



Remediation Action Plan

28-32 Bourke Road, Alexandria, NSW, 2015

Prepared for: Alexandria Property Development Pty Ltd c/- Johnstaff
Projects (NSW) Pty Ltd

EP3072.002_v2 | 9 November 2023



QMS Certification Services



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Remediation Action Plan

28-32 Bourke Road, Alexandria, NSW, 2015

Alexandria Property Development Pty Ltd c/- Johnstaff Projects (NSW) Pty Ltd
Level 12, 70 Pitt Street
Sydney NSW 2000
Via email: Jonathon.moss@johnstaff.com.au

9 November 2023

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Loek Munnichs
Principal Environmental Scientist
Certified Environmental Practitioner (1006) – Site Contamination (SC41007)
EP Risk Management Pty Ltd
ABN: 81 147 147 591



QUALITY CONTROL

Version	Author	Date	Reviewer	Date	Quality Review	Date
v1	T. Chatman	23.06.2023	L. Munnichs	30. 06.2023	E. Handley	30.06.2023
v2	E. Handley	06.11.2023	L. Munnichs	07.11.2023	T. Chatman	09.11.2023

DOCUMENT CONTROL

Version	Date	Reference	Submitted to
v1	30.06.2023	EP3072.002_Johnstaff_Alexandria_RAP_v1	Alexandria Property Development Pty Ltd c/- Johnstaff Projects (NSW) Pty Ltd
v2	9.11.2023	EP3072.002_Johnstaff_Alexandria_RAP_v2	Alexandria Property Development Pty Ltd c/- Johnstaff Projects (NSW) Pty Ltd



Melbourne
Unit 22/1 Ricketts Road
Mount Waverley, Vic, 3149
T 03 8540 7300

Sydney
Suite 13.01, 80 Mount St
North Sydney, NSW, 2060
T 02 9922 5021

Newcastle
3/19 Bolton Street
Newcastle, NSW, 2300
T 02 4048 2845

W www.eprisk.com.au

ABN 81 147 147 591

Executive Summary

This Remediation Action Plan (RAP) has been prepared by EP Risk Management Pty Ltd (EP Risk) to accompany a detailed State Significant Development Application (SSDA) for the proposed mental health hospital and medical centre at 28-32 Bourke Road, Alexandria, NSW 2015 in the City of Sydney Local Government Area (LGA). The Site is legally described as Lot 1-3 of Deposited Plan (DP) 324707.

The report has been prepared to address the Secretary Environmental Assessment Requirements (SEARs) issued for the project (SSD-59006709) dated 8 June 2023. Alexandria Property Development Pty Ltd c/- Johnstaff Projects (NSW) Pty Ltd (Johnstaff) engaged EP Risk to prepare an updated Remediation Action Plan (RAP) for the Site, following finalisation of the proposed concept development plans.

It is understood that Johnstaff are planning to redevelop the Site from its current industrial land use to a seven (7) storey commercial building, which will involve the excavation of the soil within the Site to a maximum depth of 5.25 mAHD, measured at approximately 3.4 meters below the existing ground level (mBGL) (adopted as 8.8 mAHD), for the purposes of the construction of a semi-underground car park and subservices. The proposed basement is noted to have a floor level of 7.35 mAHD (excluding subservices) below the existing slab level (8.65 mAHD), measuring approximately 1.6 mBGL (assuming a nominal slab depth of 150mm and 150 mm subgrade stabilisation).

Previous environmental investigations conducted by EP Risk at the Site identified multiple contaminants of potential concern (CoPC) within the Site which pose a potential human health risk to current and future users of the Site, including remediation and construction workers, and a risk to the surrounding environment if shown to have the potential to move off-site. Most notably, Lead contamination within the Site was shown to significantly exceed the adopted human health criteria for commercial/industrial land use by over 250%.

Consequently, a RAP is required to specify a strategy to remediate the Site to a standard suitable for the proposed commercial/industrial redevelopment, and to ensure no unacceptable risk is posed to human health or the environment, with respect to contaminants detected in soil and groundwater on-Site in accordance with relevant legislative and planning requirements.

The preferred remediation strategy was assessed to comprise the following items. This report concludes that the proposed mental health hospital and medical centre is suitable and warrants approval subject to the implementation of the following mitigation measures.

1. Assigning roles and responsibilities.
2. Preparation of WHS documents, CEMP, regulatory approval, licensing and notifications.
3. Site establishment.
4. Remediation and associated tasks
 - o Asbestos Air Monitoring;
 - o On-site treatment of ASS in accordance with the ASSMP (EP Risk 2022c);
 - o Asbestos air monitoring during remediation of AOC1;
 - o Excavation, segregation, on-site treatment and off-site disposal of material within AOC1;
 - o Visual clearance assessment of AOC1 following excavation of ASBINS;
 - o Excavation, segregation and off-site disposal of material within AOC2;
 - o Excavation, segregation and off-site disposal of material within AOC3;
 - o Excavation, segregation and on-site immobilisation of material within AOC4, and soils surrounding BH19 and BH40;

- o Validation sampling of soils underlying the excavated extents;
 - o Levelling of the Site using residual soils; and
 - o Final waste classification sampling of ex-situ immobilised soils (AOC4, and soils surrounding BH19 and BH40), and off-site disposal.
- 5. Excavation Works within the proposed basement footprint.
- 6. Importation of clean Excavated Natural Material (ENM) / Virgin Excavated Natural Material (VENM) or material classified under a suitable resource recovery order or exemption (if required).
- 7. Implementation of an Unexpected Finds Protocol throughout the duration of the works.

The proposed remediation work is classified as Category 2 remediation works in accordance with State Environmental Planning Policy (SEPP) (Resilience and Hazards) 2021. It is noted that Council requires 30 days written notice prior to commencing remediation work and at the conclusion of the remedial works and prior to occupation of the Site, a Site Audit Report (SAR) and Site Audit Statement (SAS) to satisfy NSW State Environmental Planning Policy requirements will be provided by NSW EPA Accredited Site Auditor Rod Harwood from Harwood Environmental Consultants (HEC). These documents are to be submitted to the Council of the City of Sydney (Council), prior to any development works.

Following implementation of the preferred remediation strategy, subsequent validation works and associated activities outlined in the RAP, EP Risk considers the Site can be made suitable for the proposed commercial land use. It is further noted that areas proposed for dedication to City of Sydney Council will be suitably remediated such that the areas will not be encumbered by a Long-Term Environmental Management Plan (LTEMP). Conditional to the successful completion of the recommended works, there is considered to be a minimal risk posed to future site users and surrounding ecological receptors by the previously identified contamination on-site, therefore an LTEMP is not considered to be required. Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

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1 Introduction

EP Risk Management Pty Ltd (EP Risk) was engaged by Alexandria Property Development Pty Ltd c/- Johnstaff Projects (NSW) Pty Ltd (Johnstaff) to prepare this Remediation Action Plan (RAP) to accompany a SSDA for the mental health hospital and medical centre proposed for development at 28-32 Bourke Road, Alexandria, NSW 2015 (SSD-59006709).

The Site is approximately 2,972 m² in area and currently consists of a vacant factory / warehouse, formerly used for metal product manufacturing, chemical manufacturing, and heavy metal merchants. The Site comprises three (3) lots, defined as Lots 1-3 in Deposited Plan (DP) 324707. The Site is currently zoned as E3: Productivity Support under the Sydney Local Environmental Plan (2012), and State Environmental Planning Policy Amendment (Land Use Zones) 2023, currency (08 September 2023).

This RAP is required to address the findings and recommendations of previous investigations undertaken at the Site, including a Soil Contamination Assessment (SCA) (EP Risk 2021¹), Detailed Site Investigation (DSI) (EP Risk 2022²) and Detailed Site Investigation, referred herein as Phase 2 DSI (EP Risk 2023a), previously conducted by EP Risk. Previous investigations at the Site identified leachable lead at concentrations considered likely to pose a risk to current and future Site receptors, as well as the presence of bonded (non-friable) asbestos containing material (ACM) within soils at isolated locations on-site.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-59006709) dated 08 June 2023. Specifically, this report has been prepared to respond to the SEARs requirement issued below.

Table 1 – SEARs Requirement		
Item	Description	Section Reference
Contamination	In relation to Contamination and Remediation, if required, provide a Remediation Action Plan (RAP) including Interim Audit Advice from an EPA-accredited Site Auditor certifying the RAP as appropriate.	Remedial action items provided in Section 10.4. <i>Certification of this RAP is to be issued by the appointed NSW EPA Accredited Site Auditor under the Site Audit Statement.</i>

Based on existing plans and information provided to EP Risk by Johnstaff, it is understood that the proposed development will be a State Significant Development (SSD) under Clause 14 of Schedule 1 of State Environmental Planning Policy (SEPP) (Planning Systems) 2021 with the Minister for Planning appointed as the consent authority.

Proposed development of the Site is understood to involve the following:

- Demolition of the existing Site buildings and removal of waste material.
- Excavation of the soil to a maximum depth of 3.4 mBGL for the installation of a basement car park, and subsurface utility access (noting an average floor level of 1.6 mBGL).
- Construction of a seven (7) storey commercial building.
- Dedication of land (Transfer Land) to the City of Sydney Council (Council), for the purposes of footpath widening along the Bourke Road frontage and vehicular access along the western and southern

¹ EP Risk, Soil Contamination Assessment, 28-32 Bourke Road, Alexandria, NSW, 2015, ref: EP2460.002_v1, dated 23 December 2021 (EP Risk 2021).

² EP Risk, Detailed Site Investigation, 28-32 Bourke Road, Alexandria, NSW, 2015, ref: EP2515.001_v1, dated 10 March 2022 (EP Risk 2022).

boundaries of the Site. The approximate extent of the Transfer Land is presented in **Figure 1** in the 'Figures' section of this report.

In accordance with Conditions B46 and B49 of the State Significant Development Consent (SSD) 38600121 dated 30 March 2023, the following conditions are considered relevant to the development of this RAP:

- 1) Future development application(s) must ensure that land proposed to be dedicated to Council is suitably remediated so as not to be encumbered by a Long-Term Environmental Management Plan or as otherwise agreed in the planning agreement with Council relating to the redevelopment site.
- 2) Future development application(s) must consider the potential to encounter acid sulfate soils and provide any necessary management and mitigation measures.

The following conditions of the Draft VPA are further considered within the preparation of this report:

- Remediation of the applicable Transfer Land [is to] be fit for purpose for use as a public footpath. If remediation includes a capping layer, that capping layer must be a minimum of 1.5 metres below the top-most surface of the Transfer; and
- The Developer must submit a Site Auditor Report (SAR) or Site Audit Statement (SAS) to the City for approval after the remediation has been completed, and prior to the construction of the Developer's Works.

The Site location and layout is provided as **Figure 1** in the 'Figures' section of this report.

1.1 Objective

The objective of the RAP is to provide a detailed plan to ensure the Site is remediated to a standard suitable for the proposed commercial/industrial Site redevelopment and dedication to Council, and to ensure no unacceptable risk is posed to human health or the environment, with respect to contaminants detected in soil and groundwater on-Site in accordance with relevant legislative and planning requirements.

1.2 Scope of Work

The scope of work associated with the preparation of this RAP included the following:

1. Summary of contaminants detected on-site within previously issued reports;
2. Review of potential remedial options and technologies with respect to regulatory requirements, site constraints and the proposed development plans as understood by EP Risk;
3. Development of an appropriate remedial strategy, with respect to the previously identified soil and groundwater contamination at the Site;
4. Document the procedures to be followed to render the Site suitable for the Proposed Development;
5. Outline any validation and environmental management requirements to be prepared prior to issuance of a final Site Audit Statement (SAS) for the Site following completion of remediation works; and
6. Preparation of a RAP in accordance with the requirements of NSW *State Environmental Planning Policy (Resilience and Hazards) 2021*, and NSW Environment Protection Authority (NSW EPA) *Consultants Reporting on Contaminated Land – Contaminated Land Guidelines* (2020).

2 Site Identification

Pertinent Site identification details are presented in **Table 2**. The site has a primary frontage along the northern boundary to Bourke Road of 40m. The site currently accommodates a single storey warehouse building used for the purposes of vehicle repairs.

Table 2 – Site identification	
Item	Description
Address	28-32 Bourke Road, Alexandria, NSW, 2015
Legal Description	Lots 1, 2 and 3 in DP 324707
Approximate Area	2,972 m ² (rectangular in shape)
Municipality	Council of the City of Sydney (Council)
Zoning	E3 – Productivity Support under Sydney Local Environmental Plan 2012 (currency 28.04.2023)
Proposed Land Use	Hospital and Medical Care Uses
Current Land Classification*	Commercial / Industrial

* Land classification as defined in the National Environment Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure 1999 (2013 amendment).

3 Site History

The information provided in the following sections was predominantly obtained from the Lotsearch Environmental Risk and Planning Report (2021)³ provided within EP Risk (2021a) and publicly available Council and NSW EPA records.

3.1 Sources of Information

The Site history sources utilised during the review include:

- Historical aerial photography from the years 1930, 1943, 1951, 1961, 1965, 1970, 1978, 1982, 1986, 1991, 1994, 2000, 2005, 2011, 2016 and 2021.
- Historical certificates of Title.
- Publicly available Council and NSW EPA records.

³ Lotsearch (2021) *Environmental Risk and Planning Report, 28-32 Bourke Road, Alexandria NSW*, ref: LS027294_EP, dated 06 December 2021 (Lotsearch 2021).

3.2 Council and Regulatory Records

A summary of the information accessible through publicly available records is summarised below.

Table 3 – Council and Regulatory Records Search	
Record	Findings
Topography and Elevation	The Site has an approximate elevation of approximately 8 - 12 m Australian Height Datum (m AHD) and slopes gradually from the southern to northern portion of the Site.
Geology	According to the NSW Department of Industry, Resources & Energy, 1:100,000 scale map, the Site is underlain by Quaternary medium to fine-grained marine sand with podosols.
Soil Landscapes	According to the NSW Department of Planning, Industry & Environment Soil Landscapes of the Penrith 1:100,000 Sheet ⁴ , the Site is dominated by medium to very coarse-grained quartz sandstone, minor laminated mudstone and siltstone lenses of alluvial floodplain origin.
Hydrogeology	According to the Geoscience Australia Hydrogeology Map of Australia, Aquifers on-site are anticipated to be porous, extensive with high productivity. Several groundwater wells were identified within 2 km of the Site, with the closest located approximately 94 m to the northeast of the Site. Within the 2 km boundary of the Site, standing water levels (SWL) ranged from 0.79 m below ground level (mBGL) (409 m west) to 90.0 mBGL (960 m, south). The borehole closest to the Site with available SWL data (227 m southeast) recorded a standing water level of 5.10 mBGL. EP Risk previously prepared a Groundwater Impact Assessment⁵ for the Site, which identified the average groundwater strike elevation across the Site to be at 6.65 mAHD. It should be noted that the proposed basement extent is situated below the observed groundwater table on-site at the maximum depth of excavation to allow for the installation of utilities access.
Acid Sulfate Soils (ASS)	The Commonwealth Scientific and Industrial Research Organisation (CSIRO) Atlas of Australian Acid Sulfate Soils (2013) indicates the Site is located in an area of ASS Class 3. Under a Class 3, works more than 1 m below the natural ground surface and works that may lower the water table by 1 m below natural ground surface presents an environmental risk.

⁴ NSW Department of Planning, Industry & Environment, Soil Landscapes of the Penrith 1:100,000 Sheet map 9030, Department of Environment, Climate Change and Water, accessed on 13 December 2021.

⁵ EP Risk Management Pty Ltd (2022) *Groundwater Impact Assessment*, 28-32 Bourke Road, Alexandria NSW 2015, ref: EP2515.004_v4, dated 04 July 2022 (EP Risk, 2022b).

Table 3 – Council and Regulatory Records Search

Record	Findings
	According to the CSIRO Atlas of ASS, there is a low to moderate (6%-70%) probability that the Site is affected by ASS. The Site is in an area classified as 'Disturbed Terrain' with regard to ASS, which indicates "<i>areas which have been mined or filled or have been subjected to other significant soil disturbance activities</i>" – Department of Land, Water and Conservation, <i>Guidelines for the Use of Acid Sulfate Soils Risk Maps, Second Edition</i>, March 1998 (DWI 1998). Based on the findings of the DSI prepared by EP Risk, Potential Acid Sulfate Soils (PASS) were identified to be present on-site from a minimum depth of 0.3, with recommendations for treatment outlined in the revised Acid Sulfate Soils Management Plan⁶ (ASSMP) prepared for the Site.
Mining Subsidence	No Mining Subsidence Districts were identified within 1 km of the Site. However, a number of historical Mining & Exploration Titles were identified onsite, held by several entities for petroleum and mineral resources during the years 1967 to 2015.
Coastal Protection Act 1979	The land was not subject to the operation of State Environmental Planning Policy (SEPP) 14 or SEPP 71 of the Coastal Protection Act 1979.
Contaminated Land	As of 7 December 2021, the Site was not listed on the NSW Environment Protection Authority (NSW EPA) Record for Contaminated Sites notified to the NSW EPA in accordance with the CLM Act 1997. Two (2) sites were identified within 1 km of the Site where contamination has been deemed as significant to warrant regulation under the CLM Act. These included Alexandra Canal Sediments and Sydney Park which are located 720 m southwest and 903 m west from the Site (respectively). In addition, 15 sites, listed as not requiring regulation under the CLM Act were identified within 114 m to 932 m of the site. Due to the shallow groundwater there is potential for contamination. Furthermore, one (1) site was found to be formerly regulated under the CLM Act, one (1) under current assessment and one (1) where contamination was addressed via the planning process (EP&A Act). These three sites are situated more than 600 m away from the Site.
State Environmental Planning Policy (SEPP) State Significant Precincts	There were no records of SEPP State Significant Precincts identified within 1 km of the Site. It is noted that the proposed development is considered a SSD under Clause 14 of Schedule 1 of the SEPP (Planning Systems) 2021 and is subject to management under the applicable planning legislation.
Waste Management Facilities	There were two (2) record of waste management facilities identified within 1 km of the Site.
Historical Business Directories	· Wilson & Gilkes Pty Ltd – Manufacturing and Metal Workers

⁶ EP Risk Management Pty Ltd (2022) *Acid Sulfate Soils Management Plan*, 28-32 Bourke Road, Alexandria NSW 2015, ref: EP2515.003_v3, dated 04 July 2022 (EP Risk, 2022c).

Table 3 – Council and Regulatory Records Search

Record	Findings
	· Paul Roberts and Parsons Pty Ltd – Dairy Machinery Manufacturers, Nut and Bolt Manufacturers · Corona Chemical Co. Pty Ltd – Chemical Manufacturers · Austral Bronze Crane Copper Pty Ltd – Metal Manufacturers · Advance Machinery Pty Ltd – Machinery Manufacturers · Booth, Frederick, H & Son Pty Ltd – Zinc and Lead Merchants · Union Mouldings Pty Ltd – Plastic Manufacturers · By-Products & Chemical Pty Ltd – Chemical Manufacturers · McEnally Spray Painters Pty Ltd – Sprayers Industrial · Wiggins Teape Australia Pty Ltd – Adhesives Manufacturer
Licensed Activities Under POEO Act 1997	Nine (9) records of licensed activities under the Protection of the Environment Operations (POEO) Act 1997 were identified within 1 km of the Site. To the northwest of the Site, approximately 173 m away, licensed activities included Railway systems activities and infrastructure construction. Railway systems activities, metal waste generation and metal coating activities were noted further south of the site at (approximately 625 m). Towards the southwestern end of the Site, approximately 972 m to 993 m away, licensed activities included waste, waste storage, non-thermal treatment of waste, and the recovery of general waste.
Delicensed Activities still Regulated by NSW EPA	There were six (6) records of delicensed activities still regulated by the NSW EPA identified within 1 km of the Site. Of these six (6), four (4) sites were involved with Hazardous, Industrial or Group A Waste Generation or Storage activities: · Australian Metal Co Pty Ltd, located 20 m north of the Site; · Daimler Chrysler Australia/Pacific Pty Ltd, Mercedes Benz of Sydney, located 584 m east of the Site; · Ausgrid, Energy Australia, located 691 m east of the Site; and · Alexandria Plating Pty Ltd, located 804 m south of the Site. The remaining two (2) sites were involved with Concrete work activities: · Concrete Pty Ltd, located 156 m north of the Site; and · Metromix Pty Ltd, Able Alexandria, located 593 m north of the Site.

Table 3 – Council and Regulatory Records Search

Record	Findings
Heritage	There were no records of Commonwealth Heritage and National Heritage items identified within 1 km of the Site. Three State Heritage items were identified within 1 km of the Site and include: · Yiu Ming Temple, located 385 m north of the Site; · Pressure Tunnel and Shafts, located 776 m north of the Site; and · Alexandra Canal, located 814 m southwest of the Site. Several Environmental Planning Instrument Heritage Items were identified within 1 km of the Site.
Bushfire Prone Area	There were no records of vegetation categorised as bushfire prone on Site.
Dryland Salinity	According to the National Land and Water Resources Audit, no salinity data is available for the Site.
Coastal Wetland	The Site does not fall within the proximity area for coastal wetlands.
PFAS Investigation & Management Programs	There is one (1) record of PFAS Investigation & Management Programs listed within 1km of the site: · Alexandria Fire and Rescue NSW located 77 m northeast of the site.

3.3 Review of Historical Aerial Photos

A detailed review of the historical aerial photography is given in the DSI (EP Risk 2022). The findings of the aerial photographs can be summarised as:

- The earliest historical aerial photograph is from 1930, during which the Site appears to consist of a partially constructed warehouse surrounded by other construction.
- Significant industrial development occurred in the area of the Site from 1930 until the 1970s.
- Extensions to the Site buildings were conducted in the 1990s, and some buildings in the surrounding area were demolished and rebuilt.
- The last development within the area shown by the aerial photos was between 2016 and 2021, when the area south-west of the Site was cleared of storage units.

3.4 Previous Investigations

A list of previous/additional investigations undertaken at the Site include:

1. Non-Destructive Hazardous Materials (HAZMAT) Assessment (EP Risk 2021a⁷)
2. Soil Contamination Assessment (EP Risk 2021⁸)

⁷ EP Risk, *Non-destructive Hazardous Materials (HAZMAT) Assessment, 28-32 Bourke Road, Alexandria, NSW, 2015*, ref: EP2460.001_v1, dated 22 December 2021 (EP Risk 2021a).

⁸ EP Risk, *Soil Contamination Assessment, 28-32 Bourke Road, Alexandria, NSW, 2015*, ref: EP2460.002_v2, dated December 2021 (EP Risk 2021)

3. Detailed Site Investigation – (EP Risk 2022⁹)
4. Groundwater Impact Assessment (EP Risk 2022b)
5. Acid Sulfate Soils Management Plan (EP Risk 2022c)
6. Pre-Demolition HAZMAT Assessment (EP Risk 2023¹⁰)
7. Detailed Site Investigation (Revised) – (EP Risk 2023a¹¹)

3.4.1 Hazardous Materials Assessment (EP Risk 2021a) & (EP Risk 2023)

Suitably qualified and experienced Occupational Hygienists from EP Risk conducted a Site Inspection for HAZMAT, reported as a Non-destructive HAZMAT Assessment (EP Risk 2021a) and Pre-Demolition HAZMAT Assessment (EP Risk 2023) detailing the location, type and extent of all visible and accessible HAZMAT within the Site boundary, as shown in **Figure 1** in the Hazardous Material Assessment (EP Risk 2021a). A review of the assessments conducted identified the following contaminants on Site, as presented in **Table 4** below.

Table 4 – Hazardous building materials identified at the time of Assessment								
Property	ACM		SMF	PCB	LCP	LCD	ODS	Mould
	Non-friable	Friable						
Interior western warehouse	Present	Present	Present	Not present	Present	Present	Present	Present
Interior eastern warehouse	Present	Present	Present	Not present	Present	Present	Not present	Not present
Exterior of entire site	Present	Not present	Not present	Not present	Present	Not present	Not present	Not present

3.4.2 Soil (SCA – EP Risk 2021)

The SCA (EP Risk 2021) was conducted to determine the presence and extent of CoPC within the Site soil prior to the purchasing of the Site by Alexandria Property Development. The findings of the SCA are outlined below.

- The following analytes were reported at concentrations exceeding the adopted Health Investigation Levels (HILs) in four (4) of the nine (9) test pits:
 - o Lead;
 - o Heptachlor; and
 - o B(a)P.
- One (1) of the nine (9) test pits were shown to contain asbestos in the form of a non-friable (bonded) asbestos cement fragment.
- The exceedances are summarised in **Table 5** below and are compared against the National Environmental Protection Council (NEPC) (1999) *National Environment Protection (Assessment of Site*

⁹ EP Risk, *Detailed Site Investigation*, 28-32 Bourke Road, Alexandria, NSW, 2015, ref: EP2515.001_v3, dated July 2022 (EP Risk 2022)

¹⁰ EP Risk, *Pre-Demolition Hazardous Materials (HAZMAT) Assessment*, 28-32 Bourke Road, Alexandria, NSW, 2015, ref: EP3072.001_v1, dated 21 April 2023 (EP Risk 2023).

¹¹ EP Risk, *Detailed Site Investigation*, 28-32 Bourke Road, Alexandria, NSW, 2015, ref: EP2515.001_v4, dated June 2023 (EP Risk 2023a).

Contamination) Measure as amended April 2013 (ASC NEPM 2013) HILs and Ecological Screening Levels (ESLs):

Table 5 – CoPC exceedances within the SCA				
Contaminant	Criteria	Maximum Concentration	Locations above criteria	Depth
Lead (mg/kg) ¹	1,500	21,600	TP06, TP09	0.1 mBGL
B(a)P (mg/kg) ²	1.4	5.3	TP05, TP06, TP09	0.1 mBGL
Heptachlor (mg/kg) ¹	50	223	TP04	0.1 mBGL

¹ ASC NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil

² ASC NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil

- Vertical or horizontal delineation works were not undertaken as part of the SCA. The full extent of the contamination cannot be determined from the available data within the SCA (EP Risk 2021).
- Also, heptachlor and chlordane are classified as scheduled chemicals and must be managed under the Chemical Control Order in relation to Scheduled Chemical Wastes as the total concentration of scheduled chemical wastes exceeds 50 mg/kg.

3.4.3 DSI (EP Risk 2022) & Phase 2 DSI (EP Risk 2023a)

The soil and groundwater investigation results were undertaken in two (2) phases. Results were compared to the relevant investigation levels, as detailed below.

Heavy Metals

- Concentrations of Lead in soil are shown to be the most significant CoPC analysed within the Site. The concentrations of Lead in forty-six (46) exceeded the National Environment Protection Measures 2013 (ASC NEPM 2013) Health Investigation Level (HIL) D criteria for Commercial/Industrial land use.
- Lead was shown to be the most significant contaminant within the soil samples analysed. Concentrations of Lead were shown to be in excess of 125,000 mg/kg, with one result showing a concentration of 207,000 mg/kg. This greatly exceeds all adopted health-based investigation levels for Lead, and also exceeds the NSW EPA Criteria for Restricted Solid Waste SCC2, which thereby classifies the soil as Hazardous Waste.
- The highest Lead concentration is over 250% of the HIL value, which confirms that the HIL is said to be 'exceeded' as per ASC NEPM 2013. Additionally, the 95% UCL of the arithmetic mean for all samples collected within the DSI is calculated to be greater than the relevant HIL value within the southern portion of the Site, at 131,797 mg/kg, compared to the HIL value of 1,500 mg/kg. The 95% UCL of the arithmetic mean was calculated to be 585.5 mg/kg for sampling locations outside of the south-east portion.
- Multiple Extraction Procedure (MEP) testing performed on four (4) samples was designed to simulate the behaviour of Lead within on-site soils under repetitive precipitation of acid rain within an improperly designed sanitary landfill. Repetitive extractions of leachate under these simulated conditions are considered to represent the highest expected concentration of Lead likely to leach into the natural environment. The results indicate that leachable Lead is likely to be present at concentrations above the adopted human health and ecological criteria at all simulated precipitation events, although a decreasing trend is noted over time.

Polycyclic Aromatic Hydrocarbons (PAH)

- PAH concentrations and B(a)P TEQ within analysed soil samples were reported below the adopted health-based criteria with exception of B(a)P in seven (7) samples in excess of the ASC NEPM 2013 ESLs for Commercial/Industrial land use, coarse soil. Additionally, eleven (11) samples exceed the minimum concentration for General Solid Waste without TCLP analysis, with one (1) exceeding the minimum value for Restricted Solid Waste without TCLP analysis.
- Results of the TCLP analysis reported leachable concentrations of B(a)P below the laboratory LOR for the TCLP method and below the criteria for GSW.

Total Recoverable Hydrocarbons (TRH)

TRH concentrations within analysed soil samples were reported below the adopted health-based criteria and environmental health-based criteria for all soil samples analysed, with the exception of the following:

- Three samples reported concentrations of TRH C6-C10 (F1 minus BTEX) above the adopted ESL of 215 mg/kg. Based on the absence of ecological receptors present at the Site, the reported exceedances were not considered to pose a complete SPR linkage and therefore were not considered to pose an unacceptable risk.
- Two (2) samples reported concentrations of TRH C6-C10 (F1 minus BTEX) above the adopted HSL for Vapour Intrusion in a sand matrix. One sample (BH09_0.3) reported concentrations greater than 250% of the adopted HIL, therefore was considered to require further remediation and/or management.

No exceedances of the adopted criteria were detected within the remaining contaminant groups for soil. Excluding BH09_0.3, remaining soils on-site were calculated to have a 95% UCL of the arithmetic mean concentration of TRH C6-C10 (F1 minus BTEX) below the adopted HIL at 200 mg/kg.

It is noted that concentrations of TRH C6-C10 (F1 minus BTEX) were reported below the laboratory LOR in all groundwater samples analysed.

Acid Sulfate Soil (ASS)

- The pre-classification of the area as having the potential to contain ASS was shown to be accurate, as the criteria for potential ASS was close to being exceeded within BH05.
- A strong sulphurous odour was detected within the groundwater at MW03/BH05 and in soils at BH16. This, along with a greyish soil observed is an indicator for ASS.
- The analytical results indicate that ASS are present within surficial soils at a minimum depth of 0.3 mBGL. It is noted that the results provided an indication of Potential ASS in both FILL and Natural material and should be considered in the development of the proposed immobilisation strategy for soils disturbed on-site.

Asbestos

- Asbestos in soils concentrations were reported below the laboratory LOR in all soil samples analysed. Asbestos-containing material (ACM) was observed in the form of two (2) bonded (non-friable) asbestos containing fibre cement sheeting fragments, present in adjacent soils at depths of 0.1 mBGL (BH27) and 0.3 mBGL (BH23), respectively.

Groundwater Analytical Results

- Concentrations of Copper, Lead, Nickel and Zinc exceeded the ASC NEPM 2013 GIL for fresh water and marine water in majority of groundwater samples analysed in the south-east portion of the Site.
- Concentrations of Arsenic, Lead and Nickel were reported above the criteria stipulated by the Australian Drinking Water Guidelines (2022). It is noted that the Site is located within an area prohibited for extraction of groundwater for the purposes of drinking water, and the identified concentrations of Arsenic, Lead and Nickel were deemed unlikely to present a risk to receptors via inhalation based on the physical properties of the contaminant.
- Groundwater is likely to be an exposure pathway to future construction and/or remediation workers on the Site due to the relatively shallow groundwater and the future plans of the Site to construct a semi below ground car park.
- Concentrations of Cadmium, Copper, Lead, Nickel and Zinc were detected in excess of the ANZG (2018) 95% Toxicant DGVs for Marine Water and Fresh Water in majority of samples taken. The exceedance of the ecological criteria for heavy metals does not trigger the requirement for a Tier-2 risk assessment or indicate the Site poses an unacceptable level of risk to on- and off-site receptors based on the following line of evidence:
 - There is no evidence to suggest there is a current or potential future direct contact exposure pathway for identified Site receptors as the proposed development will act as a seal, effectively eliminating groundwater ingress/access.
- There are detectable concentrations of several PFAS chemicals in all four (4) samples analysed, however these were not shown to exceed the adopted ASC NEPM 2013 95% criteria for Fresh or Marine Water.
- No other CoPC were detected within the groundwater samples analysed above the laboratory LOR.
- A hydraulic conductivity of 0.025 m/day was calculated for the Site.

Areas of Concern

Based on a review of the analytical results obtained for the Site during the SCA and DSI, the following Areas of Concern (AOC) were assigned to affected media on-site deemed to require further remediation and/or management.

Remaining soils outside of the AOC extents are considered suitable to remain on-site under the proposed commercial/industrial land use.

Table 6 – Areas of Concern

AOC	Approximate Depth (mBGL)	Approximate Volume (m ³)	Approximate Area (m ²)	Assessment
AOC1	0.0 – 0.3	8	65	Soils surrounding BH23 and BH27 based on the identification of bonded (non-friable) asbestos containing material.
AOC2	0 – 0.3	4	25	Soils surrounding TP04 based on the presence of Heptachlor at concentrations >250% of the adopted HIL.
AOC3	0 – 0.3	2	12	Soils surrounding BH09 based on the presence of TRH C6-C10 (F1 minus BTEX) at concentrations >250% of the HSL.
AOC4	0 – 2.0	1,600	860	Concentrations of lead observed to significantly exceed the adopted HIL within the eastern extent of the Site.

Preliminary Waste Classification

- FILL material in AOC1 is preliminarily classified to a depth of 0.3 mBGL as **Special Waste (Asbestos) – Hazardous Waste**.
- FILL material in AOC2 is preliminarily classified to a depth of 0.3 mBGL as **Hazardous Waste** and should be managed as Scheduled Chemical Waste in accordance with the NSW EPA Chemical Control Order (2004).
- FILL material in AOC4 is preliminarily classified to a depth of 2.0 mBGL as **Hazardous Waste**. It is noted that soils within AOC4 are proposed for treatment to immobilise concentrations of Lead in soil, following which the waste classification may be revised subject to analytical results.
- FILL material across the remainder of the Site, including material in AOC3 and material beneath the AOCs, is preliminarily classified to a maximum depth of 2.0 mBGL as **General Solid Waste (non-putrescible)**, with the exception of the following two (2) areas, as shown in **Figure 3**:
 - o Soils surrounding BH19 to a maximum depth of 0.5 mBGL are preliminarily classified as **Hazardous Waste** based on reported concentrations of total and leachable lead
 - o Soils surrounding BH40 to a maximum depth of 1.0 mBGL are preliminarily classified as **Hazardous Waste** based on reported concentrations of total and leachable lead.

It should be noted that soils surrounding BH19 and BH40 are considered within the 95% UCL calculation adopted for the arithmetic mean of lead in residual soils outside AOC4, however, based on the observed leachable lead concentrations are recommended to be immobilised with material in AOC4 and disposed off-site. The combined volume of BH19 and BH40 is estimated to be 145 m³. Further recommendations related to management of soils surrounding BH19 and BH40 are presented in **Section 10.4**.

Lead Immobilisation Treatment Trial (EPS 2023¹²)

EP Risk engaged Enviropacific Services (EPS) to conduct treatment trials on selected soil samples from Lead-impacted areas on-site. The findings of the analytical trials were then used to inform the application of a Specific Immobilisation Approval (SIA) to the NSW EPA, which details the type and dose of reagents proposed to convert leachable Lead to a stable form via chemical fixation. Long-term assessment of the efficacy of this method was undertaken via MEP and TCLP testing, which reported up to 99.9% Lead Leachate Reduction and concentrations below TCLP1 criteria when an optimised treatment was applied. The findings from this Immobilisation Treatment Trial form the basis for the immobilisation remediation of lead-impacted soils at the Site.

3.4.4 Groundwater Impact Assessment (EP Risk 2022b)

EP Risk conducted a desktop hydrogeological study for the Site following the findings of the SCA to develop a groundwater conceptual model that would inform future management and development at the Site. Groundwater at the Site was inferred to be at 6.65 m AHD across the Site, with regional groundwater expected to flow southwest towards Botany Bay. It should be noted that the Groundwater Impact Assessment (GWIA) was developed using preliminary design specifications, including a basement depth of 7.41 m AHD. The finalised basement design is proposed to be addressed as a revision to the GWIA, including an assessment of the potential impacts associated with development below the water table to support utilities, including the proposed lift pits.

Key potential impacts to groundwater from the proposed development were inferred to be chemical or hydrocarbon spills, and operation of the medical centre following conclusion of construction works.

3.4.5 Acid Sulfate Soils Management Plan (EP Risk 2022c)

Previous assessments conducted at the Site identified soils from a depth of 0.3 mBGL to be variably impacted by acid sulfate soils, with FILL and natural material classified as Potential Acid Sulfate Soils (PASS). Management procedures associated with PASS include the neutralisation of disturbed soils, with an adopted liming rate of 1.8 kg CaCO₃/t for FILL and 1.0 kg CaCO₃/t for natural soils.

3.4.6 Pre-Demolition Hazardous Materials Assessment (EP Risk 2023)

EP Risk attended the Site on 09 March 2023 to undertake a Pre-Demolition HAZMAT following the Non-Destructive HAZMAT assessment undertaken by EP Risk on 01 December 2021. The findings of the Assessment identified the following HAZMAT to be present on-site:

- Asbestos containing material;
- Asbestos containing dust;
- Lead-containing paint; and
- Lead-containing dust.

Consequently, EP Risk recommended the controlled removal of dust via HEPA vacuuming prior to refurbishment or demolition works. Throughout the works, a suitably qualified hygienist should be present on-site to conduct air monitoring for asbestos and lead, and to subsequently perform a visual clearance inspection at the completion of removal works.

¹² Enviropacific 2023, *EP Risk Alexandria Lead Immobilisation Treatment Trial Report*. ref: 101473, Issued 02 June 2023 (EPS 2023).

4 Site History Summary

The Site is located on Bourke Street, Alexandria on an area sloping from the south at an elevation of 12 mAHD to the north at 8 mAHD. The site is adjacent to Bowden Street to the west, Wyndham Street to the east and O'Riordan Street to the south.

Based on a review of available historical aerial photographs, the northern portion of the industrial warehouse appears to have been situated at the Site since 1930, however, based on historical title records, may have existed as early as 1920. Major developments to the Site include the construction of the southern section of the Site between 1930 – 1943, extensions to the building between 1943 – 1951, 1965 – 1970, 1986 – 1991 and the replacement of roof sheeting between 1994 - 2000. A large amount of industrial development was undertaken within the surrounding properties between 1930 - 1943, which generally involved the conversion of the nearby unoccupied land from rural to commercial/industrial.

Ownership of the Site varied between the Lots until 1989, when current owner Mooney Properties Pty Ltd acquired all three sites. Between 1935 – 1938, Lot 1 was leased to James Hardie Trading Company Limited. James Hardie Trading Company Limited was Australia's largest manufacturer of asbestos cement products.

Based on the history of the Site, there is a potential that HAZMAT including ACM may be present in the building and/or sub-surface soil contamination. Based on the age and industrial nature of the Site, other HAZMAT items may also exist on-site, including SMF, PCB and ODS.

The Site was not listed on the NSW EPA Record for Contaminated Site notified to the NSW EPA in accordance with the CLM Act. Within the 1 km boundary lies two (2) sites where contamination has been deemed as significant to warrant regulation under the CLM Act. Furthermore, nine (9) records of licensed activities under the POEO Act 1997 were identified within 1 km of the site. Due to the separation distance all sites and activities were considered unlikely to have impacted the Site.

5 Site Condition and Surrounding Environment

On 01 December 2021, EP Risk field personnel conducted an inspection of the Site and immediate surroundings prior to intrusive sampling works. The following features were observed:

The site has a primary frontage along the northern boundary to Bourke Road of 40m. The site currently accommodates a single storey warehouse building used for the purposes of vehicle repairs.

- The Site comprised of one (1) industrial warehouse with internal offices on the ground and mezzanine level. The warehouse itself is divided into two adjoining rooms (western and eastern sections), accessible through an open wall at the centre of the warehouse. The Site is currently vacant and was previously occupied by a tyre fitting and dent repair business (Sydney City Tyres).
- There was an inaccessible office space within the south-eastern portion of the Site.
- All areas were paved with concrete throughout. The concrete slab extended to a depth of approximately 0.15 mBGL throughout site. A secondary concrete slab was encountered at the western end of the Site. The primary slab was generally observed to be in good condition.
- Building structures on the Site were observed to contain bonded (non-friable) ACM. Two (2) HAZMAT inspections undertaken (EP Risk 2021)¹ (EP Risk 2023) also identified friable ACM, LCP and LCD on-site.
- Based on earlier discussions with on-site personnel and the site inspection, there was no anecdotal or visual evidence of underground fuel storage infrastructure observed on accessible portions of the Site.
- A proportional TIT was identified in the south-western portion of the Site. No further information was provided at the time of the inspection.
- A drain or potentially another TIT with hoses directing waste into it, was observed in the middle of the site in Lot 2, adjacent to stored chemicals.
- Chemicals such as all-purpose thinner and grease remover were observed on-site in un-bunded chemical storage. No chemical leaks were observed.
- A vehicle spray booth was in the south-east corner of the site.
- Visible black surface staining was observed throughout the site from the workshop, there was also evidence of disturbance in the concrete flooring. Chemicals were observed to be stored and used on-site.
- A sewer/stormwater drain ran underground Lot 2, approximately 0.3 mBGL, potentially the length of the site.

5.1 Surrounding Land Use

The Site is located within a primarily industrial area. Surrounding land use within a 1 km radius comprised of the following:

To the North

Various light industrial and retail uses, including a NSW Fire and Rescue facility.

To the South

Industrial and commercial uses as well as small lot residential properties. To the southeast of the Site is the new Gunyama Park and Aquatic and Recreation Centre.

To the East

Directly adjoining the Site is 26 Bourke Road which comprises a single storey warehouse building. Further east of the Site is the Green Square Town Centre. The Town Centre contains critical infrastructure such as the Green Square Railway Station and various other commercial/retail uses.

To the West

Directly west is 34-42 Bourke Road, comprising a two-storey warehouse building that is owned and operated by the City of Sydney Council. Further west is a mix of industrial and warehouse development with Sydney Park located further to the west adjacent to St Peters Station.

5.2 Topography and Drainage

The topography of the Site was observed to be relatively flat with a downward gradient towards the north of the Site from the south. The Site appeared consistent and level with the surrounding properties. The elevation was between approximately 8 and 12 mAHD.

5.3 Sensitive Receptors

Potential sensitive receptors identified at and near the Site were:

- General public / customers of the business.
- Maintenance / future construction / workers at the Site.
- Residents of surrounding commercial premises.

6 Conceptual Site Model

The CSM was refined following the findings of the DSI (EP Risk 2023).

Known and Potential Sources of Contamination

The current known and potential sources of contamination at the Site and in the vicinity of the Site are presented in **Table 7**.

Table 7 – Known and Potential Contamination Sources			
Location	Source	CoPCs	Affected Media
On-site	Hazardous building materials	Friable asbestos, Bonded (non-friable) Asbestos, SMF, LCD, LCP	Airborne dust, building materials
	Historic use of the Site for heavy industrial operations / manufacturing	Lead, B(a)P, Heptachlor, Asbestos	Soil, groundwater
Off-site	Historical use of the surrounding area for heavy industrial works	Potentially Heavy Metals, Hydrocarbons, BTEX, PAH, PCB, OCP, OPP	Potentially Soil, groundwater, soil vapour
	Fire Station located north-east of Site	PFAS	Potentially Soil, groundwater

Type and Extent of Contamination

A summary of the analytical results from the previous investigation reports are discussed in **Table 8** and the previous investigations in **Section 3.4**. Previous sampling locations are presented in **Figure 4**, with the areas of concern shown in **Figure 2**.

Table 8 – Maximum Contaminant Concentrations				
Matrix	Analyte	Adopted Criteria	Minimum Concentration	Maximum Concentration
Soil	Lead	1,500 mg/kg	<0.5 mg/kg	207,000 mg/kg
	Heptachlor	50 mg/kg	<0.05 mg/kg	223 mg/kg
Groundwater	Arsenic	0.01 mg/L	0.001 mg/L	0.013 mg/L
	Cadmium	0.0002 mg/L	<0.0001 mg/L	0.0012 mg/L
	Copper	0.0014 mg/L	<0.001 mg/L	0.029 mg/L
	Lead	0.0034 mg/L	0.009 ug/L	0.045mg/L
	Nickel	0.011 mg/L	0.015 mg/L	0.091 mg/L
	Zinc	0.008 mg/L	0.022 mg/L	0.60 mg/L



Health Criteria exceedance



Exceedance of Adopted Investigation Level

Affected Media

The current affected media at the Site is soil and groundwater.

Human and Ecological Receptors

Potential human and ecological receptors at and near the Site are considered to be:

- On-site receptors:
 - o Current and future intrusive workers/construction workers.
 - o Future residents, workers and visitors.
- Off-site receptors:
 - o Current and future intrusive construction and maintenance workers at surrounding commercial/industrial properties.
 - o Current and future terrestrial flora and fauna in the Alexandra Canal and connected tributaries.

6.1 Complete Exposure Pathways

The following potential and complete exposure pathways for the CoPC have been identified to exist for known contamination sources based on review of historical investigations and the results of this investigation:

- Potentially leaching of contaminants from soils to underlying groundwater.
- Fugitive dust during future construction and/or remediation works on-site.
- Dermal contact with and/or ingestion of contaminated Lead soils.

An analysis of the potential and complete source-pathway-receptor linkages between the CoPC are presented in **Table 9** below.

Table 9 – Refined Site CSM

Location	Primary Sources	Secondary Sources / Affected Media	Release Mechanism	Pathway	On-Site				Off-Site		
					Current and future intrusive construction/ maintenance workers	Current temporary and future users and visitors of the Site, including future residents / commercial workers	Limited on-Site ecological receptors (terrestrial flora and fauna) in the landscaped areas at the Site	Current and future intrusive construction and maintenance workers at surrounding properties	Current and future employees, occupants and visitors of surrounding properties	Aquatic fauna and flora at Botany Bay and Associated Tributaries	
On-site	Potentially imported fill materials of unknown origin and quality.	Soil Groundwater	Direct Contact	Dermal Contact	High	Moderate	N/A	N/A	Low	N/A	N/A
	Demolition of former buildings and structures			Ingestion	Moderate to High		N/A	N/A	N/A	N/A	N/A
	Use of the Site for mechanics and auto workshop purposes and previous Site usage as Lead merchants resulting in high levels of Lead in soil			Dermal Contact	High	Moderate	Moderate to High	N/A	N/A	N/A	N/A
				Ingestion	Moderate to High		Moderate to High	N/A	N/A	N/A	N/A
				Fugitive Dust (Ingestion)	High		Low	N/A	High	High	N/A
				Uptake by flora and fauna	N/A		N/A	N/A	N/A	N/A	Low
Off-site	Adjacent commercial / industrial properties	Off-site Groundwater	Migration of contaminated groundwater	Dermal Contact	Low		Low	Low			
				Ingestion	Low		Low	N/A			
				Uptake by flora and fauna	N/A		N/A	Low			

Potential Exposure Pathway Key:

Soil
Groundwater

7 Technical Framework

The works associated with the RAP were performed in general accordance with the following guidance:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines (ANZG 2018).
 - o ANZG 2018 is the current revision of the Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) guidelines, presented as an online platform
- *Contaminated Land Management Act 1997* (CLM Act).
- enHealth (2001) *Exposure Scenarios and Exposure Settings*, enHealth Council Australia.
- enHealth (2012) Australian Exposure Factor Guide. Department of Health and Ageing and enHealth Council Australia.
- enHealth (2012) Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risk from Environmental Hazards. Department of Health and Ageing and enHealth Council Australia.
- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).
- *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Friebel, E & Nadebaum, P (2011) *Health Screening Levels for Petroleum Hydrocarbons in soil and Groundwater. Part 1: Technical development document*, CRC CARE Technical Report no. 10, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.
- National Health and Medical Research Council and National Resource Management Ministerial Council (NHMRC/NRMMC) (2011), *Australian Drinking Water Guidelines 6* (ADWG), version 3.4, updated October 2017 (Drinking Water Guidelines).
- *National Environment Protection Council Act 1994* (NEPC Act).
- National Environmental Protection Council (NEPC) (1999) *National Environment Protection (Assessment of Site Contamination) Measure*, as amended April 2013 (ASC NEPM 2013).
- National Health and Medical Research Council and National Resource Management Ministerial Council (NHMRC/NRMMC) (2011), *Australian Drinking Water Guidelines 6* (ADWG), version 3.8, updated September 2022 (Drinking Water Guidelines).
- NHMRC (2008) *Guidelines for Managing Risk in Recreational Waters* (GMRRW 2008).
- NSW Acid Sulfate Soils Management Advisory Committee (1998), *Acid Sulfate Soils Assessment Guidelines*.
- NSW Department of Environment and Conservation (DEC) (2007) *Guidelines for the Assessment and Management of Groundwater Contamination* (NSW Groundwater Guidelines).
- NSW Environment Protection Authority (NSW EPA) (2022) *Contaminated Land Guidelines, Sampling Design Part 1 - Application*.
- NSW EPA (2020) *Assessment and Management of Hazardous Ground Gases*.
- NSW EPA (2014) *Waste Classification Guidelines: Part 1 – Classifying Waste* (NSW Waste Classification Guidelines 2014).

- NSW EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*.
- NSW EPA (2017) *Guidelines for the NSW Auditor Scheme (3rd Edition)* (NSW Auditor Guidelines).
- NSW OEH (2020) *Contaminated Sites Guidelines for Consultants Reporting on Contaminated Sites*.
- NSW State Environmental Planning Policy –Resilience and Hazards 2021.
- NSW Work Health and Safety Act 2011 (WHS Act).
- NSW Work Health and Safety Regulation 2017 (WHS Regulation).
- *Protection of the Environment Operations Act 1997* (POEO Act).
- *Protection of the Environment Operations (Waste) Regulation 2014*.
- Water Quality Australia (2018) *National Acid Sulfate Soils Guidance: National acid sulfate soils sampling and identification methods manual*.
- Western Australian (WA) Department of Health (DOH) (2021) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*.

It is noted, during the DSI, where no Australian guideline sources are available for the CoPC international guidance from World Health Organisation (WHO), US EPA or other countries was considered. Alternatively, the laboratory limit of reporting was used as an indicator for further evaluation.

8 Legislative and Regulatory Framework

8.1 Environmental Planning and Assessment Act 1979

The EP&A Act regulates development in NSW and incorporates the principles of Ecologically Sustainable Development through the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation). It should be noted that the EP&A Act was reviewed and amended as per March 2022, as per the SEPP (Resilience and Hazards) (2021).

Changes to the Act

Part 3A of the EP&A Act was repealed and replaced by the Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011. The complementary planning policy has also been revised to the State Environmental Planning Policy (State and Regional Development) 2011.

In accordance with Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011, Remediation of Contaminated Land is considered State Significant Development if it is classified as Category 1 Remediation Work on 'significantly contaminated land' and remediation is required under the CLM Act.

The Site has not been declared under the CLM Act as significantly contaminated land and therefore is considered not to fall under Category 1 Remediation Work.

State Environmental Protection Policy (SEPP) – Resilience and Hazards (2021)

The SEPP (Resilience and Hazards) 2021 consolidates and repeals the provisions of the following 3 SEPPs:

1. SEPP (Coastal Management) 2018 (Coastal Management SEPP)
2. SEPP 33 – Hazardous and Offensive Development (SEPP 33)
3. SEPP 55 – Remediation of Land (SEPP 55)

The SEPP under the EP&A Act provides a framework for contaminated land remediation.

Remediation work which requires development consent is known as Category 1 work. Category 1 refers to work:

- Categorised as designated development under Schedule 3 of the EP&A Regulation or under a planning instrument.
- Proposed on land identified as critical habitat under the Threatened Species Conservation Act 1995.
- Where consideration of section 5A of the EP&A Act indicates the remediation work is likely to have a significant effect on threatened species, populations, ecological communities or their habitats.
- Proposed in an area or zone identified in a planning instrument as being an area of environmental significance such as scenic areas, wetlands. These are listed in the SEPPs.
- Requires consent under another SEPP or a regional environmental plan.

All other remediation work is classified as Category 2 work and may be carried out without development consent. The local council must be notified at least 30 days prior to the commencement of Category 2 remedial works.

8.2 Assessment against Category 1 Criteria

An assessment of the Site against the criteria for Category 1 remediation work in SEPP (Resilience and Hazards) 2021, is presented in **Table 10** below:

Table 10 – Assessment of Category 1 Remediation Work	
Requirement	Assessment
Is the work designated development?	No, volumes are <30,000 m ³ , less than 3ha will be disturbed and the contaminated soils do originate from the Site (i.e. not being imported).
Proposed on land identified as critical habitat?	No.
Likely to have a significant effect on critical habitat or a threatened species, population or ecological community.	No.
Development for which another State environmental planning policy or a regional environmental plan required development consent?	No - EP Risk has reviewed all SEPPs and there is no reference to a requirement for remediation work. Under the SEPP (Planning Systems) 2021, Schedule 1, section 24 "Remediation of contaminated land", the remediation is not considered category 1 since there is no management order under the CLM Act, however the build of a medical centre (schedule 1, section 14) requires SSDA. The SSDA has included conditions on the remediation of the Site (i.e. Auditor sign-off and no LTEMP on land to be dedicated to Council).
Carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument: i) coastal protection; ii) conservation or heritage conservation; iii) habitat area, habitat protection area, habitat or wildlife corridor; iv) environment protection; v) escarpment, escarpment protection or escarpment preservation; vi) floodway; vii) littoral rainforest; viii) nature reserve; ix) scenic area or scenic protection; x) wetland; or xi) carried out on land in a manner that does not comply with a policy made under the contaminated land	No. It is also noted that the Site is located within Area 2 of the Botany Sands groundwater extraction zone which restricts extraction for domestic purposes.

planning guidelines by the council or any local government area in which the land is situated.	
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Based upon the assessment provided in **Table 10**, it is considered that the proposed remediation work is classified as Category 2 remediation works in accordance with SEPP (Resilience and Hazards) 2021. Council requires 30 days written notice prior to commencing remediation work.

8.3 Protection of the Environment Operations Act 1997

8.3.1 Environment Protection Licence

Under Section 48 of the POEO Act, an Environment Protection Licence (EPL) is required if the activity undertaken is listed in Schedule 1. The POEO Act also defines 'waste' for regulatory purposes.

Contaminated soil treatment is declared to be a scheduled activity requiring a licence if:

- In any case, it has the capacity to treat more than 1,000 cubic metres (m³) per year of contaminated soil received from off-site, or
- Where it treats contaminated soil originating exclusively on-site, it has a capacity:
 - o to incinerate more than 1,000 m³ per year of contaminated soil, or
 - o to treat (otherwise than by incineration) and store more than 30,000 m³ of contaminated soil, or
 - o to disturb more than an aggregate area of 3 ha of contaminated soil.

The remediation works for the Proposed Development do not fall unto the above categories and therefore do not require an EPL under the POEO Act.

8.4 Contaminated Land Management Act 1997

The CLM Act establishes a process for the investigation and remediation of land that is contaminated where the contamination is considered significant enough to warrant regulation. Where the NSW EPA decides to regulate land it can be declared 'Significantly Contaminated Land'.

Under Section 60 of the CLM Act, a person whose activities have contaminated land or a landowner whose land has been contaminated is required to notify the NSW EPA when they become aware of the contamination.

Under Section 105 of the CLM Act, the NSW EPA has the authority to make or approve guidelines which must be taken into consideration by the NSW EPA, accredited site auditors and contaminated land consultants. The NSW EPA has created the following guideline to assist landowners and persons who have the responsibility to report Contamination under the CLM Act:

- NSW EPA (2015) Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*.

8.4.1 Duty to Report

Under Section 2.3.1 of the NSW EPA (2015) Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*, notification of contamination is required where the 95 % upper confidence limit on the arithmetic average concentration of a contaminant in or on soil is equal to or above the HILs and/or Health Screening Levels (HSLs) for that contaminant for the current or approved use of the respective on-site land, as specified in Section 6, Schedule B1 of the ASC NEPM 2013.

The results of analytical testing undertaken in the DSI (EP Risk 2022) & (EP Risk 2023a) were compared to the Duty to Report Guideline (EPA 2015) to determine whether Alexandria Property Development c/- Johnstaff has any obligations under s60 of the CLM Act to notify the NSW EPA.

While it is noted that the 95% UCL of the arithmetic mean for all samples collected within the DSI is calculated to be greater than the adopted HIL for Lead in soils, EP risk does not consider that a duty report contamination under NSW EPA (2015) exists subject to the completion of remediation works and favourable outcome of validation works outlined in this RAP. It is noted that a Site Auditor should be engaged under the relevant planning conditions, and a Site Audit Statement will be provided following validation of source contamination removal.

Based on the justifications provided in **Section 3.4**, EP Risk does not consider a duty to report groundwater contamination under NSW EPA (2015) to be present for the Site.

8.5 Work Health and Safety Regulation 2017

The works will be undertaken in accordance with the requirements of the Model Work Health and Safety (WHS) Regulation 2017.

8.6 SafeWork NSW Code of Practice - How to Safely Remove Asbestos, 2019

The works undertaken within the Site will be undertaken in general accordance with SafeWork NSW Code of Practice: *How to Safely Remove Asbestos*, 2019.

The How to Safely Remove Asbestos Code of Practice (2019) was developed to provide practical guidance for a PCBU who have duties under the WHS Act and WHS Regulation to safely remove asbestos from workplaces where asbestos may be found including structures, plant and soil. The code of practice provides information and guidance pertaining to removal techniques, control measures and personal protective equipment (PPE).

8.7 SafeWork NSW Code of Practice - How to Manage and Control Asbestos in the Workplace, 2019

This Code of Practice has been developed to provide practical guidance for a PCBU on how to manage risks associated with asbestos and ACM at the workplace. This code provides information on how to identify the presence of asbestos at the workplace and how to implement measures to eliminate or minimise the risk of exposure to airborne asbestos fibres.

8.8 Protection of the Environment Operations (Waste) Regulation 2014

All material that requires disposal offsite must be classified in accordance with the NSW EPA Waste Classification Guidelines: *Part 1 Classifying Waste* (2014) prior to disposal.

9 Remediation Objectives, Extent and Options

9.1 Remediation Objectives

With reference to the NSW EPA Auditor Guidelines (2017) and the ASC NEPM 2013 and the Proposed Development design limited bulk excavation across the Site, the remediation objectives were established as follows:

- Minimise the human health risk to site users and workers posed by the identified CoPC within the Site, both during and after construction.
- Minimise the human health and environmental risk posed by the potential migration of contamination off-site.
- Suitably remediate and address potential migration of CoPC from the Site. Remedial works must not obstruct the long-term management of the Site and must not affect future Site users.
- Perform remedial works in accordance with applicable standards.
- Validate the remediation works in accordance with the relevant guidelines.
- Document the validation process.
- Council has requested that there is no LTEMP applicable to the land proposed for transfer to Council, as per condition B46 in the State Significant Development Consent (SSD) 38600121 dated 30 March 2023.

9.2 Remedial Extent

The remediation extent is based on the findings and conclusions of the DSI (EP Risk 2023a) for the proposed development to address identified on-site contamination. The remedial extent is informed by the identified Areas of Concern (AOCs), as presented in **Figure 2**, and with respect to the proposed development plans for the Site. The identified AOCs are summarised below, characterised by contaminant type and respective waste classification.

9.2.1 AOC1 – Asbestos in Soils (ASBINS)

AOC1 refers to soils impacted by bonded (non-friable) asbestos containing material (ACM), as identified in the SCA (EP Risk 2021a) and the DSI (EP Risk 2023a), located along the northeastern boundary of the Site comprising a volume of approximately 8 m³. The presence of ACM within the surficial 100mm of soil was considered to warrant further action to address the potential risk posed to Site receptors.

FILL material in this AOC is preliminarily classified as Special Waste (Asbestos) - Hazardous Waste based on the identified concentrations of Lead, defined from the area where the asbestos was observed to the nearest delineation point, i.e., the nearest borehole where ACM was not observed.

9.2.2 AOC2 – Organochlorine Pesticide Impacted Soils

An isolated area on the western border of the Site was previously identified by EP Risk (EP Risk 2021a) to be impacted by various Organochlorine Pesticide (OCP) compounds, including concentrations of Heptachlor reported above the adopted HIL by greater than 250%. Approximately 4 m³ of soil in this area was pre-classified as 'Hazardous Waste,' requiring management in accordance with both the NSW EPA Scheduled Chemical Wastes Chemical Control Order 2004, published under the Environmentally Hazardous Chemicals Act 1985, and regulation under the Protection of the Environment Operations Act 1997 based on the reported concentrations

of Chlordane and Heptachlor compounds. It is noted that the impacted soils were identified as overlying a secondary concrete slab. Soils beneath the slab were not identified to contain elevated concentrations of OCP.

9.2.3 AOC3 – TRH Impacted Soils

One sample location (BH09_0.3) was previously identified to contain TRH C6-C10 (F1 minus BTEX) at concentrations greater than 250% of the adopted HSL at 770 mg/kg. Soils in this AOC were considered to pose an unacceptable risk to Site receptors based on the location of the exceedance, which was noted to be within the boundary of the land proposed for transfer to Council. Furthermore, the location of the exceedance was identified adjacent to the proposed basement boundary, thereby presenting a risk of vapour intrusion without further remediation and/or management.

9.2.4 AOC4 – Lead Impacted Soils

AOC4 was identified to contain levels of lead in exceedance of the adopted HIL by an order of magnitude. Soils in this extent are considered to pose a risk to Site receptors, and a risk of leaching into groundwater on-site without further remediation. The extent of the remediation is approximately 1,600 m³ and is primarily observed within the eastern extent of the Site.

9.2.5 Site Wide – Acid Sulfate Soils

Acid sulfate soil assessments conducted at the Site identified soils from a depth of 0.3 mBGL to be variably impacted by acid sulfate, with FILL and natural material classified as Potential Acid Sulfate Soils (PASS). Management procedures associated with acid sulfate soils include the neutralisation of disturbed soils, with an adopted liming rate of 1.8 kg CaCO₃/t for FILL and 1.0 kg CaCO₃/t for natural soils.

9.3 Remedial Options and Appraisal

Remediation and/or management of the impacted soil is required to ensure the Site does not pose an unacceptable risk to human and ecological health with respect to the proposed commercial / industrial land use. Remedial options that may achieve the remedial objectives for the Proposed Development are listed in the following order in section 6 (16) of Schedules A and B of the ASC NEPM 2013:

- *On-site treatment of the contamination so that it is destroyed or the associated risk is reduced to an acceptable level; and*
- *Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or*

If the above are not practicable:

- *Consolidation and isolation of the soil on site by containment with a properly designed barrier; and*
- *Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material; or*
- *Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.*

In order to determine the optimal remediation strategy in accordance with the hierarchy above, the following remedial options that may achieve the remedial objectives include:

- Do nothing.
- On-site treatment utilising in-situ stabilisation / immobilisation.
- Source removal (soil) for disposal off-site to a licensed disposal facility and/or ex-situ treatment.
- Isolation on site by engineered barrier containment – tanking.
- Pump and treat (groundwater only).
- Long-term Environmental Management.

A summary of these options, including an assessment of the advantages and disadvantages and overall feasibility in relation to the Proposed Development is present in **Table 11**, presented in order of lowest to highest preference.

Table 11 – Remedial Options Appraisal

Option	Targeted Media	Strategy	Advantages	Disadvantages	Project Feasibility
Remediation Requirement: Lead Impacted Soils (AOC4)					
Do nothing	Soil	Leave contaminated soil in-situ.	No cost associated.	Contamination remains on-site. Does not address potential for contaminant leaching or the risk to receptors.	Not feasible as the risk posed to Site receptors and the wider environment is not considered acceptable in the current state.
Isolation / segregation	Soil	Installation of an impermeable barrier to prevent exposure to contaminated material.	Limits exposure to contaminated material.	Contamination remains on-site. Does not address potential for contaminant leaching. LTEMP required.	Not feasible as the isolation of material would not address the leachable quantities of Lead, and would not reduce the risk of off-site migration.
Source removal without treatment	Soil	Excavate and remove material to levels necessary for construction.	Removal of risk of exposure.	High cost of disposal of Hazardous Waste.	May be most cost effective depending on the cost of on-site remediation vs cost of removing untreated Hazardous Waste.
On-site treatment and containment	Soil	Treatment of soil under the NSW EPA SIA as above, and containment of treated soils on-site within a containment cell.	Reduces cost of waste disposal, contaminated soil is retained on-site and reduces carbon dioxide emissions associated with transport of material.	Costly, involves disturbance of hazardous waste. LTEMP required.	Feasible given the proposed design plans. Treated soil excavated from within the proposed basement footprint may be retained on-site for levelling purposes, provided it remains beneath a containment cell (i.e., concrete slab barrier).
Long Term Environmental Management Plan	Soil	Management of contamination under a long-term environmental management plan	Provides procedures for ongoing and future works at the Site.	Is not suitable as a remediation strategy without further action, as described above. Cannot prescribe management requirements for land to be dedicated to Council.	Feasible and required if residual contamination is to remain on-site within a containment cell.

Table 11 – Remedial Options Appraisal

Option	Targeted Media	Strategy	Advantages	Disadvantages	Project Feasibility
On-site treatment and off-site disposal	Soil	Soil treatment trials followed by immobilisation of Lead under a NSW EPA Specific Immobilisation Approval (SIA) to prevent leaching and removal off-site to a suitably licensed waste facility.	Will likely reduce waste classification and thereby reduce cost of off-site disposal.	Costly. Involves disturbance of the soil.	Feasible and preferred. LTEMP not required. Emu-picking of AOC1 required prior to treatment, asbestos air monitoring to be conducted during treatment of AOC1.
Remediation Requirement: OCP Impacted Soils (AOC2)					
Do Nothing	Soil	Leave impacted soils in-situ.	No cost associated.	Does not address risk to receptors.	Not feasible given the proposed development plans (i.e., basement excavation).
On-Site Treatment	Soil	Chemical immobilisation of contaminants	Reduces waste disposal costs.	Costly, does not address risk to receptors.	Not feasible as immobilisation would not address the risk to receptors.
Isolation / Segregation	Soil	Containment of impacted material within an isolated cell.	Does not require disposal/treatment.	Material would require management under an LTEMP.	Feasible, as a containment cell would isolate risk to receptors.
Long Term Management Plan	Soil	Management of contamination retained on-site.	Reduces waste disposal costs.	Cannot be prescribed for land to be dedicated to Council.	Not feasible as AOC2 is present within the land to be dedicated to Council.
Source removal	Soil	Removal of soil off-site.	Removes hazardous waste from Site. Less risk of exposure to remediation workers.	Costly. Involves disturbance of the soil. Requires validation following removal.	Feasible and preferred given the small quantity of material. This option removes the requirement for an LTEMP on Council dedicated land.
Remediation Requirement: Asbestos In Soils (AOC1)					
Do Nothing	Soil	Leave impacted soils in-situ.	No cost associated.	Does not address risk to receptors.	Not feasible given the proposed development plans (i.e., basement excavation).
Isolation / Segregation	Soil	Containment of impacted material within an isolated cell.	Reduces disposal costs.	Material would require management under an LTEMP. Must be contained within an engineered cell.	Feasible, however would require burial at depth beneath the proposed basement.

Table 11 – Remedial Options Appraisal

Option	Targeted Media	Strategy	Advantages	Disadvantages	Project Feasibility
Long Term Management Plan	Soil	Management of contamination retained on-site.	Reduces waste disposal costs.	Cannot be prescribed for land to be dedicated to Council.	Feasible, however not preferred.
Excavation/Source Removal	Soil	Source Removal	Removes potential future liability.	Soil must be disposed as Special Waste (Asbestos) - Hazardous Waste without further treatment. Requires a clearance inspection of the ground surface following removal.	Feasible, as the material is located within the basement footprint proposed for excavation and disposal.
On-Site Treatment and off-site disposal	Soil	Emu-picking of soils followed by immobilisation of Lead under a NSW EPA Specific Immobilisation Approval (SIA) to prevent leaching and removal off-site to a suitably licensed waste facility. Asbestos air monitoring to be conducted throughout.	Will likely reduce waste classification and thereby reduce cost of off-site disposal. Removes potential future liability.	Costly. Involves disturbance of the soil. Qualified occupational hygienist to be present during treatment.	Feasible and preferred. Soil waste classification may be reduced and overall costs reduced.
Remediation Requirement: Groundwater Contamination					
Monitoring Natural Attenuation (MNA)	Groundwater	Process of monitoring any natural processes that act to attenuate Lead concentrations in groundwater.	Cheaper than pump and treat.	Does not remove contamination. Bioaccumulation unlikely to occur given the absence of ecological receptors on-site.	Dilution may be feasible at lower concentrations if source of contamination has been removed.
Pump and treat	Groundwater	Physically remove impacted groundwater for ex-situ treatment.	Effectively removes groundwater exposure pathways. Dewatering may already be required for basement excavation works.	Contaminants may remain in-situ if absorbed into soils.	Feasible if undertaken in conjunction with remediation or removal of contamination source. Likely required during the dewatering process for construction of lift pits.

Table 11 – Remedial Options Appraisal

Option	Targeted Media	Strategy	Advantages	Disadvantages	Project Feasibility
Do nothing	Groundwater	No action.	Little to no remediation cost.	May result in the migration of contamination which affects the local human health and environment.	Feasible. If Lead source is to be removed, or contained above the groundwater table, this will be the preferred option.

9.4 Preferred Remedial Strategy

The preferred remedial strategies selected must be the most cost-effective solutions, which does not bring about unacceptable long-term liabilities, and which does not impose unreasonable constraints on future Site developments. The strategy must also be capable of achieving the technical, environmental, sustainable and economic objectives of the overall project. The preferred remedial strategy is summarised as follows, and detailed further in **Section 10.4**.

AOC1

The preferred remedial strategy for AOC1 is the excavation, segregation, emu-picking of visible bonded (non-friable) asbestos, on-site immobilisation and off-site disposal of asbestos impacted soils, followed by a visual clearance assessment of the area by a suitably qualified occupational hygienist.

All remediation works associated with AOC1 should be conducted under asbestos air monitoring events.

AOC2

The preferred remedial strategy for AOC2 is the excavation, segregation and off-site disposal of OCP impacted soils, followed by additional sampling of soils from the walls and base of the excavation pit to validate the successful remediation of the AOC.

AOC3

The preferred remedial strategy for AOC3 is the excavation, segregation and off-site disposal of TRH impacted soils, followed by additional sampling of soils from the walls and base of the excavation pit to validate the successful remediation of the AOC.

AOC4

The preferred remedial strategy for AOC4 is the excavation and on-site immobilisation of Lead in soils under a NSW EPA Specific Immobilisation Approval. Following treatment, further sampling should be conducted to validate the successful chemical fixation of leachable lead. Material surplus to the development requirements may be disposed of off-site to a licensed landfill lawfully able to accept the waste, subject to additional waste classification sampling.

Groundwater

The preferred remedial strategy for groundwater is to do nothing, as impacts to groundwater are expected to be sufficiently mitigated by the source removal of lead-impacted soils in AOC4. Concentrations of heavy metals identified in groundwater are considered to be consistent with background levels observed in the wider Alexandria region due to the historic use of the area as an industrial precinct.

10 Remediation Strategy Scope

The scope of work associated with the preferred remedial strategy can be broken down into the following stages:

1. Assigning roles and responsibilities.
2. Preparation of WHS documents, construction environment management plan (CEMP), regulatory approval, licensing and notifications.
3. Site establishment.
4. Remediation and associated tasks, involving:
 - o On-site treatment of ASS in accordance with the ASSMP (EP Risk 2022c);
 - o Asbestos air monitoring during remediation of AOC1;
 - o Excavation, segregation, on-site immobilisation and off-site disposal of material within AOC1;
 - o Visual clearance assessment of AOC1 following excavation of ASBINS;
 - o Excavation, segregation and off-site disposal of material within AOC2;
 - o Excavation, segregation and off-site disposal of material within AOC3;
 - o Excavation, segregation and on-site immobilisation of material within AOC4, and soils surrounding BH19 and BH40;
 - o Validation sampling of soils underlying the excavated extents;
 - o Levelling of the Site using residual soils; and
 - o Final waste classification sampling of ex-situ immobilised soils (AOC4, and soils surrounding BH19 and BH40), and off-site disposal.
5. Implementation of an Unexpected Finds Protocol throughout the duration of the works.
6. Provision of a Site Validation Report, to be reviewed by the appointed NSW EPA accredited Site Auditor.

EP Risk considers that subject to the implementation and favourable outcomes of the remediation strategy and associated activities outlined in this RAP, the Site may be considered suitable for the proposed commercial / industrial land use without the requirement for a long-term management plan.

10.1 Assigning Roles and Responsibilities

For the purposes of the remedial work the roles and responsibilities are presented in **Table 12**.

Table 12 – Roles and Responsibilities		
Role	Party	Responsibilities
Principal/Owner	Alexandria Property Developments	To engage the consultants and contractors.
Project Management	Johnstaff	Undertake all stakeholder management.
Site Auditor	Rod Harwood, Harwood Environmental Consultants	Approve remediation approach. Review and comment on remediation approach, validation reports and other relevant documents. Oversee the design, installation, CQC, CQA and post-construction validation testing processes and review associated data.
Validation Consultant	EP Risk	Oversee implementation of Detailed RAP. Waste classification sampling of immobilised material proposed for off-site disposal. Assess unexpected findings. Perform validation sampling and inspections. To prepare a validation report.
Remediation Contractor	TBC ¹³	To carry out the on-site treatment, excavation and off-site disposal work in accordance with the RAP.
Building Contractor	TBC	Piling works and installation of the concrete slab.

10.2 Preparation of Management Plans, Regulatory Approvals and Licensing

Safety and environmental management documentation must be finalised with staff and any other relevant stakeholders. The likely documentation required includes:

- All regulatory and landowner approvals and notifications.
- Up to date insurance certificates.
- WHS documentation detailing safe work methods to be adhered to during civil works. Emergency response procedures should also be included.
- Construction environmental management plan (CEMP) detailing how the environment will be protected during the civil works.

An initial summary of environmental and safety management requirements is provided as **Section 13**.

10.3 Site Establishment

Following approval of all the required documentation and notification to SafeWork, the contractor can mobilise all plant, equipment and amenities as required to complete the remedial works.

¹³ To be confirmed.

All safety and environmental controls are to be implemented at the first stage of remediation works. These controls include:

- Community consultation
- Demarcation of remediation areas and creation of required exclusion zones
- Site signage and contact numbers; and
- Dust suppression and controls.

10.4 Remediation and Associated Tasks

10.4.1 AOC1 - ASBINS

The presence of ACM within the FILL material has been confirmed in the SCA (EP Risk 2021) and the DSI (EP Risk 2023a), as shown in **Figure 2**. In view of the remedial options appraisal (**Table 11**), the most favourable remedial strategy for the ASBINS is summarised as follows:

1. All remediation works associated with AOC1 should be conducted under Class B – non-friable conditions in accordance with **Section 10.4.8**.
2. Soils within the AOC1 extent should be excavated and segregated. A suitably qualified Occupational Hygienist should be present on-site throughout the excavation works to inspect for visual bonded (non-friable) asbestos containing material. Emu-picking of identified asbestos should occur as the soils are inspected in batches of a small volume. Where significant volumes of asbestos are identified (at the discretion of the engaged hygienist), it is noted that the remediation strategy for AOC1 may be revised to dispose of the material without immobilisation as Special Waste (Asbestos) – Hazardous Waste to mitigate the risk posed to site workers. Consideration should be given to the screening of material through a 7mm sieve to assess for the presence of bonded (non-friable) ACM throughout the batch inspection process.
3. Following emu-picking, soils should be immobilised on-site in accordance with **Section 10.4.4**.
4. Following excavation and off-site disposal, the exposed surface of underlying soils should be visually assessed by an appropriately qualified occupational hygienist to visually assess for the presence of residual ACM.
5. Final waste classification sampling should be conducted for the material following immobilisation, followed by off-site disposal of the soils as Special Waste (Asbestos) in addition to the appropriate chemical classification of the waste. Soils should be disposed of at a licensed facility lawfully able to accept the waste, and aware of the various treatments the waste may have undergone to inform the waste classification.

If asbestos is observed during future works

In the event that asbestos is observed during future works, the area from which the ACM is identified should be delineated both vertically and horizontally, extending from the source borehole to the nearest 'clean' boreholes or validation sampling points (with regards to asbestos). The soil within this delineated area should be treated as Special Waste (asbestos) in addition to any other waste classification the soil may have if required for off-site disposal.

Whether the delineated ASBINS is required to be removed is dependent on the depth of the ASBINS and the concentration. ACM located below the planned basement excavation works may not be required to be excavated

as the installation of the basement will suitably encapsulate the ACM. Should the delineated ASBINS be encountered during basement construction, it should be removed as Special Waste (Asbestos). In the event that ACM is proposed to remain on-site within a contained cell, a LTEMP may be required.

10.4.2 AOC2 – OCP Impacted Soils

In view of the remedial options appraisal (**Table 11**), the most favourable remedial strategies for AOC2 are considered to be the excavation of the OCP Impacted Soils overlying the secondary slab present along the western portion of the Site, and off-site disposal of excavated material as **Scheduled Chemical Waste - Hazardous Waste** to a licensed facility lawfully able to accept the waste.

Validation sampling of the residual soils present following excavation works should be collected once it has been removed to facilitate final waste classifications for the underlying material. One (1) sample should be collected from each wall of the excavated AOC, and two (2) samples from the base of the excavation (if not prohibited by the secondary slab) to validate the successful removal of OCP impacted soils from AOC2.

Analytical results should be compared against the adopted Health Investigation Level (HIL) for a commercial/industrial land use scenario (HIL-D), as specified in the ASC NEPM (2013), and against the criteria outlined in the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste. Where validation samples exceed the adopted HIL, further source removal and treatment should be conducted. Delineation of material from the location of exceedance to the nearest 'clean' sampling points should be adopted.

10.4.3 AOC3 – TRH Impacted Soils

As above, the most favourable remedial strategy proposed for AOC3 soils is the excavation to a depth of 0.3 mBGL and off-site disposal as **General Solid Waste (non-putrescible)** to a licensed facility lawfully able to accept the waste.

Validation sampling of the residual soils present following excavation works should be collected once it has been removed to facilitate final waste classifications for the underlying material. One (1) sample should be collected from each wall of the excavated AOC, and two (2) samples from the base of the excavation (if not prohibited by the secondary slab) to validate the successful removal of TRH impacted soils from AOC3.

Analytical results should be compared against the adopted Health Screening Level (HSL) for petroleum hydrocarbons in a commercial/industrial land use scenario (HSL-D), as specified in the ASC NEPM (2013), and against the criteria outlined in the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste. Where validation samples exceed the adopted HSL, further source removal and treatment should be conducted. Delineation of material from the location of exceedance to the nearest 'clean' sampling points should be adopted.

10.4.4 AOC4 – Lead Impacted Soils

In view of the remedial options appraisal considered in **Table 11** above, the most favourable remedial strategies for AOC4 are summarised below, in sequential order of implementation.

Immobilisation / Treatment

NSW EPA granted a Specific Immobilisation Approval (SIA2023-S-04) for the treatment of 3,600 tonnes of Lead-impacted waste under Part 10 of the Protection of the Environment Operations (Waste) Regulation 2014. Under this approval, immobilisation of lead from soils within AOC4 via chemical fixation using reagents specified in the SIA Application may be undertaken.

Soils excavated within the basement footprint should be segregated and treated according to the approved immobilisation methodology, involving the physical processing of soils to ensure reagents are evenly distributed. Impacted soils were identified within AOC4, comprising an approximate extent of 860 m². It is understood that soils are proposed to be excavated to a maximum depth of 3.4 metres below the existing ground surface, generally to a floor level of 1.6 mBGL, although it is noted that the majority of Lead impacts were observed to be variable in depth. It is proposed that the treatment of soils be undertaken to a depth of 2.0 mBGL, with an estimate volume of 1,600 m³ to be treated. Soils should be validated following treatment, and additional volumes subject to immobilisation as required.

Validation Sampling – In-Situ Material

Following excavation, material proposed to remain in-situ underlying AOC4 should be subject to validation sampling for Lead in soil, including assessment by toxic characteristic leachate procedure (TCLP) as an indicative assessment for the leachability of lead. Analytical results should be compared against the adopted Health Investigation Level (HIL) for a commercial/industrial land use scenario (HIL-D), as specified in the ASC NEPM (2013). Sampling density should be adopted from the NSW EPA Guidelines for Sampling Design Part 1 – Application, for a minimum of eight (8) samples across the AOC.

Where validation samples exceed the adopted HIL, further source removal and treatment should be conducted. Delineation of material from the location of exceedance to the nearest 'clean' sampling points should be adopted.

Validation Sampling – Ex-Situ Immobilised Material

Following immobilisation of soils from AOC4, the material should be stored temporarily as segregated samples to allow for validation sampling of Lead, including TCLP, prior to off-site disposal or reuse on-site. Stockpiles should be sampled in accordance with the NSW EPA Guidelines for Sampling Design Part 1 – Application, and analytical results compared against HIL-D, and against the criteria outlined in the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste, Part 2: Immobilisation of Waste and Part 4: Acid Sulfate Soils, as well as the requirements stipulated in the SIA (SIA2023-S-04).

Off-Site Disposal

Following immobilisation and validation sampling, a final waste classification for the material from AOC4 should be issued. Material should be disposed of at a licensed facility lawfully able to accept the waste, as classified under the conditions of the SIA. It is noted that the immobilised material cannot contain free liquids at the time of disposal, nor during transport and must retain an angle response of greater than 15 degrees.

In accordance with the *NSW EPA Waste Classification Guidelines – Part 4: Acid Sulfate Soils*, potential ASS must be managed during off-site disposal as follows:

- Potential ASS must be kept wet at all times during excavation and subsequent handling, transport and storage, and received at the disposal point within 16 hours of excavation to be disposed of below the water table; or
- ASS must be treated by the generator of the waste before they can be considered for disposal. Treatment should be in accordance with the neutralising techniques outlined in the ASS manual, and material should be disposed of at a facility licensed to accept treated ASS.

Based on the nature of contamination observed on-site, hazardous material within AOC4 is not considered suitable to be disposed of beneath the water table, and should therefore be treated prior to disposal. Where

any soils are excavated and remain on-site for longer than 16 hours, or for a duration sufficient to dry out the material, they should further be treated prior to disposal. The proposed immobilisation treatment includes the application of a phosphate fertiliser, as well as the addition of Magnesium Oxide to neutralise excess acidity generated within the reaction produced. Acidic soils, such as those present on-site, may be suitably neutralised by the proposed treatment, without the further need for addition of aglime to address PASS. This is proposed to be validated by additional testing of soils following treatment and prior to disposal.

Long-Term Management

Provided that the immobilised material is disposed off-site, and validation results are favourable, the enforcement of a long-term environmental management plan is not considered warranted.

10.4.5 Infill

The development plans at the time of this revision are presented as **Attachment A**. Within the northeastern portion of the Site, a 440 m² area is proposed to remain unexcavated. It is understood that the approximate height of the ground floor is proposed to be 10.4 mAHD, which would require an approximate infill of 638 m³ to level the height of the area above the existing ground level (adopted as 8.8 mAHD), assuming a nominal slab thickness of 150mm.

Residual soils outside of the AOC4 extent were assessed for their suitability to remain on-site based on the following lines of evidence:

- The calculated 95% UCL for lead in residual soils was reported to be below the adopted HIL.
- No single data point within the area was observed to exceed 250% of the HIL value.
- The standard deviation of sampling points within residual soils was less than 50% of the HIL value.

With consideration to the assessment above, excavated soils outside the identified AOCs may be reused on-site for the purposes of levelling the proposed development, with the exception of the following:

- Based on the observed concentrations of leachable lead in soils surrounding sample locations BH19 and BH40, and preliminary classification as Hazardous Waste, it is considered that immobilisation and off-site disposal as per the adopted approach for AOC4 is the most suitable management approach to mitigate any potential risk of contaminant migration to groundwater. Approximate extents are summarised as follows:
 - o Soils surrounding BH19 may be preliminarily delineated to an extent of 48 m² and 10 m³ to a depth of 0.35 mBGL, as shown in **Figure 3**.
 - o Soils surrounding BH40 may be preliminarily delineated to an extent of 100 m² and 135 m³ to a depth of 1.5 mBGL, as shown in **Figure 3**.

10.4.6 Groundwater

In view of the remedial options appraisal (**Table 11**), the most favourable remedial strategy for groundwater on-site is to do nothing. The analytical results collected during the DSI did not report widespread Lead contamination in groundwater. If the Lead source is removed, this will be the preferred option.

10.4.7 Acid Sulfate Soils

Acid Sulfate Soils should be managed in accordance with the ASSMP prepared for the Site (EP Risk 2022c).

10.4.8 Asbestos Air Monitoring

Based on the previous identification of Friable Asbestos as Asbestos Containing Dust (ACD) and Bonded (non-friable) ACM in soils within AOC1, there is considered a risk of any residual ACM deteriorating in condition through the construction process and becoming airborne respirable fibres. In order to address this risk, suitably qualified environmental consultants should be present on-site during remedial works to physically identify any ACM present within soils proposed for treatment, as well as to conduct control asbestos fibre air monitoring via the placement of static or positional samples within the Site during remediation works associated with AOC1.

Air monitoring should be undertaken in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*. 2nd Edition [NOHSC: 3003 (2005)] and Australian Standard AS ISO/IEC 17025 – 2005, *General requirements for the competence of testing and calibration laboratories*.

Air monitoring clearance reports will be issued in accordance with NATA's accreditation requirements and kept on file.

10.4.9 Demolition Works

A Pre-Demolition HAZMAT undertaken identified Lead-containing dust (LCD), lead-containing paint (LCP), Asbestos-containing material (ACM) and Asbestos-containing dust (ACD) within the building. Prior to any demolition works of on-site structures, the findings of the HAZMAT are required to be remediated in accordance with SafeWork NSW requirements.

10.5 Site Validation

At the completion of the remedial works a Validation Report should be prepared in accordance with the requirements of the NSW EPA (2020) *Consultants Reporting on Contaminated Land – Contaminated Land Guidelines*, including:

- A clear definition of the sampling and analysis completed.
- A clear definition of the contamination assessment criteria.
- Figures displaying sampling locations.
- Analytical summary tables comparing results to assessment criteria.
- Field records (e.g. sampling logs, field instrument calibration records and photographs).
- Chain of custody documentation and laboratory analytical reports.
- An assessment of data reliability.
- A discussion of the field observations and analytical results.
- Recommendations for any changes to future monitoring scope or procedures.

The validation plan should account for the known and potential contaminants and for ASS, in accordance with the ASSMP.

A detailed summary of required validation sampling is outlined within **Section 11** of this report.

10.6 Contingency Plan

The following contingencies presented in **Table 13** should be considered for unexpected finds and issues:

Table 13 – Remediation Contingency Plan

Anticipated Issues	Actions
Surplus fill material requiring off-site disposal (including material surrounding BH19 and BH40)	Any materials to be disposed of off-Site must be classified in accordance with the NSW EPA Waste Classification Guidelines 2014 and the Specific Immobilisation Approval, (where material is proposed for immobilisation) for off-site disposal to a waste management facility lawfully permitted to accept the materials.
Additional contamination sources including other co-contaminants that have not previously been identified.	Undertake characterisation sampling to determine suitability to retain on-site or off-site disposal in accordance with the UFP.
Contaminated soil is found to have migrated off-Site beyond the work area.	Excavate to the extent practicable. Undertake additional delineation of soil impact outside the work area (subject to approval from off-Site landowners if required). Should impacted soil be detected off-site due to leaching of contaminants originating from the Site then a health and/or ecological risk assessment, remediation and/ or on-going management may be required.
Criteria failure of imported material.	Where material to be imported onto Site does not meet criteria outlined within Section 11.1 , material should not be imported. Alternative material must be sourced that meets importation requirements.
Heavy rain or flooding.	Construct sediment and surface water controls prior to commencing works. Prepare Dewatering Management Plan for the Site prior to commencing demolition / remediation / construction works.
Failure of management practices.	Investigation into root cause and update management practices accordingly.
Emissions complaints (noise, odour, vibration, dust, etc.).	Monitoring of emissions during works. Use water sprays to suppress the dust or stop site activities generating the noise, odour, vibration, dust, etc until it abates.
Changes in future land use for the Site.	Should the proposed land use change then the RAP should be revised to ensure that the adopted remedial option is suitable for the intended use.
Unexpected Finds.	Implementation of an unexpected finds protocol (UFP). EP Risk's unexpected finds protocol is contained in Appendix B .

11 Validation Plan

Validation is required to demonstrate that remedial measures described in the RAP have been successful and that the Site is suitable for the intended land use.

11.1 Validation Assessment Criteria

In order to develop appropriate validation assessment criteria (VAC) to address the objectives of the remediation, consideration was given to the latest screening criteria made available or approved by NSW EPA.

Tier 1 Site assessment criteria will be adopted as the VAC for CoPC defined within **Table 16 – Validation requirements**. VAC are outlined as follows:

Soil Validation Criteria

For the purposes of assessing the results of analytical testing of soils at the Site, the following guidelines are to be considered:

- NSW EPA (2017) Guidelines for the NSW Site Auditor Scheme (Third Edition);
- ASC NEPM (2013) Schedule B1; and
- NSW EPA Waste Framework under NSW EPA Waste Classification Guidelines (2014).

Soil concentrations will be compared against soil investigation levels (SILs) for commercial / industrial land-use settings.

Imported Materials

Should soil material be required to be imported through the remediation and construction process, material imported as general fill must meet the requirements of Virgin Excavated Natural Material (VENM) / Excavated Natural Material (ENM), or material classified under a suitable resource recovery order or exemption.

Asbestos Air Monitoring

For the purposes of assessing the results of control asbestos air monitoring at the Site, the following guidelines are to be considered:

- *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*, 2nd Edition [NOHSC: 3003 (2005)], Australia National Occupational Health and Safety Commission;
- *National Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC: 1003 (1995)] Australia National Occupational Health and Safety Commission; and
- Safe Work Australia *Workplace Exposure Standards for Airborne Contaminants* (2019).

Acid Sulfate Soils

Throughout the proposed remediation works, on-site monitoring for ASS disturbance should be conducted during deeper excavation earthworks (understood to occur to a maximum depth of 3.4 mBGL), to allow for the segregation, stockpiling, treatment and management of impacted soils. On-site monitoring for ASS should further be considered to address impacts of any heavy rainfall events. Action criteria for additional management measures are outlined in **Table 14** below.

Table 14 - ASS Monitoring Program Action Criteria

Media	Indicator	Action
Water	6.5 < pH > 8.5 or +/- 0.2 units of adjacent surface water bodies	pH outside this range is not suitable for discharge to the surrounding environment and requires treatment prior to discharge.
Soil	pH < 4	Indicates the excavated material is oxidising and would require treatment with aglime to neutralise the acidity.

11.2 Data Quality Objectives

To assess whether an appropriate validation sampling strategy was adopted, EP Risk adopted the data quality objectives (DQOs) planning process as:

- Recommended in the ASC NEPM 2013.
- Required within the NSW EPA Site Auditor Guidelines (2017).

Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) should be clearly outlined and assessed as part of the validation process.

DQO's have been broadly established for the validation with regards to the seven-step process outlined within the NEPM:

- State the Problem;
- Identify the decisions / goals of the study;
- Identify inputs to the decision;
- Define the study boundary;
- Develop the decision rule;
- Specify performance / acceptance criteria; and
- Optimise the design for obtaining data.

11.3 State the Problem

The Site is proposed to be redeveloped for commercial / industrial land use, development of which will include the excavation of CoPC impacted soil and ASBINS as Special Waste (Asbestos) to a maximum depth of 3.4 metres below the existing ground level, noting the floor level of the basement is primarily proposed for excavation to 1.6 mBGL.

Validation is required to determine the remediation is successful and the remaining material present on-site is suitable for the proposed land use as described within **Section 1.1** of this report.

11.4 Identify the Decision

To satisfy the requirements of the RAP, the following decisions need to be addressed:

- Will the adopted remediation strategy meet the adopted validation criteria?

- Is there a requirement for ongoing long-term management following remediation?

11.5 Identify Inputs into the Decision

The inputs required to make the decision include the following:

- Visual confirmation of the surface of the Site at the conclusion of the basement development, including site observations, inspections, survey information, as-built drawings and waste / import registers.
- Validation sampling results.

11.6 Define the Boundaries of the Study

The remediation and validation will be confined to the Site boundaries as outlined within **Section 2** and shown within **Figure 2**. The remediation works and validation assessment will be applicable at the time of the works and should be reviewed upon changes to the local environment, such as changed to the groundwater levels.

11.7 Develop a Decision Rule to Identify the Decision

The validation criteria for the contaminants of concern are presented in **Section 11.1**. These criteria have been adopted based upon the framework provided by the NSW EPA. These criteria have been used as screening levels to determine whether additional assessment is required. EP Risk considers these criteria are sufficiently conservative and have been adopted as the validation criteria. The following decision statements for analysis of the results were adopted with respect to the adopted criteria:

Soil Health-Based Remediation Criteria

- I. Where the data sets are not sufficiently populated to allow calculation of the 95% upper confidence limit (UCL_{mean}) then the individual results must be less than the adopted criteria. If all the individual results are below the adopted criteria, then no additional assessment and/or management is required. Where individual results exceed that adopted criteria, then further assessment and/or management is required.
- II. In accordance with the ASC NEPM 2013, where 95% UCL_{mean} of the average concentration for each soil analyte can be calculated, then the 95% UCL_{mean} must be below the adopted criteria; no single analyte concentration exceeds 250% of the adopted criteria; the standard deviation of the results must be less than 50% of the adopted criteria; and the normal distribution will only be used where the coefficient of variance is not greater than 1.2. Allowances to these decision rules apply where alternative 95% UCL methods that are not based on normal or log-normal distributions are adopted. Where 95% UCL_{mean} results exceed the aforementioned criteria, then further assessment and/or management is required.

Soil Ecological-Based Validation Criteria

Soil Ecological criteria are not considered applicable for the purposes of validation as the site will be completely covered by a concrete slab across the extent of the basement, thereby forming an incomplete linkage between source, pathway and potential ecological receptor.

11.8 Specify Acceptable Limits of Decision Errors

The acceptable limits were as follows:

- I. Individual or 95% UCL_{mean} concentrations to be below the adopted criteria or background concentrations.

- II. 95% of the data must satisfy the data quality indicators (DQIs) which were determined for completeness, representativeness, precision and accuracy of both field and laboratory data. Therefore, the limit on the decision error was 5% that a conclusive statement may be incorrect.
- III. A comprehensive QA/QC program was undertaken including representative sampling and sampling at an appropriate density for the purpose of the investigation.

The acceptable limit of error for sampling techniques and laboratory analysis was defined by the DQIs as follows:

Data Representativeness

Expresses the accuracy and precision with which sample data represents an environmental condition. Data representativeness was achieved by the collection of samples at an appropriate pattern and density as well as consistent and repeatable sampling techniques and procedures.

Completeness

Refers to, the percentage of data that can be considered valid data. Sufficient data was required to enable an assessment of the Decision Rules.

Comparability

A qualitative comparison of the confidence with which one data set can be compared to another. This was achieved through consistent sampling and analytical testing and reporting techniques.

Precision

A measure of the reproducibility of on measurements under a given set of conditions. The relative percent difference (RPD) has been adopted to assess the precision of data between duplicate sample pairs according to the following equation.

$$RPD\% = \frac{[C_p - C_d]}{C_p + C_d} \times 200$$

Where:

C_p = Primary sample

C_d = Duplicate Sample

An acceptance criterion of ±30% had been adopted for inorganic field duplicates and triplicates and ±50% for organic field duplicates and triplicates. However, it should be noted that exceedances of these criteria are common for heterogeneous soil or fill or for low analyte concentrations.

Accuracy

A measure of the bias in the analytical results and can often be attributed to: field contamination; insufficient preservation or sample preparation; or inappropriate analytical techniques. Accuracy of the analytical data is assessed by consideration of laboratory control samples and laboratory spikes.

Optimise the Design for Obtaining Data

A number of potentially contaminating activities, historical and current, have been undertaken at the Site associated with the operation of the Site as a chemical storage and blending facility. A systematic and targeted based validation sampling pattern is proposed based on a visual inspection and field screening of the Site. The adopted sampling approach is consistent with AS4482.1 (2005).

11.9 Data Quality Indicators

The DQOs, requirements and indicators for the assessment are presented in **Table 15**.

Table 15 – DQO, Requirements and Indicators		
DQO	Requirement	DQI
Precision		
Standard operating procedures appropriate and complied with	The sampling methods comply with industry standards and guidelines	Meet requirement
Intra-laboratory duplicates	1 per 20 samples	RPDs < 50%
Inter-laboratory duplicates	1 per 20 samples	RPDs < 50%
Laboratory duplicates	Minimum of 1 per batch per analyte	RPDs < 50%
Accuracy		
Laboratory matrix spikes	1 per batch per volatile/semi-volatile analyte	Recoveries 50% to 150%
Laboratory surrogate spikes	1 per volatile/semi-volatile analyte sample (as appropriate)	Recoveries 70% to 130%
Laboratory control samples	At least 1 per batch per analyte tested for	Result < limit of reporting (LOR)
Representativeness		
Sampling methodology - preservation	Appropriate for the sample type and analytes	Meet requirement
Samples extracted and analysed within holding times	Specific to each analyte	Meet requirement
Field equipment calibration	All field equipment calibrated, and calibration records provided.	Meet requirement
Laboratory method blanks	At least 1 per batch per analyte tested for	Result < LOR
Trip blanks	1 per lab batch for volatile analytes	Result < LOR
Trip spikes	1 per lab batch for volatile analytes	Recoveries 60-100%
Rinsate	1 per lab batch for volatile analytes	Result < LOR
Comparability		
Sampling approach	Consistent for each sample	Meet requirement
Analysis methodology	Consistent methodology for each sample	Meet requirement
Handling conditions and sampler	Consistent for each sample	Meet requirement
Field observations and analytical	Field observations to support analytical results	Meet requirement
Consistent laboratory reporting limit	Consistent between primary and secondary laboratories	Meet requirement

Table 15 – DQO, Requirements and Indicators		
DQO	Requirement	DQI
Completeness		
Sampling staff	Consistent sampling staff used.	Meet requirement
Laboratory accreditation	National Association of Testing Authorities (NATA) Accredited laboratory for methods used	Meet requirement
Accredited methods	NATA accredited methods used appropriate for each analyte.	Meet requirement
ASC NEPM 2013 lab methods	Lab methods consistent with the ASC NEPM 2013.	Meet requirement
Laboratory reporting limit	Laboratory reporting limit consistent and appropriate	Meet requirement
Consistent weather / field conditions	Consistent	Meet requirement
Chain of custody documentation	Appropriately completed	Meet requirement
Field sampling documentation	Appropriately completed	Meet requirement

11.10 Validation Sampling Works

The strategy to validate the remediation works will be undertaken according to requirements as outlined within **Table 16** below.

Table 16 – Validation requirements

Aspect	Sampling	Analysis	Observations and Documentation
Excavation			
Excavation Surface AOC1	Walkover of the AOC by a suitably qualified consultant to visually assess for the presence of ACM in soils.	N/A	To be documented as an asbestos clearance within the Site Validation Report.
Excavation Surface AOC2	One (1) sample to be collected from each wall of the excavation extent, and two (2) samples to be collected from the base excavation surface.	OCP	Results to be assessed in accordance with the VAC and documented in a Site Validation Report.
Excavation Surface AOC3	One (1) sample to be collected from each wall of the excavation extent, and two (2) samples to be collected from the base excavation surface.	TRH	Results to be assessed in accordance with the VAC and documented in a Site Validation Report.
Excavation Surface AOC4 (including footprint of AOC1 excavation)	Soil sampling density in accordance with the NSW EPA Sampling Design Guidelines (2022). Systematic sampling is recommended for validation of AOC4. Samples to be collected between 0-0.15m below the excavation surface. According to the Procedure A in EPA (2022): - EP Risk considers a 5m radius of the scheduled chemical hotspot acceptable. - Size of AOC4 is approximately 870 m². Sampling grid is approximately 8.5m in spacing, resulting in 8 sampling points.	Lead, Lead TCLP	Results to be assessed in accordance with the VAC and documented in a Site Validation Report.
Waste classification (AOC4)	All soil to be removed off-site that has not been classified as GSW and is to undergo remediation works should have a waste classification undertaken prior to off-site disposal.	Heavy metals, Lead TCLP, TRH, BTEX, PAH, OCP, PCB and asbestos.	Waste classification documentation requirements are outlined within Table 18 . Immobilised soils are to be assessed against the TCLP results for lead, as opposed to the total concentration, in accordance with the SIA issued for the Site.

Table 16 – Validation requirements

Aspect	Sampling	Analysis	Observations and Documentation
	The number of samples required is based on the EPA Victoria Industrial Waste Resource Guidelines 702 – Soil Sampling (2009) and the Specific Immobilisation Approval.		
ASS	As described in ASSMP.		
Imported Materials			
Imported VENM / ENM	Sampling is to be conducted at a minimum ratio of one sample per 250 m ³ volume of material imported.	Heavy metals, TRH, BTEX, PAH, OCP, PCB and asbestos (500 mL). Additional analysis may be required dependant on source site. Additional sampling may be required for ENM suite.	Remediation contractor to supply existing ENM/ VENM documentation (report to be prepared in accordance with the NSW EPA waste classification reporting requirements). Material must be approved by validation consultant for importation to Site. Material is to be inspected prior to and upon importation to Site by the validation consultant to confirm material is free from visible / olfactory contamination. Where check sampling occurs by the validation consultant due to apparent deficiencies in existing VENM / ENM / documentation the following is required: - Date of sampling. - Description of material. - Estimated volume of material imported at time of sampling. - Sample location plan. - Analytical reports and tabulated results comparing to the VAC.
Imported engineering materials incl, road base materials, or	At the validation consultant's discretion based on robustness of supplier documentation.	At the validation consultant's discretion based on robustness of supplier documentation.	Remediation contractor to provide documentation from supplier confirming the material is a product comprising only of natural quarried materials. Must be approved by the validation consultant. Review of quarry's EPL if applicable.

Table 16 – Validation requirements

Aspect	Sampling	Analysis	Observations and Documentation
material classified under a suitable resource recovery order or exemption.			Material is to be inspected prior to and upon importation to Site by the validation consultant to confirm material is free from visible / olfactory contamination. Where check sampling occurs by the validation consultant due to apparent deficiencies in existing VENM / ENM / documentation the following is required: - Date of sampling. - Description of material. - Estimated volume of material imported at time of sampling. - Sample location plan. - Analytical reports / tabulated results with comparison to the VAC. Use of recycled aggregate is discouraged. Should recycled aggregate be imported for engineering purposes (at the discretion of the client) sampling and analytical testing for quantification of asbestos as per the NEPM guidelines will be required.

12 Unexpected Finds Protocol

The objective of the UFP is to provide clear guidance on the safe and appropriate actions in the event of encountering potential chemical or ordnance contamination during development works.

Where such material is uncovered the UFP prescribes the quarantining of the relevant area of concern (AOC), allowing other works to proceed unhindered, while the area of concern is assessed and, if necessary, remediated and validated.

The AOC may be identified by the Principal Contractor, Environmental Consultant or a site worker. The AOC will be quarantined by the Principal Contractor by means of some appropriate barrier to prevent access to the area. The quarantined area/s will be communicated with workers during the daily tool-box talks.

Two classes of potential contamination which may be discovered during excavation works include chemical and asbestos.

12.1 State the Problem

It is acknowledged previous investigations of the Site have been undertaken to assess CoPC. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations during redevelopment. ASBINS has been previously identified within fill material at the Site, however further contamination, including hazardous material, not previously identified may exist within areas of fill not previously excavated. The nature of any residual hazards which may be present at the Site are generally detectable through visual or olfactory means, for example:

- Previously unidentified ACM in poor condition.
- Discoloured / odorous soils (visible and odorous).
- Drums / bottles / containers of chemicals (visible).
- Ash and/or slag contaminated soils / fill materials (visible).
- Petroleum contaminated soils (staining / odorous / discolouration visible).
- Volatile organic compound contaminated soils (odorous).
- Asphaltic concrete contaminated fill (visual).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances be identified (or any other unexpected potentially hazardous substance), the procedure summarised in **Appendix B** and detailed in the following sections is to be followed.

An enlarged version of the unexpected finds protocol, suitable for use at the Site, will be posted in the site Office and referred to during the Site-Specific Induction by the Principal Contractor.

If the Principal Contractor considers material to be potential chemical contamination the area will be quarantined, and a suitably qualified Environmental Consultant will be contacted. The Environmental Consultant will be responsible for assessing the findings, taking samples to characterise and delineate the extent of the potential contamination and defining appropriate remedial actions.

Where contamination is identified within any AOC an Investigation Report will be prepared by the Environmental Consultant detailing how the impacts will be managed, validated and reported.

If the area is determined by the Environmental Consultant to not be contaminated or the analyses meet the relevant site criteria, the Environmental Consultant will notify the Principal Contractor that the quarantine

restrictions on the area can be lifted and the works in that area may resume. The Environmental Consultant will prepare a report on the investigation and the conclusions drawn.

12.2 Identify the Decision

Based on the decision-making process for assessing urban sites detailed in NSW EPA (2020), modified to meet the specific project objectives, the following decisions must be made during any unexpected find assessment:

- Are there any unacceptable risks to likely future onsite receptors from impacted soils during development?
- Are there any issues relating to local area background soil concentrations that exceed the appropriate soil criteria?
- Are there any impacts of chemical mixtures?
- Are there any aesthetic concerns in fill soils present at the Site?
- Is there any evidence of, or potential for, migration of contaminants off-site?
- Is the site-specific risk assessment required to be updated?
- Is a site management strategy required?

12.3 Identify Inputs to the Decision

Inputs to the decisions are:

- Environmental data as collected by sampling and analysis and site observations made during this investigation.
- Assessment criteria to be achieved on the site as based on the intended land use and project objectives, as defined by assessment criteria nominated in **Section 12.7**.
- Final site surface survey.
- Confirmation that data generated by sampling and analysis are of an acceptable quality to allow reliable comparison to assessment criteria as undertaken by assessment of quality assurance / quality control (QA/QC) as per the data quality indicators (DQIs) established.

12.4 Define the Study Boundaries

Each unexpected find identified and investigated and where required, remediated, will be surveyed (as required) to provide accurate boundaries.

12.5 Develop a Decision Rule

Laboratory analytical data will be assessed against adopted site criteria as identified in **Section 12.7**. The decision rules adopted to answer the decisions are summarised in **Table 17**.

Table 17– Summary of Decision Rules	
Site	Area and Aspect
1. Are there any unacceptable risks to likely future onsite receptors from impacted soils during development?	The nature and extent of soil impacts will be assessed, and soil analytical data will be compared against EPA endorsed criteria (health and ecological). Statistical analyses of the data in accordance with relevant guidance documents will be undertaken, if appropriate, to facilitate the decisions. The following statistical criteria will be adopted with respect to soils: Either: the reported concentrations are all below the site criteria; Or: the average site concentration for each analyte must be below the adopted site criterion; no single analyte concentration exceeds 250% of the adopted site criterion; and the standard deviation of the results must be less than 50% of the site criteria. And: the 95% upper confidence limit (UCL) of the average concentration for each analyte must be below the adopted site criterion. If the statistical criteria stated above are satisfied, and an assessment of risk indicates no unacceptable risks, the decision is No. Otherwise, the decision is Yes.
2. Are there any issues relating to the local area background soil concentrations that exceed relevant investigation criteria?	If the 95% UCL of natural soils exceeded calculated background concentrations (NEPC 2013), the decision is Yes. Otherwise the decision is No.
3. Are there any chemical mixtures	Are there more than one group of contaminants present which increase the risk of harm? If there is, the decision is Yes. Otherwise, the decision is No.
4. Are there any aesthetics issues in fill soils at the site?	If there are any unacceptable odours, anthropogenic materials or staining the answer to the decision is Yes. Otherwise, the answer to the decision is No.
5. Is there any evidence of, or potential for, migration of contaminants off-site?	Are contaminants present within natural soils at concentrations exceeding EPA endorsed criteria? If yes, the answer to the decision is Yes. Otherwise, the answer to the decision is No. And If groundwater analytical results exceed the NEPC 2013 criteria and the downgradient groundwater impacted, the decision is yes. Otherwise, the decision is No.
6. Is a site specific risk assessment required?	If the 95%UCLs of the COPC are detected above the adopted Site criteria, a Site Specific Risk Assessment may be required.
7. Is a site management strategy required?	Is the answer to any of the above decisions Yes? If yes, a site management strategy will be required to be developed. If no, a site management strategy is not required.

12.6 Optimise the Design for Obtaining Data

Various strategies for developing a statistically based sampling plan are identified in EPA (1995), including judgemental, random, systematic and stratified sampling patterns. Random sampling is not appropriate. Based on the history of the site a systematic sampling program is considered the most appropriate for any unexpected finds. Sampling locations should be placed systematically to assess each unexpected find.

Sampling methodology of unexpected finds should be in accordance with the ASC NEPM (2013) and NSW EPA (2014) for waste classification.

12.7 Assessment Criteria

For the purposes of assessing the results of any analytical testing of soils across the Site (if required), the following guidelines should be considered:

- NSW Department of Environment Protection Authority (2017), *Contaminated Land: Guidelines for the NSW Site Auditors Scheme* (3rd Edition) (NSW EPA, 2017).
- Western Australian (WA) Department of Health (DOH) (2021) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (WA DoH, 2021).¹⁴
- ASC NEPM (2013).
- NSW EPA (2020) *Consultants reporting on Contaminated land, Contaminated Land Guidelines* (NSW EPA, 2020).

Soil concentrations should be compared against the following SILs:

- **Health-based Criteria for the current land use:** ASC NEPM (2013) HILs for commercial / industrial land use. In accordance with the proposed development and the NEPM (Section 2.4.8), the HSL-D are applicable.
- **Management Limits:** ASC NEPM (2013) Management Limits for commercial / industrial land use (Management Limits).
- **Ecological Criteria for the current land use:** In the absence of site-specific data and biota study, generic ASC NEPM (2013) Ecological Screening Levels (ESLs) and Ecological Investigation Levels (EILs) for commercial / industrial land use were adopted.

¹⁴ It should be noted that the updated 2021 guidelines are not yet endorsed by the NSW EPA / NEPM. The guidelines are considered in the context of the approved 2009 Western Australia Department of Health Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, and are considered to provide a more comprehensive review of asbestos contamination.

13 Site Management

A CEMP or similar environmental management document will be required prior to commencing the remedial works. The document will be provided by the construction contractor. A summary of the minimum environmental safeguards to be implemented during remediation works is provided in this section. These should be considered when preparing the final CEMP.

13.1 Remediation Schedule

The remediation schedule is anticipated be undertaken in the following succession:

1. Assigning roles and responsibilities.
2. Preparation of WHS documents, CEMP, regulatory approval, licensing and notifications.
3. Site establishment.
4. Remediation and associated tasks, involving:
 - o On-site treatment of ASS in accordance with the ASSMP (EP Risk 2022c);
 - o Asbestos air monitoring during remediation of AOC1;
 - o Excavation, segregation, on-site immobilisation and off-site disposal of material within AOC1;
 - o Visual clearance assessment of AOC1 following excavation of ASBINS;
 - o Excavation, segregation and off-site disposal of material within AOC2;
 - o Excavation, segregation and off-site disposal of material within AOC3;
 - o Excavation, segregation and on-site immobilisation of material within AOC4, and soils surrounding BH19 and BH40;
 - o Validation sampling of soils underlying the excavated extents;
 - o Levelling of the Site using residual soils; and
 - o Final waste classification sampling of ex-situ immobilised soils (AOC4, and soils surrounding BH19 and BH40), and off-site disposal.
8. Excavation Works.
9. Importation of clean ENM/VENM or material classified under a suitable resource recovery order or exemption (if required).
10. Implementation of an Unexpected Finds Protocol throughout the duration of the works.

13.2 Hours of Operation

Remediation works shall be undertaken as required during the following hours:

- Monday to Friday: 7:00 am to 5:00 pm.
- Saturday and Sunday: 8:00 am to 4:00pm.
- Public Holidays: No work expected.
- Emergency work is permitted to be completed outside of these hours.

13.3 Site Access

During remediation works, the works area will need to be secured around the perimeter of the remediation area which will restrict access to the Site. Only authorised persons will be able to enter the Site.

13.4 Imported Fill Materials

Prior to the importation of fill materials onto the Site the following must be undertaken:

- Material characterisation reports/certification showing the material being supplied is virgin excavated natural material (VENM) / excavated natural material (ENM) must be provided.
- Any imported VENM/ENM will need to be inspected at the source site and at the Site by a suitably qualified environmental consultant.
- Each truck entry will be visually checked and documented to confirm only approved materials consistent with the environmental approvals are allowed to enter the site. Only fully tarped loads are to be accepted by the gatekeeper. Environmental assurance of imported fill material will be conducted to confirm the materials comply with NSW EPA Waste Classification Guidelines and the Earthworks Specification for the Site.

13.5 Material Tracking Procedure

The excavated soil will be subject to a strict waste segregation protocol (detailed in a CEMP) and tracked in a waste tracking spreadsheet.

If any materials from the basement excavation are proposed to be retained onsite the materials will need to meet the human health and environmental requirements specified in NEPM 2013.

All material handled during the construction of the proposed development will be tracked in accordance with the CEMP to be prepared by the Contractor. Materials are to be tracked from excavation, treatment (if required) to off-site disposal in accordance with all applicable standards. All waste removed from the Site will be tracked using the NSW EPA online waste tracking system and provided by the Contractor.

Information / documentation required for the waste classification, off-site disposal and importation of material is outlined in **Table 18**.

Table 18– Material tracking documentation / information requirements	
Material Tracking	Documentation / Information
Waste Classification	- Material source and description, - Sampling density, pattern, CoPCs, - Results summary, incl. appropriate table with comparison to acceptance criteria, - Waste classification.
Off-site disposal	- Source location, - Estimated volume (based on excavation size), - Actual volume of disposal, - Waste classification, - Transporter, - Final destination, POEO license, - Reconcile of waste dockets with actual disposal volume, - Reconciliation of actual disposal volume and the estimated volume of disposal (based on excavation size).
Importation of material	- Volume of imported material, - Source Site, - VENM certificate applicable for NSW EPA exemptions, - Placement location, - Transporter.

A Materials Tracking Plan (MTP) will be implemented during the development works. The aim of the MTP is to identify the source and destination of all materials on the Site at any time and requires the following tasks:

- Establish and maintain a nomenclature system for identification of all source and destination areas for soil both on and off the Site. This includes excavations, stockpiles (both clean and potentially contaminated), soils for treatment or disposal (including final destination) and offsite sources of material;
- Use appropriate signage to identify the classification of the material and area number for each excavation prior to soil movement using the project documentation or in consultation with the Contract Administrator, prior to work being undertaken;
- Complete a 'Record of Soil Movement' sheet identifying the source of the materials, classification, volume and destination area of each load of material moved on or off-site;
- Place the soil in an approved location for the material based on its soil classification;
- Maintain the location of the soil without mixing with other soil classes;
- Educate all operators in the requirements of the system; and
- Check 10% of waste dockets being supplied to ensure validity.

13.6 Stockpile Management

All stockpiles will be managed in accordance with the Contractors CEMP, the ASSMP and with relevant standard and regulations. Batters would be formed with sloped angles that are appropriate to prevent collapse or sliding of the stockpiled materials.

Stockpiles shall be maintained to eliminate risk to workers and other people due to exposure to contaminants in dust or vapours and risk to the environment as a result of silt or contamination of stormwater in accordance with a Site Materials Management and Tracking Plan as part of the CEMP.

If assessment by the Environmental Consultant identifies contamination, or a stockpile is observed to be contaminated, then the Environmental Consultant will assess the stockpile in accordance with **Section 10** to delineate the contamination and assess the extent of remediation, if required. In the event the stockpile contains asbestos the stockpile will be covered to minimise dust and potential asbestos release.

In the event that covers are required, they shall extend beyond the perimeter of the stockpiles and shall be secured to prevent being blown away by wind.

Stockpiles must be placed in a secure location onsite and covered if to remain for more than 24 hours. Stockpiles will be placed at approved locations and located to mitigate environmental impacts while facilitating material handling requirements. Contaminated or potentially contaminated materials would only be stockpiled in un-remediated areas of the Project site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas (e.g. hardstand areas).

13.7 Noise

All machinery and equipment used on-site will be in good working order and will be fitted with appropriate silencers when necessary and all equipment will be operated in an efficient manner.

13.8 Soil and Water Management

Details of the soil and water management procedures will be detailed in the contractor's CEMP, which will be prepared under a separate cover.

13.9 Disposal of Contaminated Soil

Soil within the excavation footprint need to be classified in accordance with the NSW EPA (2014) Waste Classification Guidelines, and properly disposed of to a waste facility lawfully able to accept the waste.

13.10 Air Quality

Dust Control

Dust emissions should be confined within the Site boundary. The following dust control procedures will be employed to comply with this requirement as necessary:

- Erection of dust screens around the perimeter of the Site.
- Securely covering all loads entering or exiting the Site.
- Use of water sprays across the Site to suppress dust.
- Covering of all stockpiles of contaminated soil remaining on-site more than 72 hours.
- Keeping excavation and stockpile surfaces moist.

Odour Control

If significant odours are identified at the boundary of the Site, then appropriate actions will be taken to reduce the odours, which may include:

- Increasing the amount of covering of excavations/stockpiles;
- Mist sprays;
- Odour suppressants or maintenance of equipment;
- On-site air monitoring using a photoionisation detector (PID) to assess the concentration of volatile organic compounds (VOC) within the area.

In the event that VOC concentrations in ambient air exceedances, works must cease, and a competent person engaged to further investigate the potential risk of vapour inhalation for workers and to make appropriate recommendations regarding the mitigation of the potential vapour inhalation risk (where necessary). This should include the sampling and analysis of VOCs in air to determine which compounds the workers have been exposed to. Consideration should be given to the use of a half face respirator fitted with a suitable organic vapour filter, should the workers note odours or experience symptoms such as headaches or dizziness.

Asbestos Air Monitoring

Asbestos fibre air monitoring should also be undertaken during asbestos in soil remedial works. Air monitoring should be undertaken in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*, 2nd Edition [NOHSC: 3003 (2005)] and Australian Standard AS ISO/IEC 17025 – 2005, *General requirements for the competence of testing and calibration laboratories*.

Air monitoring reports will be issued in accordance with NATA's accreditation requirements and kept on file.

14 Work, Health and Safety

Health and Safety during the remediation works will be the responsibility of the contractor, including the preparation of a Health and Safety Plan and a hazard assessment.

14.1 Health and Safety Plan

A Work Health and Safety Plan (WHSP) will be prepared for the remedial works by the contractor. The purpose of the WHSP is to provide all relevant information to all Site personnel to ensure that they are aware of the hazards and the protective measures adopted to mitigate the identified hazards.

14.2 Hazard Assessment

All hazards associated with the remedial works should be identified by the contractors and incorporated into the WHSP.

14.3 Safe Work Practices

The WHSP will document all safe work practices required to protect personnel at the Site involved in the remedial works.

All workers undertaking remedial works on site are required to wear the following personal protective equipment:

- Disposable nitrile or cut resistant gloves, when in direct contact with the soil;
- Long pants;
- Long-sleeved shirt;
- Hard hat (when plant and machinery are in operation);
- High visibility fluorescent vest; and
- Steel-capped boots.

For workers working within the designated asbestos work zones the following PPE is also mandatory:

- Type 5 & 6 disposable coveralls;
- Half face respirator with P2 particulate filter or P2 disposable mask;
- Gloves; and
- Footwear that can be easily decontaminated (i.e. gumboots).

Respirators with appropriate organic vapour cartridges should be made available on site. As part of the WorkCover permitting process, additional PPE may be required in the event that friable asbestos is identified at the Site and will be upgraded to reflect WorkCover NSW requirements.

Further information regarding PPE to be worn at the Site should be outlined in the CEMP.

14.4 Contingency Plan for Site Incidents

Should Site operations or conditions result in an environmental or safety incident where the outlined health and safety requirements are not considered effective or have not adequately been followed, the following shall be implemented:

- Isolation of the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc) to prevent exposure to site personnel and/or off-site airborne dust migration;
- Appropriate PPE must be obtained / worn at all times;
- The Site Owner should be informed immediately; and
- Implementation of applicable procedures with respect to personnel and site management, or where appropriate the Unexpected Finds Protocol included in this RAP, and subsequent appropriate removal/management of the identified impacted material or reinstatement of appropriate PPE / safety practices.

Following this, a formal review of the incident by an appropriately qualified person appointed by the Site Owner with the objective of identifying the cause of the incident and providing recommendations on alternative procedures or systems to be implemented at the site and/or within an EMP to prevent/minimise the likelihood of the incident reoccurring.

Copies of all assessment of finds and actions to deal with the finds should be reported and copies held by the Site Occupier, Site Owner or any future landowners.

15 Conclusion

Alexandria Property Development c/- Johnstaff engaged EP Risk to prepare a RAP for the Site located at 28-32 Bourke Road, Alexandria, NSW. The RAP is required to address the findings of the SCA (EP Risk 2021), DSI (EP Risk 2022) and Phase 2 DSI (EP Risk 2023a), in which significant contamination was detected within soils on-site. Without remediation and/or further management, the soils were not deemed suitable to remain on-site.

The Site is proposed to be redeveloped into a commercial / industrial development, which presently comprises a seven (7) storey building and partially below-ground basement, which will extend to a maximum depth of 3.4 mBGL. The northern, western and southern borders of the Site are further proposed for dedication to Council, and is understood to require remediation to the extent that an EMP is not required for transfer land.

The objective of the RAP is to provide a detailed plan to ensure the Site is remediated to a standard suitable for the proposed commercial/industrial Site redevelopment and to ensure no unacceptable risk is posed to human health or the environment, with respect to contaminants detected in soil and groundwater on-Site in accordance with relevant legislative and planning requirements.

EP Risk identified several CoPC within material at the Site in excess of the adopted HILs. Concentrations of the identified CoPC's are considered to pose a potential human health risk to current and future users / construction workers at the Site. Consequently, under the scope of the RAP, EP Risk has reviewed all available remediation options applicable to the objectives, with the preferred remediation strategy including:

- Assignment of roles and responsibilities.
- Preparation of WHS documents, construction environment management plan (CEMP) regulatory approval, licensing and notifications.
- Site establishment
- Remediation and associated tasks, involving:
 - o On-site treatment of ASS in accordance with the ASSMP (EP Risk 2022c);
 - o Asbestos air monitoring during remediation of AOC1;
 - o Excavation, segregation, on-site immobilisation and off-site disposal of material within AOC1;
 - o Visual clearance assessment of AOC1 following excavation of ASBINS;
 - o Excavation, segregation and off-site disposal of material within AOC2;
 - o Excavation, segregation and off-site disposal of material within AOC3;
 - o Excavation, segregation and on-site immobilisation of material within AOC4, and soils surrounding BH19 and BH40;
 - o Validation sampling of soils underlying the excavated extents;
 - o Levelling of the Site using residual soils; and
 - o Final waste classification sampling of ex-situ immobilised soils (AOC4, and soils surrounding BH19 and BH40), and off-site disposal.
- Provision of a Site Validation Report, to be reviewed by the appointed NSW EPA accredited Site Auditor.
- Implementation of an Unexpected Finds Protocol throughout the duration of the works.
- Assessment of the requirement for a long-term Management Plan and/or Contingency Plan.

The proposed remediation work is classified as Category 2 remediation works in accordance with SEPP (Resilience and Hazards) 2021. It is noted that Council requires 30 days written notice prior to commencing remediation work and at the conclusion of the remedial works and prior to occupation of the Site, a Site Audit Report (SAR) and Site Audit Statement (SAS) to satisfy NSW State Environmental Planning Policy requirements will be provided by the Auditor. These documents are to be submitted to the Council of the City of Sydney (Council), prior to any development works.

Following implementation of the preferred remediation strategy, subsequent validation works and associated activities outlined in the RAP, EP Risk considers the Site can be made suitable for the proposed commercial land use. Conditional to the successful completion of the recommended works, there is considered to be a minimal risk posed to future site users and surrounding ecological receptors by the previously identified contamination on-site, therefore a long-term management plan is not considered to be required. Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

Figures







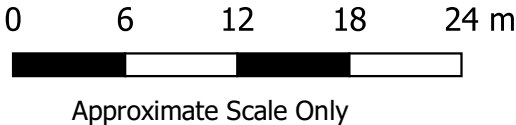
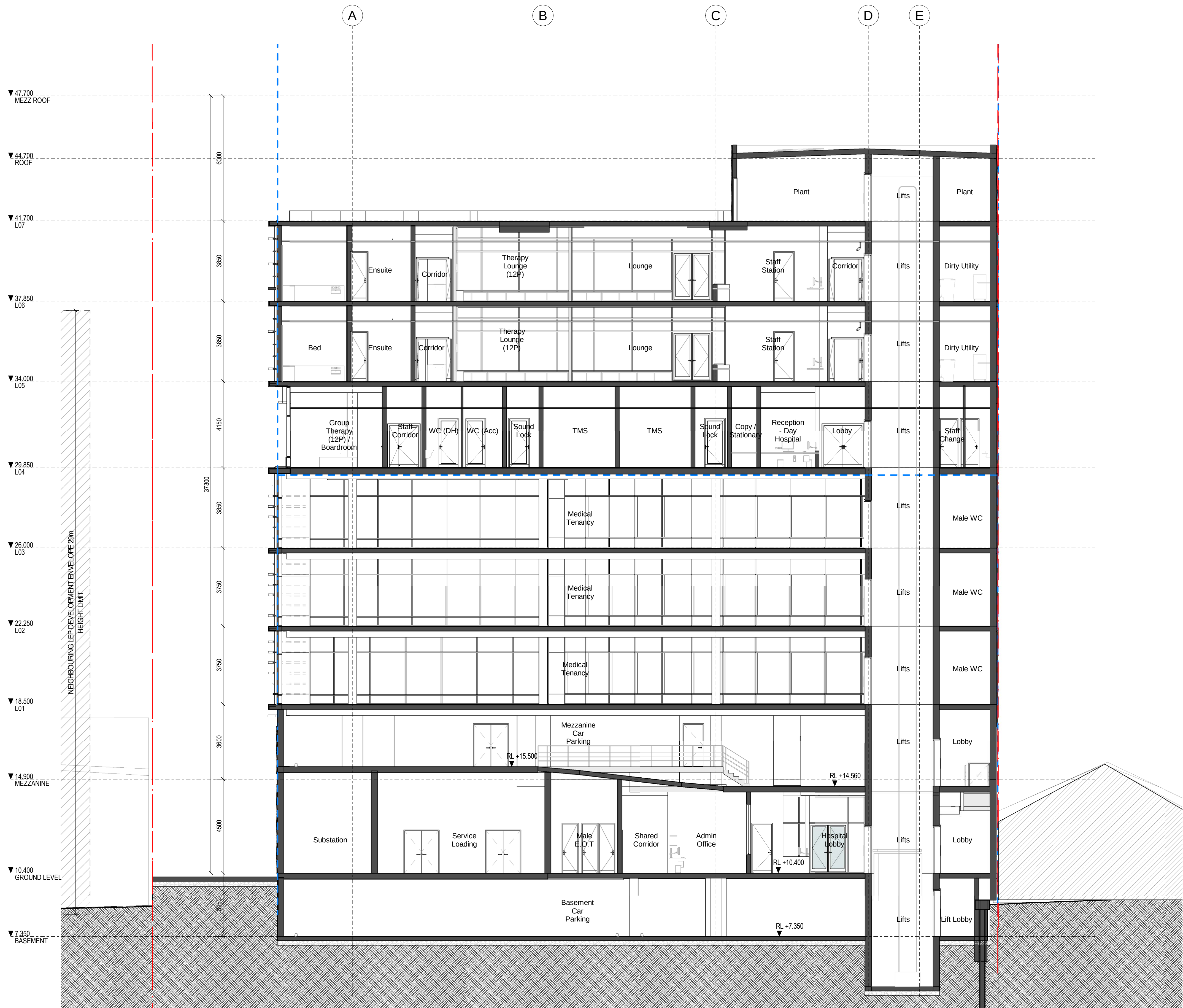


Figure 4 - Sampling Locations

Appendix A

CONCEPT PLANS FOR THE PROPOSED DEVELOPMENT



EAST - WEST SECTION 01

1 : 100

Warren and Mahoney Architects
Australia Pty Ltd

Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com

WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd

Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
Australia
Phone + 61 2 9380 2625
Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com

maap

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A 16/10/23 DRAFT - FOR
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Notes

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Client

Centuria Healthcare Property
Services

Project Title

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28-32 Bourke Road, Alexandria
2015 NSW

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EAST - WEST
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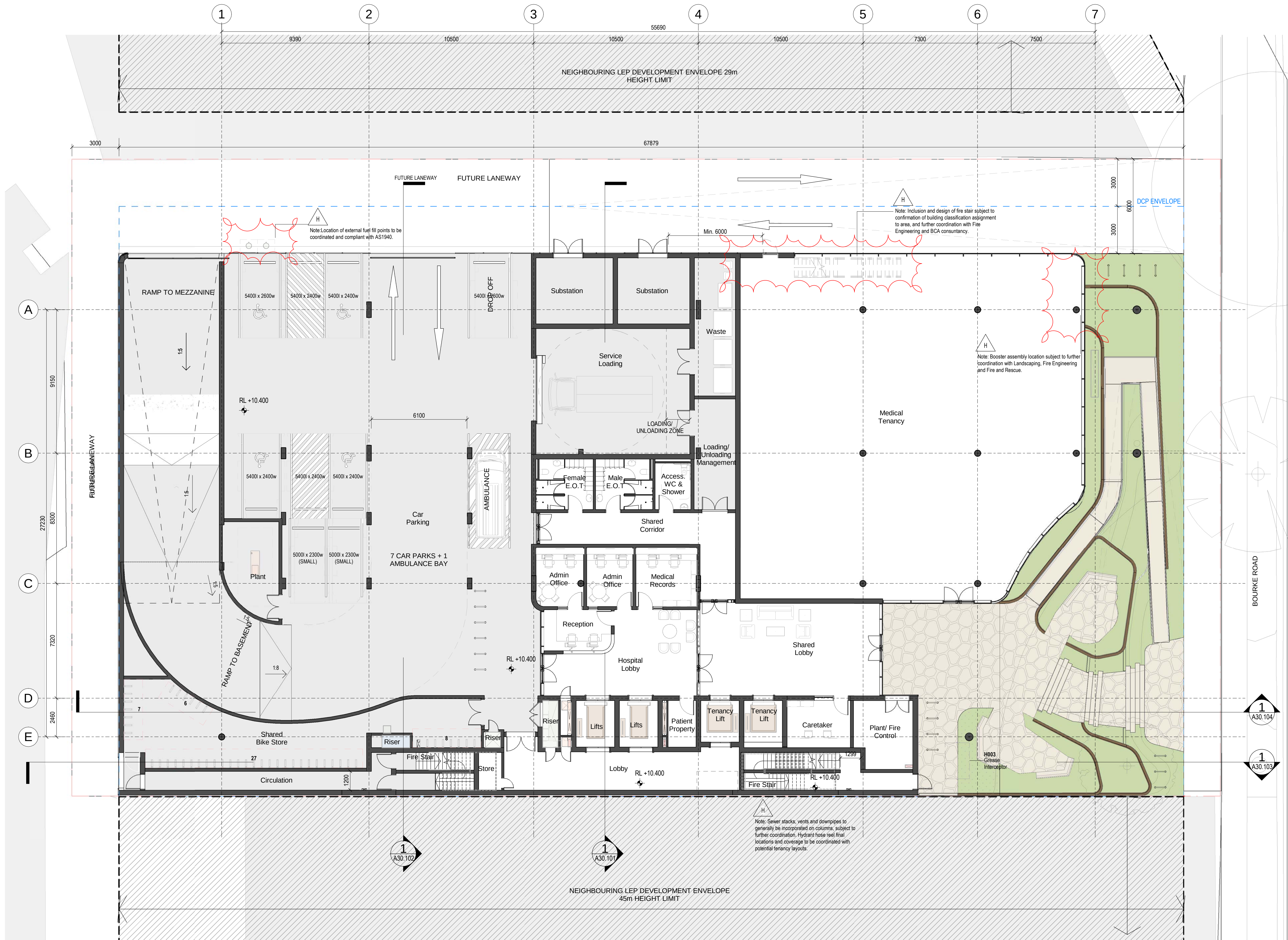
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Australia Pty Ltd

Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com

WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd

Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
Australia
Phone + 61 2 9380 2625
Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com

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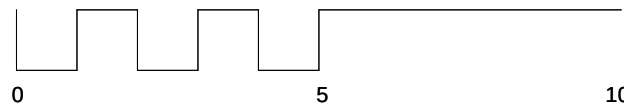
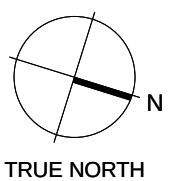
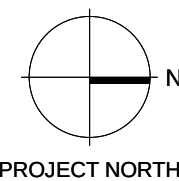
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REVIEW
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REVIEW
(ADDENDUM)
G 04/10/23 DRAFT - FOR MEP
COORDINATION
H 09/10/23 DRAFT - FOR
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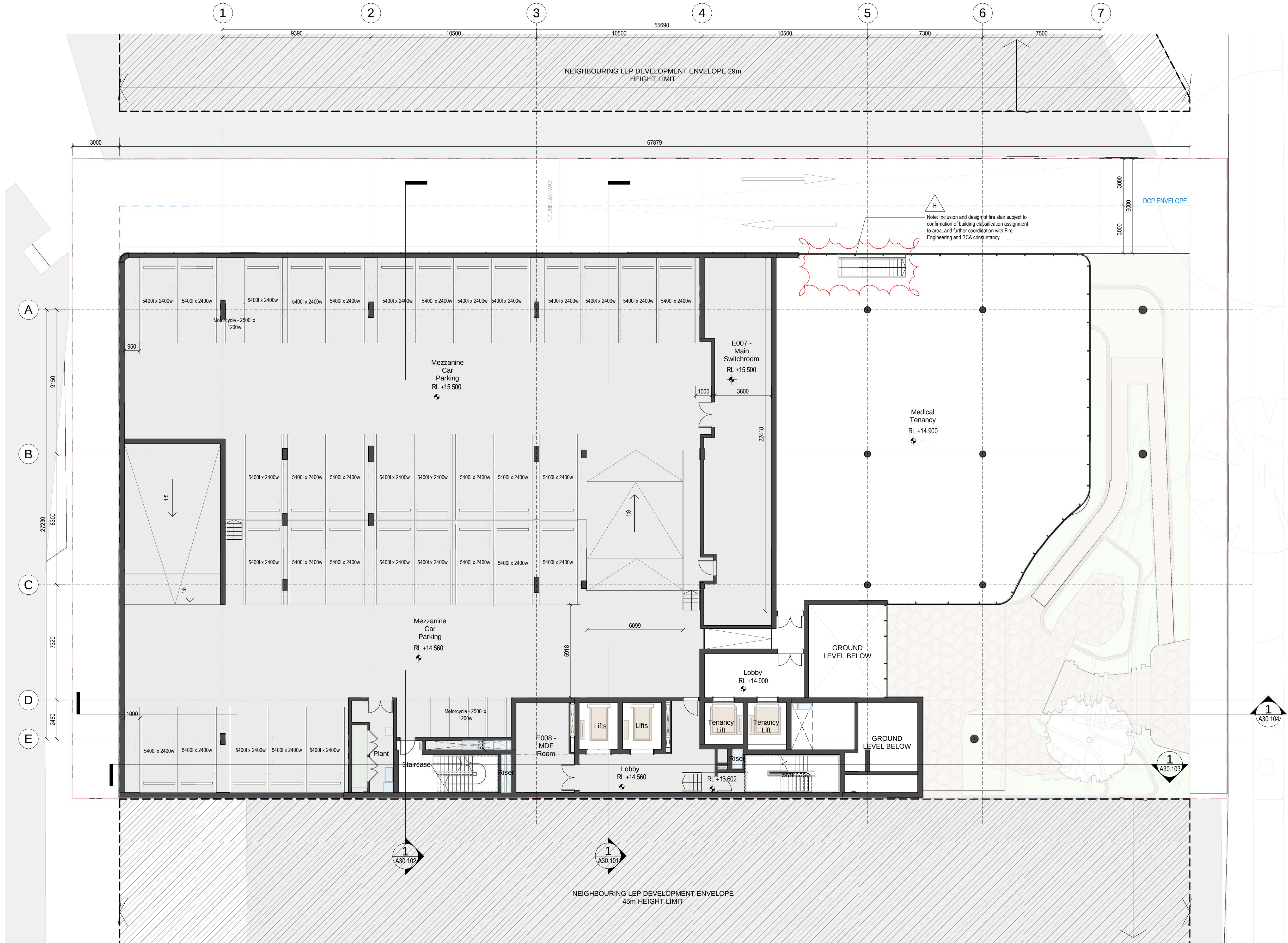
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Australia Pty Ltd

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Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com

WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd

Suite 6, Level 1
2-12 Foveaux St, Surry Hills
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Australia
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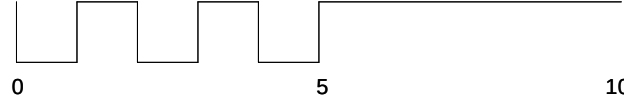
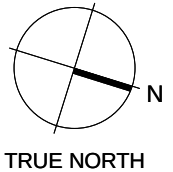
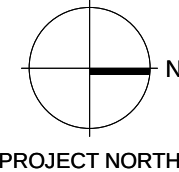
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G 04/10/23	DRAFT - FOR MEP COORDINATION
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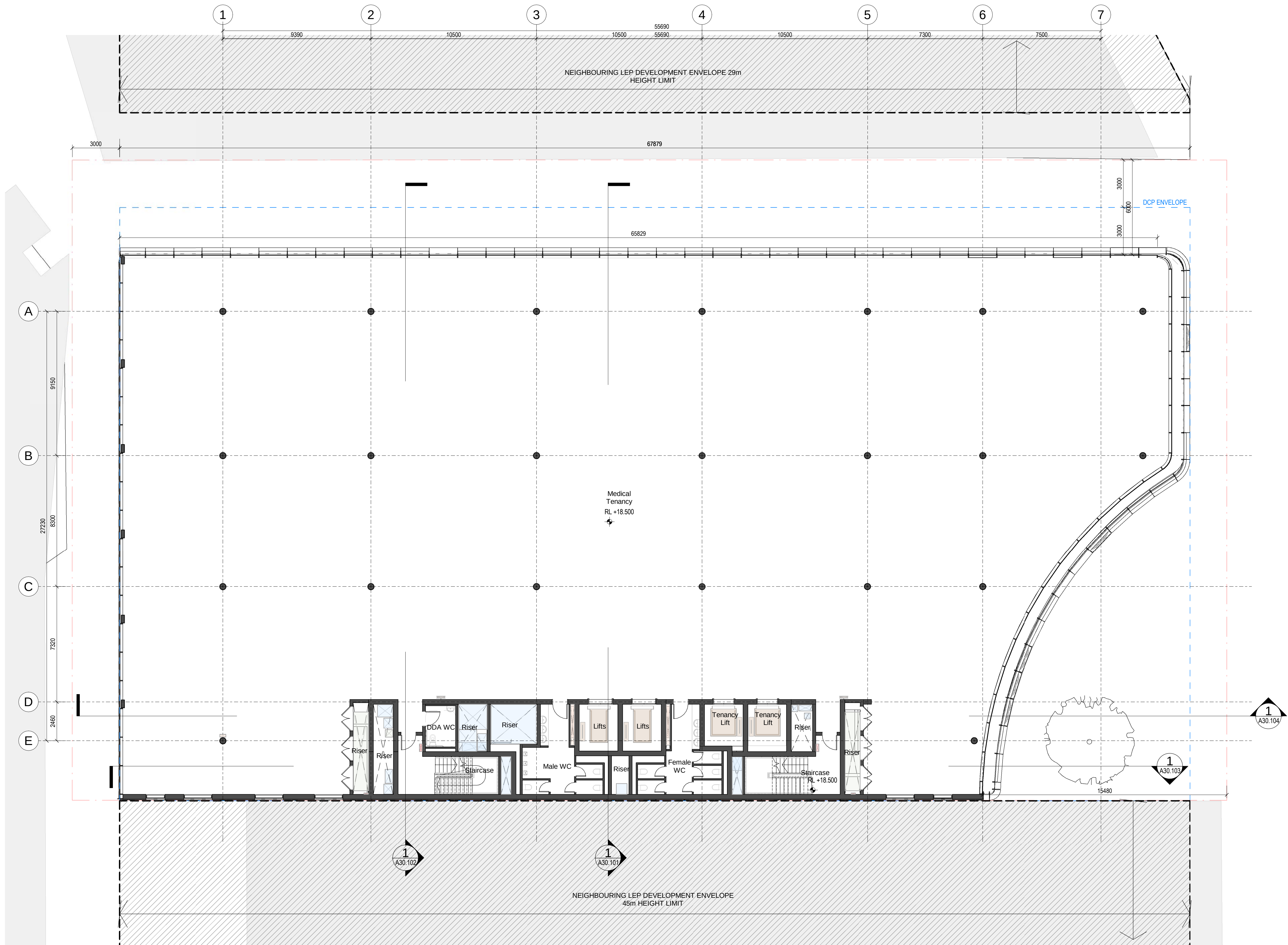
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Australia Pty Ltd

Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com

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Medical Architecture Australasia
Pacific Pty Ltd

Suite 6, Level 1
2-12 Foveaux St, Surry Hills
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Australia
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Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com

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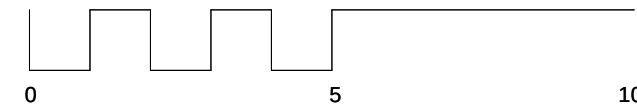
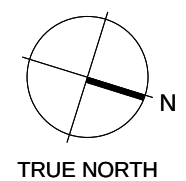
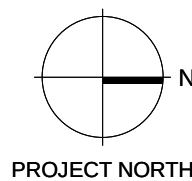
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B	22/09/23	DRAFT - FOR INFORMATION
C	27/09/23	DRAFT - FOR BCA REVIEW
D	27/09/23	DRAFT - FOR BCA REVIEW (ADDENDUM)

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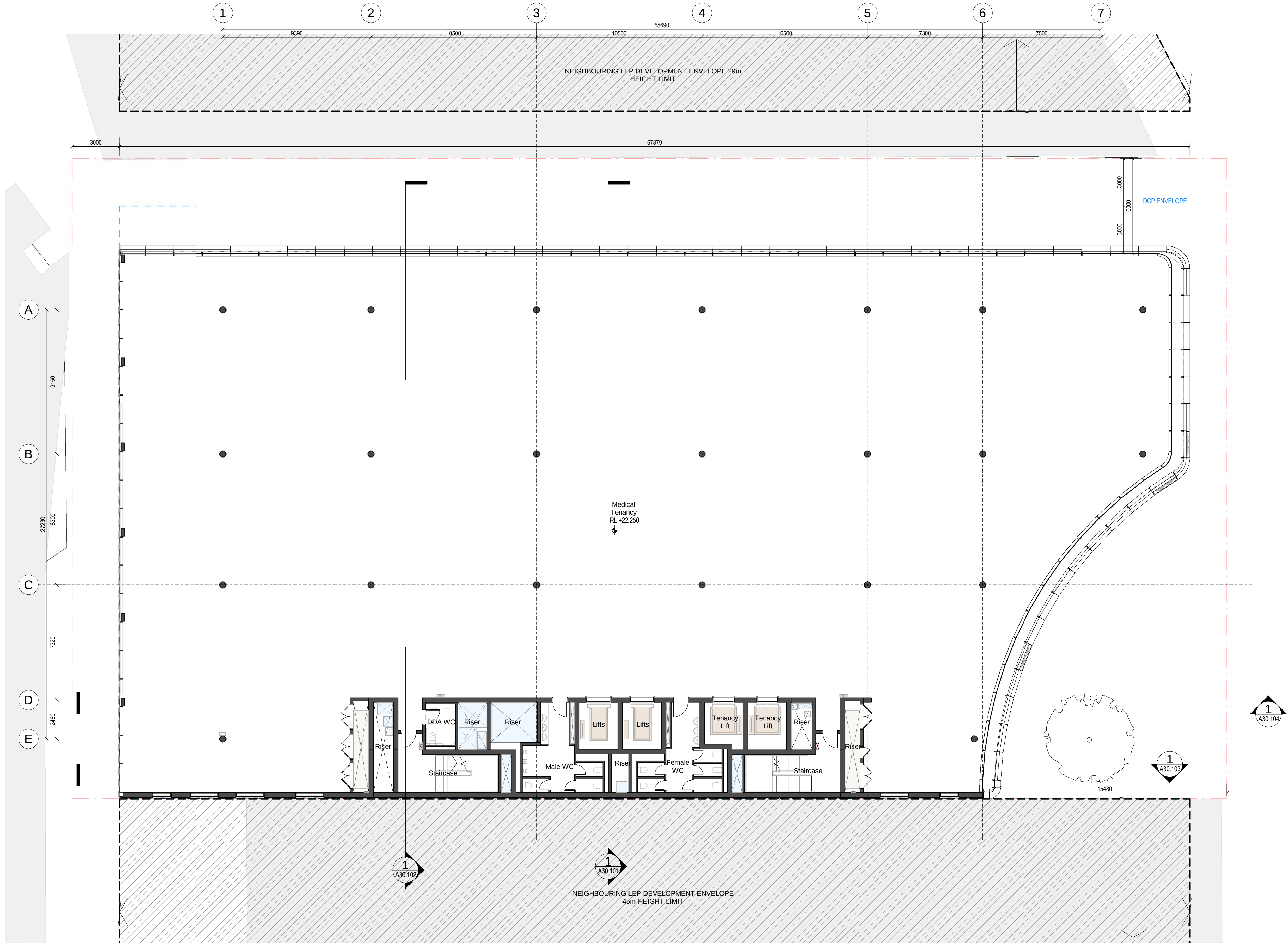
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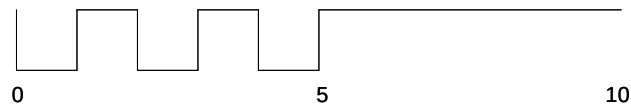
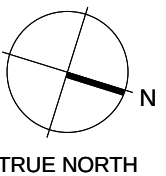
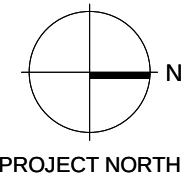
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Australia Pty Ltd
Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com
WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd
Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
Australia
Phone + 61 2 9380 2625
Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com
maap

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A 08/09/23 FOR INFORMATION
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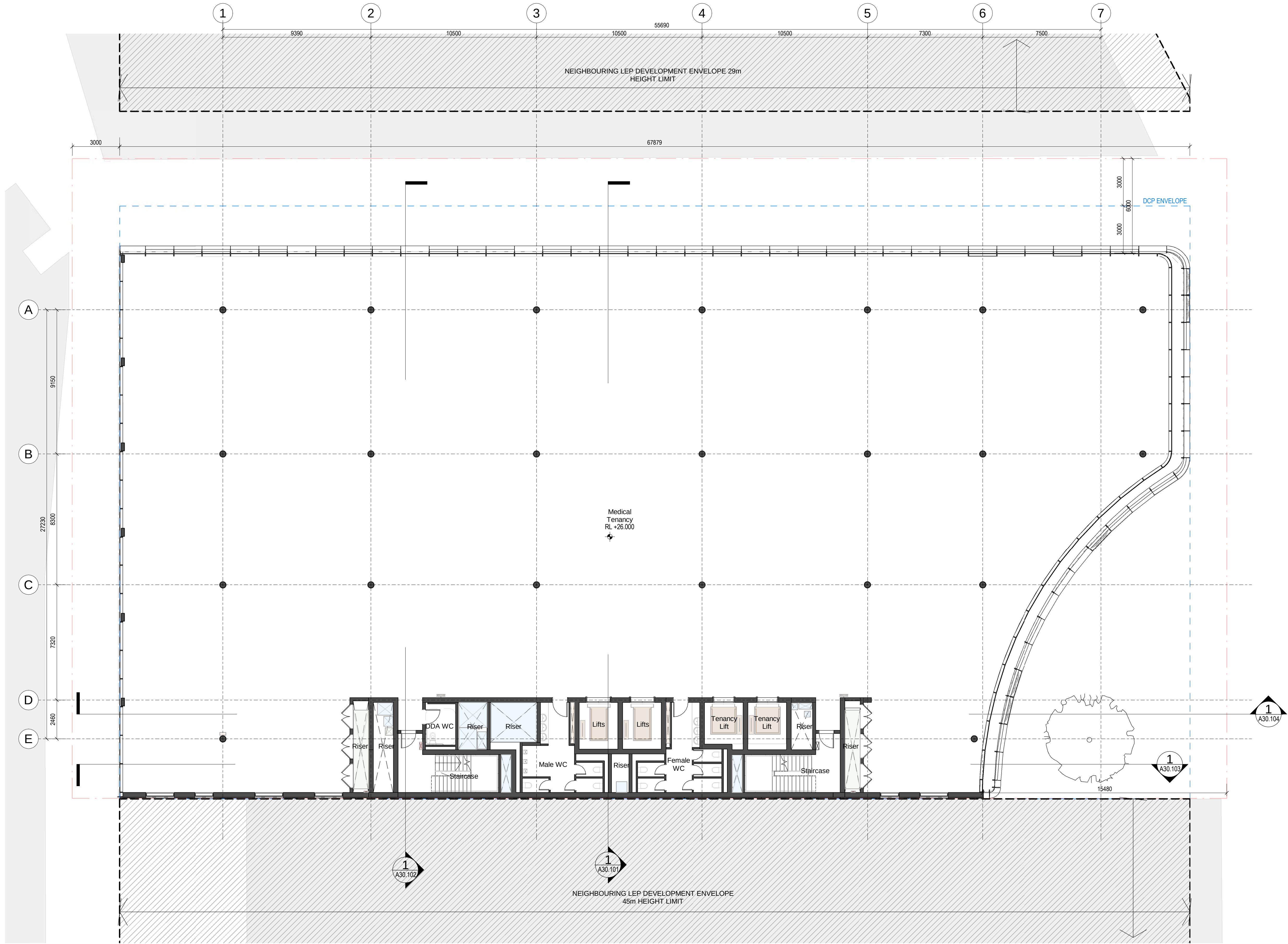
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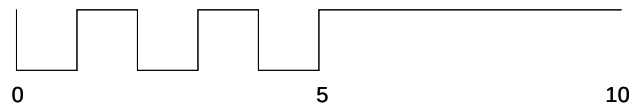
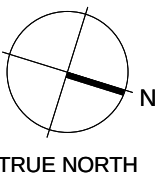
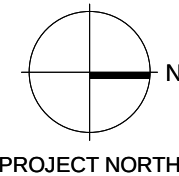
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Australia Pty Ltd
Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
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www.warrenandmahoney.com
WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd
Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
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John Alexander Clarke NSW 8903
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Drawing Title
LEVEL 03 GENERAL
ARRANGEMENT
PLAN

Drawing Status
STAGE 2 SSDA

Drawing Details
Scale 1 : 125@ A1
Date 9/10/2023 4:17:18 pm
Job No 10012
Drawn Author
Checked Checker

Drawing No
A10.103
Revision



L04 - GENERAL ARRANGEMENT

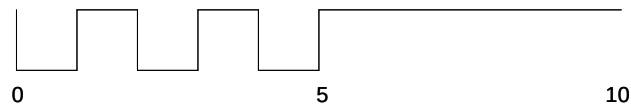
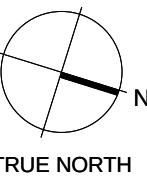
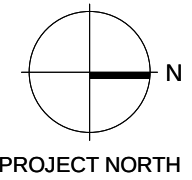
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Warren and Mahoney Architects
Australia Pty Ltd
Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com
WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd
Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
Australia
Phone + 61 2 9380 2625
Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com
maap

Revisions
A 08/09/23 FOR INFORMATION
B 22/09/23 DRAFT - FOR
INFORMATION
C 27/09/23 DRAFT - FOR BCA
REVIEW
D 27/09/23 DRAFT - FOR BCA
REVIEW
(ADDENDUM)

Notes
1:250 @ A3



Client
Centuria Healthcare Property
Services

Project Title
**ALEXANDRIA MENTAL
HEALTH CENTRE**
28-32 Bourke Road, Alexandria
2015 NSW

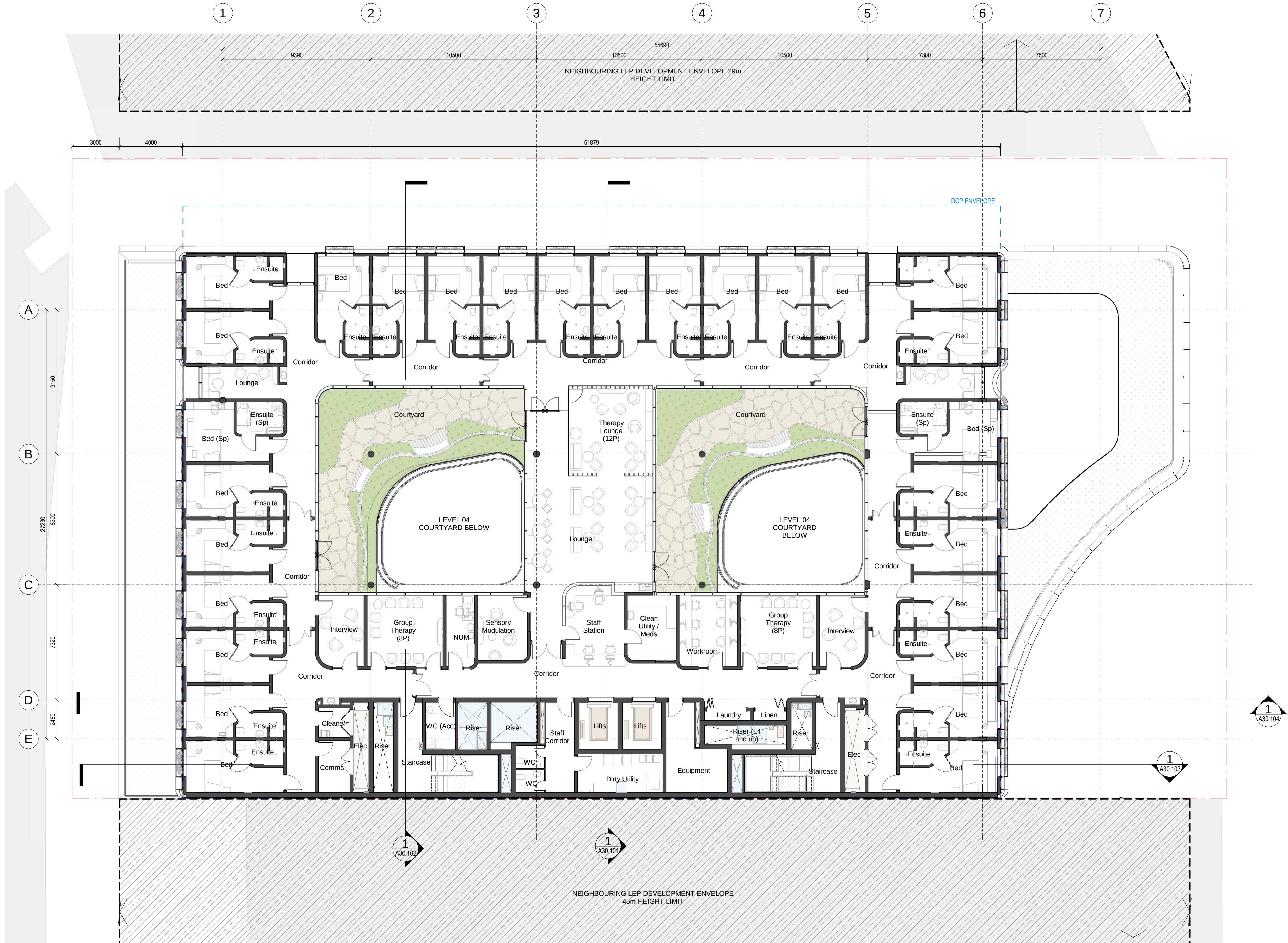
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Drawing Title
**LEVEL 04 GENERAL
ARRANGEMENT
PLAN**

Drawing Status
STAGE 2 SSDA

Drawing Details
Scale 1 : 125@ A1
Date 9/10/2023 4:17:28 pm
Job No 10012
Drawn Author
Checked Checker

Drawing No
A10.104
Revision



L05 - GENERAL ARRANGEMENT IPU

1 : 125

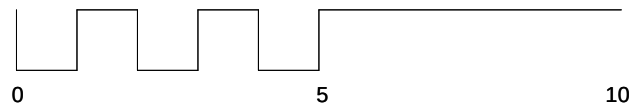
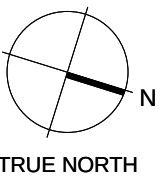
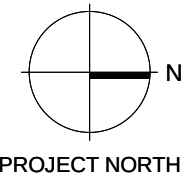
Warren and Mahoney Architects
Australia Pty Ltd
Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com
WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd
Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
Australia
Phone + 61 2 9380 2625
Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com
maap

Revisions
A 08/09/23 FOR INFORMATION
B 22/09/23 DRAFT - FOR
INFORMATION
C 27/09/23 DRAFT - FOR BCA
REVIEW

Notes
1:250 @ A3

ORIGINAL DRAWING IN COLOUR



Client
Centuria Healthcare Property
Services

Project Title
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Drawing Title
**LEVEL 05 GENERAL
ARRANGEMENT
PLAN**

Drawing Status
STAGE 2 SSDA

Drawing Details
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Date 9/10/2023 4:17:41 pm
Job No 10012
Drawn Author
Checked Checker

Drawing No
A10.105
Revision



L06 - GENERAL ARRANGEMENT IPU
1 : 125

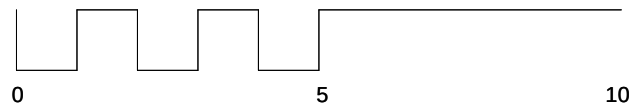
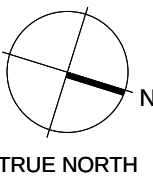
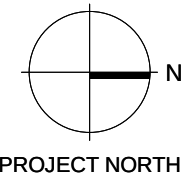
Warren and Mahoney Architects
Australia Pty Ltd
Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com
WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd
Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
Australia
Phone + 61 2 9380 2625
Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com
maap

Revisions
A 08/09/23 FOR INFORMATION
B 22/09/23 DRAFT - FOR
INFORMATION
C 27/09/23 DRAFT - FOR BCA
REVIEW

Notes
1:250 @ A3

ORIGINAL DRAWING IN COLOUR



Client
Centuria Healthcare Property
Services

Project Title
**ALEXANDRIA MENTAL
HEALTH CENTRE**
28-32 Bourke Road, Alexandria
2015 NSW

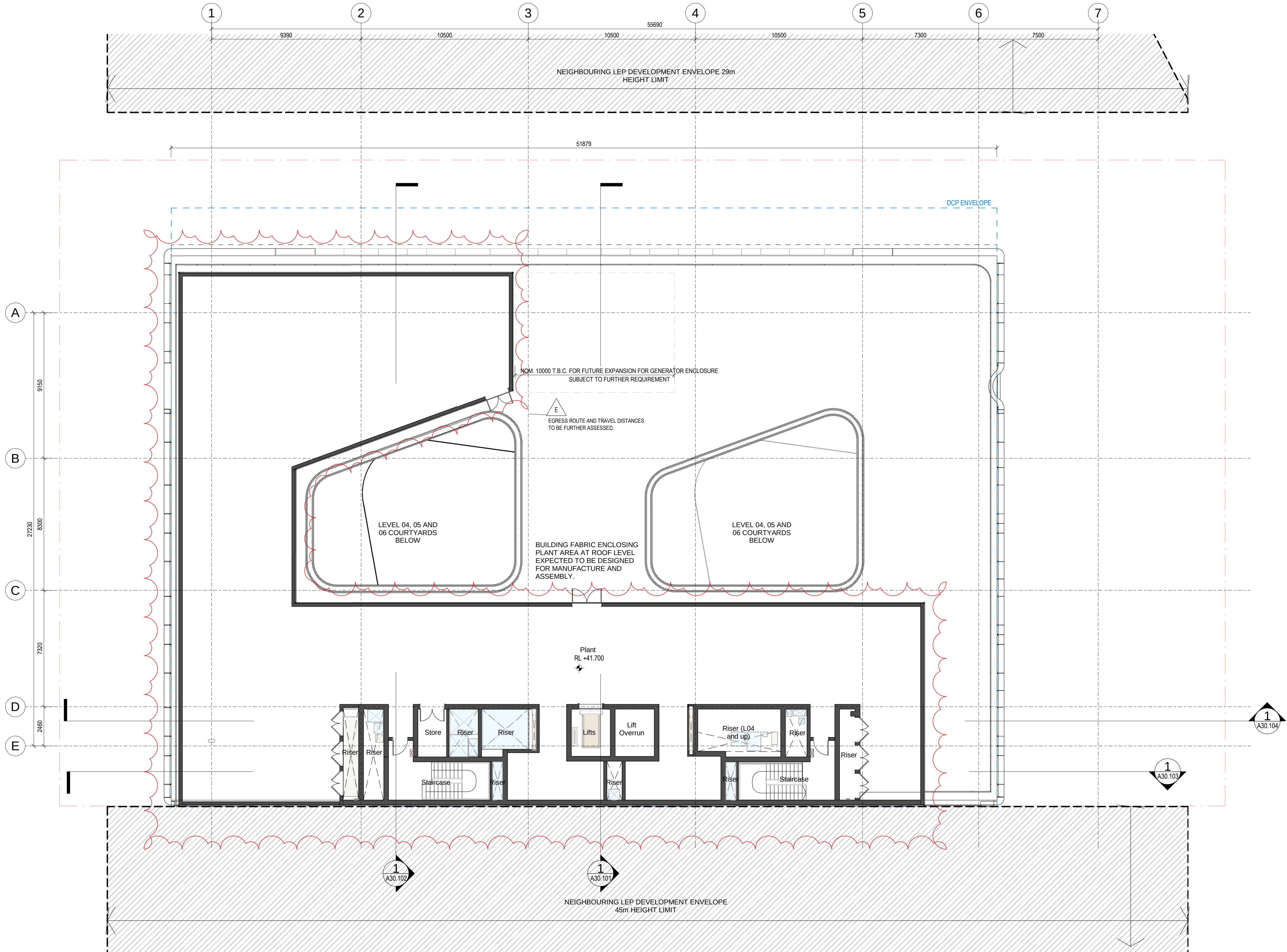
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Drawing Title
**LEVEL 06 GENERAL
ARRANGEMENT
PLAN**

Drawing Status
STAGE 2 SSDA

Drawing Details
Scale 1 : 125 @ A1
Date 9/10/2023 4:17:53 pm
Job No 10012
Drawn Author
Checked Checker

Drawing No
A10.106
Revision



L07 - GENERAL ARRANGEMENT

1 : 125

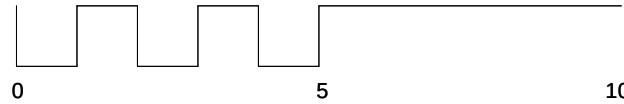
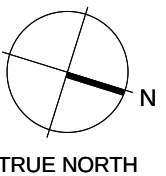
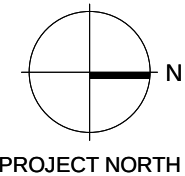
Warren and Mahoney Architects
Australia Pty Ltd
Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com
WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd
Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
Australia
Phone + 61 2 9380 2625
Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com
maap

Revisions
A 08/09/23 FOR INFORMATION
B 22/09/23 DRAFT - FOR
INFORMATION
C 25/09/23 DRAFT - FOR MEP
COORDINATION
D 27/09/23 DRAFT - FOR BCA
REVIEW
E 09/10/23 DRAFT - FOR
COORDINATION

Notes
1:250 @ A3

ORIGINAL DRAWING IN COLOUR



Client
Centuria Healthcare Property
Services

Project Title
**ALEXANDRIA MENTAL
HEALTH CENTRE**
28-32 Bourke Road, Alexandria
2015 NSW

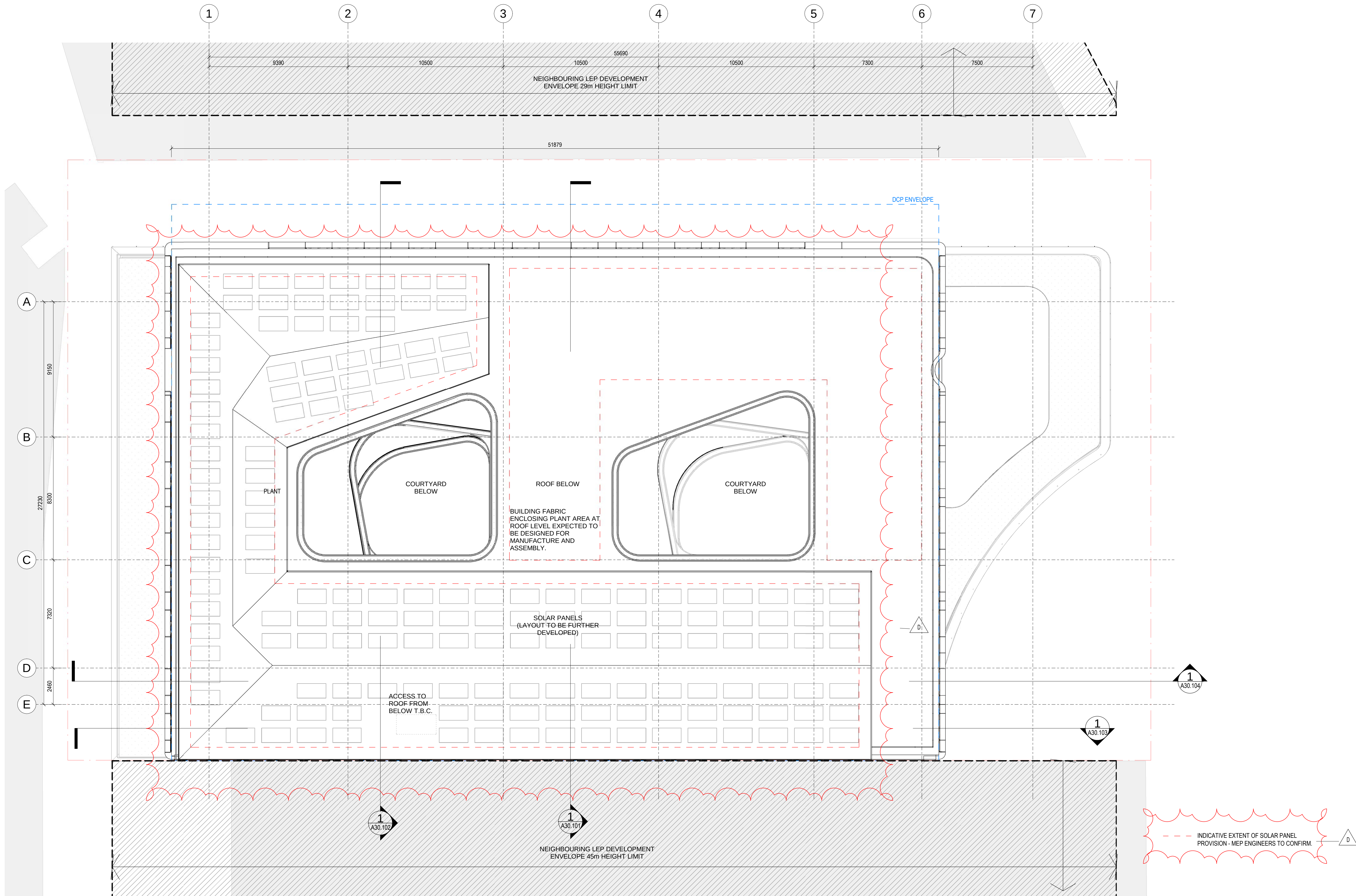
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Drawing Title
**LEVEL 07 GENERAL
ARRANGEMENT
PLAN**

Drawing Status
STAGE 2 SSDA

Drawing Details
Scale 1 : 125@ A1
Date 9/10/2023 4:18:02 pm
Job No 10012
Drawn Author
Checked Checker

Drawing No
A10.107
Revision



ROOF - GENERAL ARRANGEMENT

1 : 125

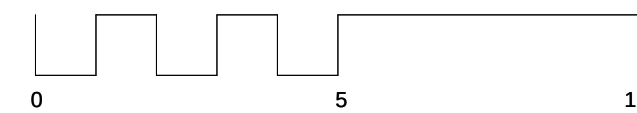
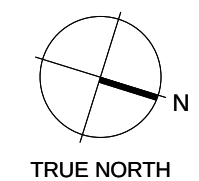
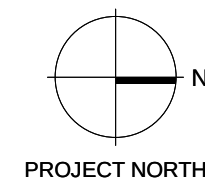
Warren and Mahoney Architects
Australia Pty Ltd
Suite 13.03, Plaza Building
Australia Square, 95 Pitt Street
Sydney, NSW 2000
Australia
Phone + 61 2 8021 9809
Nominated Architect:
Sven Ollmann ARB NSW 11123
www.warrenandmahoney.com
WARREN AND MAHONEY

Medical Architecture Australasia
Pacific Pty Ltd
Suite 6, Level 1
2-12 Foveaux St, Surry Hills
Sydney, NSW 2010
Australia
Phone + 61 2 9380 2625
Nominated Architect:
John Alexander Clarke NSW 8903
www.maaparchitects.com
maap

Revisions
A 08/09/23 FOR INFORMATION
B 27/09/23 DRAFT - FOR BCA
REVIEW
C 04/10/23 DRAFT - FOR MEP
COORDINATION
D 09/10/23 DRAFT - FOR
COORDINATION

Notes
1:250 @ A3

ORIGINAL DRAWING IN COLOUR



Client
Centuria Healthcare Property
Services

Project Title
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Drawing Title
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ARRANGEMENT
PLAN**

Drawing Status
STAGE 2 SSDA

Drawing Details
Scale 1 : 125@ A1
Date 9/10/2023 4:18:26 pm
Job No 10012
Drawn Author
Checked Checker

Drawing No
A11.108
Revision

Appendix B

UNEXPECTED FINDS PROTOCOL

Unexpected Finds Protocol (UFP)

