITY REQUIREMETNS TO BE IN ACCORDANCE WITH TABLE 5 OF "REPORT ON SALINITY INVESTIGATION, PROPOSED ADVANCED MANUFACTURING RESEARCH FACILITY, BUILDING 2, BADGERYS CREEK ROAD, BRINGELLY", DOUGLAS PARTNERS.
9. REINFORCEMENT NOTATION SHOWN ON DRAWINGS IN ACCORDANCE WITH AS/NZS 1100.501:

   NUMBER OF BARS:2
   DUCTILITY CLASS:N
   SIZE, IN MILLIMETRES:16
   SPACING, IN MILLIMETRES:200
   LOCATION:T
   EG. 2 – N16 200 T

   SQUARE MESH:SL82

   REINFORCEMENT PLACING INFORMATION
   TOP FACE:T
   BOTTOM FACE:B
   CENTRALLY PLACED:C
   EACH WAY:EW
   EACH FACE:EF
   NEAR FACE:NF
   FAR FACE:FF
   TENSION LAP:Lst
   DEVELOPMENT LENGTH:Ld

REFERENCE DRAWINGS

THESE DRAWINGS HAVE BEEN DEVELOPED USING THE FOLLOWING DRAWINGS. ANY DISCREPANCIES. ANY DISCREPANCIES BETWEEN DRAWING INFORMATION SHOULD BE NOTIFIED TO THE PRINCIPAL'S AUTHORISED PERSON IMMEDIATELY.

CONSULTANT	DRG TITLE	DRG NO.	REVISION DATE	COMMENTS
ARCHITECTUS	BASEMENT 1	FLOORPLAN GENERAL ARRANGEMENT - LEVEL B1	13/08/2025	
	GROUND FLOOR	FLOORPLAN GENERAL ARRANGEMENT - LEVEL G	13/08/2025	
	LEVEL 5 - ROOF	FLOORPLAN GENERAL ARRANGEMENT - LEVEL 5	13/08/2025	
SMEC	BRADFIELD STAGE 2A BASE.DWG		11/07/2024	SOURCE OF EXISTING STORMWATER AND PUBLIC DOMAIN
SMEC	TIN DESIGN.DWG		12/04/2024	SOURCE OF EXISTING DESIGN SURFACE
TYRRELL STUDIOS	MAIN COURTYARD PLAN	2301_AMRF_DD_PL_GA-2-250806	13/08/2025	SOURCE OF INTERNAL COURTYARD DESIGN
ARUP	20250825 - AMRF2 - MEP IN-GROUND SERVICES		25/08/2025	PROPOSED COMBINED COURTYARD SERVICES
SYDNEY WATER	CASE 208239 TENDER ISSUE	X_30013454_SEWER_TENDER ISSUE.DWG X_30013454_WATER_TENDERISSUE.DWG X_30013454_R_WATER_TENDER ISSUE.DWG	16/01/2024	SYDNEY WATER SEWER, POTABLE WATER AND RECYCLED WATER
ENDEAVOUR ENERGY	LOT 3101, DP 1282964 215 BADGERYS CREEK ROAD, BRADFIELD ENDEAVOUR ENERGY CAP No.: UIS1040 INDUSTRIAL SUBDIVISION DUCT TRENCHING AND EASEMENT PLAN AND ELECTRICAL RETICULATION	A532395_UIS1040_DUCT.DWG A532396_UIS1040_RETIC.DWG	19/08/2024	ENDEAVOUR ENERGY ASSETS

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd	Description
T02	29/08/25	PDA	PDA	KJS	FOR TENDER
T01	25/09/24	RR	KJS	KJS	FOR TENDER
P08	31/05/24	RR	KJS	KJS	WIP DESIGN DEVELOPMENT ISSUE
P07	28/03/24	AYL	KJS	KJS	50% DESIGN DEVELOPMENT
P06	03/05/24	AYL	KJS	KJS	SSDA UPDATE
P05	03/04/24	AYL	KJS	KJS	SSDA UPDATE
P04	18/12/23	AYL	KJS	KJS	100% SCHEMATIC DESIGN
P03	30/11/23	PDA	JJC	KJS	SSDA ISSUE
P02	16/10/23	AYL	JJC	KJS	80% SCHEMATIC DESIGN

Client: NSW GOVERNMENT Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title: AMRF - BUILDING 2
215 BADGERYS CREEK ROAD,
BRADFIELD

Scale at A1: NOT TO SCALE
Discipline: CIVIL

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Drawing Title: GENERAL NOTES
SHEET 2 OF 3

Drawing Status: FOR TENDER

Job No: 295398-00
Drawing No: AMRFB2-ARU-DRW-CI-000007
Issue: T02

Do not scale

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PAVEMENTS

1. PAVEMENTS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH TFNSW QA SPECIFICATIONS.
2. PAVEMENTS HAVE BEEN DESIGNED BASED ON CBR OF 2% AND A CBR SWELL > 2.5%, BASED ON THE FINDINGS OF DOUGLAS PARTNERS REPORT ON GEOTECHNICAL INVESTIGATION - PROPOSED ADVANCED MANUFACTURING RESEARCH FACILITY BUILDING 2. A CAPPING LAYER SHALL BE PLACED IMMEDIATELY ABOVE THE HIGH SWELL SUBGRADE MATERIAL FOR THE FULL FORMATION WIDTH TO PROTECT IT FROM MOISTURE VARIATIONS. THE MINIMUM CAPPING LAYER COVER OVER EXPANSIVE SUBGRADES HAS BEEN DETERMINED BASED ON FIGURE 5.1 OF VICROADS RC500.22.
3. PV1 HAS BEEN DESIGNED BASED ON AN ASSUMED TRAFFIC LOADING OF ONE 3-AXLE RIGID TRUCK, AS DEFINED BY THE NATIONAL HEAVY VEHICLE REGULATOR, PER WEEK AND 4 PASSES OF A 860SJ BOOM LIFT PER YEAR.
4. PV3 HAS BEEN ASSUMED TO HAVE NO VEHICULAR LOADING.
5. PV5 HAS BEEN DESIGNED BASED ON AN ASSUMED TRAFFIC LOADING OF TEN 3-AXLE RIGID TRUCKS AND ONE 6-AXLE SEMITRAILER, AS DEFINED BY THE NATIONAL HEAVY VEHICLE REGULATOR, PER DAY AND 4 PASSES OF A 860SJ BOOM LIFT PER YEAR.
6. PAVER THICKNESSES OF 80 mm ARE RECOMMENDED BASED ON THE ESTIMATED TRAFFIC LOADINGS AND PAVING LAYING PATTERN, AS PER CMAA PA02.
7. RESIN BONDED AGGREGATE LAYER TO BE CONSTRUCTED IN ACCORDANCE WITH THE SUPPLIER'S SPECIFICATION.
8. DURING CONSTRUCTION, CARE SHOULD BE TAKEN TO AVOID CONSTRUCTION VEHICLES TRAFFICKING MUD ONTO THE PERMEABLE BASECOURSE AS THIS MAY CAUSE CLOGGING, REDUCING THE MATERIALS PERMEABILITY. WHERE THIS IS UNAVOIDABLE THE BASE SHOULD BE MADE 50 MM THICKER THAN REQUIRED. THIS TOPPING SHOULD THEN BE SCALPED OFF AND DISCARDED IMMEDIATELY PRIOR TO INSTALLING THE BEDDING COURSE.
9. JOINTS MUST BE COMPLETELY FILLED DURING CONSTRUCTION AND KEPT FULL IN SERVICE. FAILURE TO FILL THE JOINTS ALLOWS SEDIMENTS TO PENETRATE TO THE BEDDING COURSE WHERE THEY CAUSE CLOGGING AND ARE DIFFICULT TO REMOVE WITHOUT LIFTING AND RELAYING THE PAVERS. HOWEVER, PROVIDED THE JOINTS ARE FILLED WITH AGGREGATE, SEDIMENTS ARE TRAPPED WITHIN THE UPPER PORTION OF THE JOINTING AGGREGATE WHICH, IF NECESSARY, CAN BE REMOVED USING ROAD SWEEPERS AND THEN REPLACED WITHOUT ANY NEED TO RECONSTRUCT THE PAVEMENT.
10. REFER TO TABLE 1 FOR BEDDING AND JOINTING MATERIAL RECOMMENDED GRADING:

TABLE 1: RECOMMENDED GRADING FOR BEDDING AND JOINTING MATERIAL

SIEVE SIZE	% PASSING
9.50 mm	100
4.75 mm	85-100
2.36 mm	10-40
1.18 mm	0-10
0.30 mm	0-5

11. REFER TO TABLE 2 FOR UNBOUND BASECOURSE RECOMMENDED GRADING:

TABLE 2: RECOMMENDED GRADING FOR SINGLE SIZE GRANULAR BASE

SIEVE SIZE	% PASSING
40.0 mm	100
31.5 mm	98-100
19.0 mm	85-99
10.0 mm	20-70
4.75 mm	0-15
2.36 mm	0-5

12. FOR PERMEABLE PAVEMENTS, THE FOLLOWING COMPACTION STANDARDS TO AS 1289 SHOULD BE ENFORCED:
    a. SUBGRADE: 92 - 96 % STANDARD MAXIMUM DRY DENSITY (MDD)
    b. UNBOUND BASE: 98% MODIFIED MDD
13. SPRAYED SEAL THICKNESS IS DETERMINED BASED ON THE AVERAGE LEAST DIMENSION (ALD) OF THE NOMINAL SEAL SIZE. IT IS EXCLUDED FROM THE ASSESSMENT OF PAVEMENT COURSE THICKNESS REQUIREMENTS BUT IT IS TO BE CONSIDERED FOR LEVELING PURPOSES. A SPRAYED SEAL MUST BE CONSTRUCTED AS A SEPARATE LAYER.
14. SPRAYED SEALS MUST BE ADEQUATELY CURED TO PREVENT PICK UP OF THE SEAL DURING THE PLACEMENT OF SUBSEQUENT WORK.
15. PAVEMENT TRENCH DRAINS TO BE PROVIDED IN ACCORDANCE WITH TFNSW STANDARD PAVEMENT SUBSURFACE DRAINAGE DETAILS. NO FINES CONCRETE TO BE ADOPTED UNDER TRAFFICABLE PAVEMENTS.
16. NO HYDRAULIC ANALYSIS HAS BEEN UNDERTAKEN FOR THE PERMEABLE PAVEMENT.
17. CONTRACTOR MUST ENSURE THAT ALL PERMEABLE PAVEMENT AREAS CAN SUCCESSFULLY OUTLET TO THE STORMWATER DRAINAGE SYSTEM TO ENSURE WATER DOES NOT POND WITHIN PAVEMENT LAYERS.
18. SUBSOIL DRAIN LINES TO HAVE FLUSH POINTS EVERY 20 m, LOCATIONS TO BE CONFIRMED ON SITE.
19. CLEANING & OR RENEWAL REQUIRED WHERE WATER PONDS FOR MORE THAN 1 HOUR AFTER RAINFALL IN PERMEABLE PAVEMENT AREAS.
20. IMPERMEABLE MEMBRANE MUST COMPLETELY ENCASE ALL PERMEABLE PAVEMENT EXTENTS AND EXTEND UP THE SIDE OF ALL PAVEMENT LAYERS AT EDGE AND INTERFACES WITH OTHER STRUCTURES.
21. IMPERMEABLE MEMBRANE TO BE PLACED AROUND TREE GRATE OPENING AND SOIL TO PREVENT WATER INGRESS INTO ADJACENT PERMEABLE PAVEMENT,

SUSTAINABILITY

THE SUSTAINABILITY OBJECTIVES FOR THE PROJECT INCLUDE ACHIEVEMENT OF THE FOLLOWING:

- GREEN STAR BUILDINGS V1.0 TOOL – MINIMUM 5 STAR RATING (INCLUDING AGREED “5 STAR PLUS” PATHWAY)
- NABERS ENERGY AND WATER CERTIFICATION OF THE BASE BUILDING PROVISION TO THE LEVEL 3 OFFICE SPACE
- SUPPORT THE TARGETS OF THE BDA SUSTAINABILITY AND RESILIENCE STRATEGY 2024-28 APPLICABLE TO DEVELOPMENTS IN BRADFIELD

THE CIVIL SPECIFICATION HAS BEEN DESIGNED TO FACILITATE ACHIEVEMENT OF THESE OBJECTIVES. THIS SPECIFICATION SHOULD BE READ IN CONJUNCTION WITH THE ESD PERFORMANCE SPECIFICATION ISSUED AS A SEPARATE DOCUMENT (AMRFB2-ARU-ES-SP-00-00-01). WHERE DISCREPANCIES OCCUR, THE ESD SPECIFICATION SHALL TAKE PRECEDENCE OVER THIS CIVIL SPECIFICATION FOR ITEMS RELATING TO SUSTAINABILITY INITIATIVES AND REQUIREMENTS. IT DETAILS CONTRACTOR AND SUBCONTRACTOR RESPONSIBILITIES IN ACHIEVING THE SUSTAINABILITY OBJECTIVES.

ROADS AND MARITIME SPECIFICATIONS

R44	EARTHWORKS
R53	CONCRETE FOR GENERAL WORKS
R54	GENERAL CONCRETE PAVING
R63	GEOTEXTILES
R71	UNBOUND AND MODIFIED PAVEMENT COURSE
R82	NO FINES CONCRETE SUBBASE
R82	LEAN MIX CONCRETE SUBBASE
R83	CONCRETE PAVEMENT BASE
R106	SPRAYED BITUMINOUS SURFACING (WITH CUTBACK BITUMEN)
R116	HEAVY DUTY DENSE GRADED ASPHALTED
3204	PREFORMED JOINT FILLERS FOR CONCRETE ROAD PAVEMENTS AND STRUCTURES
3211	CEMENT BINDERS FILLERS
3222	NO FINES CONCRETE (FOR SUBSURFACE DRAINAGE)
3552	SUBSURFACE DRAINAGE PIPE (CORRUGATED PERFORATED AND NON-PERFORATED PLASTIC) D&C
3051	GRANULAR PAVEMENT BASE AND SUBBASE MATERIALS
3071	SELECTED MATERIAL FOR EARTHWORKS
3151	AGGREGATE FOR SPRAYED BITUMINOUS SURFACINGS

ROADS AND MARITIME STANDARD DRAWINGS

R0300-01 STANDARD KERB AND CHANNEL SHAPES

WESTERN SYDNEY PLANNING PARTNERSHIP STANDARD DRAWINGS

SD-R04 KERBS & GUTTERS
SD-R05 SUBSOIL DRAINAGE
SD-R10 COMMERCIAL & INDUSTRIAL VEHICLE CROSSING - PLAN
SD-R10 COMMERCIAL & INDUSTRIAL VEHICLE CROSSING - SECTIONS
SD-R30 PIPE INSTALLATION UNDER ROADWAYS
SD-R44 ROAD OPENING RESTORATION
SD-R45 FOOTPATH CYCLEWAY AND KERB RECONSTRUCTION
SD-R46 EXPANSION JOINT DETAIL
SD-R67 MINOR DRAINAGE CONNECTIONS
SD-R69 TRIMMER BARS AROUND PIPE PENETRATIONS INTO PITS
SD-R73 PERIPHERY PAVING DETAILS
SD-S06 GRATED GULLY PIT WITH EXTENDED KERB INLET PIT
SD-S09 STEP IRONS
SD-S10 MINOR DRAINAGE CONNECTIONS
SD-S12 JUNCTION PIT

AUSTRALIAN STANDARDS

AS 1379 SPECIFICATION AND SUPPLY OF CONCRETE
AS/NZS 3679.1 STRUCTURAL STEEL - HOT-ROLLED BARS AND SECTIONS
AS/NZS 4671: STEEL REINFORCING MATERIALS

ABBREVIATIONS

AEP	ANNUAL EXCEEDANCE PROBABILITY
AHD	AUSTRALIAN HEIGHT DATUM
ARI	AVERAGE RECURRENCE INTERVAL
AR&R	AUSTRALIAN RAINFALL AND RUNOFF
AS	AUSTRALIAN STANDARD
BEL	EARTHWORKS LEVEL
CC	CLIMATE CHANGE
CJ	CONTRACTION JOINT
DPE	DEPARTMENT OF PLANNING AND ENVIRONMENT
DRG	DRAWING
EJ	EXPANSION JOINT
FPL	FLOOD PLANNING LEVEL
HVM	HOSTILE VEHICLE MITIGATION
IJ	ISOLATION JOINT
IL	INVERT LEVEL
IFD	INTENSITY FREQUENCY DURATION
DD	DISH DRAIN
K&G	KERB AND GUTTER
K&T	KERB AND TRAY
KO	KERB ONLY
LCS	LEAN-MIX CONCRETE SUBBASE
MK	MEDIAN KERB
MK&G	MEDIAN KERB AND GUTTER
MK&T	MEDIAN KERB AND TRAY
MR	MILL AND RESHEET
NOM	NOMINAL
NTS	NOT TO SCALE
OSD	ON-SITE DETENTION
PCP	PLAIN CONCRETE PAVEMENT
PR	PRAM RAMP
RL	REDUCED LEVEL
RCP	REINFORCED CONCRETE PIPE
RPM	RAISED PAVEMENT MARKERS
SB	DISH CROSSING
SOMC	STANDARD OPTIMUM MOISTURE CONTENT
SSL	STRUCTURAL SLAB LEVEL
SWC	SYDNEY WATER CORPORATION
TJ	TIED JOINT
TYP	TYPICAL
OMC	OPTIMUM MOISTURE CONTENT
UNO	UNLESS NOTED OTHERWISE
VC	VEHICLE CROSSOVER
VCF	VEHICLE CHAMFERED TO FALL
VENM	VIRGIN EXCAVATED NATURAL MATERIAL
VOL	VOLUME

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	ERF	KJS
	FOR TENDER			
T01	25/09/24	RR	ERF	KJS
	FOR TENDER			
P04	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			

Issue	Date	By	Chkd	Appd
P03	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			
P02	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P01	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			

Client: NSW GOVERNMENT Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title: AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1: NOT TO SCALE
Discipline: CIVIL

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Drawing Title: GENERAL NOTES
SHEET 3 OF 3

Drawing Status: FOR TENDER

Job No: 295398-00
Drawing No: AMRFB2-ARU-DRW-CI-000008
Issue: T02

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EXISTING FEATURES

- LOT BOUNDARY
- DRIVEWAY, PATHWAY OR CYCLE WAY
- KERB AND GUTTER
- KERB ONLY
- BATTER
- BASIN
- EXISTING CONTOURS
- STORMWATER
- STORMWATER - SAG PIT
- STORMWATER - KERB INLET PIT
- HV EASEMENT

PROPOSED SOIL AND WATER MANAGEMENT CONTROL MEASURES

- STABILISED SITE ACCESS
- SEDIMENT FENCE
- DIVERSION BANK AND CHANNEL
- MESH AND GRAVEL INLET FILTER
- STORMWATER SUMP
- RISING MAIN
- GEOTEXTILE INLET FILTER

PROPOSED CIVIL WORKS

- EXTENT OF WORKS BOUNDARY
- SITE BOUNDARY
- GROUND FLOOR BUILDING EXTENT

PROPOSED WORKS BY OTHERS

- WATER FEATURE

PROPOSED DRAINAGE

- STORMWATER PIPE
- Ø375 — PIPE SIZE
- STORMWATER PIT
- GRATED TRENCH DRAIN
- GRATED LINEAR DRAIN
- GRADE DIRECTION (DOWN SLOPE)
- PASSIVE IRRIGATION PIPE
- SUBSOIL RODDING POINT
- SWALE

PROPOSED PAVEMENT

- PV1 - PERMEABLE PAVEMENT WITH PAVERS
- PV2 - PERMEABLE PAVEMENT WITH RESIN BONDED AGGREGATE
- PV3 - PERMEABLE PAVEMENT WITH STABILISED AND COMPACTED DECOMPOSED GRANITE
- PV5 - PLAIN CONCRETE PAVEMENT - REINFORCED
- PLANTING
- GRAVEL
- INTERFACE DRAIN
- P1 — PAVEMENT JOINTING - P1
- P6 — PAVEMENT JOINTING - P6
- P14 — PAVEMENT JOINTING - P14
- P15 — PAVEMENT JOINTING - P15
- P19 — PAVEMENT JOINTING - P19
- B15 — PAVEMENT JOINTING - B15
- XX — NUMBER OF TIE BARS PER SLAB
- E4 — EDGE DETAIL TAG

PROPOSED UTILITIES BY BRADFIELD STAGE 2A DESIGN TEAM

- PROPOSED WATER
- PROPOSED RECYCLED WATER
- PROPOSED SEWER
- EXISTING PADMOUNT SUBSTATION LOCATION
- HV TRENCHING
- NEW DUCTS
- EXISTING DUCTS

PROPOSED AMRF2 UTILITIES

- COLD WATER PIPE - POTABLE
- COLD WATER PIPE - TREATED RECYCLED
- STORMWATER PIPE
- SANITARY PIPE
- HYDRANT PIPE
- ELECTRICAL PITS
- ELECTRICAL - LOW VOLTAGE
- ELEC - COMM
- GREASE ARRESTOR / RAINWATER TANK
- PIPE SPRINKLER
- PIPE SIPHONIC STORMWATER
- PIPE VENT
- PIPE GREASE WASTE

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	KJS	KJS
	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P07	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			
P06	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client: NSW GOVERNMENT — Bradfield Development Authority

Engineering Certification (RPEQ)
Name: .... Area: ....
Signature: .... Date: ....
RPEQ No: ....

Job Title: AMRF - BUILDING 2
215 BADGERYS CREEK ROAD,
BRADFIELD

Scale at A1: NOT TO SCALE

Discipline: CIVIL

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CONSULT AUSTRALIA Member Firm
Arup Pty Ltd
ABN 76 625 912 665

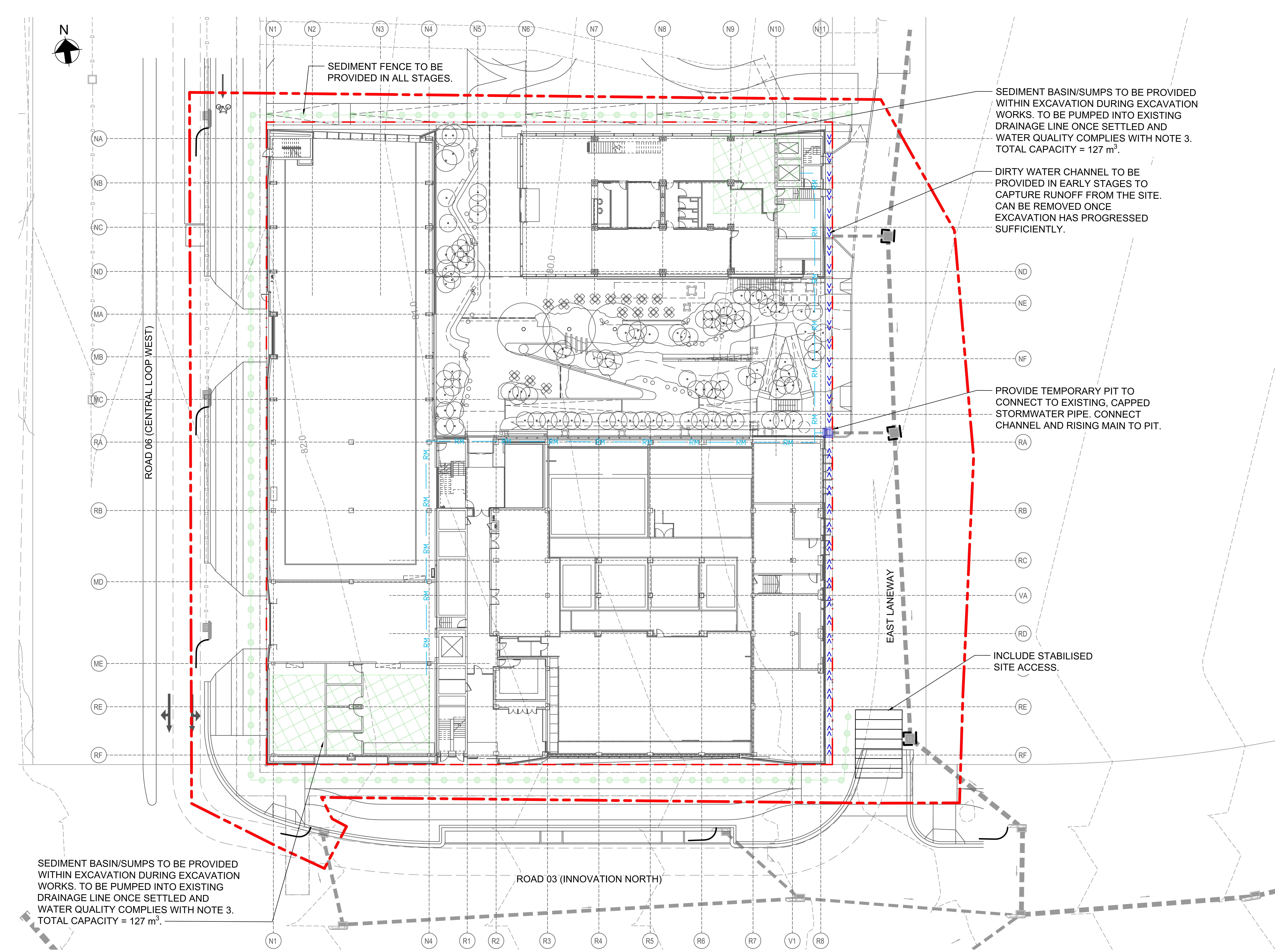
Drawing Title: GENERAL LEGEND

Drawing Status: FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000011	T02

Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR



NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.

EROSION HAZARD ASSESSMENT

1. ADOPTED RUSLE PARAMETERS FROM BLUE BOOK APPENDIX A:
   - R = 2200
   - K = 0.05
   - LS = 1.36 (6% SLOPE, 70m LENGTH)
   - P = 1.3
   - C = 1

THE PARAMETERS ADOPTED RESULT IN AN EROSION FACTOR OF 194 t/HA/YR. APPLYING THE EROSION FACTOR OVER 0.61 ha AND SOIL DENSITY OF 1.3 t/HA, RESULTS IN A SOIL LOSS OF 90m³/YR. IN ACCORDANCE WITH BLUE BOOK SECTION 6.3.2(D), SOIL LOSS VALUES < 150 m³/YR DO NOT REQUIRE THE USE OF A SEDIMENT BASIN.

2. TEMPORARY STORMWATER SUMPS FOR EXCAVATION WORKS.
   - MINIMUM SIZE = 127 m³ FOR AN AREA OF 5820 m²
   - DISCHARGE PUMP NOM. FLOW RATE 3L/S
   - RUNOFF COEFFIENT = 1.00
   - SIZING OF SUMPS BASED ON STORAGE REQUIRED FOR THE 5-DAY STORM IN THE 80th PERCENTILE AS PER THE BLUE BOOK.
   - IT IS THE CONTRACTOR'S RESPONSIBILITY TO MANAGE THE OPERATION AND MAINTENANCE OF THE PUMPS AND CONFIRM THE SUMP VOLUME WITH DUE CONSIDERATION FOR PRE-TREATMENT STORAGE REQUIREMENTS AND RISK MANAGEMENT OF THE PUMP OUT PERFORMANCE.
3. DISCHARGE FROM SUMP MAY ONLY OCCUR WHEN 80% OF THE AVERAGE ANNUAL RUNOFF VOLUME IS TREATED TO 50mg/L TSS OR LESS AND pH IS IN THE RANGE 6.5-8.5.
4. SURFACE DRAINS TO BE PROVIDED ALONG THE TOP OF ALL BATTER SLOPES.

NOT FOR CONSTRUCTION

Scales
2.5 0 5 10m
1:250(A1)/1:500(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	KJS	KJS
	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P07	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			
P06	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1 1:250m
Discipline CIVIL

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Member Firm
Arup Pty Ltd
ABN 76 625 912 665

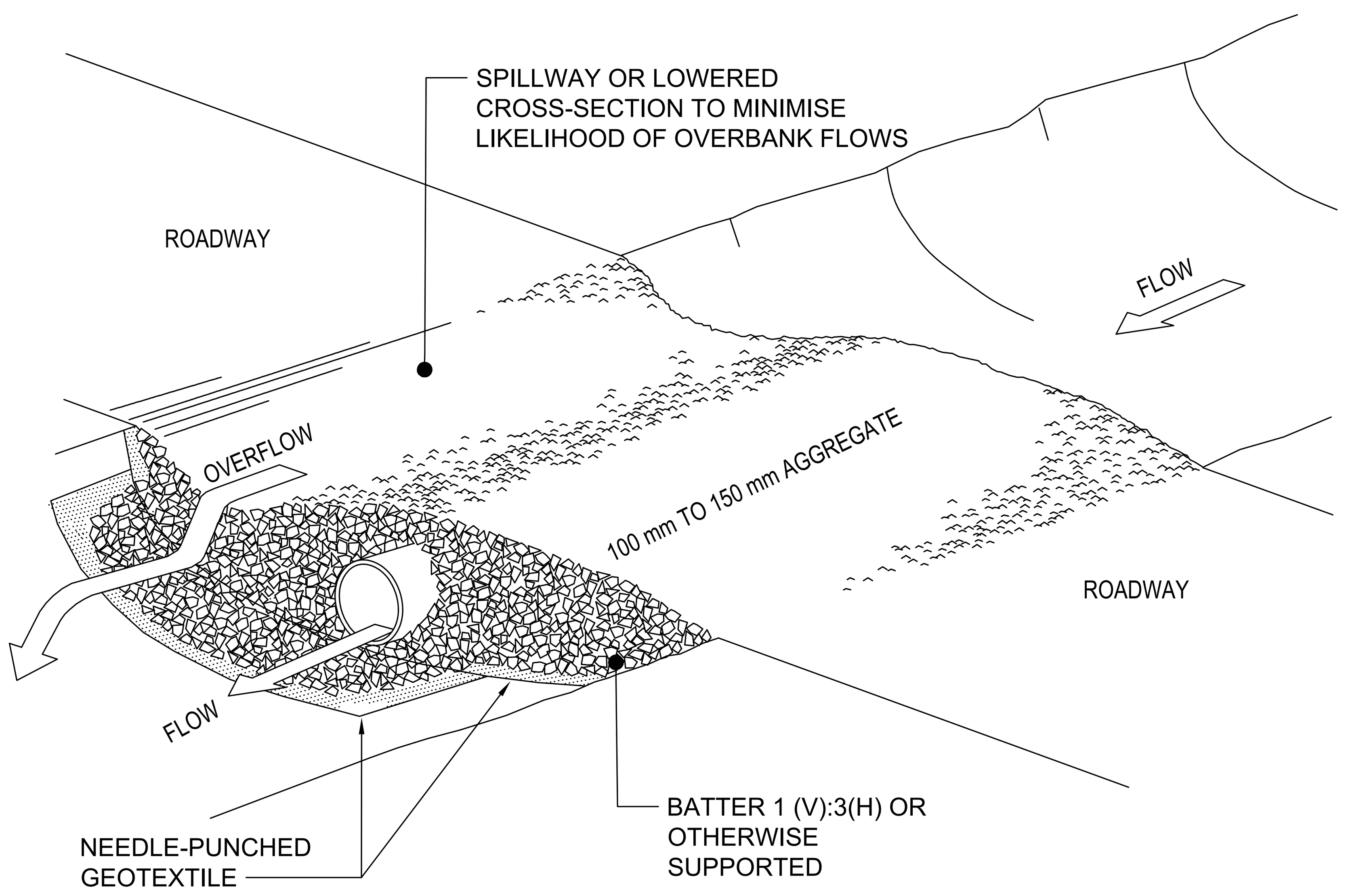
Drawing Title
SOIL AND WATER MANAGEMENT PLAN

Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000101	T02

Do not scale

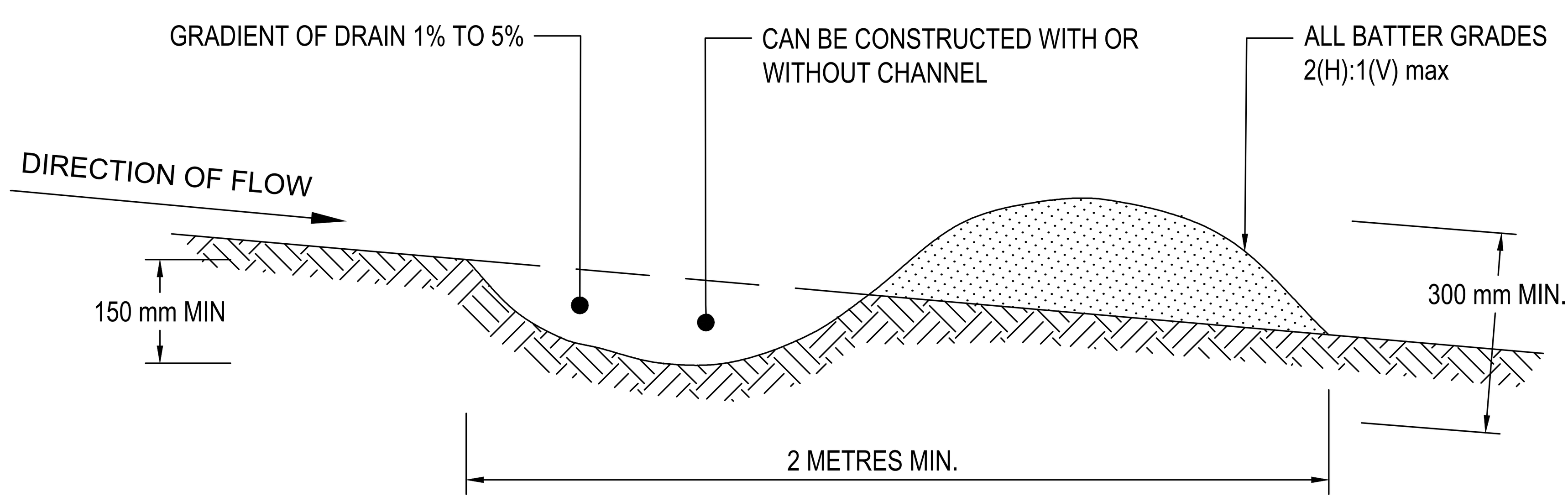
DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR



CONSTRUCTION NOTES

1. PROHIBIT ALL TRAFFIC UNTIL THE ACCESS WAY IS CONSTRUCTED.
2. STRIP ANY TOPSOIL AND PLACE A NEEDLE-PUNCHED TEXTILE OVER THE BASE OF THE CROSSING.
3. PLACE CLEAN, RIGID, NON POLLUTING AGGREGATE OR GRAVEL IN THE 100 mm TO 150 mm SIZE CLASS OVER THE FABRIC TO A MINIMUM DEPTH OF 200 mm.
4. PROVIDE A 3m WIDE CARRIAGEWAY WITH SUFFICIENT LENGTH OF CULVERT PIPE TO ALLOW LESS THAN A 3(H): 1 (V) SLOPE ON SIDE BATTERS.
5. INSTALL A LOWER SECTION TO ACT AS AN EMERGENCY SPILLWAY IN GREATER THAN DESIGN STORM EVENTS.
6. ENSURE THAT CULVERT OUTLETS EXTEND BEYOND THE TOE OF FILL EMBANKMENTS.

TEMPORARY WATERWAY CROSSING



NOTE:
ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.

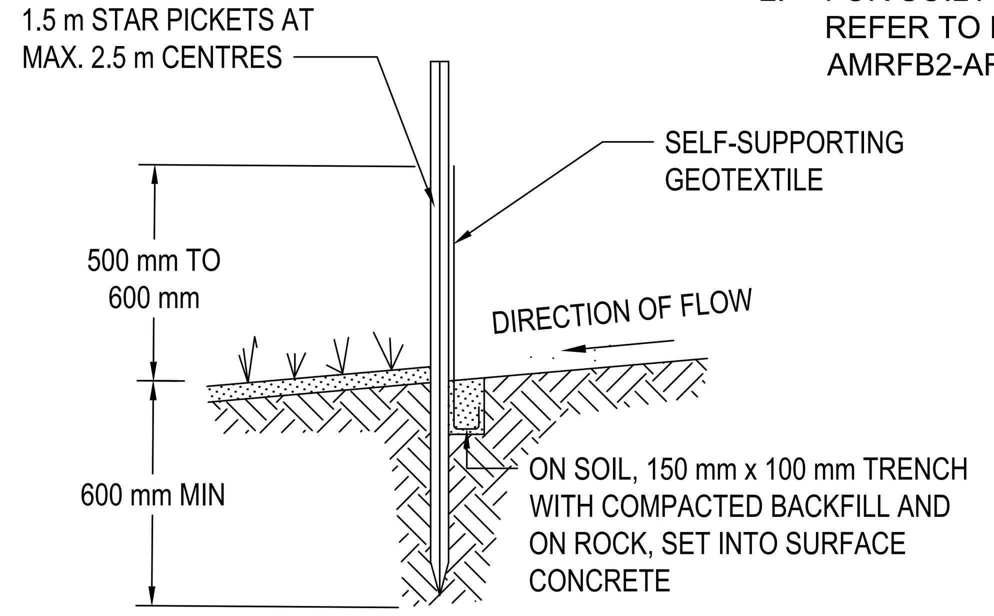
CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 PERCENT AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

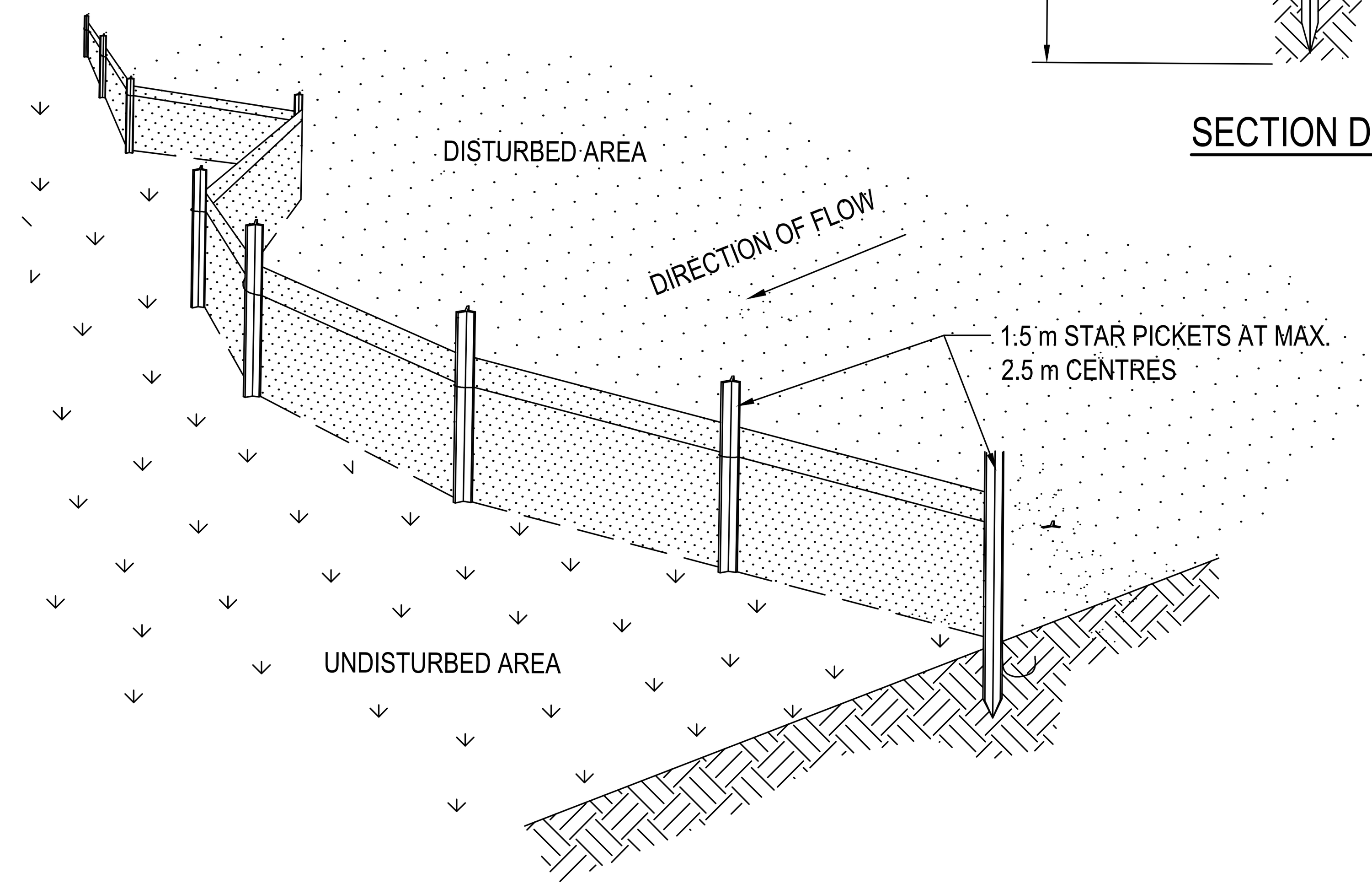
EARTH BANK (LOW FLOW)

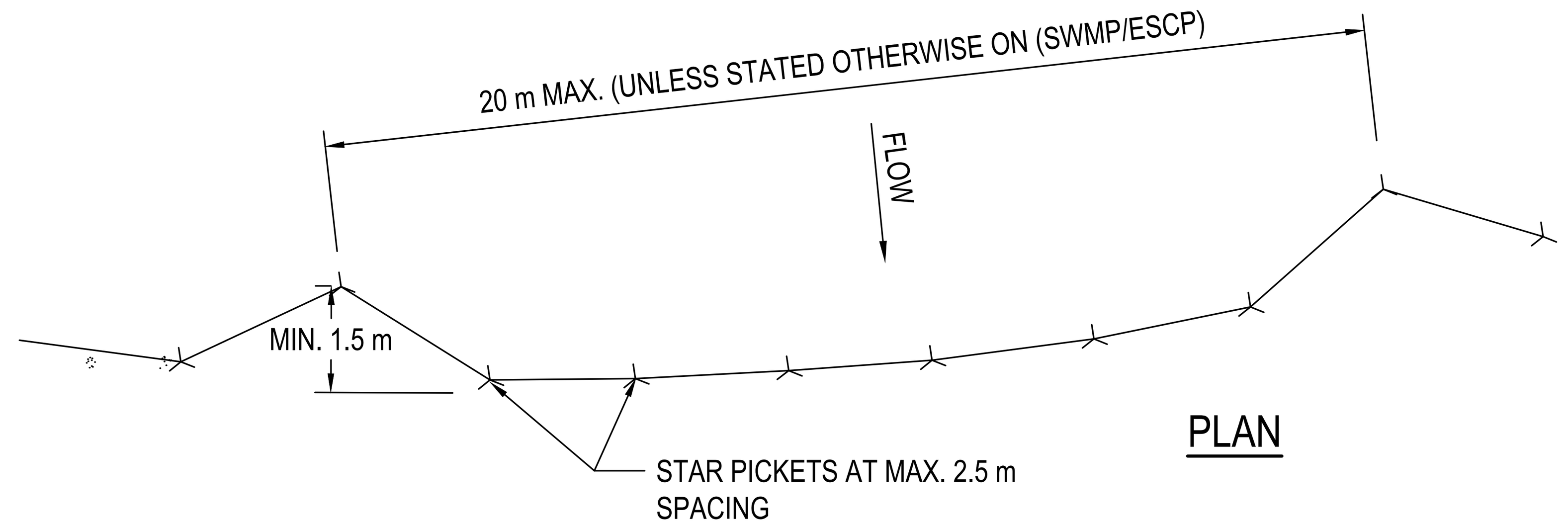
NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR SOIL AND WATER MANAGEMENT PLAN REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000101.



SECTION DETAIL





PLAN

CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150 mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150 mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	KJS	KJS
	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P07	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			
P06	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client: NSW GOVERNMENT Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title: AMRF - BUILDING 2
215 BADGERYS CREEK ROAD,
BRADFIELD

Scale at A1: NOT TO SCALE
Discipline: CIVIL

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Arup Pty Ltd
ABN 76 625 912 665

Drawing Title: SOIL AND WATER MANAGEMENT DETAILS
SHEET 1 OF 3

Drawing Status: FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000191	T02

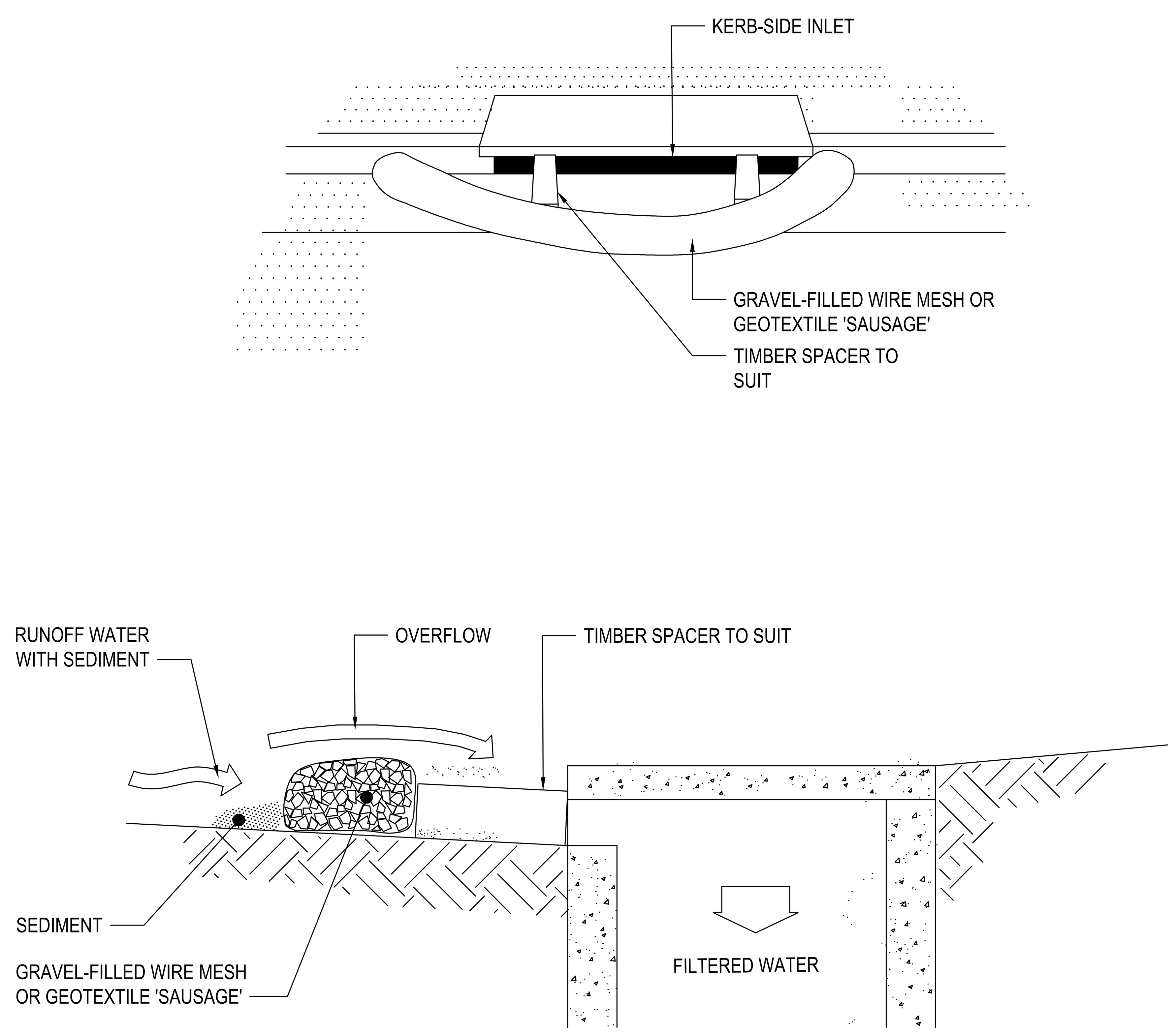
Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

A1

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR SOIL AND WATER MANAGEMENT PLAN REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000101.

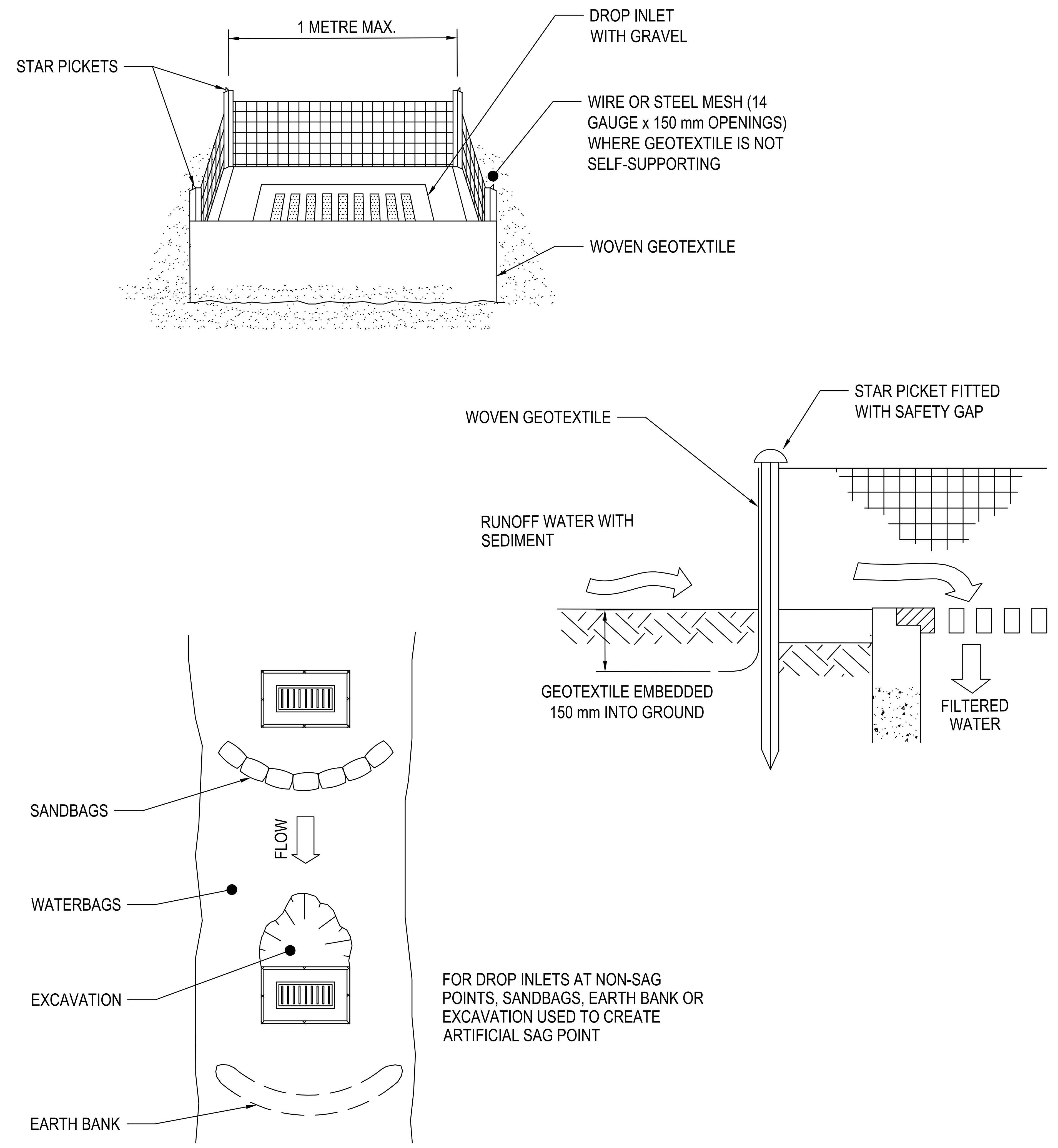


NOTE:
THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25 mm TO 50 mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150 mm HIGH x 400 mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100 mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH AND GRAVEL INLET FILTER



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	KJS	KJS
	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P07	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			
P05	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1: NOT TO SCALE
Discipline: CIVIL

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www.arup.com

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Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
SOIL AND WATER MANAGEMENT DETAILS
SHEET 2 OF 3

Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000192	T02

Do not scale

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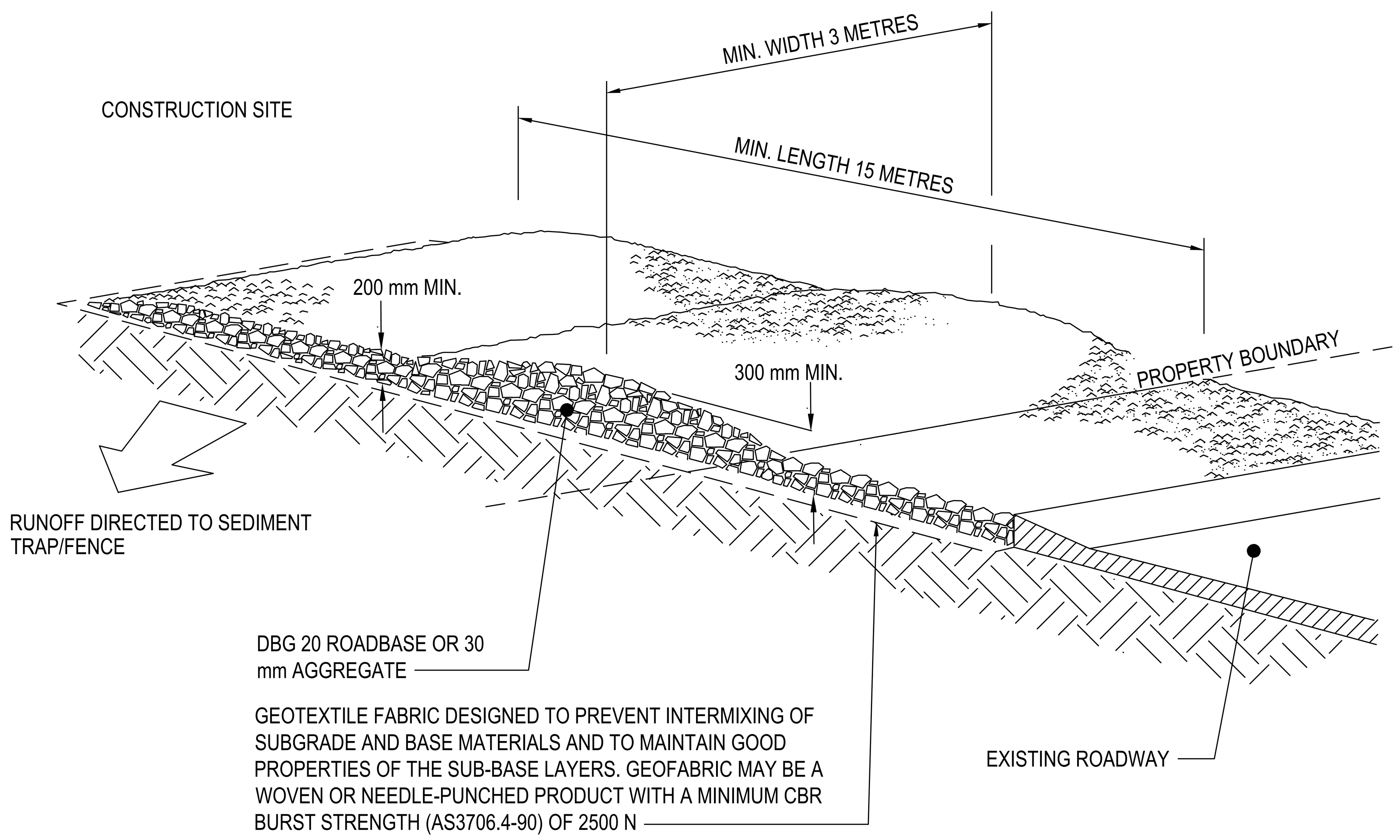
NOTES:

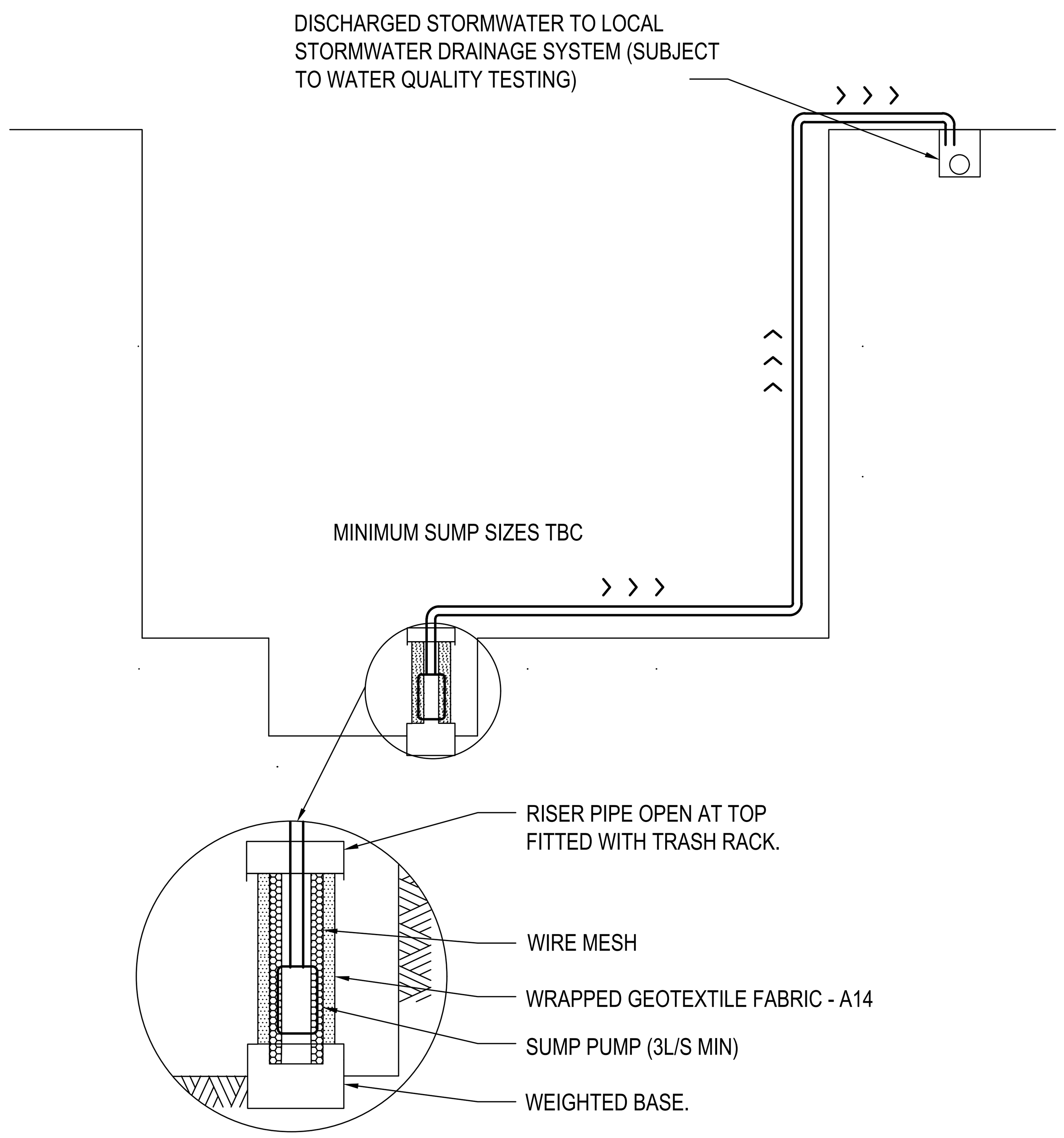
1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR SOIL AND WATER MANAGEMENT PLAN REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000101.



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200 mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30 mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE

STABILISED SITE ACCESS



STORMWATER SUMP AND OUTLET

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	KJS	KJS
	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P07	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			
P06	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client: NSW GOVERNMENT Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title: AMRF - BUILDING 2 215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1: NOT TO SCALE

Discipline: CIVIL

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Drawing Title: SOIL AND WATER MANAGEMENT DETAILS SHEET 3 OF 3

Drawing Status: FOR TENDER

Job No: 295398-00

Drawing No: AMRFB2-ARU-DRW-CI-000193

Issue: T02

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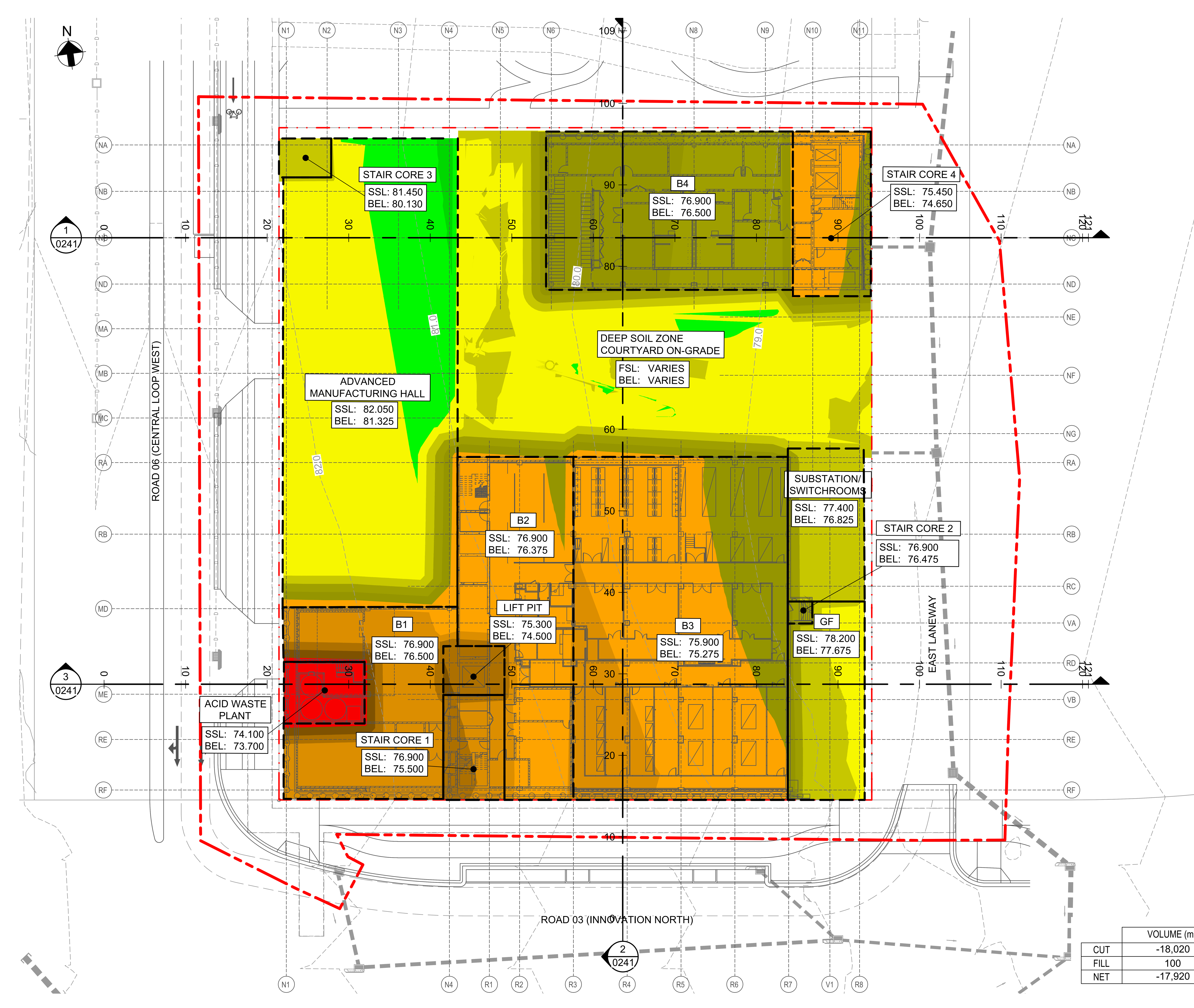

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.
3. EXISTING CONDITIONS ARE ASSUMED TO BE BRADFIELD CITY CENTRE MASTER PLAN DESIGN LEVELS.
4. CUT AND FILL VOLUMES AND COLOURS REPRESENT DEPTHS OF CUT AND FILL FROM THE EXISTING GROUND SURFACE TO FORMATION LEVEL.
5. FORMATION LEVEL BASED ON:
   - 1400 mm BELOW STAIR CORE 1
   - 425 mm BELOW STAIR CORE 2
   - 1320 mm BELOW STAIR CORE 3
   - 800 mm BELOW STAIR CORE 4
   - 800 mm BELOW LIFT PIT
   - 400 mm BELOW ACID WASTE PLANT
   - 725 mm BELOW ADVANCED MANUFACTURING HALL
   - 400 mm BELOW B1
   - 525 mm BELOW B2
   - 625 mm BELOW B3
   - 400 mm BELOW B4
   - 575 mm BELOW SUBSTATION/SWITCHROOMS
   - 525 mm BELOW GF
   - 1000 mm BELOW DEEP SOIL ZONES/INTERNAL COURTYARD ON-GRADE
6. STRUCTURAL SLAB LEVEL (SSL) SHOWN ON PLANS BASED ON STRUCTURAL DRAWINGS. BULK EARTHWORKS LEVEL (BEL) IS BASED ON THIS LEVEL MINUS THE FORMATIONS DEPTHS INDICATED IN NOTE 5.
7. ASSUMED BATTER SLOPE 1:1.
8. 10% CONTINGENCY FACTOR APPLIED TO BULK EARTHWORKS VOLUMES.
9. NO SITE STRIP ALLOWED.
10. NO BULKING FACTORS APPLIED.
11. CUT AND FILL DEPTHS AND VOLUMES INDICATE BULK EXCAVATION ONLY. EXCLUDES ANCILLARY VOLUMES RESULTING FROM ELEMENTS SUCH AS PILES, FOOTINGS, HYDRAULIC SUMPS AND TRENCH EXCAVATION.
12. ASSUMED SITE WON MATERIAL IS SUITABLE FOR REUSE. DETAILS OF MATERIAL MANAGEMENT IS SUBJECT TO CONFIRMATION WITH THE GEOTECHNICAL CONSULTANT.
13. CONTRACTOR IS TO UNDERTAKE THEIR OWN VOLUMETRIC ASSESSMENT AS PART OF DESIGN DEVELOPMENT.
14. EXCAVATIONS WITHIN 3 METRES OF THE PRE-EXISTING SURFACE LEVEL MUST BE CAPPED WITH A PERMEABLE MATERIAL.
15. THIS BULK EARTHWORKS PLAN AND VOLUME ASSESSMENT HAS BEEN BASED UPON A DESIGN SURFACE PROVIDED IN 2024. CONSTRUCTION ACTIVITIES HAVE OCCURED IN AND ADJACENT TO THE SITE SINCE. THE ACTUAL BULK EARTHWORKS SHALL BE DETERMINED BASED UPON AS-BUILT SURFACE OF THE COMPLETED WORKS.

LEGEND:

BULK EARTHWORKS LEVEL INTERFACE

Isopach Depth Range

Lower_value		Upper_value		Colour
-5.0	to	-4.0	m	
-4.0	to	-3.0	m	
-3.0	to	-2.0	m	
-2.0	to	-1.0	m	
-1.0	to	0.0	m	
0.0	to	0.5	m	
0.5	to	1.0	m	
1.0	to	1.5	m	
1.5	to	2.0	m	
2.0	to	2.5	m	
2.5	to	3.0	m	
3.0	to	3.5	m	
3.5	to	4.0	m	
4.0	to	4.5	m	
4.5	to	5.0	m	

Isopach Depth Range

Lower_value		Upper_value		Colour
-100	to	-14	m	
-14	to	-13	m	
-13	to	-12	m	
-12	to	-11	m	
-11	to	-10	m	
-10	to	-9.0	m	
-9.0	to	-8.0	m	
-8.0	to	-7.0	m	
-7.0	to	-6.0	m	
-6.0	to	-5.0	m	

	VOLUME (m³)
CUT	-18,020
FILL	100
NET	-17,920

NOT FOR CONSTRUCTION

Scales
2.5 0 5 10m
1:250(A1)/1:500(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	KJS	KJS
	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
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	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
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P04	18/12/23	AYL	KJS	KJS
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P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD,
BRADFIELD

Scale at A1 1:250m
Discipline CIVIL

ARUP
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www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
BULK EARTHWORKS PLAN

Drawing Status
FOR TENDER

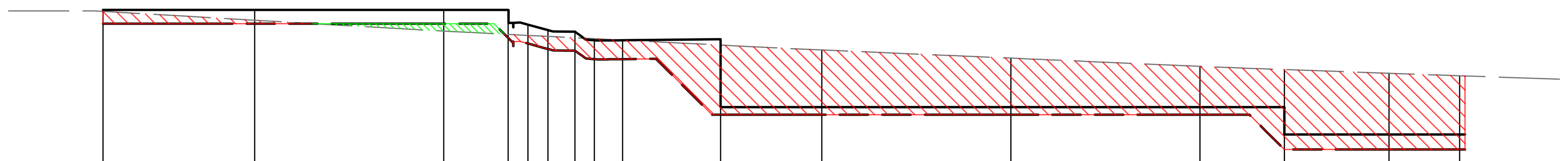
Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000201	T02

Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOTES:

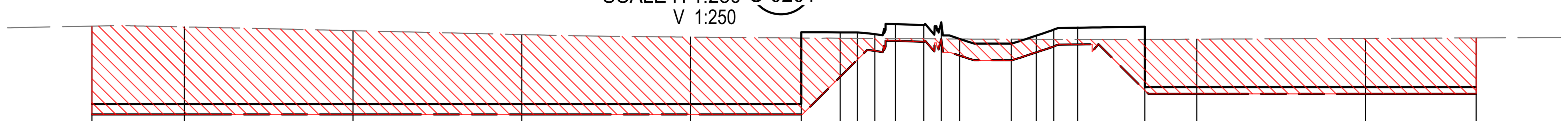
1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.
3. FOR BULK EARTHWORKS NOTES REFER DRAWING No. AMRFB2-ARU-DRW-CI-000201.



DATUM RL (m) 68.3

CHAINAGE	DESIGN LEVELS (SSL)	SURFACE LEVELS	FORMATION LEVELS
21.982	82.050	81.972	
30.000	82.050	81.505	81.325
40.000	82.050	80.929	81.325
43.407	82.050	80.753	80.575
44.461	81.269	80.700	80.269
45.519	80.980	80.647	79.980
46.939	80.894	80.576	79.894
47.973	80.441	80.524	79.441
49.461	80.442	80.449	79.442
54.644	80.500	80.188	76.500
60.000	76.900	79.929	76.500
70.000	76.900	79.495	76.500
80.000	76.900	79.061	76.500
84.468	76.900	78.890	74.652
90.000	75.450	78.692	74.650
93.736	75.450	78.562	74.650

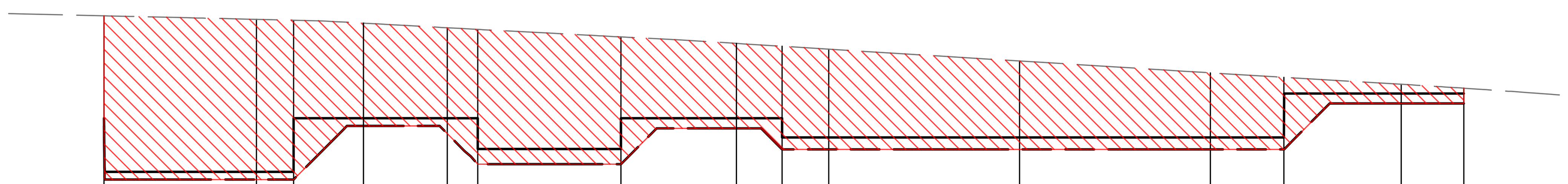
SECTION 1
SCALE H 1:250 V 1:250
C-0201



DATUM RL (m) 68.3

CHAINAGE	DESIGN LEVELS (SSL)	SURFACE LEVELS	FORMATION LEVELS
14.527	75.900	80.535	75.275
20.000	75.900	80.486	75.275
30.000	75.900	80.264	75.275
40.000	75.900	80.031	75.275
50.000	75.900	79.880	75.275
56.560	75.900	79.825	75.275
58.869	80.163	79.814	77.519
59.881	80.159	79.805	78.531
60.915	80.055	79.795	79.055
62.136	80.662	79.788	79.662
63.821	80.599	79.786	79.599
64.854	80.763	79.777	79.763
65.949	79.772	79.768	78.772
69.002	79.497	79.762	78.497
70.485	79.970	79.751	78.970
71.518	80.325	79.743	79.325
72.937	80.441	79.735	79.441
76.916	80.500	79.742	76.711
80.000	76.900	79.757	76.500
90.000	76.900	79.803	76.500
96.546	76.900	79.834	

SECTION 2
SCALE H 1:250 V 1:250
C-0201



DATUM RL (m) 68.3

CHAINAGE	DESIGN LEVELS (SSL)	SURFACE LEVELS	FORMATION LEVELS
22.016	76.900	82.260	76.295
30.000	74.100	82.076	73.700
31.949	74.100	82.031	73.700
35.618	76.900	81.875	76.500
40.000	76.900	81.636	76.104
41.603	76.900	81.548	74.501
49.103	75.300	81.157	74.500
55.158	76.900	80.816	76.375
57.553	76.900	80.668	75.277
60.000	75.900	80.517	75.275
70.000	75.900	79.897	75.275
80.000	75.900	79.279	75.275
83.853	75.900	79.041	75.275
90.000	78.200	78.678	77.675
93.278	78.200	78.477	77.675

SECTION 3
SCALE H 1:250 V 1:250
C-0201

NOT FOR CONSTRUCTION

Scales
2.5 0 5 10m
1:250(A1)/1:500(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	KJS	KJS
	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P07	28/03/24	PDA	KJS	KJS
	50% DESIGN DEVELOPMENT			
P06	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1: 1:250m
Discipline: CIVIL

ARUP
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www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

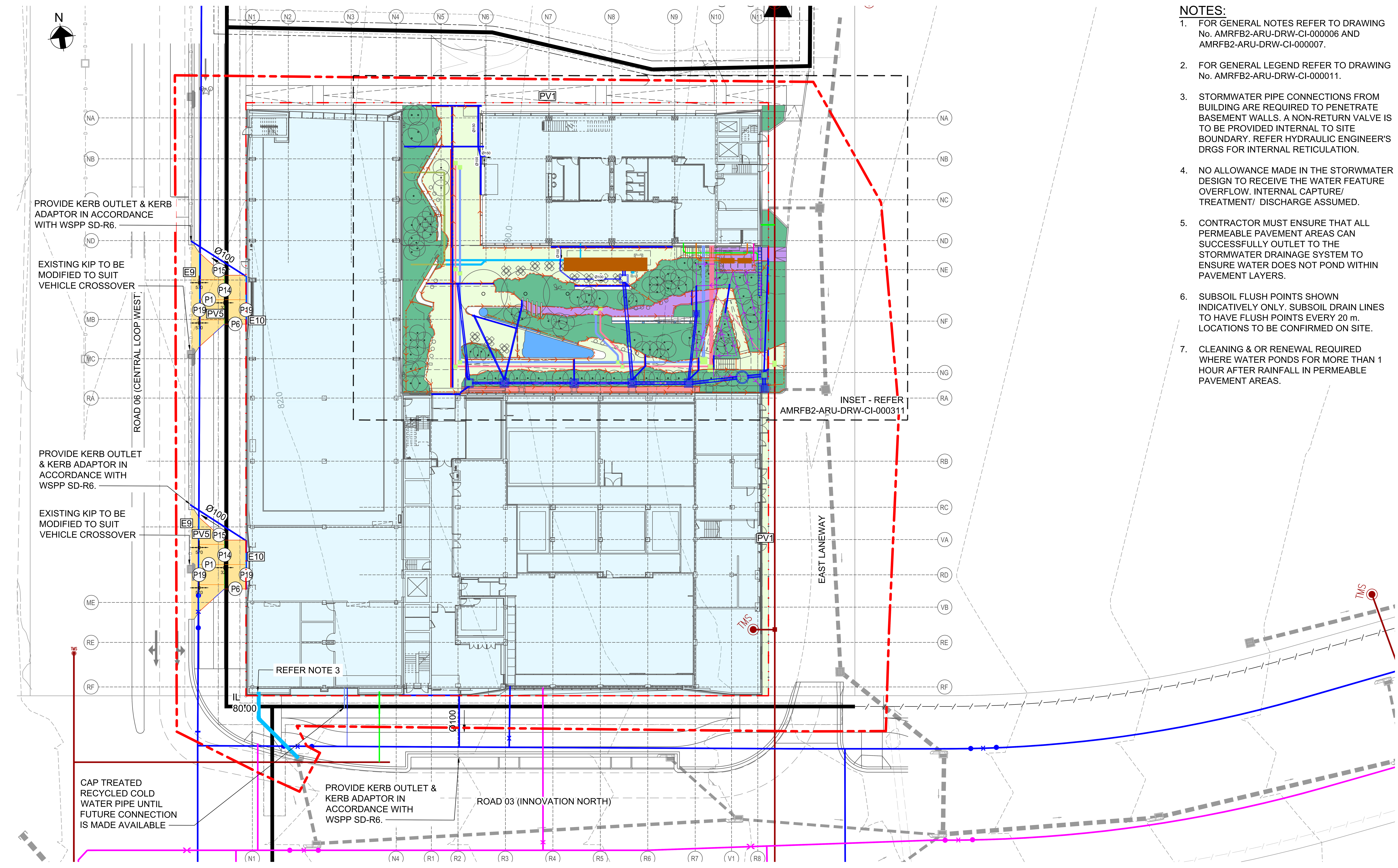
Drawing Title
BULK EARTHWORKS
SITE SECTIONS

Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000241	T02

Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR



NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.
3. STORMWATER PIPE CONNECTIONS FROM BUILDING ARE REQUIRED TO PENETRATE BASEMENT WALLS. A NON-RETURN VALVE IS TO BE PROVIDED INTERNAL TO SITE BOUNDARY. REFER HYDRAULIC ENGINEER'S DRGS FOR INTERNAL RETICULATION.
4. NO ALLOWANCE MADE IN THE STORWMATER DESIGN TO RECEIVE THE WATER FEATURE OVERFLOW. INTERNAL CAPTURE/ TREATMENT/ DISCHARGE ASSUMED.
5. CONTRACTOR MUST ENSURE THAT ALL PERMEABLE PAVEMENT AREAS CAN SUCCESSFULLY OUTLET TO THE STORMWATER DRAINAGE SYSTEM TO ENSURE WATER DOES NOT POND WITHIN PAVEMENT LAYERS.
6. SUBSOIL FLUSH POINTS SHOWN INDICATIVELY ONLY. SUBSOIL DRAIN LINES TO HAVE FLUSH POINTS EVERY 20 m. LOCATIONS TO BE CONFIRMED ON SITE.
7. CLEANING & OR RENEWAL REQUIRED WHERE WATER PONDS FOR MORE THAN 1 HOUR AFTER RAINFALL IN PERMEABLE PAVEMENT AREAS.

NOT FOR CONSTRUCTION

Scales
2.5 0 5 10m
1:250(A1)/1:500(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	KJS	KJS
	FOR TENDER			
T01	25/09/24	RR	KJS	KJS
	FOR TENDER			
P08	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			

Issue	Date	By	Chkd	Appd
P07	28/03/24	PDA	KJS	KJS
	50% DESIGN DEVELOPMENT			
P06	03/05/24	AYL	KJS	KJS
	SSDA UPDATE			
P05	03/04/24	AYL	KJS	KJS
	SSDA UPDATE			

Issue	Date	By	Chkd	Appd
P04	18/12/23	AYL	KJS	KJS
	100% SCHEMATIC DESIGN			
P03	30/11/23	PDA	JJC	KJS
	SSDA ISSUE			
P02	16/10/23	AYL	JJC	KJS
	80% SCHEMATIC DESIGN			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1 1:250m
Discipline CIVIL

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www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

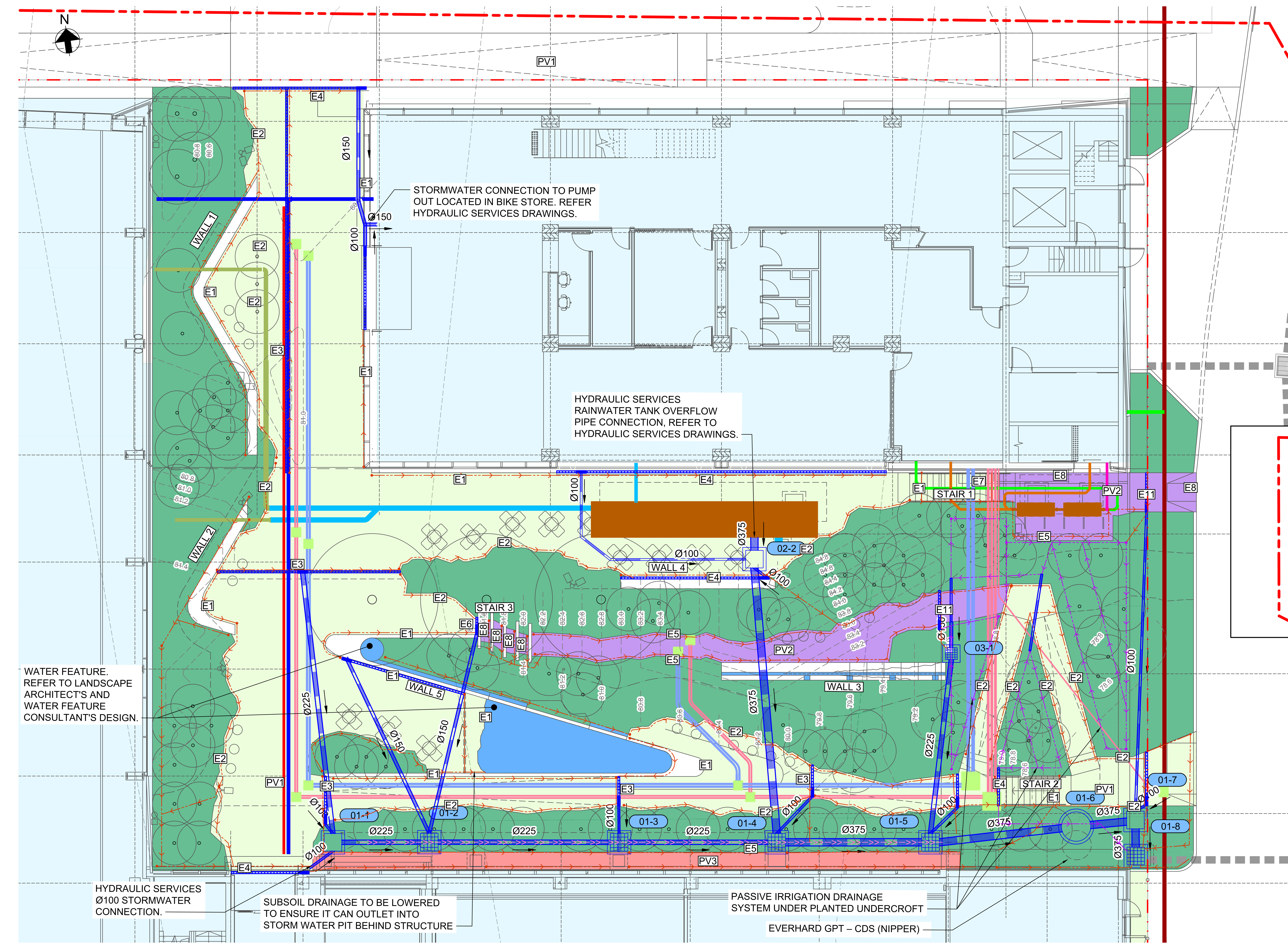
Drawing Title
CIVIL WORKS PLAN

Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000301	T02

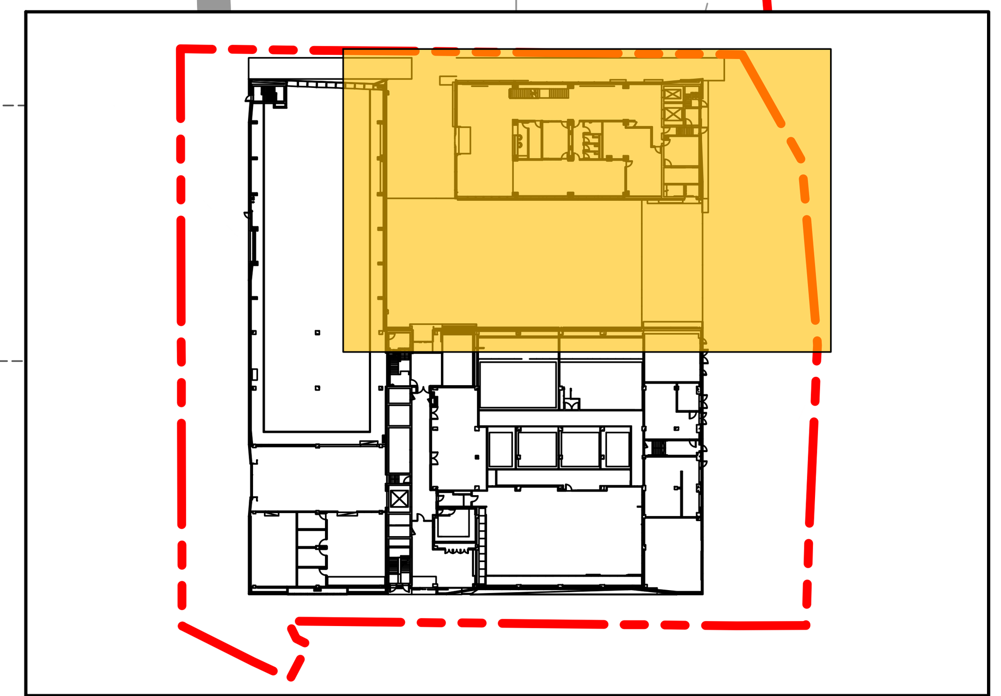
Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR



NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.
3. STORMWATER PIPE CONNECTIONS FROM BUILDING ARE REQUIRED TO PENETRATE BASEMENT WALLS. A NON-RETURN VALVE IS TO BE PROVIDED INTERNAL TO SITE BOUNDARY. REFER HYDRAULIC ENGINEER'S DRGS FOR INTERNAL RETICULATION.
4. NO ALLOWANCE MADE IN THE STORMWATER DESIGN TO RECEIVE THE WATER FEATURE OVERFLOW. INTERNAL CAPTURE/ TREATMENT/ DISCHARGE ASSUMED.
5. CONTRACTOR MUST ENSURE THAT ALL PERMEABLE PAVEMENT AREAS CAN SUCCESSFULLY OUTLET TO THE STORMWATER DRAINAGE SYSTEM TO ENSURE WATER DOES NOT POND WITHIN PAVEMENT LAYERS.
6. SUBSOIL FLUSH POINTS SHOWN INDICATIVELY ONLY. SUBSOIL DRAIN LINES TO HAVE FLUSH POINTS EVERY 20 m. LOCATIONS TO BE CONFIRMED ON SITE.
7. CLEANING & OR RENEWAL REQUIRED WHERE WATER PONDS FOR MORE THAN 1 HOUR AFTER RAINFALL IN PERMEABLE PAVEMENT AREAS.



KEY PLAN
N.T.S

NOT FOR CONSTRUCTION

Scales 1:100(A1)/1:200(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	NS	ERF	KJS
	FOR TENDER			
T01	25/09/24	RR	ERF	KJS
	FOR TENDER			
P01	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			

Client: NSW GOVERNMENT — Bradfield Development Authority

Engineering Certification (CEng)
Name: ...
Signature: ... Date: ...

Job Title: AMRF - BUILDING 2, 215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1: 1:100m

Discipline: CIVIL

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Arup Pty Ltd
ABN 76 625 912 665

Drawing Title: CIVIL WORKS COURTYARD PLAN

Drawing Status: FOR TENDER

Job No: 295398-00

Drawing No: AMRFB2-ARU-DRW-CI-000311

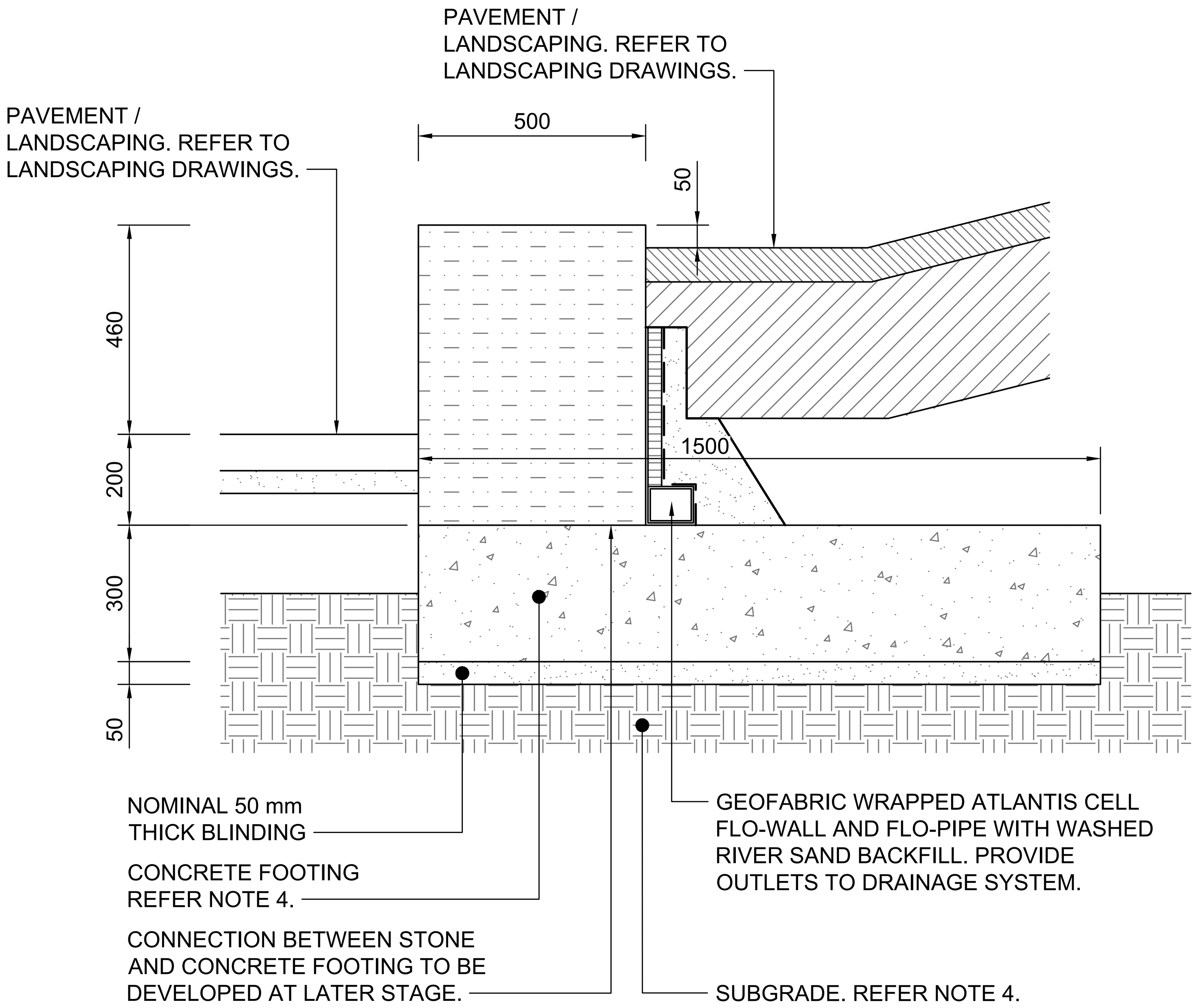
Issue: T02

Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

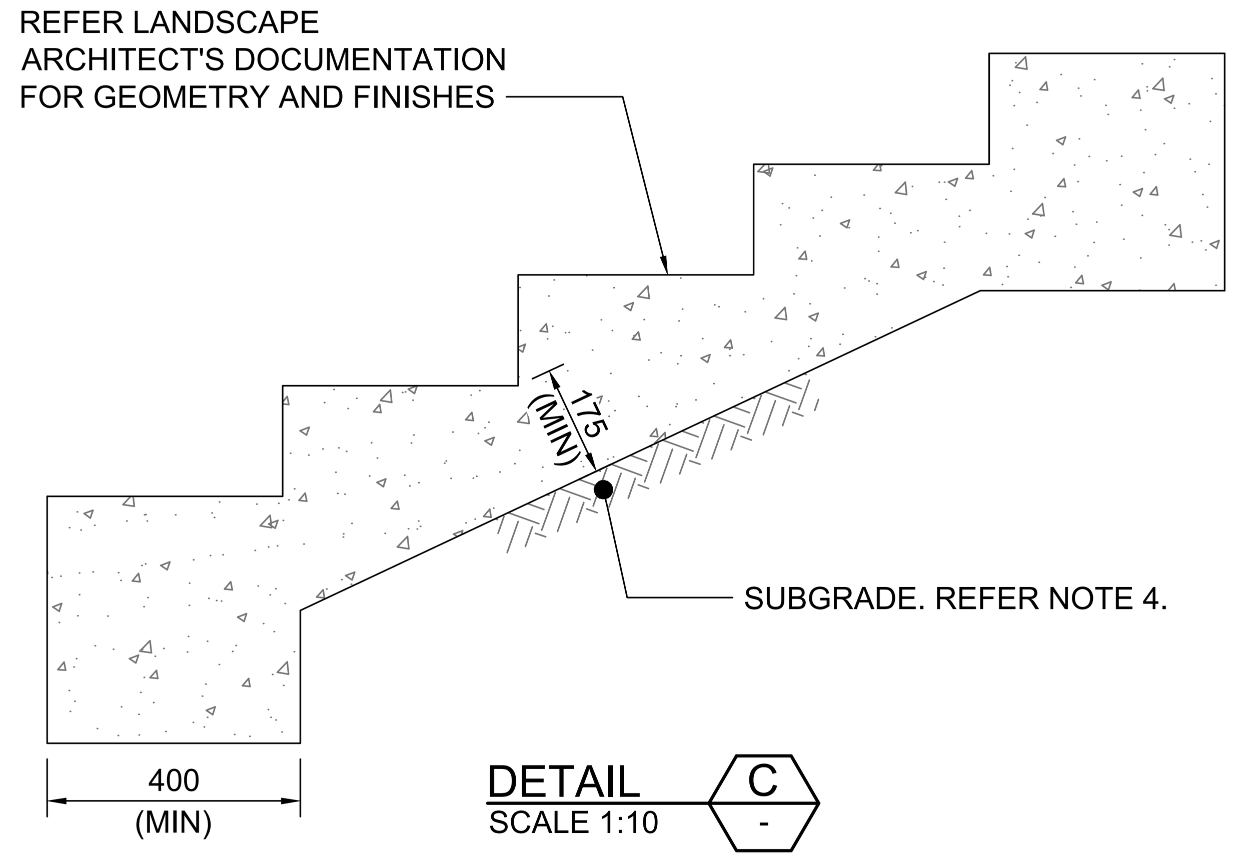
NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING NO. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. ALL WALLS ASSOCIATED WITH WATER FEATURE (WALL 5) ARE BY OTHERS..
3. STAIRS AND STRUCTURAL WALLS ≤ 1.2 m TO BE 40MPA CONCRETE WITH 2% REINFORCEMENT RATE.
4. MINIMUM 0.5 m OF NON-REACTIVE MATERIAL (E.G. CRUSHED SANDSTONE) REQUIRED UNDER RETAINING WALL 1, 2, 3, 4 AND STAIR 1 AND 2 FOOTINGS TO ACCOUNT FOR POTENTIAL SHRINK SWELL MOVEMENTS.



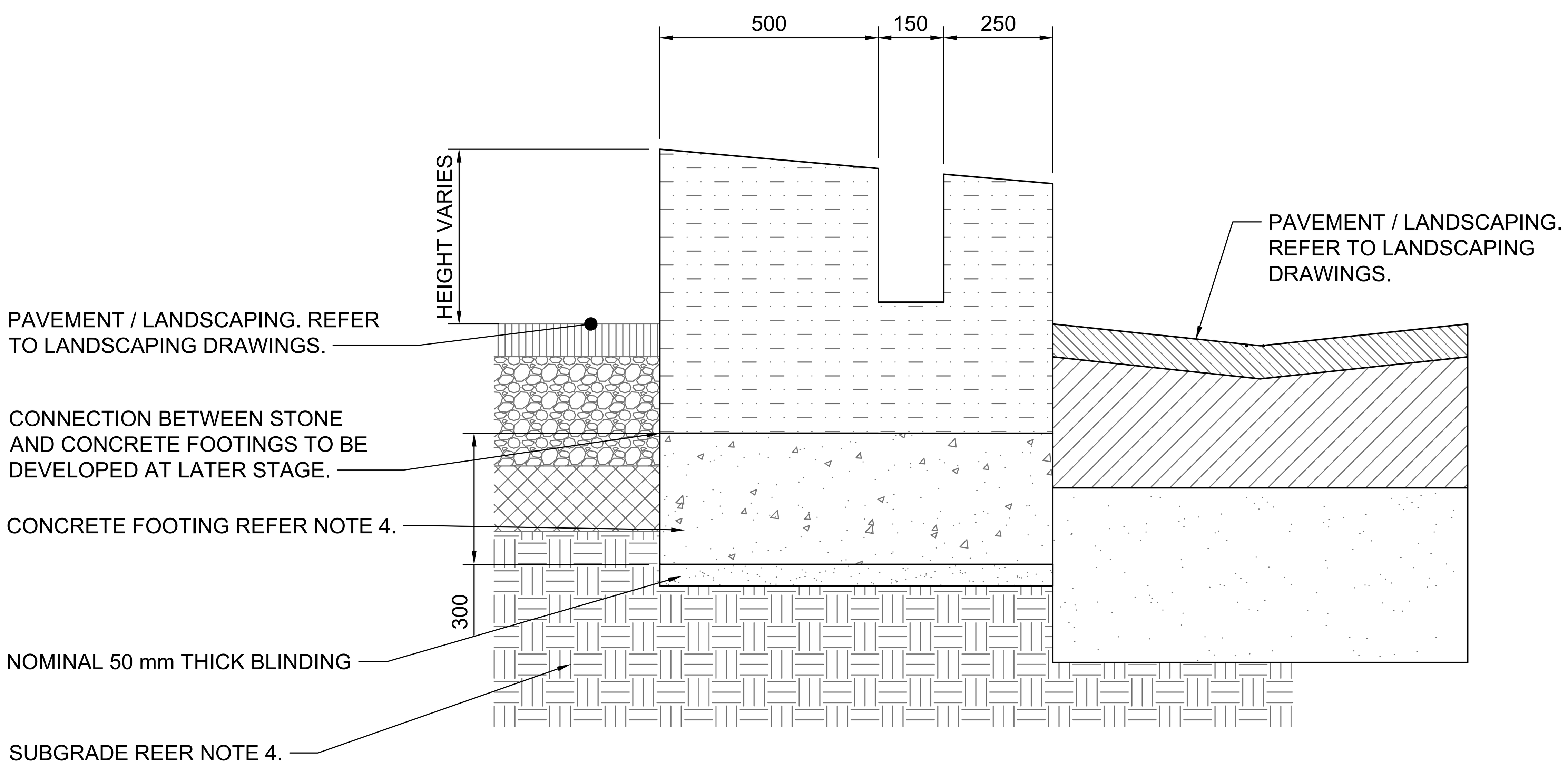
DETAIL A -
SCALE 1:10

WALLS 1, 2, 4



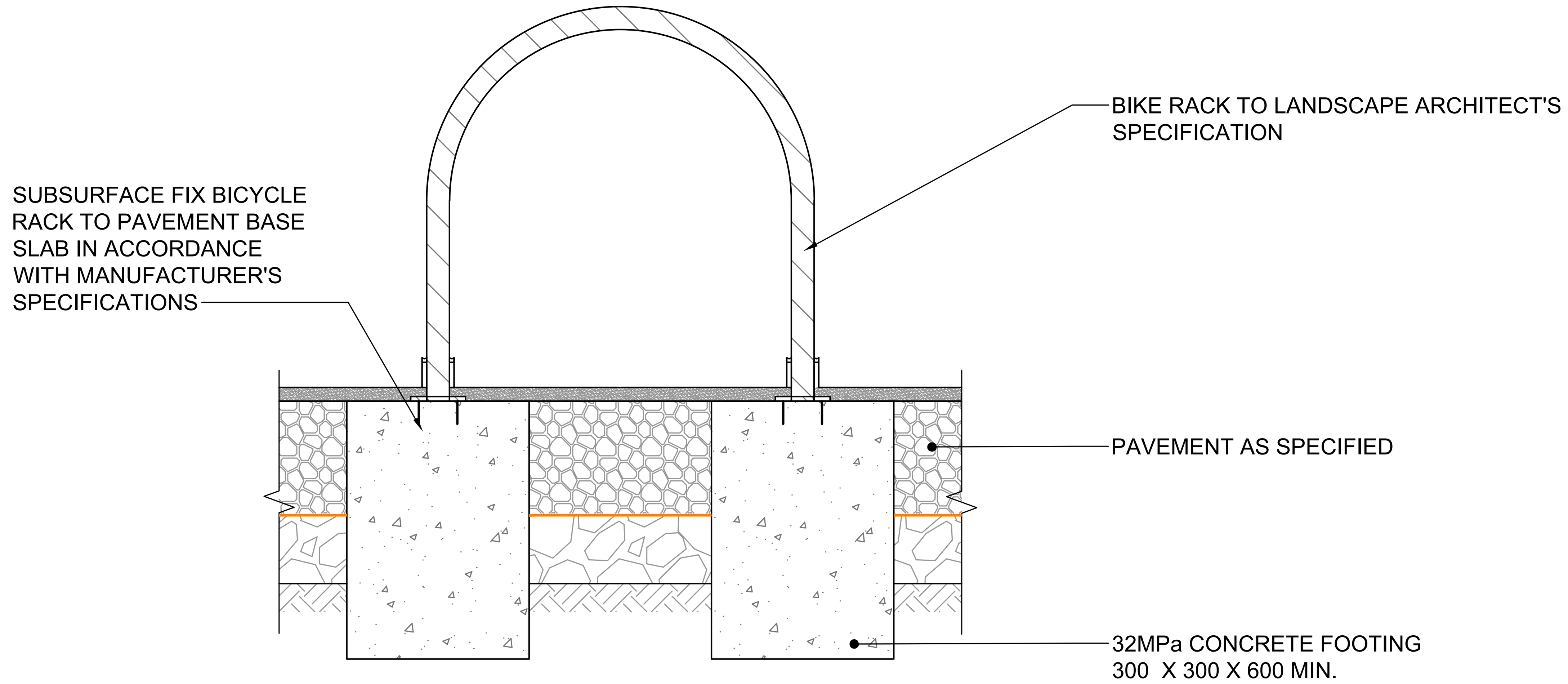
DETAIL C -
SCALE 1:10

TYPICAL GROUND STAIR DETAIL
STAIRS 1 AND 2



DETAIL B -
SCALE 1:10

WALL 3



DETAIL D -
SCALE 1:10

BICYCLE RACK SUBSURFACE FIXING - TYPICAL SECTION
SCALE 1:10

NOT FOR CONSTRUCTION

Scales
100 0 100 200 300 400 500mm
1:10(A1)/1:20(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	ERF	KJS
	FOR TENDER			
T01	25/09/24	RR	ERF	KJS
	FOR TENDER			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD,
BRADFIELD

Scale at A1 1:10mm
Discipline CIVIL

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Member Firm
Arup Pty Ltd
ABN 76 625 912 665

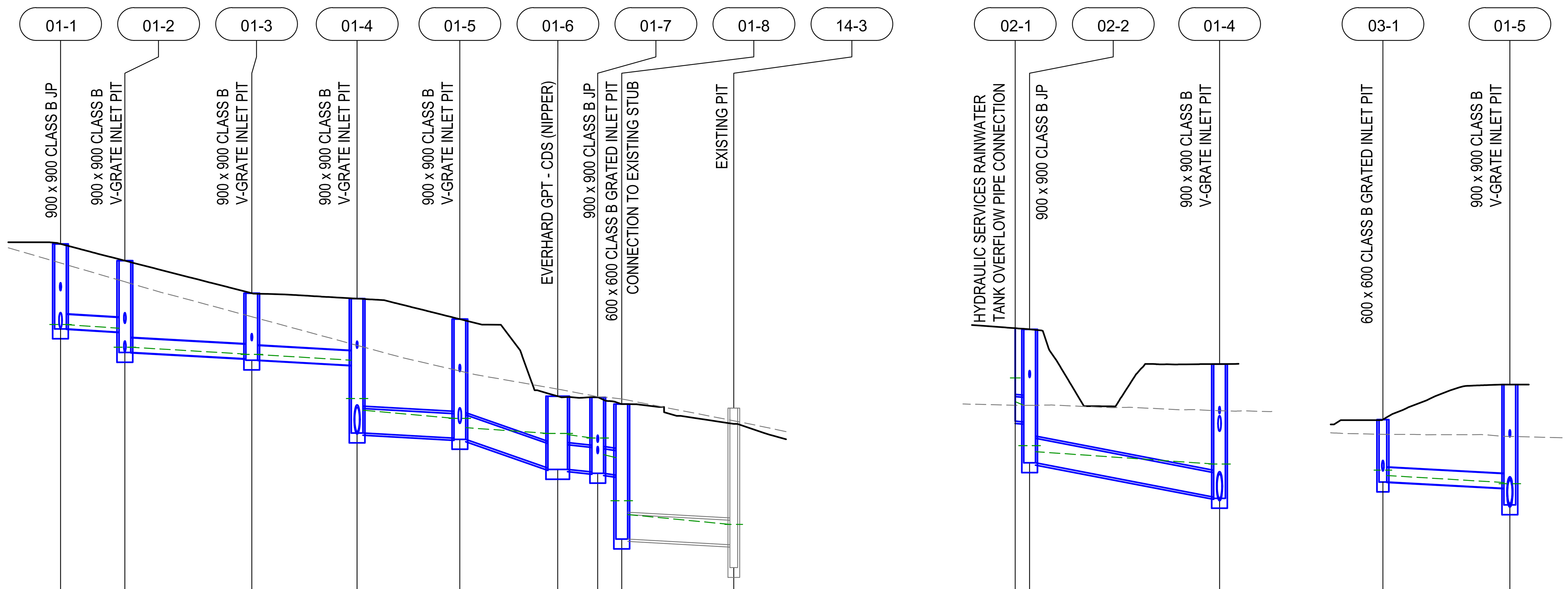
Drawing Title
CIVIL WORKS
DETAILS

Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000381	T02

Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR



NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006
2. TAILWATER LEVELS HAVE BEEN ADOPTED FROM THE 'BRADFIELD CITY CENTRE CIVIL DESIGN FOR STAGE 2A ISSUE FOR TENDER' SET.
3. 10% CLIMATE CHANGE FACTOR ADOPTED IN DESIGN.

LINE 01
H 1:250
V 1:50

PIPE GRADE (%)		1.000	1.000	1.000	1.000	5.843	1.293	1.489	1.010	
PIPE DIAMETER (mm)		Ø225	Ø225	Ø225	Ø375	Ø375	Ø375	Ø375	Ø375	
5% AEP PIPE VELOCITY (m/s)		0.990	1.110	1.160	1.560	1.700	1.640	1.810	1.710	
5% AEP PIPE FLOW (m³/s)		0.009	0.014	0.016	0.162	0.181	0.181	0.181	0.181	
DATUM R.L.		68.000								
HYDRAULIC GRADE LINE (m) (5% AEP)	79.509	79.505 79.451 79.161	79.160 79.056 79.051	79.048 78.962 78.375	78.197 78.074	77.931 77.843	77.826 77.772	77.518 77.471 76.813	76.602	76.452
PIPE INVERT LEVELS (m)		79.440 79.390	79.080 78.983	78.963 78.882	77.849 77.771	77.751 77.313	77.293 77.253	77.233 77.206	76.227 76.141	75.791
DESIGN LEVELS (m)		80.740	80.484	79.986	79.904	79.590	78.411	78.395	78.290	78.230
EXISTING LEVELS (m)		80.448	80.161	79.627	79.189	78.796	78.520	78.403	78.369	78.036
CHAINAGE (m)		0.000 4.925	4.925 9.710	14.635 8.062	22.697 7.860	30.557 7.494	38.051 3.058	41.109 1.840	42.949 8.570	51.519

LINE 02
H 1:250
V 1:50

PIPE GRADE (%)		1.000	3.602	
PIPE DIAMETER (mm)		Ø375	Ø375	
5% AEP PIPE VELOCITY (m/s)		1.420	1.480	
5% AEP PIPE FLOW (m³/s)		0.140	0.143	
DATUM R.L.		69.000		
HYDRAULIC GRADE LINE (m) (5% AEP)	79.690	79.329 79.273 78.656	78.564 78.375	78.197
PIPE INVERT LEVELS (m)		79.030 79.019	78.393 77.869	77.849
DESIGN LEVELS (m)		80.451	80.435	79.904
EXISTING LEVELS (m)		79.274	79.272	79.189
CHAINAGE (m)		0.000 1.102	1.102 14.533	15.635

LINE 03
H 1:250
V 1:50

PIPE GRADE (%)		1.000	
PIPE DIAMETER (mm)		Ø225	
5% AEP PIPE VELOCITY (m/s)		0.880	
5% AEP PIPE FLOW (m³/s)		0.020	
DATUM R.L.		69.000	
HYDRAULIC GRADE LINE (m) (5% AEP)	78.281	78.199 78.092 78.074	77.931
PIPE INVERT LEVELS (m)		78.100 78.003	77.751
DESIGN LEVELS (m)		79.055	79.590
EXISTING LEVELS (m)		78.829	78.796
CHAINAGE (m)		0.000 9.716	9.716

NOT FOR CONSTRUCTION

Scales
2.5 0 5 10m
1:250(A1)/1:500(A3)
0.5 0 1 2m
1:50(A1)/1:100(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	NS	ERF	KJS
	FOR TENDER			
T01	25/09/24	RR	ERF	KJS
	FOR TENDER			
P02	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P01	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			

Client
NSW GOVERNMENT
Bradfield Development Authority
Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1: AS SHOWN
Discipline: CIVIL

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CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
STORMWATER
LONGITUDINAL SECTIONS

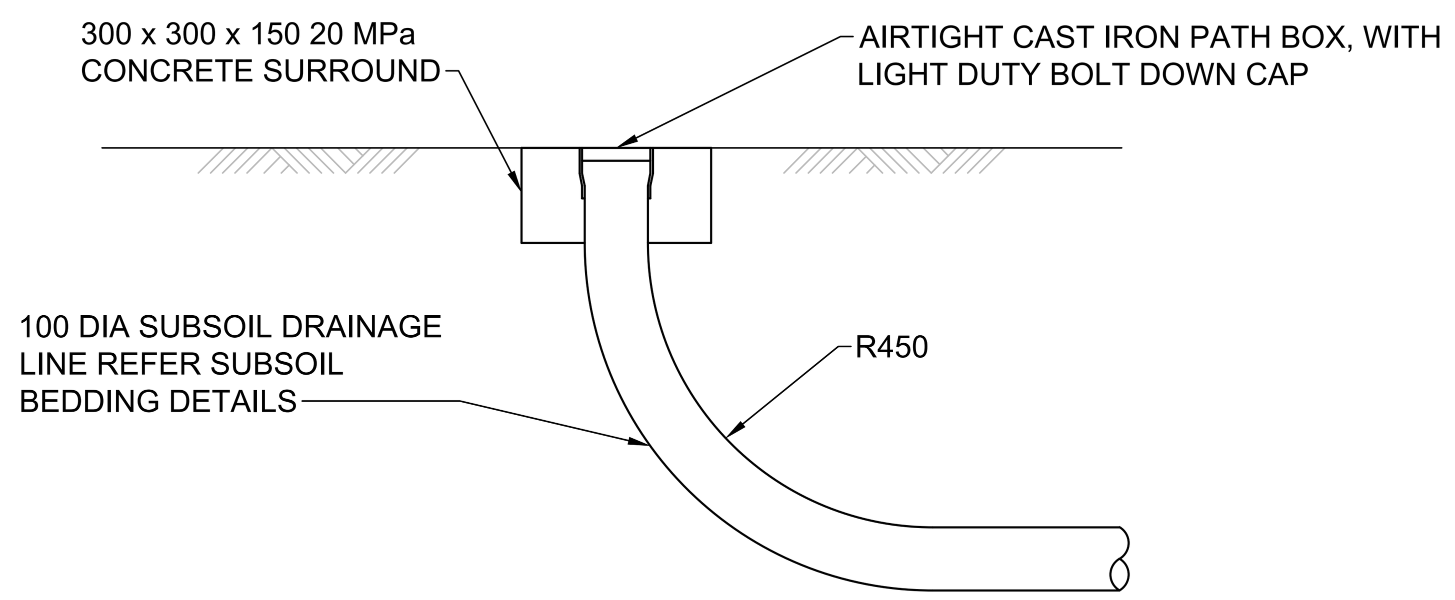
Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000641	T02

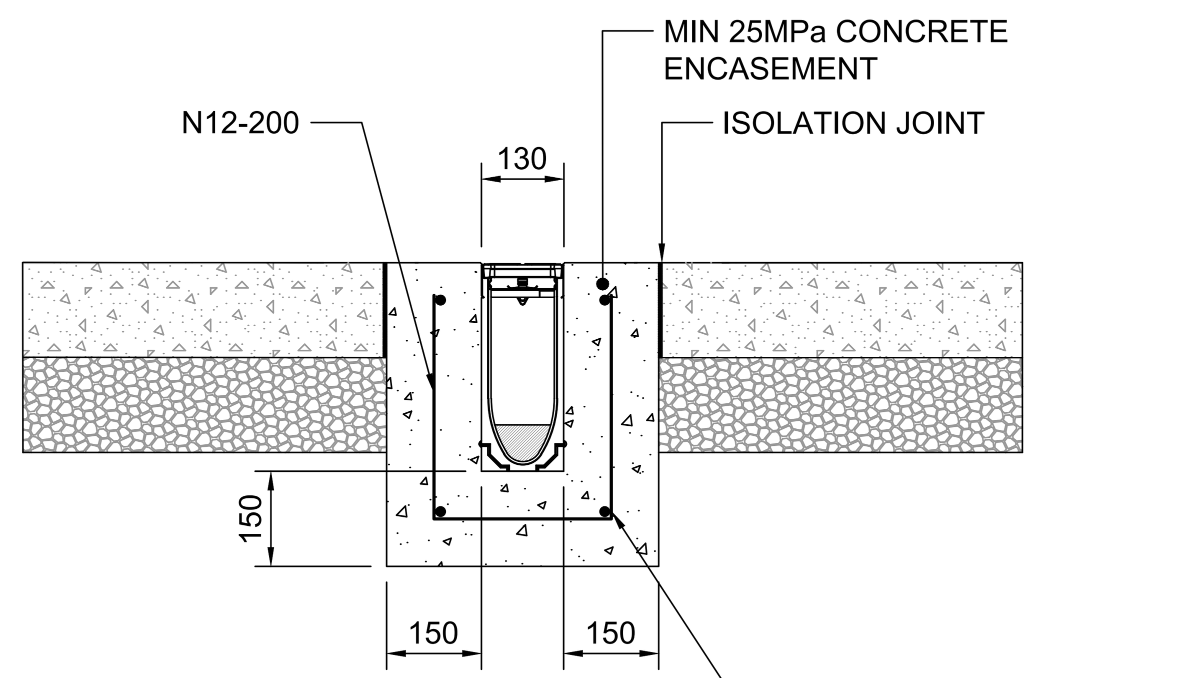
Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

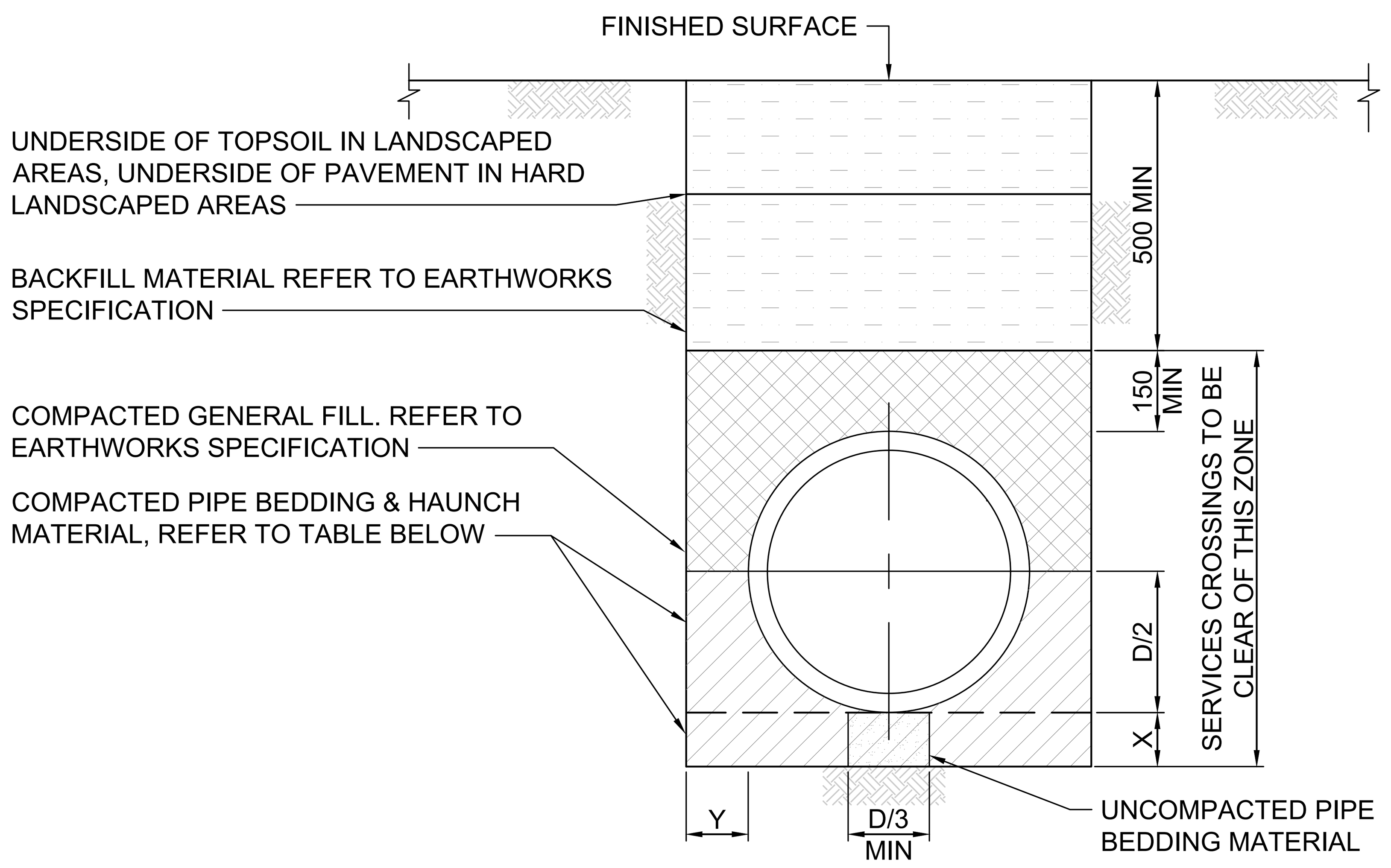
NOTES:
1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006



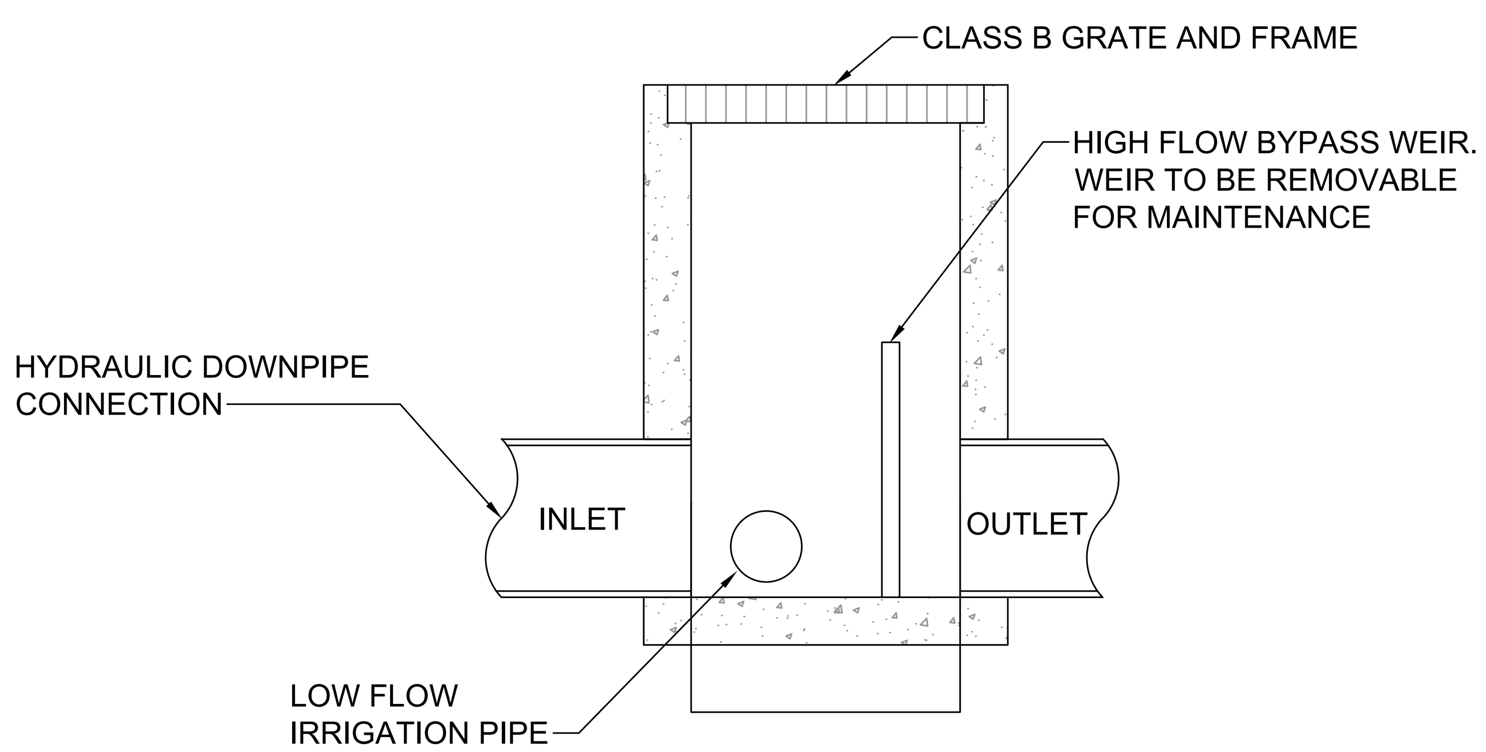
SUBSOIL FLUSHING POINT (FP)
SCALE 1:10



TRENCH DETAIL A
ACO KS100 CLASS C
SCALE 1:10



GRANULAR BACK FILL
TYPICAL SECTION
SCALE 1:10



LANDSCAPING IRRIGATION PIT DETAIL
N.T.S

GRADING LIMITS FOR PIPE
BEDDING HAUNCH MATERIAL

SIEVE SIZE (mm)	WEIGHT PASSING (%)
75.0	100
9.5	100-50
2.36	100-30
0.60	50-15
0.075	25-0

D	Y (mm)
≤900	150
>900	D/6

D	X (mm)
≤1500	100 (MIN)
>1500	150 (MIN)

PIPE BEDDING & HAUNCH MATERIAL
COMPACTION REQUIREMENTS

TYPE	MIN STD COMPACTION
COHESIVE	50%*1
COHENSIONLESS	85%*2

*1 IN ACCORDANCE WITH AS3725-2007

NOT FOR CONSTRUCTION

Scales
0.1 0 0.1 0.2 0.3 0.4 0.5m
1:10(A1)/1:20(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	PDA	ERF	KJS
	FOR TENDER			
T01	25/09/24	RR	ERF	KJS
	FOR TENDER			
P02	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P01	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			

Client
NSW GOVERNMENT
Bradfield Development Authority
Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD,
BRADFIELD

Scale at A1 1:10m
Discipline CIVIL

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CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
STORMWATER
DETAILS

Drawing Status
FOR TENDER

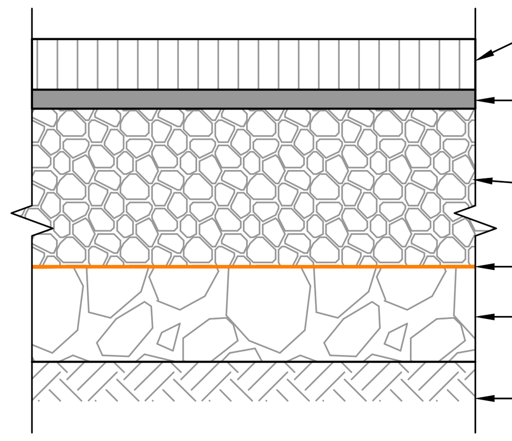
Job No 295398-00
Drawing No AMRFB2-ARU-DRW-CI-000651
Issue T02

Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOTES:

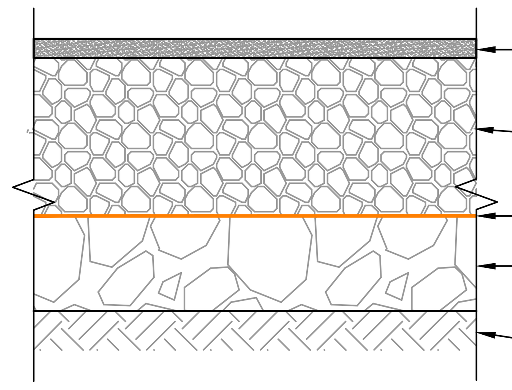
1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.
3. PAVEMENT TYPE PV4 BY OTHERS.
4. PAVER MINIMUM THICKNESS VARIES BASED ON PAVER DIMENSIONS. MINIMUM PAVER THICKNESS REQUIREMENTS ARE AS FOLLOWS:
   PV1 TYPE 1: 2000 x 400 mm - 150 mm
   PV1 TYPE 2: 500 x 100 mm - 130 mm
   PV1 TYPE 3: 250 x 100 mm - 95 mm
   THE LARGEST PAVER THICKNESS OF 150 mm IS TO BE ADOPTED FOR ALL PAVERS TO ENSURE A CONSISTENT BASE LAYER CAN BE CONSTRUCTED.



POROUS PAVERS, REFER TO LANDSCAPING PACKAGE AND NOTE 4.
30 mm BEDDING COURSE (REFER TO NOTE 9 & 10 ON AMRFB2-ARU-DRW-CI-000008)
250 mm SINGLE SIZE GRANULAR BASE (REFER TO NOTE 11 ON AMRFB2-ARU-DRW-CI-000008)
0.2 mm THICK IMPERMEABLE HDPE MEMBRANE
150 mm CAPPING LAYER (PERMEABILITY < 5x10-9 m/s. CBR > 8%. CBR SWELL < 1%. PI > 4)
SUBGRADE CBR ≥ 2%

PAVEMENT TYPE PV1
PERMEABLE PAVEMENT WITH PAVERS

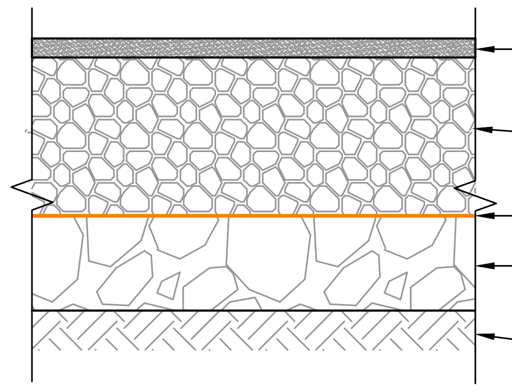
SCALE 1:10



RESIN BONDED AGGREGATE, REFER TO LANDSCAPING PACKAGE
250 mm SINGLE SIZE GRANULAR BASE (REFER TO NOTE 11 ON AMRFB2-ARU-DRW-CI-000008)
0.2 mm THICK IMPERMEABLE HDPE MEMBRANE
150 mm CAPPING LAYER (PERMEABILITY < 5x10-9 m/s. CBR > 8%. CBR SWELL < 1%. PI > 4)
SUBGRADE CBR ≥ 2%

PAVEMENT TYPE PV2
PERMEABLE PAVEMENT WITH RESIN BONDED AGGREGATE

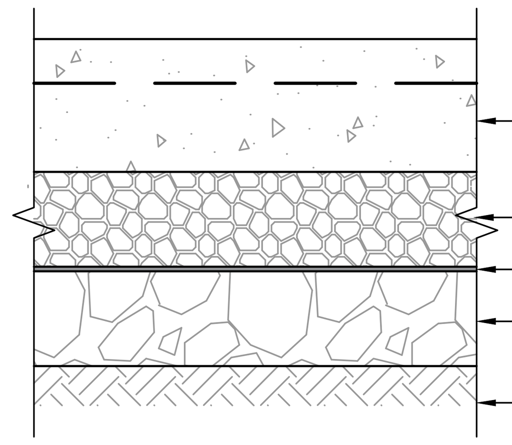
SCALE 1:10



STABILISED AND COMPACTED REFER TO LANDSCAPING PACKAGE
250 mm SINGLE SIZE GRANULAR BASE (REFER TO NOTE 11 ON AMRFB2-ARU-DRW-CI-000008)
0.2 mm THICK IMPERMEABLE HDPE MEMBRANE
150 mm CAPPING LAYER (PERMEABILITY < 5x10-9 m/s. CBR > 8%. CBR SWELL < 1%. PI > 4)
SUBGRADE CBR ≥ 2%

PAVEMENT TYPE PV3
PERMEABLE PAVEMENT WITH STABILISED AND COMPACTED DECOMPOSED GRANITE

SCALE 1:10



210 mm N32 CONCRETE (WITH SL82 MESH, WITH 70 mm TOP COVER)
150 mm DGB
7 mm SPRAYED SEAL
150 mm CAPPING LAYER (PERMEABILITY < 5x10-9 m/s. CBR > 8%. CBR SWELL < 1%. PI > 4)
SUBGRADE CBR ≥ 2%

PAVEMENT TYPE PV5
PLAIN CONCRETE PAVEMENT - REINFORCED (PCP-R)

SCALE 1:10

NOT FOR CONSTRUCTION

Scales
0.1 0 0.1 0.2 0.3 0.4 0.5m
1:10(A1)/1:20(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	NM	ERF	KJS
	FOR TENDER			
T01	25/09/24	RR	ERF	KJS
	FOR TENDER			
P02	31/05/24	RR	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			
P01	28/03/24	AYL	KJS	KJS
	50% DESIGN DEVELOPMENT			

Client
NSW GOVERNMENT
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1 1:10m
Discipline CIVIL

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Arup, Level 5, 151 Clarence St
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www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
PAVEMENT PROFILES

Drawing Status
FOR TENDER

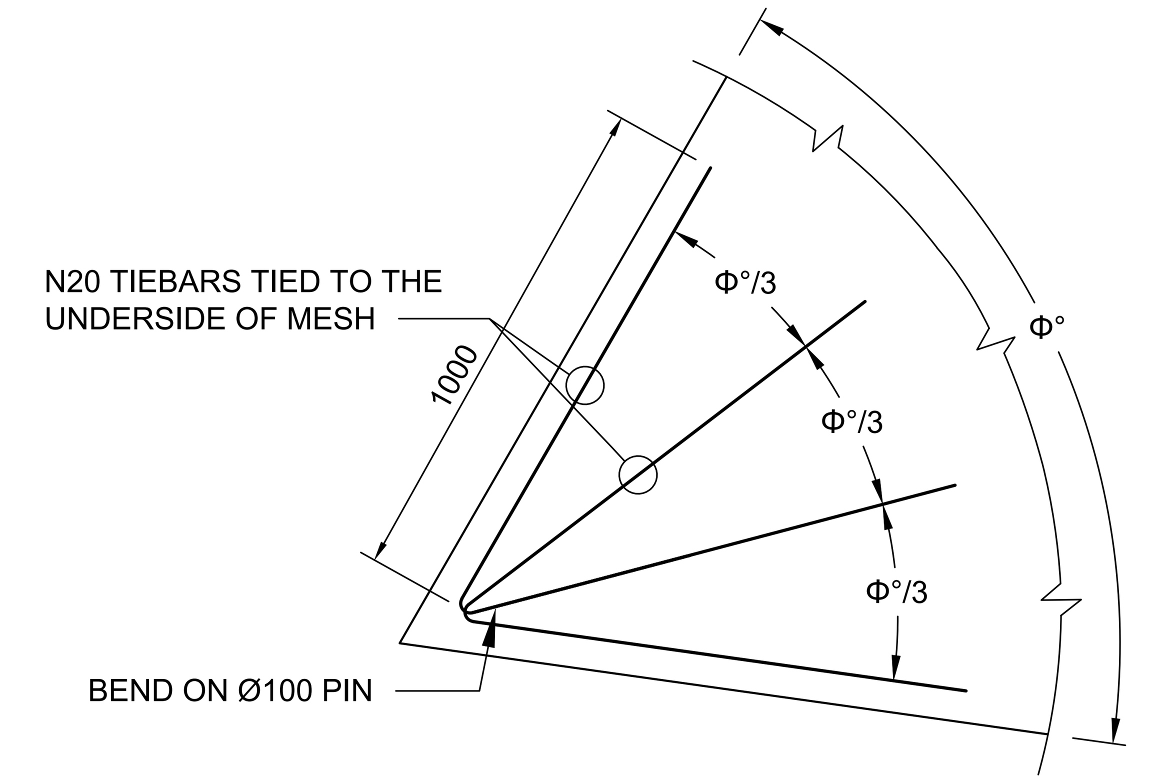
Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000791	T02

Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

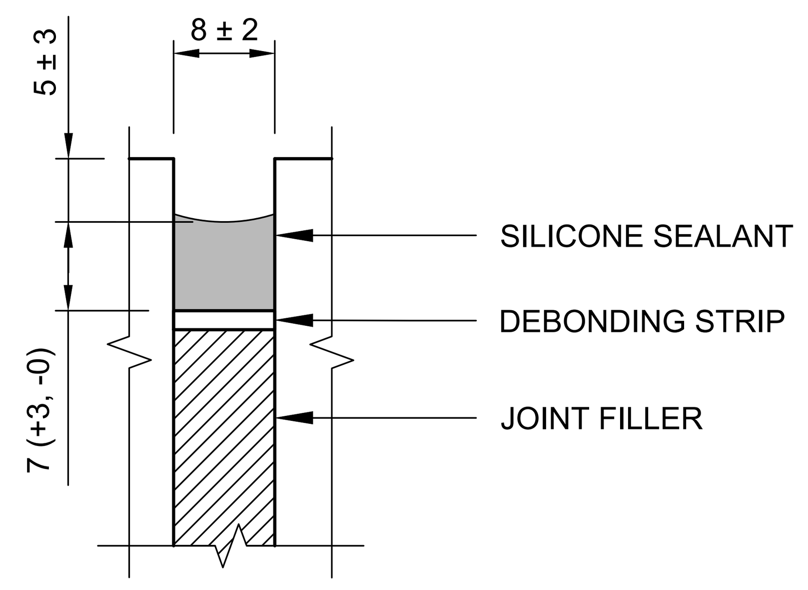
NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.

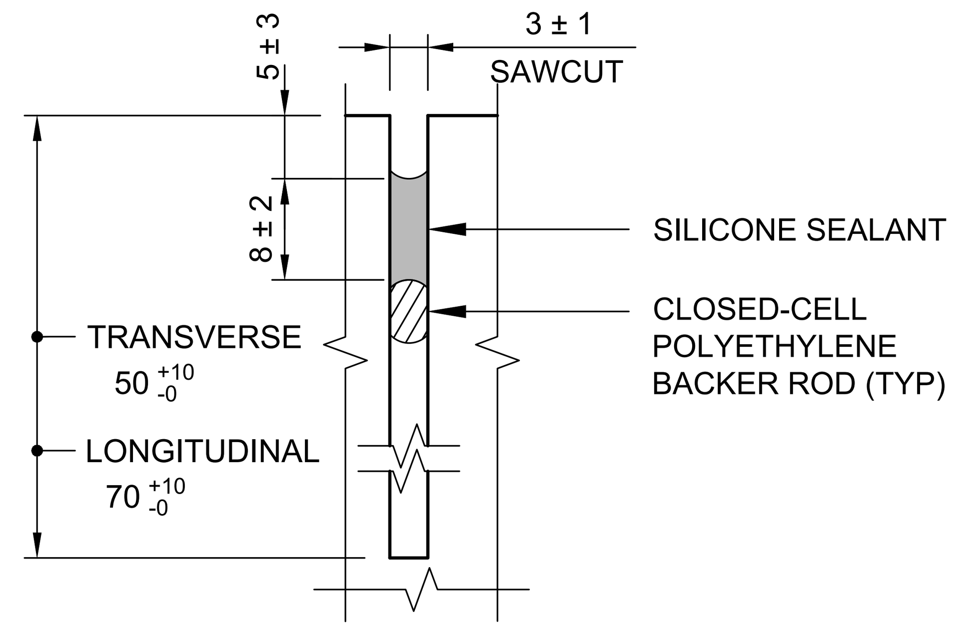


DETAIL N
NTS

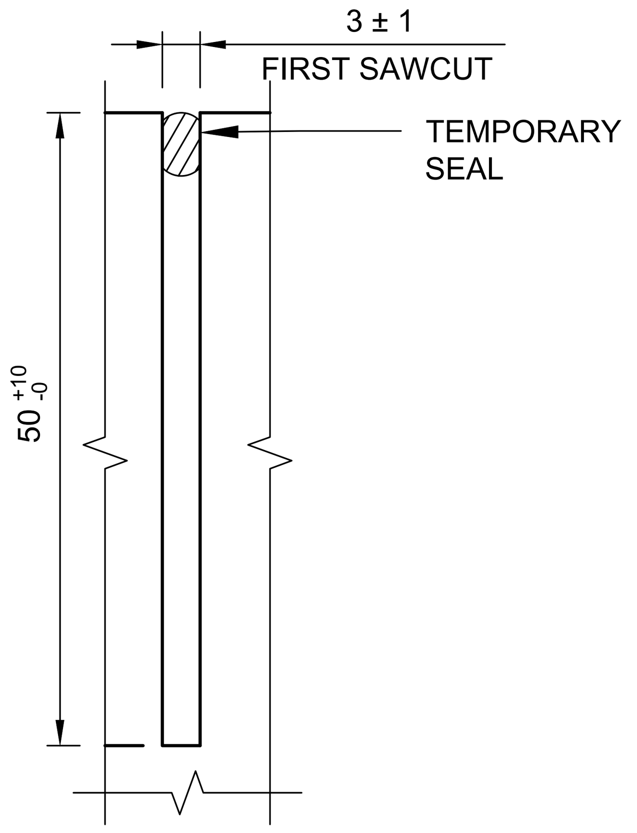
CORNER REINFORCEMENT IN SLABS WITH CORNER ANGLES < 84°



DETAIL F
NTS

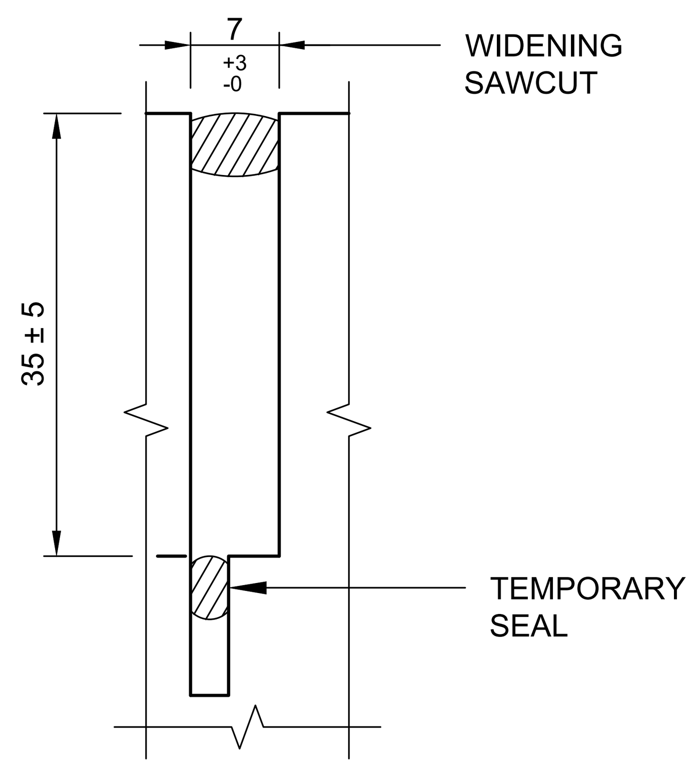


DETAIL J
NTS



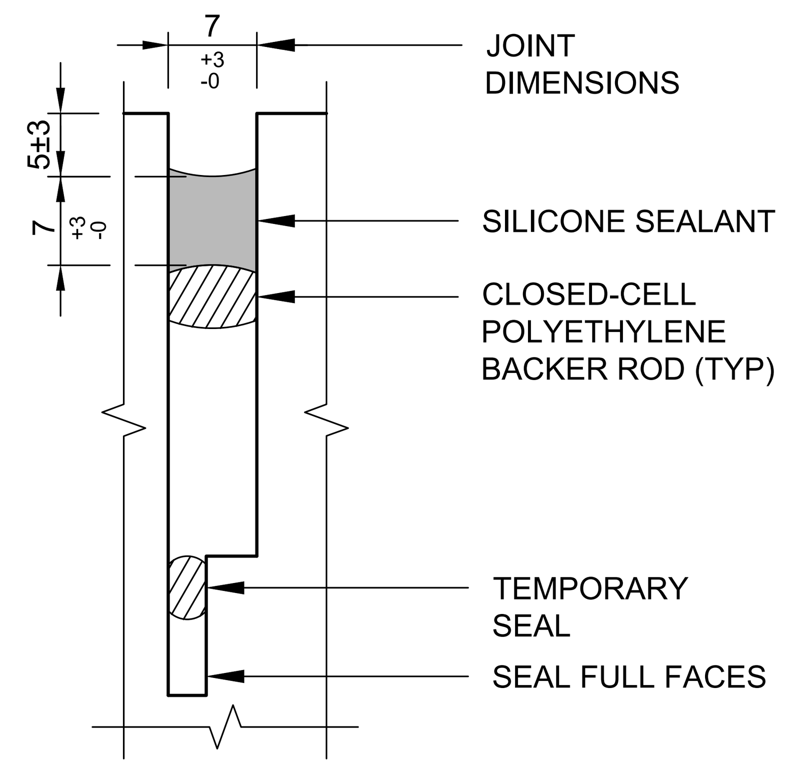
DETAIL D1
NTS

PRELIMINARY SEALING



DETAIL D2
NTS

TEMPORARY SEALING



DETAIL D3
NTS

PERMANENT SEALING

DEVELOPMENT OF SAWCUT AND SILICONE SEAL JOINT

NOT FOR CONSTRUCTION

Scales
0.5 0 1 2m
1:50(A1)/1:100(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	NM	ERF	KJS
	FOR TENDER			
T01	25/09/24	RR	ERF	KJS
	FOR TENDER			
P01	31/05/24	PDA	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			

Client
Bradfield Development Authority

Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1 NOT TO SCALE
Discipline CIVIL

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CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
PAVEMENT DETAILS
SHEET 1 OF 2

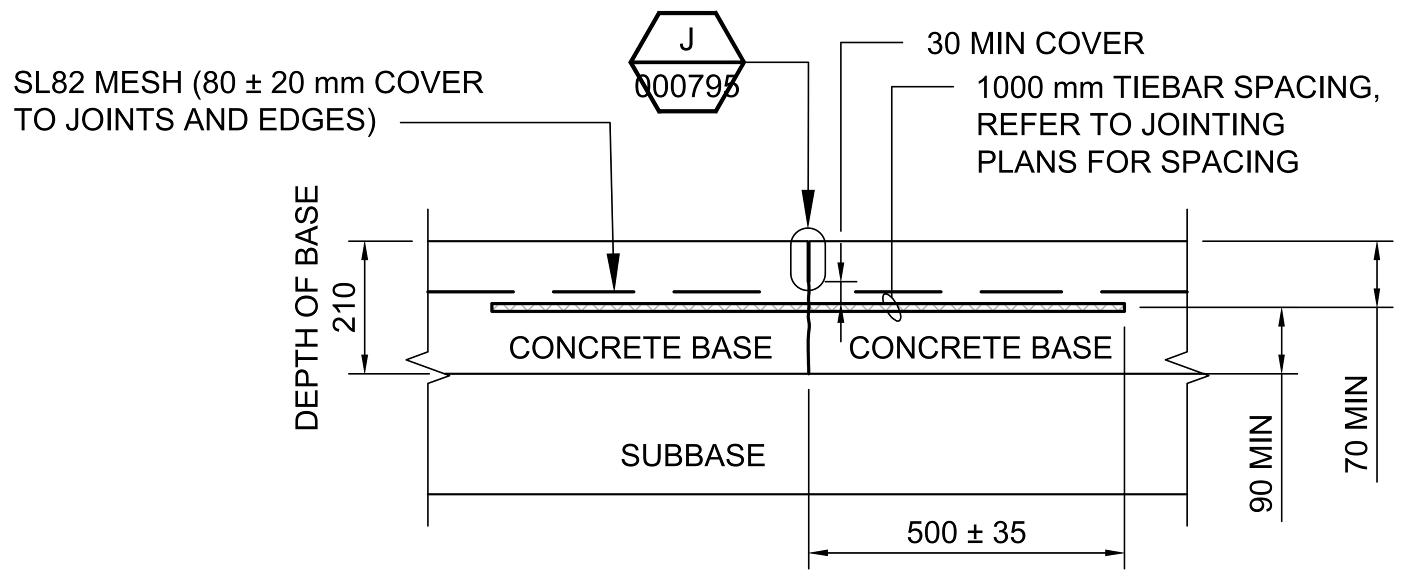
Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000795	T02

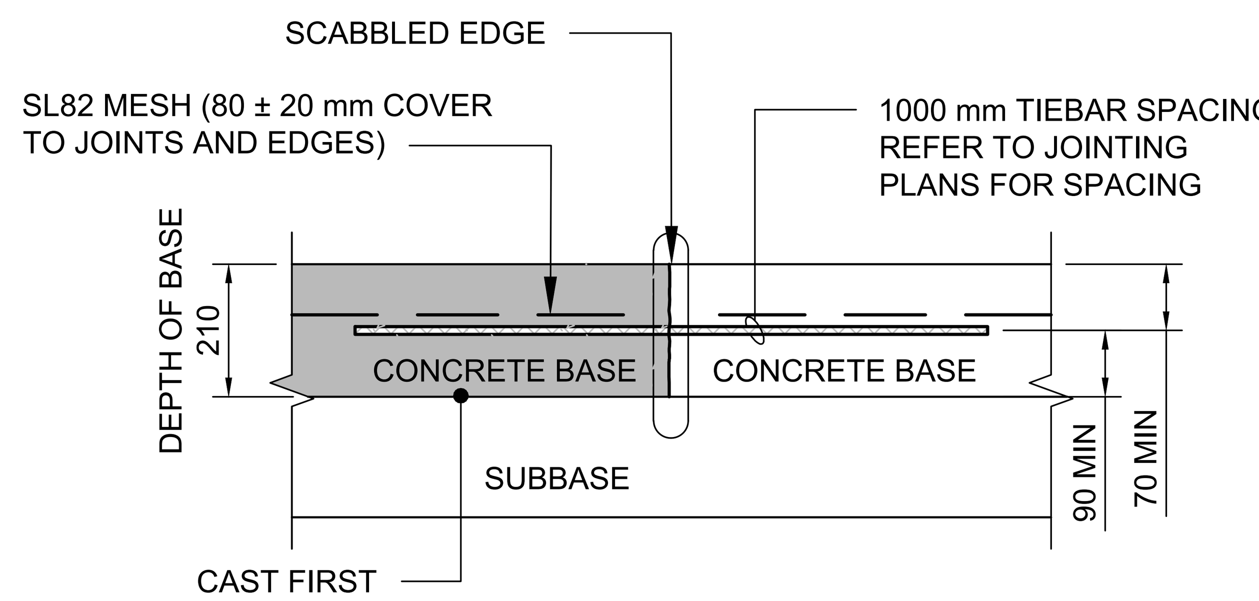
Do not scale

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

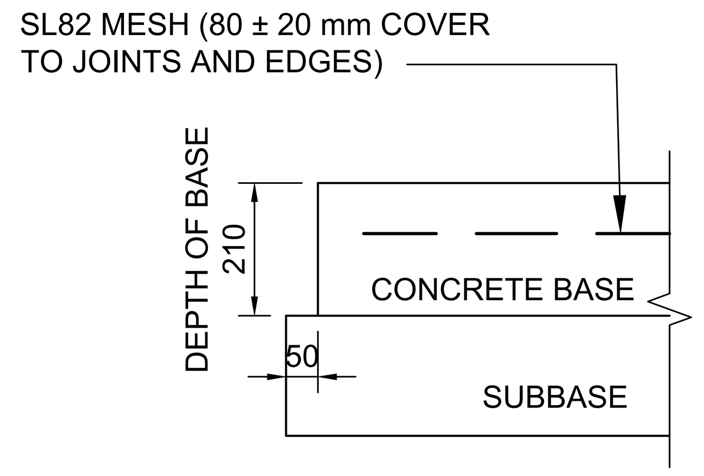
NOTES:
1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.



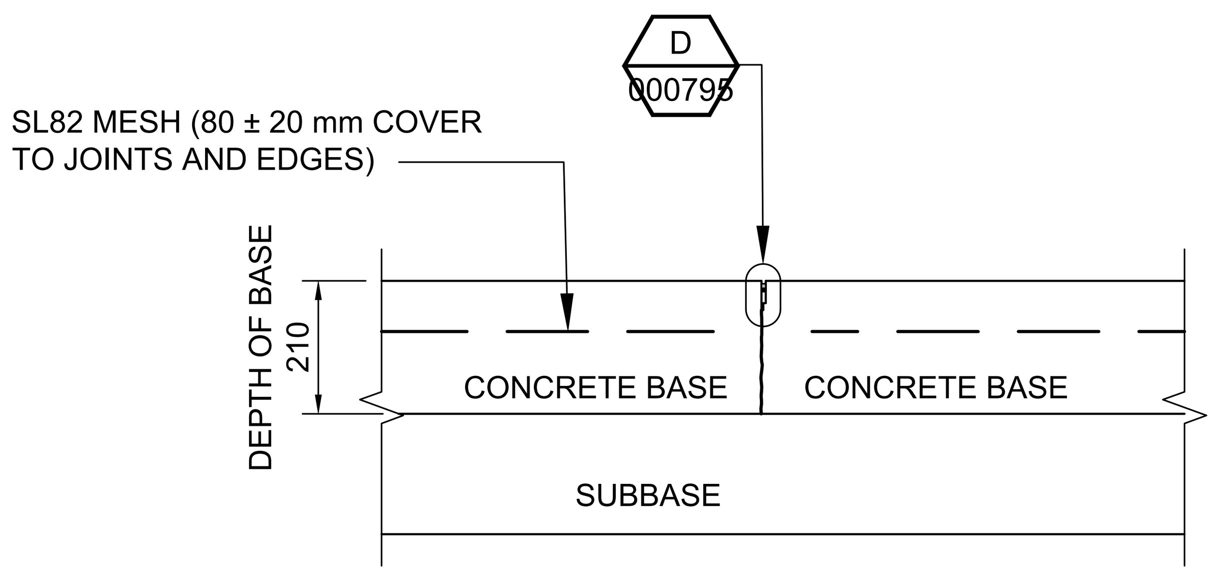
JOINT TYPE P1
LONGITUDINAL: TIED AND SAWN



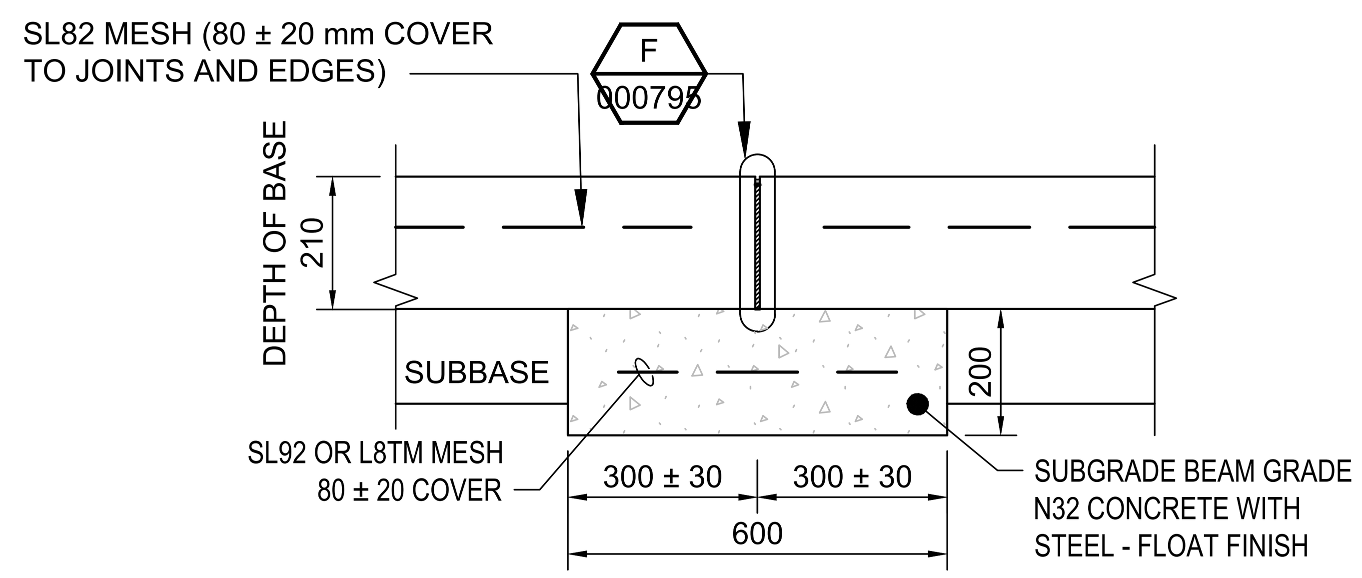
JOINT TYPE P2
LONGITUDINAL: TIED AND FORMED



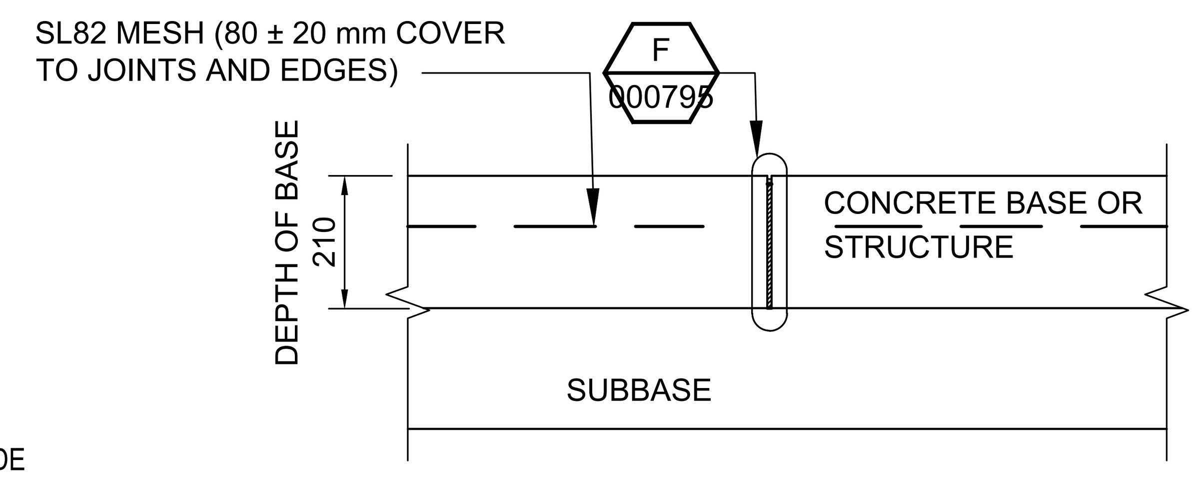
JOINT TYPE P6
BUTT EDGE



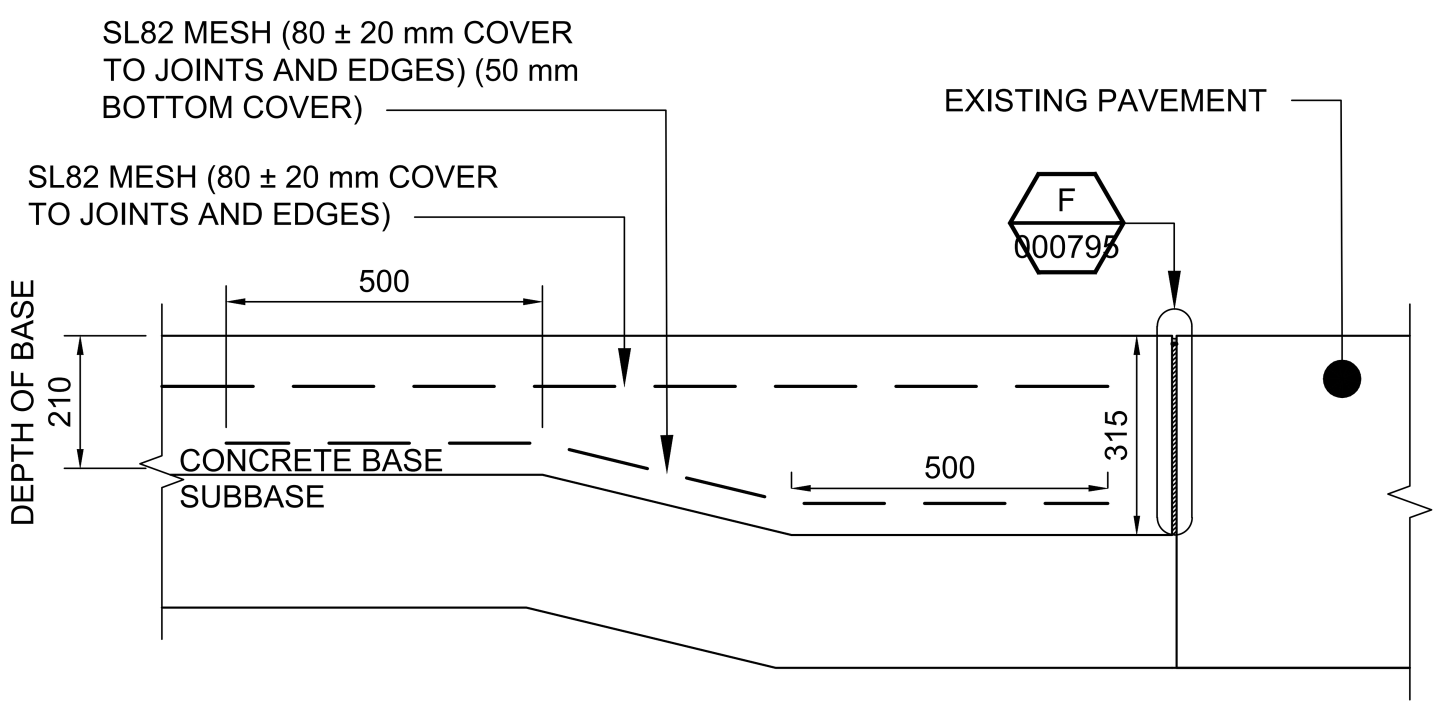
JOINT TYPE P8
TRANVERSE CONTRACTION: SAWN



JOINT TYPE P14
ISOLATION: WITH SUBGRADE BEAM



JOINT TYPE P15
ISOLATION



JOINT TYPE P19
ISOLATION JOINT WITH THICKENED EDGE

NOT FOR CONSTRUCTION

Scales
0.1 0 0.1 0.2 0.3 0.4 0.5m
1:10(A1)/1:20(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	NM	ERF	KJS
	FOR TENDER			
T01	25/09/24	RR	ERF	KJS
	FOR TENDER			
P01	31/05/24	PDA	KJS	KJS
	WIP DESIGN DEVELOPMENT ISSUE			

Client
NSW GOVERNMENT
Bradfield Development Authority
Engineering Certification (CEng)
Name: ....
Signature: .... Date: ....

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1 1:10m
Discipline CIVIL

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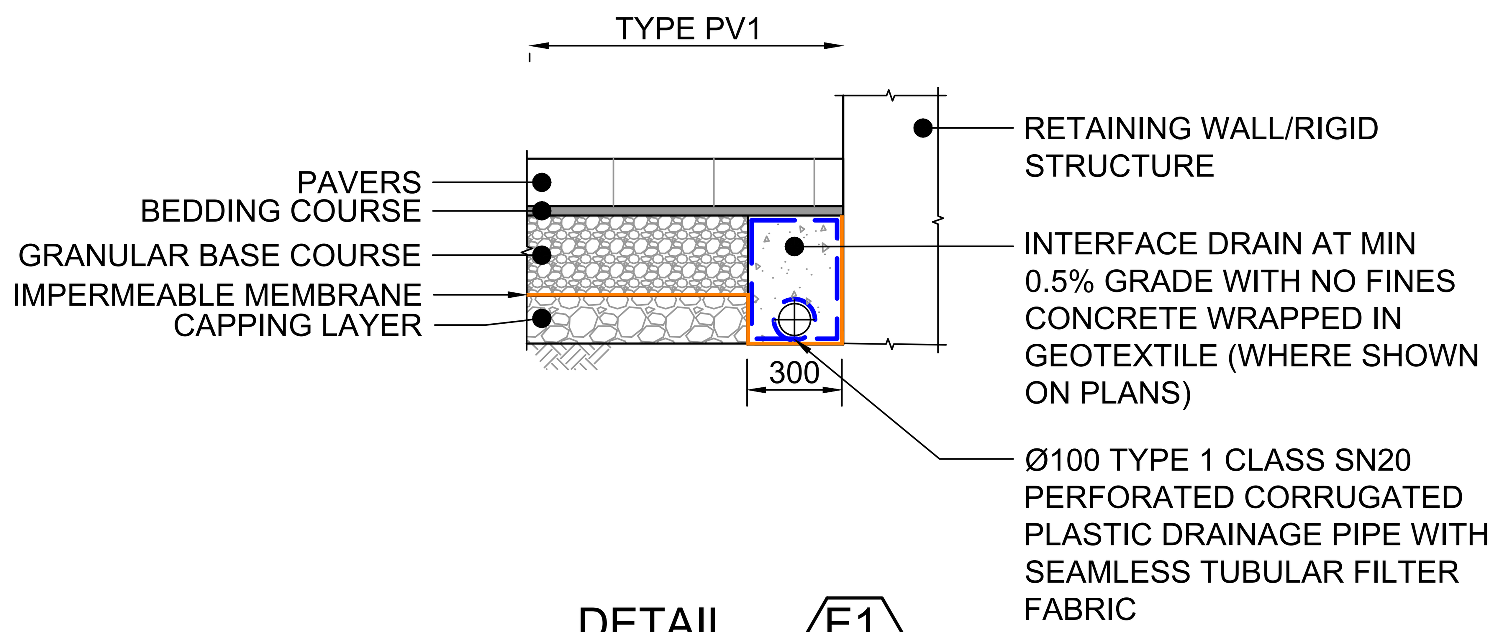
CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
PAVEMENT DETAILS SHEET 2 OF 2
Drawing Status
FOR TENDER

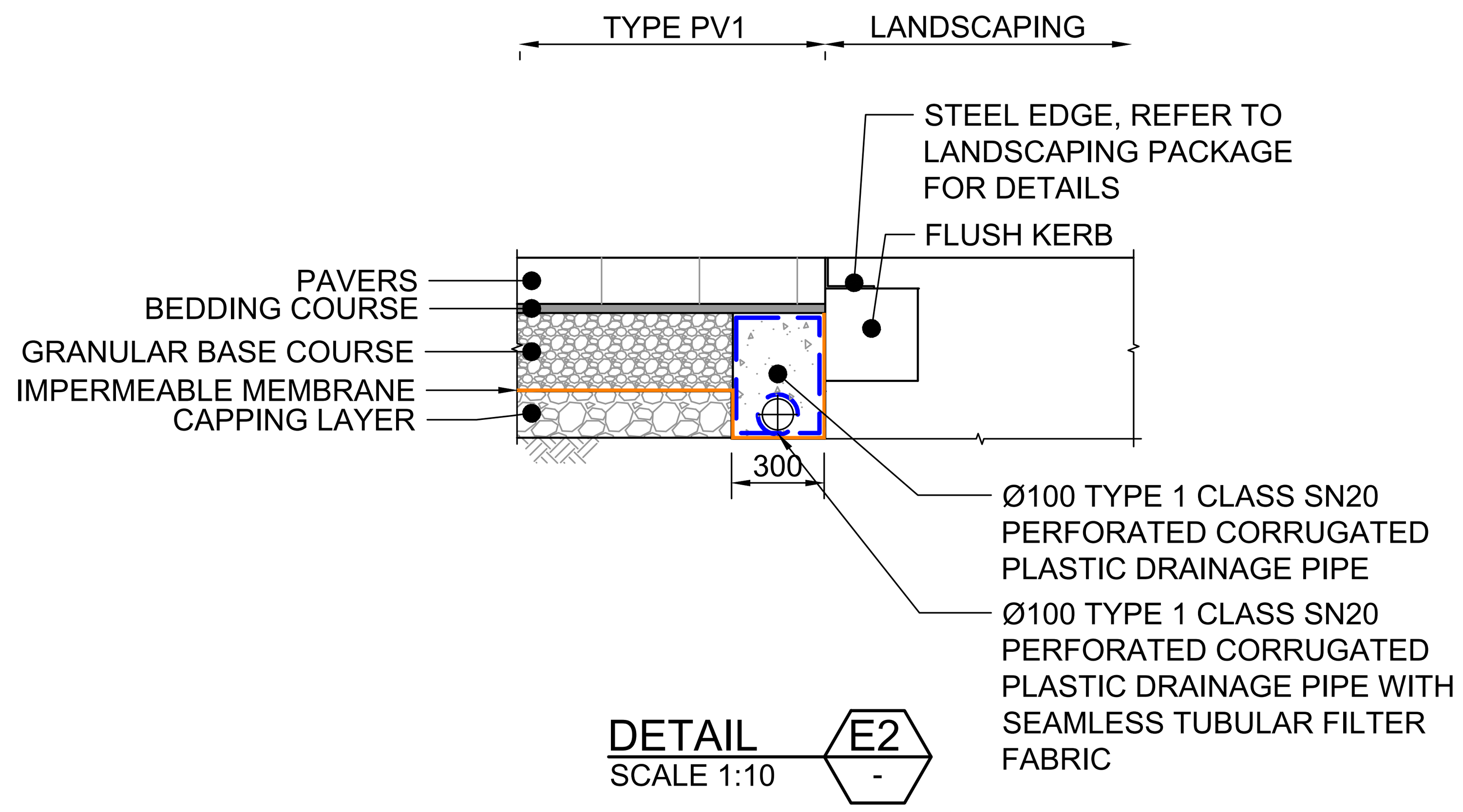
Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000796	T02

NOTES:
1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.



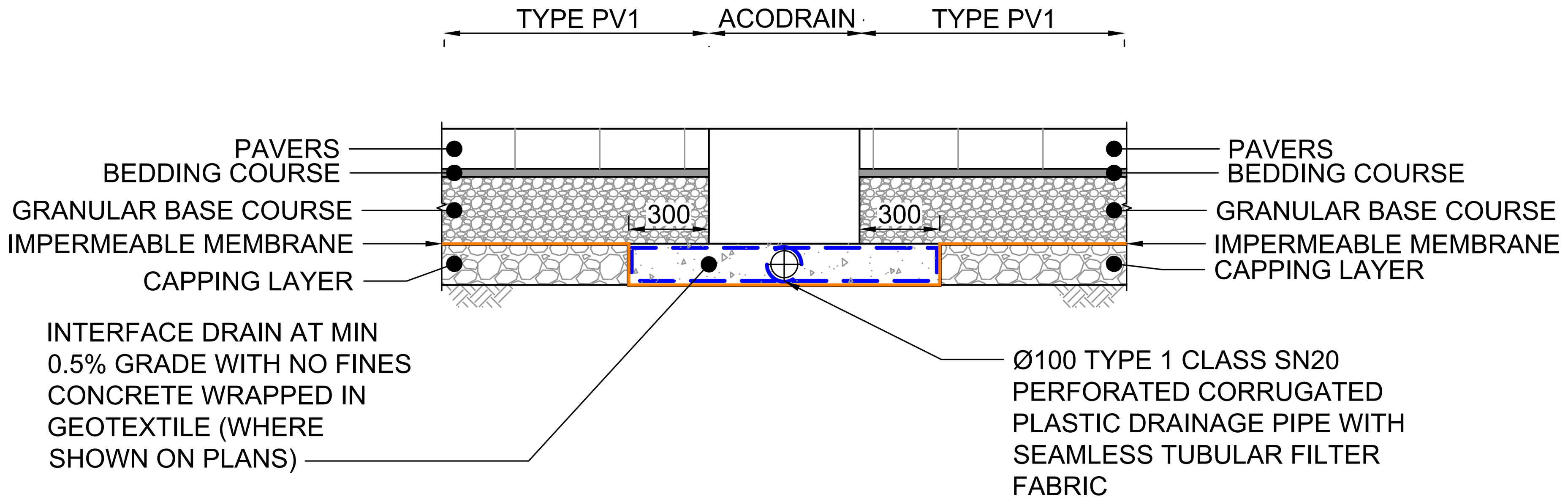
DETAIL E1 -
SCALE 1:10

PAVEMENT TYPE PV1 AND RETAINING WALL/RIGID STRUCUTRE



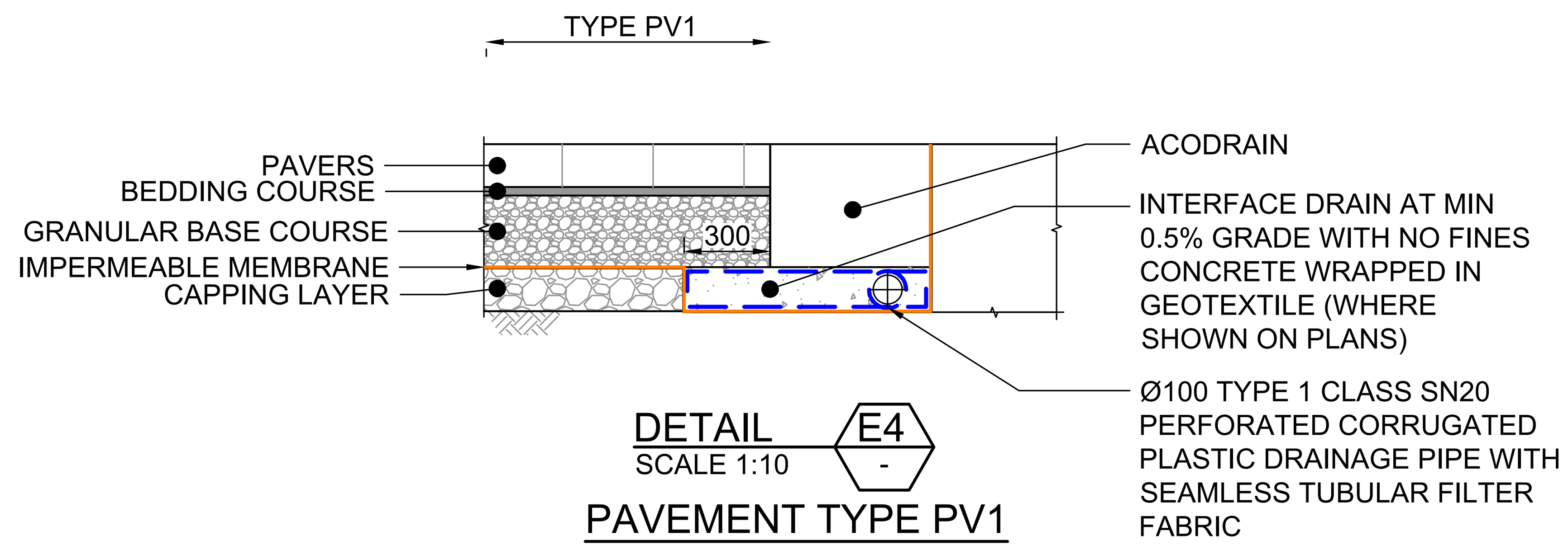
DETAIL E2 -
SCALE 1:10

PAVEMENT TYPE PV1 AND EDGE RESTRAINT



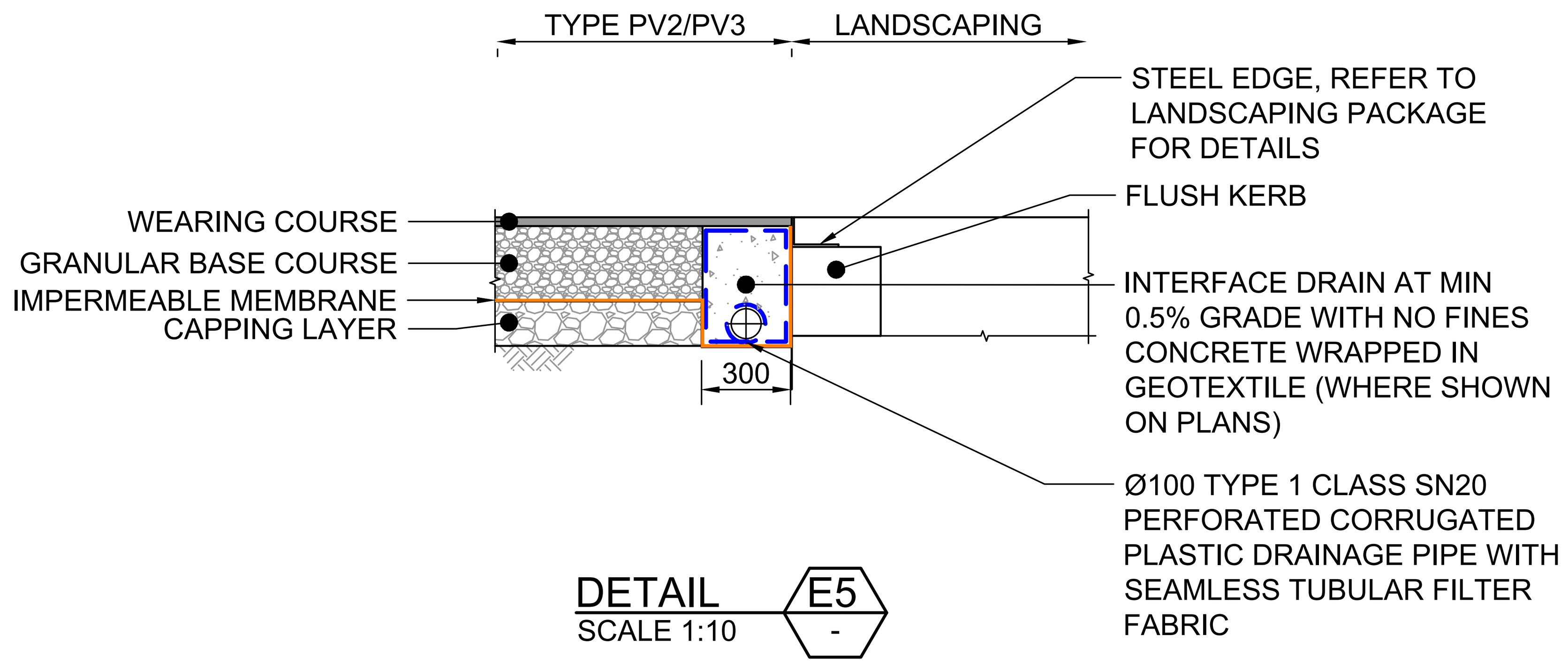
DETAIL E3 -
SCALE 1:10

PAVEMENT TYPE PV1 WITH ACODRAIN



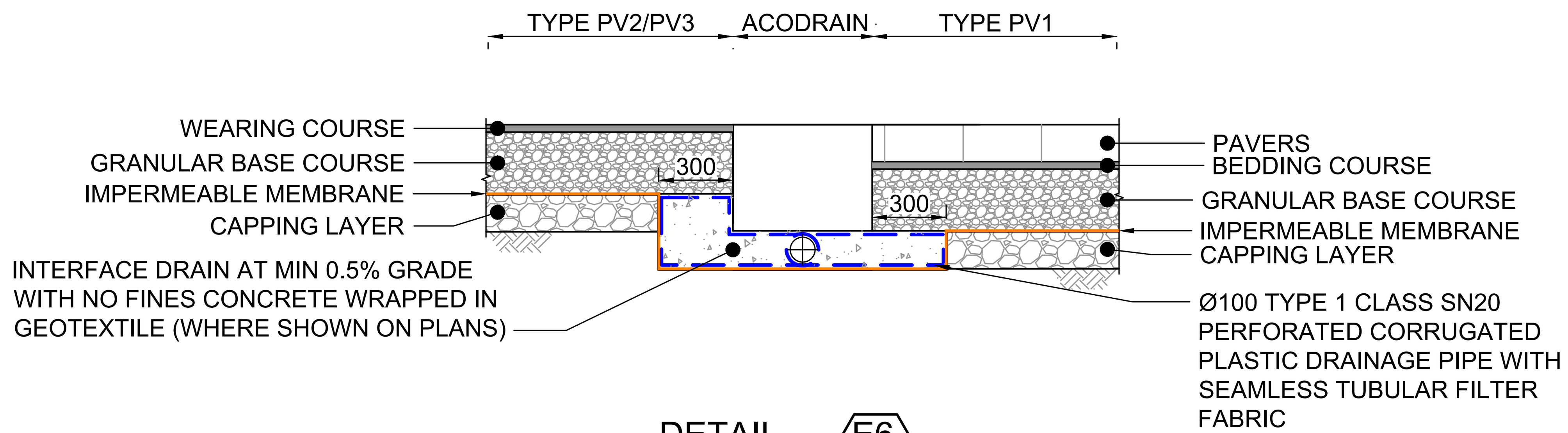
DETAIL E4 -
SCALE 1:10

PAVEMENT TYPE PV1 WITH ACODRAIN



DETAIL E5 -
SCALE 1:10

PAVEMENT TYPE PV2/PV3 AND EDGE RESTRAINT



DETAIL E6 -
SCALE 1:10

PAVEMENT TYPE PV1 INTERFACING PV2/PV3 WITH ACODRAIN

NOT FOR CONSTRUCTION

Scales
100 0 100 200 300 400 500mm
1:10(A1)/1:20(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	NM	ERF	KJS
	FOR TENDER			
T01	--/--/--	-	-	-
	NOT ISSUED			

Client
NSW GOVERNMENT
Bradfield Development Authority
Engineering Certification (CEng)
Name:
Signature: Date:

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD

Scale at A1 1:10mm
Discipline CIVIL

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Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
PAVEMENT
EDGE AND INTERFACE DETAILS
SHEET 1 OF 2

Drawing Status
FOR TENDER

Job No	Drawing No	Issue
295398-00	AMRFB2-ARU-DRW-CI-000798	T02

Do not scale

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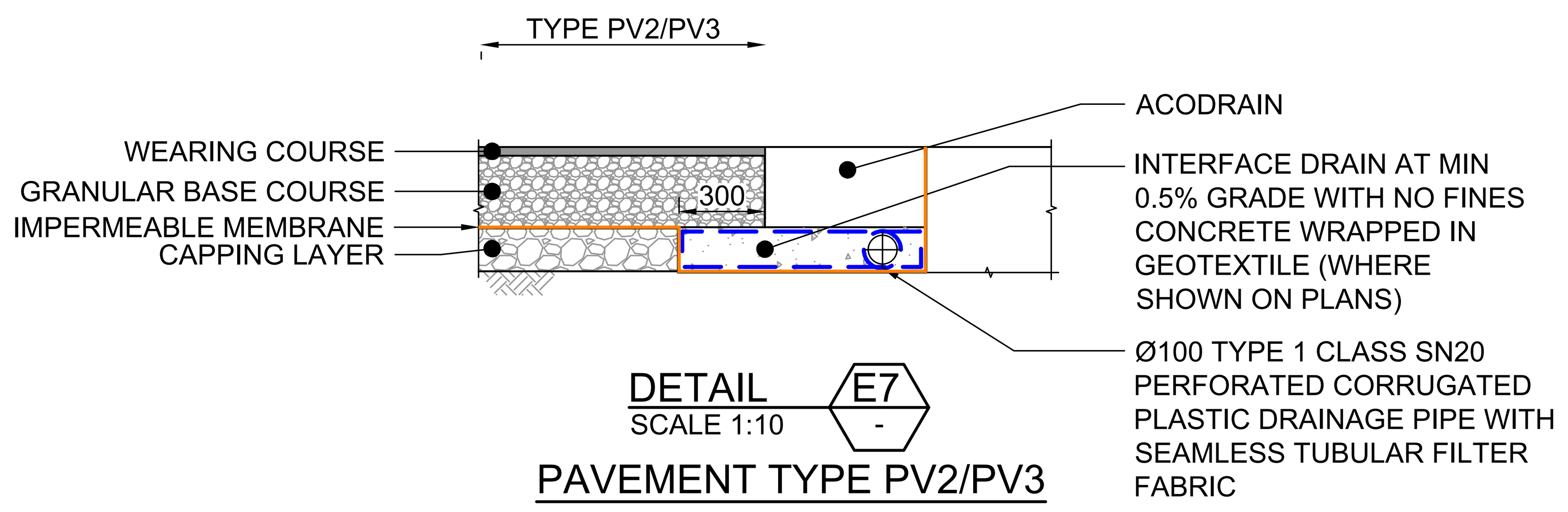
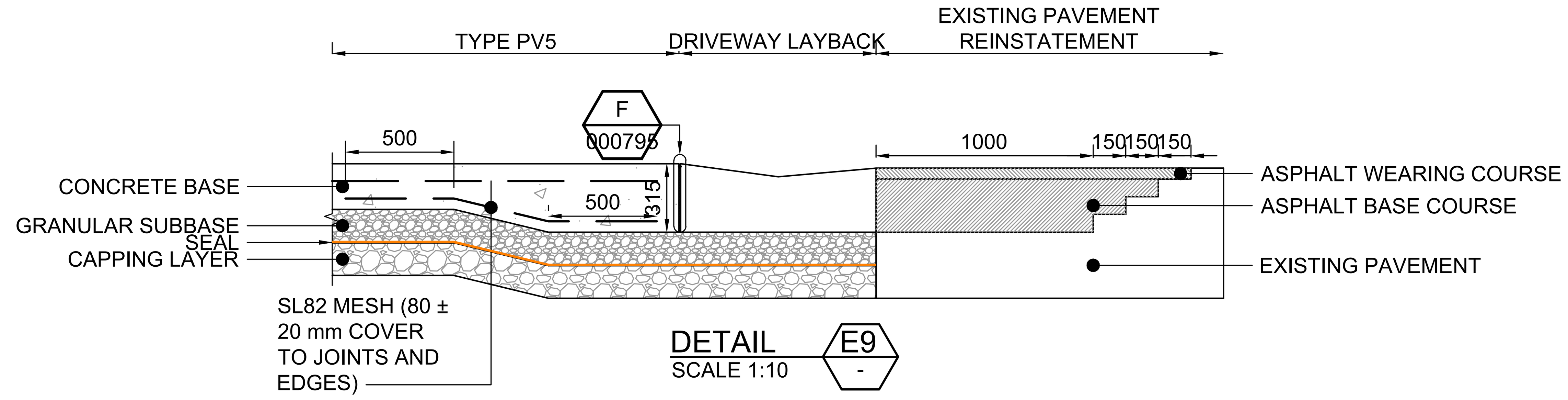
NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000006 AND AMRFB2-ARU-DRW-CI-000007.
2. FOR GENERAL LEGEND REFER TO DRAWING No. AMRFB2-ARU-DRW-CI-000011.



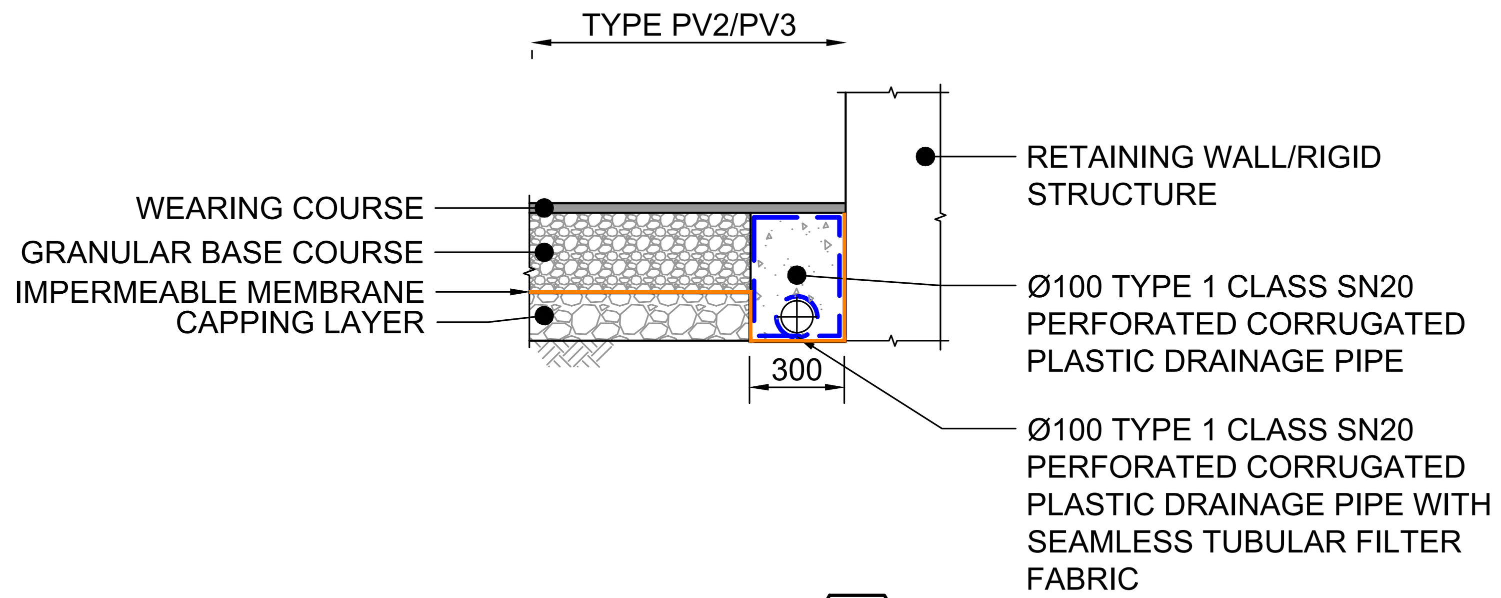
DETAIL E7 -
SCALE 1:10

PAVEMENT TYPE PV2/PV3 WITH ACODRAIN



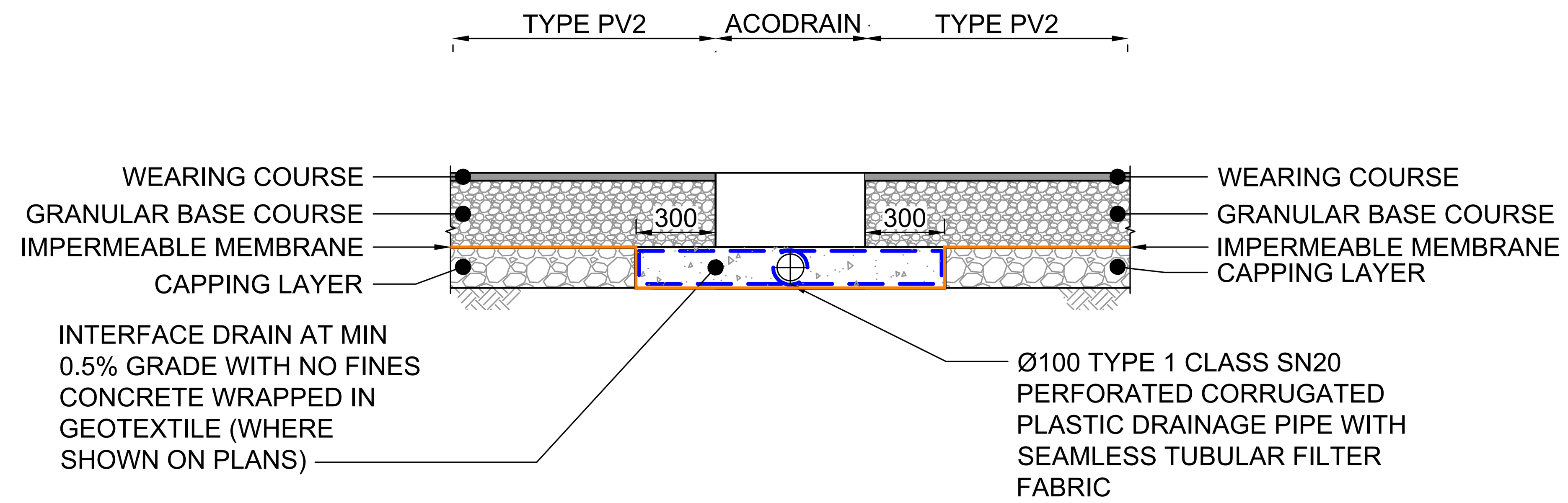
DETAIL E9 -
SCALE 1:10

PAVEMENT TYPE PV5 WITH DRIVEWAY LAYBACK AND EXISTING PAVEMENT REINSTATEMENT



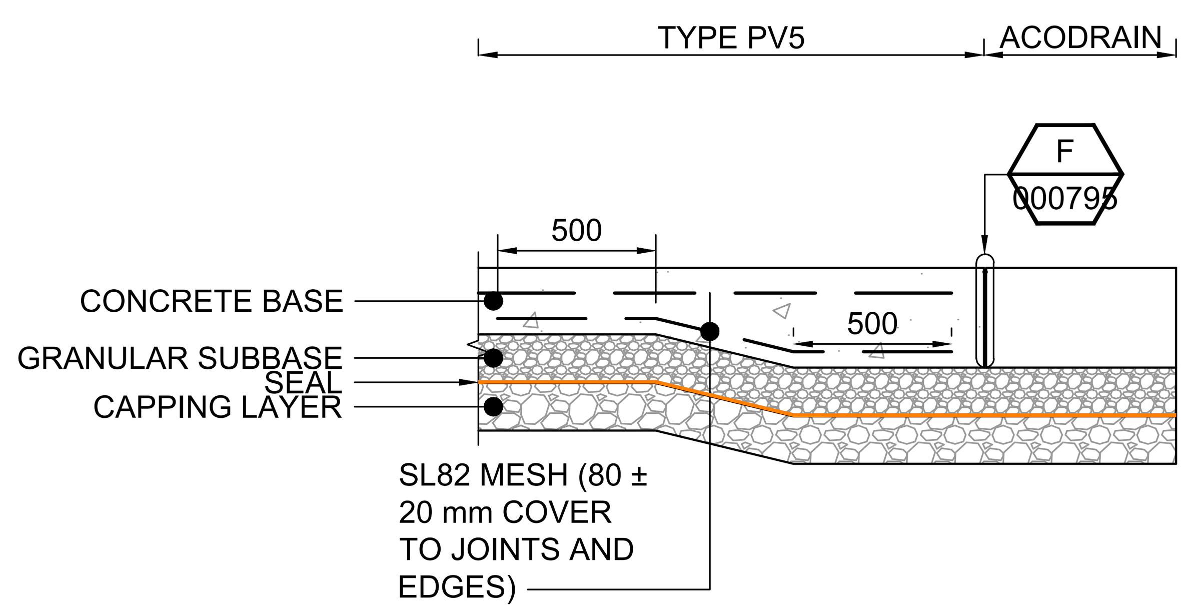
DETAIL E8 -
SCALE 1:10

PAVEMENT TYPE PV2/PV3 AND RETAINING WALL/RIGID STRUCUTRE



DETAIL E11 -
SCALE 1:10

PAVEMENT TYPE PV2 WITH ACODRAIN



DETAIL E10 -
SCALE 1:10

PAVEMENT TYPE PV5 WITH ACODRAIN

NOT FOR CONSTRUCTION

Scales
100 0 100 200 300 400 500mm
1:10(A1)/1:20(A3)

Issue	Date	By	Chkd	Appd
T02	29/08/25	NM	ERF	KJS
FOR TENDER				
T01	--/--/--	-	-	-
NOT ISSUED				

Client
NSW GOVERNMENT
Bradfield Development Authority
Engineering Certification (CEng)
Name: ...
Signature: ... Date: ...

Job Title
AMRF - BUILDING 2
215 BADGERYS CREEK ROAD, BRADFIELD
Scale at A1: 1:10mm
Discipline: CIVIL

ARUP
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www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 76 625 912 665

Drawing Title
PAVEMENT
EDGE AND INTERFACE DETAILS
SHEET 2 OF 2
Drawing Status
FOR TENDER
Job No: 295398-00
Drawing No: AMRFB2-ARU-DRW-CI-000799
Issue: T02

Do not scale

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