



Ongoing Site Treatment Management Plan

Harbourside, Darling Drive Sydney

Revision		Date
A	Initial Review	23 August 2022
B	Update Revision to Reflect period between Bulk Excavation and Construction	20 October 2022
C		
D		
E		

Table of Contents

ISSUE REGISTER	3
1 INTRODUCTION.....	4
1.1 BACKGROUND.....	4
1.2 PURPOSE OF THIS REPORT.....	4
1.3 PROJECT OVERVIEW.....	5
1.4 OVERVIEW OF THE SCOPE OF THE ONGOING SITE TREATMENT MANAGEMENT PLAN.....	5
1.5 HOURS OF WORK.....	6
1.6 CONTACT DETAILS.....	6
2 OSTMP 'ACTION LIST'	6
3 ONGOING SITE TREATMENT MANAGEMENT PLAN	7
3.1 SITE SURFACE TREATMENT	7
3.2 SITE ACCESS AND FENCING.....	7
3.3 SECURITY	8
3.4 ENVIRONMENTAL HEALTH	9
3.5 STORMWATER CONTROL AND DISCHARGE.....	9
3.6 WATER DISCHARGE MANAGEMENT AND PROTECTION OF DARLING HARBOUR.	9
3.7 ONGOING SITE TREATMENT MANAGEMENT PLAN CHECKLIST	9
4 APPENDICES	10
4.1 APPENDIX A – VEHICLE AND WORKER ACCESS & EGRESS PLAN / SITE HOARDING PLAN.....	10
4.2 APPENDIX B – SEDIMENT & EROSION CONTROL AND STORMWATER MANAGEMENT PLAN (AT&L).....	11
4.3 APPENDIX C – AIR QUALITY MANAGEMENT PLAN – DEMOLITION (JBS&G).....	12
4.4 APPENDIX D – STORMWATER MANAGEMENT PLAN.....	13
4.5 APPENDIX E – ONGOING SITE TREATMENT MANAGEMENT PLAN CHECKLIST	14

ISSUE REGISTER

EMPLOYEE NAME	EMPLOYEE SIGNATURE	DATE

1 INTRODUCTION

This Ongoing Site Treatment Management Plan (OSTMP) has been developed to address the construction items and relevant approval conditions related to the proposed development at Harbourside, Darling Drive, Sydney.

The OSTMP will be monitored throughout the project construction phase until such time as all actions on the OSTMP Action List are completed.

1.1 BACKGROUND

Mirvac is pursuing the staged redevelopment of the Harbourside Shopping Centre, with the first key planning approval secured on 25 June 2021 (SSD 7874) establishing the relevant planning parameters, including building envelopes, maximum GFA limits, Design Guidelines and Design Excellence Strategy, and car parking rates to guide the future detailed design, construction, and operation of Harbourside under subsequent SSD applications. SSD 7874 also granted consent to the demolition of the existing shopping centre and associated structures to ground floor slab level.

To enable the efficient delivery of the project, Mirvac has divided the detailed design and construction works across separate SSDAs, comprising:

- SSDA 1: Bulk excavation works and construction of retaining structures.
- SSDA 2: Detailed design, construction, and operation of the new podium and tower building.
- SSDA 3: Construction and use of the public domain, and Guardian Square, including construction and use of the Murray Street and Bunn Street bridges.

This report forms part of the first detailed design application for bulk excavation works and construction of retaining structures (SSDA 1).

This OSTMP addresses the relevant Development Consent conditions and/or other statutory authorities in relation to the demolition phase of the project.

1.2 PURPOSE OF THIS REPORT

The objectives of this report are to:

- outline the proposed phases of construction works on site and assess Mirvac's impact and interaction with the surrounding community to minimise the impacts of construction activity to the community.
- examine and address the proposed site's sediment and erosion control measures to ensure minimal impact.
- outline measures and procedures for the effective management of the environment in relation to air quality and hazardous materials.
- a commitment to providing a safe working environment.

The responsibility for the management of this document and the actions contained therein lies with the Mirvac Senior Management Team (SMT) for the project. The OSTMP review procedure will be tracked and monitored throughout the project construction phase, with required amendments and updates considered when major site condition changes occur and/or as required to suit project requirements.

All construction activities will be undertaken in accordance with the relevant sections from the Building Code of Australia, Australian Standards, Place Management NSW Approvals, Workplace Health and Safety Act and Work Health and Safety Regulations.

All employees and contractors involved in the development will be inducted prior to commencement of works on site. Included in the induction will be health, safety and environmental requirements and all applicable conditions of consent. Any relevant training requirements will be carried out and monitored for currency throughout the project.

1.3 PROJECT OVERVIEW

The Harbourside redevelopment site is located within the Darling Harbour Precinct inside the City of Sydney Local Government Area (LGA), at the south-western edge of the Sydney CBD. The precinct remains as Sydney's premier tourist and entertainment destination and accommodates varied recreation, tourism, entertainment, retail, residential apartments, and business land uses.

Specifically, the site occupies an area of approximately 2.05 hectares within the north western portion of Darling Harbour, in between Cockle Bay and the Pyrmont Peninsula. It is irregularly shaped and existing site improvements include the 2-3 storey Harbourside Shopping Centre – noting approval has already been granted for stage 1 demolition works. Indicative site boundaries are shown in **Figure 1**.



Figure 1 Harbourside Shopping Centre redevelopment site

1.4 OVERVIEW OF THE SCOPE OF THE ONGOING SITE TREATMENT MANAGEMENT PLAN

A summary of the activities is detailed as follows:

- site surface treatment/stabilisation
- site access and fencing
- security
- environmental health and prevention of contact with contaminants

- management of dust and odour to protect the amenity of the neighbourhood
- stormwater control and discharge
- water discharge management and protection of Darling Harbour.

1.5 HOURS OF WORK

The approved hours of work for demolition works, including the delivery of materials to and from the sites within the precinct, are as follows:

- Between 7:00 am and 6:00 pm, Mondays to Fridays inclusive.
- Between 8:00 am and 1:00 pm, Saturdays.
- No work will be carried out on Sundays and Public Holidays.

Works outside these times are subject to agreement and approval by Council/PMNSW or the relevant approving authority, however noting that it is anticipated that the demolition of the Monorail Station and the existing bridge will require out of hours working.

1.6 CONTACT DETAILS

The Site Manager for the project is Paul Iann

Mobile 0411 125 635

Email paul.iann@mirvac.com

The Senior Project Manager for the project is Stephen Chamberlain

Mobile 0458 748 199

Email stephen.chamberlain@mirvac.com

2 OSTMP 'ACTION LIST'

The "OSTMP Action List" forms the basis of the Harbourside OSTMP. The Action List responds to a series of anticipated DA conditions that are to be addressed prior to and during the demolition phase of the project. They further address any Authority requirements as well as taking into consideration the concerns of neighbouring building occupiers.

The Action List provides a means by which responsibilities of the project team can be readily identified and monitored.

In addition to the Action List are a series of attachments which contain more detailed information in the form of checklists, registers, templates, and reports. The attachments contain the information and tools that must be implemented during the demolition phase in order to close out the specific items and ultimately satisfy the DA conditions associated with the project.

3 ONGOING SITE TREATMENT MANAGEMENT PLAN

3.1 SITE SURFACE TREATMENT

The surface of the completed demolition or bulk excavation activities will be inspected at the completion of each activity to determine the extent of the site that requires application of a robust seal to ensure there is no risk of environmental runoff, erosion or production of dust during the period of the plan implementation.

All stockpiles will be removed prior to ensure there are no loose materials stockpiled onsite.

3.2 SITE ACCESS AND FENCING

The site will be encapsulated by a robust, engineered A and B Class hoarding arrangement. This is illustrated in the following figure 1.

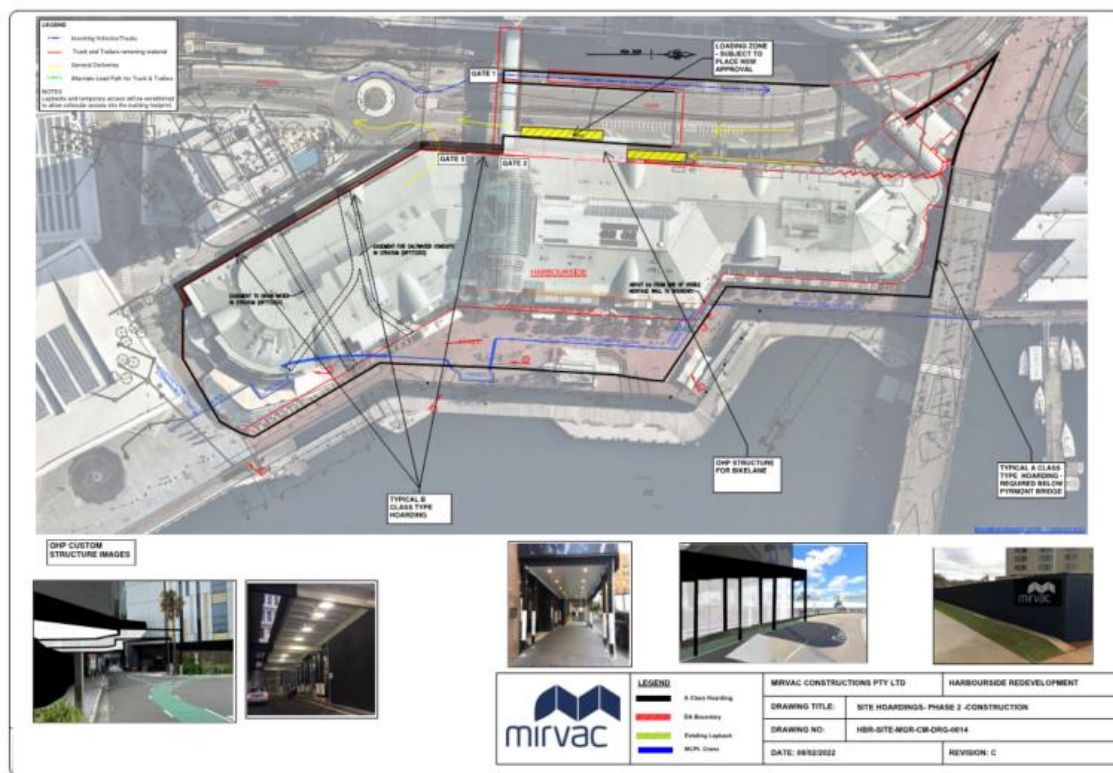


Figure 1: Proposed site hoarding plan. Refer also to Appendix A.

Any required construction traffic will enter the site via dedicated gates on the existing slip lane from Darling Drive, acting as the primary construction access point. The proposed gates along the two existing slip lane driveways will serve as the construction vehicle access and egress for all material handling purposes. There will be secondary egress path from the Southern end of the site to Darling Drive. The proposed site access and egress layout is shown in Figure 2 below:

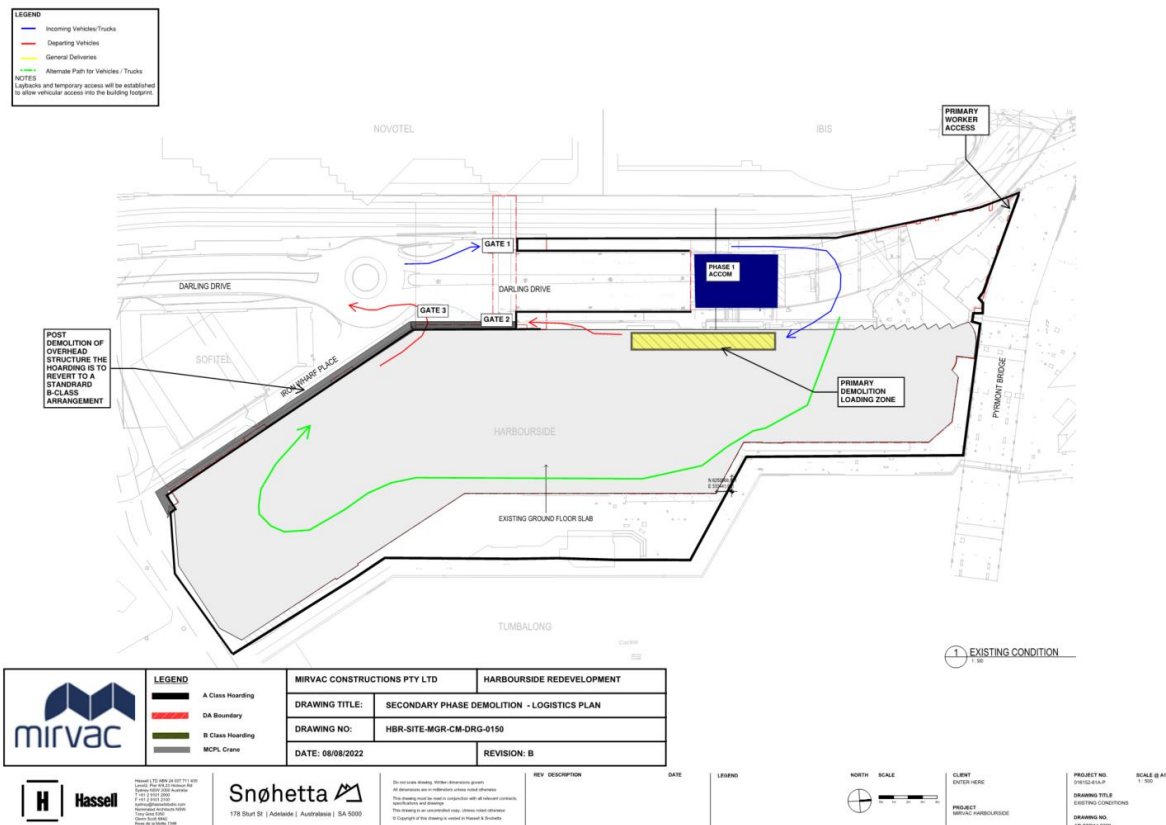


Figure 2: Proposed site access & egress plan. Refer also to Appendix A.

The following will be implemented for site access and egress points:

- The entry / exit gates will be locked. Mirvac shall ensure that clear access is maintained to facilitate any emergency access/evacuation.
- All entering and exiting of vehicles to work zones shall be in accordance with an approved Pedestrian & Traffic Management Plan and supplementary Traffic Guidance Schemes (TGSs). Traffic flow to all lanes of traffic shall remain as open as possible in accordance with DA requirements.
- Installation of suitable engineered hoardings to the full site perimeter to allow pedestrians to safely use the public footpath.
- Relevant statutory signage shall be erected defining the vehicle entry and exit points at all stages of construction.

3.3 SECURITY

The site will be secured with a robust engineered perimeter hoarding which completely encapsulates the site. Gates will be secured at all times during the implementation of this plan with the exception of the times when vehicles are required to access the site.

Additional periodical attendance by security guards will occur during the period of this plan being implemented on the site.

3.4 ENVIRONMENTAL HEALTH

The site will be inspected by a qualified environmental hygienist to ensure that the site at the completion of demolition is free from any visible contaminants.

The demolition air quality management plan requirements, contained in Appendix C will be implemented for the period to ensure there are no negative impacts from the site.

3.5 STORMWATER CONTROL AND DISCHARGE

An Erosion and Sediment Control Plan (refer Appendix B) will be implemented on the project to provide site controls and mitigation measures during the period. The Erosion and Sediment Control Plan has been designed with a holistic approach in establishing, implementing, and maintaining controls to minimise and trap sediment on the site.

The Erosion and Sediment Control Plan will be further developed and implemented on the project to provide site controls during the period if required. The plans will ensure the controls are established early during the project and maintained throughout the life of the project.

A Stormwater management plan is established with the objective of ensuring compliance with Place Management NSW and City of Sydney Councils requirements. The purpose of the management plan is to mitigate and/or address discharge of stormwater off the site and to ensure that the environmental values of receiving waters are maintained or enhanced.

The Stormwater Management Plan provided as an annexure to this report will be developed and regularly assessed to ensure adequate controls are in place throughout the various stages of construction works. (Refer Appendix B). Mirvac's standard systems and procedures includes regular external audits to assess the adequacy of the stormwater, sediment, and erosion controls in place on the site.

3.6 WATER DISCHARGE MANAGEMENT AND PROTECTION OF DARLING HARBOUR.

Refer to appendix B Stormwater Management plan.

3.7 ONGOING SITE TREATMENT MANAGEMENT PLAN CHECKLIST

Mirvac will undertake regular site inspections utilising the Ongoing site Management Plan Checklist, refer Appendix E. These will be undertaken for the applicable period between completion of demolition to ground (excluding ground floor slab) and Commencement of the civil works bulk excavation.

4 APPENDICES

4.1 APPENDIX A – VEHICLE AND WORKER ACCESS & EGRESS PLAN / SITE HOARDING PLAN

LEGEND

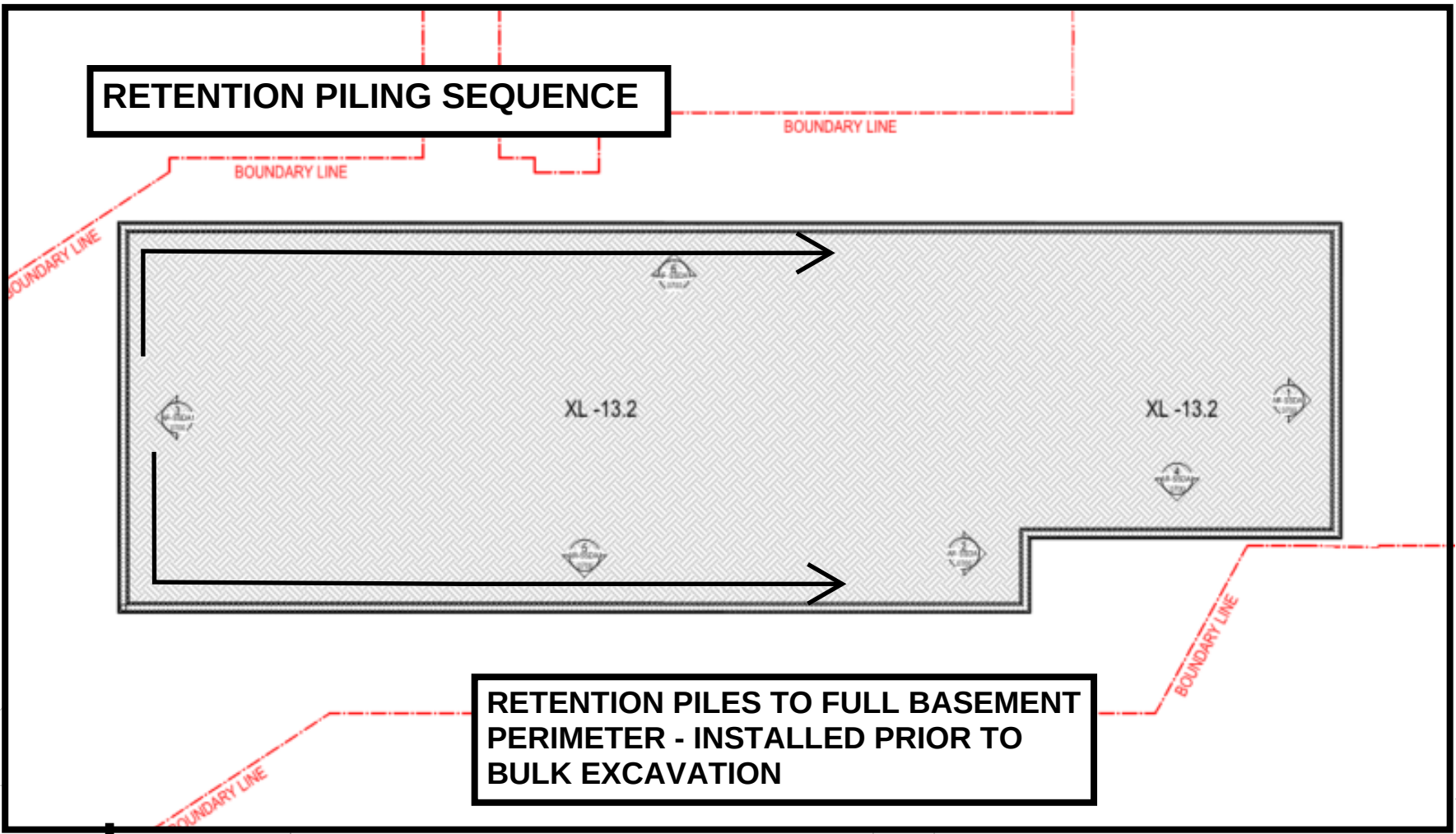
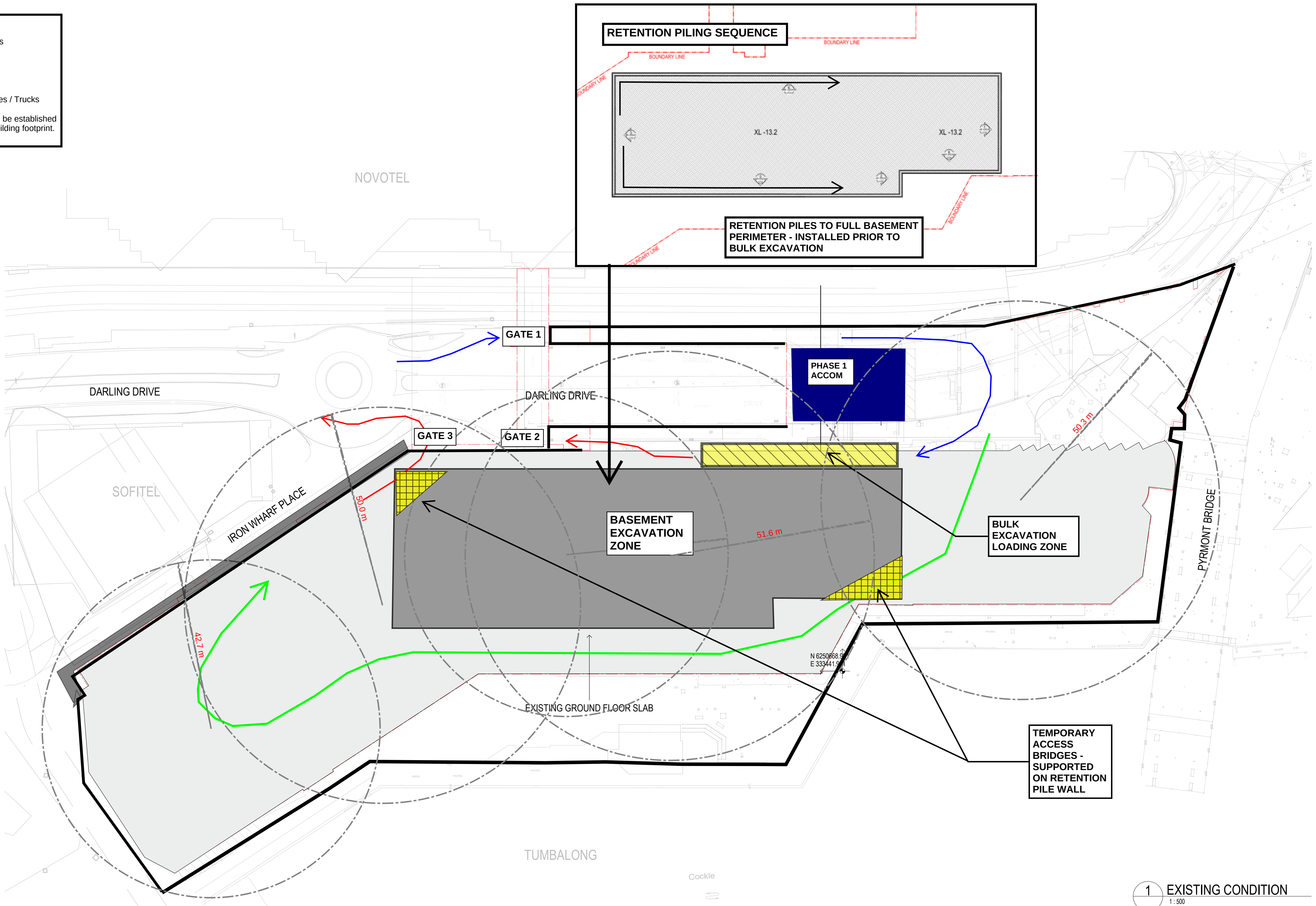
Incoming Vehicles/Trucks

Departing Vehicles

General Deliveries

Alternate Path for Vehicles / Trucks

NOTES
Laybacks and temporary access will be established to allow vehicular access into the building footprint.



1 EXISTING CONDITION
1:500

LEGEND

A Class Hoarding

DA Boundary

B Class Hoarding

MCPL Crane

MIRVAC CONSTRUCTIONS PTY LTD

DRAWING TITLE:

BASEMENT EXCAVATION - LOGISTICS PLAN

DRAWING NO:

HBR-SITE-MGR-CM-DRG-0150

DATE: 08/03/2022

REVISION: B

HARBOURSIDE REDEVELOPMENT

Hassell

Hassell LTD ABN 24 007 711 435
Level2, Pier 8/9,23 Hickson Rd
Sydney NSW 2000 Australia
T +61 2 9101 2000
F +61 2 9101 2100
sydney@hassellstudio.com
Nominated Architects NSW:
Tony Grist 5350
Glenn Scott 6842
Ross de la Motte 7398

Snøhetta

178 Sturt St | Adelaide | Australasia | SA 5000

Do not scale drawing. Written dimensions govern
All dimensions are in millimeters unless noted otherwise
This drawing must be read in conjunction with all relevant contracts,
specifications and drawings
This drawing is an uncontrolled copy. Unless noted otherwise
© Copyright of this drawing is vested in Hassell & Snøhetta

REV	DESCRIPTION	DATE

LEGEND

NORTH

SCALE

CLIENT
ENTER HERE

PROJECT
MIRVAC HARBOURSIDE

PROJECT NO.
016152-61A-P

DRAWING TITLE
EXISTING CONDITIONS

DRAWING NO.
AR-SSDA1 0200

SCALE @ A1
1:500

LEGEND

Incoming Vehicles/Trucks

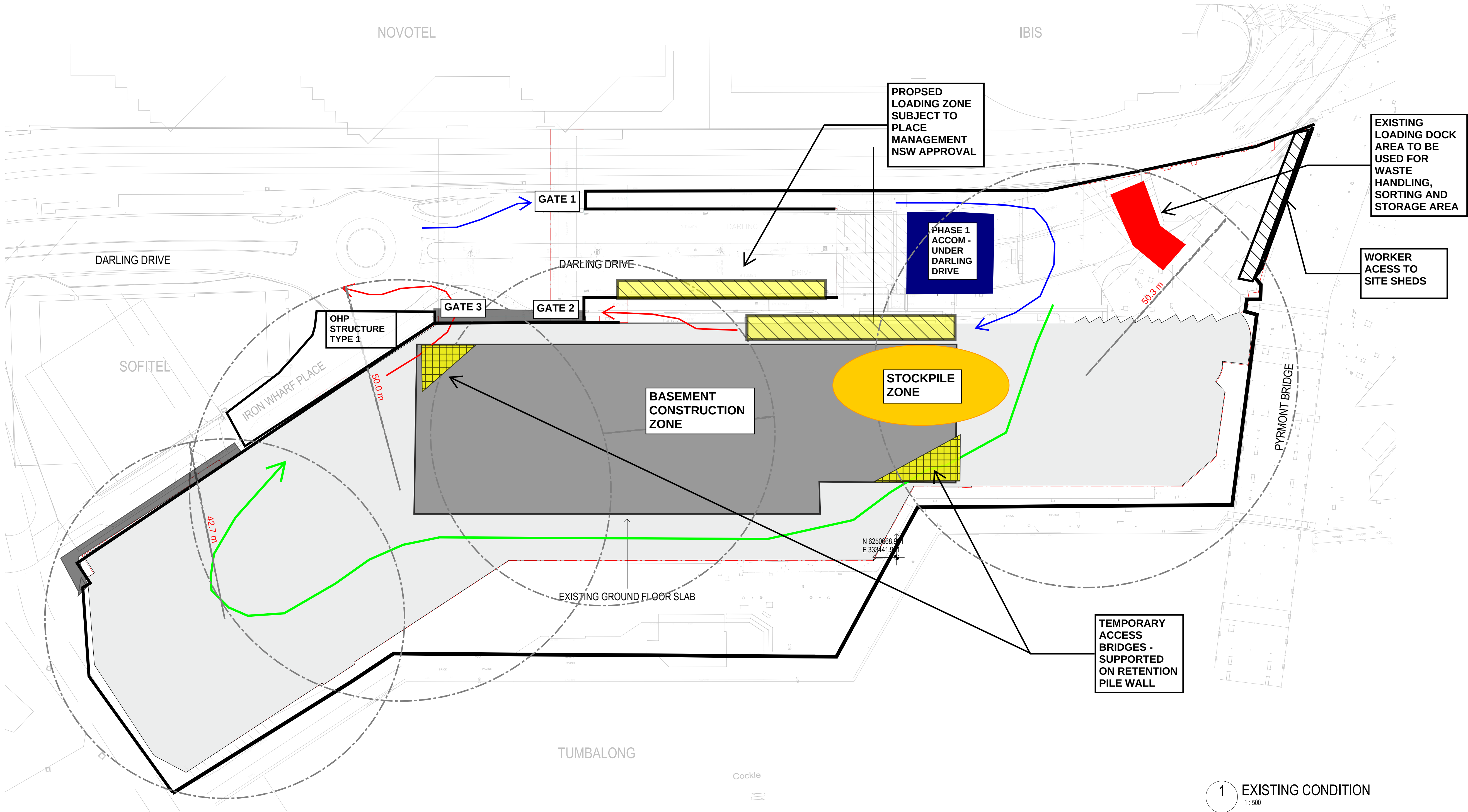
Departing Vehicles

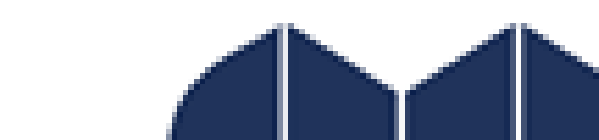
General Deliveries

Alternate Path for Vehicles / Trucks

NOTES

Laybacks and temporary access will be established to allow vehicular access into the building footprint.



	LEGEND		MIRVAC CONSTRUCTIONS PTY LTD		HARBOURSIDE REDEVELOPMENT	
		A Class Hoarding	DRAWING TITLE:	BASEMENT CONSTRUCTION - LOGISTICS PLAN		
		DA Boundary	DRAWING NO:	HBR-SITE-MGR-CM-DRG-0151		
		B Class Hoarding	DATE: 22/09/2022		REVISION: B	
		MCPL Crane				

Hassell

Hassell LTD ABN 24 007 711 435
Level2, Pier 8/9,23 Hickson Rd
Sydney NSW 2000 Australia
T +61 2 9101 2000
F +61 2 9101 2100
sydney@hassellstudio.com
Nominated Architects NSW:
Tony Grist 5350
Glenn Scott 6842
Ross de la Motte 7398

Snøhetta

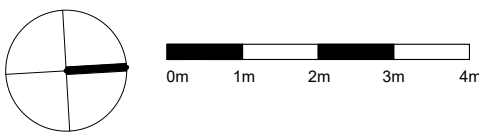
178 Sturt St | Adelaide | Australasia | SA 5000

Do not scale drawing. Written dimensions govern
All dimensions are in millimeters unless noted otherwise
This drawing must be read in conjunction with all relevant contracts, specifications and drawings
This drawing is an uncontrolled copy. Unless noted otherwise
© Copyright of this drawing is vested in Hassell & Snøhetta

REV	DESCRIPTION	DATE
-----	-------------	------

LEGEND

NORTH SCALE



CLIENT
ENTER HERE

PROJECT
MIRVAC HARBOURSIDE

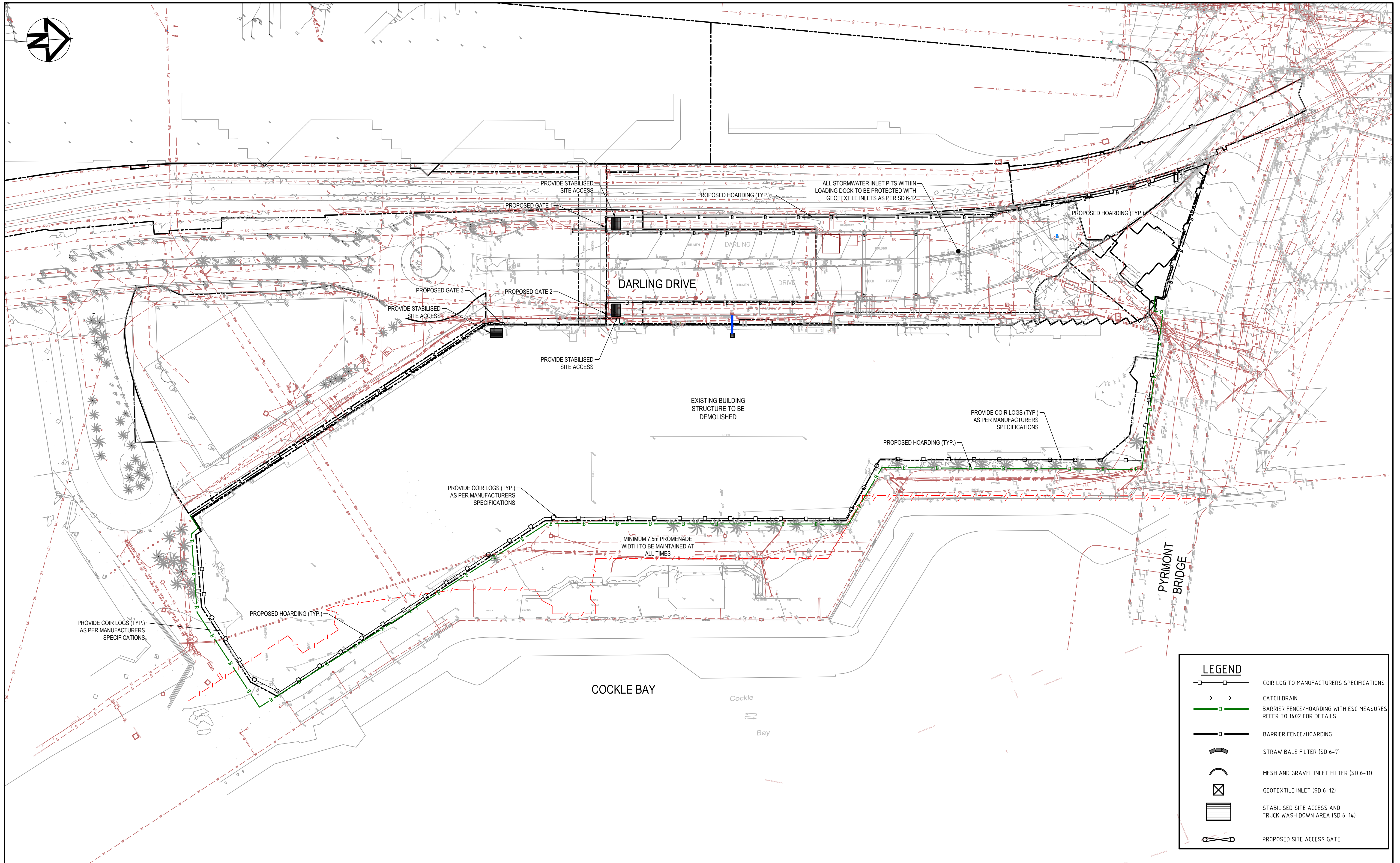
PROJECT NO.
016152-61A-P

DRAWING TITLE
EXISTING CONDITIONS

DRAWING NO.
AR-SSDA1 0200

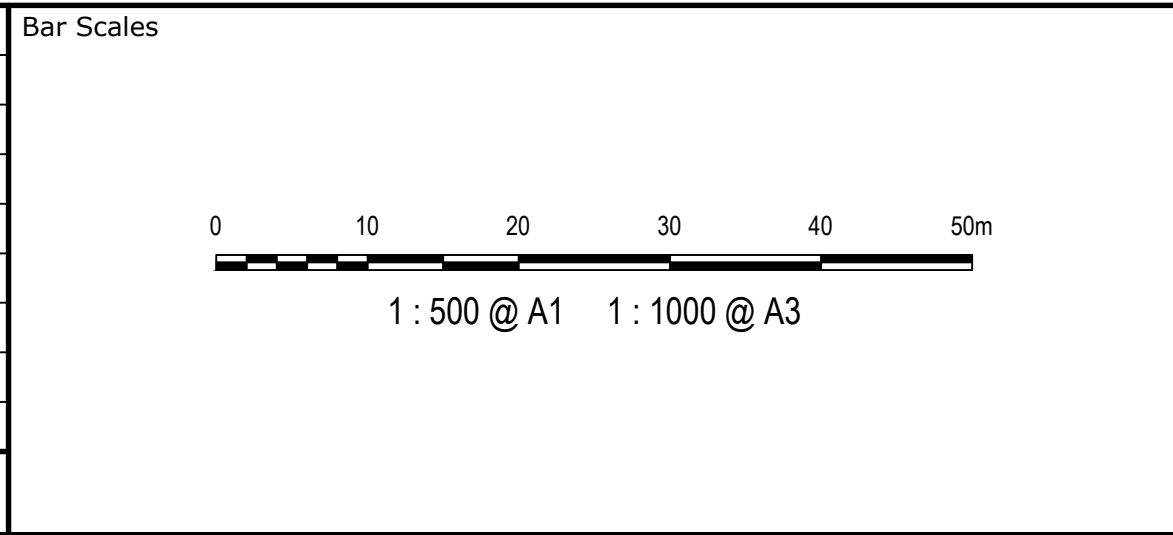
SCALE @ A1
1:500

4.2 APPENDIX B – SEDIMENT & EROSION CONTROL AND STORMWATER MANAGEMENT PLANS (AT&L)



LEGEND	
	COIR LOG TO MANUFACTURERS SPECIFICATIONS
	CATCH DRAIN
	BARRIER FENCE/HOARDING WITH ESC MEASURES REFER TO 1402 FOR DETAILS
	BARRIER FENCE/HOARDING
	STRAW BALE FILTER (SD 6-7)
	MESH AND GRAVEL INLET FILTER (SD 6-11)
	GEOTEXTILE INLET (SD 6-12)
	STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA (SD 6-14)
	PROPOSED SITE ACCESS GATE

B	ISSUED FOR APPROVAL	16-09-22
A	ISSUED FOR APPROVAL	22-06-22
Issue	Description	Date



THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L



Scales	1:200	Drawn	JH
		Designed	JH
Grid	MGA2020	Checked	GJ
Height Datum	AHD	Approved	AT
CONSENT No: DA-483/2018/F			

Project	HARBOURSIDE DEMOLITION
Title	EROSION AND SEDIMENTATION CONTROL PLAN

Civil Engineers and Project Managers	
Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au	
Status	FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION	
Project - Drawing No.	CIV-DWG-OA-1401
Issue	B

EROSION AND SEDIMENT CONTROL NOTES

GENERAL INSTRUCTIONS

1. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO CONTROL EROSION AND DOWNSTREAM SEDIMENTATION DURING ALL STAGES OF CONSTRUCTION INCLUDING THE MAINTENANCE PERIOD.
2. THE EXTENT AND POSITION OF THE EROSION AND SEDIMENT CONTROL MEASURES TO BE DETERMINED ON SITE BY THE CONTRACTOR TO SUIT THE CONSTRUCTION PROGRAM.
3. THESE PLANS PRESENT CONCEPTS ONLY AND THE MEASURES SHOWN ON THIS DRAWING(S) ARE MINIMUM REQUIREMENTS ONLY.
4. THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT, MANAGEMENT AND MAINTENANCE OF THE EROSION AND SEDIMENT CONTROL MEASURES TO MEET COUNCIL STANDARDS.
5. LARGE OPEN AREAS OR STEEP BATTERS SHOULD NOT BE LEFT EXPOSED/UNSTABILISED FOR MORE THAN 10 DAYS OR IF WET WEATHER IS FORECAST.
6. EXPOSED AREAS INCLUDING BATTERS WHICH REMAIN UN-WORKED FOR MORE THEN 10 DAYS SHOULD BE STABILISED USING TEMPORARY HYDROMULCHING, HYDROSEEDING OR MULCHING, EVEN IF AREAS WILL BE WORKED AT A LATER TIME.
7. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH :-
 - a) LOCAL AUTHORITY REQUIREMENTS
 - b) EPA REQUIREMENTS
 - c) NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION" 4TH EDITION MARCH 2004
8. THE CONTRACTOR SHALL BE AWARE OF ITS RESPONSIBILITIES FOR PROTECTING THE DOWNSTREAM ENVIRONMENT AND RECEIVING WATER FROM POLLUTION AND ENVIRONMENTAL HARM, UNDER THE ENVIRONMENTAL PROTECTION ACT 1994.
9. ADDITIONALLY THE CONTRACTOR SHALL BE AWARE OF ITS DUTY TO NOTIFY THE LOCAL AUTHORITY AND THE ENVIRONMENTAL PROTECTION AGENCY (NSW) OF A POTENTIAL OR ACTUAL INCIDENT OF ENVIRONMENTAL HARM, UNDER THE ENVIRONMENTAL PROTECTION ACT 1994.

RECOMMENDED IMPLEMENTATION SEQUENCE:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND FUNCTIONAL PRIOR TO WORKS COMMENCING AND IN THE FOLLOWING SEQUENCE:
 - a. CONSTRUCT TEMPORARY STABILISED SITE ACCESS, ENSURING ADJACENT STORMWATER RUN OFF IS DIVERTED AWAY FROM ACCESS
 - b. INSTALL SEDIMENT FENCING AND/OR BARRIER FENCING TO CONFINE INGRESS TO AND EGRESS FROM THE SITE TO STABILISED ACCESS POINT(S) ONLY.
 - c. PROVIDE INLET PROTECTION TO STORMWATER INLETS AND GULLIES ON ALL ROADS ADJOINING THE SITE.
 - d. CONSTRUCT BARRIER FENCING AROUND RESTRICTED 'NO-GO' ZONES OF RETAINED VEGETATION, AREAS NOT TO BE DISTURBED AND AREAS WHICH WILL REMAIN UN-WORKED.
 - e. CONSTRUCT UPSTREAM DIVERSION CHANNELS TO DIVERT CLEAN WATER AROUND WORKSITE, AND INSTALL APPROPRIATE CHANNEL STABILISATION.
 - f. CONSTRUCT LOW FLOW EARTH BANKS AS CATCH DRAINS PARALLEL TO CONTOURS TO LIMIT LARGE SLOPE LENGTHS (SLOPES SHOULD BE LESS THEN 80M IN LENGTH).
 - g. INSTALL ALL TEMPORARY SEDIMENT FENCES.
 - h. CONSTRUCT ANY NOMINATED SEDIMENT BASINS AND SEDIMENT TRAPS.
 - i. STABILISE ALL DISTURBED AREAS ASAP AND PROGRESSIVELY AS WORKS ARE COMPLETED. TEMPORARY STABILISATION TO BE DONE USING MULCHING, HYDROMULCHING, HYDROSEEDING OR DIRECT SEEDING TO GIVE A 70% COVERAGE OF GROUND SURFACE WITHIN 14 DAYS OF WORKS COMPLETING (EVEN IF WORKS MAY CONTINUE LATER).
2. UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO MINIMUM WORKABLE AREAS.
3. DISTURBED AREAS TO EXTEND NO MORE THAN 5 METRES (PREFERABLY 2 METRES) FROM ESSENTIAL WORKS AREAS.
4. WORK AREAS TO BE DELINEATED BY BARRIER FENCING AND DIVERSION CHANNEL UPSLOPE AND SEDIMENT FENCING DOWNSLOPE.
5. THE CONTRACTOR SHALL ENSURE THAT THE EXISTING VEGETATION AND GROUND COVER IS RETAINED AS MUCH AS POSSIBLE.
6. TOPSOIL SHALL BE STRIPPED AND STOCKPILED FOR LATER USE ONSITE.
7. SITE VEGETATION APPROVED FOR CLEARING SHOULD BE MULCHED AND STOCKPILED FOR LATER USE IN LANDSCAPING, STABILISATION AND/OR SITE REHABILITATION WORKS.
8. AT ALL TIMES THE CONTRACTOR SHALL MONITOR THE PREVAILING WEATHER CONDITIONS AND PROTECT ANY DOWNSTREAM CONSTRUCTION AND RECEIVING ENVIRONMENTS.
9. EROSION AND SEDIMENT CONTROL PROTECTION MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR THROUGHOUT CONTRACT.
10. PLANS AND CONTROL MEASURES FOR LARGE SITES WILL NEED TO BE REVISED AND UPDATED TO REFLECT THE SITE STAGES AND PROGRESSION OF WORKS.
11. MEASURES INCLUDING SEDIMENT FENCES SHOULD BE MOVED AND REINSTATED AS WORKS PROGRESS.
12. FOOT AND VEHICULAR TRAFFIC TO BE RESTRICTED IN RECENTLY STABILISED AREAS INCLUDING THOSE HYDROSEEDED, TURFED OR SEEDED.

DUST CONTROL

1. DURING WINDY AND DRY WEATHER ANY UNPROTECTED AREAS SHALL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL. WHERE WATER IS NOT AVAILABLE IN SUFFICIENT QUANTITIES, SOIL BINDERS OR DUST RETARDANTS TO BE USED FOR DUST SUPPRESSION.
2. EXPOSED SURFACES INCLUDING BATTERS SHOULD BE LEFT ROUGH TO REDUCE WIND SPEEDS AND POTENTIAL FOR WIND EROSION.
3. USE OPEN WEAVE BARRIER FENCING ON WINDWARD SIDE OF SITE IF REQUIRED. FENCING IS GENERALLY REQUIRED WHERE AREA OF DISTURBANCE IS >5000m².

CONTROL MEASURES

1. FINAL SITE LANDSCAPING SHALL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS OF CONSTRUCTION COMPLETION.
2. SEDIMENT LADEN WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM BY USING INLET PROTECTION.
3. ALL PERIMETER BANKS AND CHANNEL DRAINS SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
4. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED ONCE SITE IS STABILISED AND UPSTREAM WORKS HAVE BEEN COMPLETED.
5. AT CONSTRUCTION COMPLETION ALL TEMPORARY EARTH STRUCTURES, INCLUDING SOIL STOCKPILES ARE TO BE TRACK ROLLED AND SEEDED. THE CONTRACTOR IS TO ENSURE A 70% COVERAGE WITHIN 14 DAYS.

OTHER MATTERS

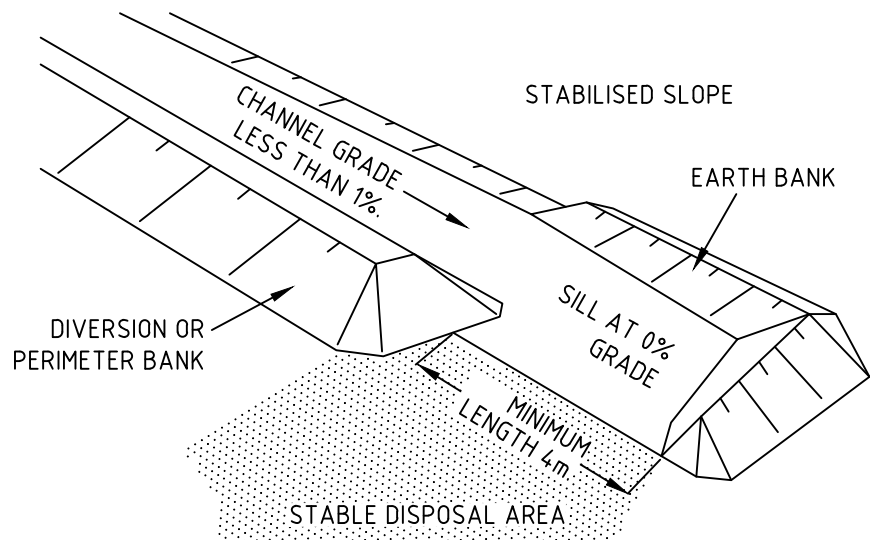
1. ACCEPTABLE RECEPTORS AND DISPOSAL PRACTICES WILL BE USED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHERS, LITTER AND GENERAL WASTE MATERIALS.
2. ANY EXISTING TREES WHICH ARE NOT REQUIRED OR APPROVED TO BE CLEARED FOR THE WORKS AND/OR FORM PART OF THE FINAL LANDSCAPING PLAN SHOULD BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
 - a. PROTECTING THEM WITH BARRIER FENCING OR MARKERS.
 - b. ENSURING NOTHING IS NAILED TO THEM
 - c. PROHIBITING PAVING, GRADING OR PLACING OF STOCKPILES WITHIN DRIP LINE.
3. ALL VEHICLE AND EQUIPMENT WASHING SHOULD BE CONTAINED IN SPECIFIC BUNDED AREAS, DISCONNECTED FROM CONCENTRATED FLOW PATHS AND THE STORMWATER SYSTEM.
4. ANY NECESSARY VEHICLE OR EQUIPMENT REFUELING SHOULD BE UNDERTAKEN AWAY FROM CONCENTRATED FLOW PATHS AND PREFERABLY WITHIN A BUNDED AREA.
5. ANY ONSITE FUEL STORAGE AREAS SHOULD BE COVERED AND BUNDED.

MAINTENANCE OF PUBLIC ROADS

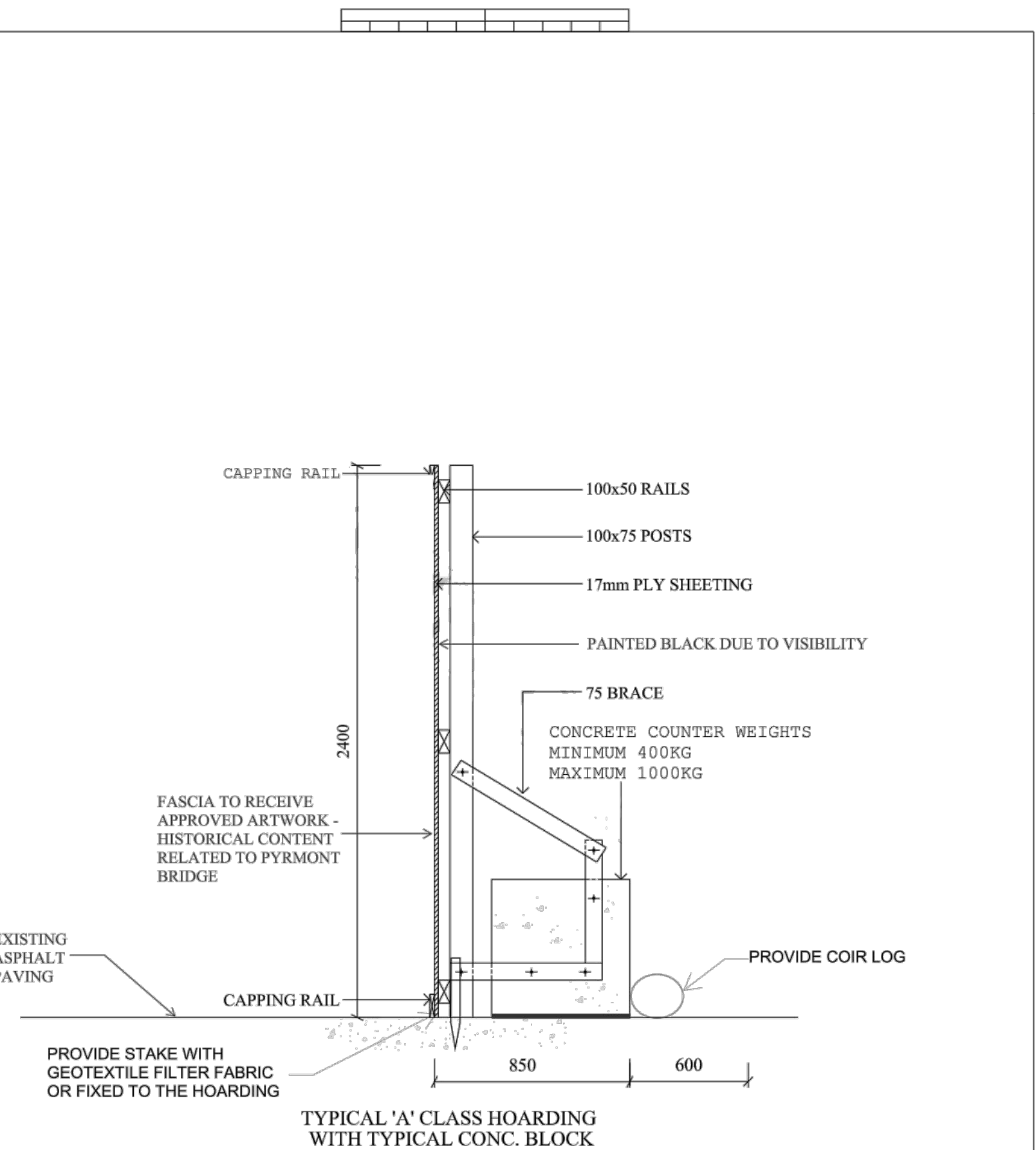
1. ALL CONSTRUCTION VEHICLES DEPARTING FROM THE SITE SHALL HAVE THEIR TYRES WASHED DOWN OR SEDIMENT REMOVED BY A STABILISED SITE ACCESS DEVICE.
2. THE STABILISED SITE ACCESS AREAS SHALL BE LOCATED SUCH THAT SILTED WATER IS FILTERED THROUGH A SUITABLE SEDIMENT TRAP (SUCH AS A SEDIMENT FENCE) INSTALLED DOWNSTREAM OF ACCESS.
3. THE CONTRACTOR SHALL INSPECT THE PUBLIC ROADS ADJACENT TO THE SITE DAILY AND MANUALLY REMOVE ANY SEDIMENT DEPOSITS (BY SWEEPING NOT WASH DOWN).

SITE INSPECTION AND MAINTENANCE

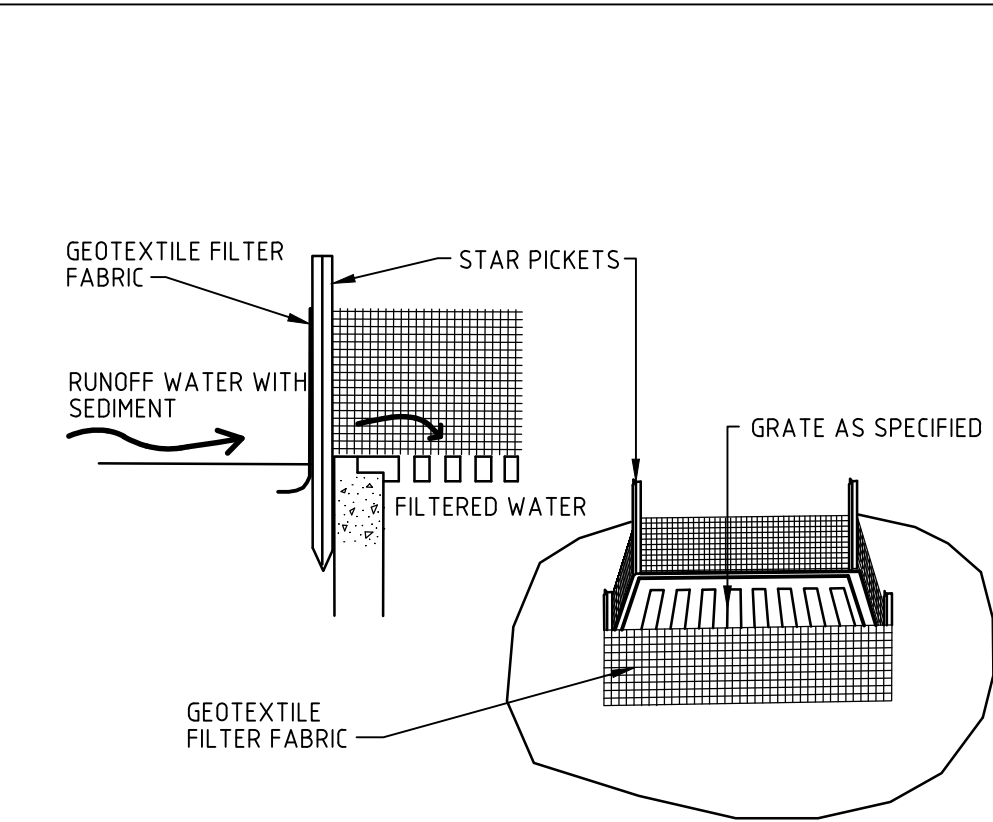
1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED REGULARLY, IMMEDIATELY BEFORE SITE CLOSURE, PRIOR TO PREDICTED LARGE STORM EVENTS AND AFTER EVERY SIGNIFICANT (> 5MM) RAINFALL EVENT OR AT LEAST ON A WEEKLY BASIS.
2. THE CONTRACTOR WILL AS A MINIMUM CONDUCT EACH INSPECTION IN LINE WITH THE FOLLOWING
 - a. RECORD TYPE OF DEVICE/CONTROL MEASURE BEING INSPECTED AND ITS LOCATION;
 - b. RECORD THE CONDITION OF EVERY CONTROL MEASURE;
 - c. RECORD MAINTENANCE REQUIREMENTS FOR EVERY CONTROL DEVICE;



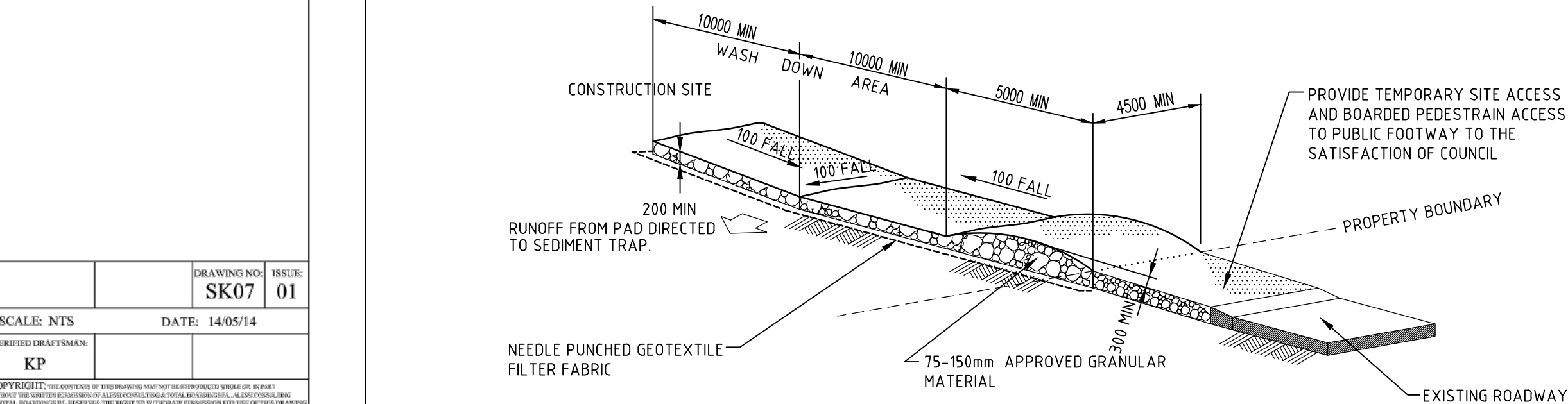
LEVEL SPREADER (OR SILL)
N.T.S



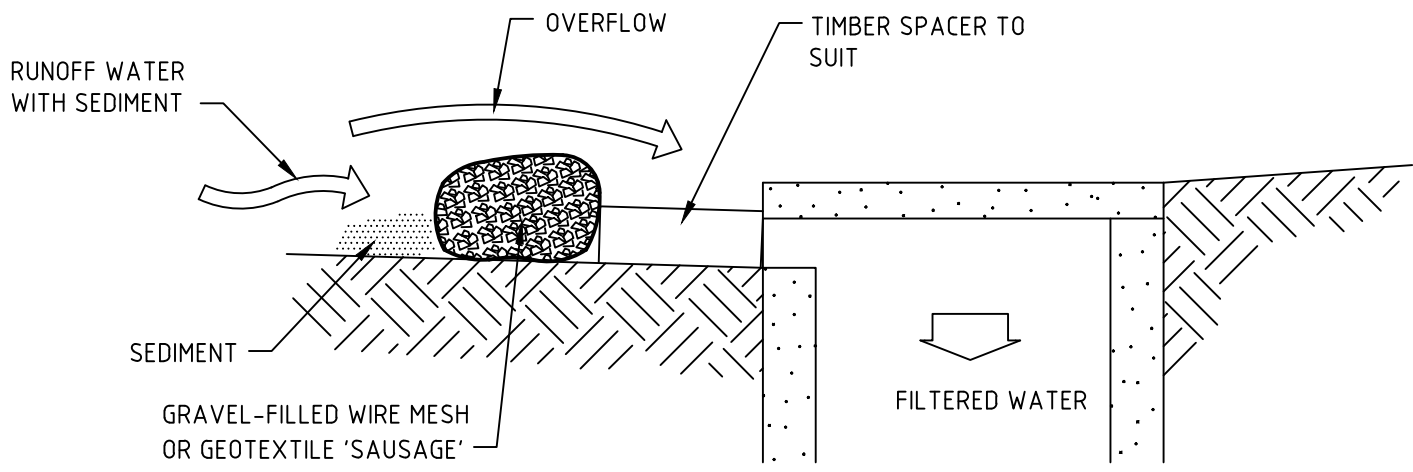
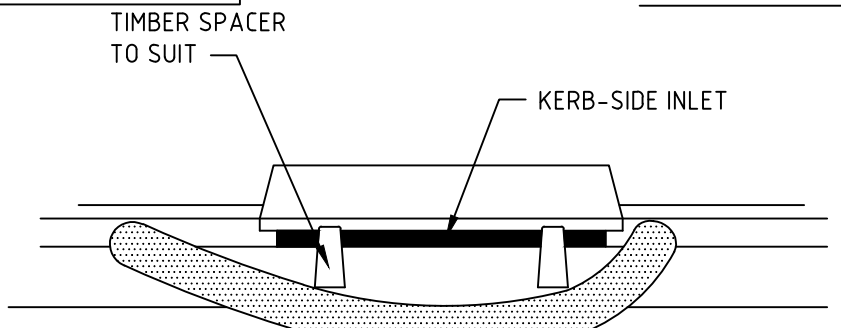
PROPOSED HOARDING FOR:		DRAWING TITLE: TYPICAL 'A' CLASS ON CONCRETE BLOCKS			DRAWING NO: SK07	ISSUE: 01
			SCALE: NTS			



GEOTEXTILE FILTER PIT SURROUND
NTS



STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA
NTS



MESH AND GRAVEL INLET FILTER
NTS

C	ISSUED FOR APPROVAL	25-09-22
B	ISSUED FOR APPROVAL	16-09-22
A	ISSUED FOR APPROVAL	22-06-22
Issue	Description	Date

Bar Scales

THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L



Scales	Drawn	JH
NTS	Designed	JH
Grid	Checked	GJ
MGA2020	Approved	AT
Height Datum	AHD	
CONSENT No: DA-483/2018/F		

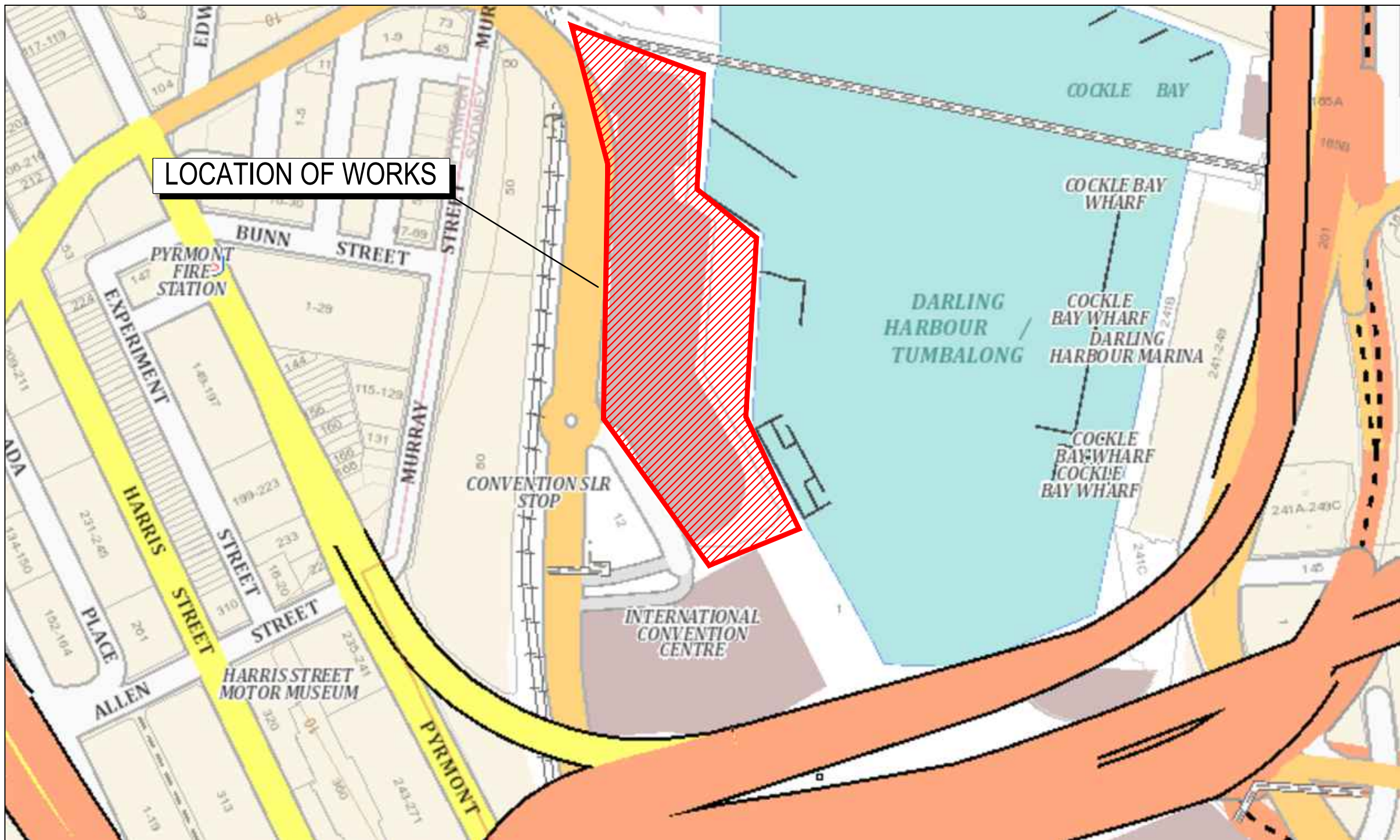
Project	HARBOURSIDE DEMOLITION
Title	EROSION AND SEDIMENTATION CONTROL DETAILS

Civil Engineers and Project Managers		
at&l Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
Status	FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	CIV-DWG-OA-1402	Issue
		C

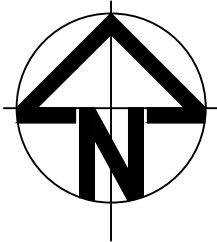
HARBOURSIDE

CIVIL WORKS PACKAGE

EXCAVATION



LOCALITY PLAN
N.T.S



DRAWING LIST

CIV-DWG-OA-0000	COVER SHEET AND DRAWING LIST
CIV-DWG-OA-0001	GENERAL NOTES AND LEGENDS
CIV-DWG-OA-0400	STORMWATER DRAINAGE PLAN
CIV-DWG-OA-0401	EROSION AND SEDIMENTATION CONTROL PLAN
CIV-DWG-OA-0402	EROSION AND SEDIMENTATION CONTROL DETAILS

		Bar Scales	THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L		Client	Scales NTS	Drawn JH	Project	HARBOURSIDE EXCAVATION	Civil Engineers and Project Managers  Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au			
						Grid MGA2020	Designed JH						
						Height Datum AHD	Checked GJ				Approved AT		
						SSD 7874					Title	COVER SHEET AND DRAWING LIST	
A	ISSUED FOR APPROVAL	07-03-22											
Issue	Description	Date											

100mm on Original

F:\21-926 Harbourside Mirvac\6.0 Drgs\Civil\Final\0000 Series - Early Works\CIV-DWG-OA-0000.dwg



EROSION AND SEDIMENT CONTROL

NOTES

GENERAL INSTRUCTIONS

- THE SITE SUPERINTENDENT/ENGINEER WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED.
- ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
 - LOCAL AUTHORITY REQUIREMENT
 - EPA REQUIREMENTS
 - NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
- MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
- WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
- CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

LAND DISTURBANCE

- WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
 - INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
 - UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

EROSION CONTROL

- DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.

SEDIMENT CONTROL

- STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
- WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
- TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

OTHER MATTERS

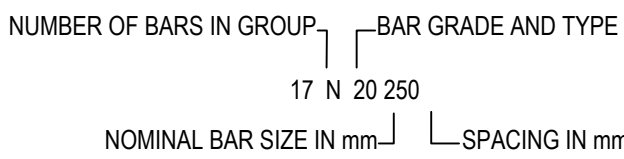
- ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH ARBORIST REPORT AND TREE PROTECTION MEASURES
 - PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
 - ENSURING THAT NOTHING IS NAILED TO THEM
 - PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS:
 - ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICH EVER IS THE GREATER
 - A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH
 - CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

CONCRETE NOTES

- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 (2018) CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- CONCRETE QUALITY ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	AS 3600 Fc MPa AT 28 DAYS	SPECIFIED SLUMP	NOMINAL AGG. SIZE
VEHICULAR BASE KERBS, PATHS, AND PITS	32	60	20
	32	80	20

- CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL
- PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379.
- NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY AT & L.
- CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE 40mm TOP AND 70mm FOR EXTERNAL EDGES UNLESS NOTED OTHERWISE.
- ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
- THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED AND CURED IN ACCORDANCE WITH R.M.S. SPECIFICATION R83.
- REINFORCEMENT SYMBOLS:
N DENOTES GRADE 450 N BARS TO AS/NZS 4671 GRADE N
R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS/NZS 4671
SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS/NZS 4671



THE FIGURE FOLLOWING THE FABRIC SYMBOL SL IS THE REFERENCE NUMBER FOR FABRIC TO AS/NZS 4671.

- FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:



SITEWORKS NOTES

- ORIGIN OF LEVELS:- REFER SURVEY NOTES.
- CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO AT & L.
- MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
- ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
- ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1(2017). (OR A DENSITY INDEX OF NOT LESS THAN 75)
- PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
- ASPHALTIC CONCRETE SHALL CONFORM TO RMS. SPECIFICATION R116.
- ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS. FORM 3051 (UNBOUND), RMS. FORM ACCORDANCE WITH AS 1289 5.2.1(2017) FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m OF BASECOURSE MATERIAL PLACED.
- ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS. FORM 3051, 3051.1 AND COMPACTED FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m OF SUB-BASE COURSE MATERIAL PLACED.
- AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN (9) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH RMS. FORM 3051 AND 3051.1 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF AT & L.
- SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY INDICATED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
- WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS. 3052 (BOUND) COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN TO MINIMUM 95% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1(2017)

STORMWATER DRAINAGE NOTES

- STORMWATER DESIGN CRITERIA:
A) AVERAGE RECURRENT INTERVAL:
1:100 YEARS ROOFED AREAS TO SURCHARGE PIT
1:20 YEARS EXTERNAL PAVEMENTS
(B) RAINFALL INTENSITIES:
TIME OF CONCENTRATION: MINUTES 5
1:100 YEARS= 269.5 mm/hr
1:20 YEARS= 210.7mm/hr
(C) RUNOFF COEFFICIENTS:
ROOF AREAS: C =1.0
EXTERNAL PAVEMENTS: C =1.0
- PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '4' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
- PIPES UP TO 300 DIA SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
- EQUIVALENT STRENGTH VCP OR FRC PIPES ARE NOT PERMITTED.
- ALL STORMWATER DRAINAGE LINES UNDER PROPOSED BUILDING SLABS TO BE uPVC PRESSURE PIPE GRADE 6. ENSURE ALL VERTICALS AND DOWNPIPES ARE uPVC PRESSURE PIPE, GRADE 6 FOR A MIN OF 3.0m IN HEIGHT.
- PIPES TO BE INSTALLED TO TYPE HS3 (ROAD) HS2 (LOTS) SUPPORT IN ACCORDANCE WITH AS 3725 (2007) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
- ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (2006) AND AS/NZS 3500 3.2 (2010).
- PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY AT & L.
- ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
- WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
- CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
- GRATES AND COVERS SHALL CONFORM TO AS 3996.
- ALL INTERNAL PIT DIMENSIONS TO CONFORM TO AS3600.3 TABLE 7.5.2.1
- AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
- ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.

EXISTING UNDERGROUND SERVICES NOTES

THE LOCATIONS OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION AND SERVICE AUTHORITY INFORMATION. THE SERVICE INFORMATION HAS BEEN PREPARED ONLY TO SHOW THE APPROXIMATE POSITIONS OF ANY KNOWN SERVICES AND MAY NOT BE AS CONSTRUCTED OR ACCURATE. AT & L CAN NOT GUARANTEE THAT THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.

CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY.

CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.

CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.

SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY BEVERIDGE WILLIAMS, BEING REGISTERED SURVEYORS. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. AT & L DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.

SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT AT & L.

THE FOLLOWING NOTES HAVE BEEN TAKEN DIRECTLY FROM THE ORIGINAL SURVEY DOCUMENTS.

NOTES:

- CONTOURS SHOWN DEPICT THE APPROXIMATE TOPOGRAPHY. SPOT LEVELS SHOULD BE TAKEN IN PREFERENCE TO CONTOURS, CONTOURS DO NOT REPRESENT THE EXACT LEVEL AT ANY POINT. ALL LEVELS SHOULD BE CONFIRMED ON SITE PRIOR TO EXCAVATION OR CONSTRUCTION.
- SOME SPOT LEVELS HAVE BEEN REMOVED FROM THE FACE OF THIS PLAN FOR CLARITY. ADDITIONAL SPOT LEVELS ARE AVAILABLE IN THE ELECTRONIC VERSION OF THIS PLAN FOR MORE DETAILED DESIGN WORKS.
- BEVERIDGE WILLIAMS SURVEY DATA HAS BEEN DIGITISED FROM POINT CLOUD DATA OBTAINED FROM 3D LASER SCANNING SURVEY TECHNIQUES. ADDITIONAL SURVEY DATA IS AVAILABLE IN THE POINT CLOUD ACCOMPANYING THIS PLAN FOR MORE DETAILED DESIGN WORKS
- SURVEY DATA SHOWN IN GREY HAS BEEN OBTAINED FROM SURVEY UNDERTAKEN BY RYGATE SURVEYORS PLAN REFERENCE 77266 DATED 27/01/2016
- BOUNDARIES SHOWN ON THIS PLAN ARE BASED ON PLANS AVAILABLE ON PUBLIC RECORD AT TIME OF SURVEY AND PRELIMINARY SURVEY INVESTIGATIONS ONLY. ALL BOUNDARY DIMENSIONS ARE BY TITLE ONLY AND SUBJECT TO FINAL SURVEY
- THE RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OFFSETS ARE CRITICAL THEY SHOULD BE CONFIRMED BY FURTHER SURVEY. PRIOR TO CONSTRUCTION BOUNDARIES SHOULD BE MARKED
- SERVICES STRUCTURES HAVE BEEN LOCATED WHERE VISIBLE ONLY. ALL SERVICES SHOULD BE LOCATED BY THE RELEVANT AUTHORITY PRIOR TO ANY DESIGN. EXCAVATION OR CONSTRUCTION WORKS
- TREE CANOPIES ARE APPROXIMATE ONLY AND SHOULD BE VERIFIED FROM POINT CLOUD IF CRITICAL TO DESIGN
- THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF ASSISTING FUTURE DESIGN WORKS AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE

CIVIL HOLD POINTS

HOLD POINTS/WITNESS POINT (INSPECTIONS)

PAVEMENT:

- PROOF ROLL SUBGRADE
- PROOF ROLL SUBBASE
- KERB SETOUT
- PROOF ROLL BASECOURSE
- SPRAY SEAL
- ASPHALT (1ST LAYER)
- FOOTPATH/DRIVEWAYS FORMWORK

STORMWATER:

- SETOUT STORMWATER PITS
- FORMWORK FOR ANY IN-SITU PITS
- EXCAVATE AND PARTIAL LAID PIPES

FINAL INSPECTIONS:

- SIGNAGE
- FINAL ASPHALT LAYER
- LINEMARKING
- DEFECTS INSPECTION
- DEFECTS RECTIFICATION
- HANDOVER

MATERIAL AND TESTING REQUIREMENTS:

PAVEMENT:

- CBR/COMPACTION TEST SUBGRADE
- SURVEY SUBGRADE
- MATERIAL DATA SHEET SUBBASE
- COMPACTION TEST SUBBASE
- SURVEY SUBBASE
- MIX DESIGN KERB
- MATERIAL DATA SHEET BASECOURSE
- COMPACTION TEST BASECOURSE
- SURVEY BASECOURSE
- MATERIAL DATA SHEET SPRAY SEAL
- APPLICATION RATE/TEMPERATURE FORM SPRAY SEAL
- MATERIAL DATA SHEET ASPHALT
- NUCLEAR DENSITY TEST
- MIX DESIGN FOOTPATH/DRIVEWAYS
- CONCRETE STRENGTH TEST FOOTPATH/DRIVEWAYS

STORMWATER:

- MATERIAL DATA SHEET PRECAST PIT AND PIPES
- MATERIAL DATA SHEET AGG PIPE AND GEOFABRIC
- MATERIAL DATA SHEET SAND BACKFILL
- DENSITY TEST SAND OVERLAY
- COMPACTION TEST BACKFILL
- CONCRETE STRENGTH TEST STORMWATER INSITU PITS

FINAL:

- WAE SURVEY (FINISHED LEVELS, STORMWATER INVERTS PIPE SIZE ETC)

COORDINATION WILL BE REQUIRED WITH UTILITY INSTALLATIONS (ATL IS NOT RESPONSIBLE FOR INSPECTIONS OR COORDINATION OF UTILITIES ON THIS PROJECT):

- WATER
- POWER
- JEMENA
- TELECOMMS

CONSTRUCTION TOLERANCES

BULK EARTHWORKS		
EARTHWORKS	-10mm / +20mm	OF FINISHED SURFACE LEVEL (AFTER COMPACTION AND TRIMMING)
STORMWATER		
PIPES	WITHIN 20mm	OF THE DESIGN INVERT LEVEL AT ANY POINT
PIPES	WITHIN 100mm	OF THE PLAN POSITION SHOWN ON THE DRAWINGS OR SPECIFIED AT ANY POINT
HEADWALLS	WITHIN 20mm	OF THE DESIGN INVERT LEVEL AT ANY POINT
HEADWALLS	WITHIN 100mm	OF THE PLAN POSITION SHOWN ON THE DRAWINGS OR SPECIFIED AT ANY POINT
CHAMBERS	WITHIN 20mm	OF THE INVERT LEVEL SHOWN ON THE DRAWINGS
CHAMBERS	WITHIN 200mm	LONGITUDINALLY OF THE PLAN POSITION, WITH REFERENCE TO THE CONTROL LINE FOR THE ROAD SHOWN ON THE DRAWINGS
LINTELS	AS PER THE TOLERANCES SPECIFIED FOR THE ADJOINING MATERIAL	
COVERS	AS PER THE TOLERANCES SPECIFIED FOR THE ADJOINING MATERIAL	
GRATES	AS PER THE TOLERANCES SPECIFIED FOR THE ADJOINING MATERIAL	
OPEN DRAINS	WITHIN 50mm	OF THE DESIGN LEVEL AT ANY POINT PROVIDED THAT THERE IS A CONTINUOUS DOWNGRADE (WITHOUT PONDING) IN THE DIRECTION OF FLOW NOT LESS THAN 0.5% AT ANY POINT
PAVEMENT		
SUBBASE	-10mm / +10mm	OF PAVEMENT COURSE THICKNESS (AFTER COMPACTION & TRIMMING)
SUBBASE	-10mm / +0mm	OF FINISHED SURFACE LEVEL (AFTER COMPACTION AND TRIMMING)
SUBBASE	-5mm / +5mm	ALONG THE FINISHED SURFACE (LAID IN ANY DIRECTION) OVER A LENGTH OF 3 METRES
BASECOURSE	-0mm / +20mm	OF PAVEMENT COURSE THICKNESS (AFTER COMPACTION & TRIMMING)
BASECOURSE	-0mm / +10mm	OF FINISHED SURFACE LEVEL (AFTER COMPACTION AND TRIMMING)
BASECOURSE	-5mm / +5mm	ALONG THE FINISHED SURFACE (LAID IN ANY DIRECTION) OVER A LENGTH OF 3 METRES
SEAL	-0mm / +10mm	OF PAVEMENT FINISHED SURFACE LEVEL (AFTER ROLLING AGGREGATE)
SEAL	-5mm / +10mm	ALONG THE FINISHED SURFACE OVER THE CARRIAGEWAY WIDTH AT THE DATE OF PRACTICAL COMPLETION
SEAL		SURFACE OF THE COURSE, INCLUDING LONGITUDINAL AND TRANSVERSE JOINTS, MUST NOT POND WATER.
ASPHALT	-0mm / +10mm	OF PAVEMENT FINISHED SURFACE LEVEL (AFTER COMPACTION)
ASPHALT	-5mm / +5mm	ALONG THE FINISHED SURFACE OVER THE CARRIAGEWAY WIDTH AT THE DATE OF PRACTICAL COMPLETION
ASPHALT	-8mm / +8mm	ALONG THE FINISHED SURFACE OVER THE CARRIAGEWAY WIDTH AT THE COMPLETION OF THE DEFECT LIABILITY PERIOD
ASPHALT		SURFACE OF THE COURSE, INCLUDING LONGITUDINAL AND TRANSVERSE JOINTS, MUST NOT POND WATER.
CONCRETE		
KERB	-5mm / +5mm	ALONG THE TOP OF KERB OVER A LENGTH OF 5 METRES
KERB	-5mm / +5mm	ALONG THE FACE OF KERB OVER A LENGTH OF 5 METRES
PATH	-0mm / +10mm	OF FOOTPATH/SHARED PATH FINISHED SURFACE LEVEL
PATH		SURFACE OF THE PATH, INCLUDING JOINTS, MUST NOT POND WATER.
VERGE		
TURF	-10mm / +0mm	OF PAVEMENT FINISHED SURFACE LEVEL (AFTER COMPACTION) TO THE ADJOINING MATERIAL (FOOTPATHS, KERBS, ETC)
MULCH	-10mm / +0mm	OF PAVEMENT FINISHED SURFACE LEVEL (AFTER COMPACTION) TO THE ADJOINING MATERIAL (FOOTPATHS, KERBS, ETC)
RETAINING / NOISE WALLS		
WALL	-20mm / +20mm	FROM ANY POINT ON THE WALL THE LEVEL MUST NOT DEVIATE FROM THAT SPECIFIED
WALL	-10mm / +10mm	INCLINATION OF THE FACE OF THE COMPLETED WALL MUST NOT DEVIATE FROM THE SPECIFIED INCLINATION PER METER HEIGHT (BLOCK WALL)
WALL	-5mm / +0mm	INCLINATION OF THE FACE OF THE COMPLETED WALL MUST NOT DEVIATE FROM THE SPECIFIED INCLINATION PER METER HEIGHT (PANEL WALL)
WALL	-20mm / +20mm	FLATNESS OF THE FACE OF THE WALL MUST BE SUCH THAT THE MAXIMUM DEVIATION FROM A 4.5 M STRAIGHT EDGE

CONTRACTOR SHALL CALL;
DIAL BEFORE
YOU DIG 1100
PRIOR TO COMMENCEMENT OF WORK
TO OBTAIN ALL CURRENT SERVICE
AUTHORITY PLANS



		Bar Scales
A	ISSUED FOR APPROVAL	07-03-22
Issue	Description	Date

THIS DRAWING CANNOT BE
COPIED OR REPRODUCED IN
ANY FORM OR USED FOR ANY
OTHER PURPOSE OTHER THAN
THAT ORIGINALLY INTENDED
WITHOUT THE WRITTEN
PERMISSION OF AT&L



Client

Scales

Drawn

JH

Project

HARBOURSIDE
EXCAVATION

Grid

MGA2020

Checked

GJ

Height

AHD

Approved

AT

CONSENT No: DA-483/2018/F

GENERAL NOTES
AND LEGENDS

Civil Engineers and Project Managers

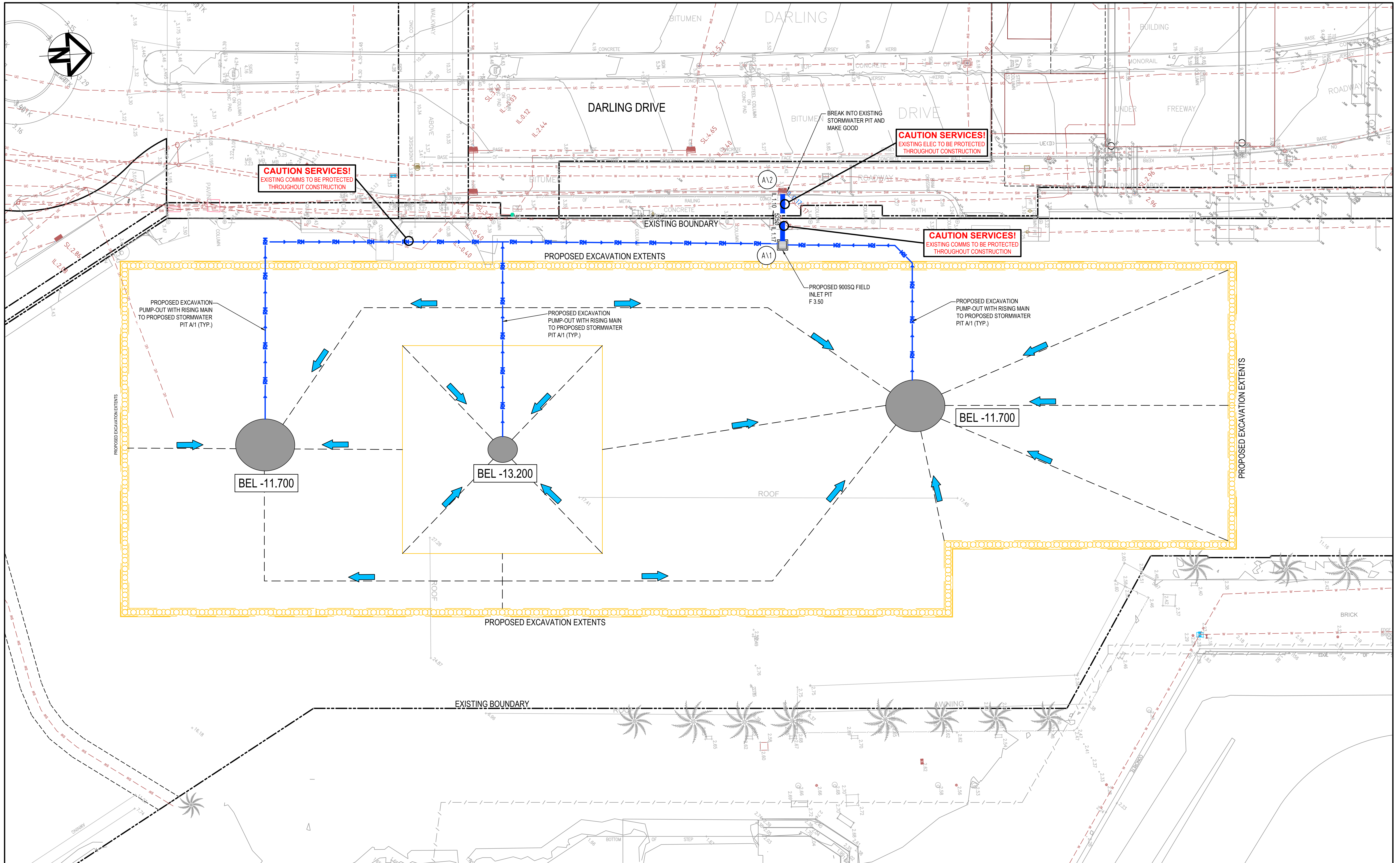
at&l
Level 7, 153 Walker Street
North Sydney NSW 2060
ABN 96 130 882 405
Tel: 02 9439 1777
Fax: 02 9923 1055
www.atl.net.au
info@atl.net.au

Status
FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION

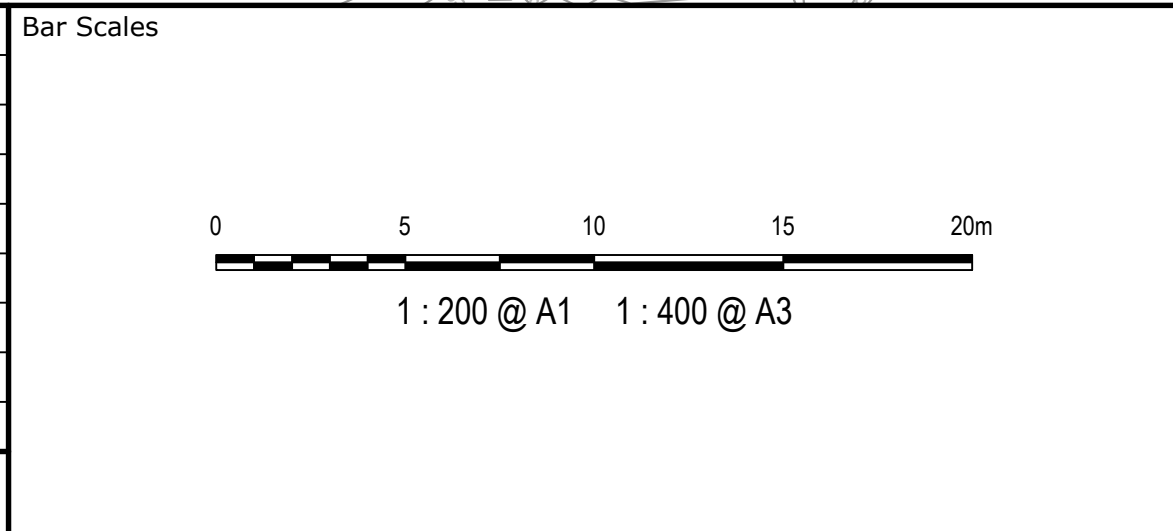
A1

Project - Drawing No.
CIV-DWG-OA-0001

Issue
A



A	ISSUED FOR APPROVAL	07-03-22
Issue	Description	Date



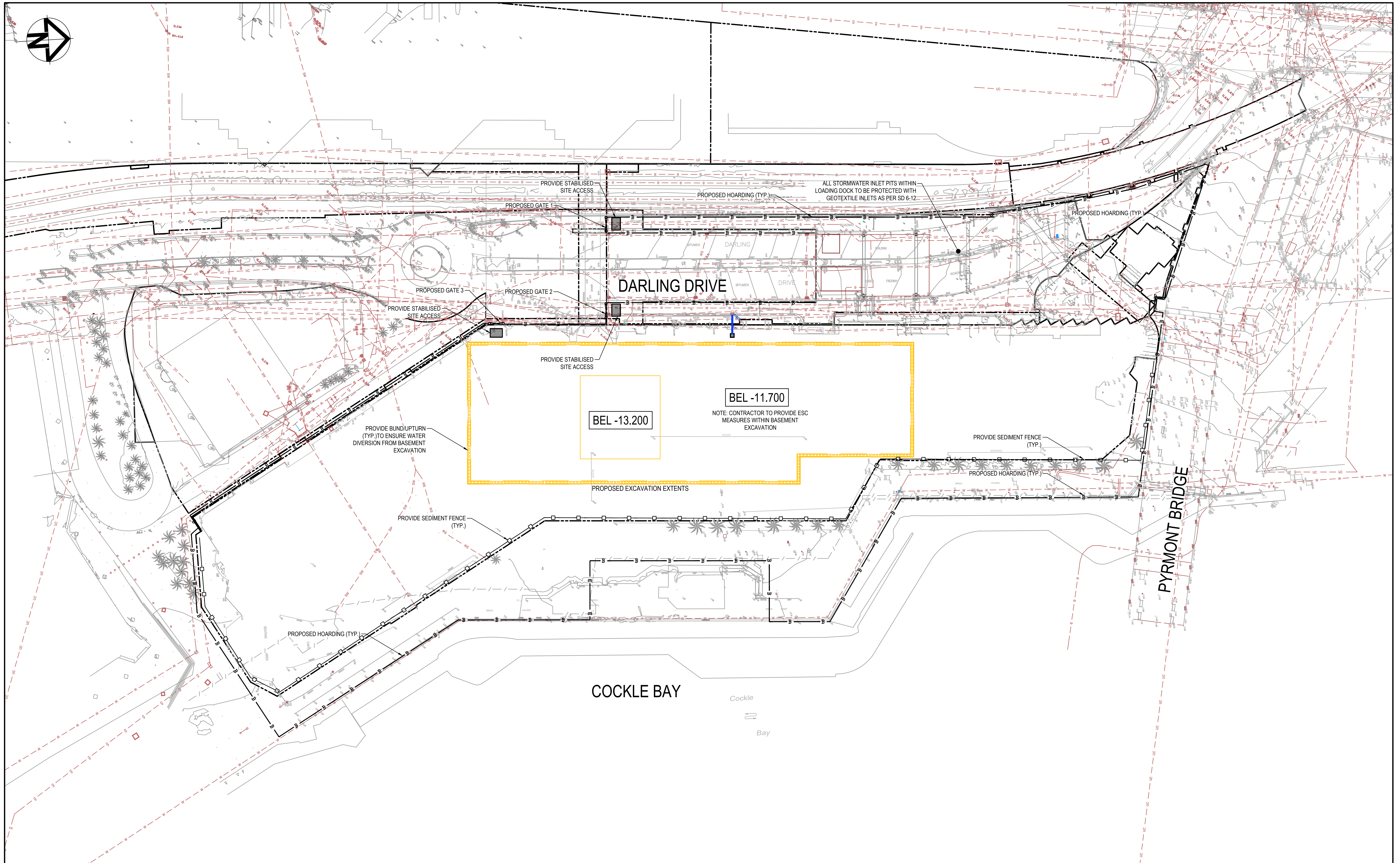
THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L



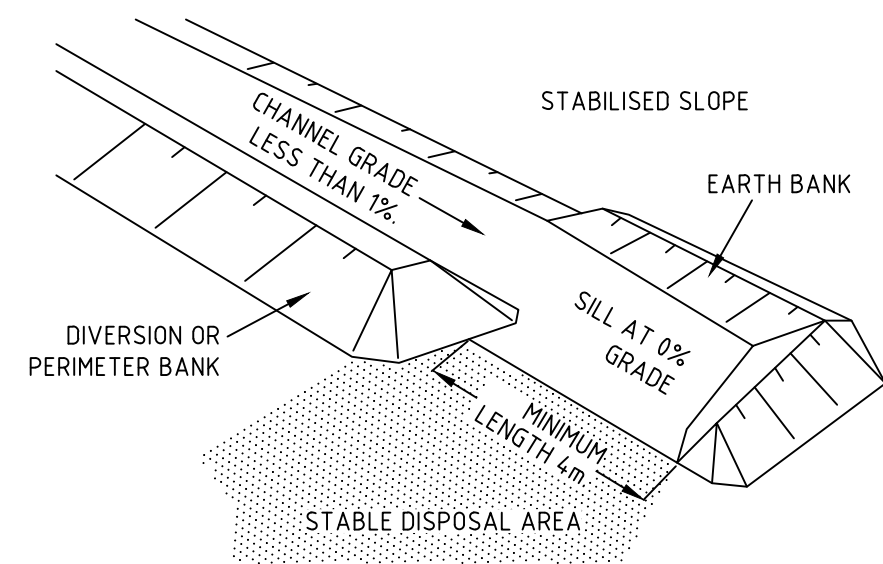
Scales	1:200	Drawn	JH
Grid	MGA2020	Designed	JH
Height Datum	AHD	Checked	GJ
		Approved	AT
CONSENT No: DA-483/2018/F			

Project	HARBOURSIDE EXCAVATION
Title	STORMWATER DRAINAGE PLAN

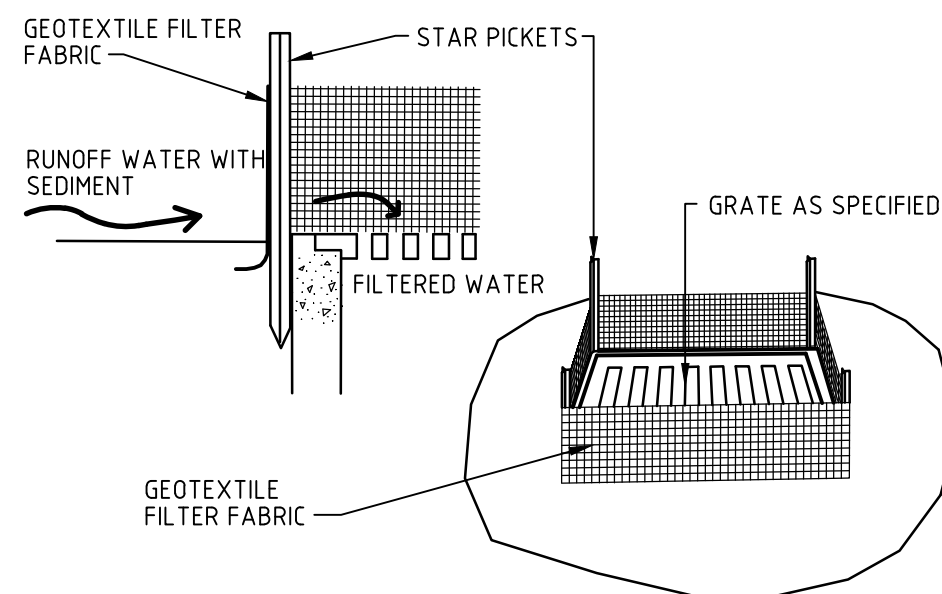
Civil Engineers and Project Managers		
at&l		
Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
Status	FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	CIV-DWG-OA-0400	Issue A



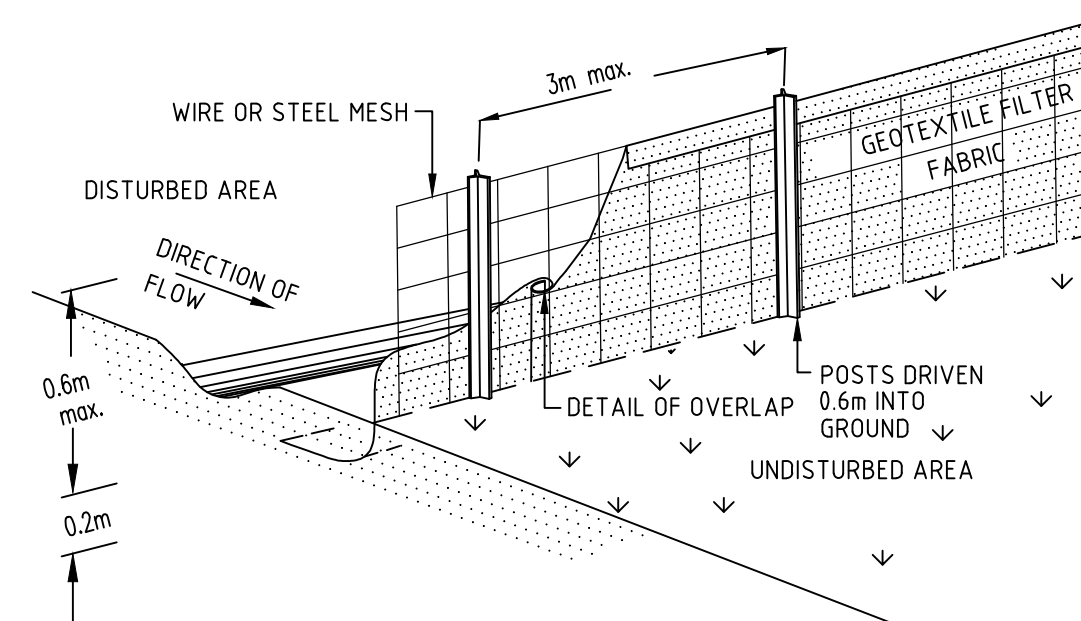
		Bar Scales		THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L	 Client	Scales		Drawn	Project		Civil Engineers and Project Managers  Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION Project - Drawing No. CIV-DWG-OA-0401					
		 1 : 500 @ A1 1 : 1000 @ A3				1:200	JH	HARBOURSIDE EXCAVATION								
						Grid	MGA2020	Designed	JH							
						Height Datum	AHD	Checked	GJ							
						CONSENT No: DA-483/2018/F		Approved	AT		EROSION AND SEDIMENTATION CONTROL PLAN					
A		ISSUED FOR APPROVAL		07-03-22								A1				
Issue		Description		Date								Issue				
												A				



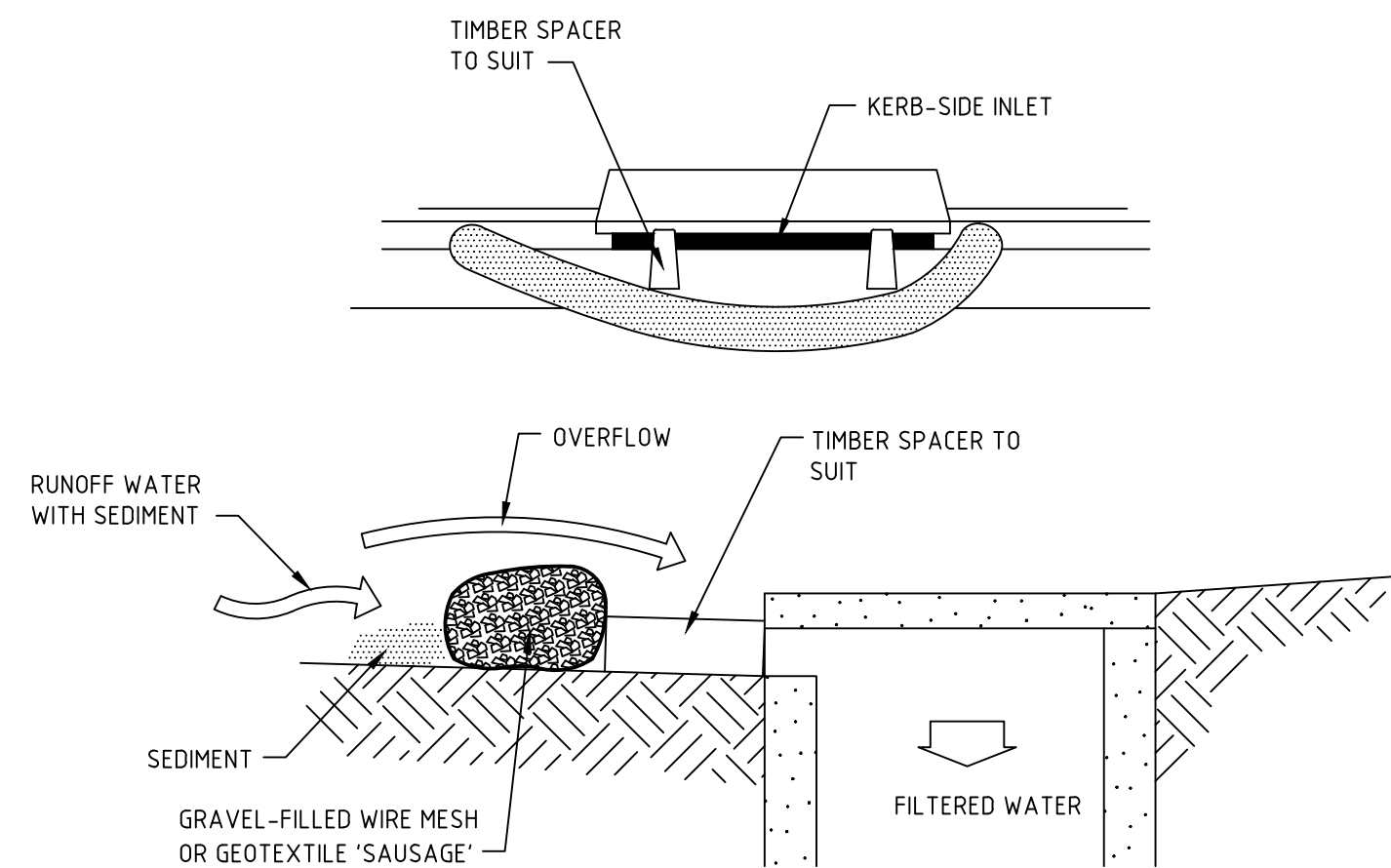
LEVEL SPREADER (OR SILL)
N.T.S



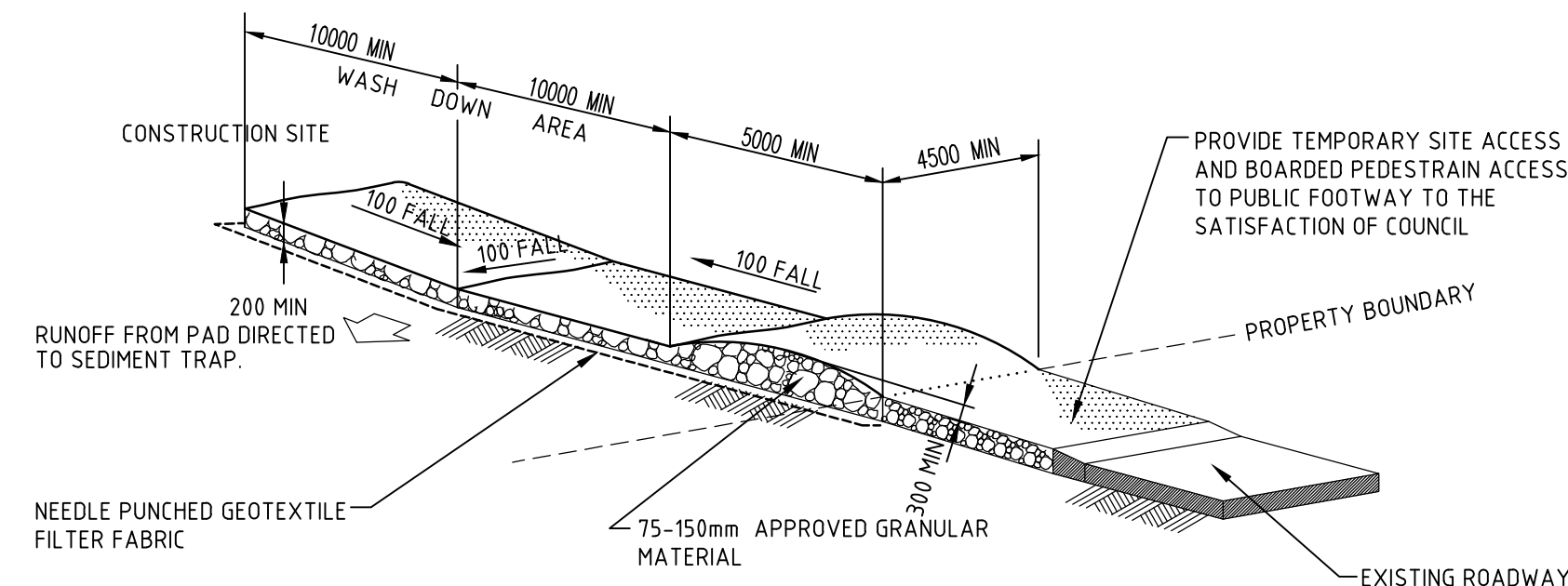
GEOTEXTILE FILTER PIT SURROUND
NTS



SEDIMENT FENCE
NTS



MESH AND GRAVEL INLET FILTER
NTS



STABILISED SITE ACCESS AND TRUCK WASH DOWN AREA
NTS

A	ISSUED FOR APPROVAL	07-03-22
Issue	Description	Date

Bar Scales

THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L



Scales	NTS
Grid	MGA2020
Height Datum	AHD
CONSENT No: DA-483/2018/F	

Drawn	JH
Designed	JH
Checked	GJ
Approved	AT
Project	HARBOURSIDE EXCAVATION
Title	EROSION AND SEDIMENTATION CONTROL DETAILS

Civil Engineers and Project Managers		
at&l Level 7, 153 Walker Street North Sydney NSW 2060 ABN 96 130 882 405 Tel: 02 9439 1777 Fax: 02 9923 1055 www.atl.net.au info@atl.net.au		
Status	FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION	A1
Project - Drawing No.	CIV-DWG-OA-0402	Issue A

4.3 APPENDIX C – AIR QUALITY MANAGEMENT PLANS– DEMOLITION AND EXCAVATION (JBS&G)



Mirvac Retail Sub SPV Pty Ltd
Air Quality Management Plan – Demolition Works

Harbourside Shopping Centre Redevelopment
2-10 Darling Drive
Sydney

29 July 2022

62851/146,599 (Rev A)
JBS&G Australia Pty Ltd

Table of Contents

Abbreviations	iii
1. Introduction	1
1.1 Introduction and background	1
1.2 Proposed Construction and Demolition Works	1
1.3 Objective and Scope of work	2
2. Summary of Site Condition	3
2.1 Site Details	3
2.2 Site Condition	3
2.3 Surrounding Environment	4
2.4 Meteorological Conditions	4
3. General Air Quality in the City of Sydney	5
3.1 Regulatory Requirements	6
4. Proposed Demolition Scope	7
4.1 Timeline and Staging	7
4.2 Demolition Phase 1	7
4.3 Demolition Phase 2	7
4.4 Equipment	7
5. Potential Sources of Air Emissions	8
5.1 Particulates (Dust)	8
5.2 Exhaust Emissions	8
5.3 Required Emissions and Controls	9
6. Conclusions and Recommendations	11
7. Limitations	12

List of Figures

Figure 1	Site Location
Figure 2	Site Layout

Appendices

Appendix A	Design Plans
Appendix B	Air Quality Procedures

Abbreviations

Term	Definition
ACM	Asbestos Containing Material
AHD	Australia Height Datum
AIOH	Australian Institute of Occupational Hygienists
AQA	Air Quality Assessment
AQMP	Air Quality Management Plan
ASS	Acid sulfate soil
AST	Above ground storage tank
bgs	below ground surface
BTEX	Benzene, toluene, ethylbenzene, xylene
CBD	Central Business District
CLM Act	Contaminated Land Management Act 1997
COPC	Contaminant of potential concern
DDR	Dust Deposition Rates
DEMP	Demolition Environmental Management Plan
DP	Deposited Plan
DSI	Detailed Site Investigation
EPA	NSW Environment Protection Authority
HMBS	Hazardous Materials Building Survey
JBS&G	JBS&G Australia Pty Ltd
LAA	Licensed Asbestos Assessor
LPI	NSW Land and Property Information
Mirvac	Mirvac Retail Sub SPV Pty Ltd
NATA	National Association of Testing Authorities (NATA)
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
PAH	Polycyclic Aromatic Hydrocarbons
PASS	Potential acid sulfate soil
PCB	Polychlorinated biphenyls
PFAS	Per-and-poly-fluoroalkyl substances
PM _(2.5/10)	Particle Matter (number indicates particle diameter in micrometres/micron)
POEO Act	Protection of the Environment Operations Act 1997
PPE	Personal Protective Equipment
RAP	Remedial Action Plan
RCS	Respirable Crystalline Silica
RL	Relative Level
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SPOCAS	suspension peroxide oxidation combined acidity
SVOC	Semi-volatile organic compounds
SWA	SafeWork Australia
SWNSW	SafeWork New South Wales
TRH	Total Recoverable Hydrocarbon
TSP	Total Suspended Particulate
UST	Underground storage tank
VOC	Volatile Organic Compound

1. Introduction

1.1 Introduction and background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Mirvac Retail Sub SPV Pty Ltd (Mircvac, the client) for the provision of environmental services associated with the development site known as Harbourside Shopping Centre, located at 2-10 Darling Drive, Sydney, NSW (the site). The site location and current layout are presented in **Figures 1** and **2** respectively. The site is legally identified as Lots 1-10, 12-15 and 17 in Deposited Plan (DP) 776815, Part Lot 2015 in DP 1234971 and Part Lot 300 in DP 836419. The site occupies an area of approximately 20,500 m².

The site is situated on the former Darling Harbour Goods Yard which consists of reclaimed land adjacent to Cockle Bay. Prior to reclamation in the 1860s the site consisted of tidal mudflats. Currently the site comprises Harbourside Shopping Centre an on-grade retail/commercial development (**Figure 2**). The site is proposed to be redeveloped for mixed land use (ground floor retail/upper levels of commercial and residential apartment tower with four levels of basement parking in areas). Design plans are presented in **Appendix A**.

The redevelopment plans require the demolition of existing structures down to ground levels prior to the completion of any soil remediation or bulk excavation works. JBS&G has been engaged to prepare this air quality management plan (AQMP) to control and mitigate potential onsite and offsite air quality impacts which may occur as a result of the demolition phase of works. A separate air quality assessment document has been prepared for the bulk excavation phase of works.

This AQMP assesses the range of potential sources of air emissions that may occur during demolition and outlines the requirements for control and monitoring of these potential emissions.

1.2 Proposed Construction and Demolition Works

As discussed above, the site is proposed to be redeveloped as a mixed-use precinct, comprising a commercial/residential tower with on-grade retail spaces and four levels of basement parking in the central portion of the site.

The proposed development works will include bulk excavation to facilitate basement construction including excavation of site fill material, underlying natural sands/clays (which have been identified as potential acid sulfate soil (PASS)) and sandstone bedrock (where encountered) to an approximate depth of -8.5 m Australian Height Datum (AHD). Approximately 51,450 m³ of material will be generated and disposed of off-site as part of basement construction activities.

With respect to demolition the proposed redevelopment will require:

- Demolition of the existing shopping centre (i.e. the Harbourside Shopping Centre) to ground level, however demolition of the existing ground slab or any inground features is not proposed. The centre, opened in 1988, is considered distinctive due to its blue glazed roof and bubble-like design. The building has three storeys and is absent of any basement levels or parking areas for retail patrons.
- Demolition of the existing Monorail Station, which is located above the northern end of the Harbourside Shopping Centre. This will require demolition of a set of stairs within the public domain of the site, which provides access from Harbourside to Pyrmont Bridge from the lower promenade area fronting Cockle Bay.
- Demolition of the Novotel Bridge Link (i.e. the Bunn Street Pedestrian Bridge). This pedestrian footbridge is situated in the middle of the Harbourside Shopping Centre on its western boundary, connecting the shopping centre to the Novotel hotel on the western side of Darling Drive.

1.3 Objective and Scope of work

The objective of the AQMP is to provide a plan designed to ensure that the risk from air emissions resulting from the proposed demolition works are acceptable to the demolition workforce of the Harbourside project and users of the surrounding area. The plan requires the implementation of a number of ongoing monitoring and management measures pertaining to the proposed demolition works. The AQMP is intended to form part of the Demolition Environmental Management Plan (DEMP) being prepared for the site by Mirvac.

2. Summary of Site Condition

2.1 Site Details

The site location and proposed layout are shown on **Figures 1 and 2**. The site details are summarised in **Table 2.1** and described in more detail in the following sections.

Table 2-1 Site Identification Details

Site Legal Identifier (as shown on Figure 2a)	Lot 1-10, 12-5 and 17 DP 776815, Part Lot 2015 DP 1234971 and Part Lot 300 DP 836419
Site Address	2 – 10 Darling Drive, Sydney, NSW
Site Area	20,500 m ²
Local Government Authority	City of Sydney (Council)
Site Geographic Coordinates (Map Grid of Australia (MGA) 56)	Refer to Figure 2
Registered Site Owner	Place Management NSW, Leased by Mirvac Retail Sub SPV Pty Limited
Current Zoning (under Sydney Local Environmental Plan (LEP) 2012)	Darling Harbour Development Plan No.1, 1985. All development requires Development Consent
Previous Land Uses	Railway Goods Yard, wharf and other industrial activities, reclaimed land
Current Land Uses	Retail and commercial (Harbourside Shopping Centre)
Proposed Land Uses	Mixed-use Precinct (basement carparking, retail and commercial ground floors with high density residential apartment block above)

2.2 Site Condition

The site layout and key features at the time of the reporting are shown on **Figure 2** and discussed herein.

The site comprises an irregular shaped parcel of land between Darling Drive, Iron Wharf Place and the Cockle Bay waterfront. The central portion of the site is occupied by the Harbourside Shopping Centre with the loading dock and redundant Sydney Monorail station in the northwest portion of the site, and the Cockle Bay waterfront occupying the entire eastern portion of the site. Site levels were noted to be generally flat consistent with historic filling/reclamation of land from Cockle Bay. The greater Pyrmont suburb was noted to be upgradient to the west of the site.

Harbourside Shopping Centre was made up of two floors of retail outlets and restaurants. A smaller third floor was located in the central portion of the site giving access to the pedestrian walkway that spans Darling Drive, connecting the site to a parking lot under the Novotel to the west. Ground conditions within Harbourside were noted to consist of concrete hardstand with various finishes (tiles, timber flooring etc).

The shopping centre loading dock is located beneath the Darling Drive overpass. The loading dock was paved with concrete and asphalt hardstand and used for importation of goods/supplies and exportation of rubbish from the various site occupants. An AST (approximately 1500 L) was identified within the northwest portion of the loading dock on concrete hardstand. It is understood that this AST was used to collect waste cooking oils from various restaurants within the shopping centre. Staining from the waste cooking oil was identified on concrete in the vicinity of the tank with any spillage likely draining into the nearby sewer system. Several shipping containers used to store merchandise and small volumes of chemicals associated with cleaning and maintenance of the site (solvents, sealants etc) were noted under the Darling Drive overpass. No underground storage tanks (USTs) or other bulk fuel or chemical tanks were noted on the site.

2.3 Surrounding Environment

The current land uses of adjacent properties or properties across adjacent roadways are summarised below.

- North: directly north of the site is Pyrmont Bridge across which lies the Australian National Maritime Museum;
- East: the eastern boundary abuts Cockle Bay. A small pedestrian jetty runs adjacent the site boundary approximately 3 m into the bay. Across Cockle Bay lies Cockle Bay Wharf (retail and restaurants) followed by the city of Sydney;
- South: to the south of the site lies the International Convention Centre building followed by the Western Distributor Motorway overpass, followed by Tumbalong Park; and
- West: the southwest of the site is bound by Iron Wharf Lane over which lies Sofitel Sydney Darling Harbour, to the west lies Darling Drive followed by L1 Light Rail tracks, Novotel Sydney on Darling Harbour and then the greater Pyrmont suburb.

2.4 Meteorological Conditions

Average climatic data obtained indicated the site's meteorological setting is characterised by average minimum temperatures which vary from 10.5°C in July to 20.5 °C in February; average maximum temperatures which vary from 17.3 °C in July to 24.8 °C in January; average annual rainfall of approximately 1079 mm with rainfall greater than 1 mm occurring on an average of 100 days per year; monthly rainfall varies from 60 mm in September to 125 mm in July.

3. General Air Quality in the City of Sydney

Air quality in the Sydney region is impacted by a range of air pollution emissions sources including major industry, motor vehicles and watercraft, commercial operations and leaking pipes and tanks as well as from domestic activities such as solid fuel heaters. Major pollutants that may potentially be emitted by the proposed earthworks have been identified as follows:

Fine Particles

Particles (or particulate matter) in the atmosphere come from a wide variety of sources, including soil (dust), vegetation (pollens and fungi), sea salt, fossil fuel combustion, biomass burning and industrial activities. Particles in the atmosphere typically exhibit a bi-modal size distribution with a peak in the range of 0.1-2.5µm and a second peak in the range 2.5-50µm. As a result, particles with a diameter of up to 2.5µm (PM_{2.5}) are commonly referred to as fine particles. There is also a distinction in the health effects of different sized particles. Particles up to about 10µm (PM₁₀) diameter are inhaled, whereas larger particles are not. On this basis, the term 'fine particles' is often used to refer to PM₁₀.

Coarse Particles

Coarse particles remain in the air for relatively short periods of time and are therefore generally not carried long distances. As a result, coarse particles tend to be a local rather than a regional problem, occurring close to industrial sources such as metal processing plants and mining operations. The level of particles in the atmosphere is determined by measurement of their mass. In the greater metropolitan area two methods of measurement are commonly used, total suspended particulates (TSP) and dust deposition rates (DDR). While the mass determined by these measures will include fine particles, these will generally only make a small contribution. Therefore, measurements of TSP and DDR are used to provide an indication of the level of coarse particulates in the atmosphere.

Concerns about coarse particles are generally more in terms of nuisance such as damage to or soiling of materials, or adverse effects on sensitive vegetation through surface coating.

Air Toxins

Another group of air pollutants which can be hazardous to human health, even at low levels, are toxic compounds known as air toxins. This group includes chemicals such as benzene, formaldehyde, chlorinated hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and dioxins. Trace amounts of many of these chemicals have been detected in air in urban environments in a number of areas around the world.

In recent years there has been increasing community concern about air toxins in ambient air and the associated health effects. These compounds may cause cancer, gene mutation, reproductive malfunction, affect foetal development, or have neurotoxic effects. While the levels that endanger public health have not been established, it is believed that even very low levels, particularly under long term exposure, could have adverse effects. Many air toxins are highly volatile and evaporate readily into the air following inhalation.

Odour

Odour is measured using panels of people who are presented with samples of odorous gas diluted with decreasing quantities of clean odour-free air. The panellists report when the smell becomes detectable. Odour in air is quantified in terms of "odour units" which is the number of dilutions required to bring the odour to a level at which 50% of the panellists can just detect the odour. This process is known as olfactometry.

Background levels of odour in the environment can vary enormously based on a range of factors.

3.1 Regulatory Requirements

Demolition activities on site will be required to be completed in accordance with several sections of environmental and occupational health and safety legislation and associated regulations. The primary Acts, Regulations and Guidelines are listed below with a brief summary of their applicability. Please note that this list is not intended to be a comprehensive listing of acts and regulations. The site owner and contractors are required to satisfy themselves that all applicable permits, licences and legislation have been obtained and their conditions satisfied.

Environmental Planning & Assessment Act 1979

The overarching Act to institute a system of environmental planning and assessment for NSW.

Work Health and Safety Act, 2011

The overarching Act for NSW setting law relating to employee health and safety and employer responsibilities.

Work Health and Safety Regulation, 2017

Sets Regulations and details the duties for employers to achieve required employee health and safety performance.

Protection of the Environment Operations Act 1997

The POEO Act is the key piece of environment protection legislation administered by the EPA.

National Environment Protection (Ambient Air Quality) Measure (NEPC 2021)

National guidelines for the assessment of ambient air quality. These guidelines provide national air quality standards and criteria for a range of pollutants.

Protection of the Environment Operations (Clean Air) Regulation 2021

Guidelines outlining regulatory requirements for various activities which may affect air quality, including air impurities emitted from activities or plant.

Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2016

NSW regulatory guidelines outlining the methods for detailed quantitative and qualitative air quality assessments from stationary sources.

Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition, 2005, Australia National Occupational Health and Safety Commission (NOHSC 2005)

Guidelines for the assessment of airborne asbestos fibres including relevant workplace exposure standards.

4. Proposed Demolition Scope

As discussed in **Section 1.2** the proposed demolition will involve:

- demolition of the existing shopping centre;
- demolition of the existing Monorail Station; and
- demolition of the Novotel Bridge Link (i.e. the Bunn Street Pedestrian Bridge).

4.1 Timeline and Staging

The duration of the demolition works will be undertaken over an approximate period of 6 months and staging of demolition works will proceed in two broad stages as discussed in the following sections.

4.2 Demolition Phase 1

Demolition Phase 1 comprises soft stripping of the site, essentially the removal of all non-structural finishes. This is likely to include removal of all fit-out currently present within the retail spaces of Harbourside. Non-structural features are to be stockpiled on site for progressive off-site disposal or recycling.

4.3 Demolition Phase 2

Demolition Phase 2 comprises structural demolition of the site, comprising:

- back propping and installation of temporary work items as specified by the project structural engineers;
- removal of roofing surfaces;
- progressive dismantling of structural steel roof(s);
- progressive dismantling of precast walls and panels; and
- progressive breakdown of in-situ concrete elements.

4.4 Equipment

Various plant and equipment will be used for completion of the proposed demolition works. Current plans assume a number of excavators will be required ranging from smaller 12-30 tonne machines for the soft stripping up to 50 tonne excavators for structural demolition.

5. Potential Sources of Air Emissions

Based on the anticipated scope of demolition works required at the site (**Section 4**) several potential sources of air emissions have been identified which are summarised in **Table 5.1**. Each type of emission is briefly described in **Sections 5.1** and **5.2**.

Table 5.1 Summary of Potential Air Emissions (Demolition Phase)

Works	Potential Air Emissions
Demolition of concrete, building and glass structures	Particulates including asbestos and silica
Haulage of demolition wastes across site roads	Particulates including asbestos and silica
Stockpiling of demolition wastes	Particulates including asbestos and silica
Operation of heavy vehicles for demolition works	Exhaust emissions

5.1 Particulates (Dust)

Demolition works will be undertaken by excavators used to hammer, rip and break the structures into smaller pieces. Demolished materials will then be stockpiled on site for transport off-site at a later stage. The greatest potential for the release of air pollutants will be during breaking of the site structures.

A pre-demolition scope of work should be developed to include controlled removal of isolated asbestos containing (limited to identified generator gaskets as outlined in the hazardous building materials survey (HBMS¹)) to avoid the potential for the structural demolition works to generate emissions of asbestos. Controlled removal of any hazardous materials identified will be required in accordance with NSW Government 'Code of Practice: How to Safely Remove Asbestos, August 2019' for off-site disposal.

Demolition can also produce emissions of synthetic mineral fibres (SMF) which have been identified at the site and respirable crystalline silica (RCS) as numerous building materials such as concrete and tiles contain quartz (composed primarily of silica). The greatest potential for the release of RCS, measured as respirable dust, will be during breaking of the site structures, and as such monitoring of respirable dust should take place for at least the first month of structural demolition works, with the requirement for continued monitoring reviewed at the end of this period.

Particulate emissions as potentially generated from the stockpiling of materials are considered to be minimal.

5.2 Exhaust Emissions

It is anticipated a range of fuel powered plant, machinery and equipment will be required to facilitate demolition activities, however no bulk fuel storage is anticipated on site. As such, potential emissions/air quality impacts have been identified as principally associated with exhaust fumes generated by plant, machinery or equipment use.

Diesel and petroleum combustion is a well-known process and regulated in accordance with relevant emission standards as prescribed by the NSW EPA. Exhaust emissions will be anticipated from construction machinery as engaged on the site. However, noting the proximity of the site to the Sydney central business district (CBD) and to Darling Harbour waters with substantial motor vehicle and watercraft activity, these are anticipated to be insignificant in comparison to existing levels of exhaust-based constituents in the surrounding area.

¹ Hazardous Building Materials Survey, Harbourside Shopping Centre Redevelopment, 2-10 Darling Drive, Sydney NSW. Prepared by JBS&G Australia Pty Ltd doc ref 62851/146426 dated 18 July 2022 (HBMS)

5.3 Required Emissions and Controls

With the exception of exhaust, all emissions listed in **Table 5.1** have the potential to become significant. As such a program of controls and air monitoring should be undertaken throughout the duration of the works.

- A pre-demolition scope of work should be prepared to include controlled removal of any hazardous materials identified (as outlined in the HBMS) in accordance with NSW Government '*Code of Practice: How to Safely Remove Asbestos, August 2019*' for off-site disposal.
- For the completion of structural demolition works, selection of work methods which allow the workforce to remain protected from the potential silica dust emissions over uncontrolled approaches, i.e. preference given to demolition methods which allow workforce to remain within enclosed cabins should be used wherever possible.
- Personnel who are not able to undertake structural demolition works from within an enclosed cabin will be required to use appropriate personal protective equipment (PPE) for the duration of their work. A list of the PPE required as a minimum for this purpose is provided in the appended air quality management procedures (as per **AQMP02, Appendix B**) and may require establishment of a decontamination area on the site for cleaning of non-disposable PPE. It should be noted that the Work Health & Safety (WH&S) Plan for the project should be referred to for the full list of PPE and decontamination requirements for the demolition workforce.
- Water sprays shall be installed and used in the location of dust generating areas should the results of realtime dust monitoring (as per **AQMP02, Appendix B**) exceed the acceptable level. This may include plans for pre-wetting of proposed demolition areas each day in addition to wetting during demolition.
- Establishment of a water misting system on site boundaries for use as required to prevent off-site emissions should the results of realtime dust monitoring (as per **AQMP02, Appendix B**) exceed the acceptable level.
- Stockpile heights shall be minimised where possible, and where stockpiles are to be left in place for significant periods of time they shall be covered or routinely wetted to prevent dust emissions.
- Where unfavourable meteorological conditions exist (i.e. strong winds directed west or south) site works shall be restricted to those with low potential for atmospheric emissions. This shall also include consideration of reduced production rates during these periods to minimise dust emissions.
- Continual visual assessment of dust emissions during all facets of demolition works. No visible dust should be observed at any stage at site boundaries.
- Periodic particulate monitoring at site boundaries undertaken using realtime aerosol monitors. The preferred method of health monitoring is to undertake real-time assessment of levels of airborne particulates and potential co-occurring respirable fibres. Real-time monitoring shall be undertaken during material disturbance activities by a stationary light-scattering laser photometer (as proposed to be a TSI DustTrak) as set to measure particulates in the PM₁₀ size fraction. Representative continuous monitoring shall be undertaken through the course of a workday at representative locations at the boundary of the worksite in proximity of the active soil disturbance works. The level of PM₁₀ shall be interpreted as a daily averaged sample, with consideration to peaks or significant exceedances above the criteria during the monitoring period which may be interpreted as being directly associated with site activities.

- As asbestos is a potential low risk exposure, respirable fibres monitoring should occur at discrete locations during all soft-stripping works when the handling of areas of known asbestos impact is planned (removal of gaskets within generators). Should additional asbestos be detected during soft-stripping then monitoring of potential airborne asbestos fibres will also be required during structural demolition works in accordance with relevant SafeWork NSW guidance.
- As RCS is considered a risk during the disturbance of materials containing quartz/silica, respirable dust monitoring at discrete locations shall be completed for the first month of structural demolition works as a minimum, with advice sought from a qualified occupational hygienist at the end of this time as to whether monitoring of airborne particulates (beyond the real-time DustTrak monitors) should continue for the remainder of demolition works. This decision should be based on the result obtained for the first month and assessment of whether the conditions monitored were representative of the full range of work methods to be adopted.
- Dust deposition gauges maintained at two discrete locations at the site boundaries for the duration of the demolition works.

These controls have been defined in a set of air quality management procedures which are provided in **Appendix B**.

6. Recommendations

Based on the information and procedures detailed herein, and subject to the limitations in **Section 7**, JBS&G consider successful implementation of this AQMP will assist to mitigate the risk to site workers and users of surrounding areas from air emissions resulting from the proposed demolition works. JBS&G recommend that to successfully manage and/or monitor air quality impacts and emissions during site demolition activities the following approach should be adopted:

- A pre-demolition scope of work should include controlled removal of any hazardous materials (as outlined in the HBMS) identified in accordance with NSW Government '*Code of Practice: How to Safely Remove Asbestos, August 2019*' for off-site disposal; and
- the following management and control measures provided in **Appendix B** should be implemented for the full duration of the demolition program:
 - AQMP01: Dust and Airborne Hazard Control;
 - AQMP02: Air Quality Monitoring;
 - AQMP03: AQMP Review; and
 - AQMP04: Training.

7. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

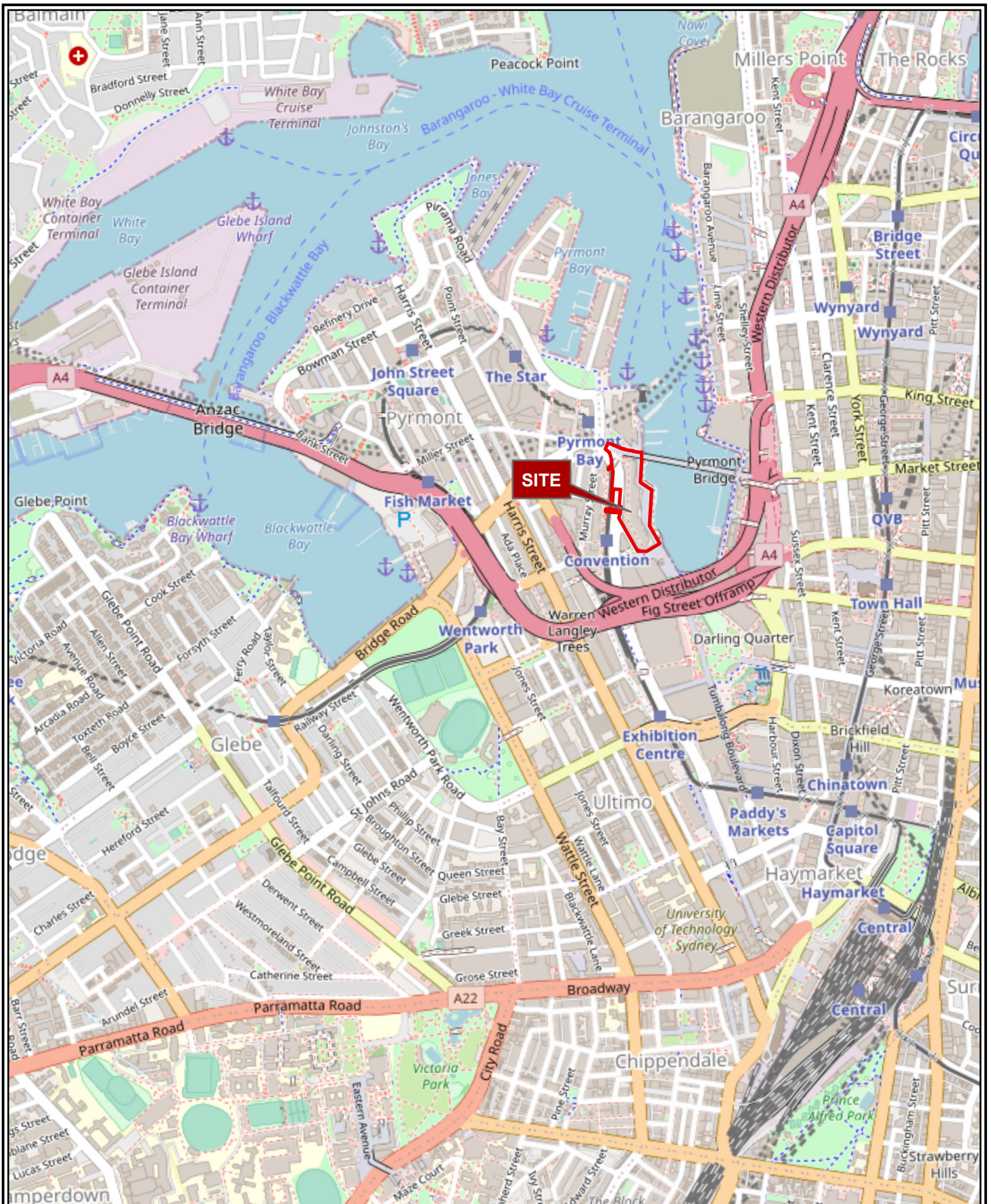
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

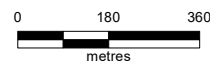
Figures



Legend:

Approximate DA Boundary - The Site

Scale 1:15,000



Coord. Sys. GDA 1994 MGA Zone 56



Job No: 59123

Client: Mirvac

Version: R02 Rev 0

Drawn By: AB

Date 3/05/2022

Checked By: CK

**Harbourside Shopping Centre,
Darling Harbour**

SITE LOCATION

FIGURE 1

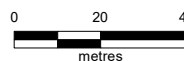




Legend:

- Approximate DA Boundary - The Site
- NSW Cadastre (DFSI, 2022)
- Structures Below the Harbour Promenade - Seaward Extent
- Site Features

Scale 1:1,750



Coord. Sys. GDA 1994 MGA Zone 56



Job No: 59123

Client: Mirvac

Version: R02 Rev 0

Drawn By: AB

Date 3/05/2022

Checked By: CK

Harbourside Shopping Centre,
Darling Harbour

CURRENT SITE LAYOUT

FIGURE 2A



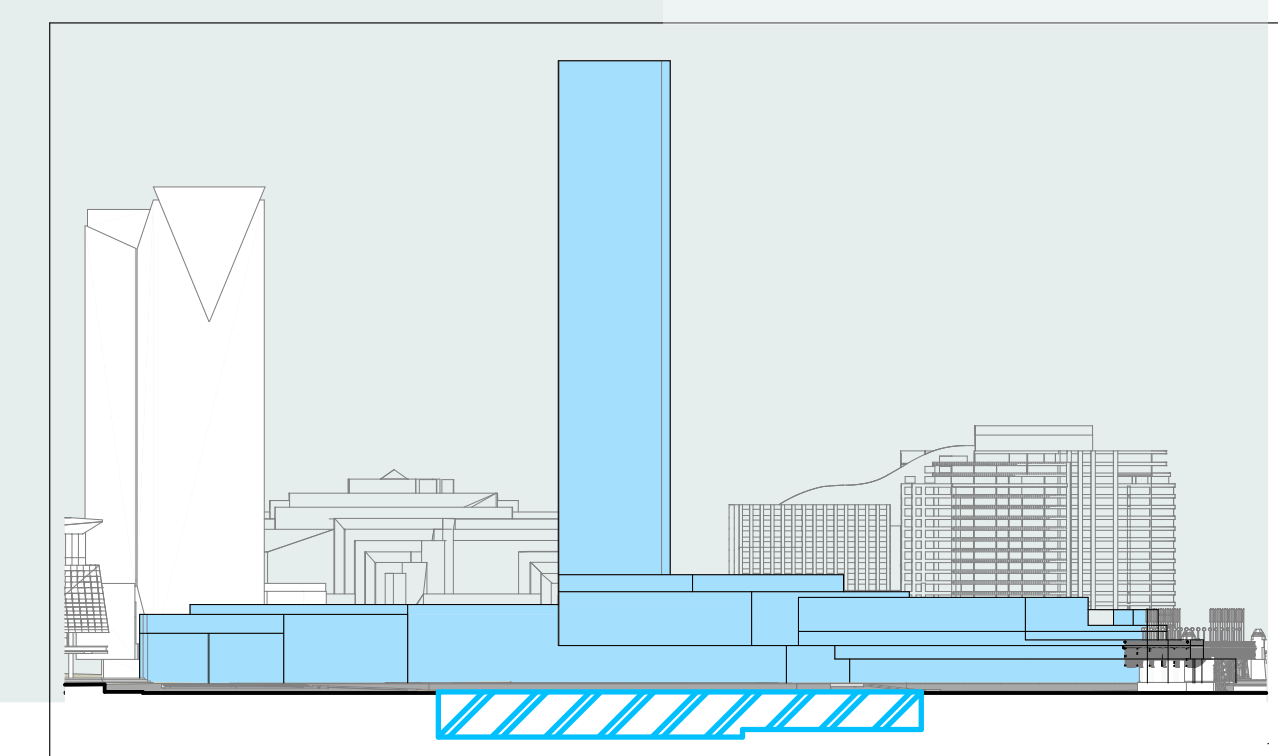
Appendix A Design Plans



BOUNDARY LEGEND

— . . — LOT BOUNDARY

— . . — WATERFRONT & PYRMONT
BRIDGE SETBACKS



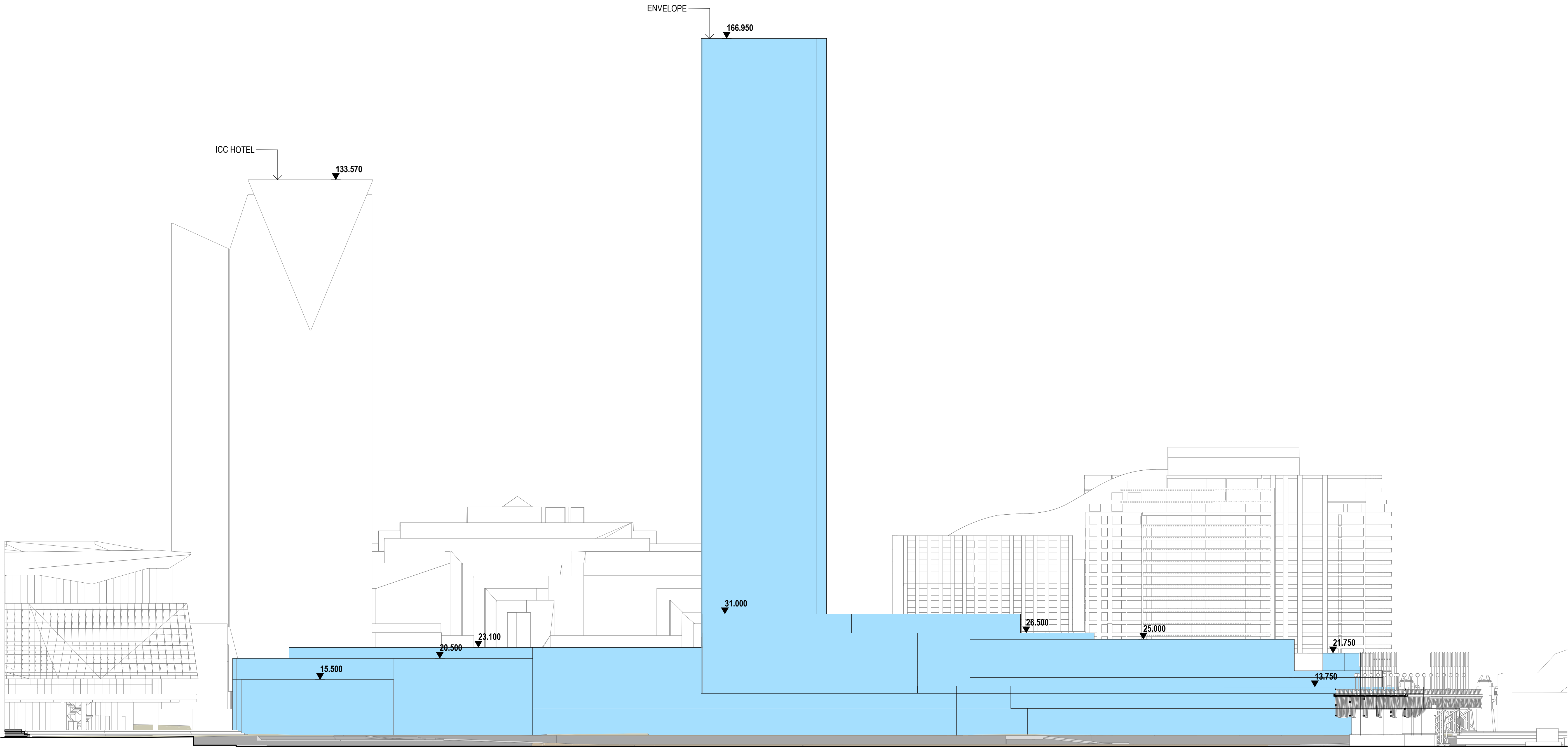
0 5 10 20m

1:500 @ A1

08/10/2020

For Approval

SSDA1-102



Planning,
Industry &
Environment

Issued under the Environmental Planning and Assessment Act 1979

Approved Application No: SSD 7874

Granted on: 25 June 2021

Signed: AW Sheet No: 4 of 10



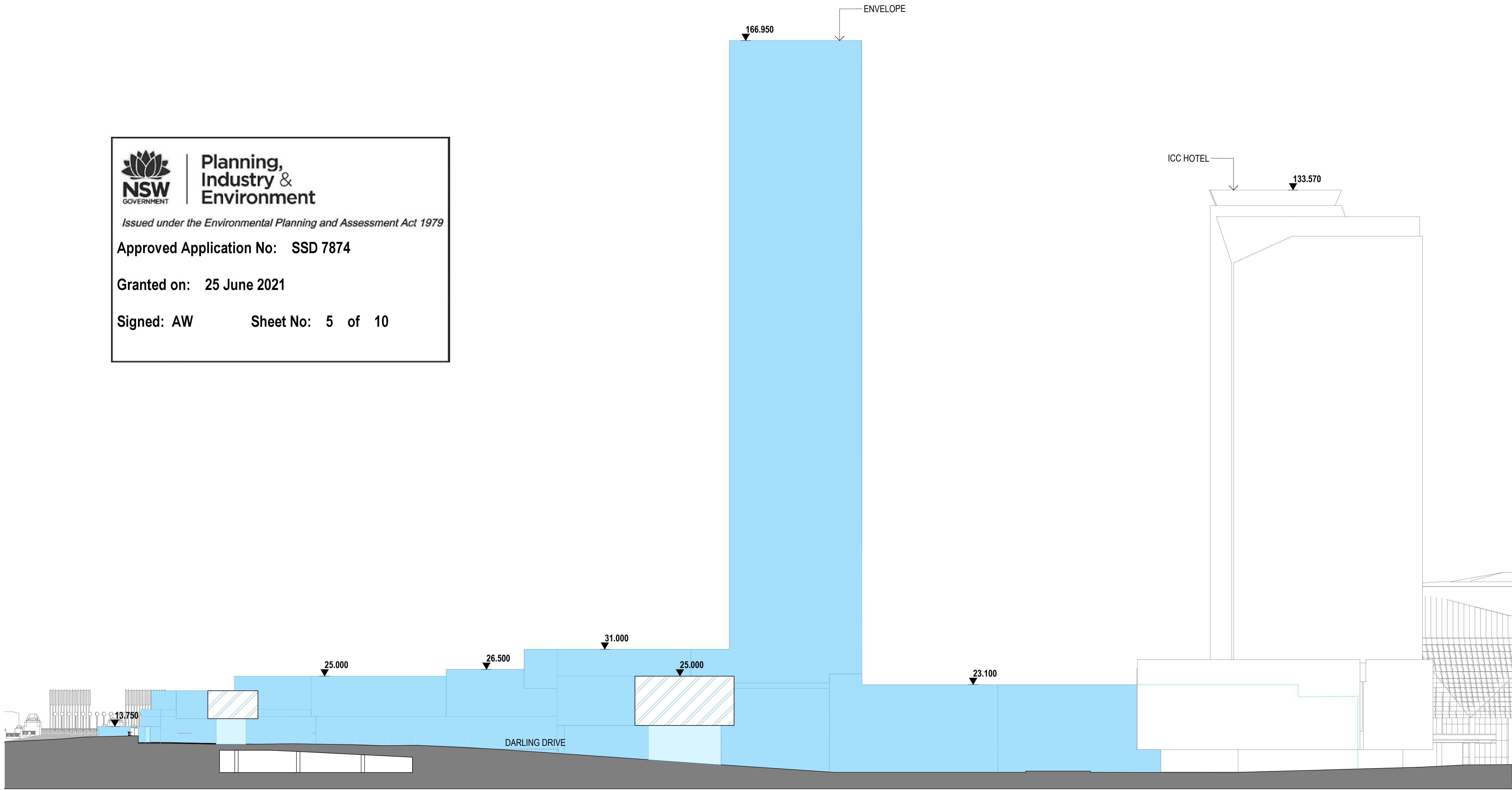
**Planning,
Industry &
Environment**

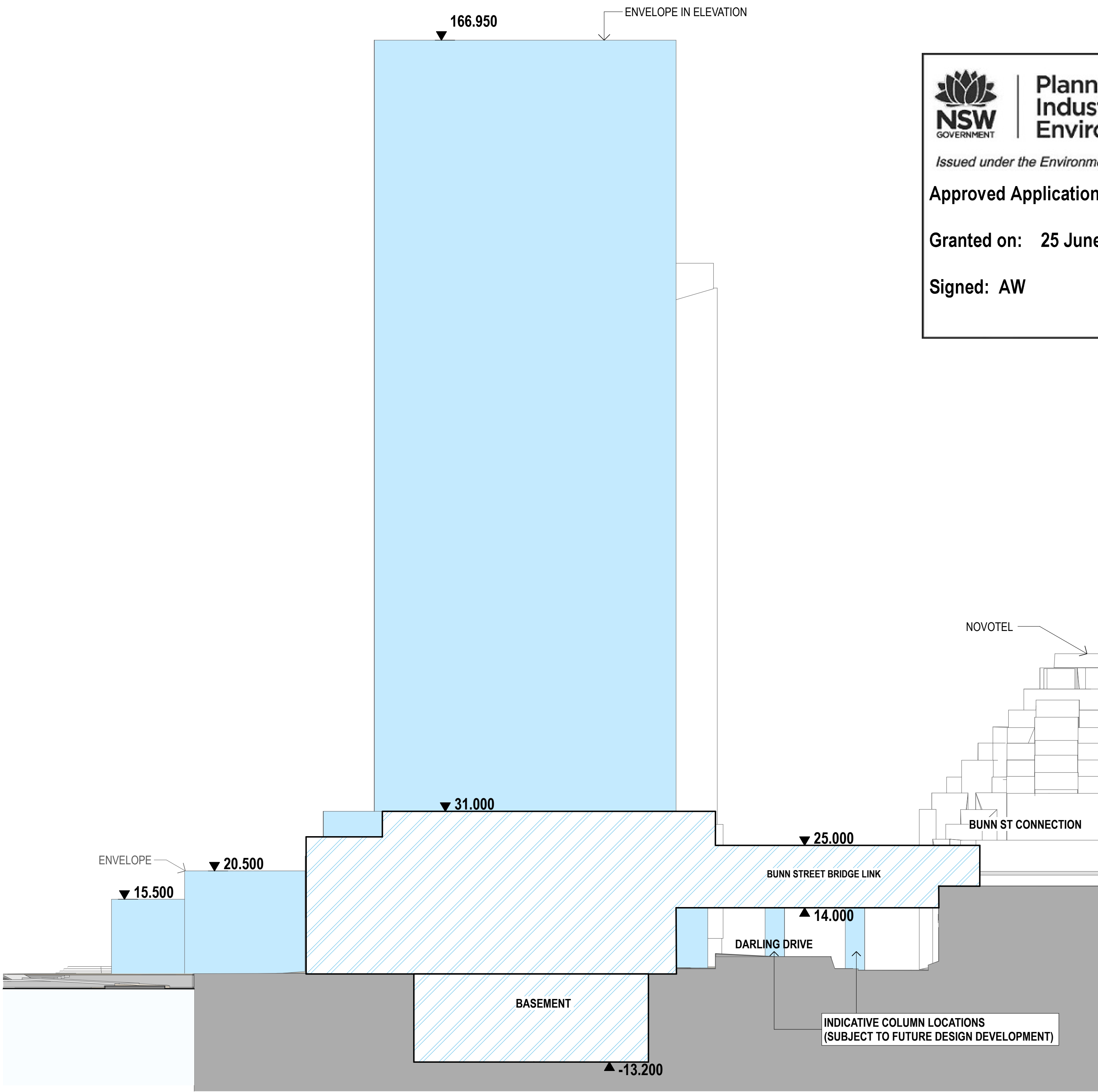
Issued under the Environmental Planning and Assessment Act 1979

Approved Application No: SSD 7874

Granted on: 25 June 2021

Signed: AW Sheet No: 5 of 10





SECTION ENVELOPE Section 1
1:500



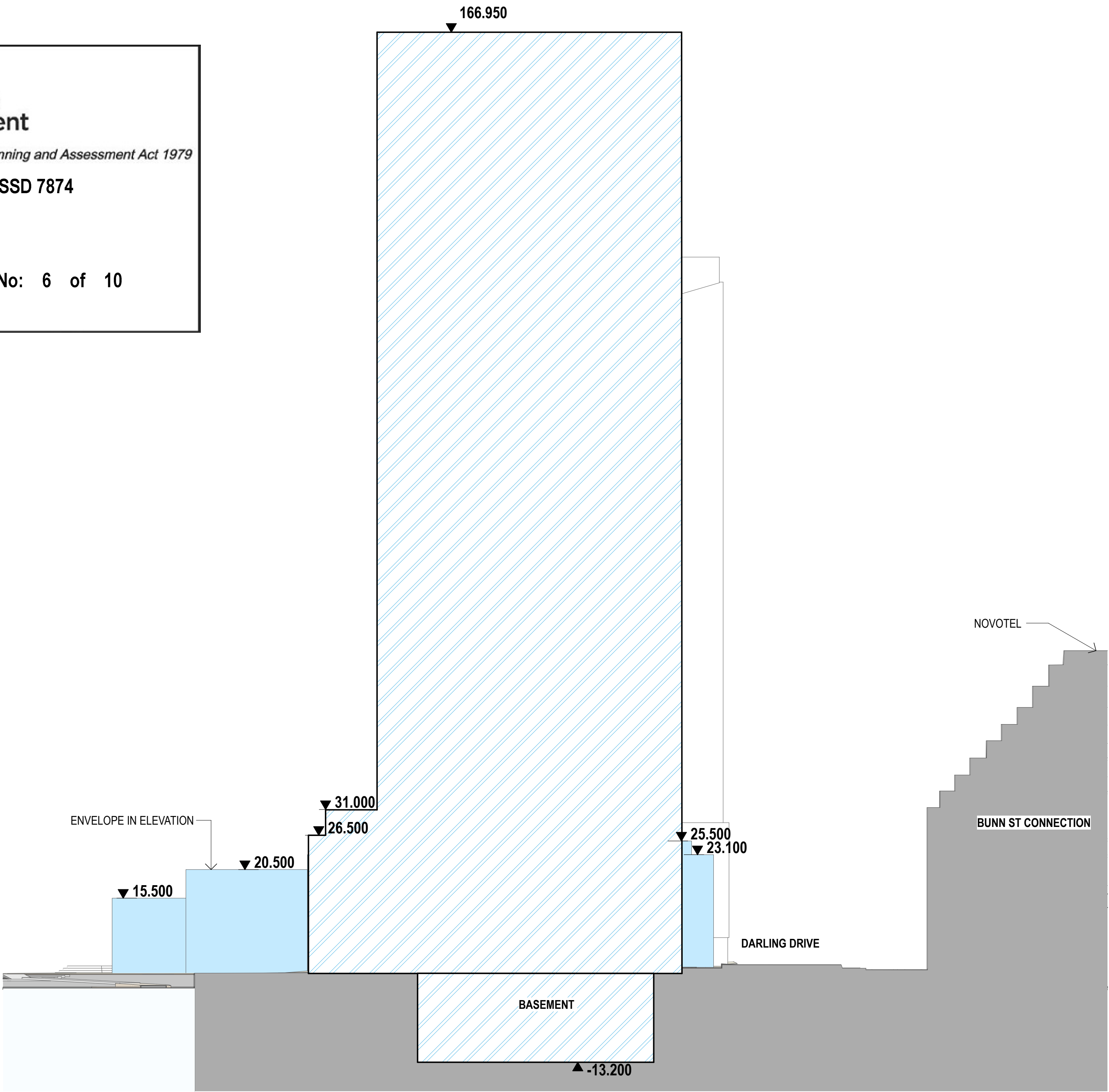
Planning,
Industry &
Environment

Issued under the Environmental Planning and Assessment Act 1979

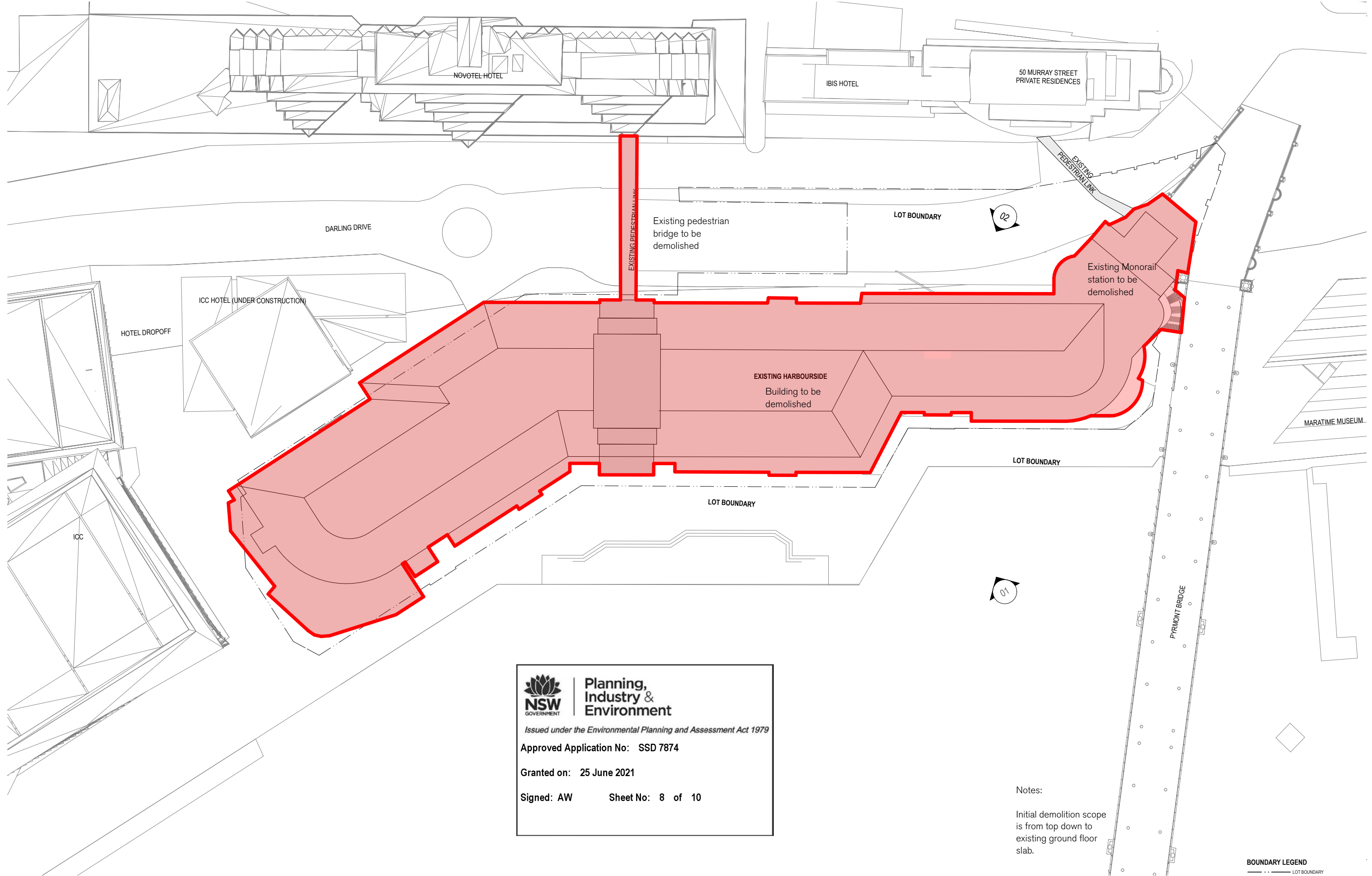
Approved Application No: SSD 7874

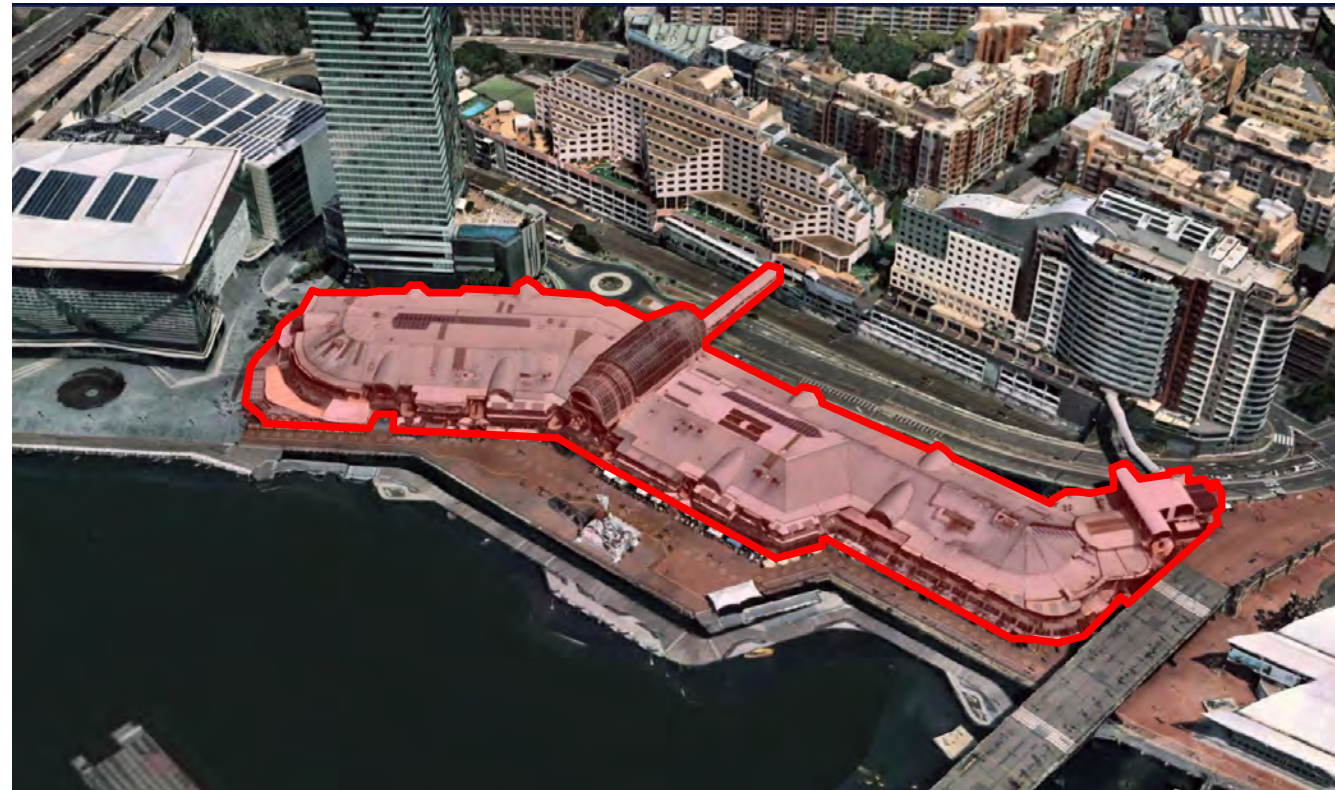
Granted on: 25 June 2021

Signed: AW Sheet No: 6 of 10



SECTION ENVELOPE SECTION 2
1:500

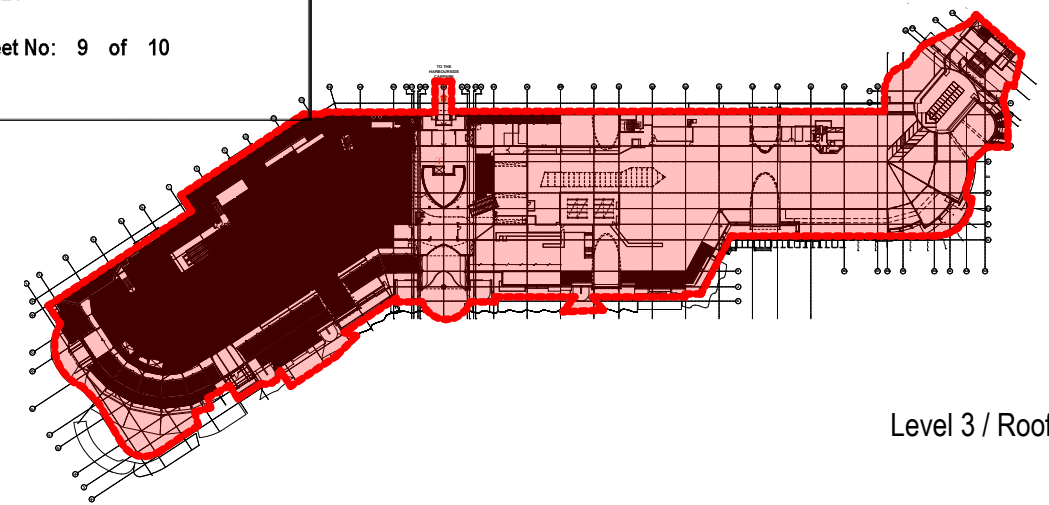




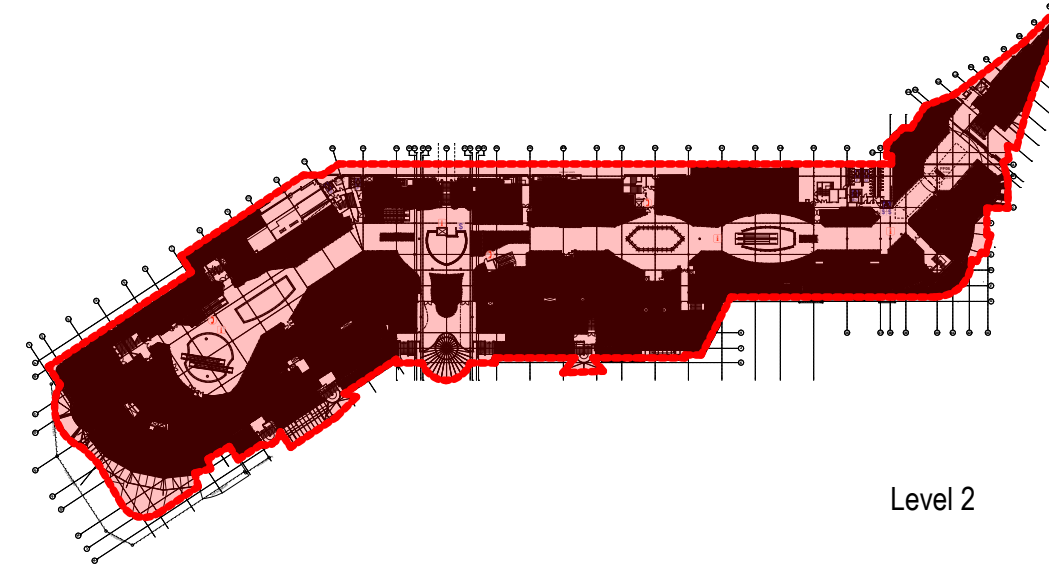
Aerial Photo 01



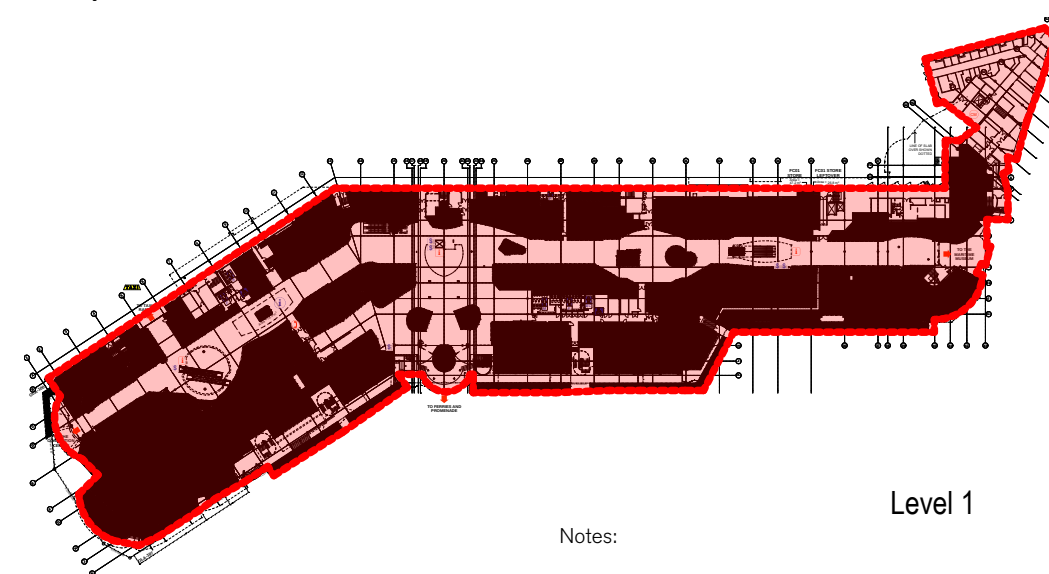
Aerial Photo 02



Level 3 / Roof



Level 2



Level 1

Floor plans
NTS

Notes:

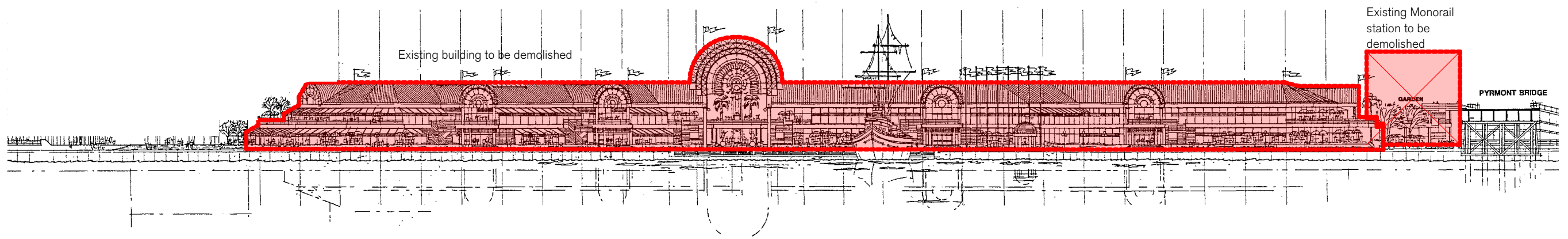
Initial demolition scope
is from top down to
existing ground floor
slab.

For Demolition

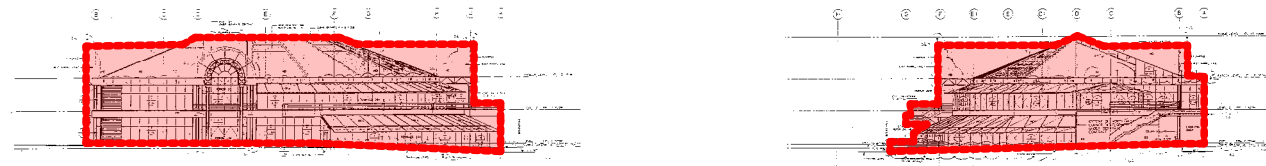


Not to Scale @ A3

For Approval

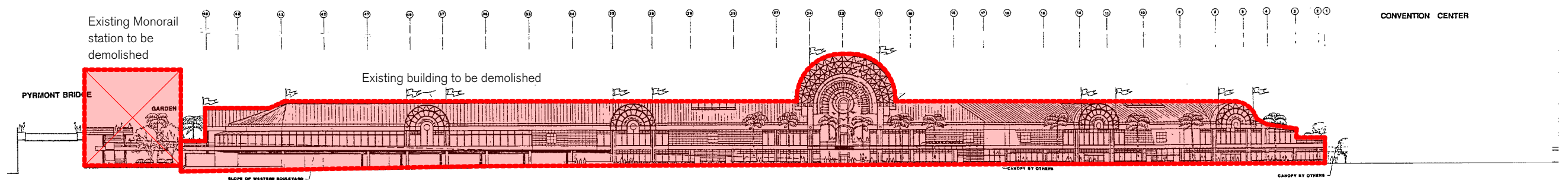


East Elevation - Demolition



South Elevation - Demolition

North Elevation - Demolition



West Elevation - Demolition



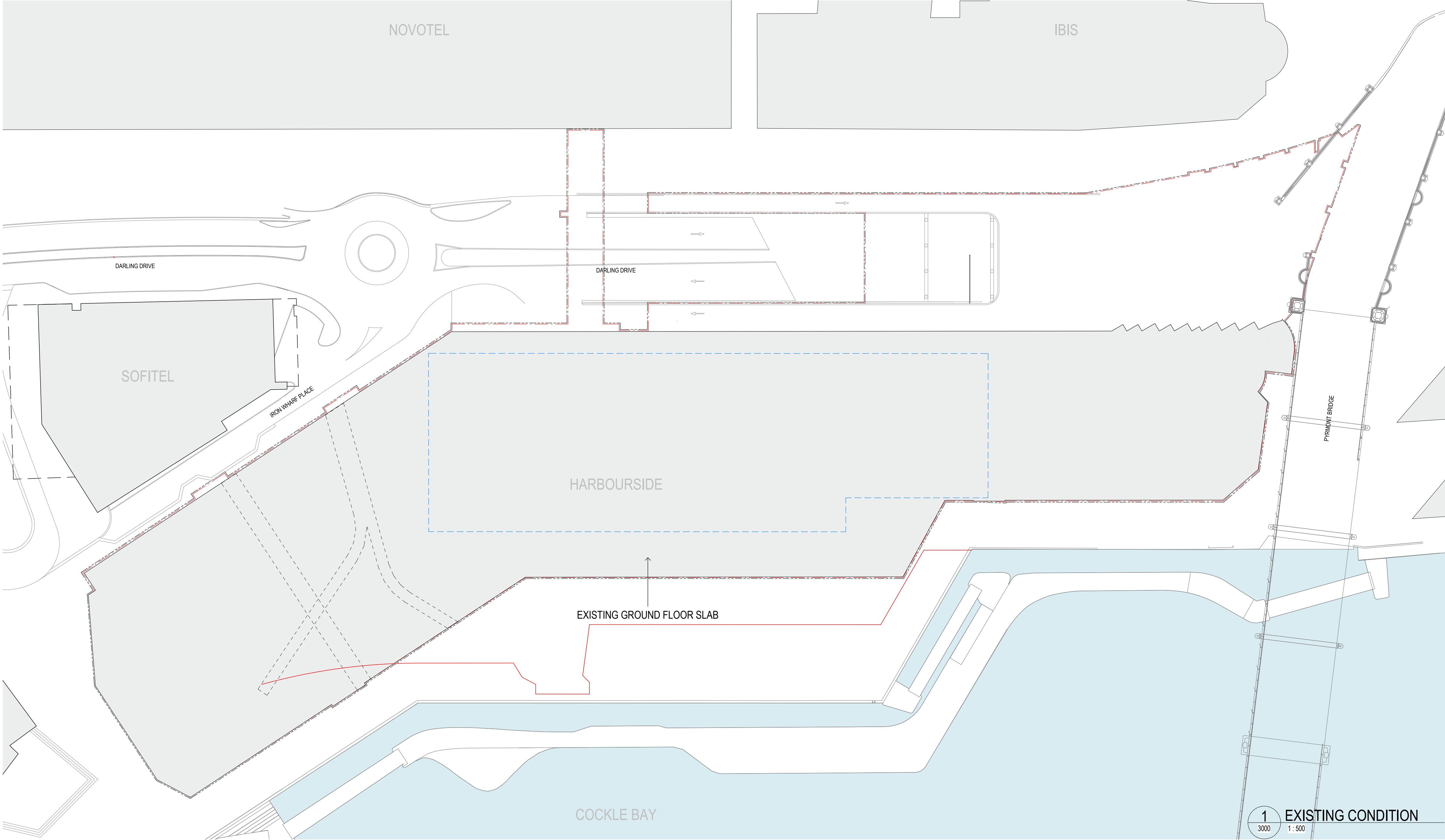
Notes:

Initial demolition scope is from top down to existing ground floor slab.

PRELIMINARY
NOT FOR CONSTRUCTION

LEGEND

- EXISTING SITE BOUNDARY (LOT BOUNDARY)
- APPROX. LOCATION OF WALL BELOW PROMENADE
- - - STAGE 1 DA - DA BOUNDARY EXTENT (APPROVED APPLICATION SSD 7874)
- - - STAGE 1 DA - DA BASEMENT ENVELOPE EXTENT (APPROVED APPLICATION SSD 7874)
- EXISTING SALTWATER CULVERTS AND ZONES OF INFLUENCE
- PROPOSED DISCHARGE LOCATION
- XL ESTIMATED FINAL EXCAVATION RELATIVE LEVEL



1 EXISTING CONDITION
3000 1:500



Hassell LTD ABN 24 007 711 435
Level2, Pier 8/9,23 Hickson Rd
Sydney NSW 2000 Australia
T +61 2 9101 2000
F +61 2 9101 2100
sydney@hassellstudio.com
Nominated Architects NSW:
Tony Grist 5350
Glenn Scott 6842
Ross de la Motte 7398



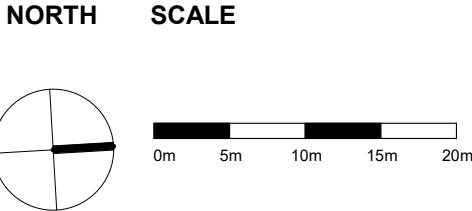
178 Sturt St | Adelaide | Australasia | SA 5000

Do not scale drawing. Written dimensions govern
All dimensions are in millimeters unless noted otherwise
This drawing must be read in conjunction with all relevant contracts,
specifications and drawings
This drawing is an uncontrolled copy. Unless noted otherwise
© Copyright of this drawing is vested in Hassell & Snøhetta

REV DESCRIPTION
2 For Information

DATE
01.03.22

NOTE
This SSDA 1 for Bulk Excavation Works and Construction
of retaining Structures, is the first or four detail design
Application of a proposed SSDAs (State Significant
Development Application) proposed for the site.
The applications will be consistent with the Harbourside
Concept Approval (SSD 7874) 25 June 2021.



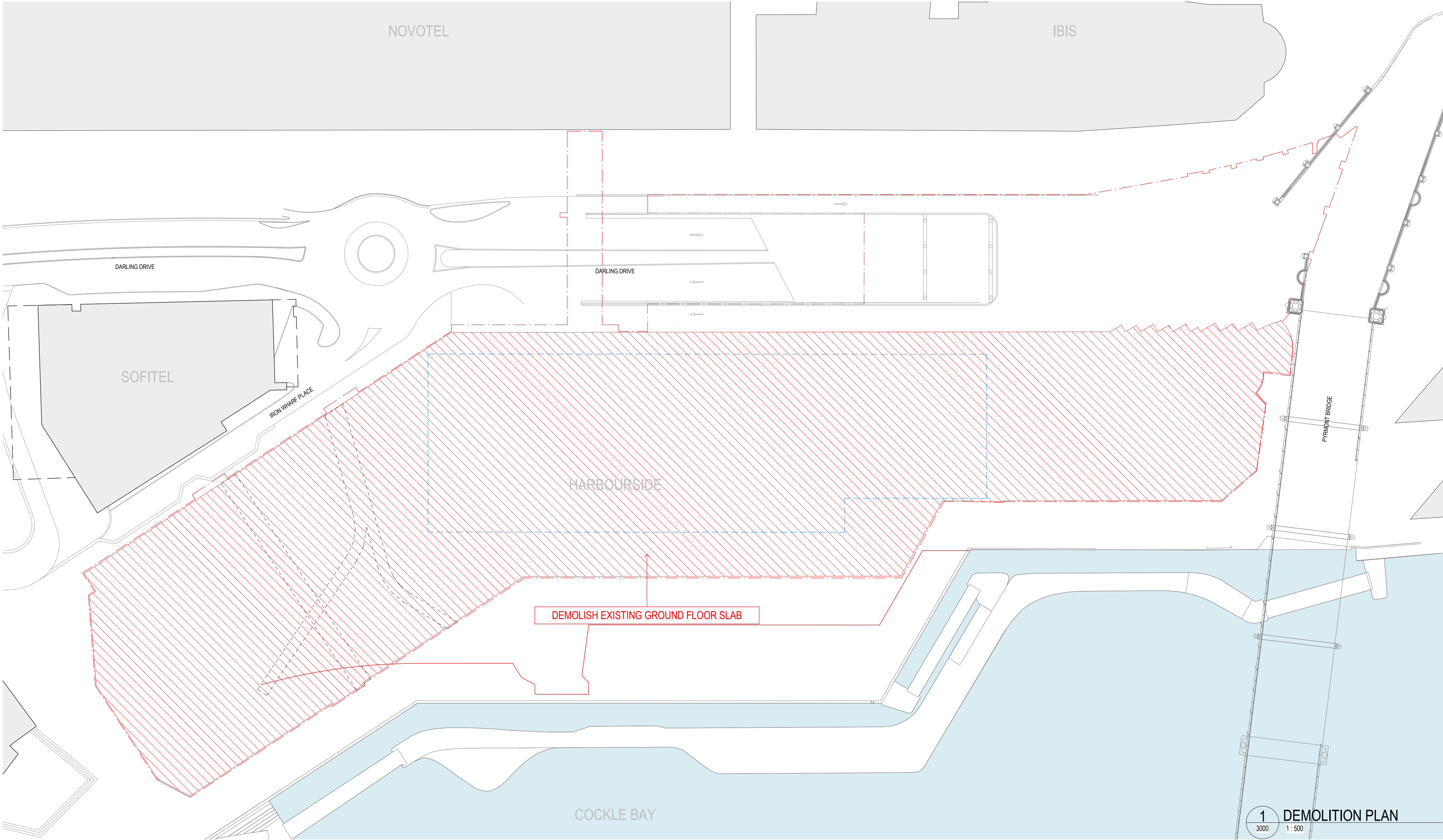
CLIENT
MIRVAC
PROJECT
MIRVAC HARBOURSIDE

PROJECT NO.
016152-61A-P
DRAWING TITLE
EXISTING CONDITIONS
DRAWING NO.
AR-SSDA1 0200
SCALE @ A1
As indicated

PRELIMINARY
NOT FOR CONSTRUCTION

LEGEND

- EXISTING SITE BOUNDARY (LOT BOUNDARY)
- APPROX. LOCATION OF WALL BELOW PROMENADE
- - - STAGE 1 DA - DA BOUNDARY EXTENT (APPROVED APPLICATION SSD 7874)
- - - STAGE 1 DA - DA BASEMENT ENVELOPE EXTENT (APPROVED APPLICATION SSD 7874)
- EXISTING SALTWATER CULVERTS AND ZONES OF INFLUENCE
- ▨ EXTENT OF DEMOLITION



Hassell LTD ABN 24 007 711 435
Level2, Pier 8/9,23 Hickson Rd
Sydney NSW 2000 Australia
T +61 2 9101 2000
F +61 2 9101 2100
sydney@hassellstudio.com
Nominated Architects NSW:
Tony Grist 5350
Glenn Scott 6842
Ross de la Motte 7398



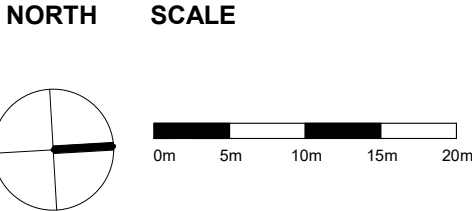
178 Sturt St | Adelaide | Australasia | SA 5000

Do not scale drawing. Written dimensions govern
All dimensions are in millimeters unless noted otherwise
This drawing must be read in conjunction with all relevant contracts,
specifications and drawings
This drawing is an uncontrolled copy. Unless noted otherwise
© Copyright of this drawing is vested in Hassell & Snøhetta

REV DESCRIPTION
2 For Information

DATE
01.03.22

NOTE
This SSDA 1 for Bulk Excavation Works and Construction
of retaining Structures, is the first or four detail design
Application of a proposed SSDAs (State Significant
Development Application) proposed for the site.
The applications will be consistent with the Harbourside
Concept Approval (SSD 7874) 25 June 2021.



CLIENT
MIRVAC

PROJECT
MIRVAC HARBOURSIDE

PROJECT NO.
016152-61A-P

DRAWING TITLE
DEMOLITION PLAN

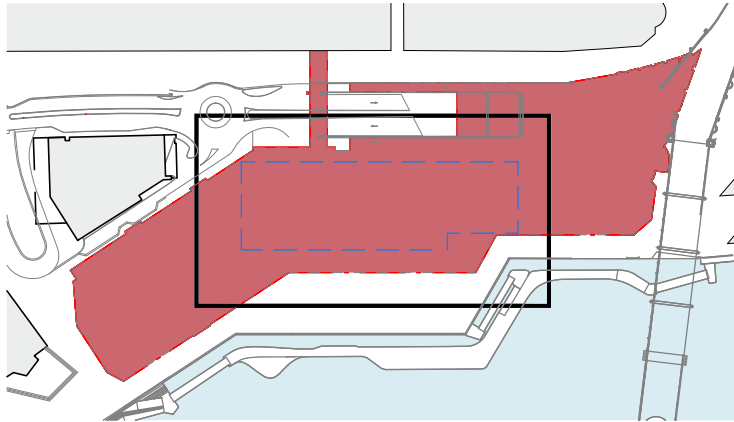
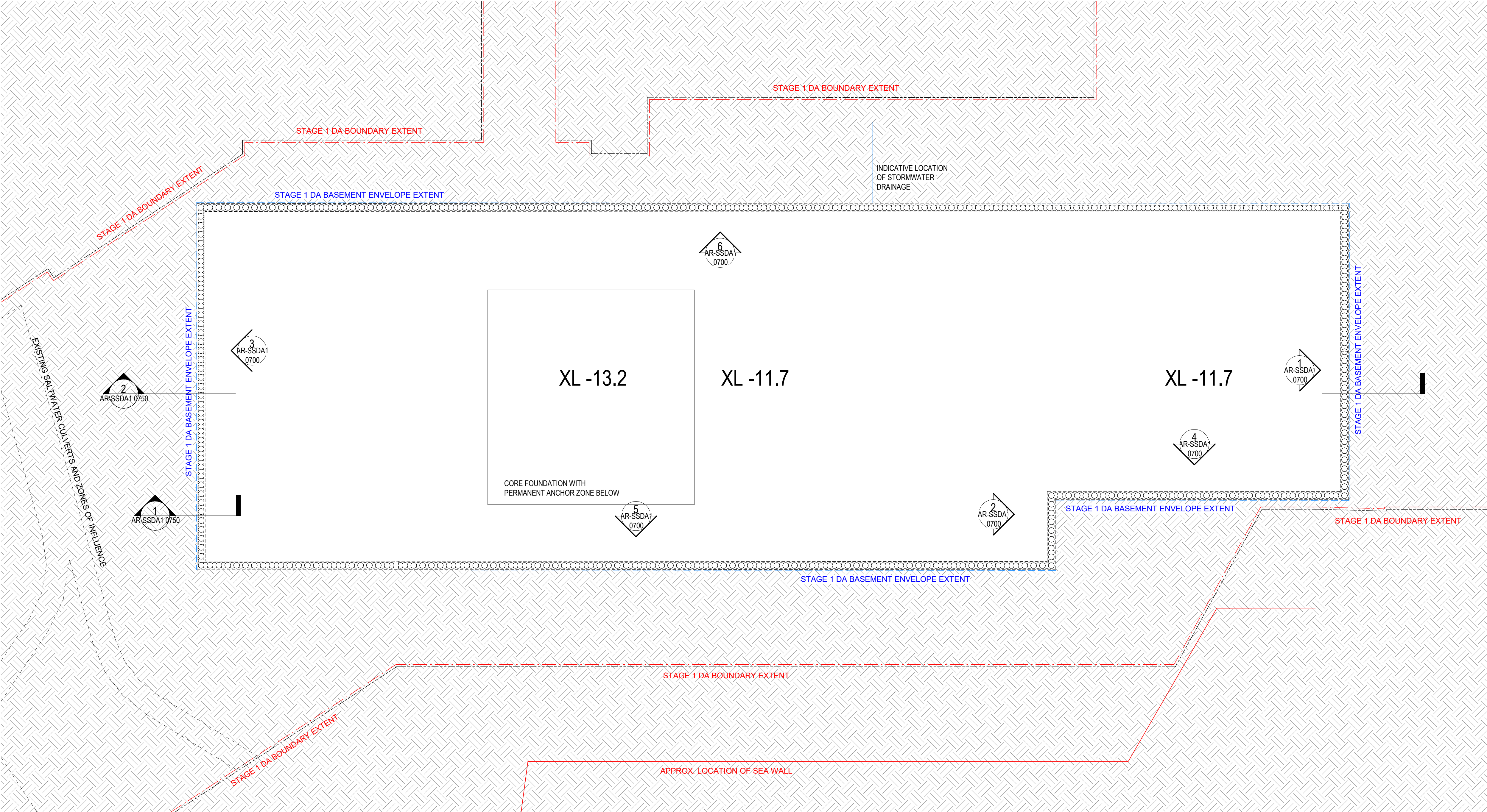
DRAWING NO.
AR-SSDA1 0300

SCALE @ A1
As indicated

PRELIMINARY
NOT FOR CONSTRUCTION

LEGEND

- EXISTING SITE BOUNDARY (LOT BOUNDARY)
- APPROX. LOCATION OF WALL BELOW PROMENADE
- - - STAGE 1 DA - DA BOUNDARY EXTENT (APPROVED APPLICATION SSD 7874)
- - - STAGE 1 DA - DA BASEMENT ENVELOPE EXTENT (APPROVED APPLICATION SSD 7874)
- - - EXISTING SALTWATER CULVERTS AND ZONES OF INFLUENCE
- PROPOSED DISCHARGE LOCATION
- XL ESTIMATED FINAL EXCAVATION RELATIVE LEVEL



1 EXCAVATION PLAN
3000 1: 250



Hassell LTD ABN 24 007 711 435
Level2, Pier 8/9,23 Hickson Rd
Sydney NSW 2000 Australia
T +61 2 9101 2000
F +61 2 9101 2100
sydney@hassellstudio.com
Nominated Architects NSW:
Tony Grist 5350
Glenn Scott 6842
Ross de la Motte 7398

Snøhetta
178 Sturt St | Adelaide | Australasia | SA 5000

Do not scale drawing. Written dimensions govern
All dimensions are in millimeters unless noted otherwise
This drawing must be read in conjunction with all relevant contracts,
specifications and drawings
This drawing is an uncontrolled copy. Unless noted otherwise
© Copyright of this drawing is vested in Hassell & Snøhetta

REV DESCRIPTION
2 For Information

DATE
01.03.22

NOTE
This SSDA 1 for Bulk Excavation Works and Construction of retaining Structures, is the first or four detail design Application of a proposed SSDAs (State Significant Development Application) proposed for the site.
The applications will be consistent with the Harbourside Concept Approval (SSD 7874) 25 June 2021.

NORTH SCALE
0m 2.5m 5m 7.5m 10m

CLIENT
MIRVAC
PROJECT
MIRVAC HARBOURSIDE

PROJECT NO.
016152-61A-P
DRAWING TITLE
EXCAVATION PLAN
DRAWING NO.
AR-SSDA1 0400
SCALE @ A1
As indicated

Appendix B Air Quality Management Procedures

Dust and Airborne Hazard Control		AQMP01
Responsibility:	Head Contractor	
Frequency:	All site works	
Location:	Site	
Objective:	To minimise dust emissions from demolition	
Procedure		
<u>Dust and Asbestos Risk</u>		
Asbestos containing materials may be present within the structures present on the site and as such removal of all hazardous materials identified in the recommended HMBS should take place in accordance with NSW Government 'Code of Practice: How to Safely Remove Asbestos, August 2019' prior to any structural demolition works. Once this removal has occurred in accordance with the Code of Practice it is considered that the demolition works will not result in asbestos emissions. However, the proposed structural demolition works will have the potential to generate dust emissions, and as such the controls as discussed below will be required.		
<u>Standards</u>		
All operations on site are to be conducted so that concentrations of airborne dust and other hazardous substances satisfy those stipulated in NSW EPA published and endorsed guidelines. These guidelines include: • NEPC (1998) 'National Environment Protection Measure for Ambient Air Quality' and • Environmental criteria provided to NSW EPA (January 2017) 'Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales'. Additionally, it will be required that visible dust emissions from the works are not observable leaving the boundary of the worksite (refer AQMP02 Air Quality Monitoring at Harbourside).		
<u>Control</u>		
Measures shall be undertaken to reduce airborne emissions from site activities including: • Isolating workers from the potential respirable silica dust emissions generated by structural demolition by selecting work methods that allow for the workforce to remain in the enclosed cabin of excavators or other plant whenever possible. In these conditions the operators must close cabin doors and windows and set air conditioning to recirculate when operating. • Use of appropriate PPE when workers cannot be isolated from the structural demolition by use of: ➢ Disposable gloves (disposed of on completion of the task) or non-disposable gloves that are cleaned within a decontamination unit in accordance with SWA (2016b) and assumes long sleeves and pants worn as per standard construction site PPE); and ➢ P2 class respirator or higher – non disposable respirators must be cleaned in the decontamination area in accordance with SWA (2016b). It should also be noted that the Work Health & Safety (WHS) plan (or similar) for the project should be referred to for the full list of PPE and decontamination requirements for the demolition workforce. • Water sprays used for dust suppression shall be used in the location of dust generating areas as a minimum should the results of realtime dust monitoring (as per AQMP02 Air Quality Monitoring at Harbourside) exceed the acceptable level. This may include pre-wetting of proposed demolition areas each day in addition to wetting during demolition; • A water misting system will be established on site boundaries for use as required to prevent off-site emissions as a minimum should the results of realtime dust monitoring (as per AQMP02 Air Quality Monitoring at Harbourside) exceed the acceptable level; • Stockpile heights shall be minimised where possible; • Where stockpiles are to be left in place for significant periods of time, they shall be covered or routinely wetted to prevent dust emissions; and • Where unfavourable meteorological conditions exist (i.e. strong winds directed west or south) site works shall be restricted to those with low potential for atmospheric emissions. This shall also include consideration of reduced production rates during these periods to minimise dust emissions.		

Regular maintenance shall be undertaken of sprinkler heads, as used for dust control throughout the site, to prevent clogging.

Air Quality Monitoring at Harbourside		AQMP02
Responsibility:	Head Contractor	
Frequency:	Duration of Demolition Works	
Location:	Site boundaries	
Objective:	To assess compliance with environmental standards for works	
Procedure		
A program of atmospheric monitoring shall be undertaken at Harbourside throughout the demolition works. The extent of required monitoring is described following:		
<i>Dusts – Realtime Particulate Monitoring</i>		
Assessment of realtime levels of dusts shall be undertaken by trained personnel observing site boundaries. Where visible dusts are found to be observable leaving the site boundary then actual site measurements shall be undertaken by a 'DustTrak' Aerosol Monitor. The averaged level of PM₁₀ (particulate matter less than 10 microns in diameter) over a period of 30 seconds shall be required to be less than 50µg/m³ at the downwind portion of the site boundary.		
Where the acceptable level of dust is exceeded by real-time aerosol monitoring, then dust control measures as advised in AQMP01 Dust and Airborne Hazard Control shall be implemented.		
<i>Dusts – Deposition Monitoring</i>		
Dust deposition monitoring shall be undertaken by dust deposition gauges maintained permanently at four locations on the site boundary (one north, one south, one east and one west). These locations have been determined on the basis of siting requirements in AS2922-1997 'Ambient Air – Guide for Siting of Sampling Units' to the extent possible. Collection and analysis of samples shall be undertaken in accordance with AS3580.10.1-2003 'Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method'. Samples shall be collected and analysed monthly throughout the works.		
Where the level of dust deposition exceeds 2g/m²/month the implementation of AQMP01 Dust and Airborne Hazard Control shall be reviewed.		
<i>Asbestos</i>		
Noting the scale of demolition works required, asbestos in air monitoring shall be undertaken for the full duration of soft stripping demolitions works.		
The asbestos in air monitoring shall be implemented by an appropriately experienced licensed asbestos assessor (LAA). Monitoring will be performed using calibrated portable air sampling pumps. Monitoring shall be conducted at the boundaries of the particular work zone within the extent of the active area of works for the required sampling interval In addition, pumps shall be placed on 'at risk' workers such as mobile plant spotters (as required).		
At the end of each monitoring period the sampling pump and attached filter will be collected and analysed at a National Association of Testing Authorities (NATA) accredited laboratory in accordance with NIOSH Method 7400 'Asbestos and Other Fibres by PCM'. All results shall be required to meet the acceptance criteria as specified in the NOHSC 'Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres (2nd edition)' of <0.01 fibres/mL. The following decision rules shall be applied to the monitoring results:		
○ Reading of less than 0.01 fibres/mL – control measures in place are working effectively, site works to continue; ○ Reading between 0.01 and 0.02 fibres/mL – a review of control measures shall be completed in the work area; and ○ Reading greater than 0.02 fibres/mL – works shall cease until engineered controls are implemented that eliminate the potential for respirable fibre exposure.		
For asbestos, the results of air monitoring (or email confirmation as a minimum) will be available the evening of each work shift completed during normal business hours (Monday to Friday, 7am to 3pm). Where work shifts are completed outside of normal business hours (Monday to Friday, 3pm-7am & weekends), air monitoring results will be available the next business day following. Daily air monitoring reports shall be displayed in a common area outside of the work area (e.g. site office or lunch shed) or be able to be produced upon request.		
<i>Silica (or RCS) Monitoring</i>		

Airborne respirable crystalline silica (RCS) dusts are considered a risk during demolition of tiles and cement containing quartz and as such daily monitoring of respirable particulates shall take place, as a minimum for the first month of structural demolition works. Monitoring will be performed using calibrated portable air sampling pumps. Monitoring shall be conducted at the boundaries of the particular work zone within the extent of the active area of works for the day. The respirable dust monitoring shall be implemented by an appropriately experienced occupational hygienist in accordance with 'AS 2985 *Workplace atmospheres – Method for sampling and gravimetric determination of respirable dust*' as modified for monitoring at static locations. Pumps shall be placed on 'at risk' workers if required based on the results of static location monitoring.

The following action levels will be applied upon receipt of daily results.

- Reading less than the exposure standard of 0.05 mg/m^3 – control measures in place working effectively, site works to continue; and
- Reading of greater than 0.05 mg/m^3 – a review of control measures and implementation of engineered controls that eliminate the potential for silica exposure.

For respirable dusts, the results will be available the following evening (for normal business hours). Where work shifts are completed outside of normal business hours (Monday to Friday, 3pm-7am & weekends), air monitoring results will be available the next business day following. Daily air monitoring reports shall be displayed in a common area outside of the work area (e.g. site office or lunch shed) or be able to be produced upon request.

Diesel

Under the proposed development scenario, it is anticipated plant/equipment utilised at the site will meet the minimum emissions standards outlined by the NSW EPA (required for registration), and standard construction requirements (i.e. documentation of plant maintenance and service history checklists etc.). As such, it is not anticipated that active monitoring for diesel particulate is required as part of site development activities.

Notwithstanding, if identified as being required, diesel particulate monitoring can be conducted to assess potential exposure risks to site workers and/or offsite receptors as outlined by the Australian Institute of Occupational Hygienists.

AQMP Review		AQMP03
Responsibility:	Head Contractor	
Frequency:	Subsequent to environmental incidents. Subsequent to changes in scope of works.	
Location:	Not applicable	
Objective:	To ensure that the AQMP is current and appropriate for the site	
Procedure Subsequent to any environmental incidents on the site and/or a significant modification to the implemented scope of works, the AQMP shall be reviewed by JBS&G. All new copies of AQMP shall be re-distributed to all relevant parties by JBS&G. The Demolition Environmental Management Plan (DEMP) as prepared for the project by Mirvac will require to be updated with the provisions of any revised AQMP.		

Training		AQMP04
Responsibility:	Head Contractor	
Frequency:	Throughout implementation of the DEMP	
Location:	-	
Objective:	To ensure that persons responsible for implementation of the AQMP are competent.	
Procedure		
Any person who is required to be responsible for technical / monitoring activities in relation to the implementation of the AQMP shall:		
• Be inducted as to the requirement and method of the specific activity by JBS&G or their nominated representative; and • Have undertaken the 24 hour Health and Safety Training for Hazardous Waste / Materials under OSHA 29 CFR 1910:120 or equivalent.		

© JBS&G

This document is and shall remain the property of JBS&G. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited

Document Distribution

Rev No.	Copies	Recipient	Date
A	1 x Electronic Copy	Stephen Chamberlain via email: stephen.chamberlain@mirvac.com	25/07/2022

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
A	Sumi Dorairaj	Matthew Bennett			25/07/2022





Mirvac Retail Sub SPV Pty Ltd
Bulk Excavation Air Quality Assessment

Harbourside Shopping Centre Redevelopment
2-10 Darling Drive
Sydney

29 April 2022

62851/145009 (Rev 1)
JBS&G Australia Pty Ltd

Table of Contents

Abbreviations.....	iv
1. Introduction.....	1
1.1 Introduction and background.....	1
1.2 Proposed Construction Works.....	1
1.3 Objective and Scope of work.....	2
2. Summary of Site Condition	3
2.1 Site Details.....	3
2.2 Site Condition	3
2.3 Surrounding Environment	4
2.4 Topography.....	4
2.5 Geology and Soils	4
2.6 Acid Sulfate Soil	4
2.7 Meteorological Conditions	5
2.8 Air Quality.....	5
3. Site Contamination Status	7
4. Hazardous and Offensive Development.....	8
5. Assessment of Air Quality.....	9
5.1 Potential Sources of Air and Odour Emissions	9
5.1.1 Exhaust Emissions	9
5.1.2 Excavation of Soils and Bedrock	9
5.1.3 Fugitive Dust	10
5.1.4 Asbestos Removal and Management	10
5.1.5 Odour Emissions	10
5.2 Potential Onsite and Offsite Receivers.....	10
5.3 Regulatory Requirements.....	11
6. Air Quality Management Strategy	12
6.1 Diesel Particulate Matter Exposure Monitoring	12
6.2 Real-Time Respirable Particulate (Dust) Monitoring	12
6.3 Respirable Fibre (silica or asbestos) Monitoring	12
6.4 Visual Monitoring	13
6.5 Dust Management.....	13
6.6 Odour Management.....	14
7. Conclusions and Recommendations.....	15
8. Limitations	16

List of Figures

- Figure 1 Site Location
Figure 2 Site Layout

Abbreviations

Term	Definition
ACM	Asbestos Containing Material
AHD	Australia Height Datum
AIOH	Australian Institute of Occupational Hygienists
AQA	Air Quality Assessment
ASS	Acid sulfate soil
AST	Above ground storage tank
bgs	below ground surface
BTEX	Benzene, toluene, ethylbenzene, xylene
CBD	Central Business District
CLM Act	Contaminated Land Management Act 1997
COPC	Contaminant of potential concern
DDR	Dust Deposition Rates
DP	Deposited Plan
DSI	Detailed Site Investigation
EPA	NSW Environment Protection Authority
JBS&G	JBS&G Australia Pty Ltd
LAA	Licensed Asbestos Assessor
LPI	NSW Land and Property Information
Mirvac	Mirvac Retail Sub SPV Pty Ltd
NATA	National Association of Testing Authorities (NATA)
NEPM	Nation Environment Protection Measure
PAH	Polycyclic Aromatic Hydrocarbons
PASS	Potential acid sulfate soil
PFAS	Per-and-poly-fluoroalkyl substances
POEO Act	Protection of the Environment Operations Act 1997
RAP	Remedial Action Plan
RL	Relative Level
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SPOCAS	suspension peroxide oxidation combined acidity
SVOC	Semi-volatile organic compounds
SWA	SafeWork Australia
SWNSW	SafeWork New South Wales
TRH	Total Recoverable Hydrocarbon
TSP	Total Suspended Particulate
UST	Underground storage tank
VOC	Volatile Organic Compound

1. Introduction

1.1 Introduction and background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Mirvac Retail Sub SPV Pty Ltd (Mircvac, the client) for the provision of environmental services associated with the development site known as Harbourside Shopping Centre, located at 2-10 Darling Drive, Sydney, NSW (the site). The site location and current layout are presented in **Figure 1** and **2** respectively. The site is legally identified as Lots 1-10, 12-15 and 17 Deposited Plan (DP) 776815, Part Lot 2015 DP 1234971, Part Lot 300 DP 836419 and occupies an area of approximately 20,500 m².

The site is situated on the former Darling Harbour Goods Yard which consists of reclaimed land adjacent Cockle Bay. Prior to reclamation in the 1860s the site consisted of tidal mudflats. Currently the site comprises Harbourside Shopping Centre an on-grade retail/commercial development (**Figure 2**). The site is proposed to be developed for mixed land use (ground floor retail/upper levels of commercial and residential apartment tower with four levels of basement parking in areas).

Environmental investigations have not identified soil to be impacted with contaminants at concentrations considered to pose a potential risk to receptors under the proposed development. Notwithstanding, a Remedial Action Plan (RAP, JBS&G 2021a¹) has been prepared to address the potential for soil contamination which may be identified following demolition of existing site structures, and the presence of a single waste cooking oil above ground storage tank (AST). It is understood that to meet the draft Secretary's Environmental Assessment Requirements (SEARs) for the Bulk Excavation development consent, an air quality assessment (AQA) is required as part of the environmental impact statement (EIS) for potential onsite and offsite air quality impacts which may occur during ground disturbance activities.

The following AQA has been developed with consideration to the *National Environment Protection (Ambient Air Quality) Measure* (Air Quality NEPM), updated 2021, and Chapter 3 Hazardous and Offensive Development of *State and Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP²) and outlines the detailed assessment of potential air quality impacts and appropriate management and mitigation measures that may be required during bulk excavation activities.

1.2 Proposed Construction Works

As discussed above, the site is proposed to be redeveloped as a mixed-use precinct, comprising a commercial/residential tower with on-grade retail spaces and four levels of basement parking in the central portion of the site.

The proposed development works will include bulk excavation to facilitate basement construction including excavation of site fill material, underlying natural sands/clays (which have been identified as potential acid sulfate soil (PASS)) and sandstone bedrock (where encountered) to an approximate depth of -8.5 m relative level Australian Height Datum (RL AHD). Approximately 51,450 m³ of material will be generated and disposed of off-site as part of basement construction activities.

Bulk excavation activities will also occur external to the basement envelope to establish required construction levels (detailed excavation) and/or as may be required for piling/footing construction or services installation.

¹ Remedial Action Plan, Harbourside Shopping Centre Redevelopment, 2-10 Darling Drive, Sydney, prepared for Mirvac Residential (NSW) Pty Ltd, JBS&G Australia Pty Ltd, ref: 59123/135805 (Rev B) dated 4 March 2021 (JBS&G 2021a)

² State Environment Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) has been repealed and the requirements incorporated into the Resilience and Hazards SEPP 2021 as of 1 March 2022.

1.3 Objective and Scope of work

The objective of the assessment is to conduct an AQA to satisfy the SEARs provided for the proposed development.

The scope of works comprised:

- Detailed review of the site setting, environmental condition, surrounding land uses and development scenario;
- Detailed review of previous environmental investigations to establish the known site contamination status;
- An assessment of the class, quantity and location of any dangerous and hazardous materials which may be encountered during redevelopment activities to determine if the proposed works constitutes potentially hazardous or offensive development;
- Identification of potential sources of air and odour emissions associated with the proposed development and potential receptors; and
- Appraisal of appropriate air quality impact mitigation, monitoring, and control measures.

2. Summary of Site Condition

2.1 Site Details

The site location and proposed layout are shown on **Figures 1 and 2**. The site details are summarised in **Table 2.1** and described in more detail in the following sections.

Table 2-1 Site Identification Details

Site Legal Identifier (as shown on Figure 2a)	Lot 1-10, 12-5 and 17 DP 776815, Part Lot 2015 DP 1234971 and Part Lot 300 DP 836419
Site Address	2 – 10 Darling Drive, Sydney, NSW
Site Area	20,500 m ²
Local Government Authority	City of Sydney (Council)
Site Geographic Coordinates (Map Grid of Australia (MGA) 56)	Refer to Figure 2
Registered Site Owner	Place Management NSW, Leased by Mirvac Retail Sub SPV Pty Limited
Current Zoning (under Sydney Local Environmental Plan)LEP) 2012)	All development requires Development Consent
Previous Land Uses	Railway Goods Yard, wharf and other industrial activities, reclaimed land
Current Land Uses	Retail and commercial (Harbourside Shopping Centre)
Proposed Land Uses	Mixed-use Precinct (basement carparking, retail and commercial ground floors with high density residential apartment block above)

2.2 Site Condition

The site layout and key features at the time of the reporting are shown on **Figure 2** and discussed herein.

The site comprised an irregular shaped parcel of land between Darling Drive, Iron Wharf Place and the Cockle Bay waterfront. The central portion of the site is occupied by the Harbourside Shopping Centre with the loading dock and redundant Sydney Monorail station in the northwest portion of the site, and the Cockle Bay waterfront occupying the entire eastern portion of the site. Site levels were noted to be generally flat consistent with historic filling/reclamation of land from Cockle Bay. The greater Pyrmont suburb was noted to be upgradient to the west of the site.

Harbourside Shopping Centre was made up of two floors of retail outlets and restaurants. A smaller third floor was located in the central portion of the site giving access to the pedestrian walkway that spans Darling Drive, connecting the site to a parking lot under the Novotel to the west (it is noted that the pedestrian walkway forms part of the DA site boundary). Ground conditions within Harbourside were noted to consist of concrete hardstand with various finishes (tiles, timber flooring etc).

The shopping centre loading dock is located beneath the Darling Drive overpass. The loading dock was paved with concrete and asphalt hardstand and used for importation of goods/supplies and exportation of rubbish from the various site occupants. No gross or widespread staining was noted on the loading dock hardstand during the site inspection. An AST (approximately 1500 L) was identified within the northwest portion of the loading dock on concrete hardstand. It is understood that this AST was used to collect waste cooking oils from various restaurants within the shopping centre. Staining from the waste cooking oil was identified on concrete in the vicinity of the tank with any spillage likely draining into the nearby sewer system. Several shipping containers used to store merchandise and small volumes of chemicals associated with cleaning and maintenance of the site (solvents, sealants etc) were noted under the Darling Drive overpass. No underground storage tanks (USTs) or other bulk fuel or chemical tanks were noted on the site.

2.3 Surrounding Environment

The current land uses of adjacent properties or properties across adjacent roadways are summarised below.

- North: directly north of the site is Pyrmont Bridge across which lies the Australian National Maritime Museum;
- East: the eastern boundary abuts Cockle Bay. A small pedestrian jetty runs adjacent the site boundary approximately 3 m into the bay. Across Cockle Bay lies Cockle Bay Wharf (retail and restaurants) followed by the city of Sydney;
- South: to the south of the site lies the International Convention Centre building followed by the Western Distributor Motorway overpass, followed by Tumbalong Park; and
- West: the southwest of the site is bound by Iron Wharf Lane over which lies Sofitel Sydney Darling Harbour, to the west lies Darling Drive followed by L1 Light Rail tracks, Novotel Sydney on Darling Harbour and then the greater Pyrmont suburb.

2.4 Topography

Review of topographic information obtained from the Spatial Information Exchange Viewer (LPI 2021³) indicated that the elevation of the site ranges from approximately 2 m Australian Height Datum (AHD) in the eastern portion to 4 m AHD at the western boundary. The site is situated on reclaimed land and covered in hardstand making the site artificially level.

2.5 Geology and Soils

The site is present within the following natural geological and soil landscapes:

Geology: Hawkesbury Sandstone formation - medium to coarse grained quartz sandstone, very minor shale and laminate lenses and Quaternary sediments (silty to peaty quartz sand, silt and clay. Ferruginous and humic cementation in places. Common shell layers).

Soils: Disturbed Terrain – disturbed terrain landscape group characterises areas having been subject to removal of natural soils or greatly disturbed or buried natural soils often associated with quarries, tips, land reclamation and large cut to fill features. Soils within this group can include imported or reclaimed soils, rock, building and waste materials.

Previous assessment activities as discussed in **Section 3** have identified fill material underlying the site ranging in depth from 2.7 m below ground surface (bgs) within the central portion of the site to 11.85 m bgs within the southern site extent. Fill materials were noted to generally comprise light brown sand, dark grey gravelly sand, light brown gravelly sand and grey sandy clay. No substantial anthropogenic material has been encountered during investigations. Natural sandy clay marine deposits (2.7 to 5.55 m bgs) and grey clay (11.85 m to 12.85 m bgs) were encountered underlying fill materials. Sandstone bedrock was encountered beneath natural material at all the majority of locations.

2.6 Acid Sulfate Soil

The site is located within an area of 'disturbed terrain' directly adjacent an area of 'high probability of the occurrence of Acid Sulfate Soils'.

Previous investigations identified PASS on site, predominately within natural marine sandy clays with isolated pockets of PASS in fill material. With consideration to the site setting and geological and soil

³ 'Spatial Information Exchange Viewer', NSW Land and Property Information, Accessed 16 February 2021, <https://maps.six.nsw.gov.au/> (LPI 2021)

characteristics of the site, management of Acid Sulfate Soils (ASS) during the proposed development is required as outlined in the site acid sulfate soils management plan (ASSMP, JBS&G 2021b⁴).

2.7 Meteorological Conditions

Average climatic data obtained indicated the site's meteorological setting is characterised by average minimum temperatures which vary from 10.5°C in July to 20.5 °C in February; average maximum temperatures which vary from 17.3 °C in July to 24.8 °C in January; average annual rainfall of approximately 1079 mm with rainfall greater than 1 mm occurring on an average of 100 days per year; monthly rainfall varies from 60 mm in September to 125 mm in July.

2.8 Air Quality

Air quality in the Sydney region is impacted by a range of air pollution emissions sources including major industry, motor vehicles and watercraft, commercial operations and leaking pipes and tanks as well as from domestic activities such as solid fuel heaters. Major pollutants that may potentially be emitted by the proposed earthworks have been identified as follows:

Fine Particles

Particles (or particulate matter) in the atmosphere come from a wide variety of sources, including soil (dust), vegetation (pollens and fungi), sea salt, fossil fuel combustion, biomass burning and industrial activities. Particles in the atmosphere typically exhibit a bi-modal size distribution with a peak in the range of 0.1-2.5µm and a second peak in the range 2.5-50µm. As a result, particles with a diameter of up to 2.5µm (PM_{2.5}) are commonly referred to as fine particles. There is also a distinction in the health effects of different sized particles. Particles up to about 10µm (PM₁₀) diameter are inhaled, whereas larger particles are not. On this basis, the term 'fine particles' is often used to refer to PM₁₀.

Coarse Particles

Coarse particles remain in the air for relatively short periods of time and are therefore generally not carried long distances. As a result coarse particles tend to be a local rather than a regional problem, occurring close to industrial sources such as metal processing plants and mining operations. The level of particles in the atmosphere is determined by measurement of their mass. In the greater metropolitan area two methods of measurement are commonly used, total suspended particulates (TSP) and dust deposition rates (DDR). While the mass determined by these measures will include fine particles, these will generally only make a small contribution. Therefore measurements of TSP and DDR are used to provide an indication of the level of coarse particulates in the atmosphere.

Concerns about coarse particles are generally more in terms of nuisance such as damage to or soiling of materials, or adverse effects on sensitive vegetation through surface coating.

Air Toxins

Another group of air pollutants which can be hazardous to human health, even at low levels, are toxic compounds known as air toxins. This group includes chemicals such as benzene, formaldehyde, chlorinated hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and dioxins. Trace amounts of many of these chemicals have been detected in air in urban environments in a number of areas around the world.

In recent years there has been increasing community concern about air toxins in ambient air and the associated health effects. These compounds may cause cancer, gene mutation, reproductive malfunction, affect foetal development, or have neurotoxic effects. While the levels that endanger public health have not been established, it is believed that even very low levels, particularly under

⁴ Acid Sulfate Soil Management Plan, Harbourside Shopping Centre Redevelopment. Prepared by JBS&G Australia Pty Ltd, doc ref 59123/136012 (Rev 0) dated 30 March 2021 (JBS&G 2021b)

long term exposure, could have adverse effects. Many air toxins are highly volatile and evaporate readily into the air following inhalation.

Odour

Odour is measured using panels of people who are presented with samples of odorous gas diluted with decreasing quantities of clean odour-free air. The panellists report when the smell becomes detectable. Odour in air is quantified in terms of “odour units” which is the number of dilutions required to bring the odour to a level at which 50% of the panellists can just detect the odour. This process is known as olfactometry.

Background levels of odour in the environment can vary enormously based on a range of factors.

3. Site Contamination Status

A Detailed Site Investigation (DSI) was undertaken by JBS&G (2021c⁵) to assess site conditions in accordance with relevant EPA made or endorsed guidelines. The following provides a summary of the known environmental status of sub-surface media anticipated to be encountered during bulk excavation activities, to assist in identifying potential air quality issues which may be encountered during development activities. It is noted a single waste (cooking) oil AST will be removed as part of demolition activities, and as such, is excluded from the assessment of outlined herein.

Fill and natural material have been assessed for a broad range of contaminants of potential concern (COPCs) including heavy metals, PAHs, volatile organic compounds (VOC) semi-volatile organic compounds (SVOCs), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), per-and-poly-fluoroalkyl substances (PFAS), phenols and asbestos. All concentrations were below the adopted health-based criteria. During the investigation, no stained or significantly odorous soils were identified. Some locations reported a slight organic odour in natural material.

No visible asbestos containing material (ACM) was noted at any sample location during the DSI (JBS&G 2021c) or by previous geotechnical investigations. Trace levels of asbestos fibres were reported by the laboratory below the adopted health-based site criteria in two samples in fill material. The concentration of fibres was also below the respective Work Health and Safety (WHS) limit of reporting and as such, fill material in these locations are not considered to constitute an asbestos impacted environment. JBS&G (2021c) noted there to be a potential for more widespread asbestos impacts present elsewhere within the fill profile, which may be encountered during bulk excavation activities.

Management and/or remediation requirements of the potential for soil contamination (principally heavy metals and asbestos impacts) which may be identified following demolition and bulk excavation activities has been documented in the RAP (JBS&G 2021a), which will likely comprise the excavation and off-site disposal of impacted soil (if identified).

Fifteen samples were submitted for suspension peroxide oxidation combined acidity (SPOCAS) analysis - six consisted of natural grey marine clay/sandy clay soils and nine of fill materials. Laboratory results indicate PASS conditions in all six natural samples and one fill sample. It is noted that all exceeding samples were taken from beneath the water table. The results indicate that PASS is present in natural materials and in isolated pockets of the fill profile. The presence of PASS below the site will be managed in accordance with the detailed ASSMP (JBS&G 2021b) developed for the site.

All concentrations of COPC in groundwater were below the adopted site criteria with the exception of some heavy metals and ammonia. Heavy metal concentrations in groundwater were considered to represent typical concentrations of an urban area. Ammonia concentrations marginally exceeded the more conservative marine water criterion adopted (ANZG 95 %) and are considered unlikely to pose a risk to the receiving water. Management of dewatering activities is anticipated to be required during proposed development activities to ensure discharge water does not represent an unacceptable ecological risk.

Hazardous ground gas and soil vapour were assessed as not posing a potential risk to site receptors, not require remediation and/or management.

⁵ Mirvac Residential (NSW) Developments Pty Ltd, Detailed Site Investigation, Harbourside Shopping Centre Redevelopment, 2-10 Darling Drive, Sydney. Prepared by JBS&G Australia Pty Ltd ref: 59123/134845 (Rev A) dated 2 March 2021 (JBS&G 2021c)

4. Hazardous and Offensive Development

An assessment has been undertaken of the potential applicability of Chapter 3 Hazardous and Offensive Development of the Resilience and Hazards SEPP to the proposed bulk excavation works. With respect to the requirements for information to determine whether an industry is potentially hazardous, the following has been considered:

- Hazardous materials associated with the proposed development primarily consist of potentially impacted soil which may be subject to remediation and/or management. As outlined in **Section 3** these soils do not have sufficient quantities of impact present to warrant a Dangerous Goods classification;
- Other hazardous materials present on-site during the bulk excavation works are anticipated to be restricted to diesel/fuels which are associated with earthmoving equipment/heavy machinery required to implement excavation activities;
- Fuels are not proposed to be stored on-site, rather will be supplied to site via road tanker as required for refuelling of earthmoving equipment/heavy machinery; and
- It would be estimated that two fuel deliveries would occur weekly, possibly consisting of as much as 2,000 L of diesel fuel supplied to earthmoving equipment/heavy machinery. Diesel fuel is classified as a combustible liquid.

It is noted the waste cooking oil AST will be removed prior to bulk excavation activities, and as such, has not been considered as part of the bulk excavation AQA as outlined herein.

Based on this characterisation, none of the screening tests as advised in Chapter 3 of the Resilience and Hazards SEPP are exceeded, and bulk excavation development activities are not considered to pose a potentially hazardous industry.

With respect to the requirements for information as identified in the assessment to determine whether the proposed bulk excavation development is an industry as considered to be potentially offensive, the following has been considered:

- The excavation, storage and handling of site fill material, natural underlying PASS and sandstone bedrock will potentially cause air emissions;
- Potential surface water contact with soil and/or acidification of PASS and leaching/migration of impact (if identified) will potentially cause water emissions; and
- The operation of earthmoving equipment to implement the remedial works will also cause potential air and noise emissions.

Noting the above, the level of emissions from the works will be controlled to ensure that no unacceptable impacts occur within or in proximity to the site. Detailed controls and management measures are presented in **Section 5**.

On this basis, the proposed bulk excavation works are not considered to be potentially offensive as per the meaning provided in Chapter 3 of the Resilience and Hazards SEPP.

5. Assessment of Air Quality

5.1 Potential Sources of Air and Odour Emissions

As discussed in **Section 3** and **Section 4**, the screening assessment of the known environmental condition of the site and proposed bulk excavation activities to facilitate the development scenario are considered to not pose a potentially hazardous or offensive industry, as per the meaning outlined in Chapter 3 of the Resilience and Hazards SEPP.

Notwithstanding, potential sources which may result in emissions and impacts on air quality have been identified, as follows:

- the use of fuels associated with earthmoving equipment/heavy machinery/equipment; and
- excavation, storage and handling of site fill material, natural underlying sands/clays (PASS) and sandstone bedrock (where encountered).

As discussed in **Section 3**, whilst no unacceptable levels of asbestos contamination have been identified, a potential exists for impact to be identified in fill material at the site following demolition (which may be encountered during bulk excavation works). As such, management to reduce potential air quality impacts as may be associated with asbestos has been included herein for completeness.

Further discussion of potential source emissions and air quality impacts specific to the anticipated development scenario follows.

An air quality management strategy has been developed to outline minimum controls required to manage potential emissions and air quality related issues, as outlined in **Section 6**.

5.1.1 Exhaust Emissions

It is anticipated a range of fuel powered plant, machinery and equipment will be required to facilitate bulk excavation activities. As outlined in **Section 4**, no bulk fuel storage is anticipated during construction activities. As such, potential emissions/air quality impacts have been identified as principally associated with exhaust fumes generated by plant, machinery or equipment use.

Diesel and petroleum combustion is a well-known process and regulated in accordance with relevant emission standards as prescribed by the NSW EPA. Exhaust emissions will be anticipated from construction machinery as engaged on the site. However, noting the proximity of the site to the Sydney central business district (CBD) and to Darling Harbour waters with substantial motor vehicle and watercraft activity, these are anticipated to be insignificant in comparison to existing levels of exhaust-based constituents in the surrounding area.

5.1.2 Excavation of Soils and Bedrock

As discussed in **Section 1.2**, the proposed development scenario will include bulk excavation of site fill, natural sand/clay (PASS) and sandstone bedrock to facilitate construction of a four-level basement, services installation, piling/footing installation and to establish construction levels.

Based on review of previous intrusive investigations, site fill material and underlying natural material have been identified to primarily comprise sandy gravel and clayey sandy soils (coarse to fine matrices) overlying sandstone bedrock. Potential emissions and impacts on air quality associated with the excavation of site materials have been identified as the potential generation of airborne dust particulate (respirable dust and/or respirable silica and/or asbestos fibres (discussed in **Section 5.1.4**)) and odours as may be associated with the exposure of PASS/saturated organic containing estuarine soils (**Section 5.1.5**).

Relevant control measures to address the potential air quality impacts associated with excavation, storage and handling and/or offsite disposal of site materials are presented in **Section 6**.

5.1.3 Fugitive Dust

Exposed surfaces will be anticipated to generate dust by wind movement and erosion of surface particles. The excavated areas, any designated haulage roads and the proposed area of stockpiling have been considered as having an unlimited wind erosion potential subsequent to the completion of excavation works and construction (and subject to any application of stabilising materials such as road base gravel). This is characterised as being a smooth field, lacking any vegetation and covered with loose sandy soil.

The greatest potential for the release of air pollutants from stockpiled material will be during handling of soils and/or emission of fugitive dusts when stockpiled materials are uncovered.

5.1.4 Asbestos Removal and Management

Following demolition activities there is the potential for asbestos impacts to be present at the site. An inspection and sampling program to confirm the absence of asbestos and or other contaminants (e.g. heavy metals, etc) resultant from demolition activities has been developed and required to be implemented in accordance with the RAP (JBS&G 2021a). Asbestos contaminated soil necessitating management for potential asbestos exposure is defined in *How to Manage and Control Asbestos in the Workplace Code of Practice* (SWA 2019) as:

- Soil that contains visible asbestos as determined by a competent person; or
- Soil that contains asbestos fibres at quantities exceeding trace levels (considered to be the analytical detection limit in lieu of alternate guidance) as reported by analysis undertaken in accordance with AS4964:2004 *Method for the qualitative identification of asbestos in bulk samples*.

Environmental, health and safety management requirements for the handling of these materials has been documented in the site RAP, based on the requirements provided for asbestos-related works in SWA (2019). Additional management requirements to control/monitor potential airborne exposure of asbestos which may impact air quality have been outlined in **Section 6**. Additionally, a Construction Environmental Management Plan (CEMP) may be prepared to address environmental controls during development activities.

5.1.5 Odour Emissions

As outlined in **Section 3**, site soils do not pose a potential significant source of odour generation potential and do not contain levels of contaminants consider to generate potential odour emissions upon excavation. Notwithstanding, soils identified to contain slight organic odours and/or the exposure of P/ASS underlying the site may result in minor odour emissions from the site. The site RAP (JBS&G 2021a) presents appropriate odour controls, in addition to other management requirements which may be presented in a CEMP or similar document to be prepared for development activities.

5.2 Potential Onsite and Offsite Receivers

Potential human populations who may be exposed to air quality impacts during development activities (if appropriate management is not implemented prior to or during development) include:

- Construction and site maintenance workers;
- Sub-surface excavation and intrusive workers; and
- Workers or residents in surrounding areas.

Review of the surrounding land uses (**Section 2.3**) identified commercial/retail spaces and multi-storey high density residential buildings located within the Sydney and Pyrmont CBD. Background air quality within the general CBD and surrounding area is considered to be reduced by virtue of the general regional activities (i.e. vehicles, watercraft, combustion generators etc.). Given the highly

urbanised setting of the site, it is anticipated that surrounding buildings are fitted with recirculating air conditioning and filtration systems, affectively eliminating exposure of residents or workers within these buildings to potential air quality impacts, as may be generated during site development activities. No highly sensitive receptors (i.e., schools, childcare centres, hospitals etc.) were identified in immediate vicinity of the development site.

5.3 Regulatory Requirements

Development activities on site will be required to be completed in accordance with several sections of environmental and occupational health and safety legislation and associated regulations. The primary Acts, Regulations and Guidelines are listed below with a brief summary of their applicability. Please note that this list is not intended to be a comprehensive listing of acts and regulations. The site owner and contractors are required to satisfy themselves that all applicable permits, licences and legislation have been obtained and their conditions satisfied.

Environmental Planning & Assessment Act 1979

The overarching Act to institute a system of environmental planning and assessment for NSW.

Work Health and Safety Act, 2011

The overarching Act for NSW setting law relating to employee health and safety and employer responsibilities.

Work Health and Safety Regulation, 2017

Sets Regulations and details the duties for employers to achieve required employee health and safety performance.

Contaminated Land Management Act 1997 (CLM Act)

The *Contaminated Lands Management Act 1997* (CLM Act) controls the assessment of contamination and requirement of remediation of soils and groundwater.

POEO Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is the key piece of environment protection legislation administered by the EPA.

National Environment Protection (Ambient Air Quality) Measure (NEPC 2021)

National guidelines for the assessment of ambient air quality. These guidelines provide national air quality standards and criteria for a range of pollutants.

Protection of the Environment Operations (Clean Air) Regulation 2021

Guidelines outlining regulatory requirements for various activities which may affect air quality, including air impurities emitted from activities or plant.

Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2016

NSW regulatory guidelines outlining the methods for detailed quantitative and qualitative air quality assessments from stationary sources.

Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition, 2005, Australia National Occupational Health and Safety Commission (NOHSC 2005)

Guidelines for the assessment of airborne asbestos fibres including relevant workplace exposure standards.

6. Air Quality Management Strategy

The following sections provide management and/or control measures which can be implemented to address potential sources of air quality and emissions impacts identified in **Section 5.1** in general accordance with relevant regulatory guidelines (**Section 5.3**).

6.1 Diesel Particulate Matter Exposure Monitoring

Under the proposed development scenario, it is anticipated plant/equipment utilised at the site will meet the minimum emissions standards outlined by the NSW EPA (required for registration), and standard construction requirements (i.e. documentation of plant maintenance and service history checklists etc.). As such, it is not anticipated that active monitoring for diesel particulate is required as part of site development activities.

Notwithstanding, if identified as being required, diesel particulate monitoring can be conducted to assess potential exposure risks to site workers and/or offsite receptors as outlined by the Australian Institute of Occupational Hygienists (AIOH, 2013⁶).

6.2 Real-Time Respirable Particulate (Dust) Monitoring

The preferred method of health monitoring is to undertake real-time assessment of levels of airborne particulates and potential co-occurring respirable fibres. Real-time monitoring shall be undertaken during material disturbance activities by a stationary light-scattering laser photometer (as proposed to be a TSI Dusttrak) as set to measure particulates in the PM₁₀ size fraction. Representative continuous monitoring shall be undertaken through the course of a workday at representative locations in proximity of the active soil disturbance works, at the boundary of the worksite. The level of PM₁₀ shall be interpreted as a daily averaged sample, with consideration to peaks or significant exceedances above the criteria during the monitoring period which may be interpreted as being directly associated with site activities.

A criterion of 0.05 mg/m³ of PM₁₀ shall be adopted as the action level for the site works. Where this criterion is observed to be exceeded, then immediate instruction shall be provided to revise air emission controls and review the specific work activities that are suspected to have resulted in the elevated PM₁₀ levels.

The Dusttrak shall be operated by an appropriately trained environmental consultant or occupational hygienist. Daily dust monitoring reports are to be prepared following the monitoring period.

6.3 Respirable Fibre (silica or asbestos) Monitoring

Airborne respirable fibres are considered a risk during excavation of rock material with a high silica content, such as sandstone. Therefore, this type of monitoring will only be carried out during these works to provide a representative data set of potential silica exposure.

Should asbestos be identified, monitoring of potential airborne asbestos fibres will be required during disturbance activities in accordance with relevant SafeWork NSW guidance.

Monitoring will be performed using calibrated portable air sampling pumps. Monitoring shall be conducted at the boundaries of the particular work zone within the extent of the active area of works for the day. In addition, pumps shall be placed on 'at risk' workers such as mobile plant spotters (as required).

⁶ AIOH (2013). Diesel Particulate Matter and Occupational Health Issues, Positional Paper, July 2013

At the end of each monitoring period the sampling pump and attached filter will be collected and analysed at a National Association of Testing Authorities (NATA) accredited laboratory in accordance with relevant guidelines (**Section 5.3**).

For asbestos, the results of air monitoring (or email confirmation as a minimum) will be available the evening of each work shift completed during normal business hours (Monday to Friday, 7am to 3pm). For silica, the results will be available the following evening (for normal business hours). Where work shifts are completed outside of normal business hours (Monday to Friday, 3pm-7am & weekends), air monitoring results will be available the next business day following. Daily air monitoring reports shall be displayed in a common area outside of the work area (e.g. site office or lunch shed) or be able to be produced upon request.

The following action levels will be applied upon receipt of daily results.

Crystalline Silica (Respirable) Monitoring

- Reading less than the exposure standard of 0.05 mg/m^3 – control measures in place working effectively, site works to continue; and
- Reading of greater than 0.05 mg/m^3 – a review of control measures and implementation of engineered controls that eliminate the potential for silica exposure.

Asbestos Air Monitoring:

- Reading of less than 0.01 fibres/mL – control measures in place are working effectively, site works to continue;
- Reading between 0.01 and 0.02 fibres/mL – a review of control measures shall be completed in the work area; and
- Reading greater than 0.02 fibres/mL – works shall cease until engineered controls are implemented that eliminate the potential for respirable fibre exposure.

It is noted that these action levels adopted are more conservative than the exposure standard for airborne asbestos (0.1 fibres/mL) as advised by Safe Work Australia for an 8-hour shift. The respirable fibre monitoring shall be implemented by an appropriately experienced occupational hygienist (or licensed asbestos assessor (LAA) as may be applicable for asbestos works).

6.4 Visual Monitoring

Visual monitoring shall be undertaken by the person(s) in control of the work-site at regular periods throughout the works. It shall be ensured that visible dust emissions from the works are not visible at the boundary of the worksite. Where visual dust emissions are observed, then control measures shall be revised.

6.5 Dust Management

During any intrusive works at the site dust levels shall be managed, by ensuring:

- Water sprays are used on the excavation areas, stockpiles and haulage pathways;
- Stockpiles will be either periodically wetted down or covered to control dusts;
- Haulage vehicles shall be covered and are to leave via the designated (stabilised) site access;
- Haulage vehicles and plant and equipment shall be washed down whenever they leave the asbestos work area; and
- Access roads are to be sufficiently maintained to ensure no visible dust at the site boundary.

Care should be taken to not over-wet excavations and/or stockpiles such that excess runoff is generated. If dust is visible at the boundary of the work area, then additional dust control measures shall be employed, which may include:

- Temporarily suspending activities until wind speeds reduce; and / or
- Additional use of water sprays or dust suppression mixtures.

Further dust management measures may be further instructed by monitoring results as generated by monitoring works undertaken in accordance with **Section 6.2**.

6.6 Odour Management

A potential exists for natural soils identified as PASS to generate odours during disturbance activities. All PASS disturbance activities are required to be conducted in accordance with the ASSMP (JBS&G 2021b). If PASS materials are identified to present a potential odour issue and required to be temporarily stockpiled on site, these materials are to be appropriately covered with geofabric/builders' plastic until such time as they are removed/disposed of off-site.

7. Conclusions and Recommendations

Based on the AQA detailed herein, and subject to the **Limitations** in **Section 8**, the following conclusions and recommendations are presented:

- Based on the known contamination status of the site and proposed development scenario, the proposed bulk excavation activities are considered to not pose a potentially hazardous or offensive industry;
- No highly sensitive receptors (i.e., schools, childcare centres, hospitals etc.) were identified in proximity to the site, with on and off-site receptors identified as site workers and/or workers and residents of surrounding properties; and
- Potential sources of air and odour emissions were identified, principally associated with excavation and exposure of site material (fill and natural soil/rock) and the use of fuels (for equipment/plant etc.).

JBS&G recommend the appropriate management and control measures, as outlined herein, be implemented to manage and/or monitor air quality impacts and emissions during bulk excavation activities.

8. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

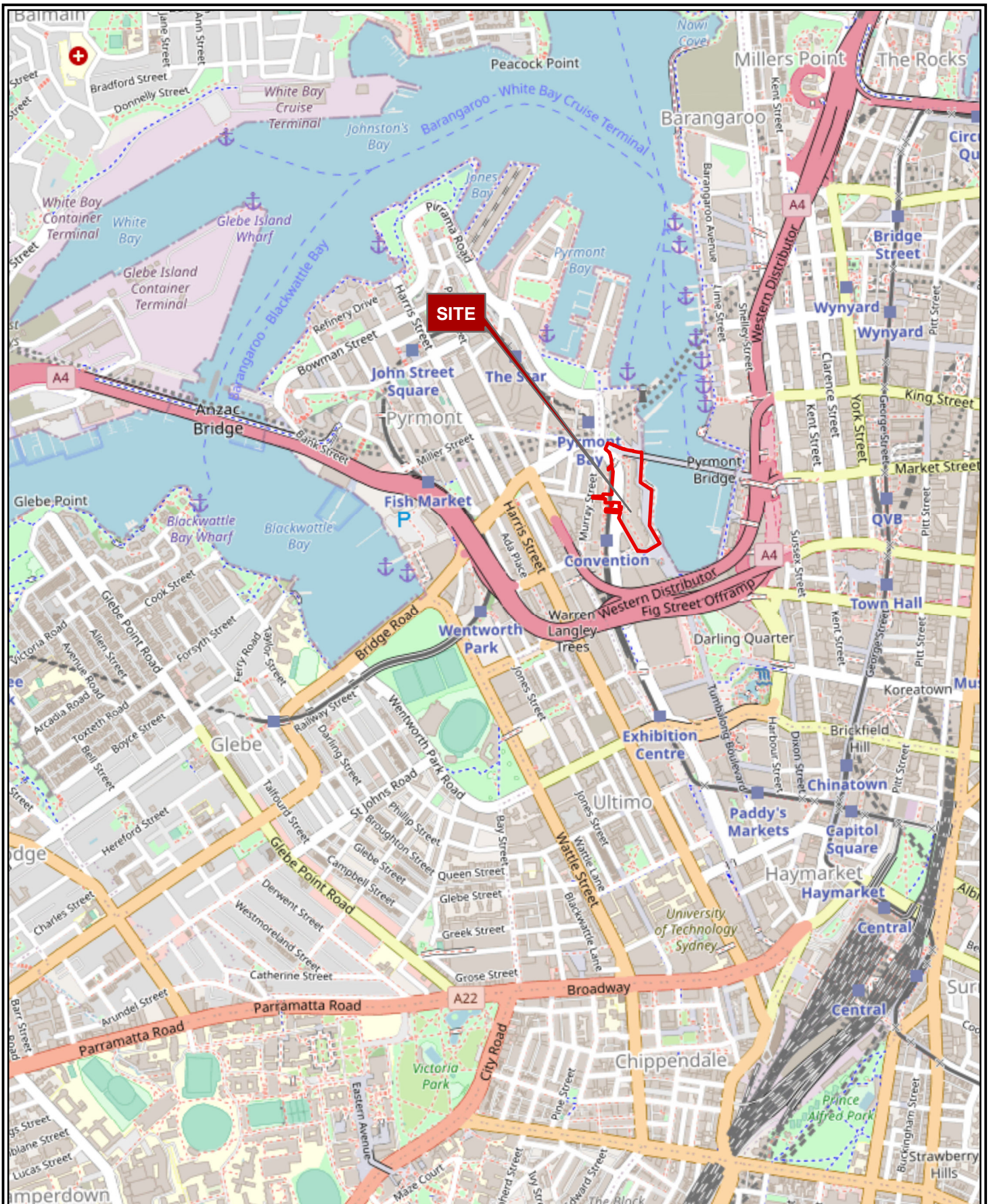
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

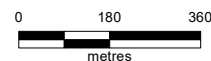
Figures



Legend:

Approximate DA Boundary - The Site

Scale 1:15,000



Coord. Sys. GDA 1994 MGA Zone 56



Job No: 62851

Client: Mirvac

Version: R02 Rev 1

Drawn By: AB

Date 29/04/2022

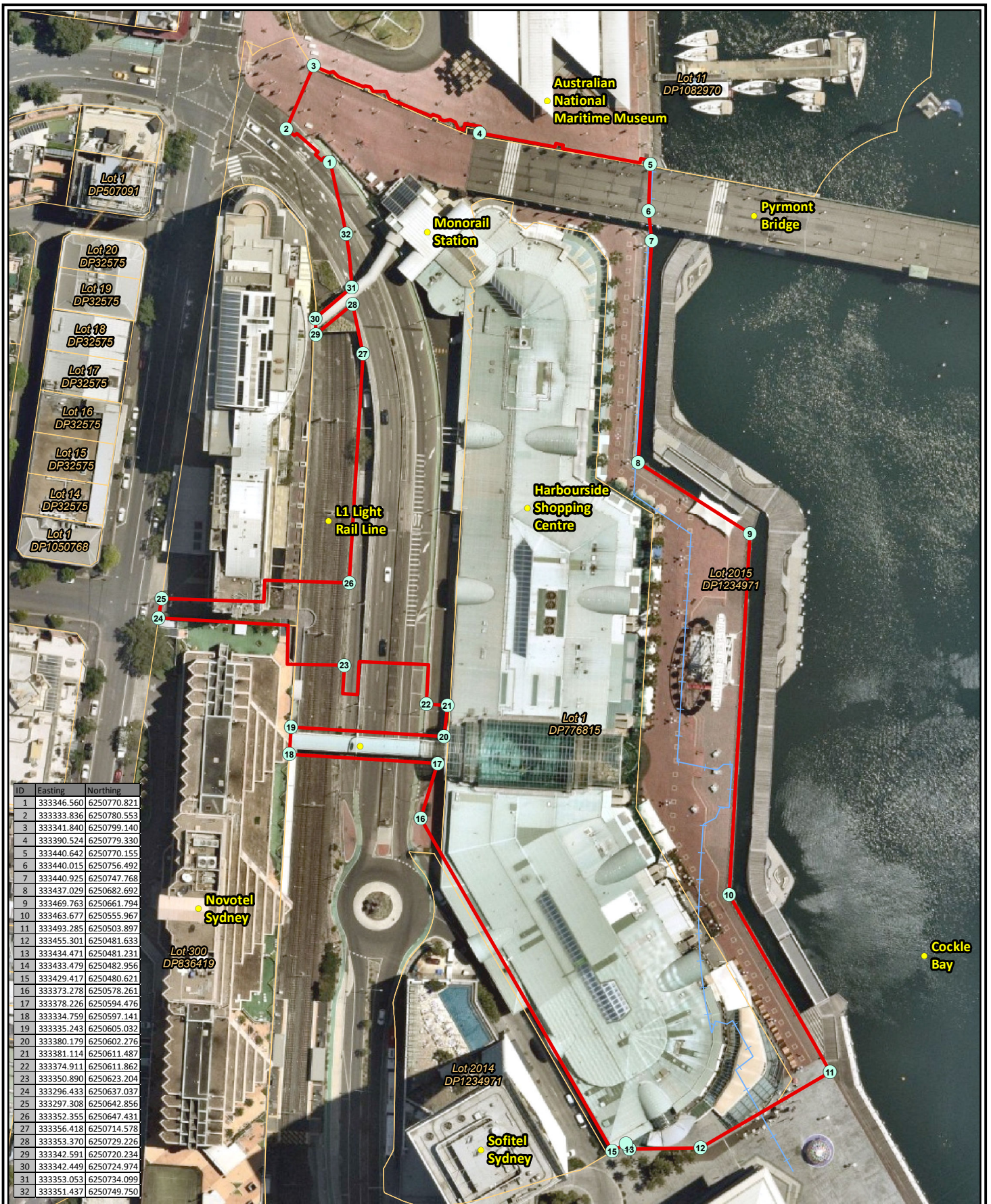
Checked By: CK

**Harbourside Shopping Centre,
Darling Harbour**

SITE LOCATION

FIGURE 1

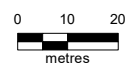




Legend:

- Approximate DA Boundary - The Site
- NSW Cadastre (DFSI, 2022)
- Structures Below the Harbour Promenade - Seaward Extent
- Site Features

Scale 1:1,500



Coord. Sys. GDA 1994 MGA Zone 56



Job No: 62851

Client: Mirvac

Version: R02 Rev 1

Date 29/04/2022

Drawn By: AB

Checked By: CK

Harbourside Shopping Centre,
Darling Harbour

SITE LAYOUT

FIGURE 2A



© JBS&G

This document is and shall remain the property of JBS&G. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited

Document Distribution

Rev No.	Copies	Recipient	Date
0	1 x Electronic Copy	Stephen Chamberlain via email: stephen.chamberlain@mirvac.com	7/04/2022
1	1 x Electronic Copy	Stephen Chamberlain via email: stephen.chamberlain@mirvac.com	29/04/2022

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
0	Chris Kauffman	Matthew Bennett	Matthew Bennett		7/04/2022
1	Chris Kauffman	Matthew Bennett	Matthew Bennett		29/04/2022



4.4 APPENDIX D – STORMWATER MANAGEMENT PLAN

Mirvac Group Water Quality Discharge Procedure



1.0 Purpose

This procedure outlines the requirements for the management of sediments and other pollutants contained within stormwater flows and discharges from Mirvac construction projects. The procedure outlines water quality requirements to be achieved before any discharge is undertaken.

2.0 Scope

The procedure applies to all development projects across Mirvac where stormwater is discharged through natural flows or from catchment reservoirs including basements, lift shafts, excavations, sedimentation ponds/pits or other water storage vessels.

3.0 Definitions

berm	Earth mound designed to restrict and slow water flow so that it drops sediment fines.
hydrology	Predicted stormwater runoffs and estimated flow control barriers and reservoir capacity.
pH	A measure of acidity or alkalinity of water.
turbidity	A measure of water clarity and how much light is able to penetrate through a column of water.
suspended solids	Organic and inorganic particles, such as solids from wastewater, sand, clay, and mud, that are suspended and carried in water
swale	A ditch on a contour or slope designed to slow and hold water flow enabling infiltration of water and nutrients into the soil.

4.0 Risk assessment

Stormwater runoff and discharge shall be a consideration in all risk and opportunity planning for Mirvac construction projects. All Mirvac construction works shall manage discharge of sediments and other pollutants to a waterway or waterbody. Management of discharges is a legislative requirement in each state or region of operation and a requirement of the Mirvac Group Health Safety Environment Management System. All discharges shall be carried out without contaminating surrounding waterways or any stormwater discharge system. Management considerations shall include water quality of any natural run-off or discharge (e.g. by dewatering), hydrology and flooding, particularly during wet weather, and include the stability of any stockpile(s) or site terrain.

4.1 Barrier measures

Barrier control measures at a construction project shall include:

- sedimentation barriers to perimeter fencing and stockpiles or other excavated areas where run-off is identified as a risk;
- use of silt traps to protect stormwater inlets within a site boundary and those inlets identified 'at risk' in streets immediately bounding a construction project;
- installation of a rumble strip(s) or coarse aggregate to heavy vehicle entry/exit points;
- work tasks generating slurry shall be identified and absorbents, trays, or other methods of retention carried out;
- installation of swales, berms, retention pits or other flow restrictors to slopes to slow run-off so that it drops sediment;
- inspection of all barriers and other controls at maximum weekly intervals and immediately after any significant rainfall event (i.e. 20 mm or more);
- location of high risk plant, e.g. concrete pump, or activities like refuelling away from stormwater inlets or protection of inlets during high risk activities; and
- covering of spoil loads transported from a construction project.

Mirvac Group Water Quality Discharge Procedure



4.2 Monitoring of stormwater quality

Monitoring of any stormwater to be discharged shall be in accordance with this procedure or Local Government Guidelines should such Guidelines require a higher standard. Monitoring prior to discharge shall include the following test results (based on Australian and New Zealand Guidelines for Fresh and Marine Water Quality) using a water quality meter:

- a pH in a range of 6.5 to 8.5;
- a Turbidity range of <50 NTU (Nephelometric Turbidity Units) or no more than 10% higher than the turbidity in the receiving water; and
- suspended solids not exceeding 50 parts per million (ppm).

Where discharge is to occur into environmentally sensitive areas, e.g. marine ecosystems, monitoring shall be undertaken by an independent Service Provider accredited by the National Association of Testing Authorities (NATA).

4.2.1 Visual inspection

Stormwater flows shall be observed to ensure:

- no visible litter or other floatable materials such as foams or scums; and
- no visible film of oil, grease and petrochemical products or odours from such products at the point of entry.

4.2.2 Sediment removal

Where retained stormwater does not meet the quality outlined previously a Flocculant, e.g. Alum, shall be added in order to remove suspended sediment, bacteria and other elements by settling. Use of any flocculant shall be in accordance with the precautions for use outlined in the Material Safety Data Sheet provided with the product.

4.2.3 Records

Monitoring records shall be retained at the construction project for audit purposes using Appendix A – Water Quality Register. All discharge results shall be reviewed for compliance with Part 4 of this procedure through routine audit processes at maximum three (3) month intervals.

5.0 Reference material

- **National** (www.environment.gov.au)
 - Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
- **New South Wales** (www.environment.nsw.gov.au)
 - Environment Matters 8: Stormwater Pollution from Building Sites (Guide)
 - Protection Of the Environment Operations (POEO) Act.
- **New Zealand** (www.mfe.govt.nz)
 - National Environmental Standards for Clean Water, Air and Land.
- **Queensland** (www.epa.qld.gov.au)
 - Environment Protection Water Policy
- **Tasmania** (www.dpiw.tas.gov.au)
 - Environmental Best Practice Guidelines - Construction Practices in Wetlands & Waterways.
- **Victoria** (www.epa.vic.gov.au)
 - State Environment Protection Policy (Waters of Victoria).
- **Western Australia** (www.epa.wa.gov.au)
 - Environment Protection Act.

Water Quality Register



Appendix - A

Workplace:

Mirvac representative:

Service Provider:

Instrument 1 - Type: pH ☐ Turbidity ☐ Suspended Solids ☐

Make/ Model:

Service Date:

Instrument 2 - Type: pH ☐ Turbidity ☐ Suspended Solids ☐

Make/ Model:

Service Date:

Instrument 3 - Type: pH ☐ Turbidity ☐ Suspended Solids ☐

Make/ Model:

Service Date:

		6.5 – 8.5	<50	<50	= ACCEPTABLE LEVELS				
Test Date	Test Time (24Hr)	pH	Turbidity (NTU)	Total Suspended Solids (ppm)	Test Person's Name	Test Location	Comments	Discharge Date	Discharge Quantity (Litres)

List corrective action: (i.e. treatment required to correct unacceptable levels)

Further comments:

4.5 APPENDIX E – ONGOING SITE TREATMENT MANAGEMENT PLAN CHECKLIST

Workplace					
Shutdown		Start-up		Date:	
OK = √ Not OK = X and action needed				N/A	am pm
Temporary fences around workplace zone					
All fence panels are shackled & secure					
No holes or gaps in fencing					
Safety signage prominent, including NO ENTRY signs					
After Hours contact information displayed					
Main switchboard location indicated for emergency services					
Erosion and sediment controls in place as per the approved plans					
Handrails to excavations, formwork or slabs					
All leading edges					
Penetrations in formwork or slabs					
Access stairs clear with handrails					
Bar caps to retaining walls and protruding starter bars					
No materials blocking access points of entry/egress					
Safety and Traffic signage is displayed					
Pedestrians access is separated from vehicle traffic					
Alarms functioning OK					
Contact numbers of key personnel circulated & keys distributed					
Guard procedure in place					
All external gates locked (unlocked)					
No materials stored in public areas					
No sharp objects observed protruding into Public areas or Public roads.					
No construction rubbish in Public areas					

No tools or equipment lying around Public areas			
No trip, slip hazards or loose material on slopes observed			
No water ponding around or on pedestrian access routes			
No broken glass observed			
No Sub-contractor's vehicles are parked in Public areas			
No syringes observed			
Secured or removed from Public areas			
Mobile Plant prevented from unauthorised access and use			
Tower crane access points protected against unauthorised access			
Meter/distribution boards to be padlocked or zip tied shut (unlocked)			
Keys removed from all plant – mobile & static (keys made available)			
Hazardous materials stored in secure cages			
Bins/drums emptied of water			
Loose materials and equipment secured			
No materials leaning up against temporary fences			
Stockpiles battered, or otherwise managed to prevent erosion by wind & rain			
Site water run-off protection in place incl. site surface treatment and stabilisation			
Streets clean			
Environmental socks installed around stormwater grates			

Inspected by:		Signature:	
Workplace Manager:		Signature:	