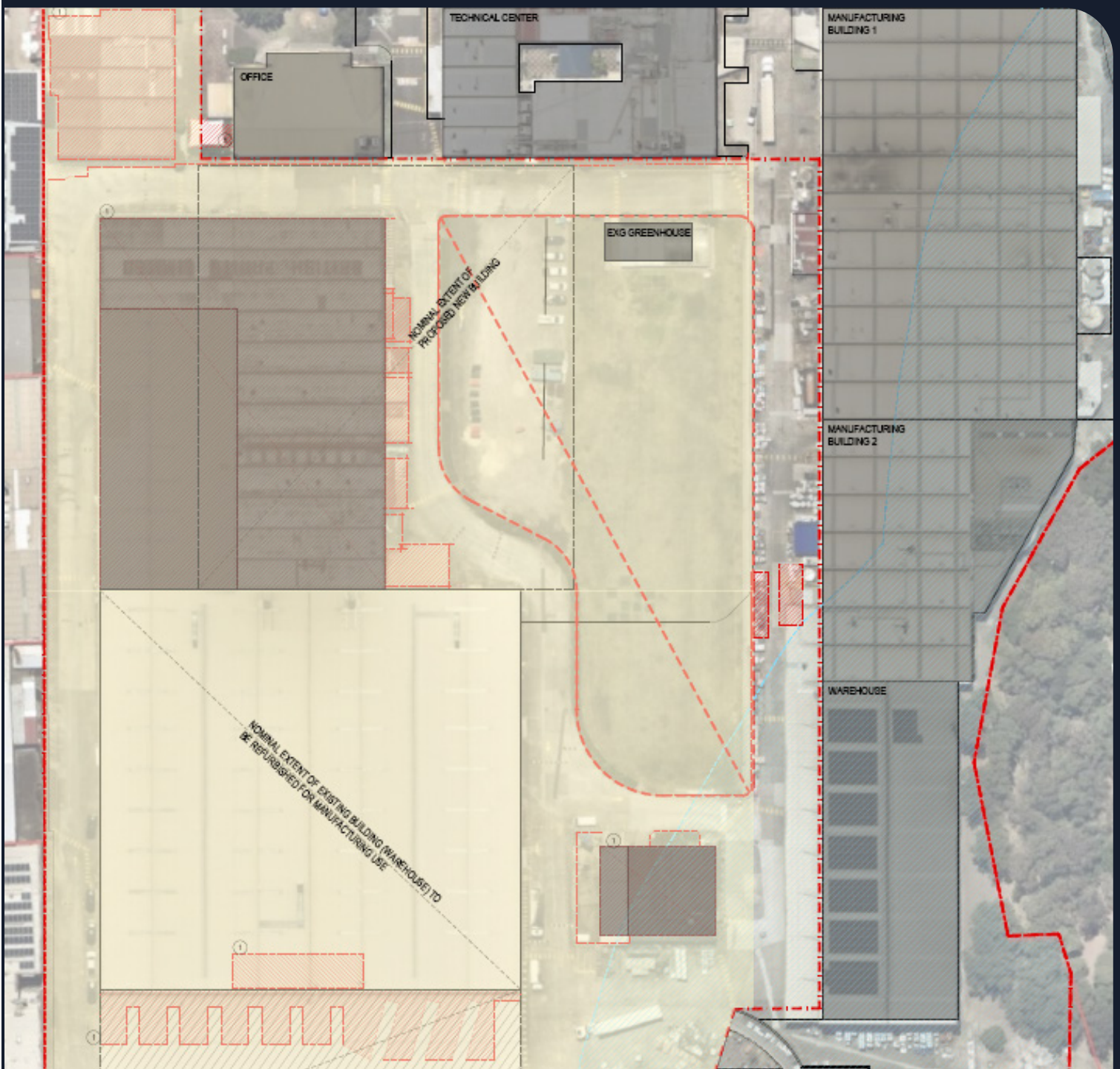


SSD-71052213: Gow Street Manufacturing and Warehouse Facility.

15 and 20 Gow Street, Padstow, NSW

28 October 2024

Remediation Action Plan





Document Information

Remediation Action Plan

SSD-71052213: Gow Street Manufacturing and Warehouse Facility. 15 and 20 Gow Street, Padstow, NSW

Prepared by:

Senversa Pty Ltd

ABN: 89 132 231 380

Level 24, 1 Market St, Sydney, NSW 2000

tel: +61 2 8252 0000

www.senversa.com.au

Prepared for:

DuluxGroup

1956 Dandenong Road

Clayton, VIC 3168

Revision	Date	Author	Reviewed	Approved	Detail
0	19 September 2024	Zoe Smith	Andrei Woinarski	Andrei Woinarski	Draft for client review
1	25 October 2024	Zoe Smith	Andrei Woinarski	Andrei Woinarski	Updated
2	28 October 2024	Zoe Smith	Andrei Woinarski	Andrei Woinarski	Updated

Project Manager: Zoe Smith

Project Director: Andrei Woinarski

Disclaimer and Limitations:

This document is confidential and has been prepared by Senversa for use only by its client and for the specific purpose described in our proposal which is subject to limitations. No party other than Senversa's client may rely on this document without the prior written consent of Senversa, and no responsibility is accepted for any damages suffered by any third party arising from decisions or actions based on this document. Matters of possible interest to third parties may not have been specifically addressed for the purposes of preparing this document and the use of professional judgement for the purposes of Senversa's work means that matters may have existed that would have been assessed differently on behalf of third parties.

Senversa prepared this document in a manner consistent with the level of care and skill ordinarily exercised by members of Senversa's profession practising in the same locality under similar circumstances at the time the services were performed.

Permission should be sought before any reference (written or otherwise) is made public that identifies any people, person, address or location named within or involved in the preparation of this report. Senversa requires that this document be considered only in its entirety and reserves the right to amend this report if further information becomes available. This document is issued subject to the technical principles, limitations and assumptions provided herein in **Section 10.0**.

©2024 Senversa Pty Ltd

Senversa acknowledges the traditional custodians of the land on which this work was created and pay our respect to Elders past and present.



Executive Summary

Introduction

Senversa Pty Ltd (Senversa) was engaged by DuluxGroup Limited (Dulux) to prepare a remedial action plan (RAP) to manage identified contamination at the part of the property at 15 and 20 Gow Street, Padstow, NSW (the property) proposed for redevelopment (the “site”, as shown in **Figure 1**). The property is identified as Lot 100 in DP1011185 and Lot 53 in DP1064349. The site is identified as part Lot 100 DP 1011185 and has an approximate area of 3 hectares (ha).

Context

The main portion (15 Gow Street) of the property is currently operating as a chemical packaging, warehousing and distribution facility including the manufacturing of resins and adhesives.

The site that will be subject to redevelopment comprises the central and western portion of 15 Gow Street. The redevelopment project is designated State Significant Development (SSD-71052213), titled ‘Gow Street Manufacturing and Warehouse Facility’. The redevelopment is proposed to include the refurbishment of an existing warehouse for chemical manufacturing and construction of a new laboratory and warehouse facility for the storage and distribution of sealants, adhesives, fillers and household cleaning products. The northern part of the property (20 Gow Street) is an open space carpark.

There has been substantial historical investigation and remediation of contamination at the property. A preliminary site investigation (PSI) (Senversa Apr 2015) consolidated the understanding of previous works and contamination conditions, and presented a conceptual site model. A detailed site investigation (DSI), inclusive of an updated PSI, for the site was conducted in 2024 (Senversa, Sep 2024) to supplement these. The DSI recommended that a Remedial Action Plan (RAP) be prepared to address data gaps and manage identified contamination issues to make the site suitable for the proposed development.

The required extent of remediation or management comprises:

- **Fill material across the site:** While not all fill material is contaminated, for the purposes of remediation planning all fill material should be considered potentially impacted by asbestos. This is a conservative precautionary approach adopted as the occurrence and concentrations of asbestos in fill have not been delineated laterally or vertically. Fill materials should also be assumed not suitable for use as growing media in landscaping areas unless assessed otherwise.
- **Hydrocarbon impacted soils:** Soils local to former UST areas impacted by petroleum hydrocarbons, some areas of the former Resins Plant and Gelcoat facility, and fill at BH3 in the workshop area, that represent a potential elevated risk if exposed.
- **Remnant primary chemical storage infrastructure:** Available information indicates most former USTs have been decommissioned and removed. However, there is uncertainty in the occurrence of disused USTs in the former workshop area in the southwest of the existing warehouse.
- **Groundwater** was assessed to represent a low risk provided it is not extracted and used. However, exposure to a hydrocarbon sheen present at GW12 and potential impacts local to former primary sources warrant control to protect workers during deep intrusive construction or maintenance works.



Objective

The remedial objectives are:

- To make the site suitable for ongoing commercial/industrial land use as part of the development.
- Mitigate risks to human health and manage potential environmental impacts during the remedial works, including meeting SSD conditions of approval.

While this RAP is prepared under the CLM Act, Dulux have a goal to minimise ongoing asbestos management requirements under NSW workplaces laws, regulations and codes of practice.

Remedial Strategy

A remedial options assessment was undertaken, and the preferred strategy developed that comprised the following key components:

1. Removal to the extent practicable of remaining disused USTs (if found to be present), or decommissioning if otherwise, as required under UPSS regulation.
2. In-situ containment of contaminated soils. This includes leaving undisturbed materials under existing building slabs and pavement to be retained, and capping other contaminated soils via new building slabs, pavement or clean soils and a marker layer.
3. Use of suitable site soils or imported media in open space landscaping areas.
4. Passive management under a long-term environmental management plan (LTEMP) to restrict use of groundwater and control exposure to residual contamination at depth during deep intrusive works.

The aim is that no actions would be needed for normal site use by workers, visitors and landscaping maintenance workers.

There are several data gaps identified that could not previously be addressed to inform ongoing management requirements under the passive LTEMP – the RAP incorporates assessment of these.

Conclusion

Subject to the suitable implementation of the measures described in this RAP, it is concluded that the site can be made suitable for the intended commercial/industrial use and that the risks to the environment can be appropriately protected during the remediation works. Ongoing passive management of certain intrusive works into residual contaminated soils and impacted groundwater under building slabs, pavement and a marker layer will be required via appropriate implementation of a passive LTEMP.



Contents

Executive Summary	ii
List of Acronyms	vii
1.0 Introduction	1
1.1 Background	1
1.2 Proposed Development	2
1.3 SEAR Conditions	2
1.4 Objective	2
1.5 Key Stakeholders	3
1.6 Regulatory and Guidance Requirements.....	3
2.0 Site Information	5
2.1 Site Identification.....	5
2.2 Previous Investigations	6
2.3 Site Setting.....	6
2.4 Contamination Setting.....	8
2.4.1 Summary of Site History	8
2.4.2 Contamination Summary	8
2.4.3 Data Gaps	11
3.0 Conceptual Site Model	12
4.0 Remediation Strategy	16
4.1 Remedial Objectives	16
4.2 Extent of Required Remediation	16
4.3 Constraints and Limitations.....	16
4.4 Remediation Policies	17
4.4.1 Soil	17
4.4.2 Groundwater	17
4.4.3 Ecological Sustainable Development	18
4.4.4 UPSS Regulation	18
4.4.5 Council Contaminated Land Policy	18
4.5 Remediation Options Evaluation.....	18
4.6 Preferred Remediation Approach	20
4.7 Approvals, Permits and Notifications	21
5.0 Remediation Work Plan	22
5.1 Design Review	22
5.2 Address Data Gaps.....	22



5.3	Capping Contaminated Soils	25
5.3.1	Marker Layer	28
5.3.2	Cover Layer.....	28
5.3.3	Areas Where Contaminated Fill is Removed.....	28
5.3.4	Deviations	28
5.4	Materials Management	29
5.4.1	Material Tracking.....	29
5.4.2	Excavated Fill/Soils	29
5.4.3	Waste (Off-site Disposal)	30
5.4.4	Imported Materials	30
5.5	Remediation Validation	30
5.6	Ongoing Management	31
6.0	Validation Plan	32
6.1	Data Quality Objectives	32
6.1.1	Step 1 – State the Problem.....	32
6.1.2	Step 2 – Identify the Decisions	32
6.1.3	Step 3 – Identify Information Inputs	33
6.1.4	Step 4 – Define the Study Boundaries.....	33
6.1.5	Step 5 – Develop the Decision Rules	34
6.1.6	Step 6 – Specify Limits of Decision Error	35
6.1.7	Step 7 - Optimise the Design for Obtaining Data.....	38
6.2	Validation Design and Methodology	38
6.3	Environmental Consultant Presence.....	43
6.4	Quality Assurance and Quality Control.....	43
6.4.1	Field QA/QC.....	43
6.4.2	Laboratory QA / QC	44
6.5	Remediation Acceptance Criteria	45
6.6	Validation Reporting.....	47
7.0	Site Management Provisions	48
7.1	Asbestos Management	48
7.2	Construction Environmental Management.....	49
7.2.1	Site Access	49
7.2.2	Vehicle Cleaning	49
7.2.3	Dust Control	49
7.2.4	Odour Control.....	50
7.2.5	Soil Erosion and Surface Water Runoff	50
7.2.6	Site Security and Signage.....	51
7.3	Worker Health and Safety	51
7.4	Reporting.....	51



7.4.1	Non-conformance and Corrective Action Reports	51
7.4.2	Incident Management Reports	52
7.4.3	Complaint Reporting	52
7.5	Remediation Schedule	52
7.6	Hours of Operation	52
8.0	Contingency Plan	53
8.1	Remedial Contingencies	53
8.2	Unexpected Finds	54
9.0	Conclusion	55
10.0	Principles and Limitations	56
11.0	References	57

Tables in Text

Table 1.1: Roles and Responsibilities	3
Table 2.1: Site Identification	5
Table 2.2: Property Environmental Setting	6
Table 2.3: Summary of Property History	8
Table 3.1: Source-Pathway-Receptor Linkages	13
Table 4.1: Soil Remedial Options Assessment	19
Table 5.1 Sampling Strategy to Address Data Gaps	23
Table 5.2: Capping Design	26
Table 5.3 Stockpile Details Required in the Material Tracking Register	29
Table 5.4 Importation Details Required in the Material Tracking Register	29
Table 5.5 On Site Reuse Details Required in the Material Tracking Register	29
Table 5.6 Exportation Details Required in the Material Tracking Register	29
Table 6.1: Decision Rules	34
Table 6.2: Data Quality Indicators	36
Table 6.3: Validation Strategy and Design	39
Table 6.4: Adopted Assessment Criteria	45
Table 8.1: Contingencies	53
Table 10.1: Principal and Limitation of Investigation	56

Appendices

Figures

Appendix A: Proposed Development Plans

Appendix B: Contamination Data Tables



List of Acronyms

Acronym	Definition
ASSMAC	Acid Sulfate Soils Management Advisory Committee
AASS	Actual Acid Sulfate Soil
ABC	Ambient background concentration
ACL	Added contaminant limit
ACM	Asbestos containing material
AEI	Area of Environmental Interest
AHD	Australian Height Datum
AMG	Australian Map Grid
ANZG	Australian and New Zealand Guidelines
AS	Australian Standard
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
ASS	Acid Sulfate Soil
ANZECC	Australian and New Zealand Environment and Conservation Council
BH	Borehole
BTEX	Benzene, toluene, ethylbenzene, xylenes
BYDA	Before You Dig Australia
CEC	Cation Exchange Capacity
COC	Chain of custody
CoPC	Contaminant of potential concern
CSM	Conceptual site model
DGV	Default Guideline Values
DP	Deposited Plan
DQIs	Data Quality Indicators
DQOs	Data Quality Objectives

Acronym	Definition
DSI	Detailed Site Investigation
EIL	Ecologically based investigation level
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environment Protection Authority (NSW)
ESL	Ecological screening level
GDE	Groundwater Dependent Ecosystems
GME	Groundwater monitoring event
GPR	Ground-Penetrating Radar
ha	Hectare
HEPA	Heads of EPA Australia and New Zealand
HIL	Health-based investigation level
HSL	Health screening level
km	Kilometre
L	Litre
LFG	Landfill gas
LOR	Limit of reporting
m	Metre
m³	Cubic metres
m AHD	Metres Australian Height Datum
m bgl	Metres below ground level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per litre
MAH	Monocyclic aromatic hydrocarbon
MW	Monitoring well



Acronym	Definition
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
OCP	Organochlorine Pesticides
OPP	Organophosphate Pesticides
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated Biphenyl
PFAS	Per- and Polyfluoroalkyl Substances
PFOS	Perfluorooctane Sulfonate
PID	Photo-ionisation detector
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
PSH	Phase separated hydrocarbons
QA	Quality assurance
QC	Quality control
RAP	Remedial Action Plan
RPD	Relative percentage difference
SAQP	Sampling and Analysis Quality Plan
S_{Cr}	Chromium Reducible Sulfur
SEAR	Secretary's Environmental Assessment Requirements
spp	Species Protection
SSD	State Significant Development
SVOC	Semi-volatile organic compound
SWL	Standing water level
TDS	Total dissolved solids

Acronym	Definition
TOC	Total organic carbon
TPH	Total petroleum hydrocarbons
TRH	Total recoverable hydrocarbons
UEL	Upper explosive limit
uPVC	Unplasticised Polyvinyl Chloride
USEPA	United States Environment Protection Agency
UST	Underground storage tank
µg/kg	Micrograms per kilogram
µg/L	Micrograms per litre
VOC	Volatile organic compound



1.0 Introduction

Senversa Pty Ltd (Senversa) was engaged by DuluxGroup Limited (Dulux) to prepare a remedial action plan (RAP) to manage identified contamination at the part of the property at 15 and 20 Gow Street, Padstow NSW (the property) proposed for redevelopment (the "site", as shown in **Figure 1**). The property is identified as Lot 100 in DP1011185 and Lot 53 in DP1064349. The site is identified as part Lot 100 DP 1011185 and has an approximate area of 3 hectares (ha).

The main portion (15 Gow Street) of the property is currently operating as a chemical packaging, warehousing and distribution facility including the manufacturing of resins and adhesives. The site that will be subject to redevelopment comprises the central and western portion of 15 Gow Street. The redevelopment is proposed to include the refurbishment of an existing warehouse for chemical manufacturing and construction of a new laboratory and warehouse facility for the storage and distribution of sealants, adhesives, fillers and household cleaning products. The northern part of the property (20 Gow Street) is an open space carpark.

The redevelopment project is designated State Significant Development (SSD-71052213), titled 'Gow Street Manufacturing and Warehouse Facility'. The Planning Secretary's Environmental Assessment Requirements (SEAR) dated 18 June 2024 require an Environmental Impact Statement (EIS) be prepared that must address certain requirements, including investigation of contamination and preparation of a RAP, if required.

There has been substantial historical investigation and remediation of contamination at the property. A preliminary site investigation (PSI) (Senversa Apr 2015) consolidated the understanding of previous works and contamination conditions, and presented a conceptual site model (CSM). A detailed site investigation (DSI), inclusive of an updated PSI, for the site was conducted in 2024 (Senversa, Sep 2024) to supplement these. The DSI recommended that a RAP be prepared to address data gaps and manage identified contamination issues to make the site suitable for the proposed development.

1.1 Background

The main portion of the property (15 Gow Street) is shared by two DuluxGroup owned entities, Selleys and Dulux, operating on separate portions in the east and north (Selleys) and west and central (Dulux) (refer **Figure 1**). The main chemical manufacturing activities currently occur at the Selleys factory. The premises at 20 Gow Street is on the opposite side of Gow Street, which consists of an open space carpark to service the Dulux facility. The property layout is provided on **Figure A**.



Figure A: Property Layout



Senversa prepared a DSI (Senversa, Sep 2024) that concluded a RAP is required to manage identified contamination issues to make the site suitable for the proposed development. These key contamination issues or data gaps relate to risks associated with:

- Managing exposure to and disturbance of soils during intrusive works due to the occurrence of asbestos in fill and potential localised aesthetic and hydrocarbon impacts.
- Controlling use of site soils, which may not be ecologically suitable for use as exposed soils or growing media in landscaping areas.
- Controlling use of groundwater that may not be suitable for extraction and use, and exposure during deep excavations due to residual hydrocarbon impacts in the former UST areas.
- Appropriate environmental management of site soils and water during development construction works. This includes management of acid sulfate soils that may be disturbed via implementation of an acid sulfate soil management plan.

Due to logistical and access constraints, there were limitations in the sampling able to be conducted and there are identified data gaps. These should be incorporated into the RAP and addressed prior to and during redevelopment works.

1.2 Proposed Development

The development is proposed to comprise the following works:

- Demolition of existing warehouse and maintenance building.
- Strip out and refurbishment of existing warehousing space to create a state of the art manufacturing facility with ancillary raw materials storage which will continue to be operated by the Dulux Group and Selleys.
- Construction of external tank storage and tanker unloading area.
- Re-modelling of the existing vehicle access to allow uni-directional truck flow.

Development plans considered in this RAP are presented in **Appendix A**.

1.3 SEAR Conditions

The SEAR dated 18 June 2024 includes the following requirements in relation to contamination:

- *“A site contamination assessment in accordance with the Managing Land Contamination Planning Guidelines: SEPP 55 – Remediation of Land (DUAP, 1998), including:*
 - *Characterisation of the nature and extent of any contamination on the site and surrounding area*
 - *A Detailed Site Investigation (DSI) and a Remedial Action Plan, if the Preliminary Site Investigation indicates contamination is present and a DSI is required.”*

The PSI and DI is reported in Senversa (Sep 2024). The report comprises the RAP to address this condition.

1.4 Objective

The primary objective of this RAP is to describe the remedial processes and procedures required to be implemented during site development works to make the site is suitable for the proposed development. Specific remedial objectives are presented within **Section 6.1**.

The RAP is restricted to the site area as shown in **Figure 1**, consistent with the extent of development works. Residual contamination on the remainder of the property, principally within the eastern portion of the property (Selleys factory) is managed under the existing EMP (Senversa 2016) and, as it is located downgradient, will not impact the development site. The RAP does not assess the northern



portion of the property (carpark area at 20 Gow Street) as this area is not subject to development works and its use will not change.

1.5 Key Stakeholders

The stakeholders likely involved in the remediation project are listed in **Table 1.1** below.

Table 1.1: Roles and Responsibilities

Role	Organisation	Qualification / Experience Requirement for Remediation
Owner/Developer	Dulux	-
Consent Authority	Department of Planning, Housing and Infrastructure	-
Principal Contractor (PC)	TBC	-
Remediation Contractor (RC)	TBC	-
Environmental Consultant (EC)	Senversa Pty Ltd	<p>Suitable trained and experienced. All reports to be prepared under direction of and approved by a person with an EPA-recognised consultant certification scheme:</p> <ul style="list-style-type: none"> Environment Institute of Australia and New Zealand - Certified Environmental Practitioner (Site Contamination) (CEnvP (SC)). Soil Science Australia - Certified Professional Soil Scientist Contaminated Site Assessment and Management (CPSS CSAM).

TBC = to be confirmed.

1.6 Regulatory and Guidance Requirements

This RAP has been developed with reference to the following guidelines and standards:

- Acid Sulfate Soils Management Advisory Committee (ASSMAC), 1998. Acid Sulfate Soil Manual.
- CBC (2017). *Contaminated Land Policy*, City of Canterbury-Bankstown
- DUAP & EPA (1998) Managing Land Contamination Planning Guidelines, SEPP 55 – Remediation of Land.
- HEPA (2020). *PFAS National Environmental Management Plan (NEMP)*. Version 2.0. National Chemicals Working Group of the Heads of EPAs Australia and New Zealand (PFAS NEMP).
- National Environment Protection Council (2013). National Environment Protection (Assessment of Site Contamination) Amendment Measure (No.1). This is hereafter referred to as 'ASC NEPM'.
- DEC (2007). *Guidelines for the Assessment and Management of Groundwater Contamination*.
- NSW EPA (2014). *Waste Classification Guidelines. Part 1: Classifying Waste*.
- NSW EPA (2015). *Technical Note: Light Non-Aqueous Phase Liquid Assessment and Remediation*
- NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme (3rd edition)*.
- NSW EPA (2020a). *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*.



- NSW EPA (2020b). *Assessment and Management of Hazardous Ground Gases, Contaminated Land Guidelines*.
- NSW EPA (2020c). *Guidelines for implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019*.
- NSW EPA (2022). *Sampling Design part 1 – application, Contaminated Land Guidelines*.
- WA Department of Health (DOH) (2021) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*.

This list may be updated with reference to SSD approval conditions where relevant.



2.0 Site Information

2.1 Site Identification

A summary of the property and site identification is presented below:

Table 2.1: Site Identification

Item	Description
Property Address	15 and 20 Gow Street, Padstow, NSW 2211.
Property Area	Approximately 6 ha.
Site Area	Approximately 3.0 ha.
Site Legal Description	Part of Lot 100 of DP 1011185.
Geographic Coordinates (approximate centre of site) (GDA2020/MGA56)	Eastings: 318646 Northings: 6242876
Current Site Owner	DuluxGroup (Australia) Pty Ltd.
Site Elevation	5-10 m Australian Height Datum (AHD).
Local Government Area	City of Canterbury-Bankstown Council.
Site Zoning	IN1 – General Industrial (Canterbury-Bankstown Local Environmental Plan 2023).
Property Use	<p>Chemical packaging, warehousing and distribution facility including manufacturing of paints, resins and adhesives (commercial/industrial premises). The main chemical manufacturing activities currently occur at the Selleys factory (off-site).</p> <p>The warehouse at the site is currently largely vacant.</p> <p>Activities at the property are regulated via the POEO Act under:</p> <ul style="list-style-type: none"> Environment Protection Licence (EPL) No. 7106 for chemical production and storage.
Surrounding Land Use	<ul style="list-style-type: none"> North: Gow Street, Dulux carpark, Ausgrid substation and commercial properties. South: South-Western Motorway, with various commercial and industrial properties beyond including a computer repair service, commercial cleaning service, Bunnings home improvement store and tool manufacturer. Stuart Street Reserve is situated approximately 440 m south of the site, followed by residential properties. West: Commercial properties including a real estate agency, mattress store, stone cutter and chemical wholesaler. Beyond this is Fairford Road with various commercial and industrial properties including a galvanising facility, stone supplier, poultry wholesaler, truck repair store, logistics service, gym, recycling centre and mechanic. Residential properties are situated approximately 910 m to the west of the site, followed by Sir Joseph Banks High School. East: Bushland and Salt Pan Creek, followed by various commercial properties including an auto body shop, mechanic and book binder, as well as a sports club with tennis courts, baseball field and McLaughlin Oval. Beyond this are high density residential properties followed by other commercial businesses.
Current Site Occupier	Dulux
Site Location and Features	Figure 1.



2.2 Previous Investigations

Contamination at 15 Gow Street has been subject to extensive investigation and remediation during the period from mid-1990s to 2016. A preliminary site investigation (PSI) (Senversa Apr 2015) consolidated the understanding of previous works and contamination conditions, and presented a conceptual site model (CSM). The DSI (Senversa Sep 2024) reviewed the relevant previous investigation reports, including the 2015 PSI, existing EMP and results of the groundwater and vapour monitoring program under the existing EMP. The findings of these are summarised in the following sections.

2.3 Site Setting

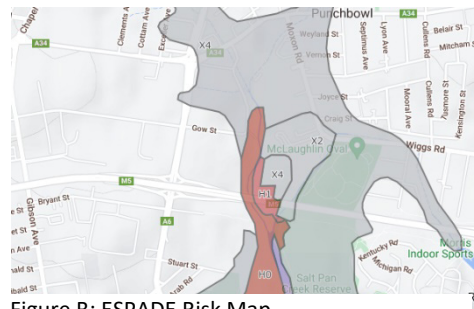
The property's environmental setting was described in the DSI (Senversa, 2024), with a summary for the site presented in **Table 2.2**.

Table 2.2: Property Environmental Setting

Item	Description
Topography	<p>The site is at an elevation of approximately 5 to 10 m AHD and shows the land generally slopes from west to east toward Salt Pan Creek.</p> <p>Based on the Department of Planning and Environments eSPADE v2.2 the site is located within disturbed terrain area, which is characterised as level plain to hummocky terrain, extensively disturbed by human activity, including completed disturbance, removal or burial of soil. Local relief <10 m, slopes < 30%. Landfill includes soil, rock, building and waste materials. Original vegetation completely cleared, replaced with turf or grassland.</p>
Geology and Soil	<p>Based on geological information obtained from the <i>Sydney Geological Map Sheet 1:100,000</i>, the surface geology at the site is comprised of Middle Triassic aged black to dark grey shale of the Ashfield Shale (Rwa). This is then likely to be underlain by Middle Triassic aged medium to coarse grained quartz sandstone of the Hawkesbury Sandstone (Rh) formation.</p> <p>Review of eSPADE 2.2 indicated that the site is located within disturbed terrain and the geology was reported to consist of artificial fill. Dredged estuarine sand and mud, demolition rubble, industrial and household waste. Also includes rocks and local soil materials.</p> <p>The PSI reports that imported fill generally consisting of gravelly clays and sands is present to depths of up to four metres along the eastern site boundary. This imported fill is considered likely to have been gained from the alluvial gravelly clays present banks of Salt Pan Creek in the 1950s and 60s. The thickness of fill generally decreases across the middle to western boundary to less than 1 m thick overlying weather shales and clays on the western boundary at MW1 and GW01.</p> <p>Senversa (Jul 2024) reported fill materials are underlain by grey, red and orange mottled low plasticity, stiff, dry clays with intermittent ironstone gravel and sandy lenses identified at 2.0 to 2.6 m bgl and 3.0 to 3.2 m bgl. Clays were typical of the quaternary alluvial sediments of Western Sydney. Clay becomes moist, darker grey, high plasticity and very stiff from 4.2 m bgl and becomes saturated from approximately 5.0 m bgl indicating that bores intersected the shallow groundwater table.</p>
Hydrology	<p>The surface water features within 1 km of the site are as follows:</p> <ul style="list-style-type: none"> • Salt Pan Creek, located approximately 100 m to the east of the site and flows through an urbanised area toward Georges River, approximately 4 km to the south. • No surface water bodies were identified on-site. • There were no wetlands recorded within a 500 m radius of the site. <p>The site is largely paved or covered by buildings, which will limit infiltration. Excess rainfall on the site would be directed through the stormwater network, which is anticipated to flow towards Salt Pan Creek.</p> <p>There are two first flush stormwater management systems on the site (Senversa Apr 2015):</p> <ul style="list-style-type: none"> • Drum Yard (25 KL tank) – Drains the Drum Yard. • South East of Site (12 KL tank) Drains remainder of the site.



Item	Description
Hydrogeology	<p>A review of the NSW Natural Resource Atlas found that the major aquifer in the area is within the Middle Triassic shales and sandstones, however, thinner potentially lower yielding aquifers may be present in the Quaternary aged sediments overlying these lithologies.</p> <p>Senversa (Jul 2024) reported there were three water bearing units underlying the site:</p> <ul style="list-style-type: none"> • Perched Aquifer: Unconfined perched system of limited lateral extent generally hosted in imported or reworked quaternary alluvium around areas where USTs have been installed, which was not consistent across the entire property. • Shallow Quaternary Aquifer: Unconfined aquifer present across the eastern third of the property and hosted in the quaternary aged alluvial gravelly clays. • Shale Aquifer: Semi-confined aquifer hosted within the Middle Triassic aged Ashfield Shale that appears to be unconfined across the western two thirds of the property and becomes confined as it dips underneath the shallow quaternary aquifer towards the site's eastern boundary. <p><u>Groundwater Receptors</u></p> <p>The saline nature of groundwater and occurrence in clays and shales, and presence of a reticulated water supply, indicates groundwater under the site is not likely to be extracted and used for drinking or beneficial use. Shallow groundwater is inferred to flow towards the east where it may discharge to Salt Pan Creek.</p> <p>A search Groundwater Dependent Ecosystems (GDE) Atlas identified there were no groundwater dependent ecosystems on the site. The nearest groundwater dependent ecosystem was Georges River located 5.6 km west of the site. Terrestrial GDE including estuarine saltmarsh was located on the eastern boundary of the property.</p> <p>A search of the WaterNSW groundwater database undertaken on 28 June 2024 (Real-time water data (waternsw.com.au)) indicated that there were 37 groundwater bores listed as being with a 500 m radius of the site, including five registered bores within the site boundary (GW103670, GW103680, GW103690, GW103688 and GW103677). The construction borelogs for the five registered bores on-site are provided in Appendix C.</p> <p>The five on-site bores were constructed in November 2000 to depths of between 0.5 and 5.0 metres below ground level (m bgl) and were for monitoring purposes only. The available drilling logs indicate that the lithology generally consisted of fill material comprising concrete, sand, gravel and clay to a maximum depth of 1.3 m bgl. This was underlain by natural grey / brown clay.</p>
Acid Sulphate Soil (ASS)	<p>A review of the <i>Acid Sulfate Soil Potential in NSW</i> map found that the site has Class 5 Acid Sulphate Soil Potential. The northeast corner of the property (Selleys factory and drum yard, off-site) is classified as having Class 2 Acid Sulphate Soil Potential. Class 2 requires that a preliminary hydrology study is undertaken prior to undertaking any works where the water table is likely to be lowered.</p> <p>Review of ESPADE Spatial Viewer risk mapping indicates the area occupied by the site has not been required to be assessed for the presence of ASS based on the outcomes of a preliminary evaluation. Such sites are by default characterised as "no known occurrence", being defined as areas where land management activities are not likely to be affected by ASS materials. However, the eastern portion of the property appears to be within disturbed terrain and high probability near the ground surface (H0).</p> <p>The DSI (Senversa Sep 2024) reported visual indicators and chromium reducible sulfur (Scr) and net acidity above relevant action criteria in fill and natural soils at TP101 that comprise potential acid sulfate soils (PASS). Based on the results, an acid sulfate soil management plan is required if there will be ground disturbance as part of the redevelopment works.</p>
Salinity	<p>A search of the salinity potential of Western Sydney indicates the site is located within an area of moderate salinity potential. Well drained areas with moderate to high relief present a lower risk of salinity potential. Conversely poorly drained areas of low relief present a higher risk of salinity potential.</p> <p>The DSI (Senversa Sep 2024) reported soil extract electrical conductivity (ECe) values exhibited an average value of 2.76 dS/m within the negligible salinity range.</p>
Sensitive Receptors	<p>The following sensitive environmental receptors were identified:</p> <ul style="list-style-type: none"> • Salt Pan Creek, located approximately 100 m to the east and flows through an urbanised area toward Georges River, approximately 4 km to the south. • Flora and fauna of adjacent bushland and Salt Pan Creek Reserve located approximately 330 m southeast of the site. • A search of Bionet Atlas of NSW Wildlife identified there were no sensitive wildlife on the site. A non-threatened flying-fox has been sighted at the site. Vulnerable bionet species sightings have been recorded in the bushland at Salt Pan Creek.





2.4 Contamination Setting

2.4.1 Summary of Site History

Senversa (Sep 2024) provided a summary of the main historical events at the main property. **Figure 1** presents locations of the key features.

Table 2.3: Summary of Property History

Date	Land Use
Pre-1948	Area was utilised for market gardens and production of salt obtained from swampland areas (potentially on the eastern portion of the site) by evaporating the salt water.
Early 1950s	British Paints (16 – 29 Gow Street) develop the site.
1953	British Paints begin paint production (Dulux Paint Factory)
1960	Resin Plant begins production of alkyd resin (key component of oil-based paints).
1985	Production of water-based paints only.
1997	Production of all paints cease.
2001	Demolition, soil remediation and validation of the Resins Plant. USTs within site removed or decommissioned.
2003/2004	Gelcoat Facility building and electrical substation demolished, with remediation and validated.
2005-2015	Minor soil remediation works and further contamination investigations.
Up to 2020s	Commercial warehousing and storage in existing warehouse and former paint factory building.

2.4.2 Contamination Summary

The previous investigations covered various aspects of soil, groundwater, vapour, and human health risk assessment, as well as remediation and validation works. Some of the key historical contamination issues of concern identified were:

- Elevated levels of total petroleum hydrocarbons (TPH), monocyclic aromatic hydrocarbons (MAHs), naphthalene, benzo(a)pyrene (B(a)P), and total polycyclic aromatic hydrocarbons (PAHs) in soil and groundwater from former USTs, former Resins Plant, and former Gelcoat facility.
- Presence of phase separated hydrocarbons (PSH) in groundwater and potential vapour intrusion risk in the Selleys factory area (off-site).
- Elevated levels of volatile chlorinated hydrocarbons (VCHs) (including 1,1-DCA, 1,1-DCE and VC) in groundwater in the in the Selleys factory area (off-site).
- Potential asbestos and polychlorinated biphenyl (PCB) impacts in fill soils across the site.



Most contamination issues have been mitigated as part of decommissioning past manufacturing plants and as activities ceased or changed. Some of the findings and recommendations previously reported include:

- The site was generally considered suitable for ongoing industrial use, with no unacceptable human health risk from identified contamination, except for some isolated areas that required further investigation, management, or remediation.
- The existing EMP (Senversa 2016) was prepared to:
 - Manage potential worker exposure to impacted soils and groundwater during intrusive activities.
 - Control extraction of groundwater at the site, without further assessment of the risks to human health and the environment.
 - Monitor the groundwater and vapour conditions.

The DSI (Senversa Sep 2024) identified key contamination issues or data gaps relate to risks associated with:

- Managing exposure to and disturbance of soils during intrusive works due to the occurrence of asbestos in fill and potential localised aesthetic and hydrocarbon impacts.
- Controlling use of site soils, which may not be ecologically suitable for use as exposed soils or growing media, during development works.
- Controlling use of groundwater that may not be suitable for extraction and use, and exposure during deep excavations due to residual hydrocarbon impacts in the former UST areas.
- Appropriate environmental management of site soils and water during development construction works. This includes management of acid sulfate soils that may be disturbed via implementation of an acid sulfate soil management plan.

Key results are summarised below. Copies of soil vapour, groundwater and soil sampling analytical data from the DSI (Senversa Sep 2024) are provided in **Appendix C**.

2.4.2.1 Remnant Primary Sources

UST structures were not detected via GPR in the UST areas north of the paint factory, north of the former resins plant and within the former resins plant. This supports previous reports indicating the USTs were decommissioned and removed.

The occurrence of disused USTs in the former workshop area could not be confirmed due to interference.

2.4.2.2 Soil

Some soils in the vicinity of former USTs, current Dulux workshop and parts of the former manufacturing plants are impacted by staining/malodours and hydrocarbons. However, soil concentrations were below health criteria for heavy metals, BTEX, TRH, PAHs, VOCs, SVOCs, OCPs, OPPS, PCBs, phenols and PFAS. Historical data (Orica Consumer Products 2001, JBS Environmental 2004a/2005b) indicates there was elevated TPH, VOC and/or PAH concentrations at several historical sample locations that exceed criteria and may require management including:

- Former northeast UST area: Historical exceedances of health, ecological and Management Limits for TPH at S3. However, subsequent investigation in 2004 reported TRH exceeding ecological criteria only.
- Dulux Workshop: At BH3, B(a)P exceeds health criterion, and B(a)P and TRH exceed ecological criteria.



Asbestos as bonded ACM was identified in fill at two locations (TP103 and BH102), being reported at a concentration exceeding health criterion at BH102. Asbestos as AF/FA was identified at concentrations less than the health criterion (0.001 %w/w) in two of 12 samples analysed (TP103_0.9-1.0, TP104_1.8-1.9). Previous investigations have noted ACM has been observed in site fill. While the occurrence of asbestos identified in the current investigation in within the southern part of the former Resins Plant, the relatively low sampling density adopted and use of boreholes in historic investigations underlying existing buildings, means there could be more frequent and widespread occurrence of asbestos than indicated.

PFAS was detected in all analysed soil samples at low levels less than health and direct toxicity ecological criteria.

Site soils may not be suitable for use as growing media in landscaping areas unless verified otherwise. The developed site will be mostly covered by buildings and hardstand that will limit exposure to ecological receptors. The ecological risk from soils is considered low on this basis.

There has been limited soil sampling in some site areas with elevated uncertainty in the extent of residual soil impacts within the northern part of the former paint factory associated with the UST area (north) and at the former washdown area, the Dulux Workshop and canteen area.

2.4.2.3 Groundwater

Groundwater levels and flow directions were broadly similar to that reported under the EMP monitoring program. The depth to water (>2 m bgl on average), low permeability strata and saline nature of the groundwater supports that extraction and incidental contact during most intrusive works will not be likely. However, discontinuous pockets of perched water near former UST area occur at shallower levels, and groundwater could be encountered during deeper excavations.

A hydrocarbon sheen was reported at GW12, located on the eastern boundary of the site. A diesel-origin LNAPL has historically been reported at this location, steadily decreasing in thickness from *circa* 0.2 m in 2015. This represents a low risk, but its source is uncertain.

Groundwater sampling of wells on or adjoining the site reports low concentrations less than health criteria for heavy metals (excluding cobalt at GW05, located on the property cross-gradient to the site), TRH, BTEX, PAHs (excluding B(a)P at GW02, located in the south), MAHs, chlorinated hydrocarbons, alcohols, ketones, formaldehyde, phthalates and PFAS. The noted exceedances are minor and not considered significant for the site.

Heavy metals (cobalt, copper, manganese, nickel and/or zinc) concentrations exceed ecological criteria in groundwater at least one location. The concentrations are generally consistent across the site and property, and are thought to represent site ambient conditions reflecting the urbanised industrial region, including historic off-site source from upgradient industry, and water quality within Ashfield Shale.

Formaldehyde concentrations exceeded the adopted ecological criterion at GW02, GW04 and GW05. Formaldehyde occurs in groundwater sampled at the site's upgradient boundary (*circa* 400 ug/L at GW01 and GW03), and the highest concentration was reported at GW05, located off-site at the property's northern boundary, suggesting contribution from site ambient conditions.

PFOA, PFOS or PFHxS were not detected at concentrations above the LOR (0.01 to 0.02 ug/L) in samples from wells GW01-GW05. PFOS was detected in groundwater at GW15 at a concentration less than the health criterion but exceeding 95% and 99% species protection levels. Limited analysis of site soils samples for PFAS does not suggest the source are site soils local to GW15. The source and extent of impact is uncertain.

There is uncertainty in the nature of groundwater in the central portion of the site and near the UST area north of the former paint factory.



2.4.2.4 Soil Vapour

PID readings ranged from 0 ppm to 27 ppm (VP115). Methane, carbon dioxide, hydrogen sulfide and carbon monoxide were all recorded at 0 ppm or % v/v.

Detections of VOCs were recorded in all vapour samples analysed. All vapour results were below the adopted criteria, typically by more than one or two orders of magnitude.

Within the building footprints, analyte concentrations were typically not detected or close to the LOR and more than one or two orders of magnitude less than criteria, noting that:

- Generally, higher concentrations of VOCs were reported in the Paint Factory than warehouse.
- At VP112, elevated chloroform was reported (3,300 ug/L), less than the criterion (14,300 ug/mg). However, the extent of impact east and west is uncertain.

2.4.3 Data Gaps

The DSI (Senversa Sep 2024) identified uncertainties in the characterisation of contamination at the site. Residual contamination in soil, soil vapour and groundwater at the property is currently managed under the existing EMP. The proposed development will retain existing building slabs, has minimal cut and will be mostly covered by hardstand or buildings. This development design and measures in the existing EMP can mitigate many of these uncertainties if implemented appropriately. However, key data gaps that warrant addressing to inform ongoing management requirements include:

- Uncertainty in the extent and temporal changes of impacts to soil vapour at VP112 and to the east underlying the future building footprint. It would also be prudent to re-sample selected vapour points, including BH101 and BH102, to assess temporal variability.
- Uncertainty in contamination conditions in soil where there has been limited sampling, including the Dulux workshop and canteen areas, or where the development requires bulk excavation. Uncertainties in other areas have been (or can be) addressed via soil vapour and/or groundwater sampling, and retention under future buildings/slabs that will limit exposure.
- The nature of groundwater in the central portion of the site.
- Occurrence of remnant USTs in former workshop in southwest of warehouse.

The DSI identified a data gap relating to the source and extent of PFOS impact to groundwater at GW15. This data gap does not affect the site suitability, rather it relates to informing risk to the receiving environment and for the property as a whole. It is appropriate to address this data gap via further review of property information records and sampling downgradient groundwater as part of the monitoring program in the EMP.

The DSI did not assess the open space carpark at 20 Gow Street. The existing carpark will be subject to ongoing use as an open space industrial carpark for the property as a whole – Senversa understands it is included in the SSD application only to demonstrate compliance with planning controls. No works or change in use are proposed, however, if this changes then assessment of contamination may be required.



3.0 Conceptual Site Model

An assessment of source-pathway-receptors (SPR) linkages was compiled for the site (Senversa, Sep 2024) as presented in **Table 3.1** below. It includes an indication of whether SPR linkages require further investigation or management. The SPR linkages have been classified as follows:

- **Incomplete** – linkage likely to be incomplete with negligible exposure to contamination likely to occur via this pathway.
- **Potentially complete** – linkage potentially complete. Further data collection required to close data gaps and confirm whether pathway is complete or potentially significant in terms of risk.
- **Complete** – linkage likely to be complete. Based on available information, a complete exposure pathway has been identified and/or there is significant uncertainty and these linkages require more detailed investigation or risk assessment/management.



Table 3.1: Source-Pathway-Receptor Linkages

Source	Exposure Pathway	Receptor(s)	Status	Assessment of complete linkages
On-site sources: • Variable fill quality underlying the site. • Residual impacts associated with former UST areas. • Residual impacts associated with previous manufacturing plants subject to remediation. • Soils in workshop area.	Dermal contact or incidental ingestion (sub-surface soils)	Site commercial/industrial workers and visitors	☒	Most of the site is currently and will be sealed so no complete exposure pathways in most areas. The exposure pathway incomplete for most workers on site as they would not come into contact with soils during day-to-day activities.
		Current and future intrusive workers (including utility and landscape workers and grounds keepers)	☑	Limited exceedances of HIL D health criteria have been historically reported in soils for B(a)P at the workshop and TPH/TRH at northeast UST area. Soils may be aesthetically impacted in former UST areas and manufacturing plants, that could require management during construction if disturbed (e.g. malodours). The extent of these impacts is localised and will be covered by buildings or pavement in the future, limiting exposure. It is expected that exposure of construction workers would be managed by standard occupational health and safety measures (e.g. wearing gloves during soil or groundwater handling, etc) implemented as part of a construction environmental management plan for the project.
		Construction workers during redevelopment		There has been a low sampling density or reliance on boreholes in some areas, which reduces the level of certainty in risk. This should be considered during construction.
		Off-site recreational users of Coxs Creek	☒	Soil exposure pathway incomplete for off-site recreational or commercial workers as they would not come into contact with soils from the site.
Off-site Sources: • Migration of potential offsite contamination onto the site	Dermal contact or incidental ingestion (sub-surface water)	Site commercial/industrial workers and visitors	☒	Extraction and beneficial use of groundwater is considered unlikely on the basis of the high salinity of groundwater, typically low permeability and poor yield of clays/shale, and presence of a reticulated water supply. The exposure pathway incomplete for most workers on site as they would not come into contact with groundwater during day-to-day activities.
		Current and future intrusive workers (including utility and landscape workers and grounds keepers) Construction workers during redevelopment	☑	There is potential for incidental direct contact to groundwater during deep excavations. Concentrations of COPC were reported to be generally less than health criteria. However, there is potential for LNAPL to occur in proximity of MW12 (eastern boundary of site) and localised solvent and hydrocarbon impacts near former USTs. The average depth of 2.2 m bgl in 1 July 2024 indicates that potential exposure via incidental contact to intrusive or construction workers will be limited. Most services would be expected in the top metre and above the water table. However, it is possible deep excavations are required during construction that could intersect the water table in areas of residual contamination. There could be localised pockets of shallower perched water that is impacted by hydrocarbons near former UST areas and MW12.



Source	Exposure Pathway	Receptor(s)	Status	Assessment of complete linkages
		Off-site recreational users of Coxs Creek Off-site intrusive workers	<input checked="" type="checkbox"/>	Groundwater flows east and may eventually discharge to Coxs Creek. However, there is no evidence of migration of site-related contaminants at concentrations exceeding recreation health criteria (which are also conservatively protective of intrusive workers) off the property via groundwater. Groundwater underlying the Selleys Factory managed under the EMP.
	Inhalation of vapours (from soil and/or groundwater)	All site users (recreational, commercial workers, construction workers prior to and during construction) Offsite recreational users Offsite commercial workers	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Soil and groundwater concentrations were below HSLs in the current investigation, but exceedances have been historically reported near former primary source areas. All soil and sub-slab vapour concentrations were below health criteria. There remain some uncertainties in soil vapour conditions in the former paint factory and area to the east that will be covered by occupied buildings. Off-site migration of hazardous ground gas has not been identified and is not a likely pathway.
	Inhalation of contaminated soil dust (from exposed soils)	All site users (commercial workers, intrusive workers, construction workers prior to and during construction) Offsite recreational users Offsite commercial workers	<input checked="" type="checkbox"/>	Negligible opportunity for site users to be exposed to contaminated dust/soil during normal site conditions as surfaces are or will be sealed. Asbestos as bonded ACM was identified in fill at two locations (TP103 and BH102), being reported at a concentration exceeding HSL D health criterion at BH102. Asbestos as AF/FA was identified at concentrations less than the health criterion (0.001 %w/w) in two of 12 samples analysed (TP103_0.9-1.0, TP104_1.8-1.9). There has been limited sampling in some areas and reliance on boreholes, which have limitations, and asbestos may be more widespread than identified. Potential exposure during construction or intrusive works to contaminated dust/soils would need to be managed during excavation of materials. This could be managed by the implementation of an unexpected finds protocol and/or asbestos management plan to prevent generation of airborne asbestos fibres.
	Direct uptake from soil	On-site terrestrial flora and fauna (minor landscaping areas)	<input checked="" type="checkbox"/>	Site soils reported variable exceedances of ecological criteria. Due to the heterogenous nature of the soils and these results, site soils should be assumed to be not suitable for use as growing media in landscaping areas unless assessed otherwise.



Source	Exposure Pathway	Receptor(s)	Status	Assessment of complete linkages
	Migration and discharge of groundwater or surface water to Coxs Creek	Off-site: aquatic ecosystem of creek	☑	<p>Exceedances of direct toxicity ecological criteria were identified for some metals and formaldehyde at many wells, and PFOS at GW15. Metals concentrations are considered likely attributable to ambient conditions associated with diffuse urban sources and Ashfield Shale, though the historically elevated concentrations thought to be associated with an off-site source or site sources were reported. The formaldehyde also appears to be largely related to a site background source. There is uncertainty in the downgradient extent of PFAS at GW15 and formaldehyde. The ecological criteria, however, apply to the receiving waters of Coxs Creek and are not necessarily representative of an actual risk.</p> <p>Leaching of potential contaminants from exposed soils to surface water runoff was not assessed directly but should be managed during construction.</p>



4.0 Remediation Strategy

4.1 Remedial Objectives

Based on results of previous investigations outlined within **Section 2.2** and the CSM in **Section 3.0**, the remedial objectives are as follows:

- To make the site suitable for ongoing commercial/industrial land use as part of the development.
- Mitigate risks to human health and manage potential environmental impacts during the remedial works, including meeting SSD conditions of approval.

While this RAP is prepared under the CLM Act, Dulux have a goal to minimise ongoing asbestos management requirements under NSW workplaces laws, regulations and codes of practice.

4.2 Extent of Required Remediation

On the basis of Senversa's understanding of the contamination and proposed development outlined in this document, the required remediation comprises the following:

- Fill material across the site: While not all fill material is contaminated, for the purposes of remediation planning all fill material should be considered potentially impacted by asbestos. This is a conservative precautionary approach adopted as the occurrence and concentrations of asbestos in fill have not been delineated laterally or vertically. Fill materials should also be assumed not suitable for use as growing media in landscaping areas unless assessed otherwise.
- Hydrocarbon impacted soils: Soils local to former UST areas impacted by petroleum hydrocarbons, some areas of the former Resins Plant and Gelcoat facility, and fill at BH3 in the workshop area, that represent a potential elevated risk if exposed.
- Remnant primary chemical storage infrastructure: Available information indicates most former USTs have been decommissioned and removed. However, there is uncertainty in the occurrence of disused USTs in the former workshop area in the southwest of the existing warehouse.
- Groundwater was assessed to represent a low risk provided it is not extracted and used. However, exposure to a hydrocarbon sheen present at GW12 and potential impacts local to former primary sources warrant control to protect workers during deep intrusive construction or maintenance works.

4.3 Constraints and Limitations

The RAP has been developed with consideration of the following key drivers and constraints:

- There is no change in land use proposed, with residual contamination at the property currently managed under the existing EMP (Senversa 2016). This EMP was not designed to address redevelopment.
- Some form of passive long-term EMP (LTEMP) to manage residual soil contamination underlying future building slabs and pavement, and restrict use of groundwater, is a "presumed remedy". This passive LTEMP is envisaged to replace the existing EMP at the site.



- Senversa's understanding of key features of the development works that act to limit exposure to potentially contaminated soils and water:
 - The existing building slabs are proposed to be largely retained.
 - New hard stand will be constructed in the southeast around tanker loading and tank storage facilities, with modification to existing pavement yet to be confirmed.
 - There will be minimal unpaved open space areas – being limited to minor landscaping in the north (current canteen), part of the existing central-east grassed area and existing southern boundary landscaping area (refer development overlay in **Figure 2**).
 - The earthworks plan is yet to be finalised. There is expected to be minimal net cut or fill to achieve design ground levels.

4.4 Remediation Policies

4.4.1 Soil

The NSW EPA preferred hierarchy on the selection of remediation options for soil in order of preference, based on the schedule A of ASC NEPM is:

- *'on-site treatment of the contamination so that it is destroyed or the associated risk is reduced to an acceptable level; and,*
- *off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or,*
- *if the above are not practicable,*
 - *consolidation and isolation of the soil on site by containment with a properly designed barrier; and*
 - *removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material, or,*
 - *where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.'*

4.4.2 Groundwater

DEC (2007) groundwater guidelines set out management objectives when contamination is identified, which is to protect human and ecological health and to ultimately restore the groundwater to its natural background quality. To achieve these objectives, the following management responses must be considered:

- Control short-term threats arising from the contamination.
- Restrict groundwater use.
- Prevent or minimise further migration of contaminants from source materials to groundwater.
- Prevent or minimise further migration of the contaminant plume.
- Clean up groundwater to protect human and ecological health, restore the capacity of the groundwater to support the relevant environmental values and, as far as practicable, return groundwater quality to its natural background quality.

NSW EPA (2015) provides guidance that LNAPL needs to be cleaned up:

- to such an extent that further removal or treatment of LNAPL no longer reduces the level of risk; and
- continue if the LNAPL is still spreading.



4.4.3 Ecological Sustainable Development

In addition, it is also a requirement under the CLM Act and contaminated land management policies to consider sustainability (environmental, economic and social), in terms of achieving an appropriate balance between the benefits and effects of undertaking the option. The remediation should not proceed if it is likely to cause a greater adverse effect than leaving the site undisturbed. And, where there are large quantities of soil with low levels of contamination, alternative strategies are required to be considered or developed.

Key considerations in this RAP include:

- That there is current and ongoing industrial land use.
- Avoidance of unnecessary generation of waste soil under the *Waste Avoidance and Resource Recovery Act 2001*.
- The occurrence of soils that report generally acceptable levels of health risk from chemical contaminants, but are heterogenous with fill potentially impacted by asbestos and aesthetics that could be of a large volume.

4.4.4 UPSS Regulation

While there are no ongoing Underground Petroleum Storage Systems (UPSS) in use at the site, the *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019* requires removal of disused UPSS unless it is not practicable to do so.

4.4.5 Council Contaminated Land Policy

The Council's Contaminated Land Policy (CBC 2017) sets out the framework for the management of contaminated land within the Canterbury Bankstown Local Government Area. While approval of remediation will be via the SSD planning pathway, it is noted that the policy states on-site containment or capping is not permitted to be undertaken without development consent.

4.5 Remediation Options Evaluation

A remedial options assessment was conducted as presented in **Table 4.1**, and focused on management of contaminated or impacted soils.

There is a presumptive remedy for:

- Removal to the extent practicable of remaining disused USTs (if found to be present), or decommissioning if otherwise as required by UPSS regulations.
- Passive management under an LTEMP to restrict use of groundwater and control exposure to residual contamination at depth during deep intrusive works.

Available information and evaluation of risks supports that active remediation of groundwater or soil vapour is not warranted. However, this will be re-evaluated as an outcome of the data gaps assessment (**Section 5.2**).

**Table 4.1: Soil Remedial Options Assessment**

Option	Discussion	Conclusion
1. On-site or off-site treatment	<p>Treatment of hydrocarbon impacted soils on-site is feasible, however, the occurrence of co-contaminants (potentially asbestos, metals and B(a)P) precludes effectiveness and environmental benefit as the soil would still likely require passive management under pavement/buildings. On-site or off-site treatment of contaminated fill material to remove asbestos is not considered appropriate or feasible due to the nature of the asbestos (bonded and friable forms) and large volume of impacted fill.</p> <p>Due to the potential presence of asbestos within the contaminated fill material, it is not suitable for offsite re-use in NSW. Once leaving the site, asbestos contaminated material would become waste and would need to be disposed of at a suitably licensed landfill.</p>	Not feasible
2. Removal of contaminated soils	<p>Excavation and off-site disposal to a suitably licenced landfill facility is technically and logistically feasible but is not considered a viable option given the large volume of fill at the site and waste generation, which is inconsistent with sustainability goals in NSW. This would also require removal of building slabs currently proposed to be retained and unnecessary exposure and environmental hazards during this process. However, this approach could remove all contamination, negating the need for ongoing management required for other approaches.</p> <p>This option would incur a significant cost that is not proportionate to the reduction in environmental risk that could be achieved through other methods.</p>	<p>Not feasible</p> <p>Targeted removal and disposal of contaminated soils associated with unexpected finds is retained as a contingency.</p>
3. On-site containment with ongoing management	<p>There are several options for on-site containment of the contaminated soils. There is a balance between the degree of conservatism in containment design and ongoing management requirements – i.e. a less conservative design (e.g. minimal capping thickness) will require more onerous ongoing management requirements.</p> <p>All options require ongoing passive management via implementation of a LTEMP. The LTEMP would need to be publicly notified and legally enforceable.</p> <p><u>Below ground, partial enclosure</u> - Remediation would involve excavation of contaminated fill materials and placement within a location identified to require filling for construction purposes. Placement location(s) should be selected within areas that would undergo minor future disturbance such as under warehouse buildings or pavement, with a cover comprising a constructed capping layer and marker placed over impacted fill. A base liner is not considered necessary due to the complexity of construction and no leachable contaminants being identified in previous investigations.</p> <p>Where contaminated soil remains in situ upon reaching construction RLs, it should be covered with a capping layer as per placed materials. This method is viewed as suitable due to proposed construction methodology and low likelihood of contact with contaminated materials following placement and capping within the site.</p> <p><u>Above ground containment</u> - Remediation would involve construction of an above ground mound with HDPE cap and soil/clay cover, no base liner. This method is viewed as unsuitable due to restrictions on available space and the potential for creating increased surface water runoff to low lying areas within the site.</p> <p><u>In-situ capping (physical separation)</u> – Imported material may be used as a capping layer to provide physical separation between contaminated fill and site receptors. The capping layer may include one or more of a combination of environmentally and geotechnically suitable soil material, building slabs and subgrade or pavement and subgrade, with a marker. This option is viewed as being suitable due to the proposed site levelling and construction methodology, site layout mostly comprising buildings/pavement and subsequent low likelihood of contact with contaminated materials.</p> <p>These options are capable of mitigating risks to low levels, while minimising waste generation and impacts to the surrounding environment/community from truck movements etc. The in-situ capping option is preferred as it does not require bulk movement of asbestos-impacted material within the site, which has a greater risk of impact to workers and surrounding environment during remediation works.</p>	<p>Capping of fill material in-situ under existing building slabs and as part of site paving and levelling works is the preferred option.</p> <p>Implementation of an LTEMP is required.</p>
4. Do nothing and ongoing management	<p>Implementation of an LTEMP is capable of managing residual contamination under the existing site condition and use. However, this is not considered suitable for the developed site where there is the opportunity to reduce risks to more acceptable levels while minimising ongoing management requirements.</p>	Not appropriate.



4.6 Preferred Remediation Approach

The preferred remediation approach is:

1. Removal to the extent practicable of remaining disused USTs (if found to be present), or decommissioning if not practicable, as required under UPSS regulation.
2. In-situ containment of contaminated soils (*Option 3*). This includes leaving undisturbed materials under existing building slabs and pavement to be retained, and capping other contaminated soil via new building slabs, pavement or clean soils and a marker layer.
3. Use of suitable site soils or imported media in open space landscaping areas.
4. Passive management under an LTEMP to restrict use of groundwater and control exposure to residual contamination at depth during deep intrusive works. The aim is that no actions would be needed for normal site use by workers, visitors and landscaping maintenance workers.

While the occurrence of PFAS at GW15 and formaldehyde in groundwater is considered to represent a low risk, consideration should be given in development detailed design so that deep services that intersect the water table do not act as a preferential migration pathway.

The preferred strategy is considered consistent with NSW remediation policy and guidance based on:

- The approach is sympathetic to the construction method and will allow ongoing management under the passive LTEMP with low likelihood for human contact with practicable and minimal control measures – normal site use and typical intrusive works should not require any actions.
- While hydrocarbon impacts can feasibly be treated, potential asbestos and metals impacts cannot be destroyed or treated, with soils likely to still require passive management.
- Removal of contaminated soil is possible; however, this is inconsistent with the principles of economically sustainable development, and the large volume (and relatively low level of contamination based on relatively few investigation locations reporting health criteria exceedances) of materials warrants on-site management.
- Excavation and offsite disposal of materials is considered prohibitively expensive and will involve increased potential for dust generation and significant truck movements of contaminated waste materials.
- While a hydrocarbon sheen is reported at GW12, this is not considered to comprise LNAPL and reflects an ongoing improved site condition since primary sources were remediated in the early 2000s.
- While groundwater reported some site-related CoPC at concentrations exceeding conservative assessment criteria, risks are low if groundwater is not extracted and used, and average metals concentrations are low and likely to reflect site background conditions. Primary sources of contamination to groundwater have been previously remediated, and the capping approach will somewhat reduce exposure of fill to further leaching and help control risks to low levels. Senversa considers that clean-up of groundwater to protect human and ecological health, and relevant environmental values are appropriate goals. It is not considered feasible nor warranted to reduce levels of contaminants to natural background given the site's current and ongoing industrial setting and lack of a recognised groundwater resource.



4.7 Approvals, Permits and Notifications

The works will be subject to approval under the EP&A Act via the SSD planning pathway.

The *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP 2021) specifies when remediation work will require development consent from the planning authority (Category 1 remediation work). Any remediation works that do not require development consent are Category 2. There are notification requirements for both Category 1 and 2 remediation works.

The proposed works could potentially comprise designated development under *Environmental Planning and Assessment Regulation 2000* and be Category 1 works if it comprises treatment of contaminated soil originating exclusively from the site on which the development is located and involves more than 30,000 m³ of contaminated soil or disturbance of more than an aggregate area of 3 ha of contaminated soil. Senversa does not consider these are triggered on the basis that the fill materials are being largely left undisturbed (i.e. the capping is constructed overlying the fill) and that only a portion of fill materials are contaminated such that the aggregate area would be less than 3 ha and 30,000 m³.

Senversa notes Council's Contaminated Land Policy states that remediation involving on-site containment requires development consent.

While the works may otherwise comprise Category 2 remediation work, Senversa understands that the SSD includes provision for implementation of this RAP, and consent for remediation works will be via the SSD approval pathway.

Due to the presence of asbestos in some fill materials, consideration should be given to SafeWork NSW notification requirements prior to the commencement of site works. This is the responsibility of the 'person conducting a business or undertaking' (PCBU) as per the *SafeWork NSW Code of Practice – How to manage and control asbestos in the workplace* (December 2022).

If disposal of water to sewer or stormwater is required during construction, approval from Council and/or the water authority will be required prior to this, and is the responsibility of the contractor.



5.0 Remediation Work Plan

The proposed remediation works will broadly comprise the following steps:

1. Enabling works including engagement of an environmental consultant (EC), develop of site management plans and establishment of environmental controls.
2. Address remaining data gaps (refer **Section 5.2**).
3. As part of demolition, contingency to remove remnant USTs and associated infrastructure to the extent practicable, or decommission if otherwise (refer **Section 8.0**).
4. Capping contaminated soils, including in new paved areas, unpaved areas and in-ground services (refer **Section 5.3**). Fill material under existing building slabs and concrete pavement may be maintained in a similar (or more limited) exposure condition as far as practicable.
5. Management of material imported and exported as waste from the site as part of the remediation works (refer **Section 5.4**).
6. Validation of the remediation above (refer **Section 5.5**).
7. Ongoing implementation of a passive LTEMP during development operation phase (refer **Section 5.6**).

These steps are described in more detail below.

If there are significant changes to the design basis (e.g. the assumptions in **Section 4.3** and outcomes of addressing data gaps in **Section 5.2**), and on receipt of SSD conditions of approval (which have not yet been issued), then this RAP should be reviewed, with any non-trivial modifications to the requirements in this RAP documented by the EC in a Remedial Work Plan and approved by Dulux.

5.1 Design Review

The development design should avoid to the extent practicable deep services that may intersect contaminated groundwater (e.g. more than 2 m bgl) and could act as a preferential migration pathway. If this must occur, then mitigations (e.g. sealing, use of low-permeability 'plugs' in backfilled trenches) should be developed and installed, subject to review and approval by the EC.

This RAP assumes retention of most existing building slabs and minimal earthworks – if this changes then implications on the validation and environmental controls outlined in this RAP should be reviewed by the EC.

5.2 Address Data Gaps

As discussed in **Section 2.4.3**, there are data gaps in the understanding of contamination conditions to be addressed via the remediation and validation process. Senversa proposes the approach described in the table below to close these data gaps. It is envisaged the works are staged prior to and following demolition, with interim reporting of the results and conclusions by the EC.

If the additional inspections and sampling indicates there is potential additional contamination or a change in the site's risk profile, then the EC should evaluate whether further assessment or additional management actions are warranted.


Table 5.1 Sampling Strategy to Address Data Gaps

Data Gap	Description	Mitigation Approach	Suggested Staging	Sampling Design
1. Verify soil vapour conditions underlying the former paint factory	While sub-slab vapour sampling reported low and acceptable concentrations of VOCs underlying the existing buildings, there is uncertainty in the extent and temporal variability of impacts at VP112, and to the east underlying the future building footprint.	Re-sample selected sub-slab vapour points and additional soil vapour sampling within the future building footprint east of the existing paint factory. Contingency actions in Section 8.0 .	Preferably during detailed design, and prior to demolition if practicable.	<p>Sample selected sub-slab vapour points and additional soil vapour sampling within the future building footprint east of the existing paint factory.</p> <p>A systematic sampling design using an approximate 30 m grid:</p> <ul style="list-style-type: none"> Re-sample selected existing sub-slab or soil vapour points: BH102, VP111, VP112, VP113, VP115. Sample selected existing sub-slab vapour points not previously sampled: VP102, VP104, VP106, VP107. Install and sample additional soil vapour points sampling within the future building footprint east of the existing paint factory (4 probes to >1.0 m). <p>A single sampling event is proposed on the basis the DSI included field screening and selected sample analysis.</p> <ul style="list-style-type: none"> Screening vapour with a PID and landfill gas meter at all vapour pin/vapour borehole locations. Collection of vapour samples into 1 L passivated vacuum canisters for laboratory analysis of VOCs.
2. Further assess accessible soils	<p>While there has been substantial soil sampling, there is uncertainty in soil contamination conditions where access restrictions have limited past sampling or increased exposure could occur that warrants a higher sampling density:</p> <ul style="list-style-type: none"> In areas that will be covered by hard stand or buildings: Dulux workshop. In areas that will be unpaved: northern canteen footprint and proposed open space grassed area. 	<p>Remedial approach to cap soils across most of the site mitigates the risk. Validation of accessible soils used in landscaping areas.</p> <p>Additional sampling to adequately characterise residual contamination to inform ongoing management requirements.</p>	Additional sampling prior to or following demolition. Validation of capping and sampling of landscaping media during construction.	<p>A stratified sampling design using an approximate 20 m grid in unpaved areas and 30 m grid in hardstand capped areas (inclusive of existing locations) targeting discrete areas. With minimum additional locations:</p> <ul style="list-style-type: none"> Dulux workshop (0.5 ha): 6 Northern canteen footprint (0.15 ha): 3 Proposed open space grassed area (0.35 ha): 6 <p>The number of sampling locations required will depend on the fill heterogeneity and sampling results themselves. The EC should evaluate whether a modified sampling density and pattern is warranted to characterise the contamination conditions within the footprint with consideration of the end land use and pavement cover.</p> <ul style="list-style-type: none"> Test pits are to be undertaken if practicable with a target depth of termination on 0.5 m into natural material or 3 m bgl. If slab conditions or access preclude pits, then soil bores advanced via hand augur or drilling may be considered by the EC. Samples collected at surface of soil, 0.5 m, 1.0 m and every 1 m thereafter. Test pits or bores are to be logged in accordance with the Unified Soil Classification System and AS 1726:2017 Australian Standard. Field screening of vapour headspace of material is to be undertaken for VOCs using a calibrated photo-ionisation Detector (PID) equipped with a 10.6 eV lamp and recorded on test pit logs. A minimum of two samples to be analysed per location for: <ul style="list-style-type: none"> Metals, TRH, BTEXN, PAHs. Fill only - asbestos (NEPM 500 mL). Selected samples for: PCBs, OCPs.



Data Gap	Description	Mitigation Approach	Suggested Staging	Sampling Design
<p>3. Verify the nature of groundwater quality in the central portion of the site</p>	<p>The nature of groundwater quality in the central portion of the site is uncertain, including near historical sources of contamination near former UST farms where perched water was encountered in BH102.</p>	<p>Additional sampling to adequately characterise residual contamination to inform ongoing management requirements.</p>	<p>Preferably during detailed design, and prior to demolition if practicable.</p>	<ul style="list-style-type: none"> • Install and sample a groundwater monitoring well targeting fill/alluvium. Design should be consistent with existing wells at the site. • Gauge, purge and sample the new well using low flow sampling methods consistent with methods adopted in the 2024 DSI with analysis for: heavy metals, TRH, VOCs, formaldehyde, PFAS (trace level). • Also gauge, purge and sample existing wells that reported elevated constituents above health-based criteria, or detected PFAS, in the 2024 DSI (including GW05, GW12 and GW15) and that were not sampled but are downgradient of the site (GW07) with analysis for: heavy metals, TRH, VOCs, formaldehyde and PFAS (trace level) at GW15.
<p>4. Verify the status of remnant USTs in former workshop</p>	<p>There is uncertainty in the nature and occurrence of remnant USTs in the former workshop in southwest part of the warehouse. A vent line at the western part of the warehouse was also observed in historical investigations. While the DSI didn't identify contamination nearby, the GPR survey was not reliable, and verification is warranted.</p>	<p>Further review of site records and intrusive inspection of the suspected UST area. Contingency action if USTs are identified to decommission and remove, if practicable – refer Section 8.0.</p>	<p>Inspection prior to or following demolition.</p>	<ul style="list-style-type: none"> • Advance two test pits in the areas of the suspected fill to visually verify whether the UST is present or not. • Opportunistically collect samples of soil / tank pit backfill as per Data Gap 2 (above).



5.3 Capping Contaminated Soils

Contaminated fill material shall be capped during development earthworks. While natural soils may also be contaminated, the extent is inferred to be limited to areas local to UST areas and fill material. The goal is to provide physical separation between potential contaminated materials and receptors to minimise the likelihood of exposure and ongoing management controls during site use.

The capping shall be via:

- Leaving *in-situ* existing building slabs and portions of concrete pavement: The development construction method will leave most building slabs and portions of concrete pavement in-situ. These slabs/pavement will act as a barrier to future intrusive works and reduce the potential for environmental impacts.
- Cover remaining areas with a marker layer and cover by:
 - new building slabs and sub-grade; or
 - pavement and sub-grade; or
 - clean suitable soils in landscaping areas.
- Install new in-ground surfaces in the cover layer (above) or in trenches lined with a marker geotextile and backfilled with suitable backfill.

There is various guidance on the minimum capping thickness required to manage contaminated soils, including:

- WA DoH (2021) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, Western Australia Department of Health – a depth of at least 0.5 m is recommended for commercial/industrial land uses.
- *Guidelines for the assessment of on-site containment of contaminated soil* (ANZECC, 1999) – The separation layer needs to be of an appropriate thickness that is unlikely to be penetrated by future users of the site. ANZECC (1999) states that a minimum thickness of 0.5 m is commonly adopted.

However, there is a balance between depth of the capping layer (more conservative), sustainability objectives (e.g. generation of waste due to the potential need to over-excavate to construct the cover layer) and ongoing management controls. Thus, the appropriate depth of the “capping material” above the marker layer will depend on the overlying land use and structures of the developed site – there should be general goals that:

- Contaminated fill materials are preferentially retained underlying buildings or pavement to the extent practicable within design constraints.
- While minimum cover thicknesses are nominated below, the thickness should be maximised to more than 0.5 m where possible and sympathetic with the development construction.

Details and schematics of the different types of capping and minimum thickness are specified in the table below.



Table 5.2: Capping Design

Type	Design	Schematic
<p>A. Building slabs and existing concrete pavement</p>	<p>Building slabs and concrete pavement will act as a marker and capping system. Once constructed, intrusive works below building slabs is not likely. There is greater potential for exposure to soils underlying pavement, which could also degrade over time. While there should be a preference to install a marker layer and cover underlying pavement to minimise future exposure to maintenance workers, this can be managed via the LTEMP. In-ground services require installation per the requirement below.</p>	
<p>B. New pavement</p>	<p>A marker layer should be installed underlying new pavement to the extent practicable. The sub-grade and pavement will act as the cover. The minimum thickness provided is a typical minimum depth of an asphalt roadway, and a deeper cover layer is preferable where able to be accommodated within the earthworks plan.</p>	
<p>C. In-ground services</p>	<p>There should be a preference to install in-ground services above the marker layer. For deeper services where this is not possible:</p> <ul style="list-style-type: none"> The perimeter of deep service trenches shall be lined with a marker layer. This should connect to surrounding marker layer. Trench backfill materials must be imported material or site soils validated as environmentally suitable. There may also be engineering requirements specific to the service or service provider which should be adhered to. <p>This recognises that existing in-ground services could remain in contaminated fill – exposure during maintenance works will be managed via the LTEMP.</p>	



Type	Design	Schematic
D. Unpaved areas	<p>In open space unpaved areas (e.g. grassed and landscaping areas), there is a greater likelihood of inadvertent exposure of contaminated soils. Thus, the general cover layer should be of sufficient width and depth to ensure the plant root zone or depth of normal site maintenance activities (e.g. mowing grass) are within suitable material. The minimum capping thickness is 0.3 m, though a deeper layer is warranted where shrubs or trees will be grown. If existing trees are maintained, a thinner layer may be appropriate that would not damage the health of the tree – the requirements for this should be assessed by the EC once the detailed landscaping design is complete.</p>	



5.3.1 Marker Layer

The purpose of the marker is to provide a visual demarcation between potentially contaminated soils and overlying cover materials that comprise slabs/pavement or have been validated as acceptable for use. Where building slabs or concrete pavement will be retained in a continuous area, the slab/pavement structure may be adopted as a marker layer – although the slab is not as visibly distinct as a brightly coloured geofabric, it cannot be intruded readily and is at a scale that can be readily identified.

The preference is to use a brightly coloured, geofabric placed over contaminated fill material. Specialised or improvised geotextile fabrics may be used, meeting the following conditions:

- Water permeable.
- High visibility.
- Rot-proof and chemically inert.
- High tensile strength.
- Coverage of the contaminated area and at least 0.5 m beyond boundary, if practical.
- Parallel sheets and adjoining sheets to be fixed together or overlap by at least 0.2 m.
- It is also expected that the marker layer will be placed to not significantly inhibit the growth of shrubs and trees to be used for landscaping.

5.3.2 Cover Layer

The overlying cover aims to provide physical separation between contaminated soils below the marker and site users. The cover layer material shall comprise:

- imported material or site natural material validated as environmentally suitable; and/or
- retained existing building slabs (asphalt pavement is not considered adequate as cover in itself).

The material should also be geotechnically suitable for the development and so that there is sufficient stability of the cover layer.

5.3.3 Areas Where Contaminated Fill is Removed

In areas where soils have been validated as suitable or contaminated fill is removed, these areas do not require capping. These areas will need to be validated by the EC (**Section 6.2**).

There should be a guiding principle that this applies to continuous and significant areas only, as judged by the EC – identification of small, disconnected land portions will not be practicable to manage under the ongoing LTEMP.

5.3.4 Deviations

Potential minor deviations required by the development design include:

- There will be some localised areas where the capping thickness is expected to be less than the design minimum requirement. If there are other areas of thinner capping then the adequacy of the proposed capping layer design shall be assessed by the EC and approved by Dulux prior to construction.
- If existing trees are maintained, surface soil validation samples should be collected (**Section 6.2**), and a thinner capping layer design may be appropriate that would not damage the health of the tree as assessed by the EC and approved by Dulux prior to construction.

There may be other deviations from the conceptual approach and minimum requirements outlined above – if these occur, they should be assessed by the EC and approved by Dulux.



5.4 Materials Management

5.4.1 Material Tracking

Tracking of excavated materials, imported materials and waste must be conducted by the RC and checked by the EC as part of validation.

A Material Tracking Register must be maintained on site which will provide information regarding the source, characteristics, destination and quantities of material beneficially reused on site, temporarily stockpiled and disposed offsite or imported to the site for capping / backfilling purposes.

The Material Tracking Register is to include the following information within a summary spreadsheet associated with material stockpiling on the site.

Table 5.3 Stockpile Details Required in the Material Tracking Register

Material Source Information	Material Classification	Stockpile ID	Quantity (m ³)	Dates Stockpiles	Final Destination/Placement
-----------------------------	-------------------------	--------------	----------------------------	------------------	-----------------------------

The Material Tracking Register is to include the following information within a summary spreadsheet associated with material imported to the site.

Table 5.4 Importation Details Required in the Material Tracking Register

Supplier	Supplier Address	Supplier Material ID	Classification	Quantity (m ³)	Dates Imported	Placement on Site	Details of Sampling and compliance with RAP
----------	------------------	----------------------	----------------	----------------------------	----------------	-------------------	---

The Material Tracking Register is to include the following information within a summary spreadsheet associated with material Onsite Reuse to the site.

Table 5.5 On Site Reuse Details Required in the Material Tracking Register

Material Source Information	Classification	Quantity (m ³)	Dates Excavated	Stockpile ID (where relevant)	Placement on Site	Details of Sampling and compliance with RAP
-----------------------------	----------------	----------------------------	-----------------	-------------------------------	-------------------	---

The Material Tracking Register is to include the following information within a summary spreadsheet associated with material exported from site.

Table 5.6 Exportation Details Required in the Material Tracking Register

Source ID	Date Disposed	Classification	Quantity (T)	Docket no.	NSW EPA Integrated Waste Tracking Solution (IWTS) System Reference	Waste Classification Report Reference
-----------	---------------	----------------	--------------	------------	--	---------------------------------------

5.4.2 Excavated Fill/Soils

Excavated fill (if any) shall be stockpiled in a designated area and must be managed as potentially contaminated unless its contamination status is assessed otherwise by sampling and analysis by the EC.

Excavated fill shall be preferentially retained on-site under the marker layer. No sampling of this material is required unless visual or olfactory indicators of contamination are identified, then the unexpected finds protocol should be followed (see **Section 8.2**).

Excavated material validated as suitable by the EC via inspection, sampling and analysis to verify the absence or presence of asbestos may be re-used on-site.



Excavated materials stockpiles and stockpiling area should be designed and managed to control potential impacts to the environment (e.g. dust, erosion and leaching). This includes placement of stockpiles on hardstand, a site area that will subsequently be capped, or high-density polyethylene (HDPE) sheeting, with sediment erosion controls and covering stockpiles to minimise the potential for dust generation.

5.4.3 Waste (Off-site Disposal)

If off-site disposal of excavated materials is required:

- The EC shall classify the waste in accordance with NSW EPA (2014) *Waste Classification Guidelines* and prepare a waste classification.
- Comply with notification and transport requirements under NSW waste regulations.
- The Material Tracking Register should be maintained to ensure an audit trail for the movement of materials around the site and off-site. This includes retaining copies of waste transport and disposal dockets from the landfill facility to provide evidence of appropriate disposal.

The specific sampling and analysis requirements are documented in **Table 6.3**.

5.4.4 Imported Materials

Where imported fill is required at the site for reinstatement of excavations, to achieve final development levels or for landscaping purposes, the material must be validated as suitable for commercial/industrial use and able to be legally imported. Imported materials must only be any of the following:

- Commercial quarried rock or sand products.
- Virgin Excavated Natural Material (VENM) as defined in EPA (2014) *Waste Classification Guidelines* and POEO Act 1997.
- Excavated Natural Material (ENM) defined in the Resource Recovery Order (RRO) and Exemption issued under *Protection of the Environment Operations (Waste) Regulation 2014*. VENM should be used in preference to ENM.
- Other material approved in writing by EPA under a RRO/Exemption and subject to agreement by Dulux and EC. VENM should be used in preference to these materials which have a greater risk of not being environmentally suitable (e.g. unexpected finds).
- Commercial landscaping products (e.g. mulch).

Imported material may be turned away from site if there is not appropriate supporting documentation for that load or there are visual or olfactory indicators of contamination. Recycled material (inter alia crushed concrete and bricks aggregate or 'DGB') imported as sub-base material represents a higher likelihood of unexpected impacts, and must therefore be supplied by a reputable supplier and validated as required in **Table 6.3**.

The preference is to identify (and validate) suitable material proposed to be imported prior to importation to site.

5.5 Remediation Validation

The EC shall conduct validation of the remediation works. The specific validation strategy is documented in **Section 6.2**.



5.6 Ongoing Management

On completion of the remediation works and development, ongoing passive management of residual contaminated soils and groundwater under the capping system will be required via implementation of an ongoing LTEMP. This may be a revised version of the existing EMP applied to the property.

The LTEMP shall be prepared by the EC.

Requirements for ongoing environmental management plans in EPA (2020) *Site Auditor Guidelines* are applicable, including:

- The LTEMP can reasonably be made to be legally enforceable. This may be via compliance with development consent conditions issued, or as it is a legal requirement to manage asbestos under NSW Work Health and Safety Regulation 2017.
- There should be appropriate public notification of any restrictions applying to the land to ensure that potential purchasers or other interested individuals are aware of the restrictions, for example appropriate notations on a planning certificate issued under the *Environmental Planning and Assessment Act* or a covenant registered on the title to land under the *Conveyancing Act 1919*.

Liaison with Council may be required at some point on the presence of the LTEMP.



6.0 Validation Plan

The remediation validation sampling, analytical and quality requirements are described in the following sections.

6.1 Data Quality Objectives

Based on the results of previous investigations and with reference to the CSM outlined above Senversa developed the following data quality objectives (DQOs) for validation of remediation requirements in this RAP. The DQOs have been developed in accordance with the ASC NEPM.

6.1.1 Step 1 – State the Problem

Contamination at 15 Gow Street has been subject to extensive investigation and remediation during the period from mid-1990s to 2016. The 2024 DSI concluded that the key contamination issues that require management relate to managing exposure to and disturbance of soils during intrusive works due to the occurrence of asbestos in fill and potential localised aesthetic and hydrocarbon impacts, and issue of suitable soils for minor landscaping areas.

This RAP sets out the remediation steps to make the site suitable. The remediation works will be conducted ancillary to development works, mostly as part of initial earthworks. The remediation required to make the site suitable for the proposed development broadly comprises capping contaminated fill and ongoing passive management of residual contamination under an LTEMP. There remain some data gaps to be addressed, and removal or decommissioning of potential remaining disused USTs, if present.

Validation is required to verify the effectiveness of the remedial works undertaken, assess long-term management requirements and document the final site condition.

6.1.2 Step 2 – Identify the Decisions

Based on the objectives of this RAP, the decisions required to meet the objectives are listed below:

1. Have data gaps been adequately addressed and are there any changes to the remediation requirements?
2. Have remaining primary contamination source structures been removed to the extent practicable?
3. Have the capping requirements in the RAP been achieved?
4. Was imported material suitable for the proposed land use?
5. Was waste material appropriately classified and transported and disposed to a suitably licensed facility?
6. Were any unexpected finds encountered during the ground disturbance works appropriately managed?
7. Are the validation data suitably reliable and complete?



6.1.3 Step 3 – Identify Information Inputs

The inputs to make the above decisions include:

- Results from previous investigations.
- Additional environmental data collected as part of data gap assessments – this includes field observations, field screening measurements, and laboratory analyses of soil samples for CoPC.
- Field observations in relation to removal of subsurface source structures or unexpected finds. Field observations may include odours, sheens, discolouration, asbestos and other indicators of potential contamination.
- Survey data of marker layer and capping thickness to confirm that these comply with RAP requirements.
- Environmental data collected as part of validation of excavated materials if re-used on-site above the marker layer – this includes field observations, field screening measurements, and laboratory analyses of soil samples for CoPC.
- Assessment criteria from guidelines made or approved by NSW EPA.
- Material tracking information of excavated, imported and waste materials.
- Waste classification data for surplus materials prior to off-site disposal – this includes field observations, field screening measurements, volume data, and laboratory analyses of soil samples for CoPC.
- Waste tracking and disposal records (including landfill dockets, trade waste disposal).
- Material characterisation data for material proposed to be imported to site – this includes literature information on source site, field observations, field screening measurements and laboratory analyses of soil samples for CoPC.
- Data quality assurance / quality control (QA/QC) assessment by comparison against data quality indicators (DQIs).

6.1.4 Step 4 – Define the Study Boundaries

The study population principally comprises fill material and the capping system.

The boundaries of the investigation are identified as follows:

- **Spatial boundaries** – the remediation validation extent is limited to the site boundaries as illustrated within **Figure 1** and soils to a depth of 3 m bgl or construction earthworks (whichever is deeper).
- **Temporal boundaries** – the temporal boundary is limited to the data collected during the remediation validation programme of work. Ongoing management will be required under the LTEMP.



6.1.5 Step 5 – Develop the Decision Rules

The decision rules adopted for this investigation are described within the table below.

Table 6.1: Decision Rules

Decision Required to be Made	Decision Basis
1. Have data gaps been adequately addressed and are there any changes to the remediation requirements?	<p>If the inspection and sampling required in this RAP has been completed, and the findings do not indicate contamination other than asbestos impacts in fill.</p> <p>Fill/soil analytical data shall be compared against adopted assessment criteria:</p> <ul style="list-style-type: none"> • If all concentrations of contaminants are reported to be equal to or below the adopted assessment criteria, then no additional management is required. • Statistical analysis of data sets of chemical CoPC analyte concentrations (i.e. excluding asbestos) will be used as inputs, consistent with guidance in the NEPM (NEPC, 2013). The analysis shall include: <ul style="list-style-type: none"> ▪ 95% upper confidence limit (UCL) of the arithmetic mean concentration of each analyte shall be less than or equal to the criterion. ▪ The maximum concentration of each analyte shall be less than or equal to 250% of the criterion. ▪ The standard deviation of each analyte shall be less than or equal to the criterion. <p>If any of these are exceeded, then additional management needs to be assessed.</p>
2. Have remaining contamination source structures been removed?	<p>This will be assessed via inspection by EC and that visual verification that structures have been removed or are not present.</p>
3. Have the capping requirements in the RAP been achieved?	<p>Is there evidence of the following:</p> <ul style="list-style-type: none"> • Survey data and inspection of marker layer placement across the site, including service trenches. • Survey data and inspection of top of cover confirming compliant thickness and extent, including service trenches. • Fill/soils underlying areas not capped shall have been appropriately inspected and sampled as required in this RAP, with an asbestos clearance by an appropriately qualified occupational hygienist.
4. Was imported material suitable for the proposed land use?	<ul style="list-style-type: none"> • Imported quarried products and exempt waste material should meet the definition of the material in the relevant order/exemption or definition of VENM. • Imported material should also contain concentrations of CoPC less than assessment criteria for commercial/industrial land use in this RAP.
5. Was waste material appropriately classified and transported and disposed of to a suitably licensed facility?	<p>Waste should be sampled and classified as per requirements in this RAP.</p> <p>Appropriate material tracking with satisfactory review by EC and retainment of transport and disposal records.</p> <p>If off-site waste disposal has potentially not been appropriately managed and documented further documentation on the management of waste materials will be required. In the event that insufficient or incorrect information is available in support of waste disposal activities, notification to the NSW EPA Waste Unit may be required where it is believed that waste has been disposed of incorrectly or unlawfully.</p>
6. Are there any unexpected finds or aesthetic concerns in fill/soils encountered during the ground disturbance works?	<p>This should be evaluated as per assessment of data gaps above.</p>



6.1.6 Step 6 – Specify Limits of Decision Error

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

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined DQIs for precision, accuracy, representativeness, comparability, completeness and sensitivity. These are defined below, but should broadly include:

- Guidance in ASC NEPM.
- Soil validation sampling design based on acceptable decision errors:
 - Type A error (i.e. deciding that the site is acceptable when it is not) – 5% probability.
 - Type B error (i.e. deciding that the site is unacceptable when it is) – 20% probability.
- An overall 95% compliance with pre-determined DQIs.

The pre-determined DQIs established for the project are discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity.

- **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 project 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 with 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 sampling techniques, analytical 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 laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted assessment criteria.

If any of the DQIs are not met, further assessment will be necessary to assess whether the non-conformance will significantly affect the usefulness of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data. DQIs are detailed within the table below.

**Table 6.2: Data Quality Indicators**

Data Quality Objectives	Frequency	Data Quality Indicator
Precision		
Blind duplicates (intra laboratory)	1/20 samples (or 1/10 for Per- and poly-fluoroalkyl substances (PFAS))	<30% RPD where result is >10 times limit of reporting (LOR)
Blind duplicates (inter laboratory)	1/20 samples (or 1/10 for PFAS)	<30% RPD where result is >10 times LOR
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% Lower recoveries may be acceptable for OCPs, OPPs, PCBs and phenols and will be assessed according to United States Environmental Protection Agency protocols.
Representativeness		
Sampling appropriate for media and analytes	Sample density as detailed within Section 6.2	All samples
Samples extracted and analysed within holding times.	NA	organics (14 days), inorganics (6 months)
Rinsate blank	1 per day where non-dedicated equipment is used. Samples are to be analysed for all CoPCs other than asbestos.	<LOR
Trip Blank	1 per lab batch (PFAS only)	<LOR
Trip spike	1 per lab batch (BTEX only)	70-130%



**Data Quality Frequency Data Quality Indicator
Objectives**

Method blank / field blank	1 per lab batch	<LOR
----------------------------	-----------------	------

Comparability

Senversa standard operating procedures for sample collection & handling	All samples	All samples
---	-------------	-------------

NATA* accredited analytical methods used for all analyses	All samples	All samples
---	-------------	-------------

Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
---	-------------	-------------

Completeness

Sample description and Chain of Custodies completed and appropriate	All samples	All samples
---	-------------	-------------

Appropriate documentation	All samples	All samples
---------------------------	-------------	-------------

Satisfactory frequency and result for QC samples	All QA / QC samples	-
--	---------------------	---

Data from critical samples is considered valid	NA	Critical samples valid
--	----	------------------------

Sensitivity

Limits of reporting appropriate and consistent	All samples	All samples
--	-------------	-------------

*National Association of Testing Authorities



6.1.7 Step 7 - Optimise the Design for Obtaining Data

Based on the validation methodology presented within the RAP the design for obtaining data has been developed based on a combination of:

- Systematic inspection or survey of capping layer components.
- Systematic inspection and sampling of waste and imported materials.
- Judgemental inspection and sampling of remaining sources, their removal and unexpected finds.

The sampling rationale and methodology is described in **Section 6.2**.

6.2 Validation Design and Methodology

As outlined in **Section 5.0**, the general remedial approach will involve the:

- Capping of contaminated fill and soils.
- Classification and validation of excavated site material and imported materials for on-site re-use or disposal.
- Management of unexpected finds.

The strategy and methodology to be adopted for the validation of each of the remediation elements is summarised in **Table 6.3** below.

Validation associated with the data gaps or potential point sources of contamination as identified in **Section 5.2**.

**Table 6.3: Validation Strategy and Design**

Area/Material	Remedial Approach	Validation Approach	Sampling Design
Capping of Contaminated Fill/Soils			
1. Capping of contaminated fill material	Marker layer and capping using suitable material is to be installed as specified in this RAP (Section 5.3).	Approval by EC of geofabric marker layer or retained concrete slab proposed to be used. Inspection of top of fill prior to marker layer installation. Survey and inspection of: <ul style="list-style-type: none"> • Marker layer (or top of concrete slab if used) (installed prior to cover). • Top of capping. The extent and thickness of the capping layer should be calculated and presented on a marked plan by the surveyor. Validation that cover material are environmentally suitable (the RC should also verify the materials are geotechnically suitable for the development).	Inspections by walking along geofabric joins or alignments on a systematic basis (e.g. 50 m alignments and overlaps). Survey points as judged by a suitably qualified surveyor.
2. Validation of areas where no marker layer is installed (i.e. no contaminated soils remaining or capping required)	Address data gaps per Section 5.2 . Unexpected finds management under LTEMP.	Address data gaps per Section 5.2 . EC to evaluate whether further sampling is required. As a minimum, these areas are to have an inspection and visual asbestos clearance.	Soil sampling per sampling density based on the area in Table 2 of the NSW EPA (2022). <i>Sampling Design part 1 – application, Contaminated Land Guidelines</i> . Field screening using a PID and logging. Selected soil samples analysed for: <ul style="list-style-type: none"> • TRH, BTEXN, PAHs, metals. • PCBs. • Fill samples for asbestos (500 mL NEPM) + field quantification (10 L sample).
3. Residual boundary landscaping areas	If existing trees are maintained within the existing landscaping boundary areas and fill is remaining and not capped, surface fill should be characterised to verify whether a thinner capping layer (e.g. mulch) may be appropriate and that would not damage the health of the tree.	Visible assessment to confirm free from visible asbestos and / or other visual or olfactory indicators of contamination. Collection of characterisation samples by EC in accordance with sampling densities prescribed herein.	Near surface soil samples (<0.1 m and 0.5 m bgl) are to be undertaken within residual fill every 30 m, or as judged by the EC. Field screening using a PID and logging. Analysis of samples for: heavy metals, PAH, TRH, BTEX, asbestos (500 mL NEPM) and selected samples of PCBs and OCPs.



Area/Material	Remedial Approach	Validation Approach	Sampling Design
Materials Management – Reuse of Excavated Site Materials			
4. Reuse of excavated site soils or concrete/ asphalt <u>below</u> the marker layer	Retention below the marker layer for passive management under the LTEMP.	Inspection by EC for unexpected finds. Consideration and management of acid sulfate soils as per the acid sulfate soil management plan (ASSMP) need to be undertaken.	-
5. Reuse of excavated site soils <u>above</u> the marker layer	-	Should reuse of site won soils be required above the marker layer then validation of this material must be conducted <i>ex situ</i> (within stockpiles) so that material can be appropriately inspected at time of sampling. Inspection by EC. Consideration and management of acid sulfate soils as per the ASSMP need to be undertaken.	Sampling it at a rate per Table 3 and Table 4 in NSW EPA (2022) <i>Sampling design part 1 – application Contaminated Land Guidelines</i> . Samples are to be collected from at least 0.5 m into the stockpile. Field screening using a PID. Selected soil samples analysed for: <ul style="list-style-type: none"> • TRH, BTEXN, PAHs, metals. • PCBs. • Fill samples for asbestos (500 mL NEPM) + field quantification (10 L sample).
6. Reuse of existing concrete slabs and asphalt <u>above</u> the marker layer	-	Concrete and asphalt slabs are to be inspected and asbestos clearance certificate to be issued by licenced asbestos assessor (LAA)/occupational hygienist prior to crushing for reuse. Slabs need to be cleaned and not impacted with residual sub-slab soil prior to crushing (where relevant). Details of cleaning are to be provided in the clearance letter. Verification of this via sampling crushed concrete stockpiles by EC prior to reuse above marker layer.	Inspection and clearance by LAA of slabs prior to crushing. Sampling of crushed material stockpiles as per soils above.



Area/Material	Remedial Approach	Validation Approach	Sampling Design
Materials Management – Imported Materials and Waste			
7. Imported Materials – Commercial Products - Quarried Natural Material (e.g. rock)	-	<p>Quarried natural material is to be accompanied by an appropriate supplier certificate. The material should meet the general definition of VENM, except that it may have been processed as part of making the product.</p> <p>Sampling will not be required – inspection is required.</p> <p>The EC will inspect imported quarried material to confirm visual consistency with material reported at the source and absence of anthropogenic material.</p>	-
8. Imported Materials – VENM or Tunnel Spoil classified under a Resource Recovery Order.	-	<p>VENM shall meet the definition of VENM under the <i>Protection of the Environment Operations (POEO) Act 1997</i>. It is recommended that sampling of this material is undertaken at source sites where possible.</p> <p>Imported Tunnel Spoil shall meet the definition under a resource recovery order/exemption under the <i>Protection of the Environment Operations (POEO) (Waste) Regulations 2014</i>.</p> <p>The EC may conduct validation sampling or the RC must source and ensure the commercial supplier of the material provides a characterisation letter/report stating that the material meets the definition of VENM or the resource recovery order/exemption. The EC will observe imported material to confirm consistency with material reported at the source.</p> <p>One characterisation letter per material type will be required, which shall be reviewed by the EC.</p> <p>The characterisation letter should include a summary of the site history of the source site, the findings of any environmental site investigations undertaken at that site and the results of any soil analysis undertaken.</p> <p>Minimum sampling requirements should conform with this table.</p>	<p>1 sample per 250 m³ imported, with a minimum of 5 samples collected per source site.</p> <p>A lower sampling density than indicated for stockpiles in NSW EPA (2022). <i>Sampling Design Guideline</i> is considered suitable given the low likelihood of contamination of the material.</p> <p>Field screening using a PID and logging. Material samples analysed for asbestos (500 mL NEPM), heavy metals, PAH, TRH, BTEXN and other relevant CoPCs based on source site land use.</p>



Area/Material	Remedial Approach	Validation Approach	Sampling Design
9. Imported Materials – other Resource Recovery Materials (e.g. ENM, Reused/Recycled Materials, Mulch).	-	<p>Imported exempt waste shall meet the definition of ENM in <i>Excavated Natural Material (ENM) Order 2014</i> or under a resource recovery order/exemption under the <i>Protection of the Environment Operations (POEO) (Waste) Regulations 2014</i>.</p> <p>The EC will observe imported material to confirm consistency with material reported at the source. It is recommended that sampling of this material is undertaken at source sites where possible.</p> <p>The EC may conduct validation sampling or the RC must source the following information for any ENM imported to the site for review by the EC:</p> <ul style="list-style-type: none"> • The commercial supplier of the material must provide a letter stating that the material is ENM or other exempt waste. One letter per material type will be required. • The commercial supplier must provide copies of test results, confirming contaminant concentrations meet the concentration criteria in the RRO. 	<p>Sampling and analysis as per ENM Order or other relevant RRO.</p> <p>In addition to assess suitability:</p> <ul style="list-style-type: none"> • ENM - a minimum of 1 sample per 250 m³ imported, with a minimum of 5 samples collected per source site. A lower sampling density than indicated for stockpiles in NSW EPA (2022). <i>Sampling Design Guideline</i> is considered suitable given the low likelihood of contamination of the material. • Other exempt waste - as per Table 3 and Table 4 of the NSW EPA (2022). <i>Sampling Design part 1 – application, Contaminated Land Guidelines</i>. <p>Field screening using a PID and logging. As a minimum, there should be analysis of asbestos (500 mL NEPM), heavy metals, PAH, TRH, BTEXN, OCP and PCBs and other relevant CoPCs based on source site land use.</p>
10. Waste	-	<p>If off-site disposal of excavated materials is required, this will be undertaken in accordance with the NSW EPA (2014) <i>Waste Classification Guidelines</i>. Consideration and management of acid sulfate soils as NSW EPA (2014) <i>Waste Classification Guidelines – Part 4</i>.</p>	<p>For soils, as per Table 3 and Table 4 of the NSW EPA (2022). <i>Sampling Design part 1 – application, Contaminated Land Guidelines</i>.</p> <p>As a minimum, there should be analysis of asbestos (absence/presence), heavy metals, PAH, TRH, BTEXN, OCP and PCBs.</p> <p>Additional analysis for Toxicity Characteristic Leaching Procedure (TCLP) and acid sulfate soil indicators if required.</p>
11. All Excavated and Placed Contaminated Materials, Imported Materials, and Waste	-	<p>Material Tracking Register as specified in Section 5.4.1.</p>	-



6.3 Environmental Consultant Presence

A suitably qualified and experienced EC is to be engaged to advise, provide oversight and undertake all validation requirements specified within this RAP. The EC may be one or more entities (i.e. different companies or skillsets). The EC is to undertake the following:

- Oversight of all remediation requirements specified within this RAP. This includes physical site presence as required to conduct inspections, sampling and monitoring.
- Conduct the data gap assessments (refer **Section 5.2**) and assess unexpected finds (if any).
- Conduct remediation validation, including:
 - Observations of the materials encountered.
 - Undertake sampling and analysis of site materials as deemed necessary.
 - Inspect and review survey records of capping and marker layers.
 - Classify waste fill/soils.
 - Characterise imported materials.
 - Review materials tracking register maintained by the RC for accurate documentation of locations of excavations, materials beneficially reused on-site, materials taken off-site and imported materials.
- Provide guidance to assist with the appropriate on-site re-use and/or disposal of material (if required).
- Make an evaluation of potential risks to human health and the environment posed by the materials remaining on-site (inclusive of imported materials) and ensure the risk to health and the environment are acceptable (if required).

When the EC is not present the RC will be required to have a suitably trained and qualified person to identify unexpected finds; in particular, in imported materials and during bulk earthworks.

6.4 Quality Assurance and Quality Control

The field and laboratory quality assurance and quality control (QA/QC) plan to be adopted for the investigation has been designed to achieve pre-determined DQI that will demonstrate that the precision, accuracy, representativeness, completeness, comparability and sensitivity of the dataset meet the objectives of the investigation.

The specific QA/QC for the field and laboratory components of the investigation have been developed based on ASC NEPC.

6.4.1 Field QA/QC

The field quality assurance procedures to be adopted and the field quality control samples to be collected during the investigation and the corresponding acceptable control limits are presented below.

Data Type	Comments and Acceptable Control Limits
Field Personnel	<ul style="list-style-type: none"> • Use appropriately trained field personnel.
Field Data Collection	<ul style="list-style-type: none"> • Site conditions and sample locations properly described. • Information to be recorded in field notes. Field notes are appropriately completed and summarised in the report on the investigation.



Data Type	Comments and Acceptable Control Limits
Sample Handling (storage and transport)	<ul style="list-style-type: none"> Soil samples will be collected into the sample jars and bags supplied by the selected analytical laboratory. The filled jars will be stored on ice in a chilled, insulated container until received by the analysing laboratory. Sample numbers, dates, preservation and analytical requirements will be recorded on Chain of Custody (COC) documentation, which will also be delivered to the analytical laboratory. All samples are required to be documented as received by the laboratory chilled and intact.
Calibration of Field Equipment	<ul style="list-style-type: none"> The Photo-ionisation detector (PID) will be calibrated with isobutylene gas at 100 ppm at the commencement of each day of sampling and if necessary, during the day in accordance with the procedure provided by the supplier. Calibration records will be kept for inclusion in the validation report.
Field Duplicates (intra-laboratory and inter-laboratory)	<ul style="list-style-type: none"> Intra-laboratory duplicates will be collected and analysed at a rate of 1 in every 20 (or 1/10 for Per- and poly-fluoroalkyl substances (PFAS) primary samples, with a minimum of 1 sample. Inter-laboratory duplicates will be collected and analysed at a rate of 1 in every 20 (or 1/10 for Per- and poly-fluoroalkyl substances (PFAS) primary samples, with a minimum of 1 sample. The duplicate samples will be obtained from locations suspected of being contaminated and analysed for the key CoPCs (soil: asbestos, TRH, BTEX, M8, PAHs) Duplicated samples will be labelled so as to conceal, from the laboratory, the relationship of the primary sample to the secondary sample. RPDs to be less than 30% for inorganic and organic analyses where the results of one or both values are greater than 10 times the limit of reporting. Where both values are less than 10 times the LOR RPDs of less than 100% are acceptable.
Rinsate Blanks	<ul style="list-style-type: none"> Rinsate blank samples (from an item of sampling equipment) will be collected and analysed at a rate of one per day of sampling. Concentrations of analytes to be less than the laboratory limits of reporting.
Trip Spikes	<ul style="list-style-type: none"> Laboratory prepared trip spikes will be used and analysed at a rate of one per batch for the soil investigation for BTEX analysis. Recovery to be greater than 70%.

6.4.2 Laboratory QA / QC

The laboratory quality assurance procedures to be adopted and the internal laboratory QC samples to be analysed and the corresponding acceptable control limits are presented below.

Item	Comments and Acceptable Control Limits
Sample Analysis	<ul style="list-style-type: none"> All sample analyses to be conducted using NATA certified laboratories which will implement a quality control plan in accordance with NEPC (2013).
Holding Times	<ul style="list-style-type: none"> All samples are to be submitted to the laboratory within the required laboratory holding times. Maximum acceptable sample holding times for soil are 14 days for organic analyses and 6 months for inorganic analyses (28 days for mercury).
Laboratory Detection Limits	<ul style="list-style-type: none"> All laboratory detection limits to be less than the adopted assessment criteria.
Laboratory Blanks	<ul style="list-style-type: none"> Laboratory blanks to be analysed at a rate of 1 in 20, with a minimum of one analysed per batch. Concentration of analytes to be less than the laboratory detection limits.
Laboratory Duplicates	<ul style="list-style-type: none"> Laboratory duplicates to be analysed at a rate of 1 in 20, with a minimum of one analysed per batch. RPDs to be less than 30%.



Item	Comments and Acceptable Control Limits
Laboratory Control Samples (Lcs)	<ul style="list-style-type: none"> LCSs to be analysed at a rate of 1 in 20, with a minimum of one analysed per analytical batch. Control limits: 70 to 130 % Acceptable Recovery.
Surrogates	<ul style="list-style-type: none"> Surrogate compound concentrations will be required to be spiked at a similar concentration to sample results, at a rate of 1 in 20. Control limits: 70% to 130% Acceptable recovery.
Matrix Spikes	<ul style="list-style-type: none"> A matrix spike is an aliquot of a sample spiked with a known concentration of target analyte. A matrix spike documents the effect(s) of bias of matrix on method performance. Matrix spike control limits: 70 to 130 % Acceptable recovery.

6.5 Remediation Acceptance Criteria

To assess whether the remediation goal has been achieved, validation criteria are adopted for the works:

- Capping extent and depth per the concept design in **Section 5.3**.
- Sourced from ASC NEPM and other NSW EPA made or approved guidelines for the purpose of validating soil samples and screening concentrations of contaminants. Criteria set out in ASC NEPM for a commercial/industrial setting, where available, are adopted based on the proposed re-development, the land use zoning of General Industrial (IN1) under the *Canterbury-Bankstown Local Environmental Plan 2023*, the surrounding environmental conditions, and the neighbouring receptors.

The following assessment criteria listed in **Table 6.1** below shall be adopted for the purpose of screening concentrations of contaminants.

Table 6.4: Adopted Assessment Criteria

Media	Receptor	Adopted Assessment Criteria
Soil	Human Health	<ul style="list-style-type: none"> Health investigation level D (HIL D), applicable for commercial/industrial in ASC NEPM and PFAS NEMP. Health screening level D (HSL D) for vapour intrusion, clay, 0-<1 and 1 - <2m in ASC NEPM. Health screening level D (HSL D) for asbestos contamination in ASC NEPM. HSL direct contact applicable for commercial/industrial (HSL D) in CRC CARE (protective of intrusive maintenance workers).
	Ecological	<p>There are expected to be limited exposure of site soils to ecological receptors – the developed site will be used for industrial purposes and mostly covered by hard stand and buildings. However, to inform evaluation of management requirements, screening shall be conducted adopting for soils in landscaping and unpaved areas:</p> <ul style="list-style-type: none"> Ecological investigation level (EIL) for commercial/industrial sites for soil is applicable to shallow soil to 2 m bgl. Site-specific EILs were calculated consistent with NEPC (2013) using the average of laboratory results; pH, total organic carbon, clay % and CEC. The ASC NEPM (2013) methodology for derivation of site-specific EILs for lead, nickel, chromium III, copper and zinc was used to determine site specific screening criteria. The derivation process requires determination of ambient background concentrations (ABC) and added contaminant limits (ACLs) for these chemicals, and the EIL is then calculated as the ABC plus the ACL. The ACL is calculated using site-specific soil properties such as soil pH, organic carbon content and cation exchange capacity (CEC). Further details are provided in Section 8.1. Ecological screening level (ESL) for fine soils in commercial/industrial sites. PFAS NEMP interim soil ecological criteria (all land uses) for direct exposure (EDE).



Media	Receptor	Adopted Assessment Criteria
	Infrastructure	Management Limits shall be used to assess the potential impacts of petroleum hydrocarbons which consider potential fire and explosive hazards and the effects of petroleum hydrocarbons on buried infrastructure.
	Aesthetics	<p>The ASC NEPM does not provide assessment criteria but states that site assessment requires balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. Aesthetic issues generally relate to the presence of low-concern inert foreign material in soil or fill resulting from human activity. Issues that require further assessment could include:</p> <ul style="list-style-type: none"> Highly malodorous soil or extracted groundwater. Hydrocarbon sheen on surface water. Discoloured chemical deposits or soil staining with chemical waste. Presence of putrescible waste that may generate hazardous levels of methane. <p>Aesthetics considerations are of a lesser concern for areas of the site which will have a sealed surface.</p>
	Waste	Thresholds and limits in NSW EPA (2014) <i>Waste Classification Guidelines</i> .
	VENM	<p>VENM (and quarried natural products) should meet the definition of VENM in POEO Act and the following will apply:</p> <ul style="list-style-type: none"> Analysis results for organics (i.e. TRH, BTEX, PAH, OCP, OPP and PCB) must be below the LOR. Any results above the LOR should be assessed on a case by case basis before allowing any material on-site. Analysis results for metals should be consistent with the range of expected background concentrations. Analysis results should not exceed HIL-D or HSL-D. If asbestos is identified, the material will not be acceptable for use at site.
	ENM, other exempt waste under an RRO	<p>As per the ENM or other RRO/exemption and the following will apply:</p> <ul style="list-style-type: none"> Analysis results for metals should be consistent with the range of expected background concentrations. Analysis results should not exceed HIL-D or HSL-D. If asbestos is identified, the material will not be acceptable for use at site.
Groundwater	Human Health	<ul style="list-style-type: none"> HSL for vapour intrusion, clay aquifer, 2-4 m for commercial/industrial (HSL D) in ASC NEPM. Incidental contact under recreational or during drain maintenance work settings will be assessed via Australian Drinking Water Guidelines (ADWG) (2022) drinking water values x 10 consistent with evaluation for recreational contact and recreational water quality guideline values in PFAS NEMP. <p>Drinking water guidelines have not been considered, given that there is no groundwater extraction for drinking purposes and provision of a reticulated water supply.</p>
	Ecological	<ul style="list-style-type: none"> The Default Guidelines Values (DGV) provided by ANZG (2018) will be used to assess aquatic exposure. DGVs apply to receiving waters rather than groundwater under the site. Salt Pan Creek is identified as the closest surface water receptor and is considered a slightly to moderately disturbed environment. As such the 95% spp level is relevant for the assessment. DGVs for freshwater are adopted, which are relevant to Salt Pan Creek. ANZG (2018) states that for chemicals that that bioaccumulate the higher 99% spp level is relevant. ECHA (European Chemicals Agency) value for fresh and marine water for formaldehyde. Interim water quality guidelines presented in the PFAS NEMP have been adopted for PFAS. The 95% spp DGVs shall be used to assess direct toxicity.



Media	Receptor	Adopted Assessment Criteria
Soil Vapour	Human Health	<ul style="list-style-type: none"> HSLs for vapour intrusion (sand, depth based) for commercial/industrial (HSL D) in ASC NEPM. Interim soil vapour health investigation levels for volatile organic chlorinated compounds for commercial/industrial (HSL D) in ASC NEPM. <p>Where VOCs that do not have a HSL/HIL value are detected, additional screening levels have been sought from:</p> <ul style="list-style-type: none"> Reference concentrations in <i>Vapour Intrusion: Technical Practice Note</i> (NSW EPA, 2010); or US EPA Regional Screening Levels (RSLs) for Commercial Air adjusted as follows: <ul style="list-style-type: none"> The RSLs are indoor air values and so have been adjusted to soil vapour screening levels using an attenuation factor of 0.03 consistent with the recent enHealth 2023 guidance. Where the RSLs are based on carcinogenic evaluation the value has also been adjusted by a factor of 10 consistent with the acceptable risk level of 1x10⁻⁵ identified in the ASC NEPM. If a compound is not considered to be genotoxic or mutagenic then the threshold RSL value have been selected consistent with evaluation of threshold/ non threshold evaluation in the ASC NEPM.

6.6 Validation Reporting

A validation report shall be prepared by the EC on completion of the in-ground and at-grade development works. This report shall comply with requirements in NSW EPA (2020a) *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land*, including the following:

- Incorporate findings of data gap assessments in **Section 5.2**.
- Survey data confirming the location and depth of marker layer and capping thickness.
- A summary of material tracking records, including receiving facilities, landfill disposal dockets and NSW EPA IWTS data to be summarised within a table as described in **Section 5.4**.
- Imported material certificates/classifications.
- Plans of sampling locations (as applicable) including historical and validation sampling.
- Inspection records and photographs.
- Tables of sample inspection, field screening and analysis results.
- NATA approved laboratory reports.
- Validation of field and laboratory data quality.
- Unexpected finds documentation.
- A summary of environmental monitoring activities (e.g. air monitoring records and asbestos clearance certificates) undertaken by the RC during remediation works.
- Identify ongoing management requirements.

The report will include an assessment of all results and data and re-evaluation of the CSM, and then draw a conclusion on the suitability of the site for ongoing commercial/industrial land use contingent upon appropriate implementation of the LTEMP.



7.0 Site Management Provisions

Prior to the commencement of remediation works the following environmental management procedures and controls are to be implemented. These should include, but are not limited to, the following:

- Asbestos works notification and management controls, including dust and fugitive fibre emission controls and monitoring.
- Sediment/erosion management.
- Stockpile management including identification of temporary stockpiling locations.
- Reference to health and safety management, including provisions for personal protective equipment.
- Excavation water (groundwater and stormwater runoff) management.
- Material tracking and disposal.
- Site access.
- Noise, odour and vibration controls.
- Monitoring requirements.

It is envisaged that these are developed and documented in:

- Site-Specific Health and Safety Plan (HASP).
- Construction Environmental Management Plan (CEMP).
- Construction Asbestos Management Plan (AMP), which could form part of the CEMP.

These may be prepared specifically for remediation works or for development construction works generally.

The following summarises the site management requirements. There may be additional requirements in DA conditions of approval or from Dulux – the SSD conditions of approval should take preference where there are any conflicts.

7.1 Asbestos Management

Asbestos has been detected in some fill material and will require management during remediation works. As such, remediation works involving asbestos impacted fill material must be conducted in accordance with regulations and SafeWork NSW (2022a/b) codes of practice for managing asbestos in workplaces.

The management controls and procedures shall be documented in the AMP. It is expected that the PC or RC will prepare and implement a construction AMP, including details on the personal protective equipment (PPE) and monitoring. The AMP must be provided to the EC prior to the initiation of the remediation works.

The AMP should be developed in accordance with SafeWork NSW (2022a/b) in consideration of site-specific risks and proposed development works but should consider at a minimum, the following:

- The location and extent of asbestos within the site.
- Notification requirements, including to SafeWork NSW.
- Roles and responsibilities, including appropriate supervision, monitoring and clearance for friable asbestos. E.g., all works that expose and/or penetrate asbestos impacted fill material must be supervised by a Class A licensed asbestos removalist contractor.
- Air monitoring requirements, which should include boundary monitoring for asbestos fibres.



- Demarcation and signage of the works area.
- Training and induction requirements.
- PPE and decontamination procedures.
- Reference to related environmental management controls in the CEMP.

7.2 Construction Environmental Management

The CEMP should outline authority approvals, regulatory requirements, team contacts, pre-construction planning, site management strategy, project administration, project specific requirements, site layout and logistics, construction methodology and construction risks and mitigation measures.

The CEMP should also discuss safety and environmental management and, inclusive of RAP requirements, discuss hazardous materials and unexpected discovery protocol.

7.2.1 Site Access

All remediation-related heavy vehicle access and egress from the site should follow a designated heavy vehicle route specified by the RC. As a minimum, the following traffic control measures will be implemented:

- All streets along the designated heavy vehicle route will be kept free from detritus material sourced from the site during the course of the project. A representative of the contractor will, on a daily basis, monitor the roadways leading to and from the site, and take steps to clean any adversely impacted pavements.
- Materials such as soil, mud, earth or similar tracked onto the driveways will be removed by means such as sweeping and shovelling, but not washing.
- Vehicles travelling along the designated heavy vehicle route shall have covered loads and adhere to the relevant speed limits.

7.2.2 Vehicle Cleaning

The following controls will be placed on operation and movement of vehicles that have been in contact with contaminated material:

- The surface of internal access roads carrying vehicular traffic will be kept clean.
- Vehicles carrying fill material shall be covered at all times with an “enviro-tarp” or similar impervious material to prevent the escape of dust or other material.
- A record of all trucks removing fill or natural materials from the site will be kept in a logbook and tracked to its final destination, NSW EPA IWTS information and tip dockets shall be retained on-site.
- The wheels and wheel arches of all vehicles having had access to the fill material will be inspected and if required, cleaned by the use of a broom or water spray to prevent mud and sediment from being deposited on Council roadways.

7.2.3 Dust Control

All practicable measures will be taken to ensure that dust emanating from the site is minimised. Measures to minimise the potential for dust generation may include:

- Where practicable minimising the excavation area and total number of stockpiles of impacted materials present within the site.
- Any asbestos material which may be encountered during the excavation works will be kept wetted at all times or otherwise covered.



- Use of water sprays over unsealed or bare surfaces, which are generating unacceptable amounts of dust.
- Covering of excavation faces and stockpiles, where necessary (if unacceptable amounts of dust are generated or if weather forecasts predict strong winds).
- Establishing dust screens consisting of a minimum of 2 m high shade cloth or similar material secured to a chain wire fence where dust is noted to be escaping the site boundary.
- Maintenance of all dust control measures to ensure good operating condition.
- All vehicles having had access to unpaved areas of the site shall exit via a wheel wash facility to prevent mud and sediment from being deposited on public roadways.

7.2.4 Odour Control

While odour is not considered to be a significant risk, all activities conducted at the site will be controlled such that all equipment used is designed and operated to control the emission of smoke, fumes and vapour into the atmosphere and any possible odours arising from the excavation or stockpiled material is controlled.

Control measures may include:

- Maintenance of construction equipment so that exhaust emissions comply with the relevant NSW legislation.
- Use of covers (if required, e.g. HDPE).

7.2.5 Soil Erosion and Surface Water Runoff

During remediation works, sediment and surface water controls in accordance with the Southern Sydney Regional Organisation of Council's brochure "*Soil and Water Management for Urban Development*" should be implemented. While the specific controls to be implemented will be documented within contractor site management plans the following should be considered:

- Sediment control.
- Clean water diversions.
- Stormwater drain protection.

Sediment and clean water diversion control measures (i.e., silt fencing, hay bales, gravel bags etc.) should be strategically placed at the following locations:

- Down-gradient of temporary stockpiles.
- Up-gradient of temporary stockpiles to redirect water.
- Down-gradient of any surrounding stormwater channels that flow within / through the site as a contingency against overflow into bunded stockpile locations.

Stormwater runoff should be diverted around open excavations.

Stormwater drain protection may comprise:

- Installation of sediment controls in any identified stormwater drains located down-gradient of any temporary stockpile areas.

During remediation works all sediment and surface water controls will be routinely inspected. Should any control measure be damaged or defective, the issue will be reported to the site superintendent to arrange for repair or modification.



7.2.6 Site Security and Signage

The site shall be secured by means of an appropriate fence to guard against unauthorised access if required.

A sign displaying the contact details of the RC will be displayed on the site adjacent to the works area.

The sign/s will be displayed throughout the duration of the remediation works in accordance with NSW regulatory requirements.

7.3 Worker Health and Safety

Remediation works shall be conducted compliant with requirements under relevant NSW or National worker health and safety regulations and guidance.

A worker health and safety plan (HASP) shall be prepared by the RC prior to commencement of remedial works. The HASP shall contain procedures and controls that are to be implemented to mitigate potential risks to site workers and surrounding residents/workers during remediation works. The approved HASP shall be implemented during remediation works.

All personnel undertaking work on the site will have undergone training relevant to the handling and management of contaminated materials including asbestos.

The HASP shall include or address:

- Roles and responsibilities.
- An assessment of hazards, risks and mitigations.
- Establishment of worker protection standards, safety practices and procedures.
- Monitoring requirements, instruments and trigger values (which may prompt a higher level of management).
- Provision for contingencies and emergency response.
- Any other requirements by the site owner or DA consent conditions.

The HASP shall consider normal construction related hazards and controls, and those specific to the proposed remediation works, including:

- Potential exposure to contaminated soil and asbestos.
- Excavations safety.
- Contingency procedures, controls and asbestos air monitoring.
- Personal Protective Equipment (PPE).
- Under/aboveground services, including USTs (if encountered), trade waste drains and sewerage.
- Excavation safety and operation of machinery in restricted spaces like excavations.

7.4 Reporting

7.4.1 Non-conformance and Corrective Action Reports

Non-conformances will be recorded within the Remediation Contractor's Non-Conformance and Corrective Action Report (or equivalent).

Details of the non-conformance, including any immediate corrective actions undertaken, are to be recorded by the on-site project team.

It is the responsibility of the project team to immediately initiate corrective actions, if required. Once completed, the project team will provide details of the actions undertaken on the Non-Conformance Report and sign, date and file the report.



7.4.2 Incident Management Reports

Reporting of environmental incidents will be undertaken in accordance with the EC's incident reporting procedures and timelines.

Records will be kept of any environmental incidents, accidents, hazardous situations, unusual events and unsafe health exposures and the corrective action taken.

The project team will investigate the cause of any emergency so that necessary changes in work practices can be made to prevent the incident recurring.

7.4.3 Complaint Reporting

The project team will maintain a register of complaints, which will include a record of any action taken with respect to the complaints.

If a complaint identifies a non-conformance, a Non-Conformance & Corrective Action report is to be initiated as per requirements of the CEMP.

Nature of the complaint is to be documented in the site's Complaints and Environmental Incidences Register (or equivalent).

7.5 Remediation Schedule

The PC or RC is to prepare a detailed program of remediation works, outlining key activities, milestones and completion dates. It is anticipated that most remediation works will be undertaken following demolition during initial site levelling and civil earthworks associated with site development.

7.6 Hours of Operation

Hours of operation are expected to be consistent with the SSD conditions of approval.



8.0 Contingency Plan

8.1 Remedial Contingencies

The purpose of the contingency plan is to identify unexpected situations that could occur, to specify procedures that can be implemented to manage such situations and to prevent adverse impacts to the environment and human health should these situations occur.

The conditions that may be encountered when undertaking works are uncertain. As unknown and variable sub-surface conditions impose a degree of uncertainty for the project, a set of anticipated conditions has been assumed in developing the RAP. However, because field conditions may vary, flexibility has been built into the RAP to adapt to differing conditions.

The conditions that can reasonably be expected, the resulting problems they may cause, and how these problems may be resolved within the context of the program have been summarised below.

Table 8.1: Contingencies

Potential Scenario	Action
UST not practicable to remove	Decommission in situ as per requirements in UPSS regulation.
Increased lateral extent / volume of contamination	In most areas of the site, the lateral extent of remediation may simply be expanded by extending capping. If there is excess material, it may be accommodated via consolidation and capping in an above-ground containment area, or disposed off-site as waste.
Other types of contamination	The capping approach and broad analytical suite adopted in previous investigations mitigates this risk. Further evaluation of associated risks and incorporation into the LTEMP may be required.
Soil contamination underlying existing trees to be retained	If soil contamination is identified underlying existing trees to be retained, contingency management will be required to either: <ul style="list-style-type: none"> remove the tree with permission from Council and remediate the soil; or install a cover and marker layer overlying contamination to the extent that a horticulturalist indicates will not impact tree health, and ongoing management; and ongoing passive management under the LTEMP.
Contamination of groundwater	The remedial approach assumes that groundwater is not suitable for extraction and use. There is a low likelihood of active groundwater remediation being required. Potential migration is proposed to be managed via the existing EMP for the property. If required, a risk assessment could be undertaken to quantify risks.
Unacceptable vapour inhalation risk	Previous investigation indicate a low and acceptable level of risk from vapour inhalation. However, there are data gaps to verify this, which will be assessed as part of the RAP. If residual soil vapour impacts represent an unacceptable risk via intrusion into future buildings as evaluated as part of the data gaps assessment, then adaptive measures include: <ul style="list-style-type: none"> Conduct a risk assessment to quantify risks for the specific development design and construction quality. Consolidation or relocation of source contaminated materials, if practicable, in open space areas. Requirement for vapour mitigation in buildings. This potential requirement would be assessed in the data gap assessment and be included in a RAP Addendum. For the purposes of the RAP, the following 'core' requirements for vapour intrusion mitigation are identified: An independent passive vapour management system for each building footprint will be designed and installed. The design shall be documented by a suitably qualified engineer and provided for review and approval by the EC. A construction quality assurance (CQA) plan shall be prepared by a suitably qualified installer and provided for review and approval by the EC. Validation, including CQA, will be documented in a report for review and approval by the EC.



8.2 Unexpected Finds

In addition to the above listed contingencies, the following steps may need to be undertaken should unexpected finds such as stained or odorous materials, buried drums or tanks, or suspect contaminated materials (other than identified impacts) be discovered during the works:

In the event that unexpected finds are encountered, the following protocol will be adopted:

- All works in the affected area will cease, the project manager, RC and will be contacted.
- The area of concern will be suitably barricaded / suitably fenced.
- Notify the EC and site auditor as soon as practicable.
- The nature of the contamination will be characterised visually and, if required, appropriate sampling and analysis will be completed by the EC.
- The requirement for any additional remediation and or sampling will then be assessed.
- Records will be kept in relation to the nature, location and management of the particular material.

Additional environmental and occupational safety controls may include:

- Upgrade of PPE, for workers within the active work zone, in accordance with the HASP.
- Segregation and bunding of discovered material.
- Use of odour suppressants (where appropriate).
- Cover the discovered material with plastic sheeting (where appropriate/possible).
- Appropriate sampling and analysis to assess potential contaminants; and
- Appropriate treatment and/or disposal of the materials following receipt of analytical results and any associated regulatory approvals required.



9.0 Conclusion

This RAP was developed to provide a framework describing the requirements for remediation, validation, and worker health and safety and environment management strategies associated with the identified contamination at the site.

Subject to the suitable implementation of the measures described in this RAP, it is concluded that the site can be made suitable for the intended commercial/industrial use and that the risks to the environment can be appropriately protected during the remediation works. Ongoing passive management of certain intrusive works into residual contaminated soils and impacted groundwater under building slabs, pavement and a marker layer will be required via appropriate implementation of a passive LTEMP.



10.0 Principles and Limitations

The following principles are an integral part of site contamination assessment practices and are intended to be referred to in resolving any ambiguity or exercising such discretion as is accorded the user or site assessor.

Table 10.1: Principal and Limitation of Investigation

Area	Field Observation and Analytical Results
Elimination of Uncertainty	Some uncertainty is inherent in all site investigations. Furthermore, any sample, either surface or subsurface, taken for chemical testing may or may not be representative of a larger population or area. Professional judgment and interpretation are inherent in the process, and even when exercised in accordance with objective scientific principles, uncertainty is inevitable. Additional assessment beyond that which was reasonably undertaken may reduce the uncertainty.
Failure to Detect	Even when site investigation work is executed competently and in accordance with the appropriate Australian guidance, such as the National Environmental Protection (Assessment of site Contamination) Amendment Measure ("the NEPM"), it must be recognised that certain conditions present especially difficult target analyte detection problems. Such conditions may include, but are not limited to, complex geological settings, unusual or generally poorly understood behaviour and fate characteristics of certain substances, complex, discontinuous, random, or heterogeneous distributions of existing target analytes, physical impediments to investigation imposed by the location of services, structures and other man-made objects, and the inherent limitations of assessment technologies.
Limitations of Information	The effectiveness of any site investigation may be compromised by limitations or defects in the information used to define the objectives and scope of the investigation, including inability to obtain information concerning historic site uses or prior site assessment activities despite the efforts of the user and assessor to obtain such information.
Chemical Analysis Error	Chemical testing methods have inherent uncertainties and limitations. Senversa routinely seeks to require the laboratory to report any potential or actual problems experienced, or non-routine events which may have occurred during the testing, so that such problems can be considered in evaluating the data.
Level of Assessment	The investigation herein should not be considered to be an exhaustive assessment of environmental conditions on a property. There is a point at which the effort of information obtained and the time required to obtain it outweigh the benefit of the information gained and, in the context of private transactions and contractual responsibilities, may become a material detriment to the orderly conduct of business. If the presence of target analytes is confirmed on a property, the extent of further assessment is a function of the degree of confidence required and the degree of uncertainty acceptable in relation to the objectives of the assessment.
Comparison with Subsequent Inquiry	The justification and adequacy of the investigation findings in light of the findings of a subsequent inquiry should be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made.
Data Useability	Investigation data generally only represent the site conditions at the time the data were generated. Therefore, the usability of data collected as part of this investigation may have a finite lifetime depending on the application and use being made of the data. In all respects, a future reader of this report should evaluate whether previously generated data are appropriate for any subsequent use beyond the original purpose for which they were collected or are otherwise subject to lifetime limits imposed by other laws, regulations or regulatory policies.
Nature of Advice	The investigation works herein are intended to develop and present sound, scientifically valid data concerning actual site conditions. Senversa does not seek or purport to provide legal or business advice.



11.0 References

- CBC (2017). *Contaminated Land Policy*, City of Canterbury-Bankstown, 22 August 2017.
- enHealth (2023). *Guidance for the human health risk assessment of volatile chlorinated hydrocarbon vapour intrusion*. Canberra. Australian Government Department of Health and Aged Care.
- National Environment Protection (*Assessment of Site Contamination*) Amendment Measure (No.1), National Environment Protection Council (NEPC) (2013). (ASC NEPM).
- NSW EPA (2014). *Waste Classification Guidelines*.
- NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme* (3rd edition).
- NSW Environment Protection Authority (2020). *Consultants Reporting on Contaminated Land*.
- NSW Environment Protection Authority (2022). *Sampling Design part 1 – application, Contaminated Land Guidelines*.
- SafeWork NSW (2022a). *Code of Practice: How to Manage and Control Asbestos in the Workplace*. December 2022.
- SafeWork NSW (2022b). *Code of Practice: How to Safely Remove Asbestos*. December 2022.
- Senversa (Apr 2015). *Preliminary Site Investigation and Conceptual Site Model, DuluxGroup Padstow Facility, 1-29 Gow Street, Padstow*. M11037_RPT_001_PSI_Rev 2, 10 April 2015.
- Senversa (2016). *Environmental Management Plan, DuluxGroup Padstow Facility, 1-19 Gow Street, Padstow*. S11037_004_RPT_PadstowEMP_Rev0, 6 May 2016.
- Senversa (2024). *Detailed Site Investigation, SSD-71052213: Dulux Padstow, NSW*. S20492_005_RPT_Rev0, 19 September 2024.
- WA Department of Health (2021) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*.



Figures

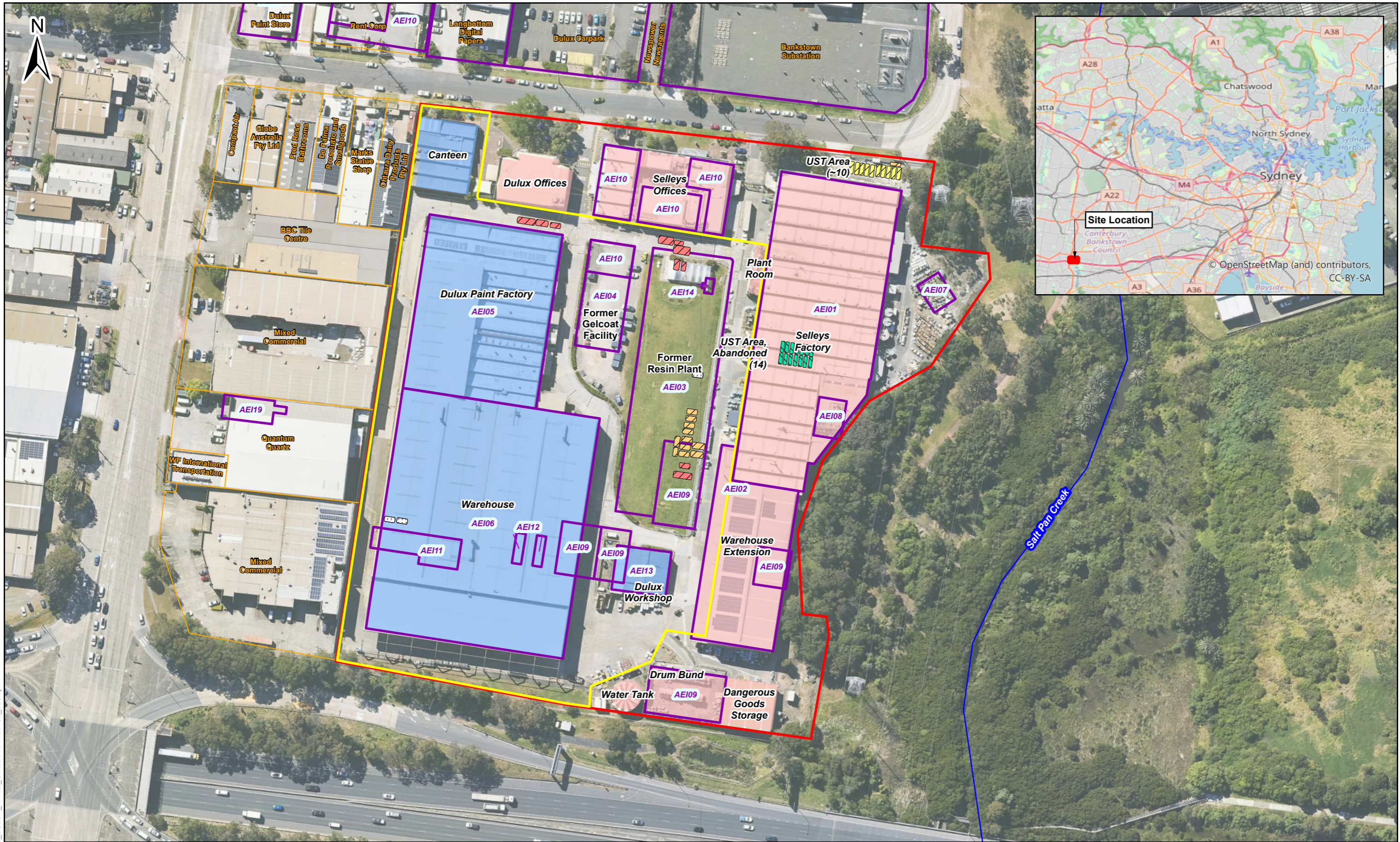
Figure 1: Site Location and Key Features

Figure 2: Future Landuse Type

Figure 3: Investigation Locations

Figure 4: Historic Investigation Locations

Figure 4-1: Historic Investigation Locations



Legend		Site Features	
Waterway		Current Site Building (Dulux)	Surrounding Land Use
USTs		Current Site Building (Selley's)	Area of Environmental Interest
Abandoned - in situ			Site Boundary
Grout Filled before 2001			Property Boundary
Removed in 2004			
Removed in 2009			
Unknown			

Created:	M. Black	Date:	25/10/2024
Reviewed:	A. Dibley	Revision:	0
Approved:	H. Yellowlees	Scale:	1:1,500 (A3)
File:	S20492_006_F001 Site Location		

Notes:
Aerial Imagery (25/03/2024) © Metromap

0 5 10 20 30 40 50 Metres
Coordinate System: GDA2020 MGA Zone 56

Figure No:	1
Title:	Site Location and Key Features
Project:	Remedial Action Plan
Location:	15 Gow Street, Padstow, NSW 2211
Client:	Dulux Group (Australia) Pty Ltd

Path: S:\01_Jobs\1_NSW_Jobs\S17235_DULUX_WYEE_GME\APRX\S20492_006.aprx
© Senversa 2024



Path: S:\01_Jobs\1_NSW_Jobs\17235_DULUX_WYEE_GME\APRX\S20492_006.aprx



Legend		Current Sampling Locations		Site Features	
Existing Groundwater Monitoring Well Location	Soil Bore	Test Pit	Current Site Building (Dulux)	Unknown	Property Boundary
Shallow Quaternary Aquifer	Vapour Point	Abandoned - in situ	Current Site Building (Selley's)	Current Site Building (Dulux)	Waterway
Shale Aquifer	USTs	Grout Filled before 2001	GPR Survey	Surrounding Land Use	
Shale Aquifer (deeper)	Removed in 2004	Removed in 2009	Site Boundary		
Sub Slab Vapour Location					
Approximate Groundwater Well Location					

Notes:
Aerial Imagery (25/03/2024) © Metromap
Future Land Use Plan - 21202_SK15i

Created:	M. Black	Date:	25/10/2024
Reviewed:	A. Dibley	Revision:	0
Approved:	H. Yellowlees	Scale:	1:1,500 (A3)
File:	S20492_006_F002 Future Landuse Type		

0 5 10 20 30 40 50 Metres
Coordinate System: GDA2020 MGA Zone 56

Figure No:	2
Title:	Future Land Use Type
Project:	Remedial Action Plan
Location:	15 Gow Street, Padstow, NSW 2211
Client:	Dulux Group (Australia) Pty Ltd



Legend

Existing Groundwater Monitoring Well Location

- Perched Aquifer
- ◆ Shallow Quaternary Aquifer
- ◆ Shale Aquifer
- ◆ Shale Aquifer (deeper)
- Sub Slab Vapour Location
- ◆ Approximate Groundwater Well Location

Current Sampling Locations

- Soil Bore
- ⊕ Test Pit
- Vapour Point
- Waterway
- Surrounding Land Use

USTs

- Abandoned - in situ
- Grout Filled before 2001
- Removed in 2004
- Removed in 2009
- Unknown

Site Features

- Current Site Building (Dulux)
- Current Site Building (Selley's)
- GPR Survey
- Site Boundary
- Property Boundary

Notes:
Aerial Imagery (25/03/2024) © Metromap

Created:	M. Black	Date:	25/10/2024
Reviewed:	A. Dibley	Revision:	0
Approved:	H. Yellowlees	Scale:	1:1,500 (A3)
File:	S20492_006_F003 Sample Locations		

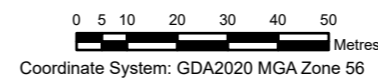


Figure No: 3
Title: Investigation Locations

Project: Remedial Action Plan
Location: 15 Gow Street, Padstow, NSW 2211
Client: Dulux Group (Australia) Pty Ltd



Note: All locations are approximately digitised.



Legend	
Historical Investigation Locations	
⊕	Orica (2001)
▲	CH2MHill (2002)
●	JBS&G (2004)
⊗	JBS&G (2005)
—	Site Boundary
▭	Property Boundary

Notes:
Aerial Imagery (25/03/2024) © Metromap

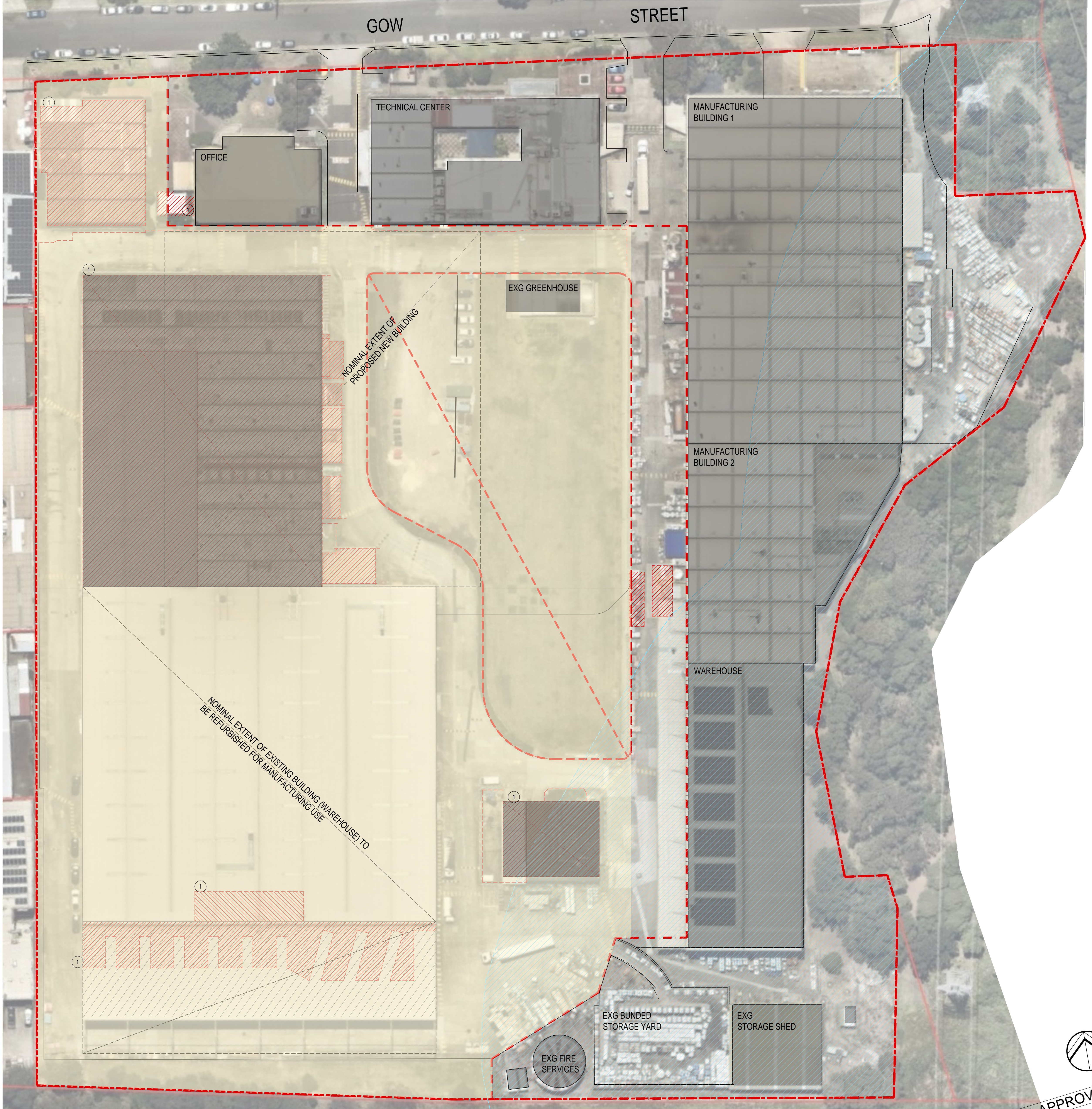
Created:	E. Marha	Date:	25/10/2024
Reviewed:	Z. Smith	Revision:	0
Approved:	A. Woinarski	Scale:	1:300 (A3)
File:	S20492_005_F004_1 Historical Sample Locations		
Coordinate System: GDA 1994 MGA Zone 56			

Figure No:	4.1
Title:	Historical Investigation Locations
Project:	Detailed Site Investigation
Location:	15 Gow Street, Padstow, NSW 2211
Client:	Dulux Group (Australia) Pty Ltd

Path: S:\01_Jobs\1.NSW_Jobs\S17235_DULUX_WYEE_GMEAPRX\S20492_005.aprx



Appendix A: Proposed Development Plans



NOTE

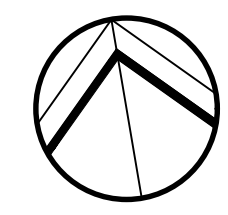
① EXISTING PRODUCTION / PLANT BUILDING

- DEMOLISH EXISTING BUILDING INCLUDING WALLS STRUCTURE
- REMOVE ALL EXISTING PLANT INCLUDING ALL STAIRS, PLATFORMS, TANKS AND FIXED EQUIPMENT ETC
- CUT AND SEAL ALL SERVICES
- REMOVE EXISTING BUILDING FLOOR SLAB
- RETAIN BELOW GROUND FOOTINGS

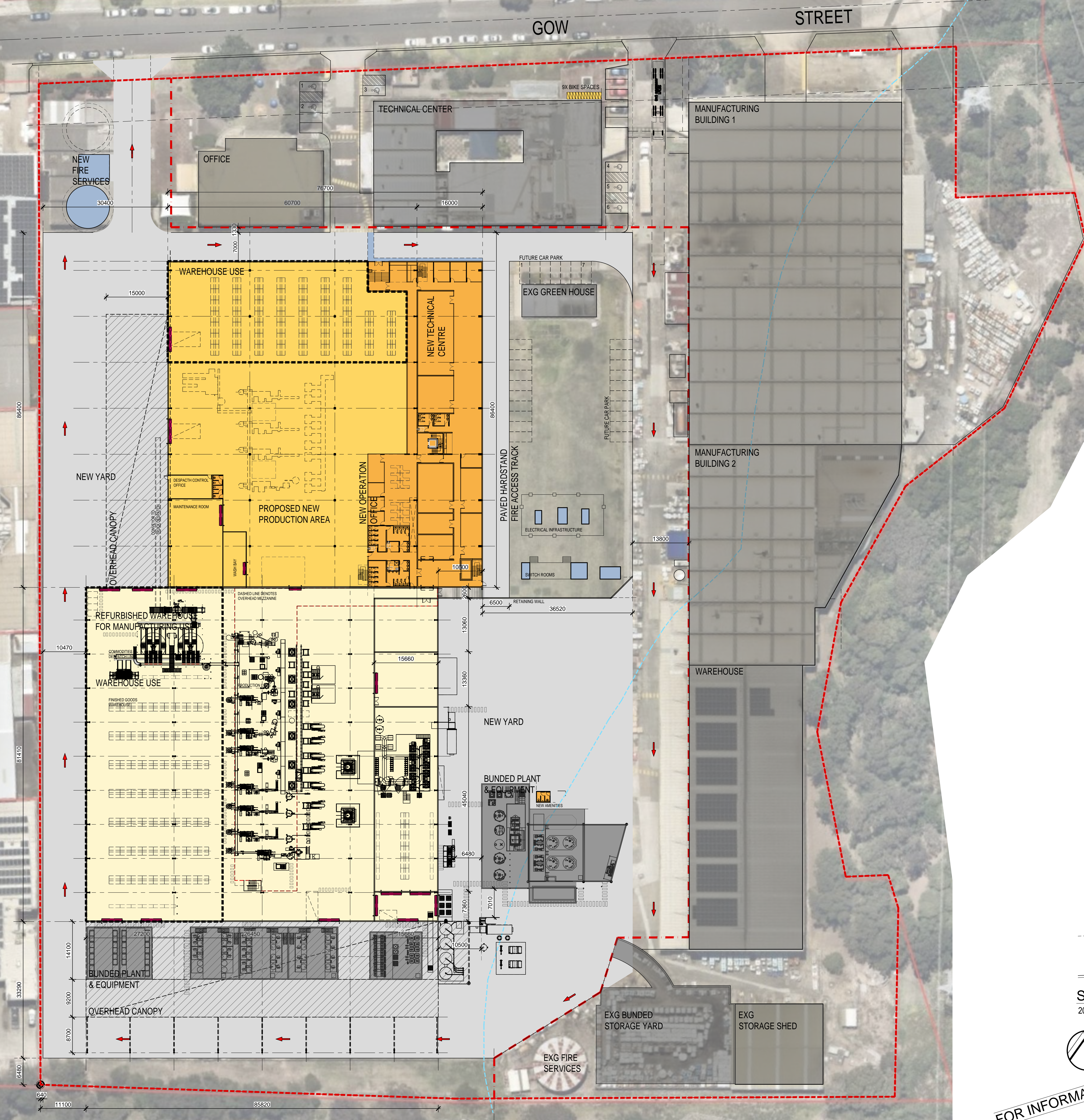
LEGEND

- NOMINAL EXTENT OF WORKS AREA MODIFICATION TO EXTERNAL PAVEMENTS TO BE CONFIRMED BY ENGINEER
- DEMOLISH EXISTING BUILDINGS INCLUDING WALLS AND STRUCTURE CUT AND SEAL EXISTING SERVICES
- RETAIN EXISTING GROUND PAVING
- EXTENT DENOTES EXISTING SOFT SCOPE TOP SOIL TO BE TAKEN UP
- HATCHED AREA DENOTES NOMINAL EXTENT OF ENVIRONMENTAL CONTROL
- HATCHED AREA DENOTES EXISTING BUILDINGS TO BE RETAINED, AND OPERATIONS TO CONTINUE DURING DEVELOPMENT

© VAUGHAN CONSTRUCTION PTY. LTD. THESE DRAWINGS ARE SUBJECT TO COPYRIGHT AND MAY NOT BE COPIED, USED OR REPRODUCED IN ANY WAY WITHOUT THE EXPRESS PERMISSION OF VAUGHAN CONSTRUCTION PTY. LTD. ALL DIMENSIONS AND AREAS INDICATED ON DRAWINGS ARE APPROXIMATE ONLY AND ARE SUBJECT TO SURVEY CORRECTION. THE DESIGN IS SUBJECT AUTHORITY APPROVALS.



FOR APPROVAL

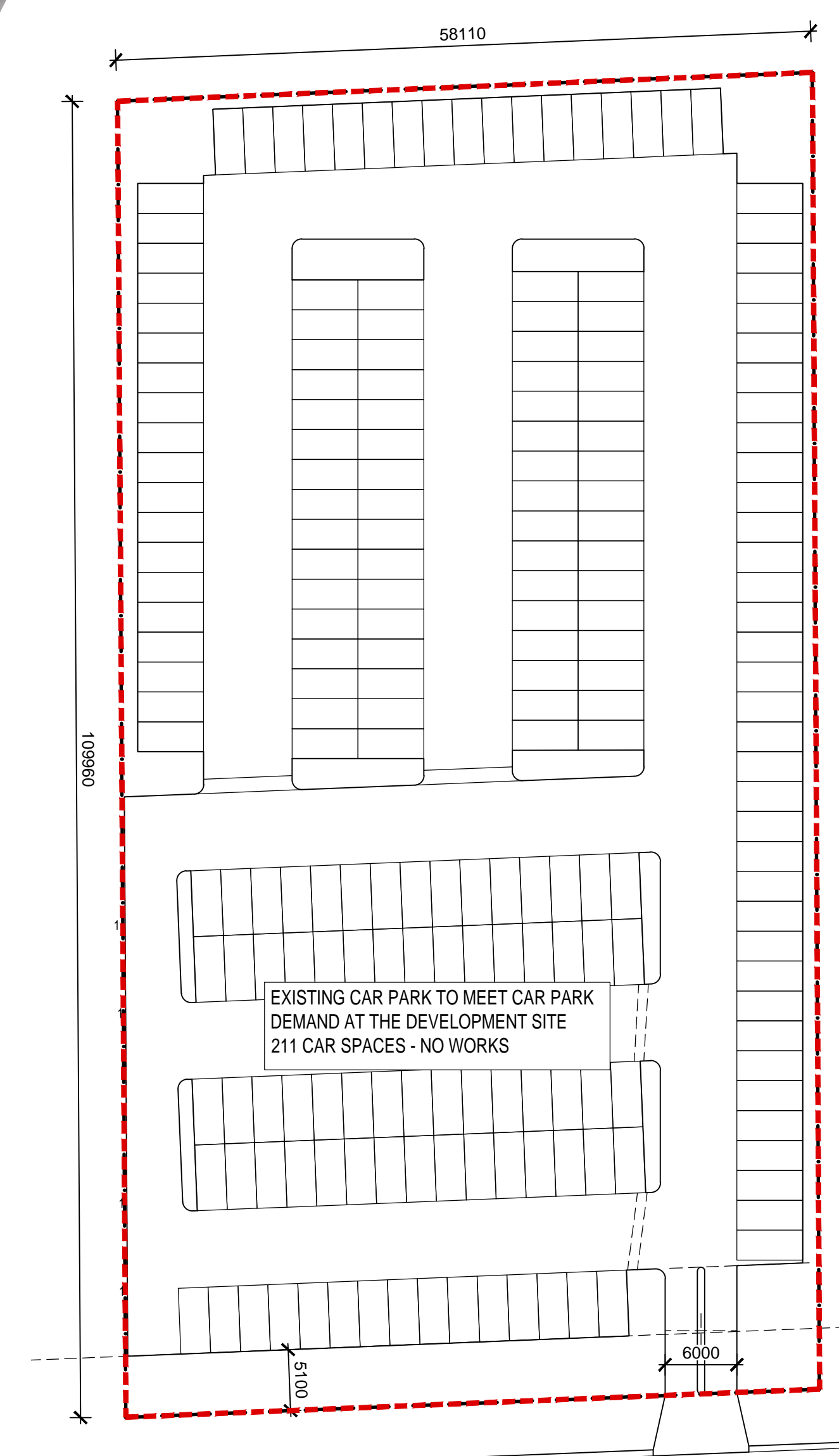


DEVELOPMENT SUMMARY UNDER TP1

SITE AREA	54,747 sqm
EXTERNALS	
NEW CONCRETE HARDSTAND	11,463 sqm
NEW BUILDINGS	
NEW WAREHOUSE	5,244 sqm
NEW MEZZANINE (L1)	1,503 sqm
NEW LABS - 2 LVL	2,764 sqm
REFURBISH EXISTING BUILDING	6,798 sqm
REFURBISH DOCK OFFICE - 2 LVL	378 sqm
NEW CANOPY TO WAREHOUSE (15M)	998 sqm
REFURBISH CANOPY (23M)	1,998 sqm
TOTAL NEW AND REFURBISHED BLD	16,687 sqm
EXISTING BUILDINGS (NO WORKS)	11,570 sqm
TOTAL BUILDING AREA	
TOTAL BUILDING AREA	28,257 sqm
PLOT RATIO	51.61%
CAR PARKING PROVIDED AT ADJACENT SITE	
CAR PARKING PROVIDED AT ADJACENT SITE	211 SPACES

DEVELOPMENT SUMMARY UNDER SK15

SITE AREAS	
LOT 100 / DP1011185	53,830 sqm
LOT53 / DP 1064349	6,341 sqm
TOTAL DEVELOPMENT SITE AREA	60,171 sqm
EXTERNALS	
NEW CONCRETE HARDSTAND AND CONCRETE DRIVEWAY	13,402 sqm
NEW BUILDINGS	
NEW PRODUCTION FACILITY	4,230 sqm
NEW MEZZANINE (L1)	1,250 sqm
NEW LABS - 3 LVL	3,270 sqm
NEW OPERATIONS OFFICE - 2 LVL	970 sqm
NEW DRIVER AMENITY	
NEW DRIVER AMENITY	9 sqm
REFURBISH EXISTING BUILDING	6,987 sqm
NEW CANOPY TO WAREHOUSE (15M)	
NEW CANOPY TO WAREHOUSE (15M)	998 sqm
REFURBISH CANOPY (23M)	1,998 sqm
TOTAL NEW AND REFURBISHED BLD	16,707 sqm
EXISTING BUILDINGS (NO WORKS)	12,211 sqm
ULTIMATE BUILDING AREAS (GFA)	
ULTIMATE BUILDING AREAS (GFA)	28,918 sqm
PLOT RATIO MEASURED AGAINST 15 GOW ST ONLY	53.72%
CAR PARKING PROVIDED AT 20 GOW STREET	
CAR PARKING PROVIDED AT 20 GOW STREET	211 SPACES
CAR PARKING PROVIDED AT 15 GOW STREET	
CAR PARKING PROVIDED AT 15 GOW STREET	12 SPACES
CAR PARKING SHOWN TO BE PROVIDED IN FUTURE	
CAR PARKING SHOWN TO BE PROVIDED IN FUTURE	27 SPACES
TOTAL CAR PARK PROVISION	223 SPACES



SITE PLAN - EXISTING CAR PARK
20 GOW STREET, PADSTOW

© VAUGHAN CONSTRUCTION PTY LTD.
THESE DRAWINGS ARE SUBJECT TO COPYRIGHT AND MAY NOT BE COPIED, USED OR REPRODUCED IN ANY MANNER WITHOUT THE EXPRESS PERMISSION OF VAUGHAN CONSTRUCTION PTY LTD.
ALL DIMENSIONS AND AREAS INDICATED ON DRAWINGS ARE APPROXIMATE ONLY AND ARE SUBJECT TO SURVEY CORRECTION.
THE DESIGN IS SUBJECT TO AUTHORITY APPROVALS.

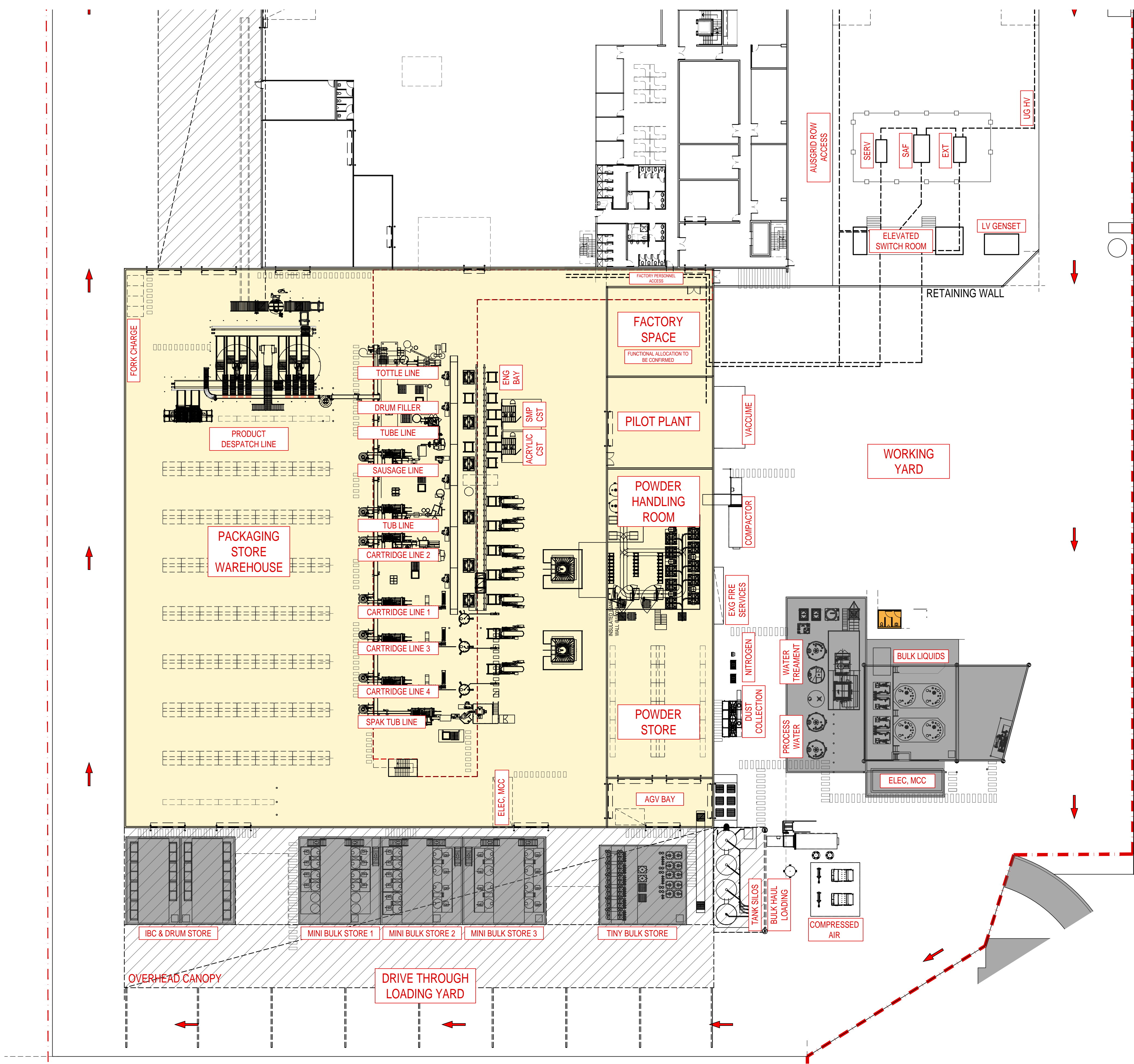
FOR INFORMATION



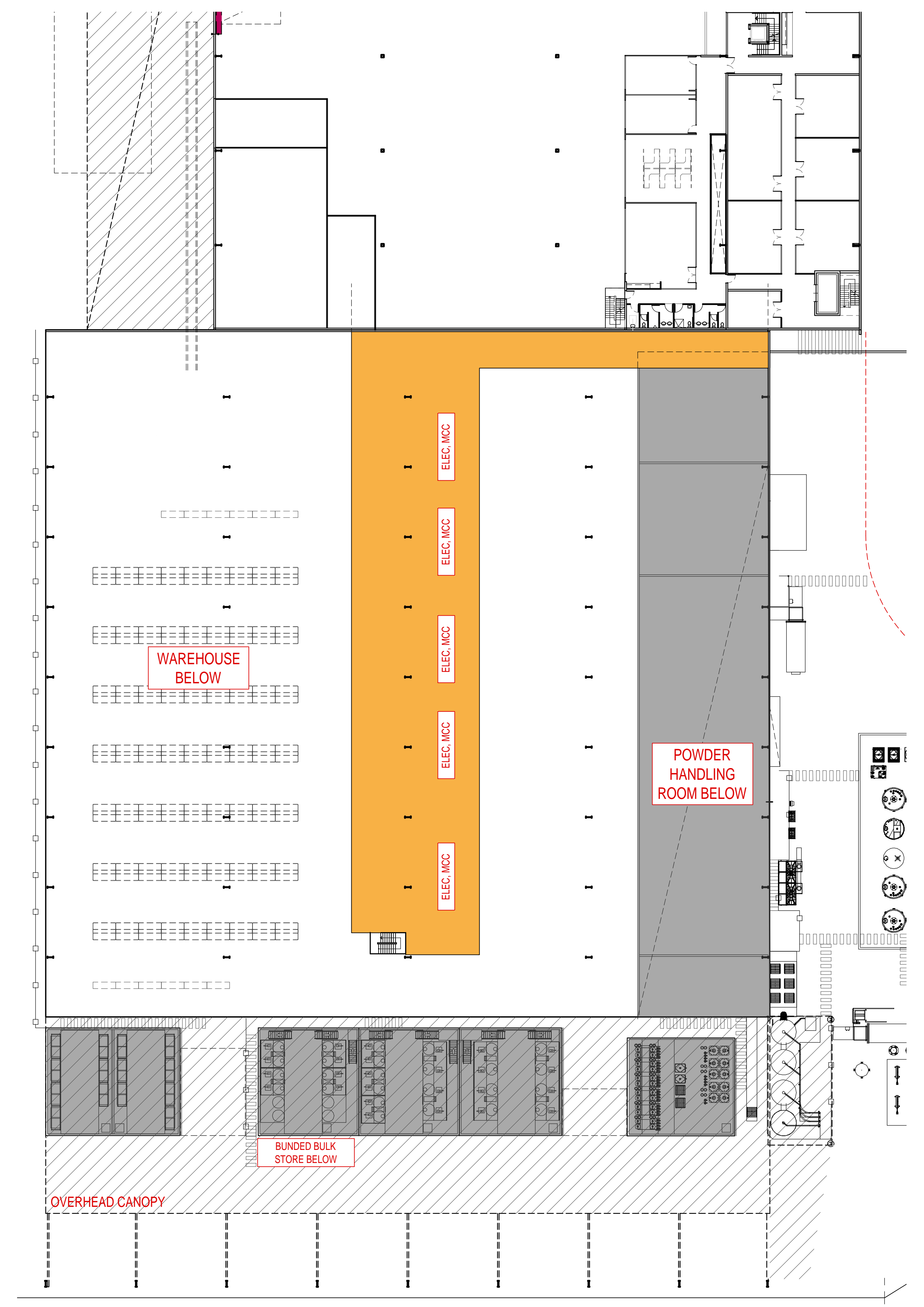
PROJECT BOWER BIRD
PROPOSED INDUSTRIAL DEVELOPMENT
GOW STREET, PADSTOW, NSW

PROPOSED SITE PLAN
scale 1:400 @ B1; 1:1000 @ A3
date 28 / 10 / 2024
drawn XD

SK15 Biii
21.202

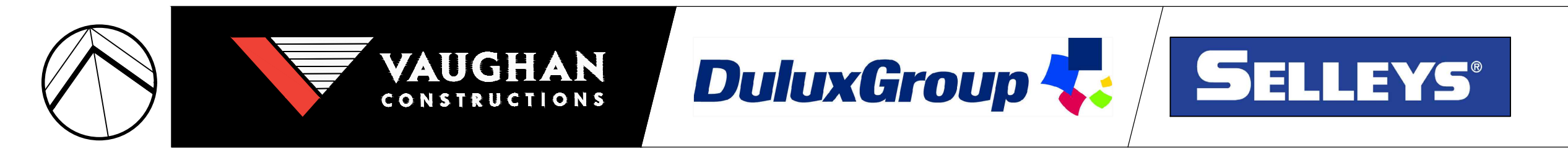


FLOOR PLAN - GROUND SCALE: 1:300



FLOOR PLAN - LEVEL 1 PRODUCTION MEZZANINE SCALE: 1:300

© VAUGHAN CONSTRUCTION PTY LTD. THESE DRAWINGS ARE SUBJECT TO COPYRIGHT AND MAY NOT BE COPIED, USED OR REPRODUCED IN ANY WAY WITHOUT THE EXPRESS PERMISSION OF VAUGHAN CONSTRUCTION PTY LTD. ALL DIMENSIONS AND AREAS INDICATED ON DRAWINGS ARE APPROXIMATE ONLY AND ARE SUBJECT TO SURVEY CORRECTION. THE DESIGN IS SUBJECT TO AUTHORITY APPROVALS.

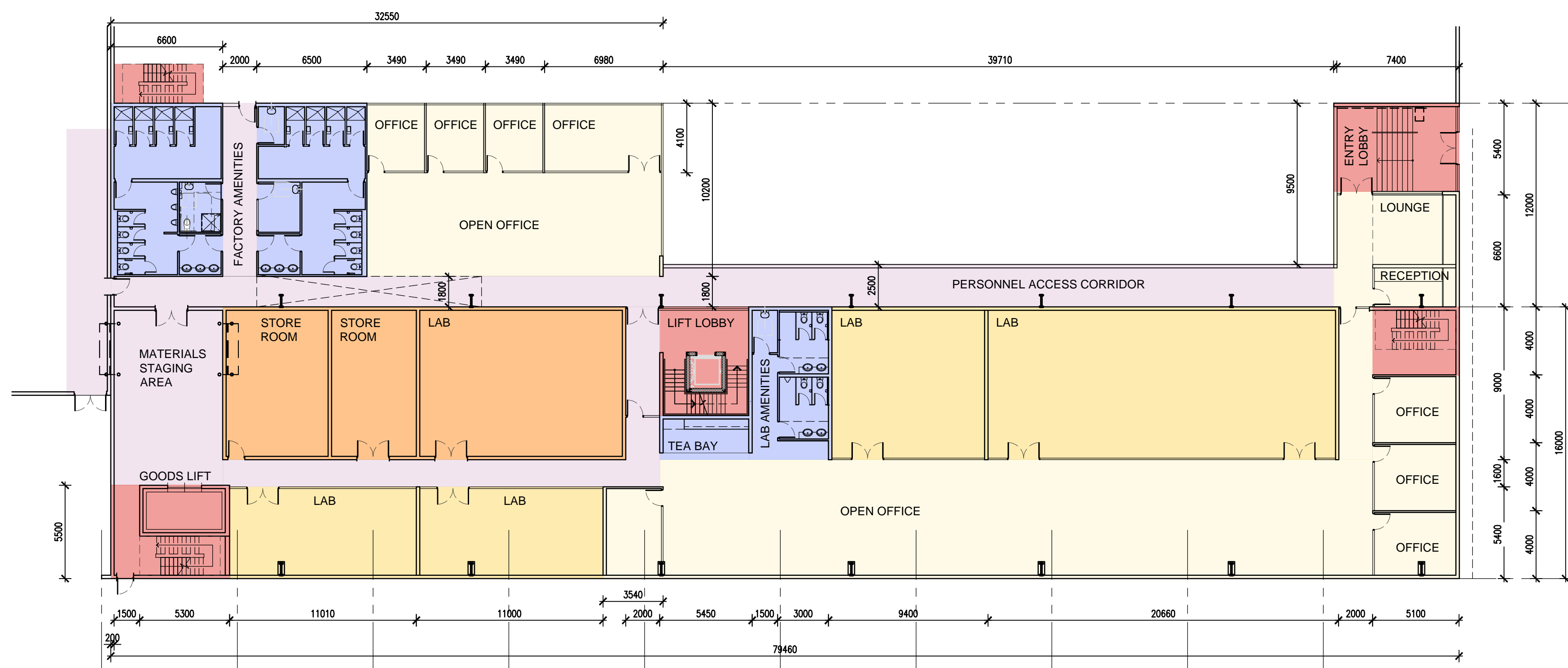


FOR APPROVAL

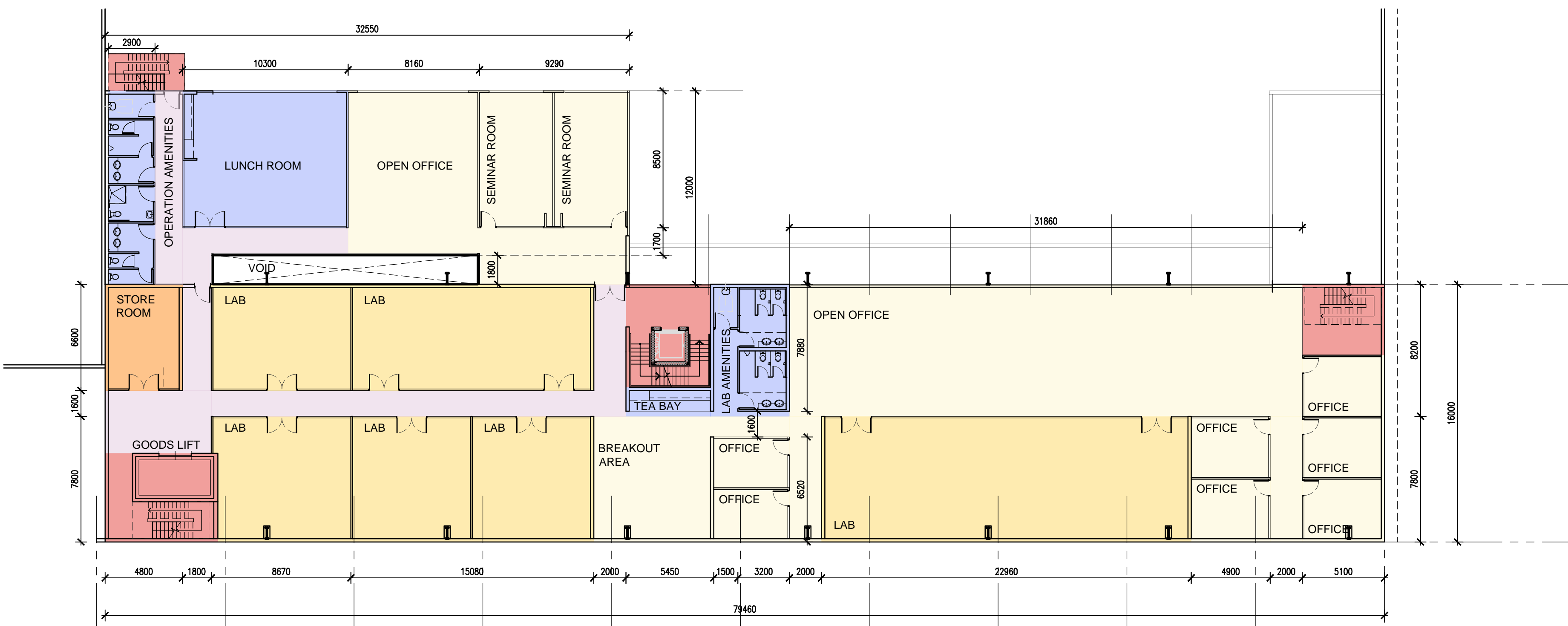
PROJECT BOWER BIRD
 PROPOSED INDUSTRIAL DEVELOPMENT
 GOW STREET, PADSTOW, NSW

DETAILED FLOOR PLANS:
 MANUFACTURING
 scale 1:300 @ B1; 1:750 @ A3
 date 09 / 08 / 2024
 drawn XD

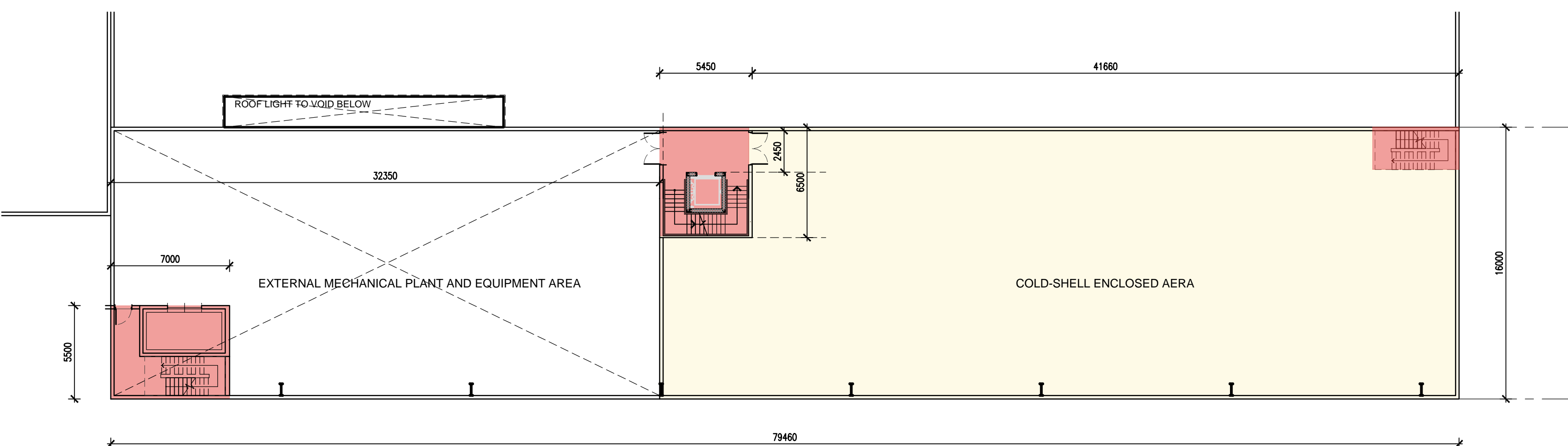
SK15 Ciii
 21.202



DETAIL FLOOR PLAN - OPERATIONS OFFICE + TECHNICAL CENTRE - GROUND SCALE: 1:200

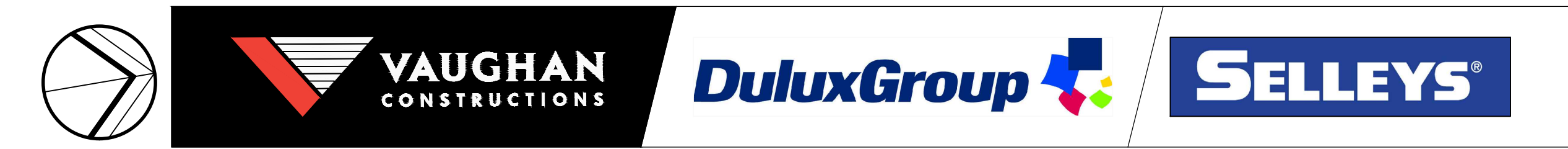


DETAIL FLOOR PLAN - OPERATIONS OFFICE + TECHNICAL CENTRE - LEVEL 1 SCALE: 1:200

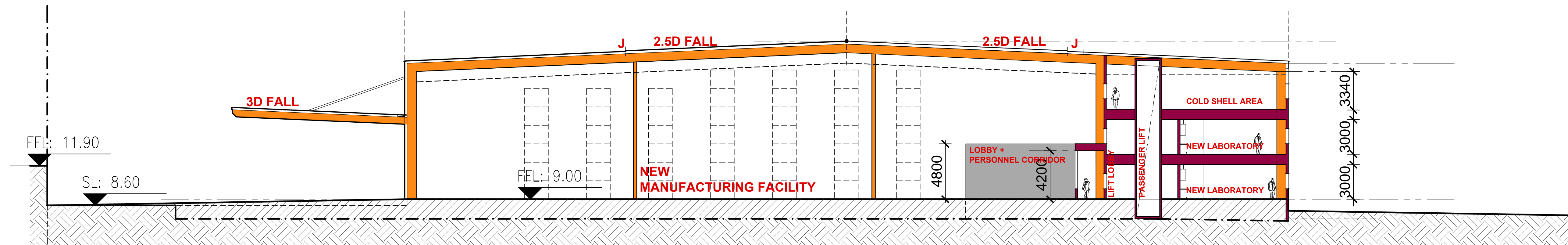


DETAIL FLOOR PLAN - OPERATIONS OFFICE + TECHNICAL CENTRE - LEVEL 2 SCALE: 1:200

© VAUGHAN CONSTRUCTION PTY LTD.
 THESE DRAWINGS ARE SUBJECT TO COPYRIGHT AND
 MAY NOT BE COPIED, USED OR REPRODUCED IN ANY
 WAY WITHOUT THE EXPRESS PERMISSION OF
 VAUGHAN CONSTRUCTION PTY LTD.
 ALL DIMENSIONS AND AREAS INDICATED ON DRAWINGS
 ARE APPROXIMATE ONLY AND ARE SUBJECT TO SURVEY
 CONFIRMATION.
 THE DESIGN IS SUBJECT AUTHORITY APPROVALS.

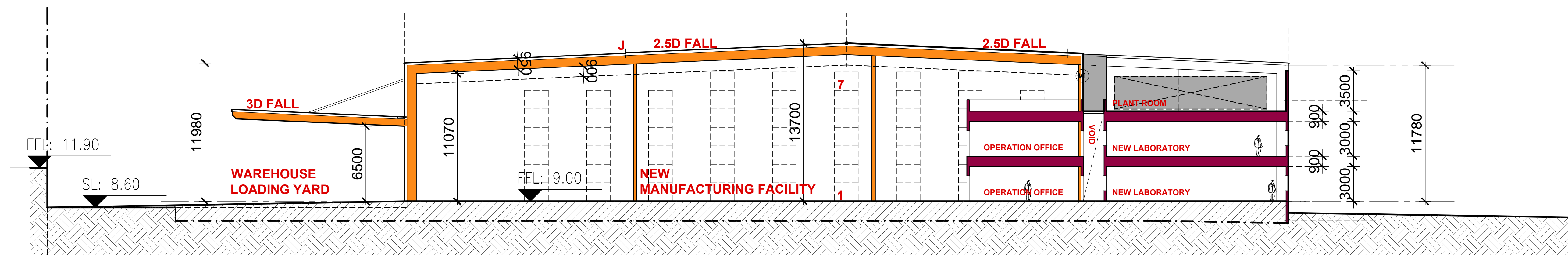


PROJECT BOWER BIRD PROPOSED INDUSTRIAL DEVELOPMENT GOW STREET, PADSTOW, NSW	DETAILED FLOOR PLANS: OFFICES + TECHNICAL CENTRE	SK15 Diii 21.202
	scale 1:300 @ B1; 1:750 @ A3	
	date 28 / 10 / 2024	
	drawn XD	



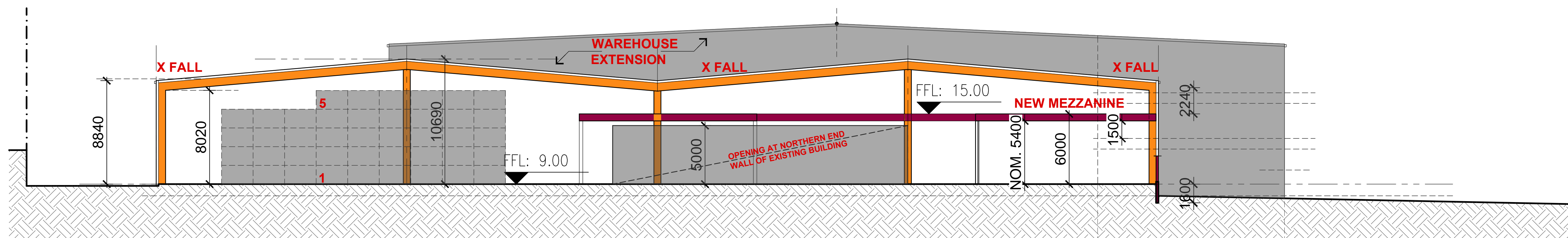
TYPICAL SECTION 2 - NEW FACTORY

SCALE: 1:200



TYPICAL SECTION 2 - NEW FACTORY

SCALE: 1:200



TYPICAL SECTION - EXG BUILDING

SCALE: 1:200

© VAUGHAN CONSTRUCTION PTY LTD.
 THESE DRAWINGS ARE SUBJECT TO COPYRIGHT AND
 MAY NOT BE COPIED, USED OR REPRODUCED IN ANY
 WAY WITHOUT THE EXPRESS PERMISSION OF
 VAUGHAN CONSTRUCTION PTY LTD.
 ALL DIMENSIONS AND AREAS INDICATED ON DRAWINGS
 ARE APPROXIMATE ONLY AND ARE SUBJECT TO SURVEY
 CORRECTIONS.
 THE DESIGN IS SUBJECT AUTHORITY APPROVALS.

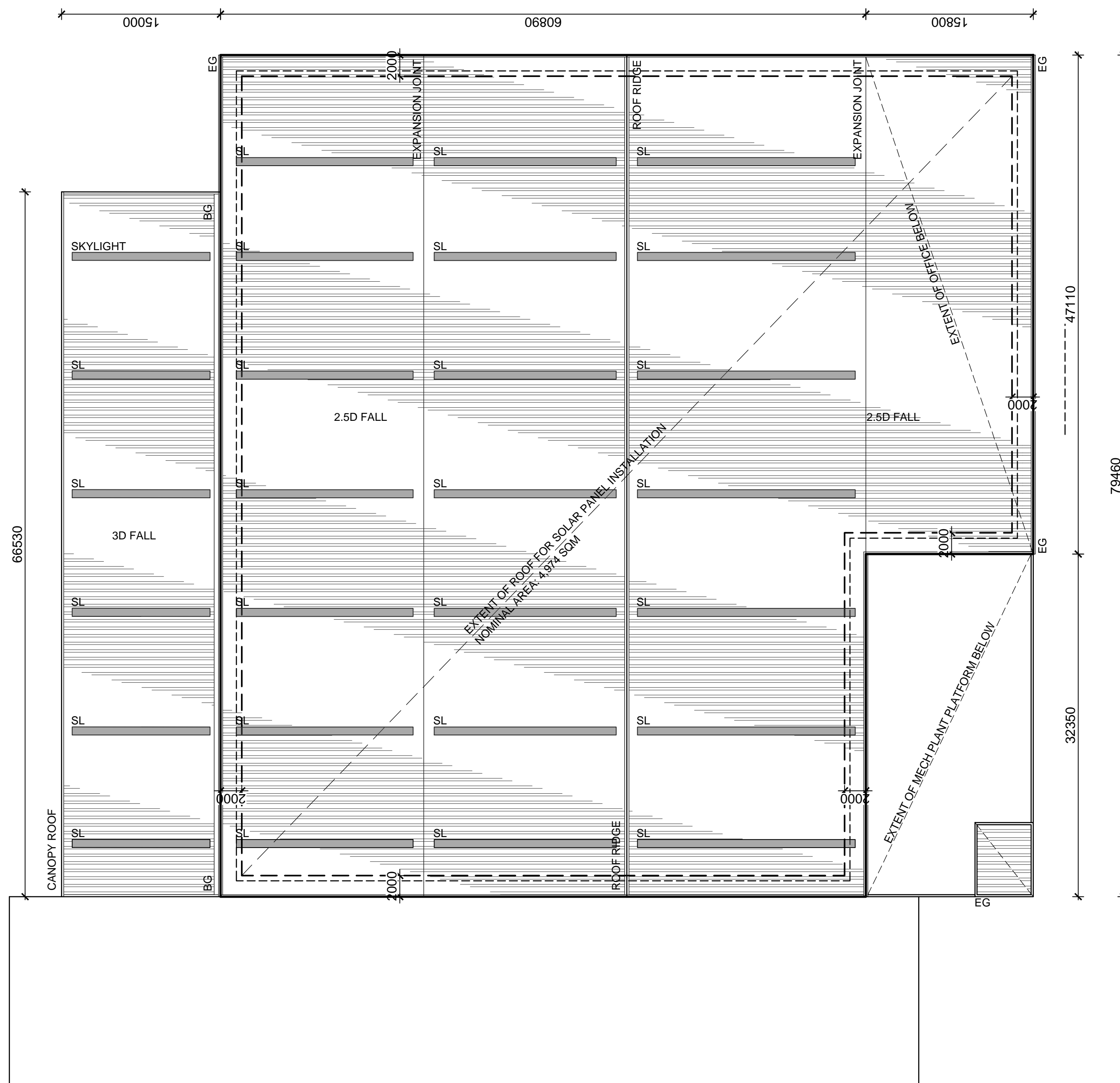


FOR APPROVAL

PROJECT BOWER BIRD
 PROPOSED INDUSTRIAL DEVELOPMENT
 GOW STREET, PADSTOW, NSW

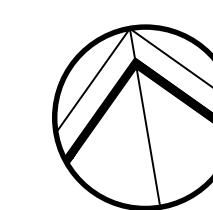
TYPICAL SECTIONS
 scale 1:200 @ B1; 1:500 @ A3
 date 28 / 10 / 2024
 drawn XD

SK15 Eiii
 21.202



ROOF PLAN - NEW BUILDING SCALE: 1:300

© VAUGHAN CONSTRUCTION PTY LTD.
 THESE DRAWINGS ARE SUBJECT TO COPYRIGHT AND
 MAY NOT BE COPIED, USED OR REPRODUCED IN ANY
 WAY WITHOUT THE EXPRESS PERMISSION OF
 VAUGHAN CONSTRUCTION PTY LTD.
 ALL DIMENSIONS AND AREAS INDICATED ON DRAWINGS
 ARE APPROXIMATE ONLY AND ARE SUBJECT TO SURVEY
 CONFIRMATION.
 THE DESIGN IS SUBJECT AUTHORITY APPROVALS.



PROJECT BOWER BIRD
 PROPOSED INDUSTRIAL DEVELOPMENT
 GOW STREET, PADSTOW, NSW

NEW BUILDING ROOF PLAN
 scale 1:300 @ B1; 1:750 @ A3
 date 28 / 10 / 2024
 drawn XD

SK15 **Giii**
 21.202



Appendix B: Contamination Data Tables

Senversa Pty Ltd

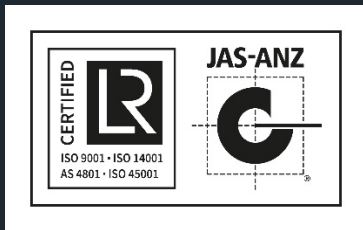
ABN 89 132 231 380

www.senversa.com.au

enquiries@senversa.com.au

LinkedIn: Senversa

Facebook: Senversa



Certified



Corporation

To the extent permissible by law, Senversa shall not be liable for any errors, omissions, defects or misrepresentations, or for any loss or damage suffered by any persons (including for reasons of negligence or otherwise).

©2024 Senversa Pty Ltd