



2-4 Hale Street, Botany NSW

Coombes Property Group Pty Ltd

Remedial Action Plan

JBS&G 65803 | 156,742

18 September 2024





We acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community.

We pay respect to Elders past and present and in the spirit of reconciliation, we commit to working together for our shared future.

Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte



Table of Contents

Abbreviations.....	v
1. Introduction	1
1.1 Background.....	1
1.2 Objectives	1
2. Site Condition and Surrounding Environment	2
2.1 Site Identification.....	2
2.2 Site Description.....	2
2.3 Surrounding Land-use	2
2.4 Topography and Geology	3
2.5 Hydrology	3
2.6 Acid Sulfate Soils.....	3
2.7 Hydrogeology.....	4
2.8 Meteorology	4
3. Previous Investigations and Summary Site History	5
3.1 Detailed Site Investigation (JBS&G 2024a)	5
3.2 Summary Site History	6
4. Conceptual Site Model	7
4.1 Extent of Contamination	7
4.1.1 Site Soils.....	7
4.1.2 Site Groundwater.....	7
4.1.3 Soil Vapour.....	7
4.2 Potential Human and Ecological Receptors and Exposure Pathways	8
4.3 Preferential Pathways	9
4.4 Data Gaps	9
5. Remediation Options	10
5.1 Guidelines and Legislation.....	10
5.2 Remediation Objectives	10
5.3 Pre-remediation Assessments	11
5.4 Extent of Remediation.....	11
5.5 Remedial Options.....	11
5.6 Assessment of Bioremediation.....	13
6. Remediation Action Plan.....	15
6.1 Approvals, licences and notifications.....	15
6.2 Site Establishment.....	15

6.3	Remediation Works.....	15
6.3.1	Pre-Remediation Activities	15
6.3.2	Decommissioning of UPSS/USTs and Associated Petroleum Hydrocarbon Impacted Soils	16
6.3.3	Excavation of TCE Impacted Soils.....	16
6.3.4	Soil Treatment.....	17
6.3.5	Constraints on Excavation and Stockpiling.....	17
6.4	Onsite Containment.....	18
6.4.1	Overview.....	18
6.4.2	Specific Capping Arrangements	19
7.	Validation Plan	20
7.1	General.....	20
7.2	Data Quality Objectives.....	20
7.2.1	State the Problem	20
7.2.2	Identify the Decision	20
7.2.3	Identify Inputs to the Decision.....	21
7.2.4	Define the Study Boundaries	21
7.2.5	Develop a Decision Rule	21
7.2.6	Specify the Limits on Decision Error.....	24
7.2.7	Validation Inspections and Sampling	27
7.2.8	Excavation of TCE Impacted Soil	28
7.2.9	Removal of Residual UPSS/USTs and Operational Infrastructure.....	28
7.2.10	Validation of Treated Soils.....	29
7.2.11	Validation of Retention of Impacted Soils On-Site.....	30
7.2.12	Ground Surface Validation (Aesthetics)	31
7.3	Validation Criteria	31
7.3.1	Soil.....	31
7.3.2	Soil Vapour.....	32
7.3.3	Waste Disposal Off-site	32
7.3.4	Transport of Asbestos Impacted Materials (if encountered)	32
7.4	Validation Reporting	32
8.	Unexpected Find	34
9.	Site Management Plan	36
9.1	Contact Persons	36
9.2	Hours of Operation	36
9.3	Soil and Water Management.....	36
9.3.1	Stockpiles / Landfarms	37
9.3.2	Site Access	37

9.3.3	Excavation Pump-out	37
9.4	Noise	38
9.5	Vibration.....	38
9.6	Air Quality.....	38
9.6.1	Dust Control.....	38
9.6.2	Odour	38
9.7	Groundwater	38
9.8	Material Transport	39
9.9	Hazardous Materials	39
9.10	Disposal of Contaminated Soil.....	39
9.11	Site Signage and Contact Numbers.....	39
9.12	Community Relations	39
9.13	Site Security	39
9.14	Occupational Health and Safety	40
10.	Health and Safety.....	41
10.1	Responsibilities	41
10.2	Hazards.....	42
10.3	Chemical Hazards.....	42
10.4	Physical Hazards.....	42
10.5	Personal Protective Equipment	43
10.6	Emergency Response	44
11.	Regulatory Approvals / Licencing	46
11.1	Protection of the Environment Operations Act 1997 (POEO 1997).....	46
11.2	State Environment Planning Policy (Resilience and Hazards) 2021	46
11.3	Protection of the Environment Operations (Waste) Regulation 2014.....	47
11.4	Waste Classification Guidelines (EPA 2014b)	47
11.5	Bayside Council (2022) 'Development Control Plan'	47
12.	Conclusions	48
13.	Limitations	49

List of Figures

Figure 1: Site Location

Figure 2: Site Layout

Figure 3: Sample Locations

Figure 4: Asbestos in Soil Detections

Figure 5: Groundwater Exceedances

Figure 6: Sub-slab Vapour Exceedances

Figure 7: Inferred Remedial Extent

Appendices

Appendix A Historical Datasets

Appendix B Development Plans

Abbreviations

Term	Definition
ACM	Asbestos Containing Material
AEC	Area of Environmental Concern
AHD	Australian Height Datum
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
ASS	Acid Sulfate Soils
AST	Aboveground Storage Tank
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CLM Act	Contaminated Land Management Act 1997
COPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
DLWC	NSW Department of Land and Water Conservation
DP	Deposited Plan
DSI	Detailed Site Investigation
EPA	NSW Environment Protection Authority
ESG	Environmental Services Group
ha	Hectare
JBS&G	JBS&G Australia Pty Ltd
LEP	Local Environmental Plan
LGA	Local Government Area
LPG	Liquified Petroleum Gas
NEPC	National Environment Protection Council
OCPs	Organochlorine Pesticides
OEH	Office of Environment and Heritage
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PDNSW	Property & Development New South Wales
POEO Act	Protection of the Environment Operations Act 1997
PSI	Preliminary Site Investigation
PFAS	Per- and Poly-fluoroalkyl Substances
RAP	Remedial Action Plan
SAQP	Sampling Analysis and Quality Plan
TCE	Trichloroethene
TRH	Total Recoverable Hydrocarbons
UST	Underground Storage Tank

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Coombes Property Group Pty Ltd (the client) to prepare a Remedial Action Plan (RAP) for the property located at 2-4 Hale Street, Botany, NSW (the site). The site is legally identified as Lot 1 deposited plan (DP) 562374 and occupies a total area of approximately 7,450 m². The site location and site layout are presented on **Figure 1** and **Figure 2**, respectively.

The site is currently occupied by existing warehouse buildings and associated carpark areas. It is currently leased by multiple tenants: Frontline Fabrications, Ripe Providores, Powder Coaters, Mechanic, Meat Storage, Smash Repairs, timber workshop and storage units. It is understood that the client intends to demolish the existing structures to develop a construction and demolition (C&D) waste management facility. The facility proposes to accept up to 300,000 tonnes per annum (tpa) of C&D waste. It would operate as a waste transfer station undertaking receipt and basic sorting with aggregation of material for bulk transport to advanced resource recovery facilities. The development plans are provided in **Appendix B**. The development requires the preparation of an Environmental Impact Statement (EIS) and this RAP is required to satisfy the Secretary's Environmental Assessment Requirements (SEARs) as related to contamination for the EIS as well as relevant aspects of State Environmental Planning Policy (SEPP) (Resilience and Hazards) 2021.

The RAP documents remedial works required to address potential contamination issues identified during previous investigations (**Sections 3** and **4**). Specifically, remedial works are required to remove potential on-going sources of contamination associated with two underground storage tanks (USTs), isolated trichloroethene (TCE) impacts in soil vapour, bonded asbestos impacts in site soils and heavy metal impacts in site fill posing a potential risk to vegetation to be established around the perimeter of the site.

This RAP has been developed in general accordance with NEPC (2013¹) and guidelines made or approved by the NSW Environment Protection Authority (EPA) and relevant Australian Standards.

1.2 Objectives

The objective of this RAP is to document the procedures and standards to be followed in order to remove the risks posed by the identified potential contamination issues, to make the site suitable for the proposed development while ensuring the protection of human health and the surrounding environment.

¹ *National Environmental Protection (Assessment of Site Contamination) Measure 2013*. National Environment Protection Council, 2013 (NEPC 2013).

2. Site Condition and Surrounding Environment

2.1 Site Identification

The site location and layout are shown on **Figure 1** and **Figure 2**, respectively. The site details are summarised in **Table 2.1** below and described in detail within the following sections.

Table 2.1 – Summary Site Details

Lot / DP	Lot 1 DP 562374
Address	2 - 4 Hale Street, Botany, NSW
Local Government Authority	Bayside Council
Approximate MGA Coordinates (MGA 56)	Easting: 332772 Northing: 6242386
Previous Use	Various industrial and commercial uses
Current Use	Commercial / Industrial
Proposed Use	Commercial / Industrial
Site Area	Approximately 7,450 m ²

2.2 Site Description

A site inspection to evaluate current site conditions and identify any potentially contaminating conditions and/or activities was undertaken by experienced JBS&G personnel on 10 March 2022. The key site features observed during the inspection have been shown on **Figure 2**. The majority of the site (approx. 95 %) is sealed with a concrete slab, while the remaining 5 % comprises garden beds and landscaping, mainly in the central portion and along the western and eastern boundaries of the site. Access to the site is gained via Hale Street, which runs parallel to the southern boundary of the site.

The site is currently comprised of industrial / commercial premises spread across several buildings. The current infrastructure at the site includes three large warehouse buildings with multiple units, a canopy in the southeast, carparking in the central portion, and a transmission box on the eastern boundary. Industrial sized refrigeration and meat storage units, associated with Ripe Providores, were identified in unit 12 at the site. Spray painting booths were found within the buildings leased by Botany Powder Coaters and Smash Repairs.

Two underground Storage Tanks (USTs) were identified at the site, one located on the eastern boundary and one located in the central area. During underground service location, a ground penetrating radar (GPR) was used to confirm the area and size of the USTs. It was unclear if the USTs have previously been decommissioned. A former bowser and vent was observed adjacent to the UST in the central portion of the site. Multiple intermediate bulk containers (IBCs) and storage drums were found in the northern portion of the site. Fragments of asbestos were also encountered across the site and it was reported that asbestos products are present on the site, including wall sheeting, tiles, and eaves. Dangerous goods including gas bottles, paints, lubricants, lacquers, and oils were stored in various locations across the site.

2.3 Surrounding Land-use

Surrounding land-uses at the time of the site inspection are described following:

- **North** – to the north the site is bound by a stormwater canal, beyond which is a dam, Mill Pond, and Mill Stream. Further afield lays the M1 motorway and Sydney Airport;
- **East** – to the east the site is bound by a sewage culvert, beyond which is further industrial / commercial buildings and warehouses. Residential structures lay further to the east;
- **South** – to the south the site is bound by Hale Street, beyond which lays industrial / commercial buildings and warehouses; and

- **West** – to the west the site is directly bound by a sewage culvert beyond which is forested parkland, the northern extent of Sir Joseph Banks Park. Further afield is Foreshore Road, then Mill Stream, and Sydney Airport.

2.4 Topography and Geology

A search of the Land and Property Information (LPI²) Spatial Map Viewer indicates that the site is situated at 4 m Australian Height Datum (AHD). The broader landscape falls gently to the north and west of the site towards Mill Stream and Mill Pond.

The regional landscape is described in soil landscape mapping as characterised by disturbed terrain that had been levelled to slopes of <3%. Local relief is usually <2m, in terraced cut and fill areas short rises may be steeper than 30%.

A review of the ESPADE 2.1 tool (OEH 2021³) indicates that the site exists on disturbed terrain of the previous swamps, wetlands and estuaries of Port Jackson. Relevant details of the soil landscapes are provided following:

- **Disturbed Terrain**
 - **Soils:** turfed fill areas commonly capped with up to 40 cm of sandy loam or up to 60 cm of compacted clay over fill or waste materials.
 - **Limitations:** dependent on nature of fill material. Mass movement hazard, unconsolidated low wet strength materials, impermeable soil, poor drainage, localised very low fertility and toxic materials.
 - **Geology:** artificial fill. Dredged estuarine sand and mud, demolition rubble, industrial and household waste. Also includes rocks and local soil materials.

JBS&G (2023)⁴ reported site soils to comprise of shallow sandy fill materials present at depths up to 2 m below ground surface (bgs), overlying natural clayey sand materials as consistent with the geological mapping of the site.

2.5 Hydrology

The nearest surface water body to the site is Mill Pond, a dammed section of Mill Stream located approximately 90 m to the north. Mill Pond receives inflowing water from Mill Stream to the north, which is connected to the Botany Wetlands and Botany Dams, approximately 1.30 km and 2.81 km northeast of the site, respectively. Outflowing water from Mill Pond empties into Mill Stream 95 m northwest of the site. Mill stream flows into Botany Bay, situated approximately 1.2 km to the south which empties into the Pacific Ocean 8.82 km from the site.

Within the sealed extent of the site, overland flow is anticipated to follow into constructed drainage infrastructure (stormwater pits). In grassed and landscaped areas of the site, surface water would infiltrate the ground surface.

2.6 Acid Sulfate Soils

Review of the 1:25 000 Botany Bay Acid Sulfate Soil (ASS) Risk Map (DLWC 1997⁵) and the ESPADE Spatial Viewer ASS risk mapping indicates the site is within disturbed terrain and with the possibility for ASS onsite. Disturbed terrain may include filled areas, which often occur during reclamation of low lying swamps for urban

² LP1 (2021) *ePlanning Spatial Viewer*, NSW State Government, accessed 9 March 2022

<https://www.planningportal.nsw.gov.au/spatialviewer>

³ OEH (2021) *ESPADE 2.1*. NSW Office of Environment and Heritage, accessed 9 March 2022

<https://www.environment.nsw.gov.au/eSpade2Webapp>

⁴ Detailed Site Investigation, 2-4 Hale Street Botany NSW, JBS&G Australia Pty Ltd, 23 January 2024 (JBS&G 2024a).

⁵ *Botany Bay Acid Sulfate Soil Risk Map (Edition 2)*, Department of Land and Water Conservation 1997, (DLWC 1997)

development. Other disturbed terrain includes areas which have been mined or dredged, or have undergone heavy ground disturbance through general urban development or construction of dams or levees. Soil investigations were required to assess these areas for acid sulfate potential, in which JBS&G (2023) reported shallow fill materials to comprise non-PASS and natural sand materials to comprise PASS.

2.7 Hydrogeology

The site is located within Prohibition Area 2 of the Botany Sands Groundwater Aquifer, where abstraction of groundwater for the purposes of domestic, recreation or irrigation uses is banned. Based on the environmental setting, groundwater at the site is expected to comprise of a shallow unconfined system and flow to the north/north-west towards Mill Pond. JBS&G (2023) reported site groundwater to comprise of a shallow (present at depths of approximately 1 m bgs) unconfined system in which groundwater was reported as fresh to brackish, with slightly acidic pH and anaerobic conditions.

2.8 Meteorology

A review of average climatic data for the nearest Bureau of Meteorology monitoring location (Sydney Airport AMO 066037 – 3.4 km AWS⁶) indicates the site is located approximately within the following meteorological setting:

- Mean minimum temperatures vary from 7.4°C in July to 19.2°C in February;
- Mean maximum temperatures vary from 17.2°C in July to 26.7°C in January;
- The mean annual rainfall is approximately 1092 mm, with rainfall greater than 1 mm occurring on an average of 96 days per year; and
- Monthly average rainfall varies from 59.8 mm in September to 123.7 mm in March with the wettest periods occurring on average in February through to June.

⁶ http://www.bom.gov.au/climate/averages/tables/cw_059006.shtml, Bureau of Meteorology, prepared and accessed 9 January 2024.

3. Previous Investigations and Summary Site History

A detailed account of the site history is provided in the historical reports completed at the site which are summarised below. Sampling locations from historical investigations are presented in **Figures 3**. In addition, results of soil, groundwater and soil vapour analysis for samples historically collected at the site are summarised in analytical tables presented in **Appendix A**.

3.1 Detailed Site Investigation (JBS&G 2024a)

JBS&G completed a Detailed Site Investigation (DSI) to assess the suitability of the site for the proposed use. The scope of works included a desktop assessment and program of soil, groundwater, soil vapour and hazardous ground gas sampling and analysis. The following provides a summary of the investigation findings/conclusions:

- The site has been used for industrial / commercial purposes since at least 1955, when warehouses first appear in the available aerial images. Additional buildings were added until 1982 and no further structures have appeared on the site since. From 1952 to 1972 the site was owned by Geigy Australasia Pty Ltd which manufactured moth proof woollen textiles. The northern portion of the site used to be a part of Bay Street and was acquired in 1961. The site is currently leased by multiple tenants including Frontline Fabrications, Ripe Proveedores, Powder Coaters, a mechanics, Meat Storage, Smash Repairs, a timber workshop and storage units.
- Two USTs are present on the site, one located on the eastern boundary and one located in the central portion and are estimated to be 10,000 L tanks. It was unclear if the USTs have previously been decommissioned. A former bowser and vent were observed adjacent to the UST in the central portion of the site. The USTs will require decommissioning (as per the UPSS regulations) to ensure the site is considered suitable for the proposed use.
- Fill material comprised of brown / black / orange / yellow / red, gravelly sand / clayey gravelly sand / sandy clay / silty sand / sand / clayey sand with inclusions of gravels, sandstone, slag, brick. Natural material comprised of brown / grey / black sand / sandy clay / clayey sand. Photoionisation detector (PID) readings ranged from 0.2 to 86.4 ppm. Slight to moderate sulfur odours were observed within sampling location MW03 3.0 to 4.0 m bgs. Staining was not observed in any of the locations.
- Bonded ACM was observed in two samples with a maximum concentration of 0.0368% w/w during field asbestos quantification, with asbestos concentrations in both samples below the adopted HSL-D of 0.05% w/w. Several ACM fragments were observed on unsealed ground surface along the western boundary and central portion garden bed, which exceeds the 'no visible surface ACM' criterion.
- Eleven soil samples reported heavy metal (nickel, copper or zinc) concentrations exceeding ecological criteria. The heavy metal concentrations are considered to be likely attributable to background conditions in soil in an urban environment, however, further assessment will be required to determine if the levels of heavy metals will pose an unacceptable risk to future vegetation to be established within landscaped zones around the perimeter of the site.
- Potential acid sulfate soils were identified in natural soils at site and will require management in instances where construction works result in the disturbance of these materials.
- Groundwater with slightly elevated levels of zinc were recorded in two monitoring wells (MW02 and MW03). The reported concentrations are considered to reflect urban background conditions given that there was no significant change of these constituents between up and down gradient monitoring wells and no significant source material identified within site soils. On this basis, the elevated levels of heavy metals in site groundwater are not considered to require management.

- Sub-slab vapour with an elevated trichloroethene concentration was reported at SV10 in the northwestern corner of the site. Currently there is limited data to confirm the extent of vapour impact. Based on the available data there is a potential unacceptable risk to future site receptors (via vapour intrusion to within enclosed spaces/buildings) and additional assessment and/or remediation will be required in this area.
- It was recommended that a RAP be prepared to provide an appropriate framework and procedures for managing the following issues:
 - Addressing potential unacceptable risks to vegetation to be established within landscaped zones around the perimeter of the site;
 - TCE impacts in soil vapour posing a potentially unacceptable health risk (via vapour intrusion) to future occupants of the warehouse building;
 - Potential health and aesthetic issues from bonded ACM on the ground surface and potentially in fill materials; and
 - Decommissioning and validation of UST infrastructure.

3.2 Summary Site History

The site history is summarised following:

- The site has been used for industrial / commercial purposes since at least 1955, when warehouses first appear in the available aerial images. Additional buildings were added until 1982 and no further structures have appeared on the site since;
- From 1952 to 1972 the site was owned by Geigy Australasia Pty Ltd which manufactured moth proof woollen textiles;
- The northern portion of the site was formerly part of Bay Street and was acquired in 1961;
- The site is currently leased by multiple tenants including Frontline Fabrications, Ripe Providores, Powder Coaters, a mechanics, Meat Storage, Smash Repairs, a timber workshop and storage units;
- Two disused USTs were identified at the site. It is unknown if the USTs were decommissioned and left in situ; and
- Fragments of asbestos containing materials were observed across the site surface.

4. Conceptual Site Model

Environmental data as abstracted from historical investigations (**Section 3**) is provided as **Appendix A**. Concentrations of contaminants of potential concern (COPCs) have been screened against a range of criteria as appropriate to the assessment of potential contamination on industrial sites. The criteria adopted are consistent with the DSI (JBS&G 2024a).

The following sections present a conceptual site model (CSM) for the site prior to the commencement of remediation. The purpose of the CSM is to identify potentially complete source-pathway-receptor linkages at the site such that an informed assessment of potential remedial options can be made.

4.1 Extent of Contamination

4.1.1 Site Soils

Bonded asbestos impacts have been identified on the ground surface within the along the western boundary and the central portion of the site, which will require remediation in order to address potential unacceptable health risks to future site users as well as address aesthetic issues associated with the impact. Bonded ACM was further reported in fill at two locations, albeit at concentrations below the adopted criteria applicable to commercial / industrial land-use. However, it is noted that the soil sampling density completed as part of JBS&G (2024a) did not meet the requirements of EPA (2022) or DOH (2021⁷) – noting the observation of building and demolition wastes within site fill materials across the extent of the site, there is the potential for additional asbestos impacts in soils then previously reported. As such, for the purposes of informing required remedial extent (**Section 5.4**), it should be assumed that all fill-based soils at the site are potentially impacted with asbestos until further assessment completed as part of pre-remediation activities (**Section 5.3**) proves otherwise.

The reported concentrations of all chemical based COPCs within site soils are below the adopted health-based criteria applicable to commercial industrial land/use.

Various heavy metals were reported to exceed generic conservative criteria protective of ecological receptors. As such, it should be assumed that fill-based soils at the site are not appropriate for use as a growing medium within future landscaped areas (primarily restricted to the boundaries of the site) unless further assessment of these materials (inclusive of physiochemical parameters of site soils to allow derivation of site specific criteria) concludes the concentration of heavy metals will not pose a risk to future vegetation to be established at the site.

It is noted that due to access restrictions, not all site soils have been adequately characterised (refer to **Section 4.4**) and therefore, pre-remediation activities (**Section 5.3**) will be required to inform the final extent of remediation.

4.1.2 Site Groundwater

Site groundwater has been reported to have elevated levels of heavy metals. The elevated levels of heavy metals are not considered to be sourced from historical activities at the site and indicative of background conditions within the surrounding environment and as such, do not require remediation or management in order to make the site suitable for the proposed use.

4.1.3 Soil Vapour

Elevated levels of trichloroethene (TCE) were reported in sub-slab vapour at SV10 in the north-western portion of the site (**Figure 6**). The area of impact appears relatively isolated in lieu of any TCE impact in surrounding

⁷ *Guidelines for the Assessment Remediation and Management of Asbestos Contaminated Sites in Western Australia*. 2021, Western Australia Department of Health (WA DOH) (DOH 2021)

sample locations, but will require further assessment and potential remediation to address potential health risks (via vapour intrusion) to occupants of the warehouse building proposed in this area.

4.2 Potential Human and Ecological Receptors and Exposure Pathways

The primary potential human receptors of concern are future commercial/industrial users of the site. Potentially complete exposure pathways to environmental impact at the site for these receptors is largely associated with TCE impacts in soil vapour which potentially may enter the future building via penetrating the slab from underlying impacts in site soils, as well as potential exposures to asbestos impacts in exposed soils. Other potential receptors will include construction workers during the site redevelopment, and potential future sub-surface intrusive / maintenance workers which may be exposed to TCE impacts and/or bonded asbestos in site soils. Additionally, vegetation to be established within future landscaped areas on-site may potentially be exposed to heavy metal impacted soils.

Based on the results of intrusive investigations presented in JBS&G (2024a), it is considered unlikely that there are any unacceptable risks to downgradient receptors associated with environmental impact sourced from the site.

Table 4.1 summarises potential receptors to environmental impact at the site and the associated exposure pathways.

Table 4.1: Summary of Potential Receptors and Exposure Pathways

Receptor	Location	Media	Potential Exposure Pathways	Exposure Pathway Status
On-site Receptors				
Future commercial/industrial users	Within buildings	Soils	Inhalation (vapours)	Potentially complete
		Groundwater	Inhalation (vapours)	Potentially complete
	Outdoor areas	Soils	Inhalation (particulates) Oral ingestion Dermal contact	Potentially complete
Construction worker or intrusive maintenance worker (short duration)	Construction areas/excavations	Soils	Inhalation (vapours, gases and particulates/fibres) Oral (infiltrating seepage water) Dermal (infiltrating seepage water)	Potentially complete
		Groundwater	Inhalation (vapours and particulates/fibres) Oral (infiltrating seepage water) Dermal (infiltrating seepage water)	Incomplete
Ecological Receptors (vegetation to be established as part of site development.	Landscaped areas only	Soils	Contaminant uptake	Potentially complete
		Groundwater	Contaminant uptake	Incomplete
Off-site Receptors				
Recreational users of Mill Stream and Botany Bay	Surface waters downgradient of the site	Surface Water as potentially affected by site groundwater	Inhalation (vapours) Oral Dermal Ingestion	Incomplete
Off-site Commercial users	Within buildings or outdoor areas.	Soils and/or groundwater	Inhalation (vapours, gases and particulates/fibres)	Incomplete
Ecological Receptors within Mill Stream and Botany Bay	Surface waters downgradient of the site	Surface Water as potentially affected by site groundwater	Oral Dermal Ingestion	Incomplete

4.3 Preferential Pathways

Given that the site geology comprises of permeable sands (both within fill and natural soils) with groundwater present in a shallow unconfined aquifer, it is considered unlikely that contaminants will substantially migrate via preferential pathways (service trenches or similar) at the site.

4.4 Data Gaps

The primary data gaps that require further assessment in order to refine the extent of required remediation at the site are related to the following:

- The extent of asbestos in soil occurrence has to date, not been completed at a density consistent with DOH (2021). As such, additional asbestos investigations are required to further inform the scale and nature of asbestos exposure controls required for the construction works in accordance with SafeWork NSW as well as refine the extent of soils that may require remediation / management during redevelopment of the site.
- The lateral extent of TCE impacts in soil vapour in the north-western portion of the site which may pose an unacceptable health risk to future site users (via vapour intrusion) requires additional assessment. It is recommended that additional sub-slab vapour sample locations are placed around SV10 in order to provide further delineation at the location in which TCE impacts have been identified. The results should be assessed as part of a site-specific human health risk assessment that incorporates future building design to evaluate the potential risks via vapour intrusion in order to define the final requirements for remediation.

Site specific ecological investigation levels (EILs) should be derived for heavy metals via collection of soil physiochemical properties (pH, cation exchange, total organic carbon etc) within soils located in future landscape zones in order to determine if fill based soils are appropriate for use as a growing medium.

- The extent of petroleum hydrocarbon impacts in proximity of the USTs to define the extent of remediation (if any) around these features. It is noted that soil / groundwater sampling is required as part of UST decommissioning (in accordance with UPSS Regulation⁸) and therefore the dataset will not only be required to define the extent of required remediation around these features but also as part of site validation.
- Additional characterisation of site soils and groundwater within previously inaccessible areas (in areas of warehouses and north-western downgradient boundary etc) to define the remediation requirements (if any) within these areas. The investigations will be required to be completed in accordance with EPA (2022).

The requirements for assessment of these data gaps are outlined in **Section 5.3**.

⁸ Guidelines for implementing the POEO (Underground Petroleum Storage Systems) Regulation 2019 (December 2020) (UPSS Regulation)

5. Remediation Options

5.1 Guidelines and Legislation

The RAP has been prepared with reference to the following guidelines and legislation:

- EPA (2014a) Best Practice Note: Landfarming. NSW Environment Protection Authority;
- EPA (2014b) Waste Classification Guidelines – Part 1: Classifying Waste. NSW Environment Protection Authority dated 2014;
- EPA (2014c) Waste Classification Guidelines – Part 4: Acid sulfate soils. NSW Environment Protection Authority dated 2014;
- EPA (2017) Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd edition). NSW Environment Protection Authority dated October 2017;
- Work Health and Safety Regulation 2017;
- SWA (2020a) How to safely remove asbestos - Code of Practice. Safe Work Australia, 2020;
- SWA (2020b) How to manage and control asbestos in the workplace - Code of Practice. Safe Work Australia, 2020;
- EPA (2020a) Assessment and management of hazardous ground gases, Contaminated Land Guidelines. NSW Environment Protection Authority dated May 2020.
- EPA (2020b) Consultants Reporting on Contaminated Land Contaminated Land Guidelines, NSW Environment Protection Authority dated April 2020;
- Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019 under the Protection of Environment Operations Act 1997 (UPSS Regulation);
- State Environment Planning Policy (Resilience and Hazards) 2021 (SEPP-RH); and
- (EPA 2022) Contaminated Land Guidelines: Sampling design part 1 – application, NSW Environment Protection Authority, EPA 2022P3915, August 2022;

5.2 Remediation Objectives

Remediation is required at the site to address the following aspects:

- The presence of two disused USTs that are required to be decommissioned in accordance with the UPSS Regulation (2019);
- Elevated TCE in soil vapour poses a potentially unacceptable risk to future site receptors via vapour intrusion and requires further assessment and/or remediation;
- Bonded asbestos impacts on the ground surface and potentially within site based fill poses a potentially unacceptable risk to future site receptors and requires further assessment and/or remediation; and
- Elevated levels of heavy metals within site based fill poses a potentially unacceptable risk to vegetation to be established within future landscaped areas and requires further assessment and/or remediation.

The objective of the remediation is to remove/manage potential risks posed by the identified contamination issues, such that the site is made suitable for the proposed development. It is a further objective to undertake works, in accordance with applicable guidelines and legislation, in a manner which is consistent with the principles of ecologically sustainable development (ESD).

5.3 Pre-remediation Assessments

Further assessment is required prior to remediation to address the data gaps identified in **Section 4.4** and inform the final extent of management / remediation at the site. The detail of the sampling / analysis activities to address the key data gaps should be provided in a Sampling, Analytical and Quality Plan (SAQP) prior to completing the sampling activities. The results of the assessment will then be required to be documented in a factual report and subsequently reviewed as part of human health risk assessment (primarily for TCE) with detail of the proposed building design and corresponding risk from each aspect. Subject to the results / findings of these assessments, the final extent of remediation / management will be documented in a Remedial Work Plan (RWP) that follows the remedial framework established in this RAP.

5.4 Extent of Remediation

Based on the findings of the previous investigations (refer to **Sections 3** and **4**) and subject to the limitations of these investigations, the anticipated extent of the proposed remedial works include:

- the area surrounding the USTs as shown on **Figure 7** (to remove the USTs and associated potential source materials);
- the area in the north-western portion to address elevated TCE in soil vapour in soils; and
- bonded asbestos impacts identified on the ground surface and conservatively assumed to be present in all fill based soils at the site.

The final extent of remediation will be informed by pre-remediation assessment activities outlined in **Section 5.3**, as well as any potential remediation works to address unexpected finds (**Section 8**) that may be encountered during construction works.

5.5 Remedial Options

The preferred hierarchy of options for remediation (clean up) and/or management adopted by NSW EPA has been established within the NEPC (2013) Assessment of Site Contamination Policy Framework as follows:

- On-site treatment so that the contaminant is either destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site; or

If the above options are not practicable:

- Consolidation and isolation of the contaminant on site by containment with a properly designed barrier;
- 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 addition, when deciding which option to choose, consideration is also required to be given to the sustainability (environmental, economic and social) aspects of each option to ensure an appropriate balance between the benefits and effects of undertaking remedial/management options.

In cases where no readily available or economically feasible method is available for remediation, it may be possible to adopt appropriate regulatory controls or develop other forms of remediation.

Consideration of each of the approaches (EPA 2017), is presented in **Table 5.1**.

Table 5.1: Remedial Options Screening Matrix

Remedial Option	Applicability	Assessment
<p>1. On-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level.</p>	<p><u>USTs</u> The UPSS Regulation requires any disused petroleum storage infrastructure to be removed from the site where it is possible to do so. However, in instances where it is not possible to remove the USTs as a result of structural concerns to any infrastructure, it is appropriate to decommission the USTs in-situ via removing the contents of the UST and filling with an inert product (concrete or foam etc). In-situ decommissioning is not the preferred method given that it will not allow for the removal of any surrounding impacts in site soils.</p>	<p>A potential option if the USTs cannot be removed due to structural concerns of any infrastructure to be retained.</p>
	<p><u>Petroleum Hydrocarbon Impacted Soils in proximity of the USTs acting as Source Material (if any)</u> Any potential petroleum hydrocarbon impacts in soils surrounding the USTs can be addressed by bioremediation / landfarming of the impacted soils. There is sufficient space on site to address the potential relatively small volume of petroleum hydrocarbon impacted soils.</p>	<p>The preferred option</p>
	<p><u>Chlorinated Hydrocarbon (TCE) Impacted Soils Posing a Vapour Intrusion Risk</u> The preferred methodology to address chlorinated hydrocarbon impacts in site soils (which may pose a vapour intrusion risk) will be dependent on the final volume of soils requiring remediation. Without pre-empting the result of the pre-remediation assessments (Section 5.3), it is anticipated that only a limited volume of impacted soils (if any) will require remediation. Should the volume of impacted soils be confirmed to be relatively small, it is recommended that they be excavated and placed into stockpile for treatment via soil vapour extraction (SVE). Noting that chlorinated hydrocarbons are not as amenable to landfarming as petroleum hydrocarbons, SVE is the preferred onsite treatment methodology, in which a vacuum can be applied to the affected soils (or the soils aerated by agitation of the stockpiled), which in turn strips the contaminant off the soils. The contaminants can be treated to remove the contaminant if present in exhaust gases at a level that poses a potential health or ecological risk or can otherwise be dispersed and discharged from the site. The stockpiled soils would require treatment until the TCE levels are reduced to a level which does not pose a human health or environmental risk.</p>	<p>The preferred option</p>
	<p><u>Impacted Fill</u> There are no practical means of destroying/removing asbestos or heavy metals within soils.</p>	<p>Not applicable</p>
<p>2. Off-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level, after which the soil is returned to the site.</p>	<p><u>USTs</u> Not an applicable option with respect to the UST.</p>	<p>Not applicable.</p>
	<p><u>Petroleum Hydrocarbon Impacted Soils in proximity of the USTs acting as Source Material (if any)</u> Hydrocarbon impacts in soils can be addressed by bioremediation / landfarming of the impacted soils. However treatment of impacted soils offsite provides no benefit over Option 1 and there are no known nearby licensed facilities to undertake this treatment.</p>	<p>Not applicable.</p>
	<p><u>Chlorinated Hydrocarbon (TCE) Impacted Soils Posing a Vapour Intrusion Risk</u> The treatment of impacted soils offsite provides no benefit over Option 1.</p>	<p>Not applicable.</p>
	<p><u>Impacted Fill</u> As above (Option 1).</p>	<p>Not applicable.</p>
<p>3. On-site <i>in-situ</i> management of the contaminant by capping</p>	<p><u>USTs</u> Not an applicable option with respect to the USTs.</p>	<p>Not applicable.</p>
	<p><u>Petroleum Hydrocarbon Impacted Soils in proximity of the USTs acting as Source Material (if any)</u> Any significant petroleum hydrocarbon impacted soils may pose a potential ongoing risk to groundwater. As such, this would not be the preferred option.</p>	<p>Not the preferred option.</p>

Remedial Option	Applicability	Assessment
and cover, and ongoing management.	<u>Chlorinated Hydrocarbon (TCE) Impacted Soils Posing a Vapour Intrusion Risk</u> Any significant TCE impacted soils may pose a potential ongoing risk to groundwater or via vapour intrusion. As such, this would not be the preferred option.	Not the preferred option.
	<u>Impacted Fill</u> This option provides for the retention of impacted soil on-site beneath a physical barrier such that there are no complete exposure pathways available between the contaminated material and potential human receptors and/or ecological receptors. Across the site, the barrier will comprise the hardstand surface under the proposed development scheme. In landscaped areas, the proposed barrier will comprise a bright marker layer covered within clean soils (capping layer) to a typical depth of 0.5 m or consistent with the potential root zone of the vegetation to be established at the site. Moreover, this option minimizes the amount of waste produced from the proposed development works and is therefore consistent with ecological sustainable development (ESD) principles.	The preferred option in instances where widespread asbestos (posing a health risk) and/or heavy metal impacts (posing a risk to future vegetation) are identified in site soils.
4. Excavation and off-site removal of the impacted material.	<u>USTs</u> The preferred option in accordance with the UPSS Regulation as it will result in the removal of the primary source of potential contamination and allow for the remediation of any associated impacts in surrounding soils.	The preferred option
	<u>Petroleum Hydrocarbon Impacted Soils in proximity of the USTs acting as Source Material (if any)</u> Waste facilities are available which can receive petroleum hydrocarbon impacted soils from the site. This method is not preferred as it will result in waste generation that can otherwise be avoided by on-site treatment.	A potential option.
	<u>Chlorinated Hydrocarbon (TCE) Impacted Soils Posing a Vapour Intrusion Risk</u> Waste facilities are available which can receive chlorinated hydrocarbon impacted soils from the site. This method is not preferred as it will result in waste generation that can otherwise be avoided by on-site treatment.	A potential option.
	<u>Impacted Fill</u> Waste facilities are available which can receive asbestos and heavy metal impacted soils from the site. This method is not preferred as it will result in waste generation that can otherwise be avoided by on-site treatment. However, should the volume of fill impacted materials be relatively small, it may be the most appropriate given that it will result in no requirements for long-term management.	A potential option.

Should further impacted material (i.e. not previously identified in historical investigations) be identified as part of an unexpected find during construction works or as part of pre-remediation activities, the remedial options screening matrix in **Table 5.1** will be required to be reviewed. Notwithstanding, it is anticipated that any impacts will be relatively isolated and could be appropriately managed through controlled excavation and off-site disposal or on-site containment (where contaminants are relatively inert and do not pose a risk to groundwater or at significant levels within soil vapour)

5.6 Assessment of Bioremediation

EPA (2014a) has been issued by the NSW EPA to control the bioremediation of hydrocarbon impacted soils. EPA (2014a) nominates several factors that affect the potential suitability of contaminants and soils to be remediated by bioremediation (referred to as landfarming in the guideline). Each of the factors has been assessed for the site in **Table 5.2** as applicable to the preferred remedial approach of bioremediation of soils to remove petroleum hydrocarbons.

Table 5.2: Assessment of Factors Affecting Bioremediation / Landfarming Suitability

EPA 2014 Factor	Assessment
Contaminant types	Landfarming is nominated as a suitable treatment method for petroleum hydrocarbons in soils. Biodegradation is nominated as causing the reduction of petroleum hydrocarbons in landfarmed soils.
Contaminant concentrations	A screening criteria of 8 % total petroleum hydrocarbon concentrations (80 000 mg/kg) is a nominated screening for suitability of soils for landfarming. The maximum levels of petroleum

EPA 2014 Factor	Assessment
	<p>hydrocarbons in soils on the site are anticipated to be well below this level, noting that the highest previously reported concentration is less than 40 000 mg/kg.</p> <p>It is noted that petroleum hydrocarbon impacted soils are potentially malodorous, and where potentially offensive odours are detected at the site boundary, then air emissions management will be required for the soils.</p>
Volume of contaminated soils	<p>It is unlikely that large volumes of soils will require bioremediation. An estimated maximum quantity of 1000 m³ of impacted soils is anticipated which is insignificant when considered with the overall extent of the site.</p>
Site area	<p>The site area exceeds the 0.5-hectare threshold nominated in EPA (2014a).</p>
Site topography	<p>EPA (2014a) reports sites with steep gradients are not suitable for landfarming. The site is relatively level, as consistent with the general topography of the local area.</p>
Local geology	<p>Impacted soils are considered likely to consists of sands.</p> <p>The soils will be landfarmed within a purpose designed area within the extent of the site which shall be provided with surface cover to mitigate the potential for leaching of impact to soils underlying.</p>
Meteorology	<p>Sydney has a humid climate that is mild with no dry season, constantly moist (year-round rainfall). Summers are hot and muggy with thunderstorms. Winters are mild. Seasonality is moderate. The temperatures vary throughout the year, with high summer temperatures, sometimes peaking above 40 °C and colder temperatures of in winter with typical night time lows of 6 °C. Rainfall occurs throughout the year with typically 90 to 100 rain days a year.</p>
Distance to sensitive receptors	<p>The site is located within a historical commercial / industrial area, although a stormwater canal adjoins the northern boundary of the site. It is anticipated that due to the anticipated small volume of material requiring remediation (<1000 m³) and relatively large site area (app 0.75 ha), bioremediation can be appropriately managed in the southern portion of the site, with maximum separation from adjoining sensitive receptors.</p>
Time	<p>EPA (2014a) reports that timeframes associated with bioremediation will potentially vary. Provision has been made in the RAP for remedial timeframes of 6 weeks. Where bioremediation cannot be achieved in these timeframes, contingency actions are available to allow landfarming rates to be accelerated (i.e. increased turning of soils, addition of bioremediation additives etc).</p>
Cost	<p>EPA (2014a) notes that landfarming should not be considered a cheap remedial option and costs may become prohibitive to undertake landfarming properly. To this extent, it is considered that the cost to undertake landfarming is typically a function of the site area available to undertake the landfarming works and the resources required to control environmental emissions from the works. Landfarming / bioremediation will be a cost effective option for the site.</p>

6. Remediation Action Plan

6.1 Approvals, licences and notifications

State Environment Planning Policy (Resilience and Hazards) 2021

From review of the site location and proposed activities, the remediation works are classified as Category 2 Remediation Works (**Section 11.2**) as per the meaning provided in *State Environment Planning Policy (Resilience and Hazards) 2021* (SEPP-RH) and will not require specific development consent under the *Environmental Planning and Assessment Act 1997*.

Notification of remediation works will be required to be given to Council at least 30 days prior to commencement, and Council requires notification within 30 days from completion of remediation works, consistent with SEPP (Resilience and Hazards) requirements and Council's Contaminated Land Policy.

Remediation works shall not commence until all required approvals, licences and notifications have been granted and/or received.

6.2 Site Establishment

All safety and environmental controls are to be implemented as the first stage of remediation works. These controls will include, but not be limited to:

- Locate and isolate all required underground utilities within the site such that excavation works can safely proceed;
- Assess the potential impacts of the excavation works to neighbouring properties. It is recommended that a suitably qualified engineer be consulted prior to any excavation works, such that appropriate controls (if required) can be implemented noting the proximity of Sydney Water's sewer along the eastern boundary of the site;
- Assess need for traffic controls;
- Work area security fencing;
- Site signage and contact numbers; and
- Sediment fencing as appropriate to mitigate sediment laden runoff from the site.

6.3 Remediation Works

6.3.1 Pre-Remediation Activities

In addition to the pre-remediation assessments (**Section 5.3**), please see actions below required prior to remediation works.

Hardstand Removal and Surface Inspection

Should the existing hardstand surfaces be removed as part of site works, then the materials will require inspection (by the environmental consultant and remedial contractor) for the potential presence of adhered asbestos (that may be encountered on the underside of the slabs) prior to potential crushing and off-site disposal in accordance with the requirements of NSW EPA (2014b).

Following the complete removal of all hardstand surfaces, the environmental consultant shall undertake a walkover (in a 2 m by 2 m grid) to identify any additional potential sources of contamination (such as surface staining, unidentified infrastructure etc) that may require remediation. Should surface oil staining or additional infrastructure be identified, then the underlying materials / features will be required to be assessed or managed in accordance with **Section 6.3.2** to **Section 6.3.4**. Should a unique source of contamination be

identified (i.e. different from that identified as part of the site history in **Section 3** and CSM in **4**) then the unexpected find protocol (**Section 8**) will be required to be implemented.

6.3.2 Decommissioning of UPSS/USTs and Associated Petroleum Hydrocarbon Impacted Soils

Residual UPSS/USTs require decommissioning in accordance with relevant Australian Standards. In general, the following work procedures are to be followed:

- The location and extent of all residual UPSS/USTs shall be confirmed prior to commencement of works. This shall include:
 - A detailed site inspection comprising review of all ground surfaces previously covered by vehicles/stored materials in historical assessments;
 - Confirmation of the location/extent of known UPSS/USTs as shown on Error! Reference source not found..
- The USTs should be emptied of all dangerous goods and made gas-free. Any contents of the tank will be disposed off-site in accordance with EPA (2014b);
- Where possible, all associated piping should be disconnected and made safe so that no flammable or combustible liquid remain;
- Hardstand overlying areas suspected or known to contain UPSS/USTs shall be broken out and removed. Inspection and/or test pitting of soil shall be undertaken in areas with known or suspected UPSS/USTs until the infrastructure is positively identified or confirmed to be absent;
- UPSS/USTs will be excavated for off-site disposal in accordance with EPA (2014b); and
- It is anticipated that soil impacts will be present proximal to the UPSS/USTs. Impacted soils shall be progressively excavated under the supervision of the Environmental Consultant until all grossly impacted soils have been removed from the excavation to the practical extent. The resulting excavation will require validation in accordance with **Section 7.2.99**. Where possible, fill and natural soils (that require excavation for remedial purposes) should be segregated, handled and managed separately.

As noted previously, the preferred hierarchy for decommissioning a tank comprises the complete removal and off-site disposal of the tanks contents and infrastructure. Where this is not reasonably practicable (e.g. in instances where the removal of the tank may present an unacceptable risk of damage to a supporting foundation of an existing building or structure), the tank is required to be made safe by filling with an inert solid material (i.e. in-situ decommissioning). Advice from a structural engineer should be obtained to understand the constraints regarding excavation/removal of the UST to any potential infrastructure in proximity of the USTs.

SafeWork NSW records (provided in JBS&G 2024a) indicate the UST in the central portion of the site is 21,000L and was installed to a depth of 2.1 m bgs.

The constraints on remediation as described in **Section 6.3.5** shall apply.

6.3.3 Excavation of TCE Impacted Soils

TCE impacted soils are proposed to be excavated and remediated onsite. The following general work methodology shall be followed:

- The extent of TCE impacted soils requiring remediation shall be confirmed via pre-remediation activities;
- Hardstand over the area requiring remediation shall be broken out and disposed in accordance with EPA (2014b);

- Impacted soils shall be progressively excavated under the supervision of the Environmental Consultant until all grossly impacted soils have been removed from the excavation to the practical extent. The resulting excavation will require validation in accordance with **Section 7.3.2**. Where possible, fill and natural soils (that require excavation for remedial purposes) should be segregated, handled and managed separately; and
- The constraints on remediation as described in **Section 6.3.5** shall apply. Where possible, fill and natural soils (that require excavation for remedial purposes) should be segregated, handled and managed separately to minimise the extent of asbestos related management controls.

6.3.4 Soil Treatment

Hydrocarbon impacted soils will be spread out in a designated area and will be subject to bioremediation / SVE prior to an assessment of whether the soils are suitable for re-use on site. It is anticipated that approximately 500 m^3 of soil (the pre-remediation activities in **Section 5.3** will likely result in this estimate been reduced) will be impacted by chlorinated or petroleum hydrocarbons and will be require treatment via SVE or bioremediation.

Soils to be treated will be spread over a maximum area of approximately 1000 m^2 , with the maximum height not exceeding 0.5 m. The layout of piles shall be determined by the Environmental Consultant and Remedial Contractor based on screening during excavation. Controls to prevent sediment run-off will be placed around all stockpiles.

It is proposed that the impacted soils be turned every 2-3 days for a period of four to six weeks. JBS&G propose to inspect the material on a weekly basis, and where found to be suitable by field analysis, undertake validation sampling and analysis to demonstrate the suitability of the material to be used as backfill at the site in accordance with **Section 7**.

Suitably treated materials will be used as backfill on-site. Material considered not suitable for reuse on-site (i.e. materials unable to be treated) will be classified in accordance with EPA (2014b) prior to off-site disposal.

Where possible, fill and natural soils (that require bioremediation) should be segregated, handled and managed separately. Furthermore, the constraints on excavation and stockpiling (outlined in **Section 6.3.5**) including the requirements for assessment and management (where required) of ASS/PASS in saturated natural soils will require consideration when treating soils.

6.3.5 Constraints on Excavation and Stockpiling

The practicable limits of excavation include the consideration of the following:

- Physical limitations of available equipment;
- Excavation of saturated materials (typically below a depth of 1-2 m bgs) shall only occur where aesthetic indicators of petroleum hydrocarbon impact are present. This may include hydrocarbons odours or otherwise sheens present in seepage water;
- Geotechnical constraints associated with excavation safety and excavation stabilisation requirements (e.g. benching) and / or potential effects on nearby infrastructure. As such, specialist geotechnical and/or structural engineering advice will be required to inform safe excavation requirements, noting that excavations will only proceed to the extent that they do not undermine the structural integrity of any neighbouring structures as informed by the specialist's recommendations; and
- Structural constraints should the excavation extend to a close proximity to roadways, footpaths, building and underground conduits.

Excavated material will be segregated and stockpiled based on an initial screening of levels of contamination. During excavation, any natural saturated soils encountered shall be stockpiled separately and field screened for the presence of ASS/PASS conditions during works. Where any such conditions are encountered, the requirements for management as informed by an acid sulfate soil management plan (ASSMP) (JBS&G 2024b⁹) shall be followed. The excavated material will be temporarily stockpiled on plastic sheeting to provide a separation layer between potentially contaminated soils and surface soils.

Site won fill obtained from areas of the site not impacted by petroleum hydrocarbons and / or validated, stockpiled soils will be used to partially backfill the open excavations, battering the excavation edges to minimise fall hazards if required.

6.4 Onsite Containment

The preferred remedial option for the asbestos impacted fill-based soils on the site is management on-site by long term containment. The following procedures (**Sections 6.4.1** and **6.4.2**) will require to be implemented to ensure that environmental/health risks associated with the retention of these soils are appropriately controlled.

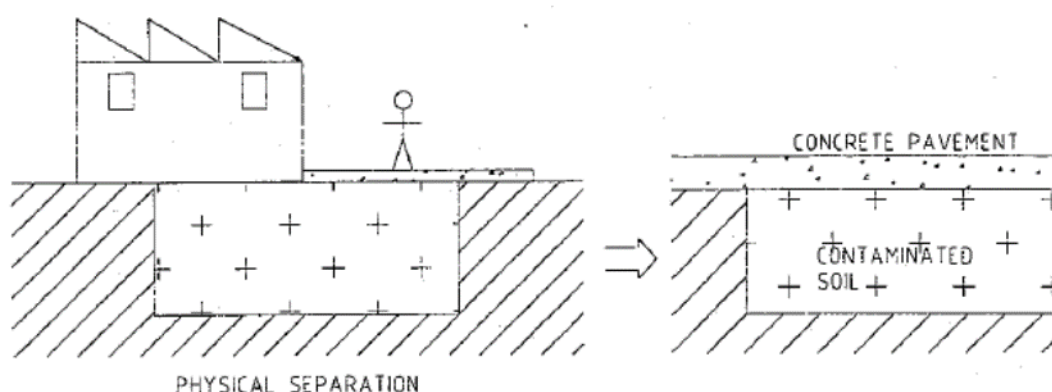
6.4.1 Overview

Where pre-remediation assessments identify widespread impacted fill, it will be managed to the extent achievable via containment and the implementation of permanent physical separation which eliminates the inhalation exposure pathway for airborne asbestos fibres.

The minimum requirements for the physical separation to be adopted in remediation of the site include:

- A minimum soil cover thickness of 0.5 m¹⁰ in landscaped or mass planting/shallow landscaped areas and 1.5 m in tree pit zones which is underlain by a visual “marker layer” in unpaved areas, i.e., planter boxes in landscaped areas etc.; or
- Permanent concrete floor/ground slabs as underlain by visual “marker layer”, i.e., underlying buildings, roads, pathways; or
- Top (concrete) of pile foundations (no marker layer required for below pile foundations).

A conceptual sketch, sourced from ANZECC 1999¹¹, is shown following:



⁹ Acid Sulfate Soil Management Plan, 2-4 Hale St Botany, JBS&G Australia Pty Ltd, 23 January 2024 (JBS&G 2024b)

¹⁰ It is noted that excavations to a depth of 0.5 m to install a marker and capping layer will not be possible within if excavations have the potential impact the structural integrity of neighbouring structures. As such, it is proposed to install a minimum soil cover thickness of 0.1 m (underlain by a marker layer) in these areas. Specialist geotechnical and/or structural engineering advice to be completed prior to implementation of this RAP.

¹¹ *Guidelines for the Assessment of On-site Containment of Contaminated Soil*, Australian and New Zealand Environment and Conservation Council, September 1999. (ANZECC 1999).

The marker layer shall consist of a bright orange coloured non-woven polyester continuous filament or PET (such as nonwoven geotextiles) or similar with a minimum density of approximately 150 grams per square metre (or equivalent). The marker layer must:

- Be easily recognisable within soils (i.e., bright orange in colour);
- Be durable as a long-term marker layer (i.e., > 140 grams per square metre); and
- Maintain integrity during remedial/civil works such as capping layer installation and road/building construction.

Additionally, the marker layer must meet geotechnical and civil specifications where required.

The specific details of the marker layer are required to be included in the site validation report and long-term Environmental Management Plan (LTEMP) documents in addition to surveyed plans showing the extent of the capped area.

6.4.2 Specific Capping Arrangements

The following capping procedures will be applied to each of the potential exposure scenarios across the site, prior to completion of construction works:

- Beneath permanent concrete structures, the installation of a marker layer over contaminated fill material with capping layer consisting of a minimum thickness of 0.1 m environmentally suitable materials below the permanent concrete slab as the physical barrier.
- Permanent hardstand structures (i.e., concrete slabs, pile caps or asphaltic concrete or similar, footpaths, but not bricks or pavers) – installation of a marker layer overlying potentially contaminated material followed by sub-grade material validated as environmentally suitable materials for human exposure and then the permanent structure (e.g., exterior concrete footpaths, asphaltic roads, etc.).
- Mass planting / shallow landscaping areas – installation of the marker layer at a minimum depth of 500 mm below the final finished site levels, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure.
- New tree pit zones / deep landscaping zones – installation of the marker layer at a minimum depth of 1.5 m below the final finished site levels, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure, noting that the marker layer should extend the depth required for installation of the new tree's existing root ball or otherwise consistent with the anticipated root zone of the deep landscaping area.
- Within underground services trenches / services – service infrastructure will require remediation to 150 mm below the depth of services, with a marker layer and capping layer installed consisting of environmentally suitable materials for potential human and/or ecological exposure.

Material above the marker layer extending to the final finished ground level will be required to be an environmentally suitable material for human and/or ecological exposure (as appropriate) as discussed further in **Section 7.2.11**.

Validation of the interim and permanent capping arrangements will be required as outlined in **Section Error! Reference source not found..2.11**, including inspections by the Environmental Consultant, a survey plan prepared by a registered surveyor showing the level and lateral extent of the impacted soils, marker layer, and capping in relation to the site boundaries.

7. Validation Plan

7.1 General

Data will be required to be collected during remediation/management and construction works to assess the effectiveness of the implemented management actions and document the final condition of the site at the completion of all works. Such information will allow conclusions to be drawn on the end suitability of the site for the proposed use. The general principles to be implemented with regard to the validation assessment are discussed in accordance with EPA (2017) requirements in the following sections.

It is anticipated that the validation assessment will be required to address the following broad issues:

- Confirm the site conditions are consistent with those identified during previous site investigation activities as documented herein;
- Documentation of measures to demonstrate that the USTs were appropriately decommissioned and that any petroleum hydrocarbon impacts in surrounding soils have been appropriately managed;
- Validation that soil remediation works has reduced the level of TCE impacts in soils such that there are no potentially unacceptable health risks via vapour intrusion;
- Validation that soil remediation works has either been removed or appropriate management measures have been implemented to eliminate any potentially unacceptable health risks associated with asbestos in soils; and
- Validation that soil remediation works has eliminated any potentially unacceptable risks to vegetation to be established within future landscape zones as associated with heavy metals in soils.

7.2 Data Quality Objectives

Data quality objectives (DQOs) have been developed for the validation assessment, as discussed in the following sections.

7.2.1 State the Problem

JBS&G (2024a) has identified the presence of contaminated site media and residual disused infrastructure at the site. The infrastructure and associated contaminated media require to be remediated to make the site suitable for the proposed development.

A set of environmental data are required to verify that remediation works as documented in **Section 6** have been implemented in a manner which causes potential risks associated with contaminated site media to reduce to low and acceptable levels.

7.2.2 Identify the Decision

The following decisions are required to be made during the validation works:

- Have the UPSS been appropriately decommissioned in accordance with UPSS (2019)?
- Are there any unacceptable risks to future human site receptors, associated with TCE, or TRH (in instances where petroleum hydrocarbon impacts are identified adjacent to the USTs), in site media, following the remediation of soils?
- Are impacted fill materials appropriately contained to control potential future exposures of human and ecological receptors to impacted material?
- Have all aesthetic issues been addressed?

- Has all material imported to site to achieve development objectives been demonstrated as suitable for use?
- Were surplus materials classified and disposed off-site to a facility licensed to accept the classified waste, or where relevant, appropriately recycled for beneficial re-use?
- Have the works been completed in accordance with the RAP, or where variations to the works were required, have these met the objectives of the RAP?
- Is the site suitable for the proposed land uses?

7.2.3 Identify Inputs to the Decision

The inputs to the decisions are:

- Previous investigation results as discussed in **Section** Error! Reference source not found.;
- The proposed development and final proposed land form and site features;
- Field observations in relation to inspection of all excavation bases, walls, stockpiles and final site surfaces for signs of potential contamination;
- Environmental data as collected from the validation of remedial excavations;
- Material characterisation data obtained during assessment of surplus material prior to off-site beneficial re-use or disposal;
- Disposal dockets and relevant documents in relation to appropriate disposal of material (if required) to be removed from site as part of the remediation works (landfill dockets, beneficial reuse / recycling dockets, trade waste disposal, etc.);
- Material characterisation data (including field observations, sampling and analytical data) obtained during assessment of material proposed to be imported to the site;
- Survey information on the height and lateral extent of the marker and capping layers (if required);
- Relevant guideline criteria for validation and waste classification;
- Management measures documented within a Long term Environmental Management Plan (LTEMP) (if required) to be prepared for the site following remediation to ensure the site remains suitable for the proposed use; and
- Data quality indicators (DQIs) as assessed by quality assurance / quality control (QA/QC).

7.2.4 Define the Study Boundaries

The validation study boundaries are restricted to the lateral extent of the approved development works, comprising the site as shown on **Figure 1**. The vertical extent of the validation study is anticipated to be restricted to soils extending to the maximum depth of disturbance as part of remediation, service installation / landscaping activities.

Ultimately the study boundaries will comprise the lateral and vertical extent of the site successfully validated in accordance with the requirements of this plan. The temporal limits of the assessment will comprise the duration of the remedial works and validation program.

7.2.5 Develop a Decision Rule

The decision rules adopted to answer the decisions identified in **Section 6.1.2** are summarised in

Table 7.1.

Table 7.1: Summary of Decision Rules

Decision Required to be Made	Decision Rule
1. Have the UPSS been appropriately decommissioned in accordance with UPSS (2020)?	Where known/suspected UPSS have been removed/or decommissioned in in-situ, where appropriate, and appropriately validated , Then the answer is Yes. Otherwise the answer is No.
2. Are there any unacceptable risks to future human site receptors, associated with TCE and potential TRH impacts in soil, following the remediation of soils?	Soil validation data shall be collected from the walls and base of excavations and of the remediated soils. If the soils validation results meet the adopted validation criteria then the answer is Yes. If the soil validation results fail the adopted validation criteria then the answer is No.
3. Are impacted fill materials appropriately contained to control potential future exposures of human and ecological receptors to impacted material?	At the completion of the remediation and site development works a marker layer and capping consisting of pavement or otherwise an minimum depth of 0.5 m non-impacted soils shall be present across the extent of the site where impacted fill materials are still in place. If site observations (inspections and photographs) and site surveys are available to demonstrate these works have occurred then the answer is Yes. If there is uncertainty as to whether these measures have been installed across the extent of the site then the answer is No.
4. Have all aesthetic issues been addressed?	If the final site surface is free of asbestos impacts and absent of significant petroleum odours or otherwise visual indicators of hydrocarbon impact (i.e. sheens), the answer to the decision will be Yes. Otherwise, the answer to the decision will be No.
5. Were surplus materials classified and disposed off-site to a facility licensed to accept the classified waste, or where relevant, appropriately recycled for beneficial re-use?	<p>Waste Materials</p> <p>Soil analytical data will be compared against EPA (2014b) criteria. Statistical analysis (comprising a review of 95% UCL of the mean, standard deviation and maximum values of dataset) of the data in accordance with relevant guidance documents will be undertaken, where appropriate, to facilitate the decisions (as detailed above).</p> <p>Documentation from the operation receiving the material including the dates, tonnage and classification of the accepted material will be required to facilitate the decision.</p> <p>If the statistical criteria stated above are satisfied, the decision is Yes, and if receipts are provided recording the disposal of material to an off-site licensed facility, the decision is Yes.</p> <p>If the material exceeds the criteria, and no disposal receipts are provided, the answer is No.</p> <p>Beneficial Off-site Re-use</p> <p>Based on the presence of ASS/PASS in natural site soils, and the presence of asbestos in site fill it is not anticipated that soil excavated from the site will be able to be beneficially reused under general exemptions. Where any such beneficial reuse is proposed a separate assessment will be required.</p>
6. Where material is imported to site for development purposes is it considered environmentally suitability for use?	Analytical data sets and inspection data will be reviewed for each proposed material type/source against established definitions for acceptable material (i.e. VENM, resource recovery exemptions, etc) and EPA endorsed criteria as established in the RAP as validation criteria (Section 7.3). If the complete data set for the applicable material meet the requirements relevant to the material type, the answer to the decision is Yes and material may be imported to site. If the data set exceeds the adopted criterion, the answer to the decision is No and the material cannot be imported to site for use in development activities.

Decision Required to be Made	Decision Rule
7. Have remedial and validation works met the requirements of the RAP?	<p>If the answer to any of the Questions 1 to 6 is No, the answer to the decision is No. Further assessment is required to establish the nature and extent of additional remediation/management as may be required.</p> <p>If the RAP requirements were addressed, and there are no outstanding issues, the answer to the decision is Yes.</p>
8. Is the site suitable for the proposed land use?	<p>If the answer to Question 7 is Yes, then the answer to the decision is also Yes. Otherwise, the answer to the decision is No. In this instance further remediation/management actions will require to be implemented and appropriately documented such that a future review of the above decisions may result in a different decision outcome.</p> <p>It is noted that in instances where impacted materials are contained, the statement of site suitability will be contingent on the implementation of a long-term environmental management plan (LTEMP) that documents procedures to maintain integrity of capping layer etc.</p>

7.2.6 Specify the Limits on Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits for this project have been adopted in accordance with the appropriate guidance from the NSW EPA, NEPC (2013), appropriate indicators of data quality (DQIs used to assess quality assurance / quality control) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined DQI) established for the project as discussed below in relation to precision, accuracy, representativeness, comparability and completeness (PARCC parameters). The acceptable limit on decision error is 95% compliance with DQIs.

The DQIs and data assessment criteria are summarised as presented in **Table 7.2**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** – expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.

- **Sensitivity** – expresses the appropriateness of the chosen field and laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted site assessment criteria.

Table 7.2 Summary of Data Quality Indicators

Data Quality Objectives	Frequency	Data Quality Indicator
Precision		
Blind duplicates (intra laboratory)	1 / 20 primary samples	1-10x LOR – no limit;
Blind duplicates (inter laboratory)	1 / 20 primary samples	10x-30x LOR - <50 % relative percent difference (RPD) ¹
Laboratory duplicates	1 / 20 primary samples	>30x LOR - <30 % RPD
Accuracy		
Surrogate spikes	All organic samples	70-130 %
Laboratory control samples	1 per lab batch	70-130 %
Matrix spikes	1 per lab batch	70-130 %
Representativeness		
Sampling appropriate for media and analytes	All samples	- ²
Samples extracted within holding times.	All samples	TRHs, VOCs and SVOCs – 14 days Asbestos – no limit
Trip spike (BTEX only)	1 per sampling event	70-130% recovery
Rinsate blank	1 per sampling event	<LOR
Method blank	1 per lab batch	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All Samples	All samples
Standard analytical methods used for all analyses	All Samples	NATA accredited methods
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples ²
Limits of reporting appropriate and consistent	All Samples	All samples ²
Completeness		
Sample description and COCs completed and appropriate	All Samples	All samples ²
Appropriate documentation	All Samples	All samples ²
Satisfactory frequency and result for QC samples	All QA/QC samples	95% compliance
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted Site assessment criteria	All samples	LOR ≤ site assessment criteria

¹ If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgment will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field.

² A qualitative assessment of compliance with standard procedures and appropriate sample collection methods will be completed during the DQI compliance assessment.

7.2.7 Validation Inspections and Sampling

The validation inspections, sampling and analysis required for remediation areas are summarised in **Table 7.3** and detailed in the following sections.

Table 7.3 Validation Inspection and Sampling Program

Item	RAP Sampling Density			Analytical Suite
Source Removal Excavation Validation				
	Excavation Floors	Excavation Walls	Materials	
Excavations formed to remove USTs	1 / 100 m ² (10 m grid) Minimum 2 samples per excavation. Minimum 2 samples per UST removed.	1 / 4 m (from each distinct horizon or material type or 1 m vertical soil profile)	N/A	TRHs, BTEXN, PAHs and lead (all excavations) in soil samples
Excavations formed by the removal of TCE contaminated soils	1 / 100 m ² (10 m grid) Minimum 2 samples per excavation where the excavation is terminated above groundwater	1 / 4 m (from each distinct horizon or material type or 1 m vertical soil profile)	N/A	VOCs 8260 in soil vapour samples
Excavations formed by the removal of impacted materials (if identified as part of an unexpected find)	1 / 100 m ² (10 m grid) Minimum 2 samples	1 / 10 m (from each distinct horizon or material type or 1 m vertical soil profile) Minimum 4 samples	N/A	As determined by the nature of the impact
Petroleum Hydrocarbon Impacted Soils Remediation				
Bioremediated Soils / Landfarm pile(s)	1 sample per 25 m ³ , minimum 3 samples per pile.			Soil Samples: TRH BTEXN
SVE Treated Soils	1 sample per 25 m ³ , minimum 3 samples per pile.			Soil Vapour Samples: VOCs 8260
Materials Importation				
Imported VENM	Minimum of 3 samples per source site / material type to 500 m ³ then 1 sample per 500 m ³ thereafter			TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos (500 ml)
Quarry VENM Materials (e.g. blue metal, sandstone, shale)	Confirmation that the material is quarried rock (VENM) prior to importation, and visual confirmation.			Site Inspection required.
Material subject to a NSW EPA Resource Recovery Order/Exemption	Confirmation by the supplier that the material meets the terms of the order. Then environmental consultant sampling at a minimum of 3 samples per source site / material type to 500 m ³ then 1 sample per 500 m ³ thereafter, prior to importation			TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos (500 ml)
Export of Materials				
Surplus waste materials for off-site disposal are to be classified in accordance with EPA (2014b).	Stockpiled materials for off-site disposal require a minimum of 5 samples (up to 75 m ³) or a sample density of 1/25 m ³ to 200 m ³ (whichever is greater) Decreased sampling frequency to be justified on basis of stockpile homogeneity and risk of contaminants present.			Heavy metals TRH/BTEXN PAHs OCP/PCBs Asbestos SPOCAS (ASS) TCLP (Heavy metals and PAHs) at the Environmental Consultant's discretion.

7.2.8 Excavation of TCE Impacted Soil

The validation program for the removal of the TCE impacted soils comprises:

- Inspection of the excavated areas by a suitably trained and experienced environmental consultant to confirm the extent of potentially impacted materials have been removed. This inspection shall be cognisant of aesthetic indicators of TCE impact (i.e. odours, etc.) and elevated PID measurements. If additional potentially impacted material is identified, further excavation will be conducted and the affected area will be re-inspected until such time as visual, olfactory and field screening validation is obtained;
- Following field screening validation, soil vapour (as appropriate to the nature of the impact) samples will be collected from the remediation area walls at a rate of 1 sample per 4 linear m, and from the excavation bases at a rate of 1 sample per 100 m² (minimum 2 samples per base and one sample from each wall). The methodology to collect soil vapour samples is provided following:
 - Soil vapour probes will be installed to a depth of 1 m within the walls or base of the excavation via driving a star picket with a metal tube attached within the excavation;
 - 6 mm nylon tubing will be placed within the metal tubing to the depth of the probe and sealed from the atmosphere via the application of air drying clay;
 - The probes will be immediately purged via drawing and expelling approximately 0.5 L of gas from within the probe with a syringe;
 - Gas readings will subsequently be monitored until PID readings have stabilised;
 - If PID readings indicated that TCE concentrations are likely less than 50% of the validation criteria, a minimum volume of 6 L of vapour shall be collected onto a carbon tube with calibrated pump;
- Excavation validation samples will be analysed at a laboratory NATA accredited for the required analyses on an accelerated turnaround time (i.e. 24 hr) to allow for excavations to be backfilled as soon as possible and mitigate the potential risk of oxidising PASS (see further commentary below). If the concentration of COPCs are identified in any of the excavation validation samples exceeding criteria, then the soils will be excavated 0.3 m deeper or otherwise 1 m further in the lateral direction of failure and the validation process repeated. Alternatively, where impact exceeding criteria is not identified by the laboratory, the remedial areas will be deemed to have been successfully remediated and validated.

TCE impacted soils shall be treated via SVE for beneficial onsite reuse. Soils within the walls and base of the open excavation shall be field screened (in accordance with the requirements of an ASSMP to be prepared separately) for ASS – where the results indicate the potential for PASS materials to be oxidised in the period following excavation pending validation results, the environmental consultant shall give direction to the contractor to backfill the excavation. Any additional remedial excavations required will be completed in subsequent stages.

7.2.9 Removal of Residual UPSS/USTs and Operational Infrastructure

Following removal of residual infrastructure, the Environmental Consultant shall:

- Inspect underlying surfaces and/or resultant excavation for indicators of additional connecting services or residual infrastructure (i.e. piping, concrete conduits, etc.);
- Where no indicators of residual infrastructure are identified, the Environmental Consultant shall photograph the resultant surfaces/excavation for inclusion in the validation report;
- The Environmental Consultant shall then direct the Remedial Contractor to undertake excavation/removal of residual impacted soils (if present). The procedure for validation of impacted soil removal is provided below; and

- Upon disposal of infrastructure, the Remedial Contractor shall provide disposal dockets to the Environmental Consultant for inclusion in the validation report.

Petroleum Hydrocarbon Impacted Soils Excavation

The validation program for the removal of the petroleum hydrocarbon impacted soils surrounding the USTs comprises:

- Inspection of the excavated areas by a suitably trained and experienced environmental consultant to confirm the extent of potentially impacted materials have been removed. This inspection shall be cognisant of aesthetic indicators of petroleum hydrocarbon impact. The potential presence of petroleum hydrocarbons should be further assessed by the use of a PID. If additional potentially impacted material is identified, further excavation will be conducted and the affected area will be re-inspected until such time as visual and olfactory validation is obtained;
- Following visual and olfactory validation, soil (as appropriate to the nature of the impact) samples will be collected from the remediation area walls at a rate of 1 sample per 4 linear m, and from the excavation bases at a rate of 1 sample per 100 m² (minimum 2 samples per excavation base or UST removed and two samples from each wall);
- Excavation validation samples will be analysed at a laboratory NATA accredited for the required analyses on an accelerated turnaround time (i.e. 24 hr) to allow for excavations to be backfilled as soon as possible and mitigate the potential risk of oxidising PASS (see further commentary below). If the concentration of COPCs are identified in any of the excavation validation samples exceeding criteria, then the soils will be excavated 0.3 m deeper or otherwise 1 m in a further lateral extent in the direction of failure and the validation process repeated. Alternatively, where impact exceeding criteria is not identified by laboratory analysis of validation samples, the remedial areas will be deemed to have been successfully remediated and validated; and
- Excavated soils shall be transferred to the prepared area on the site for bioremediation by landfarming.

Soils within the walls and base of the open excavation shall be field screened (in accordance with the requirements of the ASSMP) for ASS – where the results indicate the potential for PASS materials to be oxidised in the period following excavation pending validation results, the environmental consultant shall give direction to the contractor to backfill the excavation. Any additional remedial excavations required will be completed in subsequent stages.

7.2.10 Validation of Treated Soils

Bioremediation

The completion of bioremediation of petroleum hydrocarbon impacted soils within the landfarm requires to be confirmed by validation sampling. Soils within the landfarm will be spread at a typical thickness of 0.5 m. Validation samples shall be collected from a depth of 0.25 m below the landfarm surface and directly transferred to a laboratory supplied sample jar. Samples shall be confirmed to be free of aesthetic indicators of impact prior to analysis.

Samples shall be collected at a minimum frequency of 1 sample per 25 m³ or a minimum three samples per landfarm stockpile. Landfarmed soils shall be analysed in accordance with **Table 7.3**.

If the concentration of COPCs are identified in any of the landfarm samples exceeding criteria, then consideration will be given to continuing the process of landfarming, or alternatively disposing of soils from the site. Where impact exceeding criteria is not identified by the laboratory, the subject landfarm soils will be deemed to have been successfully remediated and validated and suitable for reinstatement.

SVE Treated Soils

The successful treatment of TCE impacted materials will be informed by field screening of soil vapour levels within treated stockpiles. The same methodology as adopted for the field screening of remedial excavations was also used for measuring contaminants within stockpiles. The minor difference being, a temporary soil vapour probe shall be driven 1 m within a discrete stockpile. Samples shall be collected at a minimum frequency of 1 sample per 25 m³ or a minimum three samples per landfarm stockpile. Treated soils shall be analysed for VOC 8260. If the concentration of COPCs are identified in any of the treated stockpile samples exceeding criteria, then consideration will be given to continuing the process of treatment, or alternatively disposing of soils from the site. Where impact exceeding criteria is not identified by laboratory analysis of validation samples, the subject treated stockpile will be deemed to have been successfully remediated and validated, and will be considered suitable for reinstatement.

7.2.11 Validation of Retention of Impacted Soils On-Site

The preferred remedial method for the widespread asbestos affected soils is long term retention on the site. This shall be undertaken as per a long-term containment strategy.

A further objective of the site development works will be minimisation of wastes as generated by the project. There is a likelihood as a consequence of the proposed development works, e.g. excavations required to facilitate sub-surface service installation, that surplus soils will be generated during the site remediation and associate earthworks. Consideration may be given to assessment of surplus soils for beneficial reuse where the subject soils are free from asbestos and/or considered not to comprise ASS/PASS.

With this proposed waste minimisation strategy, it is likely that impacted fill soils may be caused to be redistributed across the site. This relocation of impacted soils / fill materials is proposed to be restricted to unsaturated horizons within the site only. The validation of the appropriate re-use of impacted materials within the site and the long-term management of the soils to control potential health and ecological risks will be dependent on three aspects of site validation:

- Material tracking;
- Consideration of distribution of site impacts by comparison to previous health risk assessments undertaken for the site;
- Installation of a marker layer; and
- Installation of a capping layer.

The validation of each component is discussed further following.

Material Tracking

The movement of all impacted materials (subject to long term containment) on the site is required to be subject to a Material Tracking Plan (MTP). The MTP shall be administered by the environmental consultant with the provision of all required information by the remediation contractor and will generally contain the following elements:

- Date (yyyy/mm/dd);
- Site figure showing source (cut) and placement (fill);
- Estimated volume (cubic metres);
- Type of material (asbestos, VENM etc);
- Depth of source (RL);
- Depth of placement (RL);
- Source (from) information in terms of MGA56 co-ordinates as established by site GPS and/or survey;

- Placement (to) information in terms of MGA56 co-ordinates as established by site GPS and/or survey;
- Source (from) information in terms of site feature (e.g. Building X);
- Placement (to) information in terms of site feature (e.g. under site building);
- Reference document (where necessary, i.e. virgin excavated natural material / excavated natural material classification);
- Purpose of placement (i.e. containment, surplus to site requirements etc); and
- Comments (when required).

Marker Layer

Visual inspection will be undertaken by the Environmental Consultant to verify the installation of the marker layer across the complete extent of the site where fill soils are present in the sub-surface. Photographic records and a survey prepared by the Project Surveyor of the marker layer installation, including vertical and lateral extents will be retained for inclusion in the Validation Report.

Capping Layer

Material to be used as a capping layer (other than concrete pavement) must be validated by the Environmental Consultant to be environmentally suitable, consisting of VENM, ENM, suitable on-site materials (i.e. materials from another portion of the development site that are non-impacted) or material considered suitable for beneficial reuse via a resource recovery exemption issued by NSW EPA. Additionally, contaminant concentrations in any capping layer material must not exceed the adopted site validation criteria for soils.

The capping layer must be placed at the thicknesses specified for each capping scenario as detailed in **Section 6.4**. Photographic records and a survey of the capping layer installation, which details the final thicknesses of the capping layer, including the vertical and lateral extents prepared by the Contractor will be retained for inclusion in the Validation Report. This shall also make reference to the requirements for landscaping soils and zones as consistent with the final development plans (to be prepared).

7.2.12 Ground Surface Validation (Aesthetics)

Prior to the completion of remedial works and also following placement of the marker layer, the ground surface of the site shall be thoroughly inspected by the environmental consultant to confirm the absence of visual ACM which may have been incidentally deposited during works.

Should any observable ACM be identified, the area should be emu-picked prior to re-inspection by the environmental consultant.

7.3 Validation Criteria

7.3.1 Soil

Soil validation data collected on site will be compared to the most conservative petroleum hydrocarbon in soil criteria provided in NEPC (2013) for the protection of human health applicable to commercial / industrial land-use. In addition, consideration of ecological criteria will be required in areas proposed to be landscaped.

Aesthetic impacts of soils will be interpreted by on-site observations of indicators of soil staining and/or ACM and/or odours and/or other anthropogenic materials.

The petroleum hydrocarbon site validation criteria are nominated in **Table 7.4** following.

Site specific soil validation criteria as protective of ecological receptors shall be derived on the basis of soil physiochemical parameters to be assessed as part of pre-remediation activities.

Table 7.4: Soil Validation Criteria

Constituent	Health Investigation Levels	Health Screening Level for Vapour Intrusion (mg/kg)	Management Limits – Coarse Soil
TRH C ₆₋₁₀ Less BTEX (F1)	-	45	700
TRH C _{>10-C16} Less naphthalene (F2)	-	110	1000
TRH C _{>16-34}	-	-	3500
TRH C _{>34-40}	-	-	10 000
Benzene	-	0.5	-
Toluene	-	160	-
Ethylbenzene	-	55	-
Xylenes	-	40	-
Naphthalene	-	3	-

7.3.2 Soil Vapour

Soil vapour validation data collected on site will be compared to the site-specific risk criteria to be established from the human health risk assessment as completed as part of pre-remediation activities (**Section 6.3.1**).

7.3.3 Waste Disposal Off-site

All wastes requiring off-site disposal must be classified in accordance with *Waste Classification Guidelines* (EPA 2014b). The Remedial Contractor is responsible for the lawful disposal of the classified waste to a licensed waste disposal facility lawfully able to accept the waste.

Disposal dockets for each individual off-site waste disposal load must be provided to the to the Remediation Consultant by the Contractor to demonstrate appropriate off-site disposal of waste occurred for site validation purposes.

7.3.4 Transport of Asbestos Impacted Materials (if encountered)

Transport of materials affected by asbestos will require to be further cognisant of the requirements of *Work Health and Safety Act (2011)* and *Work Health and Safety Regulation (2017)*, *How to Manage and Control Asbestos in the Workplace: Code of Practice*, October 2018, Safe Work Australia, *Managing Asbestos in or on Soil*, 2014, WorkCover and the EPA (2014b).

The details of the relevant contractor shall be further advised to the relevant parts of the materials tracking form(s).

7.4 Validation Reporting

At the completion of the remedial works, a validation report will be prepared in general accordance with the *Consultants Reporting on Contaminated Land Contaminated Land Guidelines* (EPA 2020), documenting the works as completed. The report will contain information including:

- Details of the remediation works conducted;
- Information demonstrating that the objectives of this RAP have been achieved, in particular the validation sample results and assessment of the data against both the pre-defined DQO and the remediation acceptance (validation) criteria;

- Information demonstrating compliance with appropriate regulations and guidelines including UPSS infrastructure destruction/disposal documentation;
- Any variations to the strategy undertaken during the implementation of the remedial works;
- Results of all environmental monitoring undertaken during the course of the remedial works;
- Details of any environmental incidents occurring during the course of the remedial works and the actions undertaken in response to these incidents;
- Verification of regulatory compliance;
- Details on waste classification, tracking and off-site disposal including landfill dockets;
- Photographic records of applicable remediation works;
- Survey data for all area subject to capping and containment; and
- Clear statement of the suitability of the site with respect to permissible land uses with references for ongoing management (if applicable).

The report will serve to document the remediation works for future reference. It is noted that due to site access and/or construction constraints, that the remediation and validation works may occur in stages.

8. Unexpected Find

The possibility exists for hazards to be present at the site other than those identified and expected based on previous investigations.

Environmental sampling is based on chemical analytes identified as a potential concern during a documented process of reviewing historical site activities. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations. The nature of any additional hazards which may be present at the site are generally detectable through visual or olfactory means, for example:

- Areas of previously unidentified ACM on the ground surface or within fill material;
- Uncontrolled filling, such as in eroded drainage lines;
- Drums or underground tanks;
- Chemical bottles; and
- Odorous or unusual coloured soils;

As a precautionary measure to ensure the protection of the workforce and surrounding community, if any of the abovementioned substances be identified (or any other unexpected potentially hazardous substance), the procedure summarised in **Flowchart 8.1** and detailed in the following sections is to be followed.

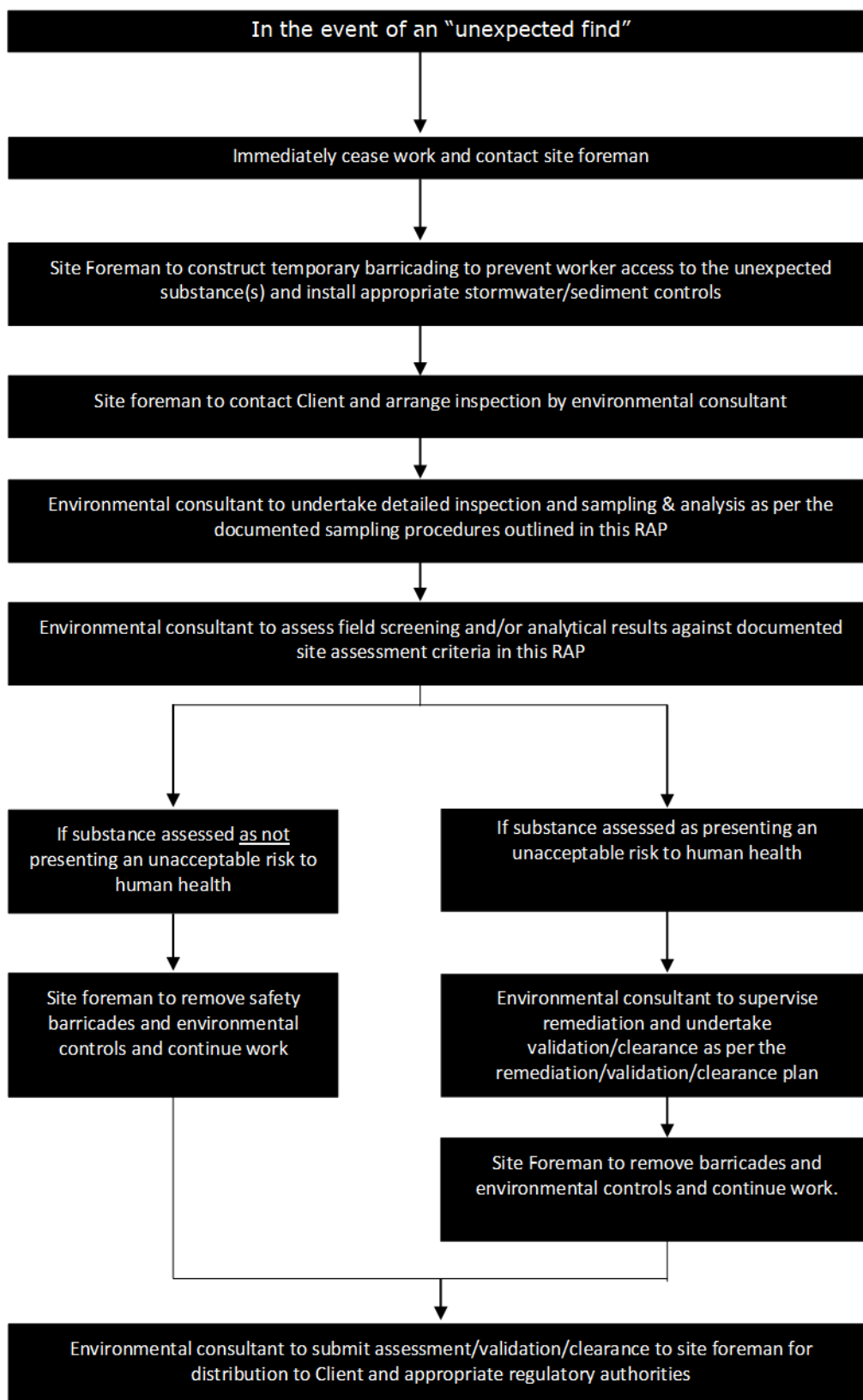
An enlarged version of an unexpected finds protocol, suitable for use on site, should be posted in the Site Office and referred to during the Site-Specific Induction by the Principal Contractor.

The sampling strategy for each 'unexpected find' shall be designed by a suitably qualified environmental consultant, in accordance with guidelines made or endorsed by EPA. The strategy will, however, be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

The sampling frequency of the identified substance / materials shall meet the requirements the NSW EPA (2022).

The assessment criteria shall be determined by the Environmental Consultant, with the subject material to at least meet the criteria nominated in **Section 7.3**, and additional criteria (as necessary) obtained from published national guidance documents.

Flowchart 8.1: Unexpected Find Protocol



9. Site Management Plan

This section contains procedures and requirements that are to be implemented as a minimum requirement during the remedial works at the site.

9.1 Contact Persons

Contact details for key personnel involved in remediation and validation works are summarised in Error! Reference source not found..

Table 9.1: Contact Details

Client's Supervisor/Manager	
Name	To be advised
Company	To be advised
Address	To be advised
Contact Phone	To be advised
Remediation Contractor	
Name	To be advised
Company	To be advised
Contact Phone	To be advised
Environmental Consultant	
Name	To be advised
Company	To be advised
Address	To be advised
Contact Phone	To be advised

9.2 Hours of Operation

It is understood that the hours of operation for remedial works will be conducted in accordance with the recommended site hours suggested by the EPA¹², however, works hours will be subject to requirements of any development approval conditions provided by the consent authority.

Typical hours of operation for remedial works are:

- Monday to Friday: 7am to 6pm.
- Saturday: 8 am to 1 pm.
- Sunday and public holidays: No work permitted.

Emergency work is permitted to be completed outside of these hours.

9.3 Soil and Water Management

All works shall be conducted in general accordance with Landcom (2004)¹³ guidance (the Blue Book), which outlines the general requirements for the preparation of a soil and water management plan.

All remedial works shall be conducted in accordance with a soil and water management plan, which is to be kept onsite and made available to council officers on request. All erosion and sediment measures must be maintained in a functional condition through the remediation works by the remedial contractor.

¹² *Interim Construction Noise Guideline*. Department of Environment & Climate Change NSW. DECC 2009/265. July 2009.

¹³ *Managing Urban Stormwater: Soils and Construction*, Landcom 4th Edition, March 2004.

To prevent the migration of impacted soil off site, silt fences shall be constructed at the down-gradient site boundaries by the remedial contractor. Any material which is collected behind the sediment control structures shall be removed off site to a licensed waste facility after waste classification.

In storm or extended rainfall event, the structures located on site for sediment control shall be monitored and replaced or altered if necessary by the contractor. Collected material shall be managed in accordance with remediation works by the contractor.

9.3.1 Stockpiles / Landfarms

All materials stockpiled onsite (inclusive of the Landfarm) will be managed by the remedial contractor. Unique numbers will be provided for each stockpile, the source of the stockpile, its volume, material characterisation and its location onsite (via GPS) recorded.

The following procedures will be implemented by the remedial contractor:

- No stockpiles of soil or other materials shall be placed on footpaths or nature strips unless prior Council approval has been obtained;
- All stockpiles of soil or other materials shall be placed away from drainage lines gutters or stormwater pits or inlets;
- All stockpiles of soil or other materials likely to generate dust or odours shall be covered (where practical); and
- All stockpiles of contaminated soil shall be placed on plastic sheeting to limit cross contamination of the underlying soils and stored in a secure area.

9.3.2 Site Access

During remediation works, temporary fencing will be installed which will restrict access to remedial areas on the site. Only authorised persons will be permitted to enter the remedial areas.

Vehicle access to the site shall be stabilised to prevent the tracking of materials from the site and the adjoining driveway/access point to the road will be swept or cleaned on an as-needed basis. Any collected materials shall be treated as potentially contaminated and handled as per the classification/reuse/disposal requirements outlined in this RAP.

9.3.3 Excavation Pump-out

It anticipated that excavation pump out may be required due to surface water inflow to excavations during remediation or construction works. Any excavation pump-out water shall be sampled by the environmental consultant for analysis for total suspended solid concentrations, turbidity, pH and the identified contaminants of concern prior to release to stormwater with appropriate documentation indicating that the discharged water is compliant with the ANZG (2018¹⁴) default guideline values (DGVs) for the 95 % Protection of Fresh Water Ecosystems. If not, the water may be disposed off-site to a licenced facility lawfully able to accept the waste.

¹⁴ Australian and New Zealand Guidelines for Fresh an Marine Water Quality, August 2018, Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (ANZG 2018)

9.4 Noise

Remediation work shall not give rise to 'offensive noise' as defined in the POEO Act 1997. All equipment and machinery associated with the remediation work shall be operated by the Contractor in accordance with *the POEO Act 1997* and the *Noise Control Regulations 2000*.

All machinery and equipment used on site will be in good working order and fitted with appropriate silencers when necessary.

Louder equipment shall be located away from noise sensitive areas. Works shall be staged as required to avoid concurrent operation of multiple pieces of noisy equipment. Works outside of normal hours of operation (**Section 9.2**) shall be avoided.

9.5 Vibration

The use of plant and machinery shall not cause vibrations to be felt or capable to be measured at neighbouring premises.

9.6 Air Quality

During remedial works, dust emissions and any odours will be confined within the site boundary.

9.6.1 Dust Control

During the remedial works, as necessary, excavation areas will be wetted down using a water spray to minimise the potential for dust to be generated by the remedial contractor.

Dust shall also be controlled by ensuring vehicles leave via the designated (stabilised) site access and all equipment have dust suppressors fitted by the remedial contractor.

During all remedial works, dust screens will be erected around the perimeter of the site by the remedial contractor. Where significant fugitive emissions are observed from specific site areas, these areas shall be wetted and/or covered by the remedial contractor.

Meteorological conditions will be monitored by the environmental consultant and remedial contractor. Remedial work will be stopped or modified where meteorological conditions are adverse (i.e., dry conditions and strong winds towards sensitive receptors).

Plant and vehicles should limit their speed when working within asbestos exclusion zones and only traverse wetted haul roads.

9.6.2 Odour

Given the nature of some of the material being excavated at the site, namely hydrocarbon impacted soils, there may be some odour issues at the site boundaries.

If odours are detectable at the site boundaries, 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.

Records of volatile emissions and odours shall be kept by the remediation manager. Equipment and machinery will be adequately maintained to minimise exhaust emissions. No materials shall be burnt on the site.

9.7 Groundwater

No groundwater remediation is proposed as part of site remediation works. However, should dewatering be required for construction purposes, a dewatering approval may be required from the NSW Department of Primary Industry (DPI).

9.8 Material Transport

Trucks will be loaded in a designated area in a manner designed to minimise noise, vibrations and odour to adjoining premises. The transportation contractor shall ensure that there is no material tracked out onto public roads and that each load is securely covered. Removal and deliveries of soils and materials, equipment and machinery will only occur during the hours of remediation works unless specific approvals are obtained.

All appropriate road rules shall be observed and state roads will be selected as far as practicable over local roads when deciding on the transport route to the off-site material disposal location. In addition, the transport contractor will be required to be appropriately licensed to transport and dispose of the waste identified as requiring removal from the site.

As of 1 July 2015, it will be required under the *Protection of the Environment Operations (Waste) Regulations 2014* (POEO 2014) to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m² of asbestos sheeting. Any asbestos waste exceeding 100 kilograms or more than 10 m² of bonded ACM in one load disposed off-site must be tracked using the NSW EPA online system WasteLocate. Each load will be assigned a unique consignment code to allow NSW EPA to monitor their movement from site of generation to disposal.

In addition, the proximity principle, under POEO 2014, makes it an offence to transport waste generated in NSW by motor vehicle for disposal more than 150 kilometres from the place of generation, unless the waste is transported to one of the two nearest lawful disposal facilities to the place of generation.

9.9 Hazardous Materials

Hazardous and / or intractable wastes arising from the remediation work shall be removed and disposed of in accordance with the requirements of NSW EPA, SafeWork NSW and the relevant regulations by the Contractor.

Any hazardous wastes will be transported by a NSW EPA licensed transporter.

9.10 Disposal of Contaminated Soil

All soil will be classified, managed and disposed in accordance with the *Waste Classification Guidelines* (EPA 2014). Documentary evidence for all soil disposal shall be kept for inclusion in the Validation Report.

9.11 Site Signage and Contact Numbers

A sign shall be displayed adjacent to the site access throughout the duration of the works with the contact details of the remediation contractor and project manager.

9.12 Community Relations

Owners and/or occupants of premises adjoining the site will be notified at least seven days prior to the commencement of remedial works.

Any community concerns or queries should be directed to the site manager. The site manager will notify the site owner of any community queries or concerns so that the site owner will direct an appropriate person to address the community query or concern.

9.13 Site Security

The remedial areas shall be secured against unauthorised access by means of an appropriate fence.

9.14 Occupational Health and Safety

It is the employer's responsibility to ensure that all site remediation works comply with all Work Health and Safety and Construction Safety Regulations of NSW SafeWork. A Health and Safety Plan is provided in **Section** Error! Reference source not found..

10. Health and Safety

This health and safety plan contains procedures and requirements that are to be implemented as a minimum during the remediation works.

The objectives of the health and safety plan are:

- To apply standard procedures that reduce risks resulting from the above works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.

These objectives will be achieved by:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards and mandatory safety practices and procedures; and
- Provision for contingencies that may arise while operations are being conducted at the site.

This health and safety plan does not provide safety information specific to construction and other demolition or excavation activities carried out by contractors, such as the safe operation, maintenance and inspection of plant, etc. Contractors will be required to prepare their own Safe Work Method Statements for their work activities. All parties working on the site shall comply with all applicable Health and Safety legislation, regulations, codes and guidelines.

10.1 Responsibilities

Remediation Supervisor

The remediation supervisor is responsible for ensuring that the work is carried out in accordance with the health and safety plan. This will include:

- Ensuring a copy of the health and safety plan is available at the site during the remediation/validation activities;
- Ensuring all works are undertaken in accordance with appropriate regulations and standards;
- Confirming individuals are competent in performing allotted tasks;
- Liaison with the contractor representatives, as appropriate, regarding safety matters; and
- Investigation and reporting of incidents and accidents.

Every individual worker is responsible for conducting their allocated tasks in a safe manner and in accordance with their training and experience. They must give due consideration to the safety of all others in their proximity and cooperate in matters of health and safety. All workers must leave their work areas in such a condition that the location will not be hazardous to others at any time.

10.2 Hazards

The known or potential hazards associated with the work activities described in **Section** Error! Reference source not found. are listed below:

- Chemical hazards associated with the presence of potentially contaminated soil and groundwater inclusive of elevated levels of hydrocarbons;
- Inhalation hazards associated with the potential presence of bonded ACM in soils;
- Physical hazards, including:
 - work in or near excavations;
 - operating machinery;
 - heat stress and UV exposure;
 - underground (particularly with the presence of UST(s)) or overhead services;
 - manual handling; and
 - noise.

In the event of the discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, or of any new hazard that could potentially cause serious harm to personnel or the environment, work will be suspended until the Project Manager has been notified and appropriate instructions have been provided to field personnel.

10.3 Chemical Hazards

When working with potentially contaminated materials in general, care must be taken to ensure that the contamination is not introduced to the worker via ingestion, inhalation or absorption. PPE and decontamination requirements related to the remedial works are summarised in **Section 10.5**

10.4 Physical Hazards

Operating Machinery

Heavy plant and equipment operating in the vicinity of field personnel presents a risk of physical injury. Personnel should be cognisant of their position in relation to operating machinery at all times.

Never walk behind or to the side of any operating equipment without the operator's knowledge. Do not assume that the operator knows your position. Personnel should stay at least 1 m from the operational area of heavy equipment and should not stand directly below any load or piece of equipment (e.g. backhoes).

Work in or Near Excavations

All excavations shall be shored, sloped or otherwise constructed so as to minimise the potential for collapse. No excavations greater than 1.5 m depth are anticipated to be created.

Cuts and Abrasions

The manual work associated with the remediation works gives rise to the risk of cuts and abrasions to personnel working in the area. As well as the direct consequences of any cut or abrasion, such injuries can lead to the possibility of exposure to contaminants through the wound as well as diseases such as tetanus. To minimise the risk of direct or indirect injury, personnel will wear the personal protective equipment described in **Section 10.5**.

Heat Stress and UV Exposure

Site personnel may experience heat stress due to a combination of elevated ambient temperatures and the concurrent use of personal protection equipment; this depends in part on the type of work and the time of year.

In addition to heat stress, overexposure to UV radiation in sunlight can result in sunburn to exposed skin. The use of a high protection sunscreen (SPF15 or greater) on all exposed skin is recommended. Hats (including hard hats in specified areas) will also provide additional sun protection during the peak (i.e. 10:00 am to 3:00 PM) sun period. Sunglasses should be worn (where appropriate) to protect eyes from effects of UV exposure.

Underground Services

There is the potential for underground services (electricity, natural gas lines, water, telephone, sewer, and stormwater) to be present beneath the work area. The remediation contractor shall ensure that appropriate procedures will be taken to minimise the risk associated with excavation near services.

It is further noted that the presence of UST(S) will require appropriate decommissioning. The Remedial Contractor shall ensure that appropriate procedures will be taken to minimise the risk associated with the works.

Aboveground Electrical Hazards

All electrical plant and equipment must comply with the requirements of Australian Standard AS 3000. Hand held portable tools shall comply with AS/NZS 3160 Hand-held Portable Electric Tools and shall be double insulated. Cord connected portable hand lamps shall comply with AS/NZS 3118. A Residual Current Device (RCD) shall protect plug-in portable equipment, which is connected to a supply above Extra Low Voltage - 12-24volts (including equipment supplied from a generator or welding set). RCD protection shall be used with portable electrical equipment at all times while the equipment is connected to a power supply above Extra Low Voltage, irrespective of whether power is switched ON or OFF. RCD's shall comply with AS 3190 and shall be type II units, rated to trip at or below 30 milliamps within 40 milliseconds.

All equipment shall be operated in compliance with the NSW WorkCover (2006) Work Near Overhead Power Lines: Code of Practice. Minimum approach distances for all equipment should exceed:

- 3.0 m for nominal phase to phase ac voltage lines up to 132,000 Volts;
- 6.0 m for 132 000 to 330 000 Volts;
- 8.0 m for greater than 330 000 Volts; and
- 3.0 m for nominal pole to earth dc voltage up to and including 1500 +/- volts.

Manual Handling

When lifting or handling heavy objects, use correct lifting techniques, bending the knees not the back. If the item to be lifted is too heavy or awkward for one person to lift, seek assistance from other company employees or use mechanical assistance.

Noise

Long-term exposure to high levels of noise is unlikely. However, operating machinery may cause significant noise exposures for short periods. Earplugs and/or earmuffs should be worn in any situation where noise levels make normal conversation difficult.

10.5 Personal Protective Equipment

All workers who may come into direct contact with contaminated soil will wear the following PPE:

- Overalls or long sleeved collared shirt;

- Heavy duty outer gloves (eg. leather) where there is a risk of cuts or abrasions, otherwise PVC outer gloves if in direct contact with contaminated soil;
- Steel capped boots;
- Safety glasses;
- High visibility vest or jacket; and
- Hard hat.

In addition to the above, the following PPE will be worn by the personnel responsible for handling of fill materials within the extent of the site where asbestos impacted soils are identified/encountered:

- During any work in which direct contact of personnel to asbestos impacted soils may occur and prior to final clearance – overalls, gloves, rubber soled work shoes or gum boots should be worn by personnel involved in the work. These shoes will remain inside the work area for the duration of the work.
- Approved respirators shall be worn during direct handling of asbestos impacted soils to provide respiratory protection. The minimum protection is an approved properly fitting P2 disposable respirator or half faced respirator fitted with a particulate cartridge. However, it is expected that the remediation contractor will conduct a risk assessment in relation to the works and should consider the requirement for positive pressure, hood or full-face powered air-purifying respirator fitted with an approved Class M filter.
- The remediation contractor shall supply and keep in good order, two complete sets of protective clothing and respirators for authorised inspection personnel. These will remain the property of the contractor at the end of the contract.
- Respirators should be issued for personal use only and shall be kept in a clean condition. Alcohol based antiseptic swabs should be made available for the cleaning of respirators.
- Any respirator defects should be reported for subsequent repair. They should be maintained in a clean and safe working condition.
- Employees must receive instruction in the correct method of using the respirator and on the importance of correct facial fit and maintenance. No person with a beard shall be allowed within the asbestos work area except using an approved positive pressure continuous airflow hood.

In the event that the PPE detailed above differs from that required by the Class B licensed contractor, the requirements of the licensed contractor will prevail.

Vehicle, Plant and Equipment

All equipment, including personal protective equipment, will be washed or otherwise cleaned to ensure that contaminated soil, water or dust is removed before it leaves the Site. All plant and equipment will have their outer bodies thoroughly cleaned of soil and sediment before moving off the site.

10.6 Emergency Response

The remediation contractor will be responsible for preparing an emergency response plan, which will provide details on appropriate action and evacuation procedures in the event of an emergency.

In the event of an emergency arising on the site, appropriate action should be taken. Site evacuation procedures should be followed, as necessary.

In the event of an accident: evaluate the seriousness of the injury, and contact emergency services, if necessary; provide first aid, as appropriate, and if safe to do so evacuate the injured person via the Decontamination Zone; make the area as safe as possible without jeopardising safety.

If a serious accident occurs, do not disturb the scene, except to make safe and prevent further injury or damage, and keep all unauthorised people out, and report all accidents to the Project Manager.

11. Regulatory Approvals / Licencing

11.1 Protection of the Environment Operations Act 1997 (POEO 1997)

The proposed remediation/validation activities are not required to be licensed under the *Protection of the Environment Operation Act 1997*, which is based on the following:

- The proposed remediation works will not treat more than 1000 m³ per year of contaminated soil received from off-site.
- The proposed remediation works will not involve the treatment of contaminated soil originating on-site with the capacity: (i) to incinerate more than 1000 m³ per year of contaminated soil, or (ii) to treat (otherwise than by incineration) and store more than 30 000 m³ of contaminated soil, or (iii) disturb an aggregate area of 3 hectares of contaminated soil.

11.2 State Environment Planning Policy (Resilience and Hazards) 2021

Development consent for remediation works is addressed by reference to State Environmental Planning Policy 55 – Resilience and Hazards (SEPP-RH) and associated Planning Guidelines (DUAP 1998).

The proposed remediation works are classified as 'Category 2' Remediation Works – i.e. not requiring consent. The notification requirements include notification to council 30 days before Category 2 remediation works commence. The proposed works do not constitute Category 1 works because it is understood that:

- The work is not Designated Development under Schedule 3 of the EPA&A Regulation or under a planning instrument.
- The work proposed is not on land identified as critical habitat under the *Threatened Species Conservation Act 1995*.
- Consideration of s.5A of the EP&A Act indicates the remediation work is not likely to have a significant effect on threatened species, populations, ecological communities or their habitats.
- The work is not proposed in an area or zone to which any classifications to the following effect apply under an environmental planning instrument:
 - coastal protection;
 - conservation or heritage conservation;
 - habitat area, habitat protection area, habitat or wildlife corridor;
 - environmental protection;
 - escarpment, escarpment protection or escarpment preservation;
 - floodway;
 - littoral rainforest;
 - nature reserve;
 - scenic area or scenic protection;
 - wetland, or
 - carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands Commissioner).

- The work does not require consent under another SEPP or regional environmental plan.

In addition, the notification will also include relevant contact details and a proposed remediation schedule. Notice is also required to be given to Council within 30 days of remediation works completion.

11.3 Protection of the Environment Operations (Waste) Regulation 2014

The regulations make requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site will not require to be licensed. Section 48 of the Reg. requires that wastes are stored in an environmentally safe manner. It also stipulates that vehicles used to transport waste must be covered when loaded.

It will be required under the *Protection of the Environment Operations (Waste) Regulations 2014* (POEO 2014) to record the movement of all loads of more than 100 kg of asbestos waste or more than 10 m² of asbestos sheeting. Each load will be assigned a unique consignment code to allow NSW EPA to monitor their movement from site of generation to disposal.

In addition, the proximity principle, under POEO 2014, makes it an offence to transport waste generated in NSW by motor vehicle for disposal more than 150 kilometres from the place of generation, unless the waste is transported to one of the two nearest lawful disposal facilities to the place of generation.

11.4 Waste Classification Guidelines (EPA 2014b)

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with this guideline.

11.5 Bayside Council (2022) 'Development Control Plan'

The Council DCP provides a number of environmental and site management provisions required to be employed during remediation works. These will require to be adopted as minimum standards for the environmental management of remediation works.

12. Conclusions

Overall, it is considered that the proposed actions outlined in this RAP conform to the requirements of the *Contaminated Sites Guidelines for the NSW Site Auditor Scheme (3rd Edition)* (EPA 2017) because they are: technically feasible; environmentally justifiable; and consistent with relevant laws policies and guidelines endorsed by NSW EPA.

Subject to the successful implementation of the measures detailed in this RAP and subject to the limitations in **Section 13**, it is considered that the risks posed by the identified impacts at the site can be appropriately addressed and that the site can be made suitable for the proposed commercial/industrial land-use.

13. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties. The report has been prepared specifically for the client for the purposes of the commission, and no warranties, express or implied, are offered to any third parties and no liability will be accepted for use or interpretation of this report by any third party.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose. This report should not be amended in any way without prior approval by JBS&G, or reproduced other than in full including all attachments as originally provided to the client by JBS&G.

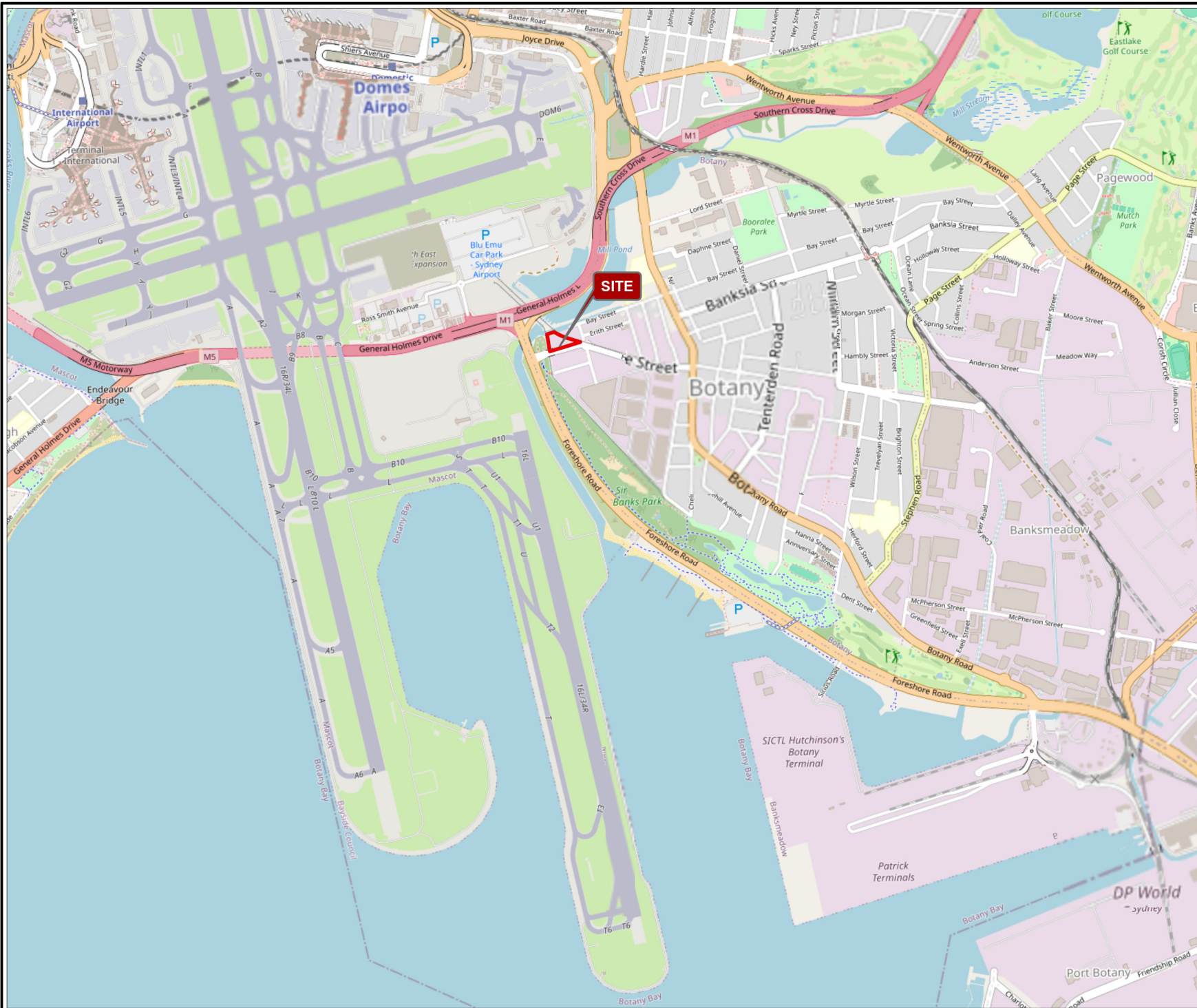
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the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


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

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

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

Figures



Legend
 Approximate Site Boundary




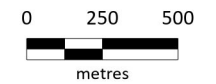
Job No: 65803

Client: Coombes Property Group

Version: R01 Rev A Date 17/01/2024

Drawn By: JL Checked By: CB

Scale 1:25,000 



Coord. Sys. GDA 1994 MGA Zone 56

**2-4 Hale Street
 Botany, NSW**

SITE LOCATION

FIGURE 1



- Legend
- ▬ Approximate Site Boundary
 - NSW Cadastre
 - Stream
 - ACM on ground Surface



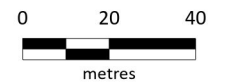
Job No: 65803

Client: Coombes Property Group

Version: R01 Rev A Date 17/01/2024

Drawn By: JL Checked By: CB

Scale 1:1,750



Coord. Sys. GDA 1994 MGA Zone 56

2-4 Hale Street
Botany, NSW

SITE LAYOUT

FIGURE 2



- Legend
- Approximate Site Boundary
 - NSW Cadastre
 - Proposed Sample Location
 - Soil Bores, JBS&G 2022
 - Monitoring Well (JBS&G 2022)
 - Soil Vapour (JBS&G 2022)



Job No: 65803	
Client: Coombes Property Group	
Version: R01 Rev A	Date 17/01/2024
Drawn By: JL	Checked By: CB
Scale 1:1,000	

Coord. Sys. GDA 1994 MGA Zone 56

**2-4 Hale Street
Botany, NSW**

SAMPLE LOCATIONS

FIGURE 3

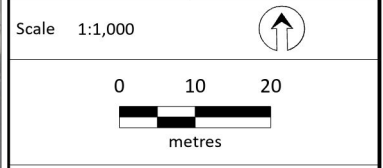


- Legend
- ▭ Approximate Site Boundary
 - ▭ NSW Cadastre
 - ▭ ACM on ground Surface
- Proposed Sample Location
- Soil Bores, JBS&G 2022
 - + Soil Vapour (JBS&G 2022)
 - ⊕ Monitoring Well (JBS&G 2022)
- 0-1.0 Bonded Asbestos Detected



Job No: 65803
 Client: Coombes Property Group

Version: R01 Rev A	Date 17/01/2024
Drawn By: JL	Checked By: CB



Coord. Sys. GDA 1994 MGA Zone 56

**2-4 Hale Street
 Botany, NSW**

ASBESTOS DETECTIONS IN SOIL

FIGURE 4



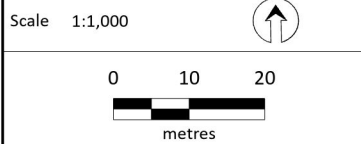
MW03	Concentration mg/L
Zinc (Filtered)	0.013

MW02	Concentration mg/L
Zinc (Filtered)	0.011

- Legend**
- Approximate Site Boundary
 - NSW Cadastre
 - ACM on ground Surface
 - Proposed Sample Location
 - Monitoring Well (JBS&G 2022)
- Criteria Key**
- ANZG (2018) Marine water 95% toxicant DGVs



Job No: 65803
 Client: Coombes Property Group
 Version: R01 Rev A Date 17/01/2024
 Drawn By: JL Checked By: CB



Coord. Sys. GDA 1994 MGA Zone 56
**2-4 Hale Street
 Botany, NSW**
GROUNDWATER EXCEEDANCES

FIGURE 5

File Name: 65803_CoombesPropertyGroupBotany_R01_RevA
 Reference: Nearmap - www.nearmap.com (Capture Date: 03/01/2024)



SV10	Concentration mg/m ³
Trichloroethene	0.75

- Legend
- ▬ Approximate Site Boundary
 - NSW Cadastre
 - ACM on ground Surface
- Proposed Sample Location
- ⊕ Soil Vapour (JBS&G 2022)
- Criteria Key
- NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs



Job No: 65803
 Client: Coombes Property Group

Version: R01 Rev A	Date 17/01/2024
Drawn By: JL	Checked By: CB

Scale 1:1,000

Coord. Sys. GDA 1994 MGA Zone 56

**2-4 Hale Street
 Botany, NSW**

SOIL VAPOUR EXCEEDANCES

FIGURE 6



- Legend**
- Approximate Site Boundary
 - NSW Cadastre
 - Sample Locations**
 - Soil Bores, JBS&G 2022
 - + Monitoring Well (JBS&G 2022)
 - + Soil Vapour (JBS&G 2022)
 - Remedial Extents**
 - ACM Remedial Extent
 - UST Remedial Extent
 - TCE Remedial Extent



Job No: 65803
 Client: Coombes Property Group

Version: R01 Rev A	Date 23/01/2024
Drawn By: JL	Checked By: CB

Scale 1:1,000

metres

Coord. Sys. GDA 1994 MGA Zone 56

**2-4 Hale Street
 Botany, NSW**

INFERRED REMEDIAL EXTENT

FIGURE 7

Appendix A Historical Datasets

Table B - Acid Sulfate Soil Sample Results
Project Number: 65803
Project: 2-4 Hale St Botany



Soil Sample ID Soil Bore No. / Depth (m)	pH _{KCl}	TAA (mol H ⁺ /tonne)	pH _{ox}	TPA (mol H ⁺ /tonne)	TSA (mol H ⁺ /tonne)	S _{pos} %	a-ANC _E (mol H ⁺ /tonne)	a-Net Acidity (mol H ⁺ /tonne)	Liming Rate	Material Description*	Interpretation [^]
SB05 1.4-1.5	8.8	<2	6.2	<2	<2	<0.02	-	-	<1	Sand	Non ASS/PASS
SB03 0.3-0.4	6.5	<2	7	<2	<2	0.02	87	-	<1	Sand	Non ASS/PASS
MW01 2.0-2.1	7.3	<2	3.3	<2	<2	0.08	-	-	1	Sand	Sulfidic, non ASS/PASS
MW03 3.0-3.1	6.8	<2	2.7	150	150	0.20	-	-	10	Sand	ASS/PASS

Notes:

Acid Sulfate Soil Manual (1998) New South Wales Acid Sulfate Soil Management Advisory Committee - summary of field interpretation based on soil indicators:

- (1) Action Criteria for Coarse Textured Soils (Sands to loamy Sands with Clay<5%) and less than 1000 tonnes disturbed: Spos% - 0.03%, TSA/TPA 18mol H⁺/tonne
- (2) Action Criteria for Fine Textured Soils (Clays with >40% fines) and less than 1000 tonnes disturbed: Spos% - 0.1%, TSA/TPA 62mol H⁺/tonne
- (3) Action Criteria for All Soil Types where greater than 1000 tonnes disturbed: Spos% - 0.03%, TSA/TPA 18mol H⁺/tonne

[^] Based upon physical material description and laboratory results

italics Exceeds Action Criteria applicable for soil type (<1000 tonnes disturbed)

Table C: Summary Asbestos Quantification Results
Project Number: 65803
Project Name: 2-4 Hale St Botany

Assessment Criteria - Asbestos Concentration in Soils	
Category	Exceedance
Visible Surface Asbestos	No visible ACM
Bonded ACM in soils - HSL D	0.05 % w/w
FA and AF in soils	0.001 % w/w
Respirable Fibres	NIL fibres

Sample Information				Field Asbestos Quantification					Laboratory Analysis												
Sample ID	Fill Description	Date	Lab Report Number	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Sample Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	AF Mass (g)	Mass Asbestos in AF (g)	Mass Asbestos in FA & AF (g)	[Asbestos from FA & AF in soil] (%w/w)	Trace Analysis	Comment	
AQ01_0.2-0.6	Gravelly Sand	16/03/2022	872222	10.00	16300	0.00	0.00	0.0000	485	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w
AQ02_0.15-0.4	Sandy Clay	16/03/2022	872222	10.00	16300	0.00	0.00	0.0000	792	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w
AQ03_0-0.2	Silty Sand	16/03/2022	872222	10.00	16300	0.00	0.000	0.0000	490	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w
AQ04_0.1-0.6	Sand	16/03/2022	872222	10.00	16300	0.00	0.00	0.0000	664	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w
AQ05_0.15-0.6	Clayey Sand	16/03/2022	872222	10.00	16300	0.00	0.000	0.0000	526	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w
MW01_AQ_0-1.0	Gravelly Sand	21/03/2022	-	10.00	16300	40.00	6.000	0.0368	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
MW02_AQ_0-1.0	Clayey Gravelly Sand	21/03/2022	-	10.00	16300	28.00	4.200	0.0258	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
MW02_0-0.1	Clayey Gravelly Sand	21/03/2022	872968	-	-	-	-	-	658	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w
MW03_AQ_0-1.0	Clayey Gravelly Sand	21/03/2022	-	10.00	16300	0.00	0.00	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
MW03_0.2-0.3	Clayey Gravelly Sand	21/03/2022	872968	-	-	-	-	-	658	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w
MW03_AQ_1.0-2.0	Clayey Gravelly Sand	21/03/2022	-	10.00	16300	0.00	0.000	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
MW03_AQ_2.0-3.0	Sandy Clay	21/03/2022	-	10.00	16300	0.00	0.00	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
S806_AQ_0-1.0	Clayey Sand	21/03/2022	-	10.00	16300	0.00	0.00	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
S807_AQ_0-1.0	Clayey Sand	21/03/2022	-	10.00	16300	0.00	0.00	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
S807_0.0-0.1	Silty Sand	21/03/2022	872968	-	-	-	-	-	658	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w
S807_AQ_1.0-1.9	Clayey Sand	21/03/2022	-	10.00	16300	0.00	0.000	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
S808_AQ_0-0.7	Gravelly Clayey Sand	21/03/2022	-	10.00	16300	0.00	0.00	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	No laboratory analysis undertaken
S808_0.0-0.1	Gravelly Clayey Sand	21/03/2022	872968	-	-	-	-	-	658	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Organic fibre detected, no trace asbestos detected	No asbestos detected at the reporting limit of 0.001 % w/w

Notes:
*Where an exceedance occurs for part of a 1 metre interval, the entire 1 metre interval has been considered to exceed.
*Field observations not exceeding the criteria are displayed in **bold text**.
*Detections above limit of reporting are displayed in **bold text**.

Well ID	Samples Date	Total Well Depth	Depth to Water	Depth to LNAPL	LNAPL Thickness	Well Headspace PID	Electrical Conductivity	pH	Dissolved Oxygen	Temp	Redox	TDS	Comments
		m TOC	m TOC	m TOC	m	ppm	µs/cm	-	mgL/ppm	°C	mV	mg/L	
MW01	21/03/2022	6.00	1.204	-	-	0.0	873.0	6.53	0.01	24.7	254.6	572.0	light yellow, low turbidity, no sheen, moderate sulfur odour
MW02	21/03/2022	6.00	0.971	-	-	0.0	268.0	6.48	0.10	21.2	66.2	187.2	yellow brown, low turbidity, no sheen, no odour
MW03	21/03/2022	4.00	1.049	-	-	1.0	493.1	6.42	0.01	21.8	-204.7	341.3	clear, very low turbidity, no sheen, slight sulfur odour

Table E: Groundwater Analytical Results

Project Number: 65803

Project Name: Botany DSI



	PAH													Chlorinated Alkanes																		
	Benzo(a)pyrene TEQ	Benzo(b+f)fluoranthene	Benzo(b+j+k)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(e,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane			
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
EQL	0.0005	0.00001	0.0002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001		
ANZG (2018) Marine water 95% toxicant DGVs								0.0014								0.27	0.4	1.9														
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand 2-4m																NL																
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand 4-8m																NL																
NEPM 2013 Table 1C GILs, Recreational																																
PFAS NEMP 2020 Table 1 Health Recreational Water																																
PFAS NEMP 2020 Table 5 Interim marine 95%																																

Field_ID	Date	Lab Report	Benzo(a)pyrene TEQ	Benzo(b+f)fluoranthene	Benzo(b+j+k)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(e,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane
MW01	22/03/2022	873319	-	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005
MW02	22/03/2022	873319	-	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005
QW1 (duplicate pair MW02)	22/03/2022	873319	-	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005
QW1a (triplicate pair MW02)	22/03/2022	291577	<0.0005	-	<0.0002	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01
MW03	22/03/2022	873319	-	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.005	<0.005

Table E: Groundwater Analytical Results

Project Number: 65803

Project Name: Botany DSI



	PFAS													MAH										Miscellaneous Hydrocarbons										Chlorinated Benzenes							
	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorononanesulfonic acid (PFNS)	Perfluorodecanesulfonic acid (PFDS)	1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOs	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of PFAS (WA DER List)	Sum of PFAS	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Total MAH	Bromobenzene	Isopropylbenzene	1,2-dibromoethane	Bromomethane	Cyclohexane	Dibromomethane	Iodomethane	4-Methyl-2-pentanone	Methyl Ethyl Ketone	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene				
EQL	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.05	0.1	0.001	0.001	0.001	1	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.005	0.001	0.001	0.001	0.005	0.005	0.001	0.001	0.001	0.001	0.001	0.001				
ANZG (2018) Marine water 95% toxicant DGVs																								0.03									0.08					0.055			
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand 2-4m																																									
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand 4-8m																																									
NEPM 2013 Table 1C GILs, Recreational																					0.3																				
PFAS NEMP 2020 Table 1 Health Recreational Water		2							2																	0.01										0.3	0.3	15		0.4	3
PFAS NEMP 2020 Table 5 Interim marine 95%		0.13																																							
Field_ID	Date	Lab Report																																							
MW01	22/03/2022	873319	<0.01	0.08	<0.01	<0.01	<0.01	<0.05	<0.01	0.11	0.11	0.08	0.11	0.11	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.005	-	<0.001	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001			
MW02	22/03/2022	873319	<0.01	0.08	<0.01	<0.01	<0.01	<0.05	<0.01	0.08	0.08	0.08	0.1	0.1	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.005	-	<0.001	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001			
QW1 (duplicate pair MW02)	22/03/2022	873319	<0.01	0.08	<0.01	<0.01	<0.01	<0.05	<0.01	0.08	0.08	0.08	0.1	0.1	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.005	-	<0.001	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001			
QW1a (triplicate pair MW02)	22/03/2022	291577	<0.01	0.07	-	<0.02	<0.01	<0.01	<0.02	0.07	-	0.07	-	0.09	<0.001	<0.001	<0.001	<1	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
MW03	22/03/2022	873319	<0.01	0.06	<0.01	<0.01	<0.01	<0.05	<0.01	0.1	0.12	0.08	0.25	0.25	<0.001	<0.001	-	-	-	-	<0.001	-	<0.003	<0.001	<0.001	<0.001	<0.005	-	<0.001	<0.001	<0.005	<0.005	-	-	<0.001	<0.001	<0.001	<0.001			

Table E: Groundwater Analytical Results

Project Number: 65803

Project Name: Botany DSI



Trihalomethanes						
Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Carbon disulfide	Hexachlorobutadiene	
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	0.001	0.005	0.001	0.001	0.001	0.001
ANZG (2018) Marine water 95% toxicant DGVs		0.77				
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand 2-4m						
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Sand 4-8m						
NEPM 2013 Table 1C GILs, Recreational						0.007
PFAS NEMP 2020 Table 1 Health Recreational Water						
PFAS NEMP 2020 Table 5 Interim marine 95%						

Field_ID	Date	Lab Report							
MW01	22/03/2022	873319	<0.001	<0.005	<0.001	<0.001	0.001	-	
MW02	22/03/2022	873319	<0.001	<0.005	<0.001	<0.001	<0.001	-	
QW1 (duplicate pair MW02)	22/03/2022	873319	<0.001	<0.005	<0.001	<0.001	<0.001	-	
QW1a (triplicate pair MW02)	22/03/2022	291577	<0.001	<0.001	<0.001	<0.001	-	<0.001	
MW03	22/03/2022	873319	<0.001	<0.005	<0.001	<0.001	<0.001	-	

TABLE F - Soil Vapour Field Measured Parameters**Project Number: 62740****Project Name: Hale St, Botany**

Well ID	Date	Oxygen	CO2	PID	Methane	LEL
		%	%	ppm	%	%
SV01	16/03/2022	17.0	1.8	1.6	0.0	0.0
SV02	16/03/2022	15.7	3.6	1.9	0.0	0.0
SV03	16/03/2022	16.7	4.1	1.0	0.0	0.0
SV04	16/03/2022	18.3	0.7	3.5	0.0	0.0
SV05	16/03/2022	15.2	0.4	2.3	0.0	0.0
SV06	21/03/2022	0.2	11.7	5.7	0.0	0.0
SV07	16/03/2022	6.6	11.0	2.2	0.0	0.0
SV08	16/03/2022	13.9	2.9	41.5	0.0	0.0
SV09	16/09/2022	16.4	1.9	2.8	0.0	0.0
SV10	21/03/2022	17.6	4.4	1.9	0.0	0.0
SV11	21/03/2022	15.2	1.5	5.6	0.0	0.0

Table G: Soil Vapour Results
 Project Number: 65803
 Project Name: Botany DSI



	TRHs (NEPC 2013)				BTEXN				PAH	Chlorinated Alkanes									
	C6-C10	C10-C16	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene Total	Naphthalene	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane
EQL	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
Regional Screening Levels for Commercial Air US EPA 2020 ¹	3.33334	3.33334	3.33334	3.33334	0.0833335	0.0833335	0.0833335	0.2500005	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs																			
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand 0-1m			680	500	4	4800	1300	840	3										

Field_ID	Date	Lab Report	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV01	16/03/2022	872218	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV02	16/03/2022	872218	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV03	16/03/2022	872218	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV04	16/03/2022	872218	4.67	<3.33	4.5	<3.33	<0.0833	0.117	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV05	16/03/2022	872218	3.67	<3.33	3.33	<3.33	<0.0833	<0.0833	0.283	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV06	21/03/2022	872956	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
QV1 (duplicate pair SV06)	21/03/2022	872956	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV07	16/03/2022	872218	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV08	16/03/2022	872218	5.33	<3.33	4.83	<3.33	<0.0833	0.267	<0.0833	0.317	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV09	16/03/2022	872218	4.67	<3.33	4.67	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV10	21/03/2022	872956	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV11	21/03/2022	872956	4.83	<3.33	4.83	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV_FB (Field Blank)	16/03/2022	872218	<3.33	<3.33	<3.33	<3.33	<0.0833	<0.0833	<0.0833	<0.25	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833

Note:
 1. US EPA (2020) indoor air based criteria have been adjusted by a factor of 0.005 to account for attenuation from the sub-surface to the indoor air and consistent with the factor adopted in the NEPM for derivation of soil vapour criteria for other petroleum hydrocarbon constituents
 2. Adjustment for target risk of 1 in 100000 as per NEPM

Table G: Soil Vapour Results
 Project Number: 65803
 Project Name: Botany DSI



	Chlorinated Alkenes																		
	Z-2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Trichlorofluoromethane	1,1-dichloroethene	1,1-dichloropropene	Z-chlorotoluene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	n-butylbenzene	n-propylbenzene	
EQL	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335
Regional Screening Levels for Commercial Air US EPA 2020 ¹									0.3		8		0.08	0.1	52 ²				
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILS																			
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand 0-1m																			

Field_ID	Date	Lab Report	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV01	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV02	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV03	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV04	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV05	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV06	21/03/2022	872956	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
QV1 (duplicate pair SV06)	21/03/2022	872956	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV07	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV08	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV09	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV10	21/03/2022	872956	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV11	21/03/2022	872956	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833
SV_FB (Field Blank)	16/03/2022	872218	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833

Note:
 1. US EPA (2020) indoor air based criteria have been adjusted by a factor of 0.005 to account for
 2. Adjustment for target risk of 1 in 100000 as per NEPM

Table G: Soil Vapour Results

Project Number: 65803

Project Name: Botany DSI



MAH	Miscellaneous Hydrocarbo		Chlorinated Benzenes						Trihalomethanes											
	p-Isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Isopropylbenzene	1,2-dibromethane	Dibromomethane	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene			Chlorobenzene	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	2-Propanol
	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
EQL	0.0833335	0.0833335	0.833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335	0.0833335
Regional Screening Levels for Commercial Air US EPA 2020 ¹																				
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCs HILs																				
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand 0-1m																				

Field_ID	Date	Lab Report																			
SV01	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV02	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV03	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV04	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV05	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV06	21/03/2022	872956	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
QV1 (duplicate pair SV06)	21/03/2022	872956	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV07	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV08	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV09	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV10	21/03/2022	872956	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV11	21/03/2022	872956	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833
SV_FB (Field Blank)	16/03/2022	872218	<0.0833	<0.0833	<0.833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<0.0833	<1.67	<0.0833

Note:

1. US EPA (2020) indoor air based criteria have been adjusted by a factor of 0.005 to account for att
2. Adjustment for target risk of 1 in 100000 as per NEPM

Appendix B Development Plans

WASTE MANAGEMENT FACILITY

2-4 HALE ST, BOTANY

ARCHITECTURAL DRAWING SCHEDULE

DRAWING NO.	DRAWING NAME	REVISION	ISSUE DATE
A000 - GENERAL NOTES / SITE CONTEXT			
A001	COVER SHEET / DRAWING LIST	J	22.03.2024
A002	EXISTING SITE CONDITION PLAN	E	22.03.2024
A003	DEMOLITION PLAN	H	22.03.2024
A004	PERSPECTIVE	F	15.03.2024
A005	SITE PLAN	J	22.03.2024
A006	SIGNAGE PLAN	G	22.03.2024
A100 - GENERAL ARRANGEMENT PLANS			
A101	WAREHOUSE PLAN	G	22.03.2024
A102	ROOF PLAN	H	22.03.2024
A200 - ELEVATIONS			
A201	WAREHOUSE ELEVATIONS	J	22.03.2024
A203	OFFICE ELEVATIONS	E	15.03.2024

CONTEXT PLAN



DEVELOPMENT APPLICATION

Issue	Description	Date	By	QA
A	Issue for Discussion	04.08.2023	RCI	LA
B	Issue for Information	05.01.2024	RCI	LA
C	Issue for Information	18.02.2024	RCI	SW
D	Development Application	23.02.2024	CL	MF
E	Development Application Updates	01.03.2024	CL	MF
F	Development Application Updates	07.03.2024	CL	MF
G	Development Application Updates	13.03.2024	CL	MF
H	Development Application	15.03.2024	CL	MF
J	Development Application	22.03.2024	CL	MF



STRATEGY | DESIGN | DELIVERY
 Level 15, 124 Walker Street
 North Sydney NSW 2060 Australia
 Tel: 61 02 9554 5011
 Fax: 61 02 9554 4946
 Email: sydney@reidcampbell.com
 Website: www.reidcampbell.com

DEVELOPMENT APPLICATION

CLIENT

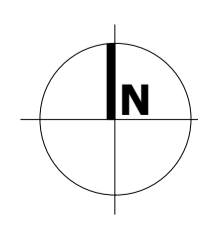


PROJECT MANAGER

PROJECT
 WASTE MANAGEMENT FACILITY
 2-4 HALE ST, BOTANY

Drawn	Checked	PRINT DATE
DT	LA	22/03/2024 3:54:10 PM

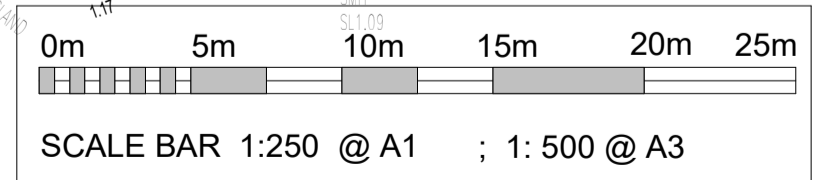
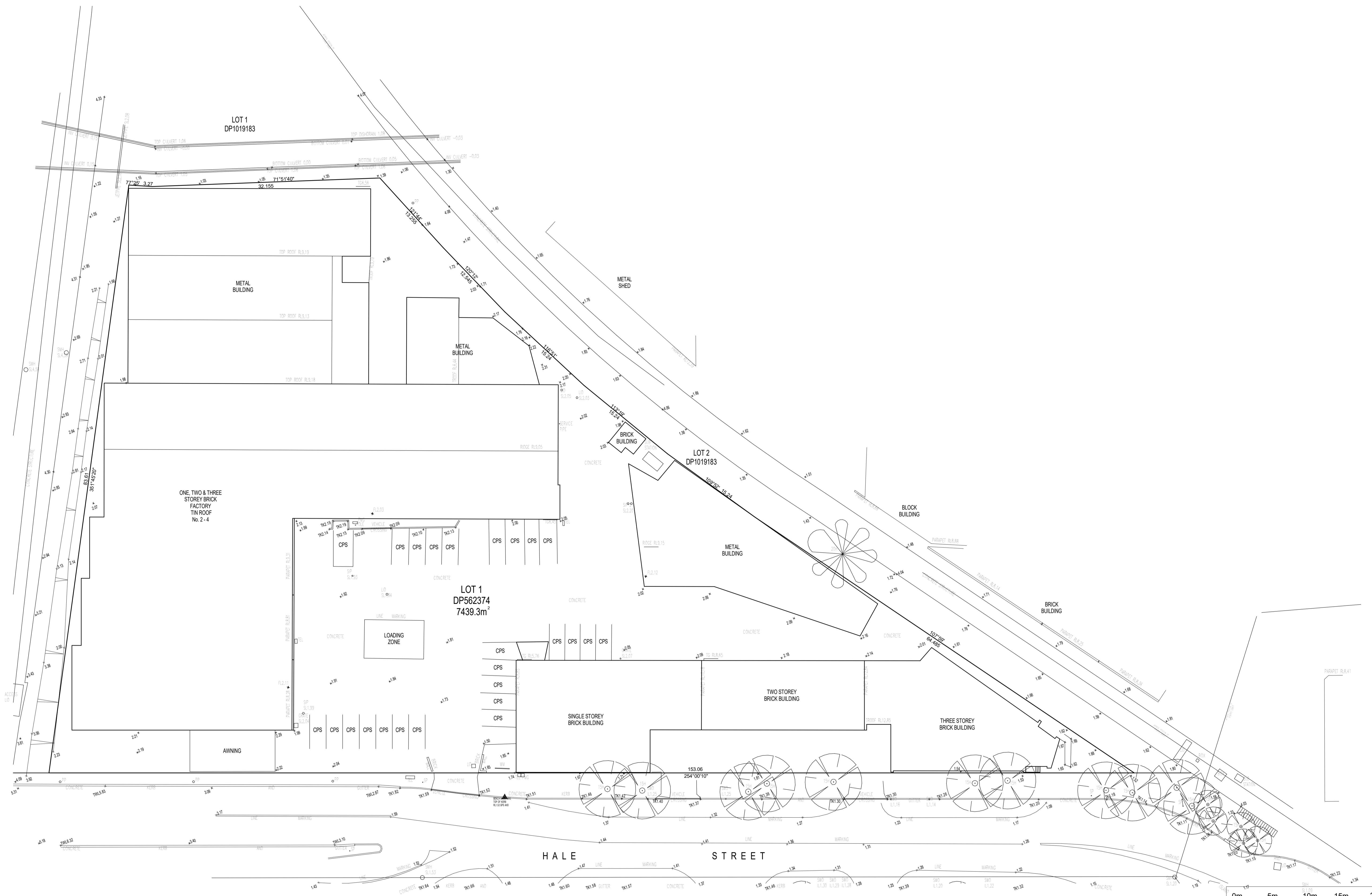
NORTH POINT



Drawing Title
 COVER SHEET / DRAWING LIST

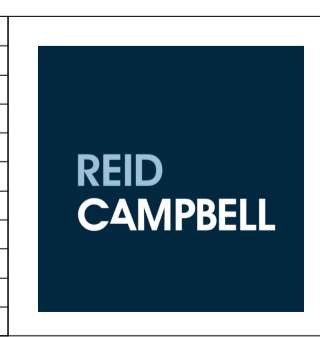
SHEET NUMBER
 1220011_A001

ISSUE
 J



Notes
 -This drawing and design is subject to Reid Campbell (NSW) Pty Ltd copyright and may not be reproduced without prior written consent.
 -Contractor to verify all dimensions on site before commencing work.
 -Report all discrepancies to project manager prior to construction.
 -Figured dimensions to be taken in preference to scaled drawings.
 -All work is to conform to relevant Australian Standards and other Codes as applicable, together with other Authorities' requirements and regulations.

Issue	Description	Date	By	QA
A	Issue for Information	16.02.2024	RCI	SW
B	Development Application	23.02.2024	CL	MF
C	Development Application Updates	13.03.2024	CL	MF
D	Development Application	15.03.2024	CL	MF
E	Development Application	22.03.2024	CL	MF



STRATEGY | DESIGN | DELIVERY
 ACN 100 033 801 ABN 28 977 605 875
 Level 15, 124 Walker Street
 North Sydney NSW 2060 Australia
 Tel: 61 02 9954 5011
 Fax: 61 02 9954 0946
 Email: sydney@reidcampbell.com
 Website: www.reidcampbell.com

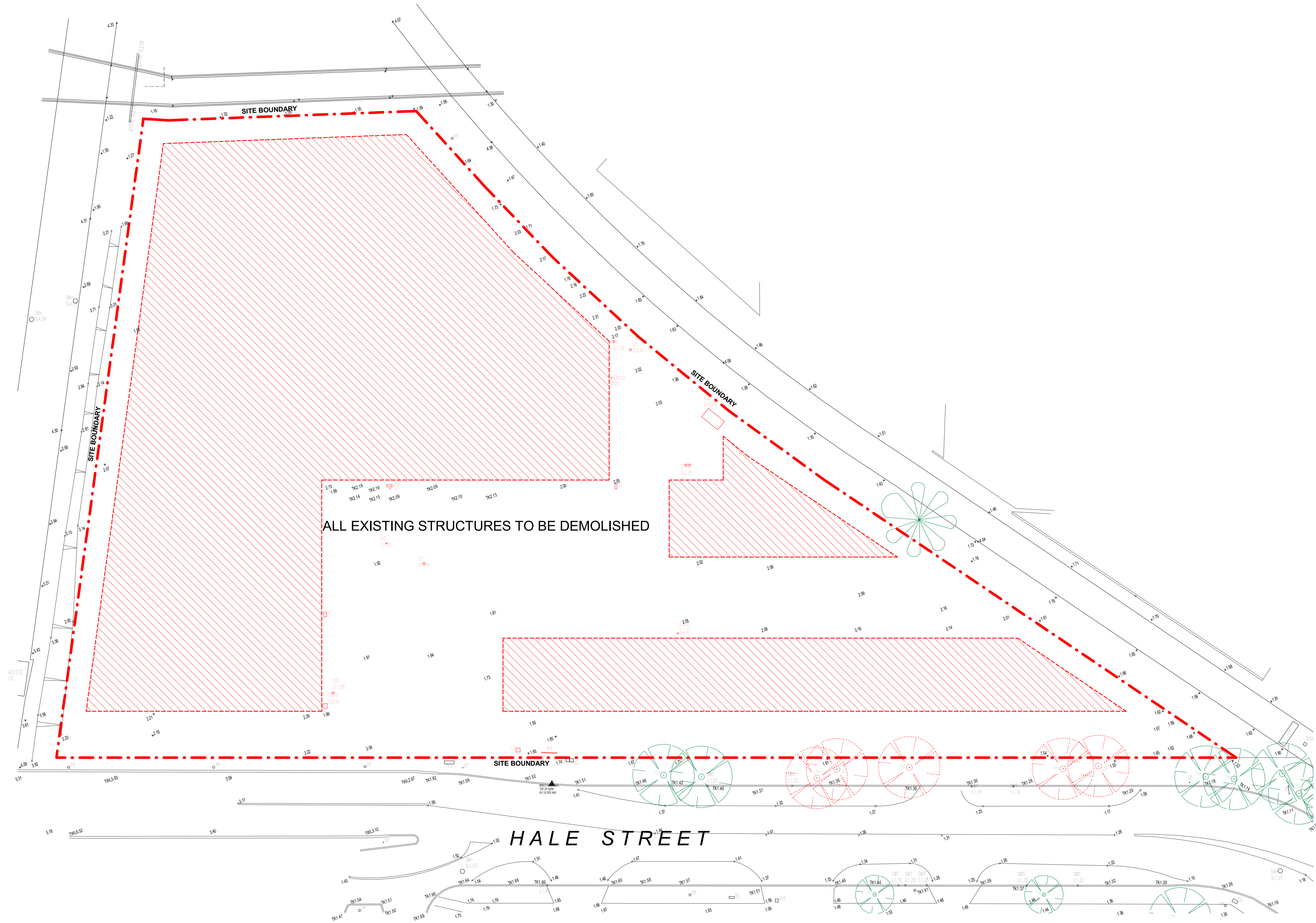
DEVELOPMENT APPLICATION



CLIENT
 PROJECT MANAGER
 PROJECT
 WASTE MANAGEMENT FACILITY
 2-4 HALE ST, BOTANY

Drawn DT
 Checked LA
 PRINT DATE
 22/03/2024 3:54:16 PM

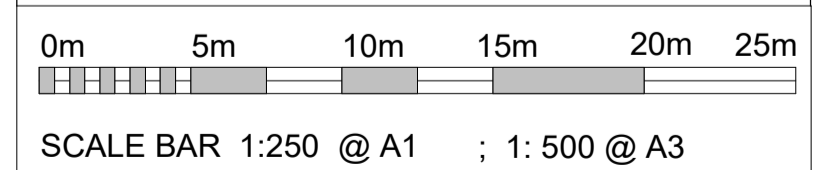
NORTH POINT
 Drawing Title
EXISTING SITE CONDITION PLAN
 SHEET NUMBER
1220011_A002
 ISSUE
E



DEMOLITION LEGEND	
	SITE BOUNDARY
	DEMOLISHED
	TREE RETAINED
	TREE REMOVED
	EXISTING BUILDING

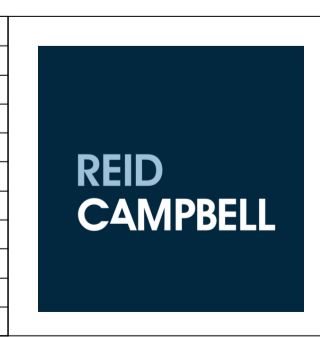
- DEMOLITION NOTES**
- BUILDER TO CONFIRM ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY PART OF THE WORKS.
 - CONTRACTOR TO COORDINATE ALL DEMOLITION WORKS WITH RELEVANT CONSULTANTS DOCUMENTATION, INCLUDING BUT NOT LIMITED TO CIVIL, STRUCTURAL, HYDRAULIC ETC.
 - CONTRACTOR TO ALLOW TO MAKE GOOD ALL RETAINED ELEMENTS ON SITE.
 - REFER TO CIVIL ENGINEERS DOCUMENTATION FOR ALL EXTERNAL LEVELS, FALLS, STORM WATER DRAINAGE AND PAVEMENT DESIGN.
 - CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL OF ALL MATERIALS FROM SITE.
 - ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.
 - REFER SERVICES ENGINEERS DOCUMENTATION FOR DETAILS OF SERVICES.
 - REFER TO TRAFFIC ENGINEERS DOCUMENTATION FOR ALL INTERNAL SITE AND EXTERNAL ROAD WORKS AND TRAFFIC MANAGEMENT DETAILS.
 - BUILDER IS TO LOCATE, REDIRECT, CAP AND SEAL ETC ANY IN GROUND SERVICES PRIOR TO COMMENCEMENT OF ANY PART OF THE WORKS.
 - BUILDER IS TO SECURE AND/OR HOARD THE SITE TO THE SATISFACTION OF LOCAL AUTHORITY AND TO MAINTAIN PUBLIC SAFETY.
 - ALLOW TO MAKE GOOD EXISTING PATH, NATURE STRIP, KERBS, ETC. OUTSIDE PROPERTY BOUNDARY AFFECTED BY CONSTRUCTION WORKS.
 - CONTRACTORS RESPONSIBILITY TO ESTABLISH EXTENT OF DANGEROUS MATERIALS INCL. ASBESTOS, BEFORE DEMOLITION.

- NOTES**
- ALL LEVELS AND EXTENTS ARE INDICATIVE & SHOULD BE READ IN CONJUNCTION WITH CIVIL ENG. DWGS FOR FINAL LEVELS OF ALL EARTH WORKS AND EXCAVATION.
 - ALL LANDSCAPING TO LANDSCAPE ARCHITECT'S DETAILS.
 - ALL INFORMATION SUBJECT TO DETAILED DESIGN AND ENGINEERING INPUT.
 - HYD. MECH, ELECTRICAL, AND FIRE ELEMENTS ARE INDICATIVE ONLY.
 - ALL MEASUREMENTS OF EXISTING STRUCTURES ARE APPROXIMATE ONLY, AND TO BE CONFIRMED ON SITE.
 - TENANT FITOUT ITEMS SHOWN BLUE



Notes
 -This drawing and design is subject to Reid Campbell (NSW) Pty Ltd copyright and may not be reproduced without prior written consent.
 -Contractor to verify all dimensions on site before commencing work.
 -Report all discrepancies to project manager prior to construction.
 -Figured dimensions to be taken in preference to scaled drawings.
 -All work is to conform to relevant Australian Standards and other Codes as applicable, together with other Authorities' requirements and regulations.
 Michael Morony NSWARB No. 8218, QLD Reg. No. 5852, ARBV No. VIC00002, APBSA No. s3931, WA00026

Issue	Description	Date	By	QA
A	Issue for Information	05.01.2024	RCI	LA
B	Issue for Information	16.02.2024	RCI	SW
C	Issue for Information	23.02.2024	CL	MF
D	Development Application	07.03.2024	CL	MF
E	Development Application Updates	13.03.2024	CL	MF
F	Development Application Updates	15.03.2024	CL	MF
G	Development Application	22.03.2024	CL	MF



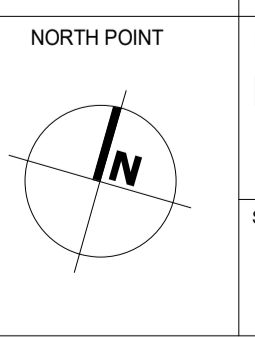
STRATEGY | DESIGN | DELIVERY
 ACN 102 023 801 ABN 28 377 605 875
 Level 15, 124 Walker Street
 North Sydney NSW 2060 Australia
 Tel: 61 02 9954 5011
 Fax: 61 02 9954 0946
 Email: sydney@reidcampbell.com
 Website: www.reidcampbell.com

DEVELOPMENT APPLICATION



CLIENT
 PROJECT MANAGER

PROJECT
WASTE MANAGEMENT FACILITY
 2-4 HALE ST, BOTANY
 Drawn DT, Checked LA, PRINT DATE 22/03/2024 3:54:19 PM



Drawing Title
DEMOLITION PLAN
 SHEET NUMBER
1220011_A003
 ISSUE
H



Notes
 -This drawing and design is subject to Reid Campbell (NSW) Pty Ltd copyright and may not be reproduced without prior written consent.
 -Contractor to verify all dimensions on site before commencing work.
 -Report all discrepancies to project manager prior to construction.
 -Figured dimensions to be taken in preference to scaled drawings.
 -All work is to conform to relevant Australian Standards and other Codes as applicable, together with other Authorities' requirements and regulations.
 Michael Morony NSWARB No. 8218, QLD Reg. No. 5852, ARBV No. VIC00002, APBSA No. s3931, WA00026

Issue	Description	Date	By	QA
A	Issue for Information	05.01.2024	RCI	LA
B	Issue for Information	15.02.2024	RCI	SW
C	Development Application Updates	01.03.2024	CL	MF
D	Development Application Updates	07.03.2024	CL	MF
E	Development Application Updates	13.03.2024	CL	MF
F	Development Application	15.03.2024	CL	MF



STRATEGY | DESIGN | DELIVERY
 ACN: 002 023 801 ABN: 28 917 605 875
 Level 15, 124 Walker Street
 North Sydney NSW 2060 Australia
 Tel: 61 02 9954 5011
 Fax: 61 02 9954 4946
 Email: sydney@reidcampbell.com
 Website: www.reidcampbell.com

DEVELOPMENT APPLICATION

CLIENT



PROJECT MANAGER

PROJECT
WASTE MANAGEMENT FACILITY
 2-4 HALE ST, BOTANY

Drawn	Checked	PRINT DATE
DT	LA	15/03/2024 5:27:11 PM

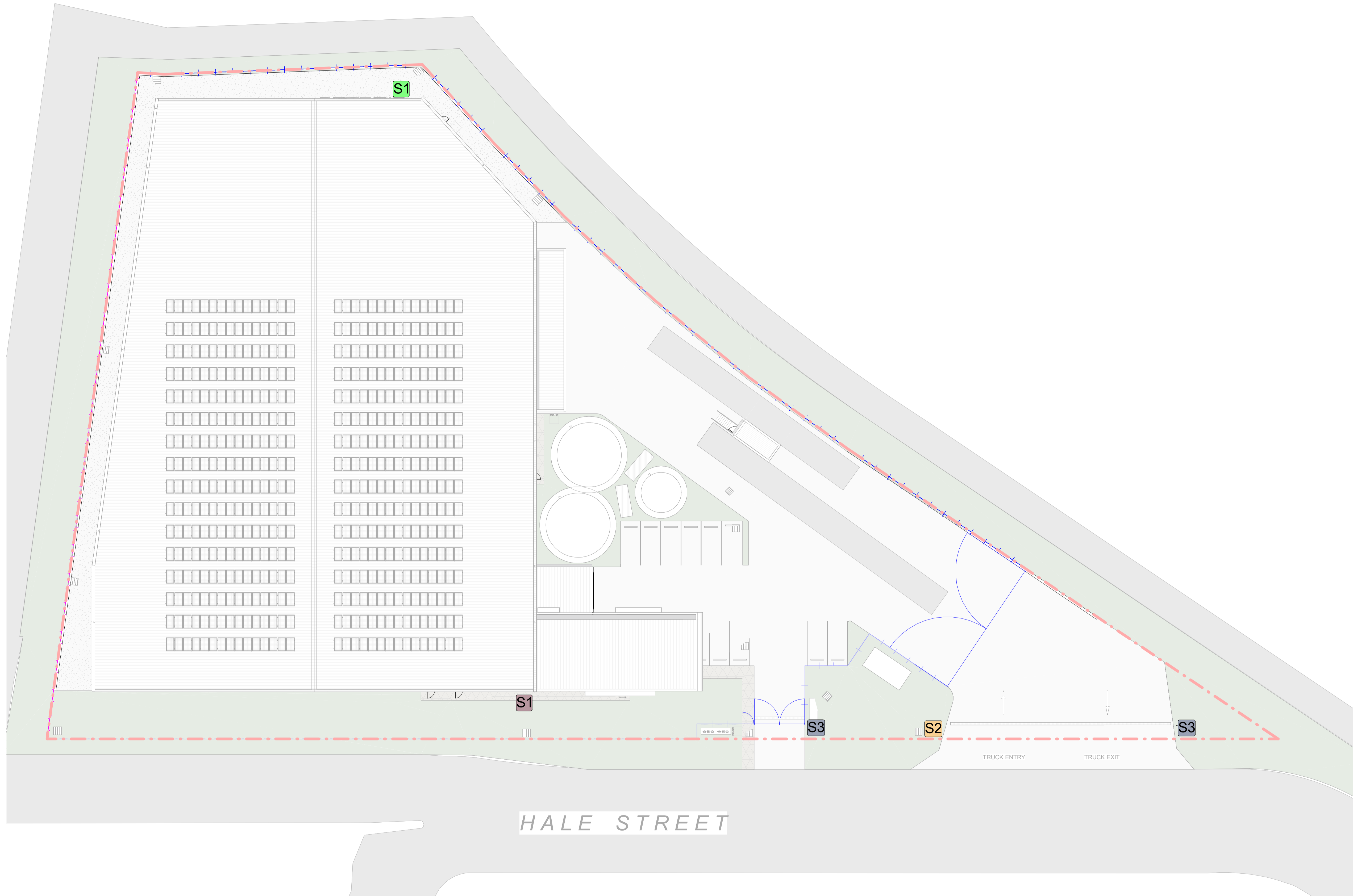
NORTH POINT

N/A

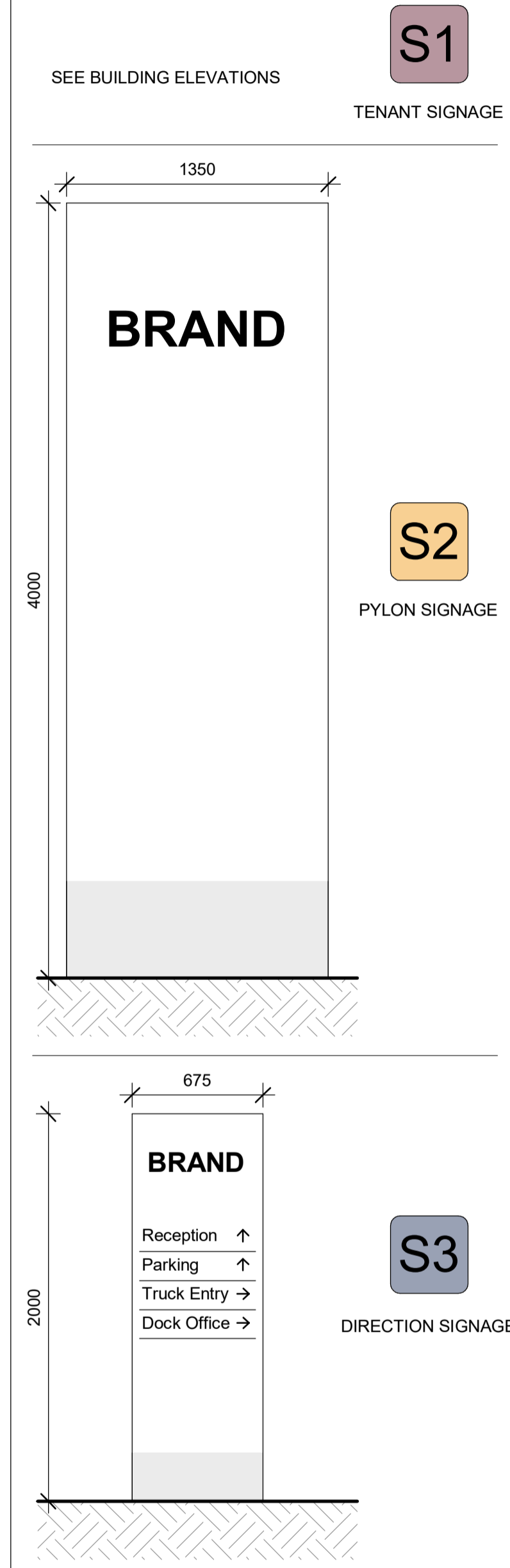
Drawing Title
PERSPECTIVE

SHEET NUMBER
1220011_A004

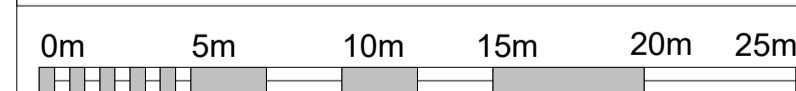
ISSUE
F



TYPICAL SIGNAGE



- NOTES**
- ALL LEVELS AND EXTENTS ARE INDICATIVE & SHOULD BE READ IN CONJUNCTION WITH CIVIL ENG. DWGS FOR FINAL LEVELS OF ALL EARTH WORKS AND EXCAVATION.
 - ALL LANDSCAPING TO LANDSCAPE ARCHITECT'S DETAILS.
 - ALL INFORMATION SUBJECT TO DETAILED DESIGN AND ENGINEERING INPUT.
 - HYD. MECH, ELECTRICAL, AND FIRE ELEMENTS ARE INDICATIVE ONLY.
 - ALL MEASUREMENTS OF EXISTING STRUCTURES ARE APPROXIMATE ONLY, AND TO BE CONFIRMED ON SITE.
 - TENANT FITOUT ITEMS SHOWN BLUE



SCALE BAR 1:250 @ A1 ; 1:500 @ A3

Notes
 -This drawing and design is subject to Reid Campbell (NSW) Pty Ltd copyright and may not be reproduced without prior written consent.
 -Contractor to verify all dimensions on site before commencing work.
 -Report all discrepancies to project manager prior to construction.
 -Figured dimensions to be taken in preference to scaled drawings.
 -All work is to conform to relevant Australian Standards and other Codes as applicable, together with other Authorities' requirements and regulations.
 Michael Morony NSWARB No. 8218, QLD Reg. No. 5852, ARBV No. VIC00002, APBSA No. s3931, WA00026

Issue	Description	Date	By	QA
A	Issue for Information	05.01.2024	RCI	LA
B	Issue for Information	16.02.2024	RCI	SW
C	Development Application	23.02.2024	CL	MF
D	Development Application Updates	07.03.2024	CL	MF
E	Development Application Updates	13.03.2024	CL	MF
F	Development Application	15.03.2024	CL	MF
G	Development Application	22.03.2024	CL	MF

REID CAMPBELL

STRATEGY | DESIGN | DELIVERY
 ACN: 002 033 801 ABN: 28 977 605 875

Level 15, 124 Walker Street
 North Sydney NSW 2060 Australia
 Tel: 61 02 9954 5011
 Fax: 61 02 9954 4946
 Email: sydney@reidcampbell.com
 Website: www.reidcampbell.com

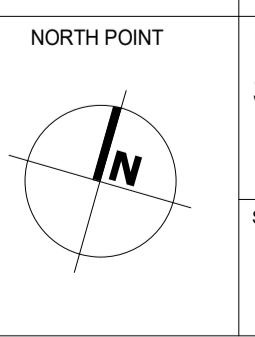
DEVELOPMENT APPLICATION

CLIENT

COOMBES PROPERTY GROUP

PROJECT MANAGER

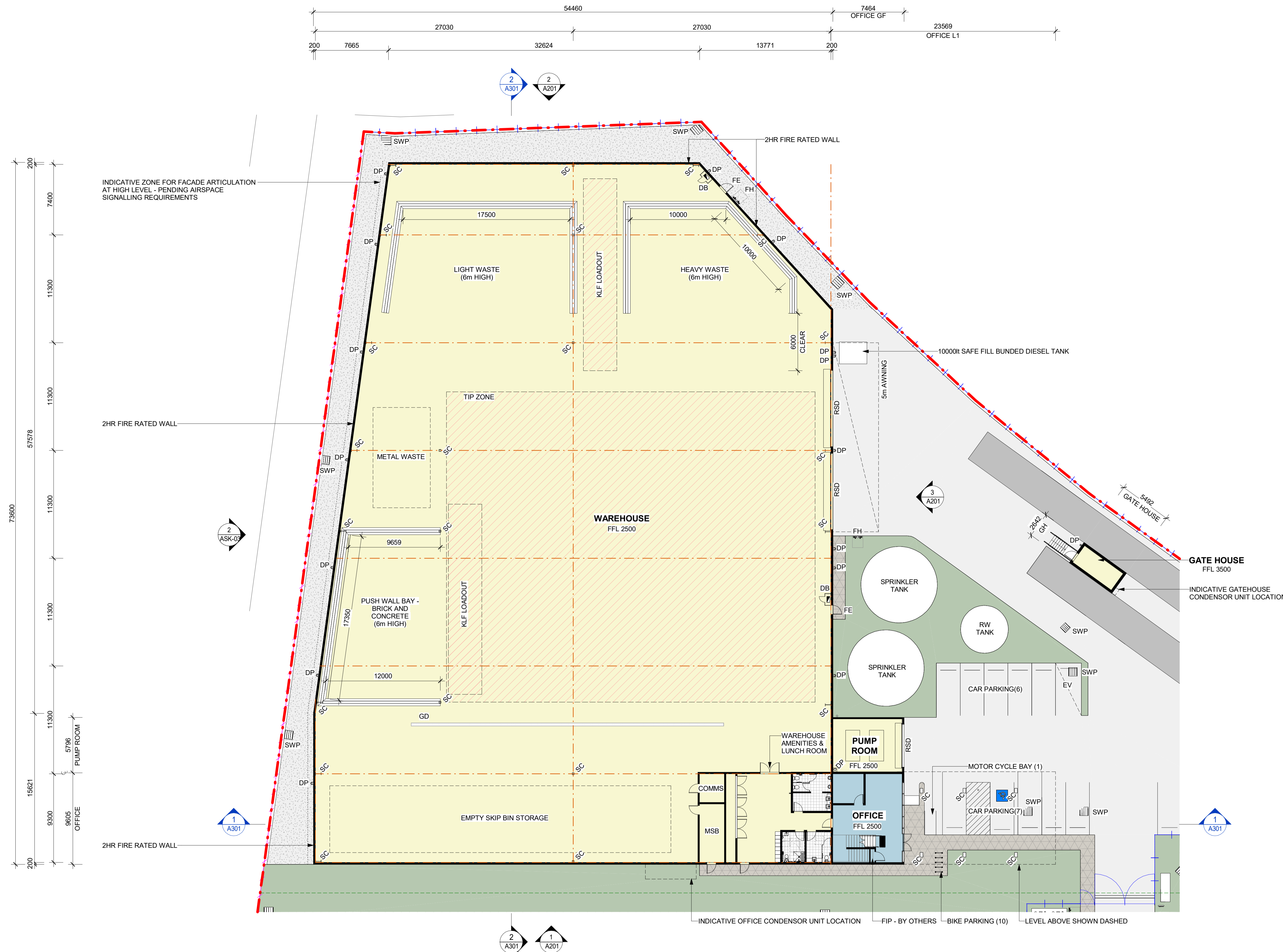
PROJECT
WASTE MANAGEMENT FACILITY
 2-4 HALE ST, BOTANY



Drawing Title
SIGNAGE PLAN

SHEET NUMBER
1220011_A006

ISSUE
G



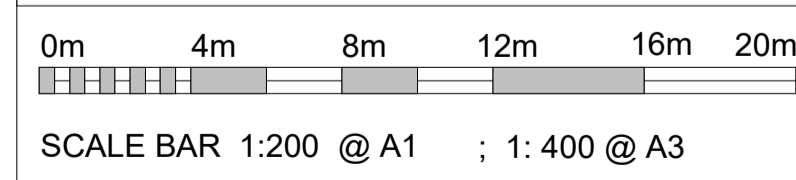
LEGEND

- - - SITE BOUNDARY
- - - LANDSCAPE SETBACK
- + + + FNC-1: 2.1 M PALISADE FENCE
- + + + FNC-2: 2.1 M CHAINLINK FENCE
- WAREHOUSE
- LOADING ZONE
- OFFICE
- HEAVY DUTY PAVEMENT
- LIGHT DUTY PAVEMENT
- COMPACTED GRAVEL TRAIL
- PEDESTRIAN PAVEMENT
- LANDSCAPING

ABBREVIATION

DB	DISTRIBUTION BOARD
DP	DOWN PIPE
EV	ELECTRIC VEHICLE PARKING
FE	FIRE EXIT DOOR
FH	FIRE HYDRANT
RSD	ROLLER SHUTTER DOOR
SC	STRUCTURAL COLUMN
SWP	STORM WATER PIT
GD	GRADED DRAIN

- NOTES**
1. ALL LEVELS AND EXTENTS ARE INDICATIVE & SHOULD BE READ IN CONJUNCTION WITH CIVIL ENG. DWGS FOR FINAL LEVELS OF ALL EARTH WORKS AND EXCAVATION.
 2. ALL LANDSCAPING TO LANDSCAPE ARCHITECT'S DETAILS.
 3. ALL INFORMATION SUBJECT TO DETAILED DESIGN AND ENGINEERING INPUT.
 4. HYD, MECH, ELECTRICAL, AND FIRE ELEMENTS ARE INDICATIVE ONLY.
 5. ALL MEASUREMENTS OF EXISTING STRUCTURES ARE APPROXIMATE ONLY, AND TO BE CONFIRMED ON SITE.
 6. TENANT FITOUT ITEMS SHOWN BLUE



Notes

- This drawing and design is subject to Reid Campbell (NSW) Pty Ltd copyright and may not be reproduced without prior written consent.
- Contractor to verify all dimensions on site before commencing work.
- Report all discrepancies to project manager prior to construction.
- Figured dimensions to be taken in preference to scaled drawings.
- All work is to conform to relevant Australian Standards and other Codes as applicable, together with other Authorities' requirements and regulations.

Michael Morony NSIWARB No. 8218, QLD Reg. No. 5852, ARBV No. VIC00002, APBSA No. s3931, WA00026

Issue	Description	Date	By	QA
A	Issue for Information	05.01.2024	RCI	LA
B	Issue for Information	16.02.2024	RCI	SW
C	Development Application	23.02.2024	CL	MF
D	Development Application Updates	07.03.2024	CL	MF
E	Development Application Updates	13.03.2024	CL	MF
F	Development Application	15.03.2024	CL	MF
G	Development Application	22.03.2024	CL	MF

STRATEGY | DESIGN | DELIVERY

ACN: 002 033 801 ABN: 28 977 605 875

REID CAMPBELL

Level 15, 124 Walker Street
North Sydney NSW 2060 Australia

Tel: 61 02 9554 5011
Fax: 61 02 9554 0946
Email: sydney@reidcampbell.com
Website: www.reidcampbell.com

DEVELOPMENT APPLICATION

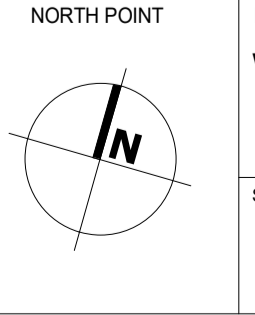
CLIENT

COOMBES PROPERTY GROUP

PROJECT MANAGER

PROJECT
WASTE MANAGEMENT FACILITY
2-4 HALE ST, BOTANY

Drawn DT
Checked LA
PRINT DATE
22/03/2024 3:54:42 PM



Drawing Title
WAREHOUSE PLAN

SHEET NUMBER
1220011_A101

ISSUE
G

CONTINUOUS
COLORBOND
BARGED CAPPING

SITE BOUNDARY

COLORBOND EAVES GUTTER TO
HYD. ENG. DETAILS

PROVISION FOR MECH. FAN
SHOWN DASHED

5m STEEL FRAMED CANTILEVERED
AWNING WITH METAL ROOF
SHEETING

CONCEALED BOX GUTTER
TO HYD. ENG. DETAILS

SITE BOUNDARY

COLORBOND EAVES GUTTER TO HYD.
ENG. DETAILS

GATE HOUSE
RF1
LIGHT WEIGHT METAL CLAD PARAPET
WALL
COLORBOND METAL PROFILED ROOF
SHEETING

COLORBOND EAVES GUTTER TO
HYD. ENG. DETAILS

COLORBOND BOX GUTTER TO HYD.
ENG. DETAILS

COLORBOND METAL PROFILED ROOF
SHEETING

POWDERCOATED ALUMINIUM HOOD
SURROUND TO WINDOW WITH TIMBER
LOOK ALUMINIUM SUN SHADE BLADES

CONCEALED BOX GUTTER TO HYD.
ENG. DETAILS

LIGHT WEIGHT METAL CLAD PARAPET
WALLS

METAL CLAD EXTRUSION TO FORM
SHADING FRAME

COLORBOND METAL PROFILED ROOF
SHEETING

POWDERCOATED ALUMINIUM HOOD
SURROUND TO WINDOW WITH TIMBER
LOOK ALUMINIUM SUN SHADE BLADES

PROVISION FOR SCREENED
SERVICES PLATFORM

TRANSLUCENT ROOFING
SHEET TO MATCH METAL
ROOF PROFILE - RF2

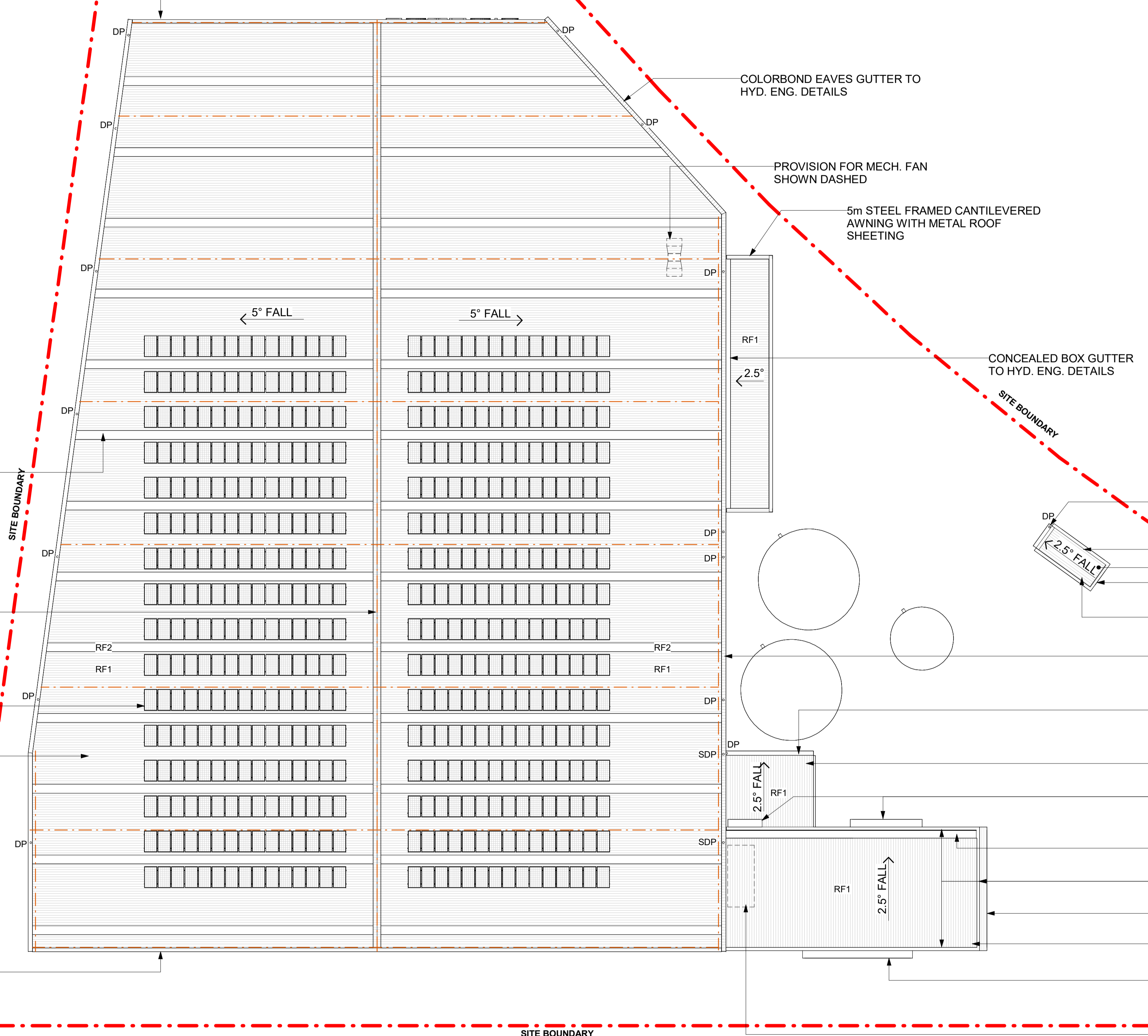


FOLDED COLORBOND
METAL RIDGE CAPPING

INDICATIVE 300kW SOLAR
ARRAY (TBC)

COLORBOND METAL
PROFILED ROOF
SHEETING - RF1

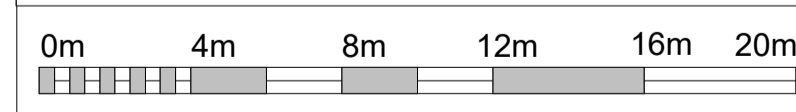
CONTINUOUS
COLORBOND BARGE
CAPPING



ABBREVIATION

DP	DOWN PIPE
SDP	SIPHONIC DOWNPIPE
RF1	PROFILED METAL ROOF SHEETING
RF2	TRANSLUCENT ROOF SHEETING

- NOTES**
- ALL LEVELS AND EXTENTS ARE INDICATIVE & SHOULD BE READ IN CONJUNCTION WITH CIVIL ENG. DWGS FOR FINAL LEVELS OF ALL EARTH WORKS AND EXCAVATION.
 - ALL LANDSCAPING TO LANDSCAPE ARCHITECT'S DETAILS.
 - ALL INFORMATION SUBJECT TO DETAILED DESIGN AND ENGINEERING INPUT.
 - HYD. MECH, ELECTRICAL, AND FIRE ELEMENTS ARE INDICATIVE ONLY.
 - ALL MEASUREMENTS OF EXISTING STRUCTURES ARE APPROXIMATE ONLY, AND TO BE CONFIRMED ON SITE.
 - TENANT FITOUT ITEMS SHOWN BLUE



SCALE BAR 1:200 @ A1 ; 1:400 @ A3

Notes

- This drawing and design is subject to Reid Campbell (NSW) Pty Ltd copyright and may not be reproduced without prior written consent.
- Contractor to verify all dimensions on site before commencing work.
- Report all discrepancies to project manager prior to construction.
- Figured dimensions to be taken in preference to scaled drawings.
- All work is to conform to relevant Australian Standards and other Codes as applicable, together with other Authorities' requirements and regulations.

Michael Morony NSWARB No. 8218, QLD Reg. No. 5852, ARBV No. VIC00002, APBSA No. s3931, WA00026

Issue	Description	Date	By	QA
A	Issue for Information	05.01.2024	RCI	LA
B	Issue for Information	16.02.2024	RCI	SW
C	Development Application	23.02.2024	CL	MF
D	Development Application Updates	26.02.2024	CL	MF
E	Development Application Updates	07.03.2024	CL	MF
F	Development Application Updates	13.03.2024	CL	MF
G	Development Application	15.03.2024	CL	MF
H	Development Application	22.03.2024	CL	MF

REID CAMPBELL

STRATEGY | DESIGN | DELIVERY

ACNC 100 033 801 ABN: 28 917 605 875

Level 15, 124 Walker Street
North Sydney NSW 2060 Australia

Tel: 61 02 9554 5011
Fax: 61 02 9554 0946
Email: sydney@reidcampbell.com
Website: www.reidcampbell.com

DEVELOPMENT APPLICATION

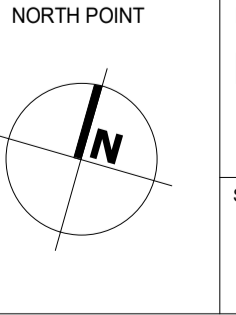
CLIENT

COOMBES
PROPERTY GROUP

PROJECT MANAGER

PROJECT
WASTE MANAGEMENT
FACILITY
2-4 HALE ST, BOTANY

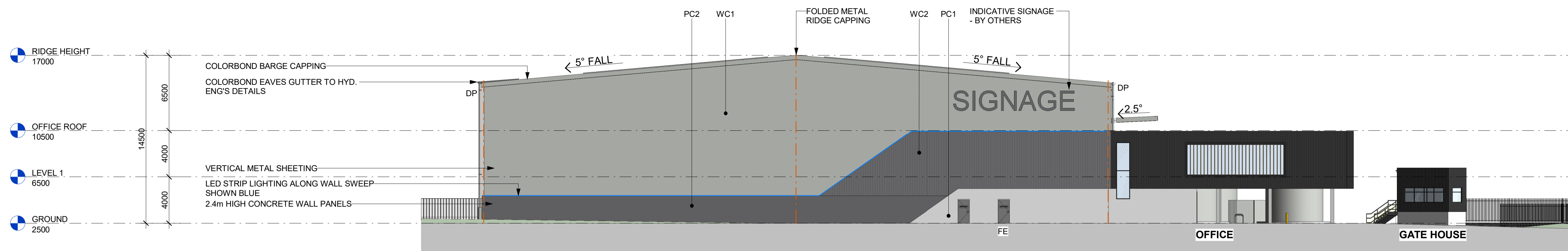
Drawn DT
Checked LA
PRINT DATE
22/03/2024 3:54:48 PM



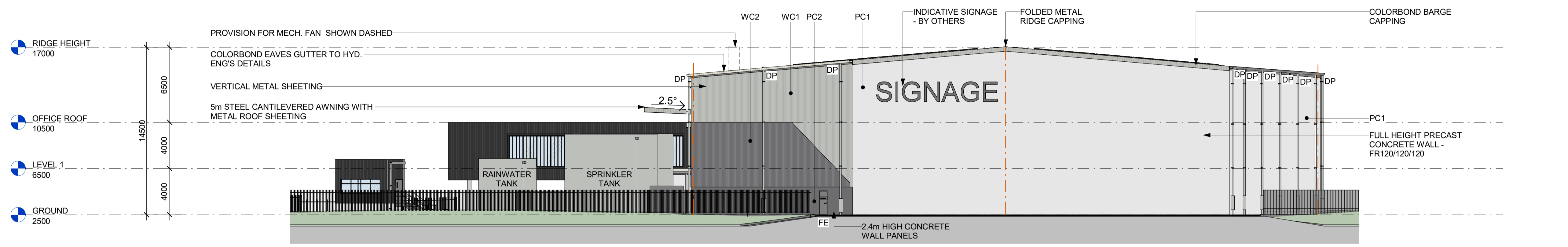
Drawing Title
ROOF PLAN

SHEET NUMBER
1220011_A102

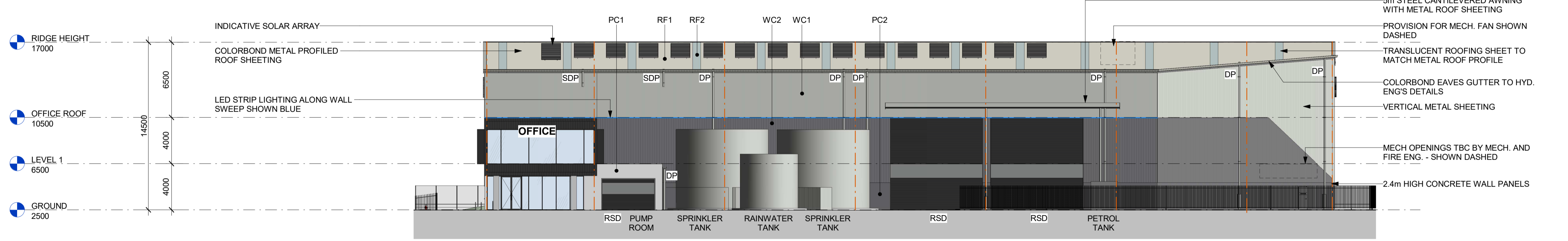
ISSUE
H



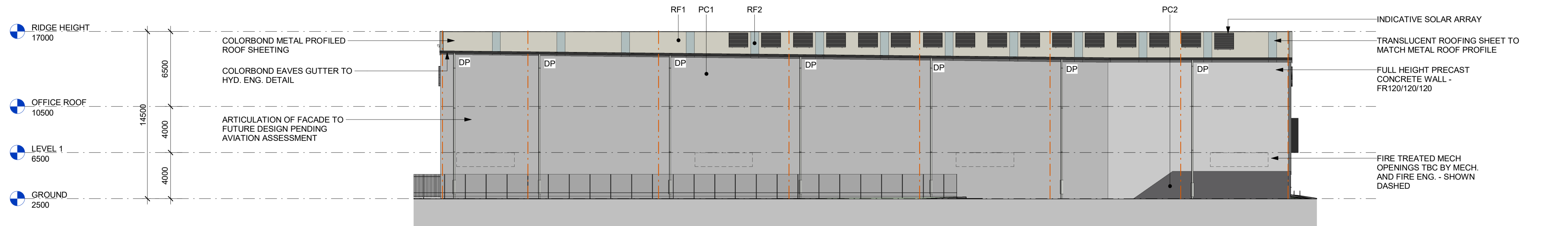
1 SOUTH ELEVATION
1: 200



2 NORTH ELEVATION
1: 200



3 EAST ELEVATION
1: 200

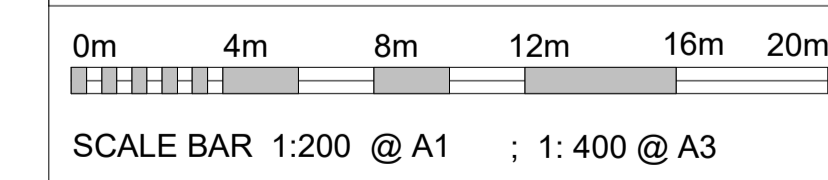


4 WEST ELEVATION
1: 200

CC CORE COLOUR SCHEME	RF1 METAL PROFILED ROOF SHEETING 'SURFMIST'
WC1 COLORBOND LONGLINE STANDING SEAM CLADDING 'SHALE GREY'	RF2 TRANSLUCENT PROFILED ROOF SHEETING
WC2 COLORBOND LONGLINE STANDING SEAM CLADDING 'BASALT'	RSD METAL SHEETING 'MONUMENT'
WC3 COLORBOND LONGLINE STANDING SEAM CLADDING 'MONUMENT'	GL1 TINTED CLEAR VISION GLAZING (LOW REFL.)
PC1 PRECAST PANEL - NATURAL SEALED FINISH OR SIMILAR APPROVED	PC2 PAINTED PRECAST PANEL 'BASALT'
CO1 CLASS 2C OFF FORM CONCRETE OR SIMILAR APPROVED	TB1 TIMBER LOOK ALUMINIUM BLADES

ABBREVIATION	
DP	DOWN PIPE
SDP	SYPHONIC DOWN PIPE
FE	FIRE EXIT DOOR
RSD	ROLLER SHUTTER DOOR

- NOTES**
- ALL LEVELS AND EXTENTS ARE INDICATIVE & SHOULD BE READ IN CONJUNCTION WITH CIVIL ENG. DWGS FOR FINAL LEVELS OF ALL EARTH WORKS AND EXCAVATION.
 - ALL LANDSCAPING TO LANDSCAPE ARCHITECT'S DETAILS.
 - ALL INFORMATION SUBJECT TO DETAILED DESIGN AND ENGINEERING INPUT.
 - HYD. MECH, ELECTRICAL, AND FIRE ELEMENTS ARE INDICATIVE ONLY.
 - ALL MEASUREMENTS OF EXISTING STRUCTURES ARE APPROXIMATE ONLY, AND TO BE CONFIRMED ON SITE.
 - TENANT FITOUT ITEMS SHOWN BLUE



Issue	Description	Date	By	QA
A	Issue for Information	05.01.2024	RCI	LA
B	Issue for Information	16.02.2024	RCI	SW
C	Development Application	23.02.2024	CL	MF
D	Development Application Updates	26.02.2024	CL	MF
E	Development Application Updates	01.03.2024	CL	MF
F	Development Application Updates	07.03.2024	CL	MF
G	Development Application Updates	13.03.2024	CL	MF
H	Development Application	15.03.2024	CL	MF
J	Development Application	22.03.2024	CL	MF

REID CAMPBELL

STRATEGY | DESIGN | DELIVERY

Level 15, 124 Walker Street
North Sydney NSW 2060 Australia

Tel: 61 02 9554 5011
Fax: 61 02 9554 0946
Email: sydney@reidcampbell.com
Website: www.reidcampbell.com

DEVELOPMENT APPLICATION

CLIENT

COOMBS PROPERTY GROUP

PROJECT MANAGER

PROJECT
WASTE MANAGEMENT FACILITY
2-4 HALE ST, BOTANY

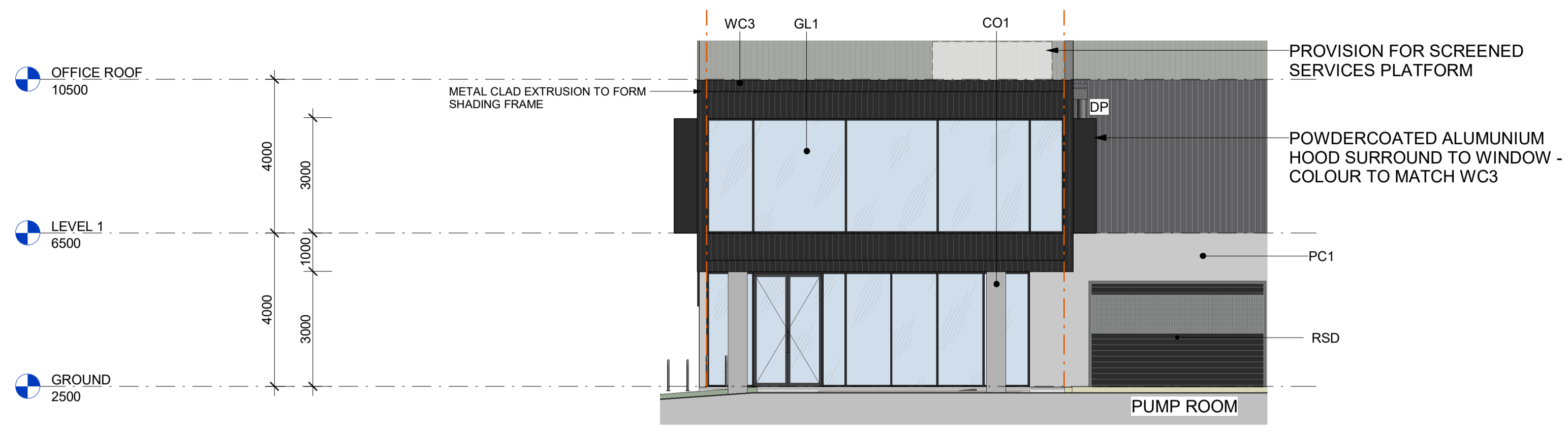
Drawn DT
Checked LA
PRINT DATE
22/03/2024 3:54:56 PM

NORTH POINT
N/A

Drawing Title
WAREHOUSE ELEVATIONS

SHEET NUMBER
1220011_A201

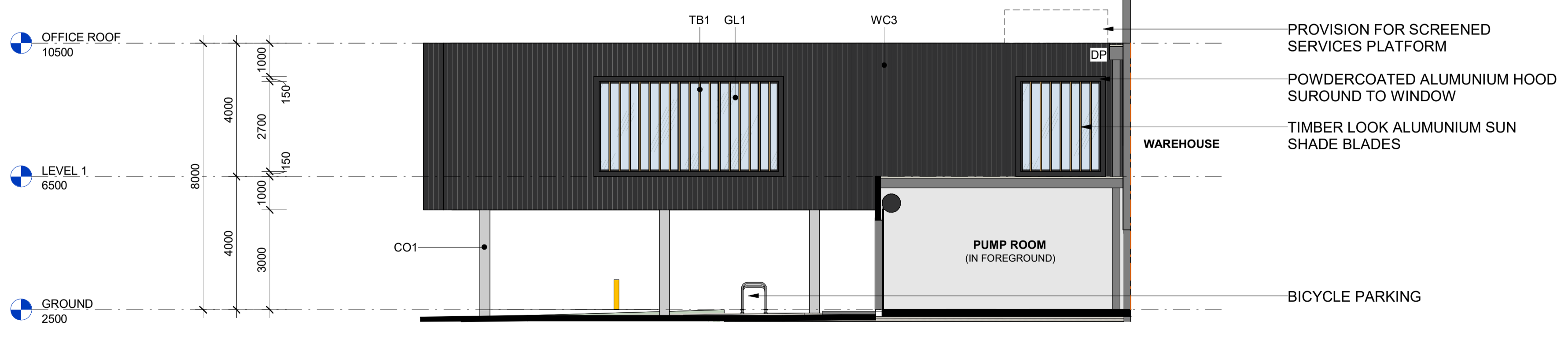
ISSUE
J



1 OFFICE EAST ELEVATION
1 : 100



2 OFFICE SOUTH ELEVATION
1 : 100

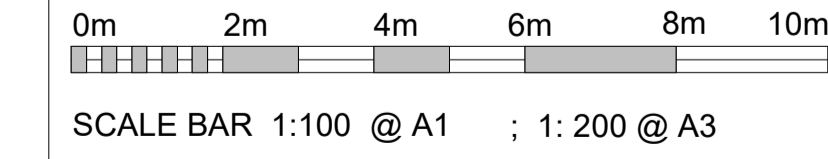


3 OFFICE NORTH ELEVATION
1 : 100

CC CORE COLOUR SCHEME	RF1 METAL PROFILED ROOF SHEETING 'SURFMIST'
WC1 COLORBOND LONGLINE STANDING SEAM CLADDING 'SHALE GREY'	RF2 TRANSLUCENT PROFILED ROOF SHEETING
WC2 COLORBOND LONGLINE STANDING SEAM CLADDING 'BASALT'	RSD METAL SHEETING 'MONUMENT'
WC3 COLORBOND LONGLINE STANDING SEAM CLADDING 'MONUMENT'	GL1 TINTED CLEAR VISION GLAZING (LOW REFL.)
PC1 PRECAST PANEL - NATURAL SEALED FINISH OR SIMILAR APPROVED	PC2 PAINTED PRECAST PANEL 'BASALT'
CO1 CLASS 2C OFF FORM CONCRETE OR SIMILAR APPROVED	TB1 TIMBER LOOK ALUMINIUM BLADES

ABBREVIATION	
DP	DOWN PIPE
RSD	ROLLER SHUTTER DOOR

NOTES	
1.	ALL LEVELS AND EXTENTS ARE INDICATIVE & SHOULD BE READ IN CONJUNCTION WITH CIVIL ENG. DWGS FOR FINAL LEVELS OF ALL EARTH WORKS AND EXCAVATION.
2.	ALL INFORMATION SUBJECT TO DETAILED DESIGN AND ENGINEERING INPUT.
3.	HYD. MECH, ELECTRICAL, AND FIRE ELEMENTS ARE INDICATIVE ONLY.
4.	ALL MEASUREMENTS OF EXISTING STRUCTURES ARE APPROXIMATE ONLY, AND TO BE CONFIRMED ON SITE.
5.	TENANT FITOUT ITEMS SHOWN BLUE



Issue	Description	Date	By	QA
A	Issue for Information	05.01.2024	RCI	LA
B	Issue for Information	16.02.2024	RCI	SW
C	Development Application	23.02.2024	CL	MF
D	Development Application Updates	13.03.2024	CL	MF
E	Development Application	15.03.2024	CL	MF



STRATEGY | DESIGN | DELIVERY
ACN: 002 033 801 ABN: 28 317 605 875
Level 15, 124 Walker Street
North Sydney NSW 2060 Australia
Tel: 61 02 9554 5011
Fax: 61 02 9554 4946
Email: sydney@reidcampbell.com
Website: www.reidcampbell.com

DEVELOPMENT APPLICATION



CLIENT	PROJECT MANAGER	PROJECT	NORTH POINT
		WASTE MANAGEMENT FACILITY 2-4 HALE ST, BOTANY	N/A
Drawn	Checked	PRINT DATE	Drawing Title
DT	LA	15/03/2024 5:27:55 PM	OFFICE ELEVATIONS

SHEET NUMBER	ISSUE
1220011_A203	E

© JBS&G

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

Document Distribution

Rev No.	Copies	Recipient	Date
A	1 x electronic	Victoria Hale (victoria@emeadvisory.com)	23/01/2024
0	1 x electronic	Victoria Hale (victoria@emeadvisory.com)	25/03/2024
1	1 x electronic	Victoria Hale (victoria@emeadvisory.com)	18/09/2024

Document Status

Rev No.	Author	Reviewer Name	Approved for Issue Name	Signature	Date
A	Chris Bielby	John De Martin		Initial draft for client comments	23/01/2024
0	Chris Bielby	John De Martin			25/03/2024
1	Chris Bielby	John De Martin			18/09/2024



Adelaide

Karna Country | 100 Hutt St,
Adelaide, SA 5000
T: 08 8431 7113

Brisbane

Turrbal/Yuggera Country | Level 37, 123
Eagle Street, Brisbane, QLD 4000
T: 07 3211 5350

Bunbury

Wardandi Noongar Country | 177
Spencer Street Bunbury, WA 6230
T: 08 9792 4797

Canberra

Ngunnawal Country | Level 1, The Realm
18 National Circuit Barton, ACT 2600
T: 02 6198 3278

Darwin

Larrakia Country | Suite G1, Level 1
48-50 Smith Street, Darwin NT 0800
T: 08 8943 0600

Hobart

Muwununa/Nuenon Country | Level 6,
111 Macquarie Street Hobart, TAS 7000
T: 03 6108 9054

Melbourne

Kulin Country | Level 5, 10 Queen
Street, Melbourne, VIC 3000
T: 03 9642 0599

Newcastle

Awabakal/Worimi Country | 61 / 63
Parry Street Newcastle West, NSW 2302
T: 02 8245 0300

Perth

Whadjuk Nyoongar Country | Allendale Square,
Level 9, 77 St Georges Terrace, WA 6000
T: 08 9380 3100

Sydney

Gadigal Country | Level 1, 50
Margaret Street, Sydney, NSW 2000
T: 02 8245 0300

Wollongong

Dharawal Country | Suite 1A, 280 - 286
Keira Street, Wollongong, NSW 2500
T: 02 4225 2647