



# APPENDIX I

## REMEDIATION ACTION PLAN





# New Chlorine Liquefaction Plant Denison Street, Banksmeadow, NSW

Ixom Operations Pty Ltd

Remedial Action Plan

JBS&G 67817 | 163,415 Rev A

30 January 2025





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

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

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

# Table of Contents

<b>Abbreviations.....</b>	<b>iv</b>
<b>1. Introduction .....</b>	<b>1</b>
1.1 Objectives .....	2
1.2 Previous Assessments .....	2
1.3 Proposed Development.....	2
<b>2. Site Condition and Surrounding Environment .....</b>	<b>3</b>
2.1 Site Identification.....	3
2.2 Site Inspection and Current Operations .....	3
2.3 Surrounding Land-Uses .....	4
2.4 Geology .....	5
2.5 Hydrogeology.....	6
2.6 Topography and Hydrology .....	6
2.7 Meteorology .....	6
2.8 EPA Regulation.....	6
2.8.1 Botany Groundwater Cleanup .....	6
2.8.2 FCAP Remediation.....	8
<b>3. Conceptual Site Model .....</b>	<b>10</b>
3.1 Extent of Contamination .....	12
<b>4. Remedial Action Plan .....</b>	<b>13</b>
4.1 Extent of Remediation.....	13
4.2 Remediation Objectives .....	13
4.3 Assessment of Remedial Options .....	13
4.4 Preferred Remedial Option .....	14
4.5 Proposed Remedial Works .....	18
4.5.1 Asbestos .....	18
4.5.2 Chlorinated Hydrocarbons and Mercury .....	19
4.5.3 Material Importation.....	20
4.6 Site Management.....	20
4.6.1 Occupational Health and Safety.....	20
4.6.2 Asbestos .....	21
4.6.3 Environmental.....	21
4.7 Contingency Plan .....	24
4.7.1 Unexpected Finds.....	24
4.7.2 Failure of Vapour Barrier .....	26

4.7.3 Emissions / Pollution .....	26
4.8 Long Term Site Environmental Management Plan .....	27
4.9 Regulatory and Planning Requirements .....	27
4.9.1 Environment Planning and Assessment Act 1979/Resilience and Hazards SEPP .....	27
4.9.2 Protection of the Environment Operations Act 1997 .....	28
4.9.3 Water Management Act 2000 .....	28
4.9.4 Protection of the Environment Operations (Waste) Regulation 2014 .....	28
4.9.5 Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017 .....	28
4.9.6 Botany Bay Development Control Plan 2013 (Amendment 5) .....	28
4.9.7 Waste Classification Guidelines .....	29
<b>5. Validation Plan .....</b>	<b>30</b>
5.1 Installation and Certification of Vapour Barrier .....	30
5.1.1 Construction Quality Assurance Plan Requirements .....	31
5.2 Vapour Validation Sampling .....	32
5.2.1 Collection of Vapour Samples .....	32
5.2.2 Assessment of Vapour Levels .....	32
5.3 Imported Soils .....	33
5.3.1 General Backfill .....	33
5.4 Asbestos Containment .....	33
5.4.1 Marker Layer .....	33
5.4.2 Capping Layer .....	34
5.4.3 Ground Surface Validation (Aesthetics) .....	34
5.5 Material Tracking .....	34
5.6 Quality Assurance / Quality Control .....	35
5.6.1 Laboratories .....	37
5.7 Validation Report .....	37
<b>6. Waste Management .....</b>	<b>38</b>
<b>7. Conclusions and Recommendations .....</b>	<b>39</b>
7.1 Conclusions .....	39
7.2 Recommendations .....	39
<b>8. Limitations .....</b>	<b>40</b>

## List of Figures

Figure 1: Site Location

Figure 2a: Site Layout and Surrounding Land-Use (1961)

Figure 2b: Site Areas and Surrounding Land-Use (1986)

Figure 2c: Site Areas and Surrounding Land-Use (2024)

Figure 3: Extent of Remediation

## Appendices

Appendix A: Data tables

Appendix B: Development Plans

## Abbreviations

Term	Definition
bgs	below ground surface
BIP	Botany Industrial Park
BGC	Botany Groundwater Cleanup
CFM	Chloroform
CHC	Chlorinated Hydrocarbons
cis-1,2-DCE	cis-1,2-dichloroethene
CLM Act	Contaminated Lands Management Act 1997
COPC	Constituent of Potential Concern
CSM	Conceptual site model
CTC	Carbon tetrachloride
1,2-DCA	1,2-dichloroethane
DCM	Methylene chloride
DNAPL	Dense non-aqueous phase liquid
DO	Dissolved oxygen
DQIs	Data Quality Indicators
EDC	Ethylene dichloride
Eh	redox potential
ESA	Environmental Site Assessment
EtO	Ethylene Oxide
GRAMP	Groundwater Remediation and Management Plan
GTP	Groundwater Treatment Plant
HCB	Hexachlorobenzene
HCBD	Hexachlorobutadiene
HCE	Hexachloroethane
LNAPL	Light Non-Aqueous Phase Liquid
MAHs	Monocyclic aromatic hydrocarbons
NSW DPE	Department of Planning and Environment
NSW EPA	NSW Environment Protection Authority
PCE	Tetrachloroethene
PFAS	Per- and poly-fluoroalkyl substances
PAHs	Polycyclic aromatic hydrocarbons
RAP	Remedial Action Plan
SAQP	Sampling, Analysis and Quality Plan
SVOC	Semi volatile organic compounds
1,1,1-TCA	1,1,1-trichloroethane
1,1,2-TCA	1,1,2-trichloroethane
TDS	Total dissolved solids
TRH	Total recoverable hydrocarbons

Term	Definition
TCE	Trichloroethene
TeCA	1,1,2,2-Tetrachloroethane
trans-1,2-DCE	trans-1,2-dichloroethene
US EPA RSL	US EPA Region 9 Regional Screening Levels
VC	Vinyl chloride
VCM	Vinyl chloride monomer
VOCs	Volatile organic compounds
VMP	Voluntary Management Proposal

## 1. Introduction

JBS&G Australia Pty Ltd (JBS&G) was engaged by Ixom Operations Pty Ltd (Ixom, the “client”) to prepare a Remedial Action Plan (RAP) to support the development of the proposed New Chlorine Liquefaction Plant located at Denison Street, Banksmeadow, NSW (the site). The site comprises an approximate 0.15 Hectare (Ha) parcel of land, formally identified as part Lot 1101 in DP 1227173 and is shown on **Figure 1**.

The site is located within the Botany Industrial Park (BIP) and has a long history of chemical manufacturing, which began in 1944 with the production of chlorine, caustic soda, hydrochloric acid, sodium hypochlorite and ferric chloride from brine solution by ICI Australia (now Orica). The former ChlorAlkali Plant (FCAP) completed these manufacturing processes with mercury cells from 1944 until 2001 when it was replaced with a membrane cell process. There were four key areas associated with the FCAP that included; the Cell Block (Block G), Chlorine Liquefaction and Chlorine Storage Area (Block L), Hydrogen and Brine Treatment Area (Block M) and Caustic Soda Filtration and Storage (Block A) as shown on **Figure 2a**. The site largely falls within Block L (refer to **Figure 2c**), where gaseous chlorine was previously liquefied and placed into cylinders and drums.

After the new ChlorAlkali Plant was constructed and commissioned in 2002, the FCAP was decommissioned and then demolished in two stages between 2004 and 2007. Investigations completed from 2006, identified elemental and inorganic mercury in soil as well as dissolved inorganic and methyl mercury impacts in groundwater beneath and downgradient of the FCAP. Remediation works were subsequently conducted on Blocks A, G and M that primarily comprised of excavation and offsite disposal of mercury impacted soils to the extent practicable along with containment of residual impacts following source removal works.

More recently, the site has been used as a Sodium Hypochlorite (Hypo) Tanker Loading Bay. It is understood that the client is proposing to establish a new Chlorine Liquefaction Plant on the site, which will comprise the construction of a new plant within an enclosed warehouse structure in the area of the current Hypo Tanker Loading Bay and relocating this service to the north.

A Detailed Site Investigation (DSI) (JBS&G 2024)<sup>1</sup> has been recently completed at the site comprising a program of soil and soil vapour assessment. The assessment has identified contamination comprising a range of chlorinated hydrocarbons in soil vapour likely attributable to vapour sources in the unsaturated zone, mercury present as soil and soil vapour impact and asbestos fragments on the ground surface in the south-eastern portion. As such, the RAP has been prepared to address these contamination issues in order render the site suitable for the proposed land-use.

This RAP has been developed in general accordance with NEPC (2013<sup>2</sup>) and guidelines made or approved by the NSW Environment Protection Authority (EPA), SEPP (Resilience and Hazards) 2021 and relevant Australian Standards.

---

<sup>1</sup> *Detailed Site Investigation, New Chlorine Liquefaction Plant, JBS&G Australia Pty Ltd, 21 November 2024 (JBS&G 2024).*

<sup>2</sup> *National Environmental Protection (Assessment of Site Contamination) Measure 2013.* National Environment Protection Council, 2013 (NEPC 2013).

## 1.1 Objectives

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

## 1.2 Previous Assessments

A range of previous assessments have historically been completed for the site or within surrounding BIP land. It is understood that URS completed investigations with Block L in 2007 on behalf of the site owner (Orica) which were not provided to JBS&G for review herein. As such, background information as applicable to the site is limited to resources that are publicly available and/or listed following:

- Former ChlorAlkali Plant, Human Health and Environmental Risk Assessment – 2013, Environmental Risk Sciences Pty Ltd, 20 June 2013 (EnRisks 2013).
- Site Audit, Blocks A and M, Former ChlorAlkali Plant, Botany Industrial Park, C. M. Jewell & Associates Pty Ltd, 19 December 2013 (SA 2013).
- Site Audit, Block G, Excavation of Shallow Impacted Soils, Block G, Former ChlorAlkali Plant, Botany Industrial Park, C. M. Jewell & Associates Pty Ltd, January 2014 (SA 2014).
- Conceptual Site Model Orica Botany, 2022, Orica Australia Pty Ltd (Orica 2022).
- Post-Remediation Biennial Groundwater Monitoring Event: December 2022, Former ChlorAlkali Plant, Botany Industrial Park, WSP Golder Associates Pty Ltd, 30 March 2023 (WSP 2023).
- Detailed Site Investigation, New Chlorine Liquefaction Plant, JBS&G Australia Pty Ltd, 21 November 2024 (JBS&G 2024).

The scope of works as completed in JBS&G (2024) was sufficient to address the absence of supply of the historical assessments. The non-availability of the earlier (2007) assessment is not considered to significantly affect the characterisation of the site.

## 1.3 Proposed Development

As noted above, the client is proposing to establish a new Chlorine Liquefaction Plant on the site, which will include construction of the new plant within an enclosed warehouse structure in the area of the current Hypo Tanker Loading Bay. It is noted that Loading Bay will be relocated to the north as part of the development in which no enclosed spaces are proposed in this portion.

The design plans are provided in **Appendix C**. Hardstand will be established across the extent of the site and no underground structures (excluding utilities such as power etc) are proposed. As such, consideration has been given to the relevant land-use of “HIL D - Commercial/industrial, includes premises such as shops, offices, factories and industrial sites” as detailed in *National Environment Protection (Assessment of Site Contamination) Measure*, 1999 (as amended 2013), National Environment Protection Council (NEPC 2013).

## 2. Site Condition and Surrounding Environment

### 2.1 Site Identification

The site location is shown on **Figure 1** and the site extent / layout are shown on **Figure 2**. The extent of the site is summarised in **Table 2.1** following.

**Table 2-1: Site Identification**

Site Feature	Description
Address	Denison Street Banksmeadow
Lot and DP	Part Lot 1101 in DP 1227173
Approximate Site Area	0.15 ha
Zoning	Industrial
Local Government Area	Bayside City Council
Approximate Coordinates (GDA94-MGA56)	335601.2 E; 6241246.9 N (centre of main portion)

### 2.2 Site Inspection and Current Operations

A detailed site inspection was conducted on 23 October 2024 by an appropriately qualified and experienced JBS&G environmental consultant. The site comprises two distinct areas as comprising of the current Hypo Tanker Loading Bay in the southern portion and a small vacant parcel of land within the location of the proposed new Loading Bay in the northern portion. Key site features within each area are displayed on **Figure 2c** and discussed below:

- The eastern portion of the Hypo Tanker Loading Bay area comprised of a raised concrete slab (approximately 1-1.5 m above surrounding ground levels) that formed the ground floor slab of a former warehouse structure. At the time of the inspection, the area was primarily used for storage of disused equipment that included steel storage tanks, shipping containers, metal pipes, cylinders pumps etc. Asbestos containing materials (ACM) in the form of bonded cement fragments were observed on exposed surface soils to the south of the raised slab;
- In the western portion of the site, there was a 2-laned concrete driveway that serviced the Hypo Tanker Loading Bay. All associated infrastructure (pipes, bowers etc) appeared to be aboveground and were fed from the new ChlorAlkali Plant located to the south of the site;
- The balance of the ground surface across the site comprised of road base gravels and igneous cobbles. There were no obvious signs of contamination (ACM, odours, staining of the ground surface) in these materials; and
- To the north of the Hypo Tanker Loading Bay Area was a concrete lined pit. The pit was secured by chain link fencing and the base was sediment laden and covered with weeds.

It is noted that the modern operations at the site are typically storing / handling products that are generally found to be non-hazardous (sodium hypochlorite) within the environment. The most significant potential contaminants are identified through a review of the site history which is detailed in **Section 3**.

## 2.3 Surrounding Land-Uses

Adjacent uses of potential significance are summarised in **Table 2.2** following and shown on **Figure 2c**.

**Table 2-2: Adjoining Land Uses**

Identification	Location	Description
Orica Australia	Surrounding site	<p>Orica owns the land immediately surrounding the site within BIP. Facilities that are located nearby or adjacent to the site include:</p> <ul style="list-style-type: none"> <li>□ ChlorAlkali Plant – the new ChlorAlkali Plant is located to the south of the site. While the land in this area is owned by Orica, the plant has been owned and operated by Ixom Operations Pty Ltd since 2015.</li> <li>□ Groundwater Treatment Plant (GTP) - located 200 m to the north of the main portion of site. Used for the processing and treatment of contaminated groundwater recovered as part of large-scale groundwater extraction/remediation (Botany Groundwater Cleanup (BGC) Project)</li> </ul>
Indorama Ventures Oxides Australia Pty Ltd	North of site (approximately 100 m from main portion)	<p>This property has a long history of chemical manufacturing, which began in 1942 with the production of carbon bisulphide by ICI Australia. Throughout the 1940s and 1950s, additional chemical plants were commissioned, including a rubber chemical plant, a herbicide plant, a formaldehyde plant, and an acetylene wet generation plant (refer to Figure 2a). These chemical manufacturing plants were decommissioned in the 1960s, after which the property was used to manufacture surfactants.</p> <p>The property was acquired from Orica (formerly ICI) by Huntsman in 1998 and then by Indorama in 2019. Until recently, ethylene oxide (EtO) and its derivatives, including glycols, glycol ethers, and non-ionic surfactants, were manufactured at the site using primary raw materials supplied by the Olefines plant operated by Qenos, located to the north of the site within the BIP.</p> <p>Indorama has recently ceased operations and is currently decommissioning the manufacturing facility.</p>
Former Qenos Facility	North and North-west of Site	<p>The former Qenos manufacturing facility is also located within BIP, with key features that are located nearby to the site include:</p> <ul style="list-style-type: none"> <li>□ Alkathene - Until recently this area was used for the production of low density polyethylene (LDPE) products from ethylene (produced at Olefines II). The area contains the Alkathene plant (high and low pressure reactors, compressors, cooling towers, product extrusion machines, and a number of electrical substations), workshops, offices, bulk liquid (petroleum based) storage areas, product silos and warehouses</li> <li>□ Alkatuff - Until recently this area was used for production of linear low density polyethylene (LLDPE) products from ethylene (Olefines II), hexene, nitrogen, hydrogen and TEAL (triethyl aluminium). The area also produced high density polyethylene (HDPE). The area comprises the Alkatuff plant, workshops, offices, additive store, catalyst store,</li> </ul>

Identification	Location	Description
		<p>hexene bulk storage tank, cooling towers, laboratory and two electrical substations</p> <ul style="list-style-type: none"> <li>Site Utilities - The site utilities area includes steam generation, demineralisation of water, effluent treatment, cooling towers, and instrument air plant. Coal unloading and storage bay adjacent to the steam plant. By-product boiler ash hoppers and loading bay. Site utilities provides services to the broader BIP and as a result the majority of operations are ongoing</li> </ul>
Southlands	West	Southlands is located to the west of the site beyond the extent shown on <b>Figure 2c</b> . The area has been remediated and divested by Orica. A range of contaminants were present inclusive of chlorinated hydrocarbons and asbestos.
Sydenham to Botany goods railway line	West	Operational freight rail line adjacent to southwestern boundary of BIP.
Residential Properties on Denison Street	East	To the east of the site (beyond the Orica owned land) is Denison Street. A variety of residential dwellings are located beyond.

There are no potentially sensitive ecosystems identified within the extent of the site (or the BIP in general) and are not anticipated with the proposed redevelopment. The nearest potentially sensitive ecological receptor is identified as Penrhyn Estuary located approximately 1 km to the south-west of the site.

The estuary is considered to be a functioning ecosystem providing a valued wading bird habitat. This has developed over a relatively short time frame (aerial photos from the early 1980s show the estuary to be barren sand dunes). Springvale Drain discharges at the eastern extent of Penrhyn Estuary.

## 2.4 Geology

Previous soil investigations from surrounding BIP land, reported that the geology of the area comprises of Botany Sands, a sequence of predominantly unconsolidated to semi-consolidated permeable sands. These sands are interspersed with lenses and layers of peat, peaty sands, silts, and clay, which become more prevalent in the lower part of the sequence. The sand layer varies in thickness across BIP from less than 20 m to over 80 m and is underlain by the Hawkesbury Sandstone, a rock formation with significantly lower permeability compared to the overlying Botany Sands.

Borehole logs from previous soil investigations within the site or surrounding FCAP land were not provided by the site owner for review herein. However, EnRisks (2013) provides a description of the soils encountered across Block L during previous investigations as follows:

- Fill ranged in depths from 0 to 1.0 m and comprised of grey and brown sands that were medium to coarse grained with 20-50 mm gravels; and
- Natural soils were reported to underly the fill materials (to 17 m as consistent with maximum depth of investigations in this area) and comprised of grey/brown to white sands that are medium to coarse grained.

The site geology is largely consistent with that described across the broader BIP area in Orica (2022). Orica (2022) further reports that the fraction of organic carbon ( $f_{oc}$ ) in soils across BIP range from low in sandy

materials (<1%) to high in peat (4-20%) and occasionally in sands with a "brown" coloration (up to 22%) which influence contaminant mobility.

## 2.5 Hydrogeology

Historical groundwater levels as collected in proximity of the site within BIP land have confirmed that the regional groundwater flow direction in the vicinity of the site is south-westerly towards Botany Bay (Orica 2022). The presence of three hydraulic containment lines at: the southwestern boundary of BIP; south (down-gradient) of the Nant Street Tank Farm, adjacent to McPherson Street; and further south on Foreshore Road, immediately prior to Botany Bay, induces groundwater flow towards the three containment lines and results in the hydraulic containment of groundwater flowing from the BIP. Shallow groundwater within BIP is generally characterised as slightly acidic with low salinity (<1000 µS/cm).

In the area of the site, WSP (2023) reports that the inferred groundwater flow direction is to the south-west consistent with the above.

## 2.6 Topography and Hydrology

The site is characterised as being generally level over the site area, with a slight fall towards Springvale Drain. The south-western part of the site is located at a slightly lower level than the northern portions of the site as consistent with this fall. Noting that a significant portion of the site is not covered in hardstand (i.e. roadbase and cobbles), it is expected that the majority of rainfall will result in groundwater recharge.

## 2.7 Meteorology

A review of climatic data for the nearest Bureau of Meteorology monitoring location (Sydney Airport AMO) indicates the Site is located within the following meteorological setting:

- Average maximum temperatures range from 17.2°C in July to 26.7°C in January;
- Average minimum temperatures range from 7.4°C in July to 19.1°C in February;
- The average annual rainfall is approximately 1093.4 mm with rainfall greater than 1 mm occurring on an average of 96 days per year; and
- Monthly rainfall varies from 59.8 mm in September to 124.7 mm in March, with the wettest periods on average occurring between the months of January to June.

## 2.8 EPA Regulation

### 2.8.1 Botany Groundwater Cleanup

The BIP site has a long industrial history (since the early 1940s) and was formerly owned and operated by ICI Australia Ltd (ICI). Historical operations at BIP have resulted in soil and groundwater contamination on and adjacent to the site which have resulted in a range of environmental regulatory actions being applied to the site.

The NSW EPA issued Orica with Notice of Clean Up Action (NCUA) No. 1030236 on 26 September 2003, under the *Protection of the Environment Operations Act 1997* (POEO Act) which applied to the BIP, inclusive of the site subject of this assessment. The NSW EPA also declared on 9 February 2005 (No. 21074) the land to be a remediation site under the *Contaminated Lands Management Act 1997* (CLM Act), with subsequent notices repealing the declaration on portions of the land surrounding BIP as they have been remediated and developed.

Following effective completion of the principal NCUA actions, and consultation with the community and Orica, the NSW EPA determined that the project would be best managed by a Voluntary Management Proposal (VMP) under the CLM Act 1997. An initial VMP was approved on 5 November 2010 (Approval No. 20101714),

which was subsequently revised on 13 August 2015 (Approval No. 20151711) and 29 April 2020 (Approval No. 20201704). The VMP is the current regulatory tool requiring effective operation of the 'Botany Groundwater Cleanup' (BGC).

The VMP applies to a range of constituents inclusive of volatile chlorinated hydrocarbons (CTC, DCM, chloroform, chloromethane, 1,1,1,2-tetrachloroethane, 1,1,1-trichloroethane [1,1,1-TCA], 1,1,2-trichloroethane [1,1,2-TCA], 1,1,2,2-tetrachloroethane, 1,2-DCA, chloroethane, cis-1,2-dichloroethene [cis-1,2-DCE], PCE, trans-1,2-dichloroethene [trans-1,2-DCE], TCE and VC) and semi-volatile chlorinated hydrocarbons (1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, 1,3,5-trichlorobenzene, 1,2,4,5-tetrachlorobenzene, pentachlorobenzene, HCB, HCBd, hexachlorocyclopentadiene, HCE and hexachloropropylene)

The BGC Project addresses BIP-related chlorinated hydrocarbon contamination issues. The overall remediation strategy, as required by various regulatory mechanisms discussed briefly above, has been a risk-based approach to:

- Protect human health and environmental receptors via hydraulic containment of the CHC plumes and source areas and administrative measures;
- Monitor the nature and extent of contamination to identify potential exposure pathways that require management; and
- Investigate potential technologies to remediate chlorinated hydrocarbon source zones and plumes (though periodic reviews and independent workshops with international experts have not identified practicable remediation alternatives).

A revised Groundwater Remediation and Management Plan (GRAMP) (Orica, 2020) was submitted as an attachment to the VMP; it outlines surface water and groundwater monitoring requirements.

#### Botany Groundwater Cleanup

Orica's approach for remediation of BIP-related contamination, as per the requirements of the NCUA and its subsequent variation notices, currently comprises:

- Containment of dissolved phase chlorinated hydrocarbon plumes on- and off-site to ensure risks to human health and the environment remain acceptable;
- Continual optimisation of operation of the hydraulic containment lines and GTP for protection of critical human health and environmental exposures and for gradual cleanup of contamination in areas;
- Improvements to the hydraulic containment system and GTP to further reduce impacts on Springvale Drain and Penrhyn Estuary/Botany Bay; and
- Ongoing review of developments in remediation technologies and experience for dense non-aqueous phase liquid (DNAPL), soil and groundwater phase CHCs, and their practical application to the BGC Project.

Containment of dissolved phase chlorinated hydrocarbon plumes on- and off-site achieved by:

- Groundwater extraction (with ex situ treatment) from the Botany Sands aquifer along the southwestern boundary of BIP (1<sup>st</sup> and 2<sup>nd</sup> Streets), the southern boundary of former Orica Southlands along McPherson Street and along Foreshore Road;
- Groundwater extracted is pumped to a purpose-built (GTP) located on the Orica owned portion of BIP; and
- Performance monitoring at the GTP and of water levels and water quality within the aquifer is ongoing.

This system is often collectively referred to as the 'GTP system' or 'hydraulic containment system'. The effectiveness of hydraulic containment is reviewed on a quarterly (and biannually since 2017) basis as part of

compliance monitoring under the GTP monitoring program. A range of remedial options have been considered to address DNAPL impacted areas though none have been found to be effective or appropriate for full scale implementation.

## 2.8.2 FCAP Remediation

The Site Audits (SA 2013 and 2014) provide a detailed history of the remediation of mercury impacts at the FCAP with associated NSW Environment Protection Authority (EPA) regulatory requirements as summarised below.

### Operational History (1942–2002):

- Orica, previously ICI Australia, operated a chemical manufacturing plant at the BIP since 1942.
- The FCAP used elemental mercury in its electrolytic process from 1944 until 2002, when it transitioned to membrane technology.
- The FCAP's above-ground structures were demolished between 2004 and 2007.

### Contamination Identified (2005–2009):

- On February 9, 2005, the NSW EPA declared the BIP and surrounding land a Remediation Site (Notice No. 21074) under the Contaminated Land Management Act 1997 (CLM Act).
- Investigations (2006–2009) revealed elemental and inorganic mercury in soil and groundwater beneath and downgradient of the FCAP.
- On July 10, 2009, the EPA confirmed the contamination warranted regulation under the CLM Act. Orica committed to remediation through a Voluntary Management Proposal (VMP).

### Voluntary Management Proposal (2011):

- Orica submitted a VMP on April 11, 2011, focusing on remediation of Blocks M and G of the former CAP. It is noted that no potential mercury contamination issues were identified as part of environmental investigations on Block L.
- Initial remediation efforts began in May 2011 with soil excavation and on-site soil washing being trialled on Block G. However, the process did not meet remediation objectives, leading Orica to suspend works in August 2011.

### Management Order Issued (2012):

- On January 6, 2012, the EPA revoked the VMP and issued Management Order No. 20111406, requiring a new remediation framework.
- Golder Associates prepared a Remedial Options Appraisal Report (April 2012) recommending capping and containment of mercury impacted soils on Block G and excavation and off-site disposal for mercury "hotspots" in Blocks A and M.

### Completion of Remediation for Blocks A and M (2013)

- Excavation and off-site disposal of mercury-impacted soils to the extent practicable was completed in accordance with the RAP on Blocks A and M.

### **Completion of Soil Source Removal Works for Block G (2013)**

- A new Management Order (20131406) set objectives for implementing the RAP on Block G, requiring excavation and off-site disposal of mercury impacts in shallow soils on Block G. These remedial works were completed to the extent practicable between September and November 2013.

### **Construction of cut-off wall and installation of Capping System (2015-2016)**

- Residual mercury impacted soils on Block G were managed through a cap and contain system, that included the construction a slurry-wall extending to bedrock, around the whole of Block G.

### **Ongoing Maintenance Order (2017)**

- At the completion of remediation works in accordance with the MO (20131406), the NSW EPA issued an Ongoing Maintenance Order (20172802) in accordance with Section 28 of the CLM Act. The order requires:

*a) Maintain the ground surface of Blocks A and M in accordance with the Orica Former ChlorAlkali Plant Remediation Project, Blocks A & M Long Term Site Environmental Management Plan, 20 December 2013;*

*b) Maintain the encapsulation cell on Block G of the Botany Industrial Park in accordance with the Orica Australia Pty Ltd, Block G Long-Term Site Environmental Management Plan, 31 January 2017;*

*c) Monitor the mercury vapours within Block G in accordance with Orica Australia Pty Ltd, Block G Air Monitoring Plan, 31 January 2017.*

*d) Monitor the groundwater levels and chemistry within and adjacent to Block G in accordance with the Golder Associates, Former ChlorAlkali Plant, Botany Industrial Park, Post-Remediation Groundwater Monitoring, 31 January 2017;*

*e) Report to the EPA as soon as practicable any incident that may adversely affect the integrity of the encapsulation structure on Block G, the surface of Blocks A or M or cause migration of contaminants to the environment; and*

*f) Submit to the EPA annually, due by 31 March each year, a written report of compliance with this Notice detailing any instances of non-compliance, and potential changes to the long-term management plans, including the monitoring programs and the results of any vapour and water quality monitoring.*

### 3. Conceptual Site Model

The conceptual site model (CSM) is summarised following as further to the findings of JBS&G (2024).

**Table 4.1 – Refined CSM**

Receptor	Location	Media	Potential Exposure Pathways	Commentary
<b>On-site Receptors</b>				
Future industrial users	Within Future Warehouse (i.e. the new Chlorine Liquefaction Plant)	Soils / Groundwater	Inhalation (vapours and gases)	This exposure pathway is potentially complete as a result of chlorinated hydrocarbon (including TCE, PCE, CTC, CFM and/or HCBD) and/or mercury impact in vapour which has been identified across the extent of the footprint in which the new Chlorine Liquefaction Plant is proposed (refer to <b>Figure 3</b> ).
	Outdoor Areas (limited to the new Hypo Loading Bay in the northern portion)	Soils	Inhalation (particulates or vapours) Oral ingestion Dermal contact	This exposure pathway is not complete given that the surface will be covered in hardstand (thereby precluding direct contact exposures).
Construction worker or intrusive maintenance worker (short duration)	Construction areas/excavations	Soils	Inhalation (vapours, gases and particulates/fibres)	Potentially complete, as a result of chlorinated hydrocarbon and mercury impacts in site soils. Fragments of ACM were further identified on the ground surface in the south-eastern portion of the site – where it is noted that additional asbestos impacts may be encountered following removal of site hardstand during demolition and construction works.
		Groundwater	Inhalation (vapours and particulates/fibres) Oral (infiltrating seepage water) Dermal (infiltrating seepage water)	This exposure pathway has not been assessed directly herein. However, it should be assumed that the pathway is potentially complete as a result of chlorinated hydrocarbon and mercury impacts in groundwater underlying the site.

Receptor	Location	Media	Potential Exposure Pathways	Commentary
<b>Off-site Receptors<sup>3</sup></b>				
Recreational users of Penrhyn Estuary and Botany Bay	Surface waters downgradient of the site	Surface Water as potentially affected by site groundwater	Inhalation (vapours) Oral, Dermal, Ingestion	This exposure pathway has not been directly assessed in this report. However, as of the time of reporting, it is caused to be incomplete through the implementation of the BGC.
Off-site Commercial / Industrial users	Within buildings or outdoor areas.	Soils and/or groundwater	Inhalation (vapours, gases and particulates/fibres)	This exposure pathway is not complete based on current surrounding land-uses. Future land-uses which comprises construction of buildings in close proximity of the site may cause this exposure pathways to be complete in the future by potential lateral migration of vapours from the site.
Ecological Receptors within Penrhyn Estuary and Botany Bay	Surface waters downgradient of the site	Surface Water as potentially affected by site groundwater	Various	This exposure pathway has not been directly assessed in this report. However similarly for recreational uses of Penrhyn Estuary and Botany Bay is caused to be incomplete through the implementation of the BGC.

<sup>3</sup> The discharge of CHCs via groundwater from BIP is currently regulated and controlled as part of BGC.

### 3.1 Extent of Contamination

The extent of contamination that will warrant remediation has been determined from a review of JBS&G (2024) and the CSM provided preceding. The extent of contamination is shown on **Figure 3** and includes:

- Asbestos (bonded) impacts present in near surface / fill based soils across the site; and
- Mercury and chlorinated hydrocarbon impacts in soil vapour posing a potentially unacceptable health risk (via vapour intrusion) to future site users within the enclosed building of the new Chlorine Liquefaction Plant. The extent of potentially impacted vapour that will require management extends across the complete site extent and likely into adjoining BIP land.

## 4. Remedial Action Plan

Remedial works are required to make the site suitable for the proposed land-use (**Section 1.3**). The extent and preferred remedial method are discussed following.

### 4.1 Extent of Remediation

Remedial works will be required to address / manage:

- Potential asbestos impacted soils across the extent of the site. Bonded asbestos fragments have been observed on the site surface in the south-eastern portion and potentially are present in fill based soils that extend to depths from 0.6 to 1.5 m bgs across the site extent;
- Chlorinated hydrocarbon impacted soils which in turn pose a vapour risk and present across the site extent; and
- Shallow mercury impacted soils in the area to the south of Depot 60 – the impacted soils pose a potentially unacceptable health risk via vapour intrusion into the future building and further need to be retained in unsaturated soil horizons during site development to reduce any potential mass loading to groundwater.

### 4.2 Remediation Objectives

The objectives of the remediation are:

- To make the site suitable from a human health perspective for the proposed industrial land-use; and
- To manage the occupational risk as associated with asbestos as suitable for the site description as a workplace.

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

### 4.3 Assessment of Remedial Options

The approach adopted in this RAP is consistent with the preferred hierarchy of options for site clean-up and/or management provided in NEPC (2013) and (EPA 2017), which are listed as follows:

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

if the above are not practicable,

- Consolidation and isolation of the soil on-site by containment within a properly designed barrier; and
- Removal of contaminated soil to an approved site or facility, followed where necessary, by replacement with appropriate material;

or

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

In addition, it is also a requirement that remediation should not proceed in the event that 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 (EPA 2017).

Remedial options have been assessed for the site as detailed in **Table 4-1** following. Remedial options have been considered specific to each of the site contamination issues identified as requiring to be addressed by this RAP. It is noted, and as discussed in **Table 4-1** – that it is likely that the source of chlorinated hydrocarbon contamination at the site extends beyond the development boundaries. Consistent with NSW EPA (2010) guidance of the potential lateral migration of these vapours of up to 30 m, and further NEPC (2013) guidance of increased lateral migration in the presence of large extents of hardstand – there are restricted opportunities to cause effective remediation of these impacts to achieve validation criteria within the extent of the site.

#### 4.4 Preferred Remedial Option

From the review of **Table 4-1**, the following remedial / management options are proposed for the site:

- Management of asbestos impacted soils with the redevelopment of the site by on-site containment;
- Management of chlorinated hydrocarbon impacted soils by inclusion of vapour barriers to buildings constructed overlying; and
- Inclusion of mercury contaminated soils with management of chlorinated hydrocarbon impacted soils and further retention of the impacted materials in shallow, unsaturated media below future hardstand.

**Table 4.1: Remedial Options Assessment**

Remedial Option	Applicability	Assessment
1. On-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level.	<u>Asbestos</u> There are no practical means by which to destroy asbestos contamination present in soils.	<u>Asbestos</u> Not considered further as not applicable.
	<u>Chlorinated Hydrocarbons</u> Treatment of chlorinated hydrocarbons is most commonly undertaken by a process to cause volatilisation of chlorinated ethenes from the soils, and capture and treatment / destruction of the volatilised chlorinated hydrocarbons.	<u>Chlorinated Hydrocarbons</u> This would be the preferred option where chlorinated hydrocarbon impact was restricted to the site and there was certainty with respect to validation. However chlorinated hydrocarbon impact extends off-site at similar or higher levels as present on the site and the lateral migration of the same impacts back into the site would preclude the validation of this approach.  There is no known proposal in the near future, or at a timeline corresponding to the site development, that shallow soil based impacts present on the adjoining BIP will be remediated.
	<u>Mercury</u> There is no known technology that has been applied within Australia to cause the destruction of mercury within soil.	<u>Mercury</u> Not considered further as not applicable.
2. Off-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level, after which the material is returned to the site.	<u>Asbestos</u> There are no practical means by which to destroy asbestos contamination present in soils.	<u>Asbestos</u> Not considered further as no off-site facility known or available to receive and treat asbestos affected soils.
	<u>Chlorinated Hydrocarbons</u> Facilities are available at Altona (Vic) and Dandenong (Vic) to treat chlorinated hydrocarbon impacted soils by thermal processes.	<u>Chlorinated Hydrocarbons</u> The environmental impacts of the cartage of a large volume of soils to Victoria for treatment is not a preferred remedial method compared to the options considered following. Previous recent experience of JBS&G further indicates that the transport would require to occur over several weeks due to the absence of available road tippers that are appropriate to cart

Remedial Option	Applicability	Assessment
		contaminated soils over interstate distances. Vic EPA permits are also unlikely as disposal facilities are available in NSW for the materials.
	<p><u>Mercury</u></p> <p>There is no known technology that has been applied within Australia to cause the destruction of mercury within soil.</p>	<p><u>Mercury</u></p> <p>Not considered further as not applicable.</p>
<p>3. On-site management of the impact by physical separation</p>	<p><u>Asbestos</u></p> <p>This option provides for the retention of asbestos impacted material on-site beneath a physical barrier such that there are no complete exposure pathways available between the contaminated material and human receptors. Across the site, the barrier will mostly comprise the hardstand surface under the proposed development scheme.</p> <p>In such instances, an asbestos register/asbestos management plan (AMP) would be required at the site to document the presence/location of bonded asbestos materials. This is typically incorporated in a long term Environmental Management Plan.</p>	<p><u>Asbestos</u></p> <p>This is the preferred option for asbestos impacted soils. The ‘capping layer’ will be readily available across the majority of the site with the hardstand / pavement that will be anticipated with the site development.</p> <p>This option minimizes the amount of waste produced from the proposed development works and is therefore consistent with ecological sustainable development (ESD) principles.</p>
	<p><u>Chlorinated Hydrocarbons</u></p> <p>The potentially complete exposure pathway identified for chlorinated hydrocarbon impacts has been identified as potential vapour intrusion to future buildings. This is able to be controlled by construction of future building overlying vapour barriers. Vapour barriers require to be effectively impermeable to potential advective or diffusive movement of chlorinated hydrocarbon vapours.</p>	<p><u>Chlorinated Hydrocarbons</u></p> <p>Consequent of the presence of the same chlorinated hydrocarbon impacted source material on the adjoining BIP land to the site – and the likelihood that this impact will persist in soils for a timeline well beyond the proposed development timeline of the site – this is the preferred option. The vapour barrier would be required for the entire footprint of the new Chlorine Liquefaction building. These vapour barriers are commonly installed as continuous bituminous membranes directly underlying building pavement.</p>
	<p><u>Mercury</u></p> <p>Mercury vapours can be similarly precluded from future buildings by the same vapour barrier</p>	<p><u>Mercury</u></p>

Remedial Option	Applicability	Assessment
	<p>approach as described for chlorinated hydrocarbons.</p>	<p>The preferred approach that aligns with the approach to manage chlorinated hydrocarbon impacted soils cooccurring with the mercury impacts.</p>
<p>4. Excavation and off-site removal of the impacted material.</p>	<p><u>Asbestos</u></p> <p>Asbestos impacted soils are able to be classified as per NSW EPA waste classification guidelines and disposed at EPA licensed waste facilities typically located within 70 km of the site.</p>	<p><u>Asbestos</u></p> <p>This option is not preferred owing to the substantial volume of asbestos impacted soils that have been identified as likely to be present across the extent of the site.</p>
	<p><u>Chlorinated Hydrocarbons</u></p> <p>Chlorinated hydrocarbon impacted soils are able to be classified as NSW EPA waste classification guidelines and disposed at EPA licensed waste facilities typically located within 70 km of the site.</p>	<p><u>Chlorinated Hydrocarbons</u></p> <p>This option is not preferred owing to the substantial volume of chlorinated hydrocarbon impacted soils that have been identified as likely to be present across the extent of the site. Further, there is substantial uncertainty as to whether validation would be achieved for a completed excavation observing that the highest levels of chlorinated hydrocarbon impacts are reported at sample locations adjoining the site boundary – and chlorinated hydrocarbons are a known contaminant on the adjoining sites. It is likely that validation excavations would be affected by laterally migrating chlorinated hydrocarbon vapours from the adjoining portions of the BIP.</p>
	<p><u>Mercury</u></p> <p>Similarly to the above, mercury impacted soils are able to be classified and disposed to landfills in a reasonable proximity of the site.</p>	<p><u>Mercury</u></p> <p>Owing to the relatively small volume of mercury affected soils this option is applicable where a site development scheme is able to be identified which will preclude the requirement for a vapour barrier.</p> <p>Otherwise there is no significant benefit to the site development potential to remove the mercury impacted soils and an outcome of waste minimisation with retention of the soils is preferred. And an approach has been identified where the mercury impacted soils can instead be managed with the cooccurring chlorinated hydrocarbon impacted soils for long term management.</p>

## 4.5 Proposed Remedial Works

The proposed remedial works are outlined following as specific to each contaminant type / grouping that has been identified in **Section 4.1** as requiring remediation.

### 4.5.1 Asbestos

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

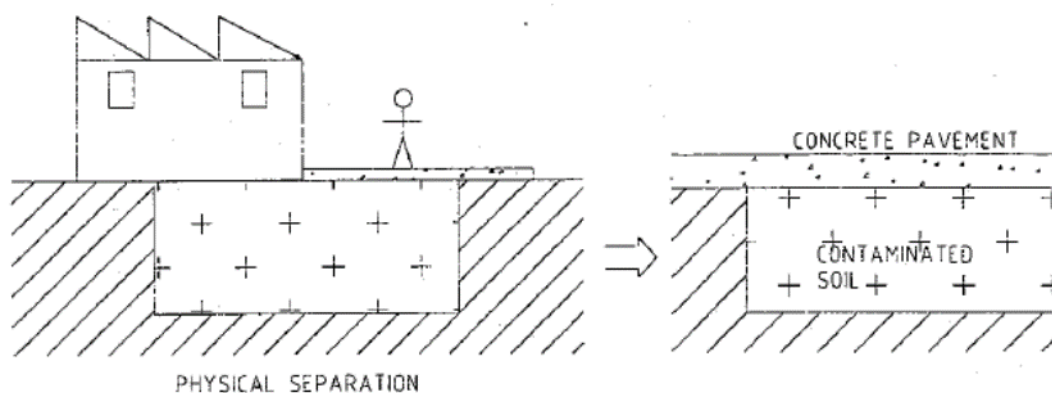
#### 4.5.1.1 Overview

Impacted fill will be managed to the extent achievable via containment and the implementation of permanent physical separation (e.g. hardstand ground surface) which eliminates the inhalation exposure pathway for airborne asbestos fibres.

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

- A minimum soil cover thickness of 0.5 m in unpaved areas (not anticipated at this stage based on proposed design) which is underlain by a visual “marker layer”; or
- Permanent concrete floor/ground slabs as underlain by a visual “marker layer”, i.e., underlying buildings, roads, pathways; or
- Top (concrete) of pile foundations (no marker layer required for below pile foundations).

A conceptual sketch, sourced from ANZECC (1999)<sup>4</sup>, is shown following:



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

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

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

<sup>4</sup> *Guidelines for the Assessment of On-site Containment of Contaminated Soil*, Australian and New Zealand Environment and Conservation Council, September 1999. (ANZECC 1999)

The specific details of the marker layer are required to be included in the site validation report and long term Site Environmental Management Plan (**Section 4.8**) documents in addition to surveyed plans showing the extent of the capped area.

#### 4.5.1.2 Specific Capping Arrangements

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

- Beneath permanent concrete structures installation of a marker layer over contaminated fill material and permanent concrete slab as the physical barrier;
- Permanent hardstand structures (i.e., concrete slabs, pile caps or asphaltic concrete or similar, footpaths, but not bricks or pavers) – installation of a marker layer overlying potentially contaminated material followed by sub-grade material validated as environmentally suitable materials for human exposure and then the permanent structure (e.g., exterior concrete footpaths, asphaltic roads, etc.);
- Unpaved areas – installation of the marker layer at a minimum depth of 500 mm below the final finished site levels, with a capping layer consisting of environmentally suitable materials for potential human and/or ecological exposure; and
- Within underground services trenches / services – service infrastructure will require remediation to 150 mm below the depth of services, with a marker layer and capping layer installed consisting of environmentally suitable materials for potential human and/or ecological exposure.

Material above the marker layer extending to the final finished ground level will be required to be an environmentally suitable material for human and/or ecological exposure (as appropriate) as discussed further in **Section 5.5**.

Validation of the permanent capping arrangements will be required as outlined in **Section 5.6**, including inspections by the Remediation Consultant, a survey plan prepared by a registered surveyor showing the level and lateral extent of the impacted soils, marker layer, and capping in relation to the site boundaries.

#### 4.5.2 Chlorinated Hydrocarbons and Mercury

A vapour barrier requires to be installed underlying the complete footprint of the proposed building on the site. The vapour barrier is recommended to be placed as a sprayed bituminous membrane across the extent of the affected building and placed underlying the building pavement.

The detailed design of the vapour barrier, as prepared by an appropriately qualified and experienced specialist contractor, shall be included with the Construction Quality Assurance Plan (CQAP). The construction standards of the vapour barrier, to be considered in preparing the proposed design, are discussed in **Section 5.1**.

As discussed further in **Section 5.1**, a substantial program of construction quality assurance shall be required with the installation of the vapour barrier.

### 4.5.3 Material Importation

Based on the scope of remedial works described herein, it is anticipated that if materials are required to be imported to site, it will generally be as a result of construction requirements.

Prior to importation of all material, appropriate assessment of such materials must be completed to demonstrate the material is both fit for purpose and suitable from a contamination view point. In accordance with EPA requirements, the extent of assessment will be determined by the type of material proposed to be imported.

Where material proposed to be imported is Virgin Excavated Natural Material (VENM), an assessment must demonstrate that the material is compliant with the definition of VENM as presented in the POEO Act 1997, adopting in the minimum requirements for characterisation of fill material as presented in EPA (1995).

Where material proposed to be imported has been characterised under the Resource Recovery Framework (Order/Exemption), the material must firstly be demonstrated by the supplier as suitable for use in accordance with the requirements of the Order via provision of a statement of compliance. Suitable materials are anticipated to comprise but will not necessarily be limited to: excavated natural material – ENM, recycled aggregate, basalt fines, compost, mixed organic waste, pasteurised garden organics and recovered fines, with reference to the list of current orders and exemptions on the NSW EPA website.

In addition to the testing completed by the supplier, given the low frequency of compliance testing required under these Exemptions, the specific material proposed to be imported will require an additional compliance assessment prior to approval to import. The additional assessment is required to ensure that the incoming material does not pose an unacceptable risk to human health and/or environment at the placement site and is therefore suitable for use. It is anticipated that such assessment activities will include visual inspections, representative sampling and laboratory analysis of material to demonstrate the material meets the requirements of this RAP. As for VENM assessments, it is considered suitable to define such requirements on a specific site basis given the potential variability of project site requirements.

Material tracking records in addition to the import assessment report are required to be included in the final validation report for the site.

## 4.6 Site Management

### 4.6.1 Occupational Health and Safety

A Work Health and Safety Management Plan (WHSP) shall be prepared by the remedial contractor prior to commencement of remediation works. The objectives of the WHSP are:

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

These objectives will be achieved by:

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

The WHSP will require to be sufficiently detailed to address the particular site hazards as associated with under/above ground services, use of plant and machinery within confined spaces (i.e. remedial excavations), contact with contaminated soil (hydrocarbon/mercury) including potential vapour inhalation, and heat stress particularly in respect of PPE.

Prior to commencement of remediation works, the remedial contractor is required to have the WHSP endorsed as acceptable by the environmental consultant and client.

#### 4.6.2 Asbestos

All asbestos works will require to be undertaken with the relevant requirements of *How to Manage and Control Asbestos in the Workplace Code of Practice*, July 2020, Safe Work Australia (SWA 2020). Whilst only bonded fragments (of <10 m<sup>2</sup>), it is recommended that the works be undertaken by a SafeWork Class A / B Accredited Asbestos Removal Contractor – noting that bonded/friable asbestos impacted soils have been reported in site soils elsewhere across BIP.

During any remedial works which are inclusive of the disturbance of surface soils on the site, perimeter asbestos in air monitoring is recommended to be conducted at the applicable remedial works area boundary. Air monitoring will be conducted on a daily basis at relevant locations whilst disturbance of asbestos contaminated areas takes place.

Air monitoring will be conducted during any ground disturbance activities within the site to verify that implementation of appropriate control measures have been successful at managing the risk of air borne fibre generation. Air monitoring will be undertaken in accordance with the requirements of the *National Occupational Health and Safety Commission (NOHSC) Asbestos Code of Practice and Guidance Notes*, in particular the Guidance note for the estimation of airborne asbestos dust [NOHSC 3002:2005].

#### 4.6.3 Environmental

Prior to commencement of remediation works, a Remediation Environmental Management Plan (REMP) shall be prepared by the remedial contractor which documents the environmental monitoring and management measures required to be implemented during the remediation related activities associated with the construction of the site.

The REMP shall address each of the nominated items in **Table 4.2** following and shall include the Contingency Plan and Unexpected Finds Protocol, referred to in **Section 4.7.1**.

**Table 4.2: REMP Requirements**

Requirement	Inclusion in REMP
1. Dust and Airborne Hazard Control	Dust monitoring. Provisions for dust control based on monitoring results.
2. Flora and Fauna	As appropriate. Not anticipated to be significant noting historically urbanised location.
3. Heritage Archaeological	/ None anticipated. To be assessed as Unexpected Finds if identified.
4. Visual Impacts	Visual monitoring at site boundary Specific colour requirements for various controls/measures, including PPE (e.g., masks/coveralls).
5. Emergency Response	As appropriate. Procedures required for spill incident response including material storage breach.

Requirement	Inclusion in REMP
6. Noise Control	Hours of operation, consistent with the consent conditions.
7. Traffic	<p>Controls on vehicle movements on public roads.</p> <p>Controls on transport of impacted materials.</p>
8. Protection of Adjoining Structures	Geotechnical supervision / instruction for works in proximity of south-western boundary where PFAS stabilisation occurs.
9. Odour Control	<p>Management of all potential odour generating activities (i.e., excavation of chlorinated hydrocarbon contaminated soils) with appropriate odour controls incorporating safeguards and monitoring.</p> <p>Daily monitoring of odour levels at site boundary during handling of potentially malodorous materials.</p> <p>Procedures for addressing elevated odour monitoring results, including, but not limited to reduction in earthworks activities within odorous material areas during adverse meteorological conditions; application of odour masking solutions at the odour source or between identified source(s) and receptor(s).</p>
10. Handling of Contaminated Soil and Groundwater	Soil and water management (stockpiling, site access, excavation pump out, reinstatement). During handling of contaminated soil and groundwater appropriate management of vapours will be required with appropriate controls to manage potential vapour inhalation. Procedures for addressing potentially elevated vapours including monitoring and implementation of appropriate PPE restricted exclusions zones.
11. Soil Storage/Placement Areas	<p>Soil and water management</p> <p>Stockpiling (including controls for stockpiling of chlorinated ethene impacted saturated soils, site access, excavation pump out, reinstatement).</p> <p>Minimisation of requirement to stockpile by direct loading of road tippers with highly impacted materials where possible.</p> <p>Heavy vehicle/personnel decontamination.</p> <p>Site drainage requirements, incorporating clean/dirty areas and modifications to existing surface water and drainage controls beneath retained pavements.</p> <p>Monitoring as required.</p>
12. Sediment Control	<p>Bunding.</p> <p>Collection/treatment/handling impacted sediments.</p>
13. Operation of Site Office	Minimise waste generation.
14. Decontamination of Heavy Equipment	To be undertaken prior to movement out of contamination zones into site clean zones. Demarcation of site with Exclusions zones etc to allow interpretation of requirements.
15. Environmental Monitoring	<p>Monitoring of noise, odour and particulates during excavation works. Additional monitoring for vibration during sheet pile installation works. Assessment to site environmental performance criteria.</p> <p>Monitoring as required for water / dewater releases from the site to confirm no pollution.</p> <p>Inspection checklists and field forms.</p>

Requirement	Inclusion in REMP
16. Environmental Criteria	To be prepared as specific to contaminant and potential media in which they occur. Must at least include speciated criteria for chemical constituents potentially present in air emissions.
17. Material Classification	To be detailed following the fill retention assessment and availability of proposed site cut – fill balance. Material classification required to inform waste classifications for surplus soils and opportunities for re-use.
18. Ecologically sustainable development	To be substantially achieved through waste minimisation and resource conservation. Contaminated soils are the most significant source of waste with the project and the potential requirement to import fill materials is the most significant potential resource consumption.
19. Incident Reporting	As appropriate, including standard form/checklist.
20. Security and Signage	Secure site perimeter. Site boundary signage.
21. Training	All general requirements for construction / working in excavation. Site specific additional training will be required for potential exposures to asbestos, mercury and chlorinated hydrocarbons.
22. Contact Details	Company/personnel details, including names/phone numbers for: - Principal Contractor - Remediation Consultant - Remediation Contractor - OH&S Compliance - Environmental Compliance
23. Stockpiling	No stockpiles of soil or other materials shall be placed on footpaths or nature strips unless prior Council approval has been obtained.  All stockpiles of soil or other materials shall be placed away from drainage lines gutters or stormwater pits or inlets.  All stockpiles of soil or other materials likely to generate dust or odours shall be covered.  All stockpiles of chemically contaminated soil shall be stored in a secure area and be covered if remaining more than 24 hours.  Any (and all) stockpiles of asbestos contaminated soils shall be kept damp and covered to minimise potential particulate release, and if left for more than 24 hours, be stored in a secure area.

Prior to commencement of remediation works, the remedial contractor is required to have the REMP endorsed as acceptable by the environmental consultant and client.

## 4.7 Contingency Plan

A review has been undertaken of potential contingency scenarios that may be identified during the remedial works. The following scenarios have been identified:

- Unexpected finds, particularly inclusive of historical tanks / sumps / pits that may have additionally been used to historically dispose of hazardous substances;
- Failure of the vapour liner; and/or
- Emissions / pollution complaints during storage and handling of high level chlorinated hydrocarbon / mercury / asbestos contaminated soils.

The proposed response to each contingency scenario is detailed following.

### 4.7.1 Unexpected Finds

The possibility exists for hazards that have not been identified to date to be present within fill materials or underlying pavements/building on the site. The nature of hazards which may be present, and which may be discovered at the site are generally detectable through visual or olfactory means, for example:

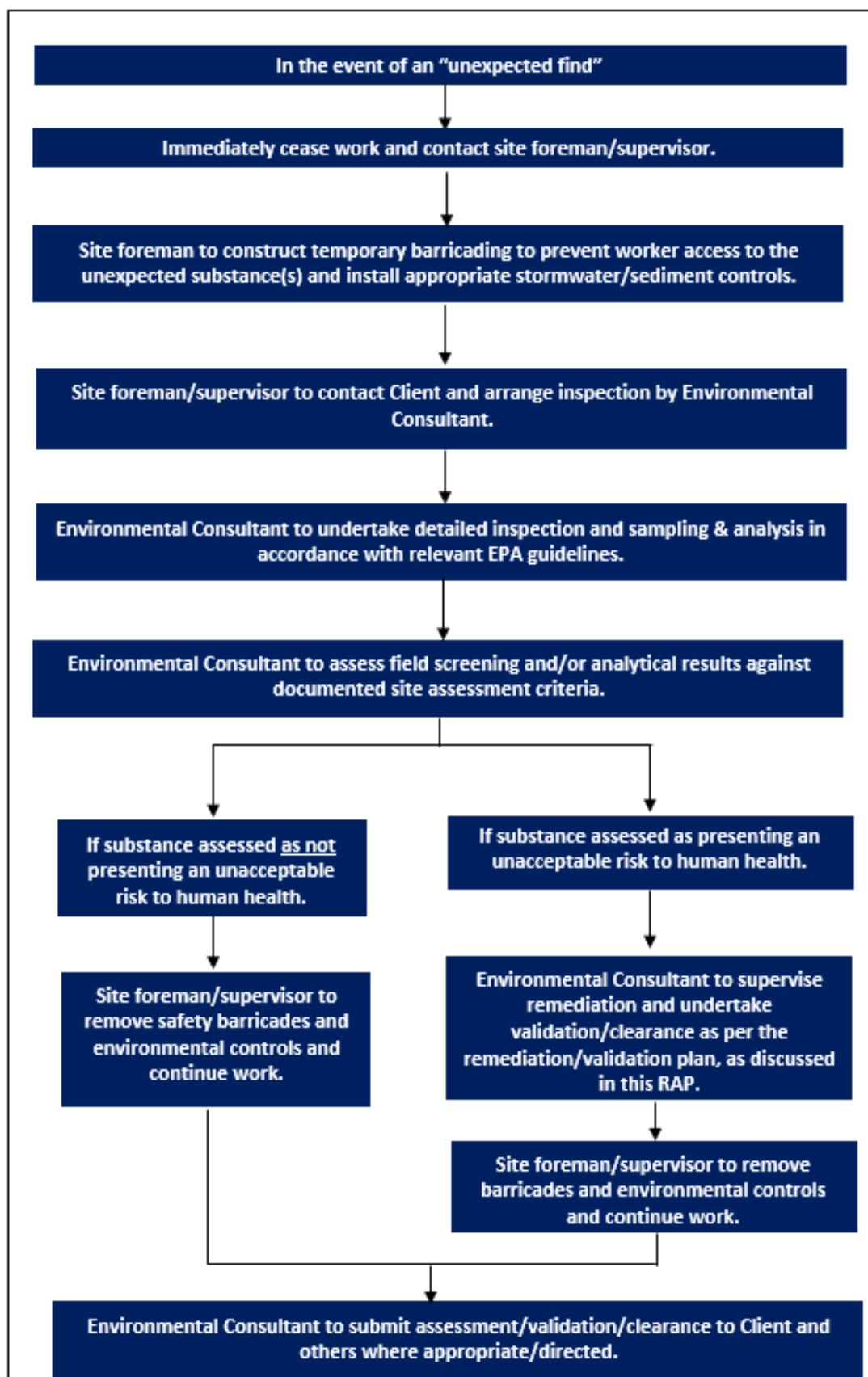
- Excessive quantities of construction/demolition waste that represents an aesthetics issue beyond that reported to date (visible); and/or
- Hydrocarbon (petroleum/chlorinated)/chemical impacted materials beyond that reported to date, including NAPL; and/or
- Drums, waste pits (visible) particularly in proximity of the former dry cleaner; and/or
- Oily Ash and/or oily slag contaminated soils/fill materials (visible/odorous); and/or
- Tarry like impacted soil/fill material (visible/odorous).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be identified, the procedure summarised in **Flow Chart 4.1** is to be followed.

An enlarged version of the Unexpected Finds Protocol, suitable for use on the site, should be posted in the Site Office and referred to during the site-specific induction by the Principal Contractor.

The sampling strategy for each “unexpected find” shall be designed by the environmental consultant. The strategy will, however, be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

**Flow Chart 4.1 Unexpected Finds Protocol**



#### 4.7.2 Failure of Vapour Barrier

Potential vapour intrusion to the proposed building, as associated with elevated levels of principally TCE on the site, is proposed to be managed by a vapour barrier underlying the site. The success of the vapour barrier is proposed to be assessed by a program of indoor sampling undertaken during conditions where potential advective flow to site buildings will be maximised (**Section 5.2**). Where these samples identify excessive levels of TCE, mercury, or any other chlorinated hydrocarbon vapour assessed, as compared to the background sample also collected at the same time, then contingency actions to control vapour ingress to the site building will require to be activated.

This will include re-mobilisation of the vapour liner contractor to the site and instruction to undertake repairs on the vapour liner. From discussions with vapour liner installation contractors these repairs can be undertaken – and are undertaken in rare instances.

Following completion of any repairs – all validation testing as nominated in the CQAP, VSAQP and consistent with the scope of **Section 5.2** as specific to the vapour intrusion pathway shall be repeated.

In the unlikely event that a vapour barrier repair is further unsuccessful in addressing the migration of vapours to buildings overlying the vapour barrier, then additional contingency actions would require to be implemented. It is proposed in this instance to install a venting system underlying the vapour barrier. The venting system would require to be sufficient to control advective flows of vapours from the sub-surface into the building.

The detailed design of the venting system should be undertaken in consultation with the Environmental Consultant to agree vent pipe locations and discharge points relative to the building. The installation of the vent lines would need to be undertaken by directional drilling from the open space area at the west of the building to install the points horizontally under the extent of the building.

#### 4.7.3 Emissions / Pollution

Due to the nature of the activities and type of contaminants identified within the site, there is a potential for complaints to be received from members of the public and/or occupants of surrounding properties relating to environmental emissions associated with remedial works, including:

- Odour emissions arising from handling of malodorous soil;
- Noise and vibration arising from remedial excavations or other works required for remediation; and/or
- Dust emissions arising from remedial excavation, material handling and placement.

Monitoring of potential environmental emissions from the site shall be undertaken during the remedial works as detailed in the REMP (discussed in **Section 4.6.3**) and appropriate actions taken to further control emissions following receipt of a complaint. The REMP will be specific to remedial works and not to construction works. The REMP shall contain provision for contingency actions where excessive emissions occur, however it is anticipated that one or more of the following actions will be considered:

- Increased application of odour screening/masking chemicals on odorous materials;
- Disturbance of soils during meteorologically favourable periods only; and/or
- Covering of impacted soils; and/or
- Implementation of alternate construction methods.

## 4.8 Long Term Site Environmental Management Plan

An Site Environmental Management Plan (SEMP) will be prepared for the site to ensure the retention of vapour liners / barriers as anticipated to be installed at the site to control potential exposures to chlorinated hydrocarbons, mercury and asbestos. The SEMP will be prepared in accordance with EPA (2017), EPA (2020) and EPA (2022b). The SEMP will define:

- The location, extent and nature of residual contamination at the site;
- The extent of the management area;
- Risk management and control measures to prevent potential exposures to groundwater contamination;
- Contact persons for potentially affected persons to seek further information / assistance;
- Definition of roles and responsibilities in the implementation of the SEMP;
- Requirements for reporting; and
- Actions to be undertaken in the instances where the containment layer and/or vapour barrier require to be breached.

The SEMP is intended to be a live document that will be revised / updated consistent with the progress of the site redevelopment works and revisions to the site design / construction in the future.

The SEMP shall be made legally enforceable through the anticipated Development Consent for the site remediation / redevelopment.

The SEMP will be required to additionally manage the retention of asbestos impacted soils. The SEMP shall be sufficient to control potential exposures to the soils and meet relevant requirements as specific to the management of asbestos in a workplace as advised to the *Work Health and Safety Act 2011*. This shall be inclusive of an Asbestos Management Plan and an Asbestos Register.

## 4.9 Regulatory and Planning Requirements

This RAP has been prepared with reference to the following guidelines and legislation.

### 4.9.1 Environment Planning and Assessment Act 1979/Resilience and Hazards SEPP

Development approval for the project falls under the provisions of Part 4 of the Environment Planning and Assessment Act 1979 (EP&A Act).

The specific SEPP which is relevant to remediation of the site is the *Resilience and Hazards SEPP* (specifically Chapter 4, Remediation of Land), which requires that development consent is not granted unless contamination has been considered and, if required, remediated.

Specifically, in relation to the subject site, Chapter 4 of the Resilience and Hazards SEPP also requires that:

- The proposed remediation works are carried out in accordance with the contaminated land planning guidelines (DUAP/EPA 1998) and any guidelines in force under the CLM Act;
- The proposed remediation works are carried out in accordance with any development consent conditions; and
- Notice of completion is provided to the local council as the consent authority within 30 days of completion of the works, with the details required under clause 18 of Chapter 4 of the Resilience and Hazards SEPP.

#### 4.9.2 Protection of the Environment Operations Act 1997

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

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

#### 4.9.3 Water Management Act 2000

No dewatering is anticipated with the remedial works. A dewatering licence will not be required for the remedial works to proceed.

If rainwater accumulates at the site and requires removal from the site, any discharge is required to be in accordance with the POEO Act. These requirements will potentially be nominated in an EPL for the works. Where deemed suitable, collected / accumulated runoff may be discharged to the site surface to allow for re-infiltration to the subsurface (i.e. not discharged from the site).

If any water is required to be discharged from site to sewer as part of the remedial works scope, approval from the asset owner (Sydney Water/Council) will be required. Sydney Water's and/or Bayside Council's approval conditions will require to be upheld by the Principal/Remediation Remedial Contractor and demonstration thereof.

#### 4.9.4 Protection of the Environment Operations (Waste) Regulation 2014

The POEO (Waste) Regulation makes requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site will not require to be licensed. Section 48 of the Regulation requires that wastes are stored in an environmentally safe manner. It is also stipulated that vehicles used to transport waste must be appropriately licensed and covered when loaded with impacted materials. For transport activities this regulation also details additional tracking requirements for vehicles carrying Special (asbestos) waste if material is fill based soils are required to be removed from the site (presumed to contain asbestos following waste classification activities).

Provision is provided in the Regulation and EPA (2014) guidelines for the NSW EPA to approve the immobilisation of contaminants in waste (if required with unexpected finds) and regulation of other waste classification such as VENM.

#### 4.9.5 Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017

All remediation works should be undertaken in accordance with requirements of the *Work Health and Safety Act 2011* (WHS Act) and *Work Health and Safety Regulation 2017* (WHS Regulation). The information and data provided in this RAP should be considered by the remedial contractor in preparation of their health and safety plans to be protective of workers on site and the neighbouring community for the remedial works (refer to **Sections 4.6.1** and **4.6.2**).

#### 4.9.6 Botany Bay Development Control Plan 2013 (Amendment 5)

The site is subject to development controls as specified in the Botany Bay Development Control Plan 2013 (DCP), which have been incorporated into this RAP and will require to be further adopted into the RWP and REMP.

#### 4.9.7 Waste Classification Guidelines

All wastes generated and proposed to be disposed off-site shall be assessed, classified and managed in accordance with EPA (2014). Further discussion of waste management has been included as **Section 6**.

## 5. Validation Plan

Validation works on the site shall include:

- Validation of the appropriate installation and maintenance of a vapour barrier on the site during construction works and the maintenance of the vapour barrier in the future in the area of the proposed future building(s). This shall be undertaken by a Construction Quality Assurance Plan as described in **Section 5.1**, validation sampling above the vapour liner as described in **Section 5.2** and the proposed Site Environmental Management Plan described in **Section 4.8**;
- Validation of any imported soils to the site. Guidance for validation of imported soils is described in **Section 5.5**; and
- Validation to confirm the containment of the asbestos hazard. This will occur across the extent of the site as described in **Section 5.6**

### 5.1 Installation and Certification of Vapour Barrier

*Assessment and Management of Hazardous Ground Gases*, May 2020, NSW EPA (EPA 2020a) states “Ideally, ground gas protection measures should be installed by certified specialists who are responsible for construction quality control. Construction quality assurance should be provided by certified specialists or qualified and experienced persons who are fully independent of the installer of the protection measures... However, there are few independent construction quality assurance contractors certified in post-installation testing of membranes. Given the ideal may not currently be attainable and practical, alternative options are necessary.” EPA (2020a) provides two options “depending on the scope and scale of the work”.

Option 1 as nominated in EPA (2020a) requires:

- Structural protection measures are installed by the general construction contractor, and an independent consultant observes and certifies the construction of these measures as they relate to ground gas protection;
- Specific ground gas protection measures, such as membranes and ventilation systems, are installed by a specialist contractor who is responsible for construction quality control, or by a general contractor (or subcontractor) working under the direction of the specialist contractor. The specialist contractor is responsible for training and assessing personnel. An independent consultant supervises installation and provides construction quality assurance (including documentation). The independent consultant may be the system designer and should be a qualified and experienced professional with expertise in ground gas protection systems. If available, possibly from interstate, an independent certified membrane inspector may provide this aspect of construction quality assurance;
- The installer tests installed components, with all testing supervised by the independent consultant, who provides construction quality assurance documentation;
- The independent consultant tests and monitors the completed systems;
- The Environmental Consultant oversees all these operations at an audit level. An audit level of supervision requires the Environmental Consultant to witness a sufficient number of operations, including a sample of all operations, to be satisfied that the work is being carried out competently and that reliable records are being kept; and
- All the construction quality assurance documentation is subsequently reviewed by the Environmental Consultant, who establishes that the work has been completed to a satisfactory standard and that any necessary corrective action has been identified, completed and checked.

Key components of this process include the vapour barrier design (discussed in **Section 4.5.2** and a proposed Construction Quality Assurance Plan (CQAP). The requirements for the CQAP are discussed following.

### 5.1.1 Construction Quality Assurance Plan Requirements

A CQAP should be prepared as part of the detailed design of the building footing vapour mitigation system and submitted to the Environmental Consultant for review and endorsement prior to commencement of construction. The CQAP shall be prepared by the vapour barrier installation contractor and be reviewed and endorsed by the Environmental Consultant prior to finalisation.

The CQAP shall apply to the installation of vapour controls at the proposed extent of the pavement underlying the whole of the site building. As a minimum the CQAP shall include:

- The process for vapour barrier installation as broken down into separable units;
- Hold points and release mechanisms as applicable to progress of vapour barrier installation between the separable units identified;
- Specific inspection and test plans (ITP) as required to facilitate the hold points and release mechanisms;
- Each ITP should explain, justify and document test procedures, the requirements for qualifications / experience of professionals required to complete them, the frequency, and acceptance criteria and certification mechanism(s);
- Within the scope of reporting as anticipated to be generated by the ITPs, necessary records to be created (inclusive of measurements and photographic evidence) require to be identified;
- Appropriate forms should be developed for each inspection or test task within the ITPs, with required signatories and necessary attachments identified; and
- Reference should further be made to any relevant requirements advised to Appendix 7 of EPA (2020a).

The CQAP shall be further prepared in accordance with the guidance provided to *Good Practice on the Testing and Verification of Protection Systems for Buildings against Hazardous Ground Gases*, August 2014, CIRIA. Specific parts of CIRIA (2014) to be included in the CQAP, and incorporated with the general requirements as outlined above, are detailed following.

- Smoke tests shall require to be undertaken once the vapour barrier has been laid, and repeated on the vapour barrier subsequent to the pouring of the overlying slab. Smoke tests shall be undertaken in accordance with Annex 3 provided to CIRIA (2014) and shall be observed by an inspector nominated by the Installer and the Environmental Consultant;
- Gas membranes will require inspection once laid to establish possible damage. This shall be undertaken by an Inspector nominated by the Installer and agreed to by the Environmental Consultant;
- Subsequent to the visual inspection of the vapour barrier, and while the Inspector remains on site, screed and/or insulation shall be placed over the top of the gas membrane to prevent damage by subsequent trades, or concrete shall be poured as quickly as possible after the inspection, and while the inspector remains on site. The Inspector shall confirm no damage to the vapour barrier during these works;
- Vapour sampling shall be undertaken within the constructed building as described further in **Section 5.2.1**;
- An appropriately experienced and qualified workforce shall be engaged to install the gas protection system;
- Reporting of any validation steps (including the visual inspection of the smoke tests and visual inspection) shall include the following detail and form the validation for the site;
  - Site name and location;

- Date and time;
- Name and company of person(s) carrying out the test / inspection including independent assessors (i.e. Environmental Consultant);
- Brief detail on gas membrane (type, date of installation, manufacturer);
- Location on site and dimensions of test area (supported by site plan);
- Weather conditions (temperature and wind);
- Location of smoke ingress and test egress points (for smoke test);
- Location of any detected defects and the nature / extent of repair;
- The results of any re-test / re-inspection should be on a separate report as cross-referenced to the original report as appropriate; and
- Report to be signed off by all persons present including at least the Environmental Consultant.

## 5.2 Vapour Validation Sampling

Specific elements of the construction validation program will be additionally contained in the CQAP to demonstrate that the vapour mitigation system, once installed, are working in terms of preventing vapour accumulation in the building. In addition to the validation requirements noted in **Section 5.1**, this is proposed to also consist of vapour / indoor air sampling of the ground floor of completed new Chlorine Liquefaction Plant prior to site occupation.

Two vapour samples shall be collected in the, and a control sample location at a distance of greater than 30 m from the site. Samples shall be collected by the use of 'Radhiello Samplers' and consist of collection of 'indoor air' / 'ambient air'.

### 5.2.1 Collection of Vapour Samples

Vapour samples as collected during each event shall be collected at the same time and as per the following requirements:

- Lower / falling barometric pressure;
- With building ventilation systems activated and maintained for the duration of the sampling;
- Sampling completed over a minimum period of 24 hours for indoor air samples; and
- All samples analysed for volatile organic compounds (VOCs).

### 5.2.2 Assessment of Vapour Levels

Levels of VOCs shall be assessed to the lower of vapour based criteria provided to:

- EPA (2010); and
- The lowest of the interim health investigation levels of vapour provided to NEPC (2013) for chlorinated constituents as divided by a factor of 10,

with consideration of existing background / ambient levels for constituents assessed by non-threshold effects as measured at the background location.

Where criteria are significantly exceeded, consideration shall be given to additional validation sampling, consideration of fate and transport processes, and/or implementation of the contingency measures as discussed in **Section 4.7**.

## 5.3 Imported Soils

Imported fills may be received during the remedial works and/or to establish site levels during redevelopment works as undertaken with remediation works. General guidance is provided following for the validation requirements of each material type as may be received at the site.

### 5.3.1 General Backfill

Sampling of the imported VENM (if required) will be undertaken at a minimum rate of three samples per source site subject to a consideration of the source of the material, potential for contamination and homogeneity. Large quantities of VENM will be sampled at a rate of one sample per 500 m<sup>3</sup>. The sampling rate may be required to be increased (i.e. one sample per 100 m<sup>3</sup>, and potentially as detailed as one sample per 25 m<sup>3</sup> as required to prepare an appropriately reliable dataset of soils characterisation) where potential indicators of contamination and/or heterogeneity are observed. Soil samples will be analysed for TRH, BTEX, PAHs, heavy metals, OCPs, PCBs and asbestos.

Sampling of imported ENM will be undertaken in accordance with the requirements of the *POEO (Waste) Regulation 2005 – General Exemption* under Part 6, Clause 51 and 51A for *Excavated Natural Material Exemption* (DECCW, NSW, 2009). Similarly if recycled fines, or another NSW EPA exempted product, are received on the site, the materials will require to have been sampled in accordance with the relevant exemption. Sampling and analysis shall further be undertaken for asbestos in all cases (if not undertaken at the source site).

Reliance can be made to sampling and analysis undertaken of the material prior to receipt on site where the Environmental Scientist confirms via an inspection of material on receipt at the site that the material is consistent with the physical description provided to the off-site characterisation description, and the material is free of anthropogenic materials or other indicators of contamination.

## 5.4 Asbestos Containment

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

The validation of the long-term management of the soils to control potential health risks will be dependent on the two validation components including:

- Installation of a marker layer; and
- Installation of a capping layer.

The validation of each component is discussed further following.

### 5.4.1 Marker Layer

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

## 5.4.2 Capping Layer

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

The capping layer must be placed at the thicknesses specified for each capping scenario as detailed in **Section 4.5.1.2**. Photographic records and a survey of the capping layer installation, which details the final thicknesses of the capping layer, including the vertical and lateral extents prepared by the Contractor will be retained for inclusion in the Validation Report.

## 5.4.3 Ground Surface Validation (Aesthetics)

Prior to the completion of remedial works and following placement of the marker layer, the ground surface of the site shall be thoroughly inspected by the environmental consultant to confirm the absence of visual ACM. Should any observable ACM be identified, the area should be emu-picked or capped with 100 mm of environmentally validated soil prior to re-inspection by the environmental consultant.

## 5.5 Material Tracking

The movement of all mercury impacted materials (subject to long term containment) on the site is required to be subject to a Material Tracking Plan (MTP) if relocated during development works to confirm they are retained above groundwater levels. The MTP shall be administered by the environmental consultant with the provision of all required information by the remediation contractor and will generally contain the following elements:

- Date (yyyy/mm/dd);
- Site figure showing source (cut) and placement (fill);
- Estimated volume (cubic metres);
- Type of material (asbestos, mercury impacted, VENM etc);
- Depth of source (RL);
- Depth of placement (RL);
- Source (from) information in terms of MGA56 co-ordinates as established by site GPS and/or survey;
- Placement (to) information in terms of MGA56 co-ordinates as established by site GPS and/or survey;
- Source (from) information in terms of site feature (e.g. Building X);
- Placement (to) information in terms of site feature (e.g. under future garden / landscaped zone);
- Reference document (where necessary, i.e. virgin excavated natural material / excavated natural material classification);
- Purpose of placement (i.e. containment, surplus to site requirements etc); and
- Comments (when required).

## 5.6 Quality Assurance / Quality Control

The pre-determined DQIs established for the project are discussed below in relation to precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS parameters), and are shown in **Table 5.1**.

- **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<sup>5</sup>) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** – expresses the appropriateness of the chosen laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted criteria.

If any of the DQIs are not met, further assessment of the data set is required in order to determine whether the non-conformance has significant effects on the usefulness of the data. Corrective action to correct an adverse impact on the reliability of the dataset may include, but is not limited to, the request of further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

**Table 5-1: Data Quality Indicators**

Data Quality Objective	Frequency	Data Quality Indicator
<b>Precision</b>		
Blind duplicates (intra laboratory)	1 / 20 samples	<50% RPD <sup>1</sup>
	1 / 10 samples for PFAS	<50% RPD <sup>1</sup>
Blind duplicates (inter laboratory)	1 / 20 samples	<50% RPD <sup>1</sup>
	1 / 10 samples for PFAS	<50% RPD <sup>1</sup>
<b>Accuracy</b>		
Laboratory duplicates	1 / 20 samples	<50% RPD <sup>1</sup>
Surrogate spikes	All organic samples	70-130%
Laboratory control samples	1 per lab batch	70-130%

<sup>5</sup> C<sub>o</sub> = analyte concentration of the original sample, C<sub>d</sub> = analyte concentration of the duplicate sample

$$RPD(\%) = \frac{|C_o - C_d|}{C_o + C_d} \times 200$$

Data Quality Objective	Frequency	Data Quality Indicator
Matrix spikes	1 per lab batch	70-130%
<b>Representativeness</b>		
Sampling appropriate for media and analytes		-
Laboratory blanks	1 per lab batch	<LOR
Samples extracted and analysed within holding times.	-	14 days for principal COPCs
Trip spike (for volatiles)	1/sampling event	70-130% recovery
Trip blank (for volatiles)	1/sampling event	<LOR
Rinsate blank	Daily for reusable equipment	<LOR
Leak Detection (soil vapour)	All soil vapour sample locations	Leak detection compound <10% of concentration achieved in shroud
<b>Comparability</b>		
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Limits of reporting appropriate and consistent	All samples	All samples
<b>Completeness</b>		
Sample description and COCs 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	-	Critical samples valid
<b>Sensitivity</b>		
Analytical methods and limits of recovery appropriate for media and adopted Site assessment criteria	All samples	LOR ≤ Site assessment criteria Asbestos: sample size greater than 500ml to enable LOR to be less than or equal to adopted site assessment criteria (where relevant)

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

<sup>2</sup> Recoveries to also be assessed against laboratory adopted limits.

To summarise the anticipated elements of the QA/QC program that will require to be incorporated with the field works:

- Preparation of blind and split duplicates in the field at a frequency of one duplicate per 20 primary samples respectively for each of the media and primary analytes assessed. Consistent with the guidance in HEPA (2020) adoption of an increased rate of duplicate sample collection and analysis for PFAS of one duplicate per 10 primary samples;
- Inclusion of trip spike samples in sample batches containing sample analysis for VOCs;
- Inclusion of trip blank samples in a representative number of analytical batches and analysis for relevant analytes as specific to the batch; and
- Preparation of rinsate blanks in any instance where non-disposable / non laboratory supplied equipment / containers are used.

### **5.6.1 Laboratories**

All laboratories used will require to be National Association of Testing Authorities (NATA) registered for the relevant analyses. In addition, the laboratories are required to meet JBS&G's internal QA/QC requirements summarised earlier.

## **5.7 Validation Report**

A Validation Report shall be issued at the completion of the works as consistent with the requirements of EPA (2017 and 2020).

## 6. Waste Management

Significant quantities of waste will potentially be generated by the site remediation works. The RWP shall include specific provisions to ensure the appropriate management of these wastes. This shall comprise:

- Waste classification reporting requirements in accordance with *Waste Classification Guidelines, 2014*, NSW EPA (EPA 2014) EPA Waste Classification Guidelines;
- Description of material handling and tracking plan including detailed description of the proposed site cut / fill balance and the material tracking system to be implemented during site remediation works;
- Statements regarding materials being disposed via appropriately licenced facility or re-used under an order or exemption; and
- Requirements for recording waste disposal dockets or other waste documentation for any disposed waste.

## 7. Conclusions and Recommendations

### 7.1 Conclusions

A remedial approach has been developed and presented in this RAP which will facilitate the remediation and/or long term management of asbestos impacted soils, chlorinated hydrocarbon impacted soils, mercury impacted soils for the future industrial redevelopment of the site.

Subject to the limitations provided as **Section 8**, it is considered that the proposed actions outlined in this RAP conform to the requirements of the *Contaminated Sites Guidelines for the NSW Site Auditor Scheme (3rd Edition)* (EPA 2017) because they are: technically feasible; environmentally justifiable; and consistent with relevant laws policies and guidelines endorsed by NSW EPA.

Subject to the successful implementation of the measures described in this RAP it is concluded that the site can be made suitable for the intended uses and that the risks posed by contamination can be managed in such a way as to be adequately protective of human health and the environment.

### 7.2 Recommendations

It is recommended:

- An appropriate contractor is engaged specific to the installation of a Vapour Barrier for the entire footprint of the proposed site building and a Construction Quality Assurance Plan (CQAP) is prepared consistent with this. The Environmental Consultant shall require to review and endorse the CQAP prior to commencement of building works;
- A Work Health and Safety Management Plan (WHSP) and Remediation Environmental Management Plan (REMP) shall be prepared by the remedial contractor prior to commencement of remediation works; and
- An LTEMP requires to be prepared for the site to ensure the long term integrity of the installed vapour barrier and preclusion of access to impacted soils retained underlying the site (including asbestos).

## 8. Limitations

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

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

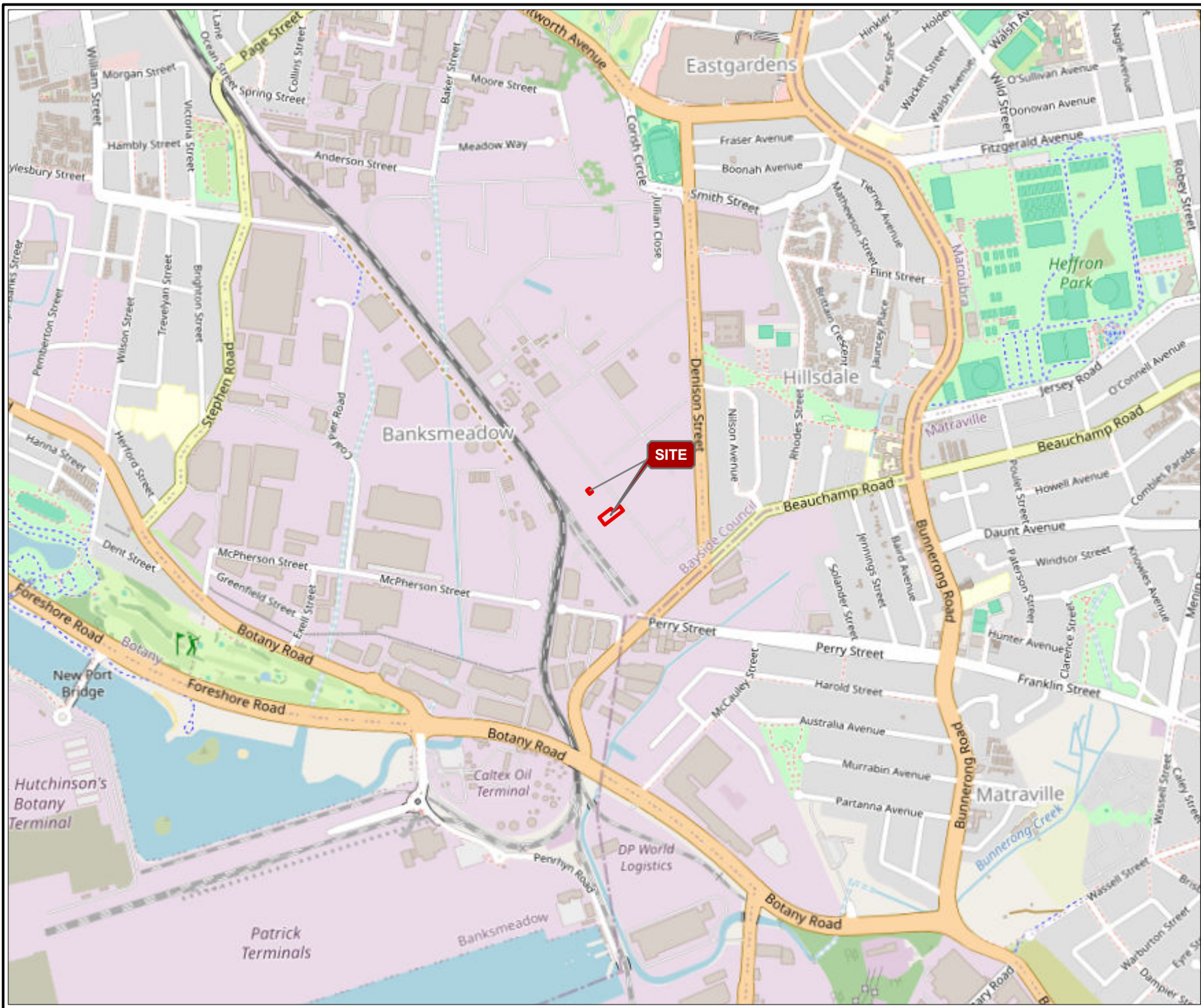
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the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


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

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

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

## Site Figures



Legend  
 Approximate Site Boundary




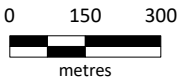
Job No: 67817	
Client: IXOM	
Version: R02 Rev A	Date 31/01/2025
Drawn By: RF	Checked By: CB
Scale 1:15,000	
	
Coord. Sys. GDA2020 MGA Zone 56	
<b>Botany BIP DSI, NSW</b>	
<b>SITE LOCATION</b>	

FIGURE 1



- Legend**
- Approximate Site Boundary
  - NSW Cadastre
  - Site Features**
  - Site Layout 1961
  - Site Layout - Blocks A, G, L, M
  - Southlands
  - Sydney to Botany Goods Railway Line



Job No: 67817  
 Client: IXOM  
 Version: R02 Rev A      Date 31/01/2025  
 Drawn By: RF      Checked By: CB

Scale 1:2,750

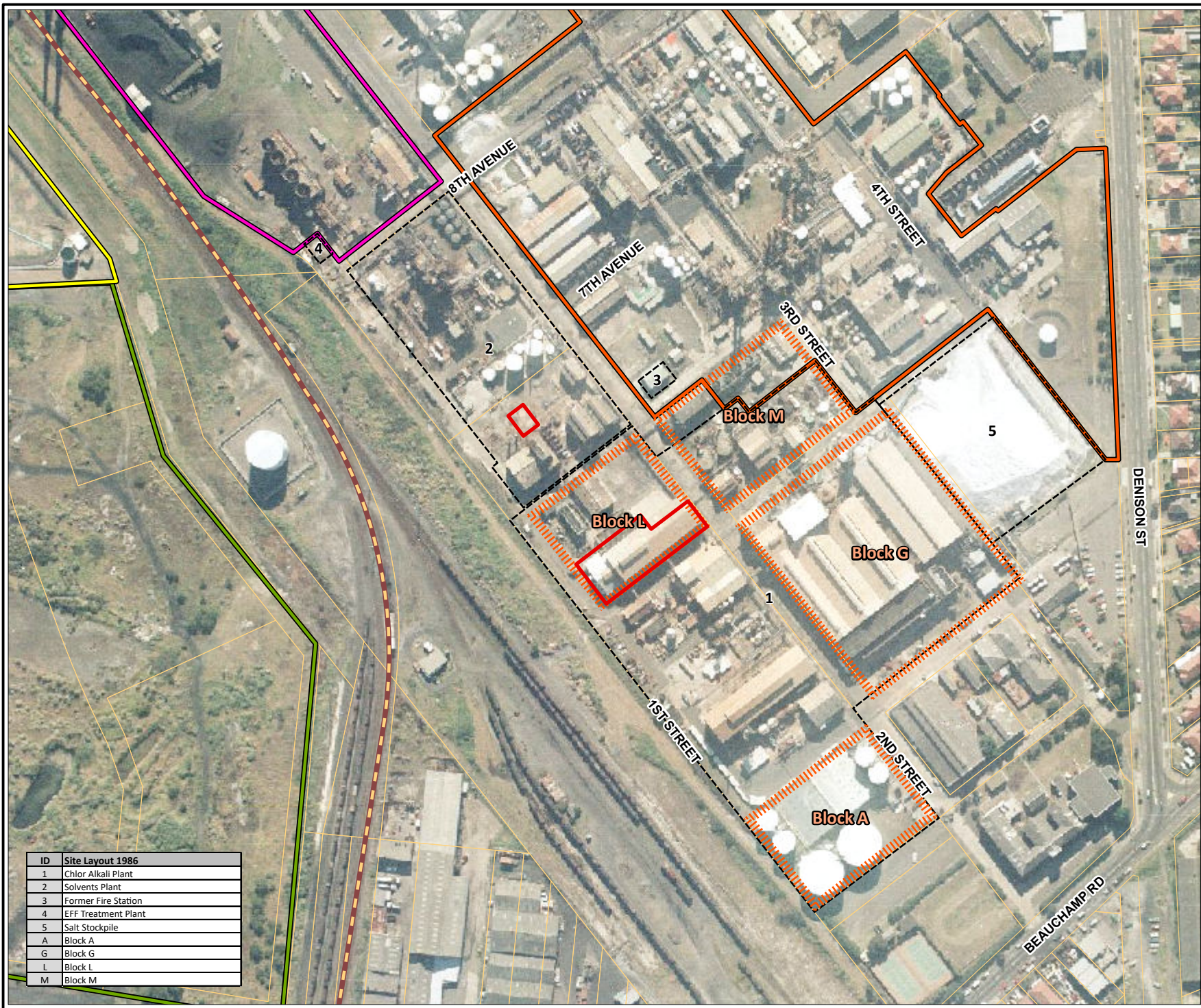
0 25 50  
metres

Coord. Sys. GDA2020 MGA Zone 56

**BIP DSI**  
**Botany, NSW**  
**SITE LAYOUT AND**  
**SURROUNDING LAND-USE (1961)**

**FIGURE 2A**

ID	Site Layout 1961
1	Solvents Plant - Under Construction
2	TCE Plant
3	Boiler House
4	Product Store
5	Hydrogen Plant
6	CTC Plant
7	Carbon Bisulphide Tanks
8	Carbon Bisulphide Filling Platform
9	Sulphur Store
10	Charcoal Store
11	Carbide Store
12	Acetylene Gas Storage
13	Carbon Bisulphide Plant
14	Drum Storage
15	Chlorine Cells
16	Soda Ash
17	Solid Caustic Soda
18	Effluent Discharge
19	Acetylene Dry Plant
20	Rubber Chemical Plant
21	Methanol Tank
22	Butanol Tank
23	Formaldehyde Plant
24	Banksmeadow Sub-station
25	Herbicide Plant
26	Drum Storage
27	VCM Plant
28	VC Gas Storage
29	Corvic Plant
30	PVC Office
31	Laboratory
32	Change Room
A	Block A
G	Block G
L	Block L
M	Block M



- Legend**
- Approximate Site Boundary
  - NSW Cadastre
  - Site Features**
  - Site Layout 1986
  - Site Layout - Blocks A, G, L, M
  - Nant Street Tank Farm
  - Site Utilities
  - Southlands
  - Surfactants Plant
  - Sydney to Botany Goods Railway Line



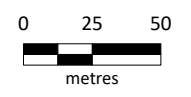
Job No: 67817

Client: IXOM

Version: R02 Rev A      Date 31/01/2025

Drawn By: RF      Checked By: CB

Scale 1:2,750     



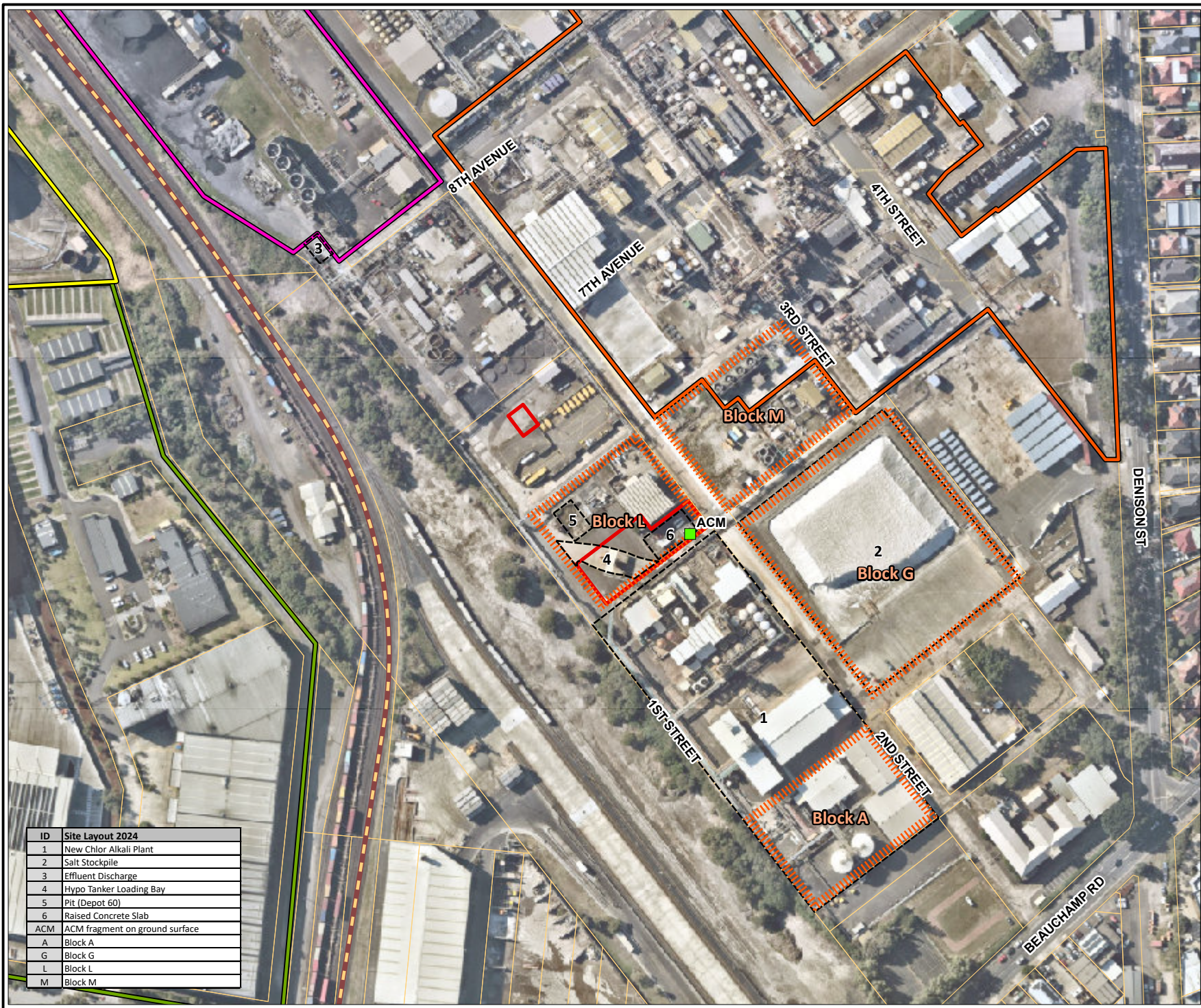
Coord. Sys. GDA2020 MGA Zone 56

**BIP DSI**  
**Botany, NSW**

**SITE LAYOUT AND**  
**SURROUNDING LAND-USE (1986)**

**FIGURE 2B**

ID	Site Layout 1986
1	Chlor Alkali Plant
2	Solvents Plant
3	Former Fire Station
4	EFF Treatment Plant
5	Salt Stockpile
A	Block A
G	Block G
L	Block L
M	Block M



- Legend**
- Approximate Site Boundary
  - NSW Cadastre
  - Site Features**
  - Site Layout 2024
  - Site Layout - Blocks A, G, L, M
  - ACM Fragment
  - Nant Street Tank Farm
  - Site Utilities
  - Southlands
  - Surfactants Plant
  - Sydney to Botany Goods Railway Line



Job No: 67817

Client: IXOM

Version: R02 Rev A	Date 31/01/2025
Drawn By: RF	Checked By: CB

Scale 1:2,750

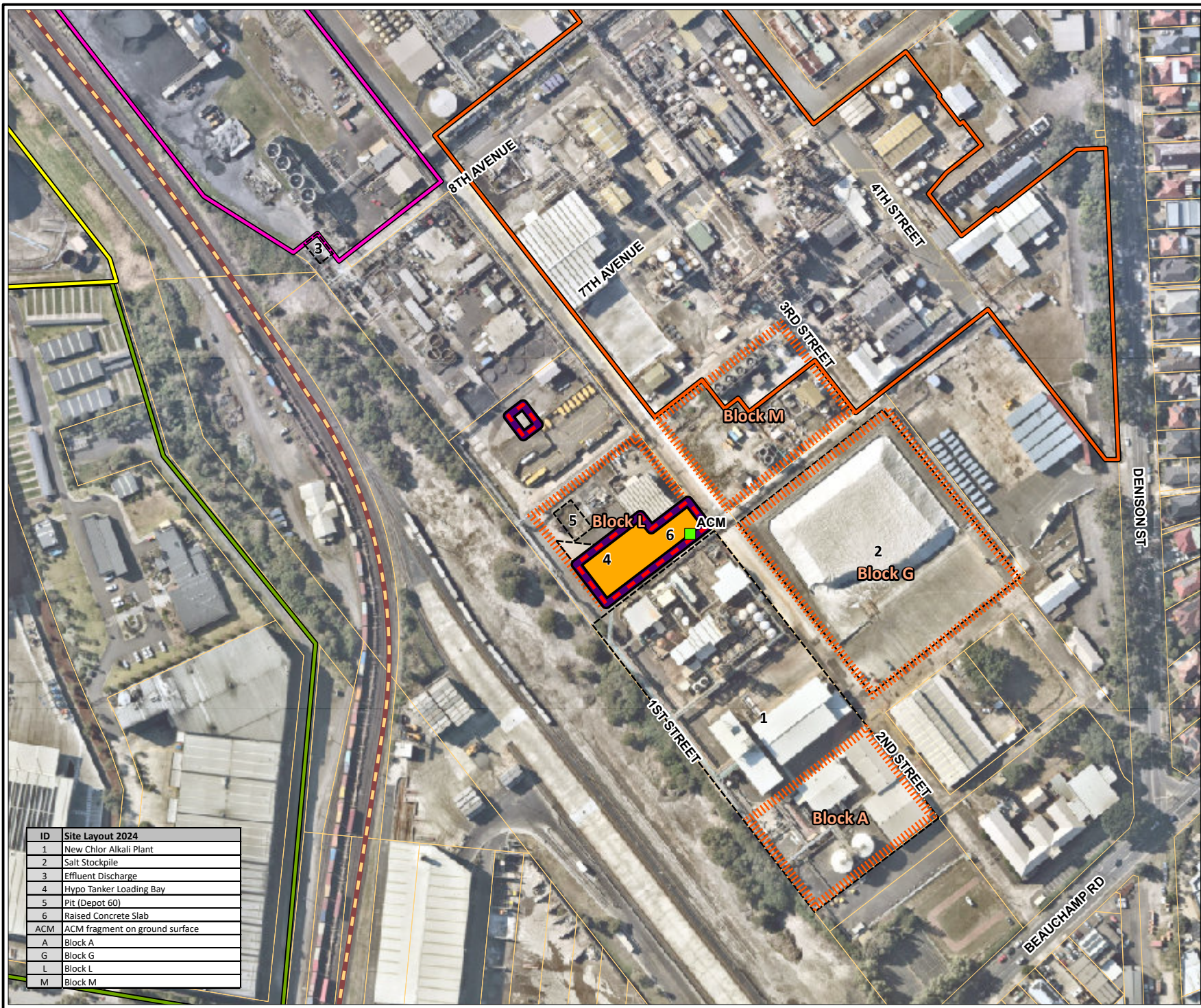
Coord. Sys. GDA2020 MGA Zone 56

**BIP DSI**  
Botany, NSW

**SITE LAYOUT AND**  
**SURROUNDING LAND-USE (2024)**

**FIGURE 2C**

ID	Site Layout 2024
1	New Chlor Alkali Plant
2	Salt Stockpile
3	Effluent Discharge
4	Hypo Tanker Loading Bay
5	Pit (Depot 60)
6	Raised Concrete Slab
ACM	ACM fragment on ground surface
A	Block A
G	Block G
L	Block L
M	Block M



- Legend**
- Approximate Site Boundary
  - NSW Cadastre
  - Sydney to Botany Goods Railway Line
  - Site Layout 2024
  - Site Layout - Blocks A, G, L, M
  - ACM Fragment
  - Extent of Vapour Barrier
  - Extent of Remediation



Job No: 67817  
 Client: IXOM  
 Version: R02 Rev A      Date 31/01/2025  
 Drawn By: RF      Checked By: CB  
 Scale: 1:2,750     

Coord. Sys. GDA2020 MGA Zone 56

**BIP DSI  
 Botany, NSW  
 EXTENT OF REMEDIATION)**

**FIGURE 3**

ID	Site Layout 2024
1	New Chlor Alkali Plant
2	Salt Stockpile
3	Effluent Discharge
4	Hypo Tanker Loading Bay
5	Pit (Depot 60)
6	Raised Concrete Slab
ACM	ACM fragment on ground surface
A	Block A
G	Block G
L	Block L
M	Block M

## Appendix A Data Tables

	Metals & Metalloids								TPHs (NEPC 1999)					TRHs (NEPC 2013)						BTEXN							
	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene_VOC
EQL	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	2	0.4	1	1	1	0.1	1	1	20	20	50	50	50	20	50	100	100	50	20	50	0.1	0.1	0.1	0.1	0.2	0.3	0.5
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 0-1m	3,000	900	3,600	240,000	1,500	730	6,000	400,000											260		3					230	
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 1-2m																			370		3						
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil													700	1,000	3,500	10,000											
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil																											
PFAS NEMP 2020 Table 2 Health Industrial/Commercial																											
PFAS NEMP 2020 Table 3 Interim EDE All land uses																											
PFAS NEMP 2020 Table 3 Interim EIE All land uses																											

Field ID	Matrix Type	Date	Lab Report Number	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum of Total)	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene_VOC	
BH2_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	2.2	<0.4	27	18	150	43	9.3	83	<20	<20	93	56	149	<20	<50	140	<100	140	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
BH2_1.0-1.2	Soil	23 Oct 2024	1154010	2.2	<0.4	6.2	21	67	28	7	83	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
BH2_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH2_5.0-5.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH3_0-0.65	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_0.5-0.6	Soil	23 Oct 2024	1154010	3.8	<0.4	18	35	110	63	13	150	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
BH3_3.0-3.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH3_5.0-5.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH3_5.9-6.0	Soil	25 Oct 2024	1154010	2.1	<0.4	<5	<5	<5	0.6	<5	5.4	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH4_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_0.9-1.0	Soil	23 Oct 2024	1154010	<2	<0.4	<5	9.5	55	6.7	7.4	63	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
BH4_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH4_4.0-4.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH5_0.4-0.5	Soil	24 Oct 2024	1154010	3.8	0.4	41	270	250	15	110	710	<20	<20	95	<50	95	<20	<50	120	<100	120	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
BH5_1.0-1.1	Soil	06 Nov 2024	1157566	2	<0.4	5.9	19	370	1	11	180	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH5_2.0-2.1	Soil	06 Nov 2024	1157566	<2	<0.4	<5	<5	<5	<0.1	<5	<5	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH5_4.0-4.1	Soil	06 Nov 2024	1157566	2.1	<0.4	<5	<5	41	0.8	<5	18	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
BH5_5.9-6.0	Soil	06 Nov 2024	1157566	<2	<0.4	<5	<5	12	0.2	<5	7.1	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	-	
HA1_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QC_B (Duplicate of HA1_0-1.0)	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QA_B (TriPLICATE of HA1_0-1.0)	Soil	24 Oct 2024	365062	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA1_0.5-0.6	Soil	24 Oct 2024	1154010	<2	<0.4	5.3	33	69	6.3	<5	66	<20	<20	350	410	760	<20	<50	700	200	900	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
HA1_1.4-1.5	Soil	24 Oct 2024	1154010	2.1	<0.4	6.5	14	40	2.6	<5	97	<20	<20	91	79	170	<20	<50	150	<100	150	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
QC (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	1154010	2	<0.4	<5	9.7	70	5.5	<5	95	<20	<20	82	<50	82	<20	<50	120	<100	120	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
QA (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	365062	<4	<0.4	3	6	62	5.6	3	40	<25	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	<50	<0.2	<0.5	<1	<1	<2	<1	<1	
HA2_0-0.1	Soil	24 Oct 2024	1154010	5.8	<0.4	16	62	450	190	42	250	<20	<20	93	60	153	<20	<50	130	<100	130	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
HA2_0-0.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA2_0.4-0.5	Soil	24 Oct 2024	1154010	3.3	0.5	15	47	200	520	33	260	<20	<20	77	71	148	<20	<50	130	<100	130	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
HA3_0.2-0.3	Soil	24 Oct 2024	1154010	<2	2.5	7.3	11	30	0.8	9.8	44	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
HA3_1.4-1.5	Soil	24 Oct 2024	1154010	<2	<0.4	<5	<5	<5	<1	7.1	<5	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
HA4_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA4_0.5-0.6	Soil	24 Oct 2024	1154010	<2	<0.4	<5	<5	6.7	<1	<5	8.9	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	
HA4_1.4-1.5	Soil	24 Oct 2024	1154010	<2	<0.4	<5	<5	<5	<1	<5	7.8	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	

	PAH																							
	PAHs (sum of positives)	2-Methylnaphthalene	3-Methylcholanthrene	7,12-Dimethylbenz(a)anthracene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(b)fluoranthene	Benzo(b+k)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (sum of total)	2-(acetylamino) fluorene
EQL	µg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	50	0.5	0.5	0.5	0.1	0.1	0.1	0.1	0.05	0.5	0.5	0.2	0.1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.5
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 0-1m										40													4,000	
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 1-2m																								
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil																								
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil																								
PFAS NEMP 2020 Table 2 Health Industrial/Commercial																								
PFAS NEMP 2020 Table 3 Interim EDE All land uses																								
PFAS NEMP 2020 Table 3 Interim EIE All land uses																								

Field ID	Matrix Type	Date	Lab Report Number	PAHs (sum of positives)	2-Methylnaphthalene	3-Methylcholanthrene	7,12-Dimethylbenz(a)anthracene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(b)fluoranthene	Benzo(b+k)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (sum of total)	2-(acetylamino) fluorene
BH2_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_1.0-1.2	Soil	23 Oct 2024	1154010	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH2_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_5.0-5.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_0-0.65	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_0.5-0.6	Soil	23 Oct 2024	1154010	-	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH3_3.0-3.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_5.0-5.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_5.9-6.0	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_0.9-1.0	Soil	23 Oct 2024	1154010	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH4_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_4.0-4.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_0.4-0.5	Soil	24 Oct 2024	1154010	-	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
BH5_1.0-1.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_2.0-2.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_4.0-4.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_5.9-6.0	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC_B (Duplicate of HA1_0-1.0)	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA_B (Triplicate of HA1_0-1.0)	Soil	24 Oct 2024	365062	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1_0.5-0.6	Soil	24 Oct 2024	1154010	-	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
HA1_1.4-1.5	Soil	24 Oct 2024	1154010	-	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
QC (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	1154010	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
QA (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	365062	<50	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5
HA2_0-0.1	Soil	24 Oct 2024	1154010	-	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
HA2_0-0.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA2_0.4-0.5	Soil	24 Oct 2024	1154010	-	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
HA3_0.2-0.3	Soil	24 Oct 2024	1154010	-	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
HA3_1.4-1.5	Soil	24 Oct 2024	1154010	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
HA4_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA4_0.5-0.6	Soil	24 Oct 2024	1154010	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
HA4_1.4-1.5	Soil	24 Oct 2024	1154010	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-



		Organophosphorus Pesticides																					
		Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethyl methanesulfonate	Fenitrothion	Fenthion	Malathion	Methidathion	Methyl parathion	Mevinphos (Phosdrin)	Phorate	Ronnel	Saflorle	Fenamiphos	Parathion
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil				2,000																			
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 0-1m																							
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 1-2m																							
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil																							
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil																							
PFAS NEMP 2020 Table 2 Health Industrial/Commercial																							
PFAS NEMP 2020 Table 3 Interim EDE All land uses																							
PFAS NEMP 2020 Table 3 Interim EIE All land uses																							

Field ID	Matrix Type	Date	Lab Report Number	Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethyl methanesulfonate	Fenitrothion	Fenthion	Malathion	Methidathion	Methyl parathion	Mevinphos (Phosdrin)	Phorate	Ronnel	Saflorle	Fenamiphos	Parathion	
BH2_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_1.0-1.2	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2_5.0-5.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_0-0.65	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_0.5-0.6	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_3.0-3.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_5.0-5.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3_5.9-6.0	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_0.9-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_4.0-4.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_0.4-0.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_1.0-1.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_2.0-2.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_4.0-4.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_5.9-6.0	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC_B (Duplicate of HA1_0-1.0)	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA_B (Triplicate of HA1_0-1.0)	Soil	24 Oct 2024	365062	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1_0.5-0.6	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1_1.4-1.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	365062	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
HA2_0-0.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA2_0-0.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA2_0.4-0.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA3_0.2-0.3	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA3_1.4-1.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA4_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA4_0.5-0.6	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA4_1.4-1.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Chlorinated Alkanes															Chlorinated Alkenes																		
	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane	Dichlorodifluoromethane	Dichloromethane	Hexachloroethane	Pentachloroethane	Trichlorofluoromethane	1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	3-chloropropene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride		
EQL	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 0-1m																																		
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 1-2m																																		
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil																																		
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil																																		
PFAS NEMP 2020 Table 2 Health Industrial/Commercial																																		
PFAS NEMP 2020 Table 3 Interim EDE All land uses																																		
PFAS NEMP 2020 Table 3 Interim EIE All land uses																																		

Field ID	Matrix Type	Date	Lab Report Number	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Chloroethane	Chloromethane	Dichlorodifluoromethane	Dichloromethane	Hexachloroethane	Pentachloroethane	Trichlorofluoromethane	1,1-dichloroethene	1,1-dichloropropene	2-chlorotoluene	3-chloropropene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride			
BH2_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
BH2_1.0-1.2	Soil	23 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
BH2_2.0-2.1	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
BH2_5.0-5.1	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
BH3_0-0.65	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
BH3_0.5-0.6	Soil	23 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
BH3_3.0-3.1	Soil	25 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
BH3_5.0-5.1	Soil	25 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
BH3_5.9-6.0	Soil	25 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
BH4_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_0.9-1.0	Soil	23 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
BH4_2.0-2.1	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
BH4_4.0-4.1	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
BH5_0.4-0.5	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<b>3.9</b>	<0.5	<b>0.7</b>	<0.5
BH5_1.0-1.1	Soil	06 Nov 2024	1157566	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<b>9.5</b>	<0.5	<b>0.9</b>	<0.5
BH5_2.0-2.1	Soil	06 Nov 2024	1157566	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
BH5_4.0-4.1	Soil	06 Nov 2024	1157566	<0.5	<0.5	<0.5	<0.5	<b>1.4</b>	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<b>1.1</b>	<0.5	<0.5	<0.5
BH5_5.9-6.0	Soil	06 Nov 2024	1157566	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<b>8.2</b>	<0.5	<0.5	<b>0.8</b>	<0.5
HA1_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QC_B (Duplicate of HA1_0-1.0)	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QA_B (Triplicate of HA1_0-1.0)	Soil	24 Oct 2024	365062	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA1_0.5-0.6	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
HA1_1.4-1.5	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QC (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
QA (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	365062	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
HA2_0-0.1	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	&																					

	Semivolatile Organic Compounds																														
	1-Chloronaphthalene	2-Chloronaphthalene	Bis(2-chloroethoxy) methane	Hexachloropropene	Dibenz(a,j)acridine	Acetophenone	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl) ether	4-Bromophenyl phenyl ether	4-Chlorophenyl phenyl ether	2,6-dinitrotoluene	2-Picoline	4-Aminobiphenyl	N-Nitrosomorpholine	N-Nitrosopiperidine	2-methyl-5-nitroaniline	N-nitrosodi-n-butylamine	N-nitrosodi-n-propylamine	1-Naphthylamine	2-Naphthylamine	3,3-Dichlorobenzidine	4-(dimethylamino)azobenzene	Azobenzene	Diphenylamine	Carbazole	Butyl benzyl phthalate	Dibenzofuran	Isosafrole	Methapyrene	Phenacetin	
EQL	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	1	0.5	0.5	1	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	1	0.5	0.5	0.5	2	1	1
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 0-1m																															
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 1-2m																															
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil																															
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil																															
PFAS NEMP 2020 Table 2 Health Industrial/Commercial																															
PFAS NEMP 2020 Table 3 Interim EDE All land uses																															
PFAS NEMP 2020 Table 3 Interim EIE All land uses																															

Field ID	Matrix Type	Date	Lab Report Number	1-Chloronaphthalene	2-Chloronaphthalene	Bis(2-chloroethoxy) methane	Hexachloropropene	Dibenz(a,j)acridine	Acetophenone	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl) ether	4-Bromophenyl phenyl ether	4-Chlorophenyl phenyl ether	2,6-dinitrotoluene	2-Picoline	4-Aminobiphenyl	N-Nitrosomorpholine	N-Nitrosopiperidine	2-methyl-5-nitroaniline	N-nitrosodi-n-butylamine	N-nitrosodi-n-propylamine	1-Naphthylamine	2-Naphthylamine	3,3-Dichlorobenzidine	4-(dimethylamino)azobenzene	Azobenzene	Diphenylamine	Carbazole	Butyl benzyl phthalate	Dibenzofuran	Isosafrole	Methapyrene	Phenacetin		
BH2_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	-	-	
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH2_1.0-1.2	Soil	23 Oct 2024	1154010	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	-	-	
BH2_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH2_5.0-5.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_0-0.65	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_0.5-0.6	Soil	23 Oct 2024	1154010	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<2	<2	<1	<1	-	<1	-	<1	<1	-	-	-		
BH3_3.0-3.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_5.0-5.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_5.9-6.0	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_0.9-1.0	Soil	23 Oct 2024	1154010	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	-	-	
BH4_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_4.0-4.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_0.4-0.5	Soil	24 Oct 2024	1154010	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<2	<2	<1	<1	-	<1	-	<1	<1	-	-	-		
BH5_1.0-1.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH5_2.0-2.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH5_4.0-4.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH5_5.9-6.0	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA1_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QC_B (Duplicate of HA1_0-1.0)	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QA_B (Triplicate of HA1_0-1.0)	Soil	24 Oct 2024	365062	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA1_0.5-0.6	Soil	24 Oct 2024	1154010	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<2	<2	<1	<1	-	<1	-	<1	<1	-	-	-		
HA1_1.4-1.5	Soil	24 Oct 2024	1154010	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<2	<2	<1	<1	-	<1	-	<1	<1	-	-	-		
QC (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	-		
QA (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	365062	<0.5	<0.5	<1	<0.5	-	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<2	<2	<1	<1	-	<1	-	<1	<1	-	-	-		
HA2_0-0.1	Soil	24 Oct 2024	1154010	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<2	<2	<1	<1	-	<1	-	<1	<1	-	-	-		
HA2_0-0.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA2_0.4-0.5	Soil	24 Oct 2024	1154010	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<2	<2	<1	<1	-	<1	-	<1	<1	-	-	-		
HA3_0.2-0.3	Soil	24 Oct 2024	1154010	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<2	<2	<1	<1	-	<1	-	<1	<1	-	-	-		
HA3_1.4-1.5	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	-		
HA4_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA4_0.5-0.6	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	-		
HA4_1.4-1.5	Soil	24 Oct 2024	1154010	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	-		

	Polychlorinated Biphenyls								Phenols															
	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,4-dinitrophenol	2,6-dichlorophenol	2-chlorophenol	2-Methylphenol	2-nitrophenol	3&4-Methylphenol (m&p-resol)	4,6-Dinitro-2-methylphenol	4-Chloro-3-Methylphenol	4-nitrophenol	Phenol	
EQL	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.2	0.5	0.4	5	1	5	5	0.5
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 0-1m								7																240,000
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 1-2m																								
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil																								
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil																								
PFAS NEMP 2020 Table 2 Health Industrial/Commercial																								
PFAS NEMP 2020 Table 3 Interim EDE All land uses																								
PFAS NEMP 2020 Table 3 Interim EIE All land uses																								

Field ID	Matrix Type	Date	Lab Report Number	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,4-dinitrophenol	2,6-dichlorophenol	2-chlorophenol	2-Methylphenol	2-nitrophenol	3&4-Methylphenol (m&p-resol)	4,6-Dinitro-2-methylphenol	4-Chloro-3-Methylphenol	4-nitrophenol	Phenol	
BH2_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.2	<1	<0.4	<5	<1	<5	<0.5	
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH2_1.0-1.2	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	<0.5	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.2	<1	<0.4	<5	<1	<5	<0.5	
BH2_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH2_5.0-5.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_0-0.65	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_0.5-0.6	Soil	23 Oct 2024	1154010	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<1	<1	<5	<1	<5	<2	
BH3_3.0-3.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_5.0-5.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_5.9-6.0	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_0.9-1.0	Soil	23 Oct 2024	1154010	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.2	<1	<0.4	<5	<1	<5	<0.5	
BH4_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_4.0-4.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH5_0.4-0.5	Soil	24 Oct 2024	1154010	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<1	<1	<5	<1	<5	<2	
BH5_1.0-1.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH5_2.0-2.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH5_4.0-4.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH5_5.9-6.0	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA1_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QC_B (Duplicate of HA1_0-1.0)	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QA_B (Triplicate of HA1_0-1.0)	Soil	24 Oct 2024	365062	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA1_0.5-0.6	Soil	24 Oct 2024	1154010	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<1	<1	<5	<1	<5	<2	
HA1_1.4-1.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	<1	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<1	<1	<5	<1	<5	<2	
QC (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	1154010	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.2	<1	<0.4	<5	<1	<5	<0.5	
QA (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	365062	<0.1	<0.1	<0.1	<0.1	<0.1	<b>0.3</b>	<0.1	<b>0.3</b>	<1	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<10	<5	<10	<0.5
HA2_0-0.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	<1	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<1	<1	<5	<1	<5	<2	
HA2_0-0.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA2_0.4-0.5	Soil	24 Oct 2024	1154010	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<1	<1	<5	<1	<5	<2	
HA3_0.2-0.3	Soil	24 Oct 2024	1154010	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<1	<1	<5	<1	<5	<2	
HA3_1.4-1.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	<0.5	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.2	<1	<0.4	<5	<1	<5	<0.5	
HA4_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA4_0.5-0.6	Soil	24 Oct 2024	1154010	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.2	<1	<0.4	<5	<1	<5	<0.5	
HA4_1.4-1.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	<0.5	<1	<1	<0.5	<0.5	<5	<0.5	<0.5	<0.2	<1	<0.4	<5	<1	<5	<0.5	

EQL	PFAS																																				
	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	N-Ethyl perfluorooctane sulfonamide (NEFOSA)	N-Methylperfluorooctanesulfonamide (N-MeFOSE)	N-Ethylperfluorooctanesulfonamide (N-EtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethylperfluorooctane sulfonamidoacetic acid (NEFOSAA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecane sulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecane sulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of WA DWER PFAS (n=10)*	Sum of PFAS	Perfluorononanesulfonic acid ion		
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005	0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001	0.001	0.005	0.0002	0.0002	0.005	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0002	0.0001	0.0002	0.0001	0.005	0.0001	0.01	0.0001	0.005
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																																					
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 0-1m																																					
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 1-2m																																					
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil																																					
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil																																					
PFAS NEMP 2020 Table 2 Health Industrial/Commercial																																					
PFAS NEMP 2020 Table 3 Interim EDE All land uses																																					
PFAS NEMP 2020 Table 3 Interim EIE All land uses																																					

Field ID	Matrix Type	Date	Lab Report Number	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	N-Ethyl perfluorooctane sulfonamide (NEFOSA)	N-Methylperfluorooctanesulfonamide (N-MeFOSE)	N-Ethylperfluorooctanesulfonamide (N-EtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethylperfluorooctane sulfonamidoacetic acid (NEFOSAA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecane sulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecane sulfonic acid (10:2 FTSA)	Sum of PFHxS and PFOS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of WA DWER PFAS (n=10)*	Sum of PFAS	Perfluorononanesulfonic acid ion							
BH2_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
BH2_1.0-1.2	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
BH2_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
BH2_5.0-5.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
BH3_0-0.65	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
BH3_0.5-0.6	Soil	23 Oct 2024	1154010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	
BH3_3.0-3.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_5.0-5.1	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH3_5.9-6.0	Soil	25 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_0-1.0	Soil	23 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH4_0.9-1.0	Soil	23 Oct 2024	1154010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	
BH4_2.0-2.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4_4.0-4.1	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_0.4-0.5	Soil	24 Oct 2024	1154010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	
BH5_1.0-1.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH5_2.0-2.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_4.0-4.1	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5_5.9-6.0	Soil	06 Nov 2024	1157566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1_0-1.0	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC_B (Duplicate of HA1_0-1.0)	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA_B (Triplicate of HA1_0-1.0)	Soil	24 Oct 2024	365062	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1_0.5-0.6	Soil	24 Oct 2024	1154010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005	
HA1_1.4-1.5	Soil	24 Oct 2024	1154010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	1154010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.05	<0.005		
QA (Duplicate of																																													



**TABLE A- Soil Analytical Results**

Project Number: 67817  
 Project Name: Denison Street, Banksmeadow, NSW

	nes
	Pentachloronitrobenzene
	mg/kg
EQL	0.5
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 0-1m	
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand, 1-2m	
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil	
NEPM 2013 Table 7 Comm/Ind D Soil HSL for Asbestos in Soil	
PFAS NEMP 2020 Table 2 Health Industrial/Commercial	
PFAS NEMP 2020 Table 3 Interim EDE All land uses	
PFAS NEMP 2020 Table 3 Interim EIE All land uses	

Field ID	Matrix Type	Date	Lab Report Number	
BH2_0-1.0	Soil	23 Oct 2024	1154010	-
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	<0.5
BH2_0.5-0.6	Soil	23 Oct 2024	1154010	-
BH2_1.0-1.2	Soil	23 Oct 2024	1154010	<0.5
BH2_2.0-2.1	Soil	24 Oct 2024	1154010	-
BH2_5.0-5.1	Soil	24 Oct 2024	1154010	-
BH3_0-0.65	Soil	23 Oct 2024	1154010	-
BH3_0.5-0.6	Soil	23 Oct 2024	1154010	<1
BH3_3.0-3.1	Soil	25 Oct 2024	1154010	-
BH3_5.0-5.1	Soil	25 Oct 2024	1154010	-
BH3_5.9-6.0	Soil	25 Oct 2024	1154010	-
BH4_0-1.0	Soil	23 Oct 2024	1154010	-
BH4_0.9-1.0	Soil	23 Oct 2024	1154010	<0.5
BH4_2.0-2.1	Soil	24 Oct 2024	1154010	-
BH4_4.0-4.1	Soil	24 Oct 2024	1154010	-
BH5_0.4-0.5	Soil	24 Oct 2024	1154010	<1
BH5_1.0-1.1	Soil	06 Nov 2024	1157566	-
BH5_2.0-2.1	Soil	06 Nov 2024	1157566	-
BH5_4.0-4.1	Soil	06 Nov 2024	1157566	-
BH5_5.9-6.0	Soil	06 Nov 2024	1157566	-
HA1_0-1.0	Soil	24 Oct 2024	1154010	-
QC_B (Duplicate of HA1_0-1.0)	Soil	24 Oct 2024	1154010	-
QA_B (TriPLICATE of HA1_0-1.0)	Soil	24 Oct 2024	365062	-
HA1_0.5-0.6	Soil	24 Oct 2024	1154010	<1
HA1_1.4-1.5	Soil	24 Oct 2024	1154010	<1
QC (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	1154010	<0.5
QA (Duplicate of HA1_1.4-1.5)	Soil	24 Oct 2024	365062	<1
HA2_0-0.1	Soil	24 Oct 2024	1154010	<1
HA2_0-0.5	Soil	24 Oct 2024	1154010	-
HA2_0.4-0.5	Soil	24 Oct 2024	1154010	<1
HA3_0.2-0.3	Soil	24 Oct 2024	1154010	<1
HA3_1.4-1.5	Soil	24 Oct 2024	1154010	<0.5
HA4_0-1.0	Soil	24 Oct 2024	1154010	-
HA4_0.5-0.6	Soil	24 Oct 2024	1154010	<0.5
HA4_1.4-1.5	Soil	24 Oct 2024	1154010	<0.5



**TABLE B - Soil Leachate Analytical Results**

Project Number: 67817

Project Name: 6, Denison Street, Banksmeadow, NSW

	Metals & Metalloids	Ionic Balance			
	Mercury	pH of Leaching Fluid	pH (after HCL)	pH (Final)	pH (Initial)
EQL	0.001	0.1	0.1	0.1	0.1
NSW 2014 General Solid Waste TCLP1 (leached)	0.2				
NSW 2014 Restricted Solid Waste TCLP2 (leached)	0.8				

Field ID	Test Type	Date	Lab Report Number	Mercury	pH of Leaching Fluid	pH (after HCL)	pH (Final)	pH (Initial)
BH3_2.0-2.1	TCLP	25 Oct 2024	1158728	0.017	-	1.8	5.3	8.9
BH3_2.0-2.1	ASLP	25 Oct 2024	1158728	0.093	7.7	-	8.9	9.1
BH3_3.0-3.1	TCLP	25 Oct 2024	1158728	0.006	-	1.7	5.1	7.5
BH3_3.0-3.1	ASLP	25 Oct 2024	1158728	0.013	7.7	-	6.9	8.4
BH3_4.0-4.1	TCLP	25 Oct 2024	1158728	0.003	-	1.8	5.2	7.6
BH3_4.0-4.1	ASLP	25 Oct 2024	1158728	0.003	7.7	-	7.6	8.0
BH3_5.9-6.0	TCLP	25 Oct 2024	1158728	0.002	-	1.7	5.1	7.5
BH3_5.9-6.0	ASLP	25 Oct 2024	1158728	0.029	7.7	-	6.6	8.3
HA2_0.4-0.5	TCLP	24 Oct 2024	1158728	0.067	-	2.1	6.0	9.0
HA2_0.4-0.5	ASLP	24 Oct 2024	1158728	0.33	7.7	-	8.0	8.6
HA2_0-0.1	TCLP	24 Oct 2024	1158728	0.031	-	1.8	5.3	9.1
HA2_0-0.1	ASLP	24 Oct 2024	1158728	0.074	7.7	-	8.1	8.3

	Metals & Metalloids		BTEXN					PAH	Chlorinated Alkanes												
	Mercury	Benzene	Toluene	Ethylbenzene	Xylene Total	Naphthalene	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,1,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Carbon tetrachloride	Trichlorofluoromethane	
	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	
EQL	0.002	0.08	0.08	0.08	0.24	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILS																					
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand, 0-1m		4	4,800	1,300	840	3															
USEPA RSLs Industrial Air THQ=1.0 (x 10)	0.013	0.016	220	0.049	4.4	0.0036	0.017	220	0.0021	0.0077	0.077	0.013	0.00002	0.0047	0.0033			1.8	0.02		
Location Code	Field ID	Matrix Type	Date	Lab Report Number																	
BH3	BH3_SV_M	Gas	24 Oct 2024	365063	0.74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA2	HA2_SV_M	Gas	24 Oct 2024	365063	25.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH2	BH2_SV_FRONT	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
BH3	BH3_SV_FRONT	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
BH4	BH4_SV_FRONT	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
BH4	QC_SV_FRONT (duplicate of BH4)	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
BH5	BH5_SV_FRONT	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	0.32	<0.08	0.32	0.24	<0.08	<0.08	<0.08	
HA1	HA1_SV_FRONT	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
HA2	HA2_SV_FRONT	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
HA3	HA3_SV_FRONT	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
HA3	QA_SV (duplicate of HA3)	Gas	25 Oct 2024	365815	-	<0.32	<0.81	<0.81	-	<1.61	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	
HA4	HA4_SV_FRONT	Gas	25 Oct 2024	1153970	-	<0.08	<0.08	<0.08	<0.24	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	

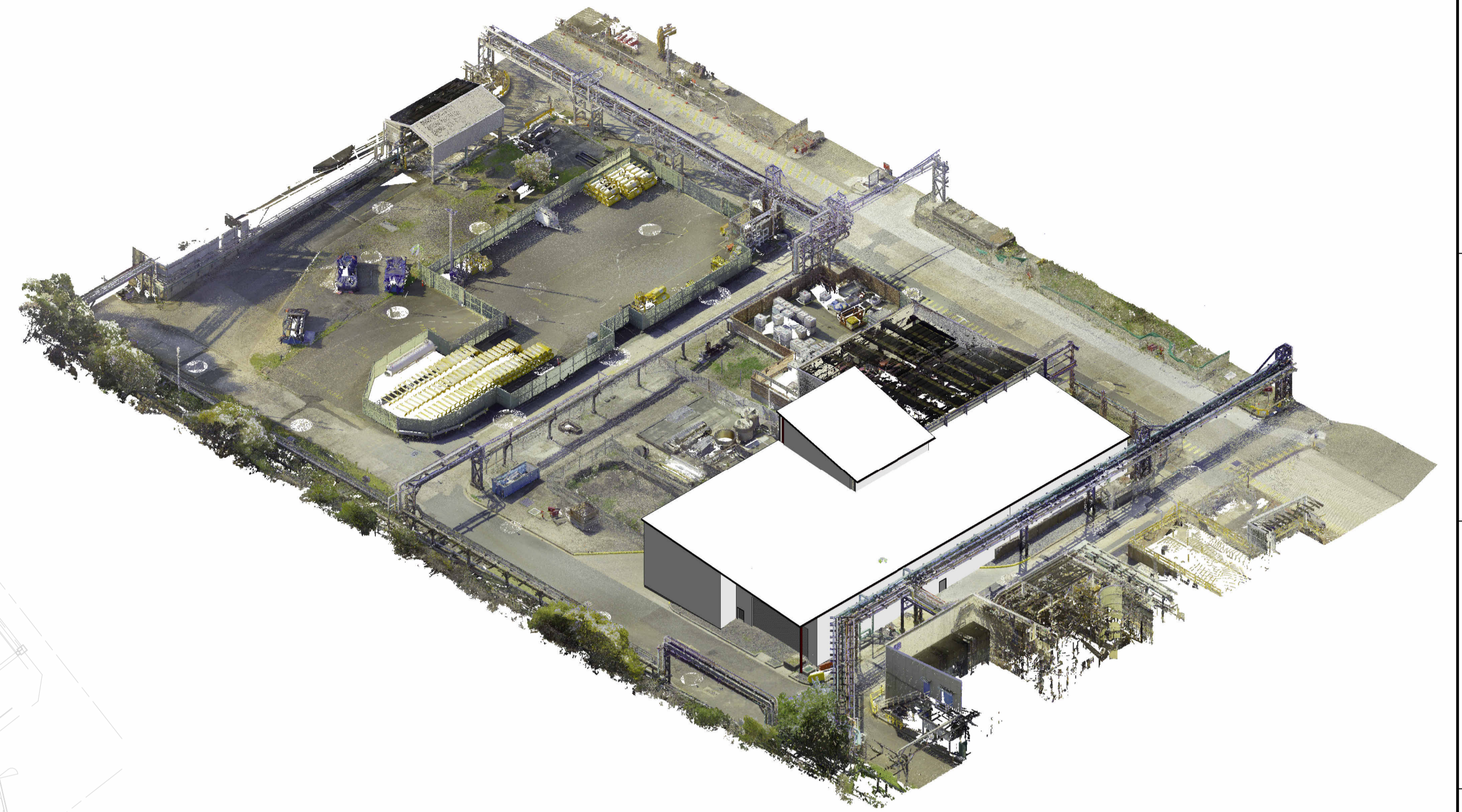
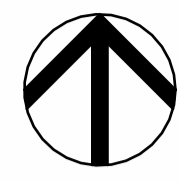
	Chlorinated Alkenes													MAH										
	1,1-dichloroethene	1,1-dichloropropene	1,3-Dichloropropene (cis)	1,3-Dichloropropene (trans)	2-chlorotoluene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Bromobenzene	Isopropylbenzene	
	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
EQL	0.08	0.08	0.81	0.81	0.08	0.08	0.08	0.08	0.08	0.81	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.81	0.08	0.81	0.08	
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILS							0.3		8			0.08	0.1											
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand, 0-1m																								
USEPA RSLs Industrial Air THQ=1.0 (x 10)	8.8								0.47			0.03	0.028	2.6	2.6	44			44		2.6	18		

Location Code	Field ID	Matrix Type	Date	Lab Report Number	1,1-dichloroethene	1,1-dichloropropene	1,3-Dichloropropene (cis)	1,3-Dichloropropene (trans)	2-chlorotoluene	4-chlorotoluene	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Vinyl Chloride	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Bromobenzene	Isopropylbenzene		
BH3	BH3_SV_M	Gas	24 Oct 2024	365063	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA2	HA2_SV_M	Gas	24 Oct 2024	365063	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH2	BH2_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	13.55	-	<0.08	5.16	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH3	BH3_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	1.37	-	<0.08	0.16	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH4	BH4_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	2.26	-	<0.08	1.26	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH4	QC_SV FRONT (duplicate of BH4)	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	2.42	-	<0.08	1.23	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
BH5	BH5_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	0.1	<0.08	27.42	-	<0.08	5.16	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
HA1	HA1_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	1.32	-	<0.08	0.18	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
HA2	HA2_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	3.06	-	<0.08	0.26	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
HA3	HA3_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	33.87	-	<0.08	29.03	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
HA3	QA_SV (duplicate of HA3)	Gas	25 Oct 2024	365815	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	-	13.71	<0.81	-	19.35	-	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81
HA4	HA4_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	12.74	-	<0.08	13.55	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

	Miscellaneous Hydrocarbons					Chlorinated Benzenes					Trihalomethanes			Chlorinated Hydrocarbons	NA		Other									
	1,2-dibromoethane	Cyclohexane	Dibromomethane	4-Methyl-2-pentanone	Methyl Ethyl ketone	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Hexachlorobutadiene	Ethyl acrylate	Methyl styrene (alpha)	1,2-butylacetate	B-Methylhexane	B-Methylpentane	Di-isobutyl ketone	Dodecane	Methylcyclohexane	Methylcyclopentane	
	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	
EQL	0.08	0.81	0.08	0.81	1.61	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs																										
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand, 0-1m																										
USEPA RSLs Industrial Air THQ=1.0 (x 10)	0.0002	260	0.18	130	220	0.088	8.8		0.011	2.2		0.0053	0.11	0.0033	0.0056	0.35										

Location Code	Field ID	Matrix Type	Date	Lab Report Number	1,2-dibromoethane	Cyclohexane	Dibromomethane	4-Methyl-2-pentanone	Methyl Ethyl ketone	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-Dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Chlorobenzene	Dibromochloromethane	Chloroform	Tribromomethane	Bromodichloromethane	Hexachlorobutadiene	Ethyl acrylate	Methyl styrene (alpha)	1,2-butylacetate	B-Methylhexane	B-Methylpentane	Di-isobutyl ketone	Dodecane	Methylcyclohexane	Methylcyclopentane	
BH3	BH3_SV_M	Gas	24 Oct 2024	365063	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA2	HA2_SV_M	Gas	24 Oct 2024	365063	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	BH2_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>1.35</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-
BH3	BH3_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>0.13</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-
BH4	BH4_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>0.53</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-
BH4	QC_SV FRONT (duplicate of BH4)	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>0.52</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-
BH5	BH5_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>0.71</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-
HA1	HA1_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>0.08</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-
HA2	HA2_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>0.58</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-
HA3	HA3_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>0.53</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-
HA3	QA_SV (duplicate of HA3)	Gas	25 Oct 2024	365815	<0.81	<0.81	-	<0.81	<1.61	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81
HA4	HA4_SV FRONT	Gas	25 Oct 2024	1153970	<0.08	-	<0.08	-	-	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<b>0.26</b>	<0.08	<0.08	<0.08	<0.08	-	-	-	-	-	-	-	-	-

## Appendix B Development Plans



ISOMETRIC VIEW  
SCALE

LOCATION PLAN  
SCALE 1 : 1000

DRAWING INDEX	
DRAWING NUMBER	DRAWING NAME
PC.20301993-13-100	LOCATION PLAN
PC.20301993-13-101	SITE PLAN - EXISTING
PC.20301993-13-102	SITE PLAN - PROPOSED
PC.20301993-13-103	GRID SET OUT PLAN
PC.20301993-13-105	GENERAL ARRANGEMENT - GROUND FLOOR PLAN
PC.20301993-13-107	GENERAL ARRANGEMENT - CONCRETE OUTLINE PLAN
PC.20301993-13-109	GENERAL ARRANGEMENT - ROOF PLAN
PC.20301993-13-111	GENERAL ARRANGEMENT - ELEVATIONS - SHEET 1
PC.20301993-13-112	GENERAL ARRANGEMENT - ELEVATIONS - SHEET 2
PC.20301993-13-113	GENERAL ARRANGEMENT - SECTIONS - SHEET 1
PC.20301993-13-114	GENERAL ARRANGEMENT - SECTIONS - SHEET 2

**CHECK PRINT - INCOMPLETE REVISION**  
NOT AUTHORISED FOR USE  
PLOT DATE: 20/11/2024 11:30:48 AM

**NOT FOR CONSTRUCTION**



REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING		
			CHECK		
			ORIGINATE/DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

NOT AUTHORISED FOR USE

**Kellogg Brown & Root Pty Ltd**



Kellogg Brown & Root Pty Ltd  
ABN 91 007 660 317

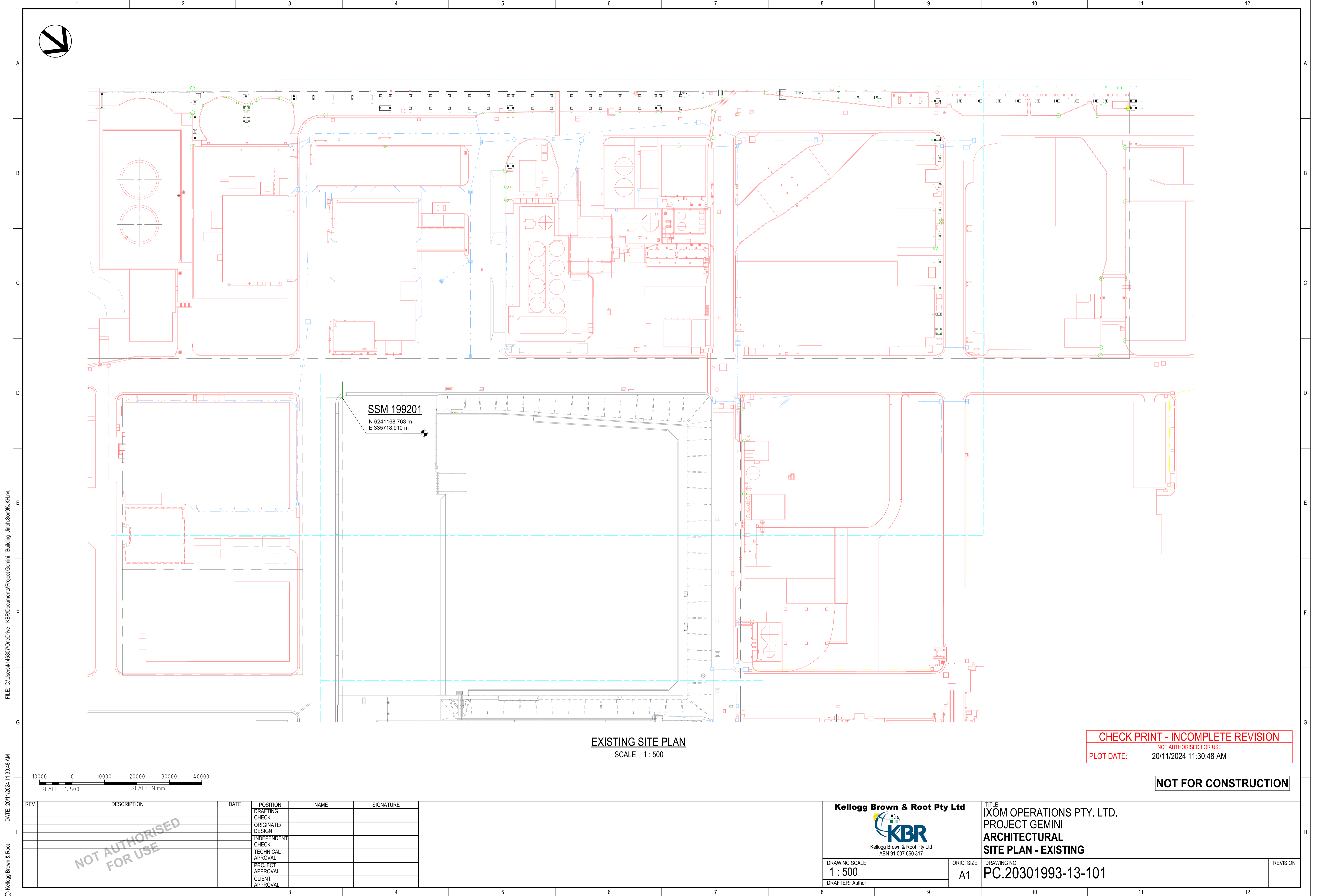
TITLE  
IXOM OPERATIONS PTY. LTD.  
PROJECT GEMINI  
ARCHITECTURAL  
LOCATION PLAN

DRAWING SCALE  
1 : 1000  
DRAFTER: Author

ORIG. SIZE  
A1

DRAWING NO.  
PC.20301993-13-100

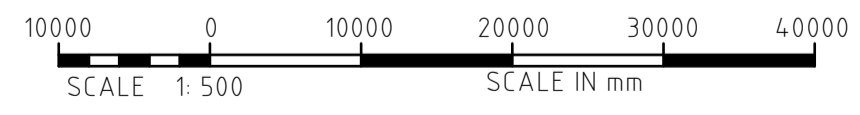
REVISION



**EXISTING SITE PLAN**  
SCALE 1:500

**CHECK PRINT - INCOMPLETE REVISION**  
NOT AUTHORISED FOR USE  
PLOT DATE: 20/11/2024 11:30:48 AM

**NOT FOR CONSTRUCTION**



REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING		
			CHECK		
			ORIGINATE/		
			DESIGN		
			INDEPENDENT		
			CHECK		
			TECHNICAL		
			APPROVAL		
			PROJECT		
			APPROVAL		
			CLIENT		
			APPROVAL		

**NOT AUTHORISED FOR USE**



**IXOM OPERATIONS PTY. LTD.**  
**PROJECT GEMINI**  
**ARCHITECTURAL**  
**SITE PLAN - EXISTING**

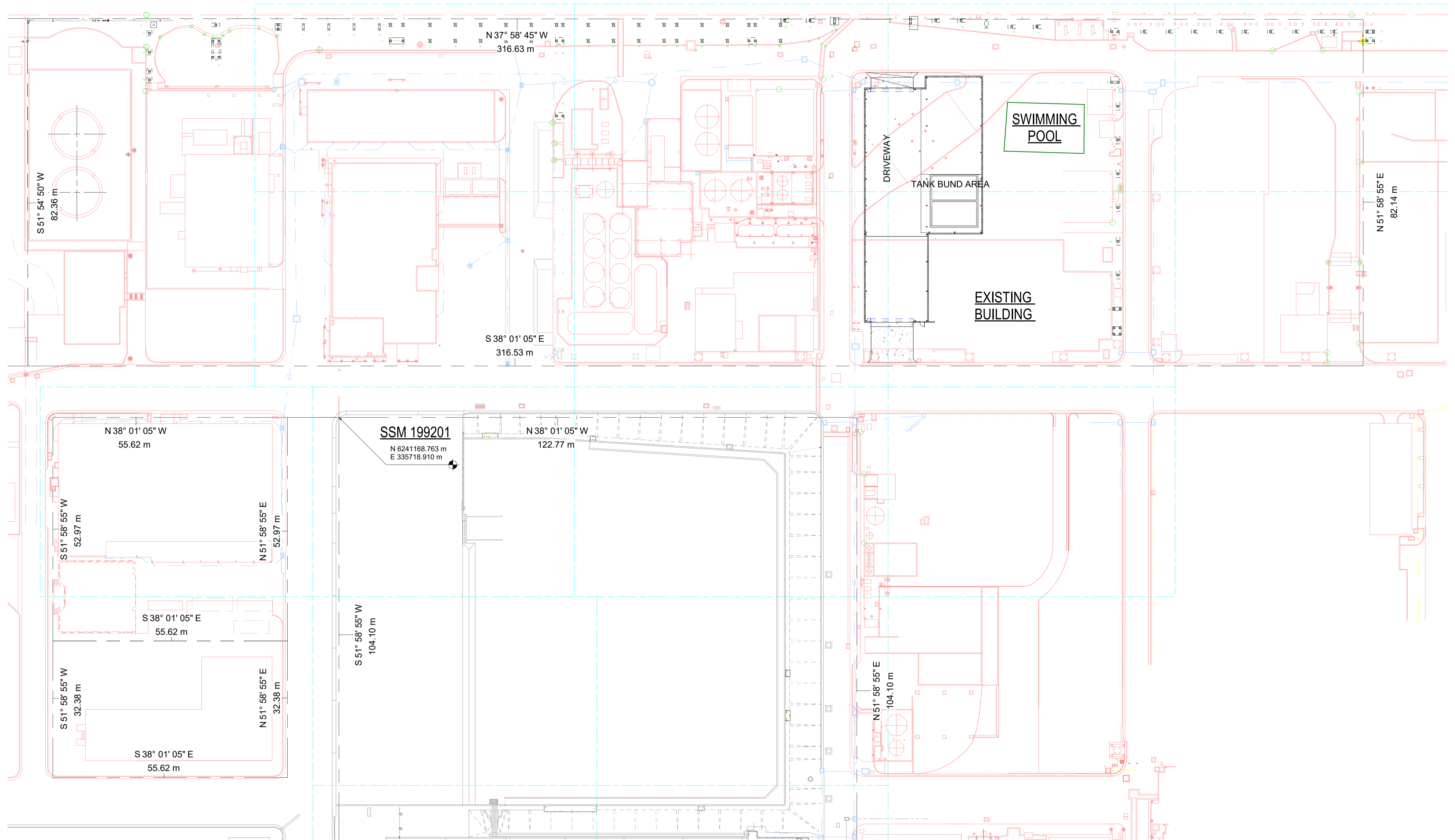
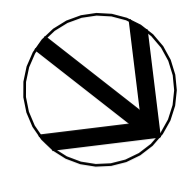
DRAWING SCALE  
**1:500**  
DRAFTER: Author

ORIG. SIZE  
**A1**

DRAWING NO.  
**PC.20301993-13-101**

REVISION

FILE: C:\Users\k166807\OneDrive - KBR\Documents\Project Gemini - Building - Jinh Song\K1.rvt  
DATE: 20/11/2024 11:30:48 AM  
© Kellogg Brown & Root



**SITE PLAN - PROPOSED**

SCALE 1:500



**CHECK PRINT - INCOMPLETE REVISION**

NOT AUTHORISED FOR USE  
PLOT DATE: 20/11/2024 11:30:49 AM

**FOR INFORMATION**

FILE: C:\Users\k168807\OneDrive - KBR\Documents\Project Gemini - Building - jinh.Sou9ku\K1.rvt  
DATE: 20/11/2024 11:30:49 AM  
© Kellogg Brown & Root

REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING		
			CHECK		
			ORIGINATE/		
			DESIGN		
			INDEPENDENT		
			CHECK		
			TECHNICAL		
			APPROVAL		
			PROJECT		
			APPROVAL		
			CLIENT		
			APPROVAL		

**NOT AUTHORISED  
FOR USE**

**Kellogg Brown & Root Pty Ltd**



Kellogg Brown & Root Pty Ltd  
ABN 91 007 660 317

DRAWING SCALE  
**1:500**

DRAFTER: Author

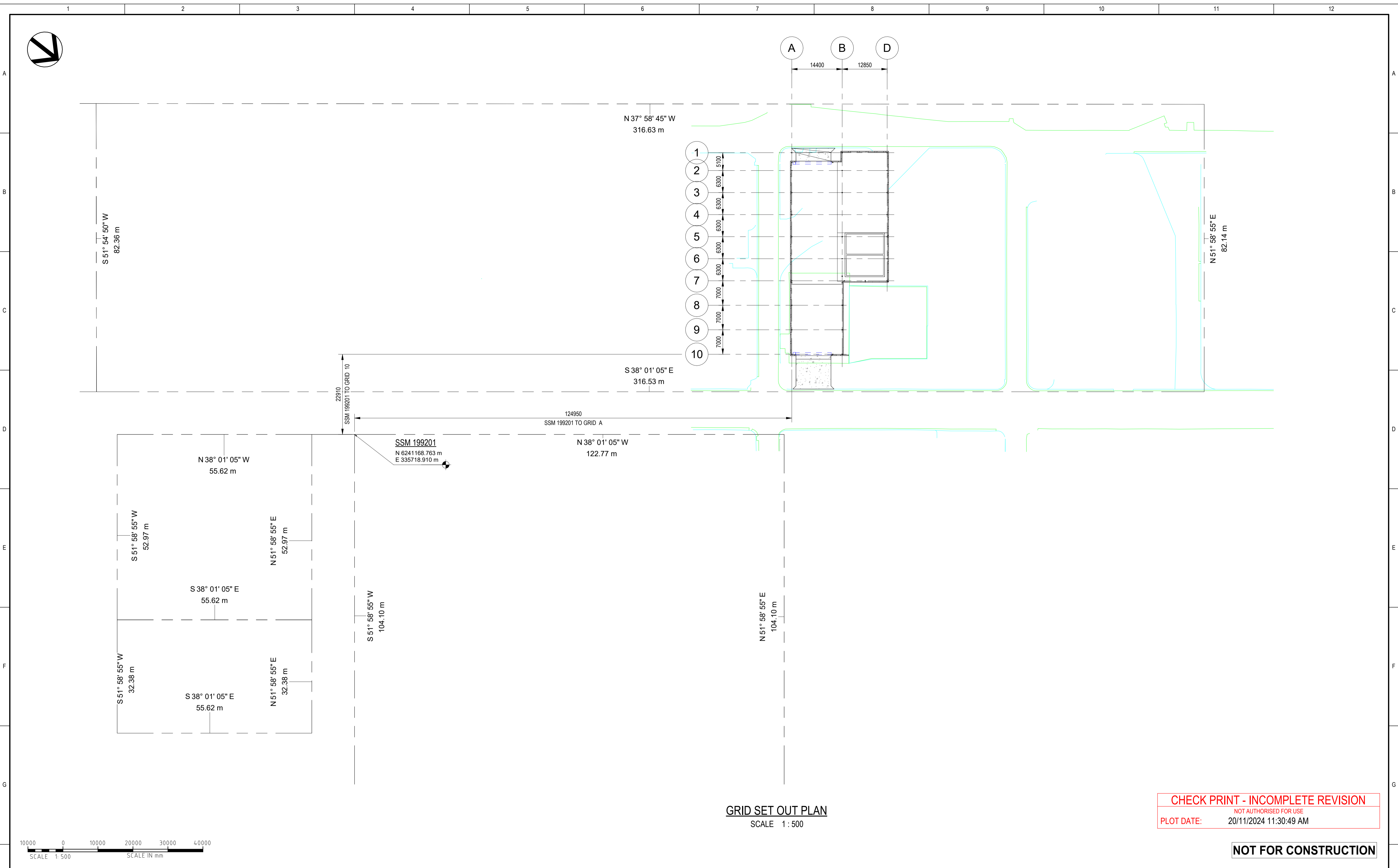
ORIG. SIZE  
**A1**

TITLE  
IXOM OPERATIONS PTY. LTD.  
PROJECT GEMINI  
ARCHITECTURAL  
**SITE PLAN - PROPOSED**

DRAWING NO.  
**PC.20301993-13-102**

REVISION

FILE: C:\Users\k166807\OneDrive - KBR\Documents\Project Gemini - Building\_Jimoh\_Sou9ku\K1.rvt  
 DATE: 20/11/2024 11:30:49 AM  
 © Kellogg Brown & Root



REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING		
			CHECK		
			ORIGINATE/DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

**Kellogg Brown & Root Pty Ltd**

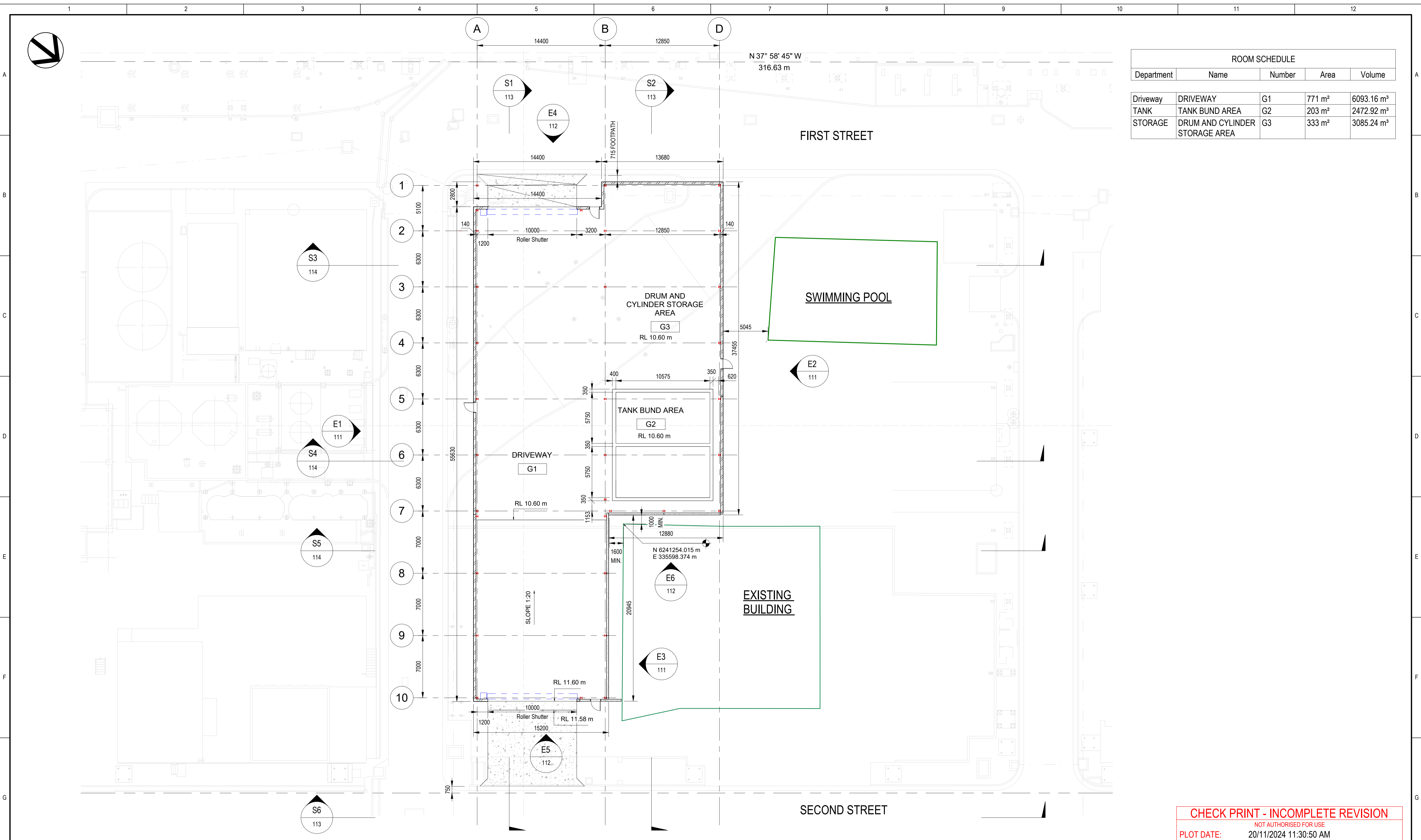
Kellogg Brown & Root Pty Ltd  
 ABN 91 007 660 317

DRAWING SCALE: 1 : 500  
 DRAFTER: Author

TITLE: IXOM OPERATIONS PTY. LTD.  
 PROJECT GEMINI  
 ARCHITECTURAL  
 GRID SET OUT PLAN

ORIG. SIZE: A1  
 DRAWING NO: PC.20301993-13-103  
 REVISION:

FILE: C:\Users\k166807\OneDrive - KBR\Documents\Project Gemini - Building - Jinh Song\K1.rvt  
 DATE: 20/11/2024 11:30:50 AM  
 © Kellogg Brown & Root



ROOM SCHEDULE				
Department	Name	Number	Area	Volume
Driveway	DRIVEWAY	G1	771 m <sup>2</sup>	6093.16 m <sup>3</sup>
TANK	TANK BUND AREA	G2	203 m <sup>2</sup>	2472.92 m <sup>3</sup>
STORAGE	DRUM AND CYLINDER STORAGE AREA	G3	333 m <sup>2</sup>	3085.24 m <sup>3</sup>

GENERAL ARRANGEMENT PLAN - GROUND



**CHECK PRINT - INCOMPLETE REVISION**  
 NOT AUTHORISED FOR USE  
 PLOT DATE: 20/11/2024 11:30:50 AM

**FOR INFORMATION**

REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING		
			CHECK		
			ORIGINATE/DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

**NOT AUTHORISED FOR USE**

**Kellogg Brown & Root Pty Ltd**

Kellogg Brown & Root Pty Ltd  
 ABN 91 007 660 317

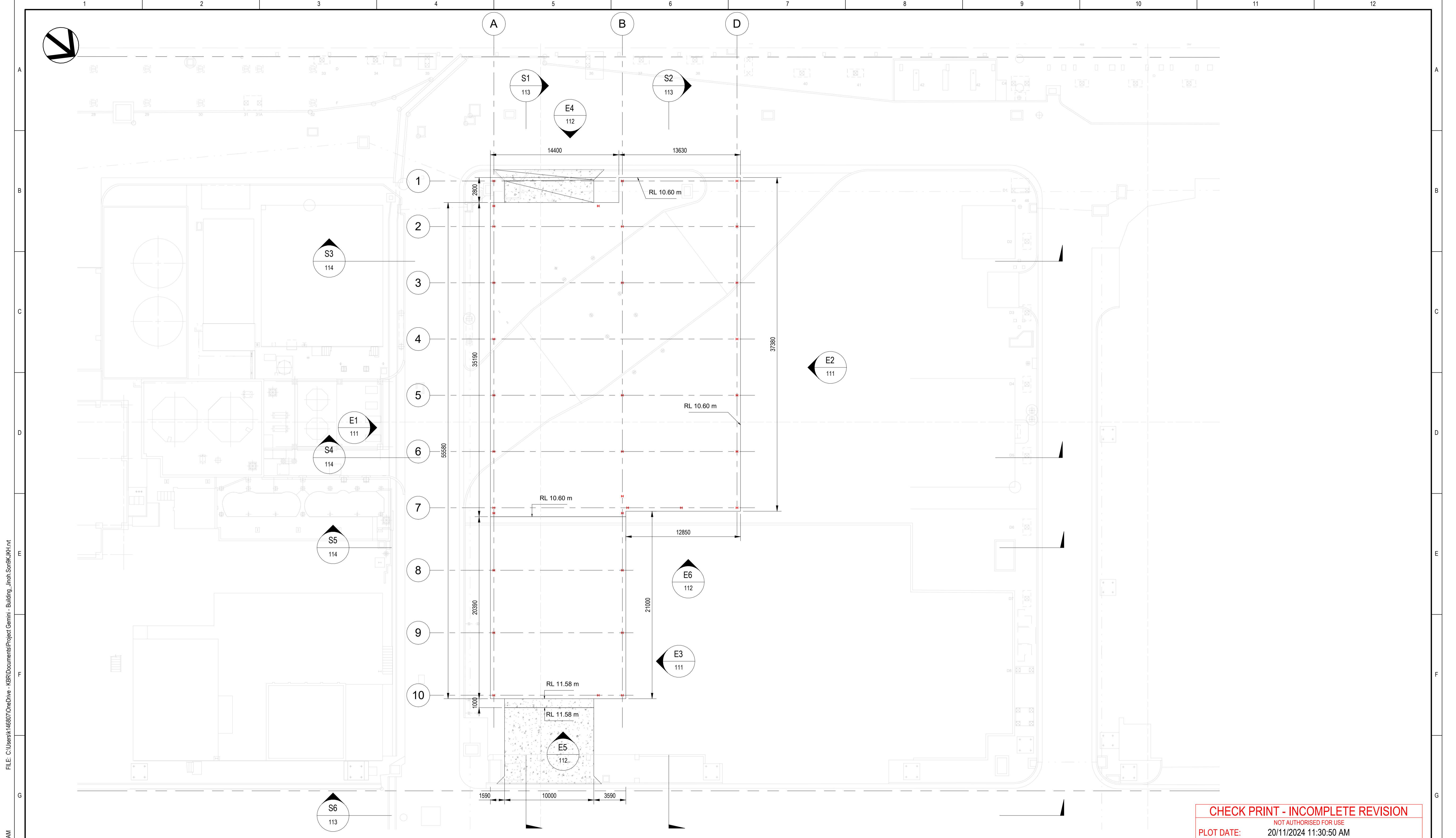
DRAWING SCALE: 1:200  
 DRAFTER: Author

TITLE  
 IXOM OPERATIONS PTY. LTD.  
 PROJECT GEMINI  
 ARCHITECTURAL  
 GENERAL ARRANGEMENT - GROUND FLOOR PLAN

DRAWING NO.  
 PC.20301993-13-105

ORIG. SIZE  
 A1

REVISION



CONCRETE OUTLINE PLAN - GROUND  
SCALE 1:200

**CHECK PRINT - INCOMPLETE REVISION**  
NOT AUTHORISED FOR USE  
PLOT DATE: 20/11/2024 11:30:50 AM


**FOR INFORMATION**



REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING CHECK		
			ORIGINATE/ DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

**NOT AUTHORISED FOR USE**

**Kellogg Brown & Root Pty Ltd**



Kellogg Brown & Root Pty Ltd  
ABN 91 007 660 317

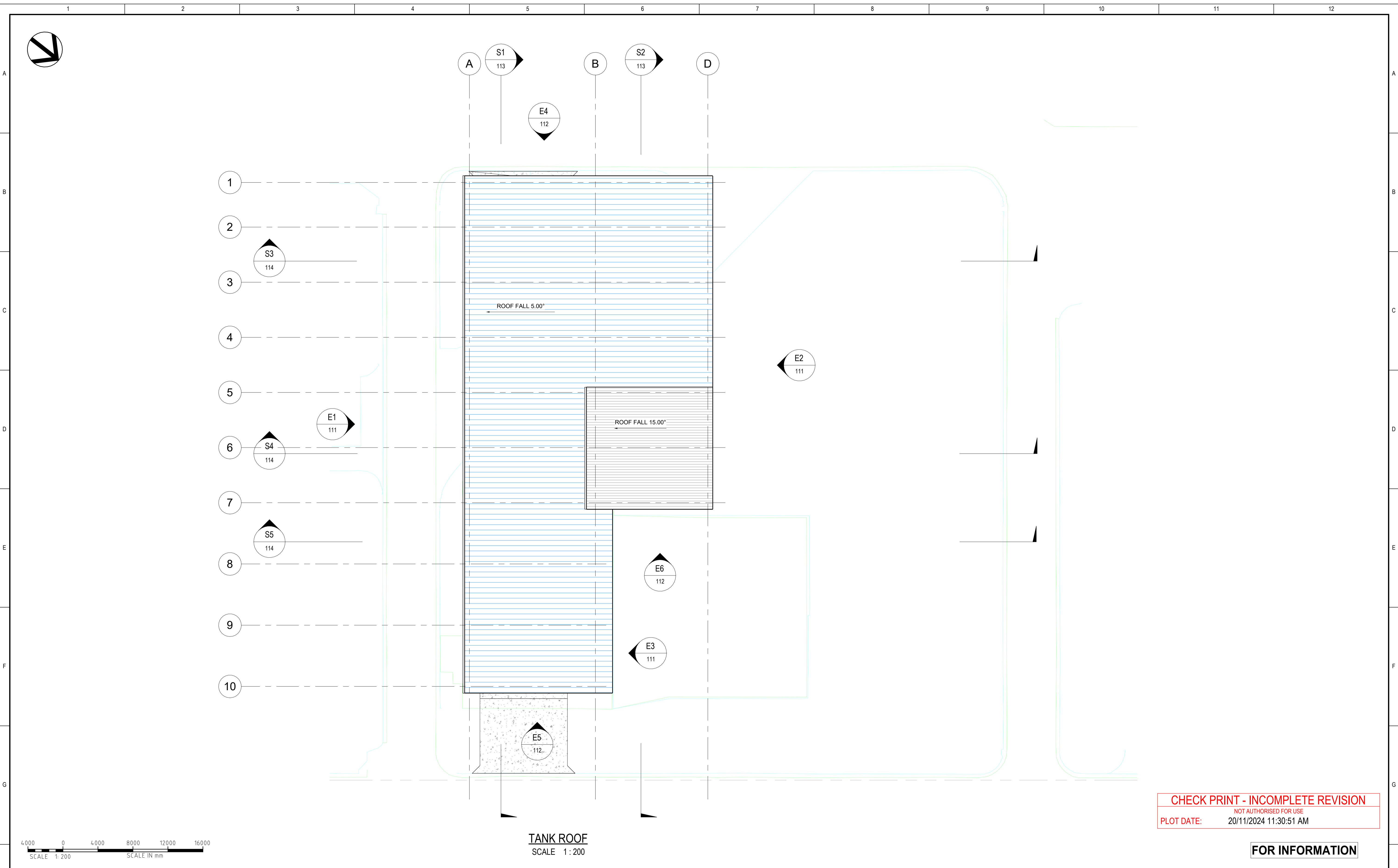
DRAWING SCALE: 1:200  
DRAFTER: Author

TITLE  
IXOM OPERATIONS PTY. LTD.  
PROJECT GEMINI  
ARCHITECTURAL  
GENERAL ARRANGEMENT - CONCRETE OUTLINE PLAN

ORIG. SIZE: A1  
DRAWING NO.: PC.20301993-13-107  
REVISION:

FILE: C:\Users\k166807\OneDrive - KBR\Documents\Project Gemini - Building - Jinh-Song\K1.rvt  
DATE: 20/11/2024 11:30:50 AM  
© Kellogg Brown & Root

FILE: C:\Users\k166807\OneDrive - KBR\Documents\Project Gemini - Building - Jinh\_Song\K1.rvt  
 DATE: 20/11/2024 11:30:51 AM  
 © Kellogg Brown & Root



**TANK ROOF**  
 SCALE 1 : 200




**CHECK PRINT - INCOMPLETE REVISION**  
 NOT AUTHORISED FOR USE  
 PLOT DATE: 20/11/2024 11:30:51 AM

**FOR INFORMATION**

REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING CHECK		
			ORIGINATE/ DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

**NOT AUTHORISED FOR USE**

**Kellogg Brown & Root Pty Ltd**

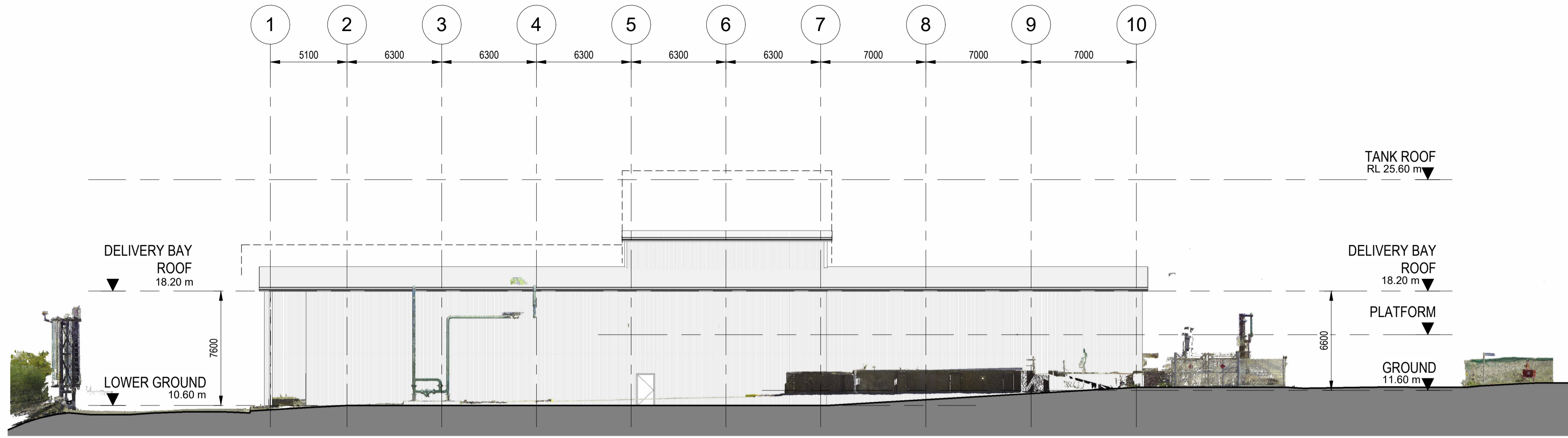


Kellogg Brown & Root Pty Ltd  
 ABN 91 007 660 317

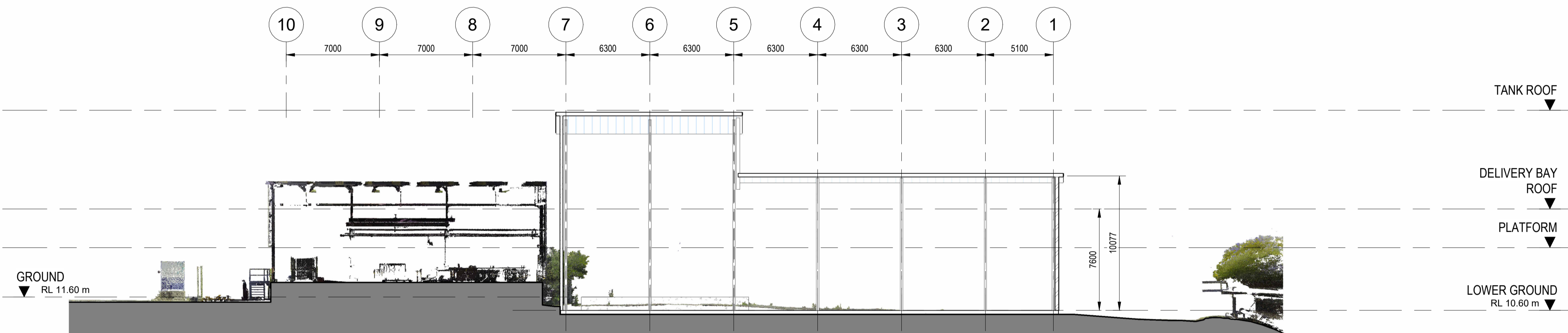
DRAWING SCALE: 1 : 200  
 DRAFTER: Author

TITLE  
 IXOM OPERATIONS PTY. LTD.  
 PROJECT GEMINI  
 ARCHITECTURAL  
 GENERAL ARRANGEMENT - ROOF PLAN

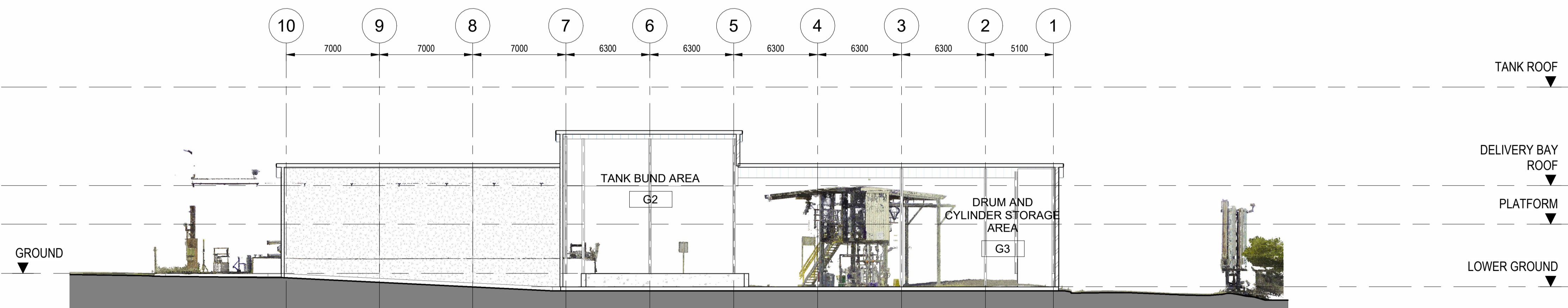
ORIG. SIZE: A1  
 DRAWING NO.: PC.20301993-13-109  
 REVISION



ELEVATION E1  
SCALE 1 : 200



ELEVATION E2  
SCALE 1 : 200



ELEVATION E3  
SCALE 1 : 200



**CHECK PRINT - INCOMPLETE REVISION**  
NOT AUTHORISED FOR USE  
PLOT DATE: 20/11/2024 11:31:02 AM

**FOR INFORMATION**

REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING CHECK		
			ORIGINATE/ DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

NOT AUTHORISED FOR USE



TITLE  
IXOM OPERATIONS PTY. LTD.  
PROJECT GEMINI  
ARCHITECTURAL  
GENERAL ARRANGEMENT - ELEVATIONS - SHEET 1

DRAWING SCALE  
1 : 200  
DRAFTER: Author

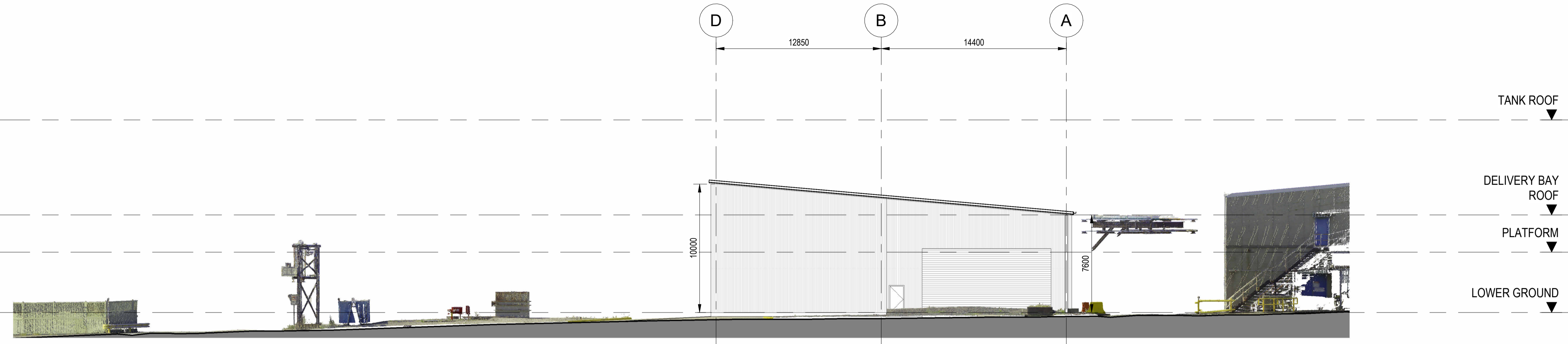
ORIG. SIZE  
A1

DRAWING NO.  
PC.20301993-13-111

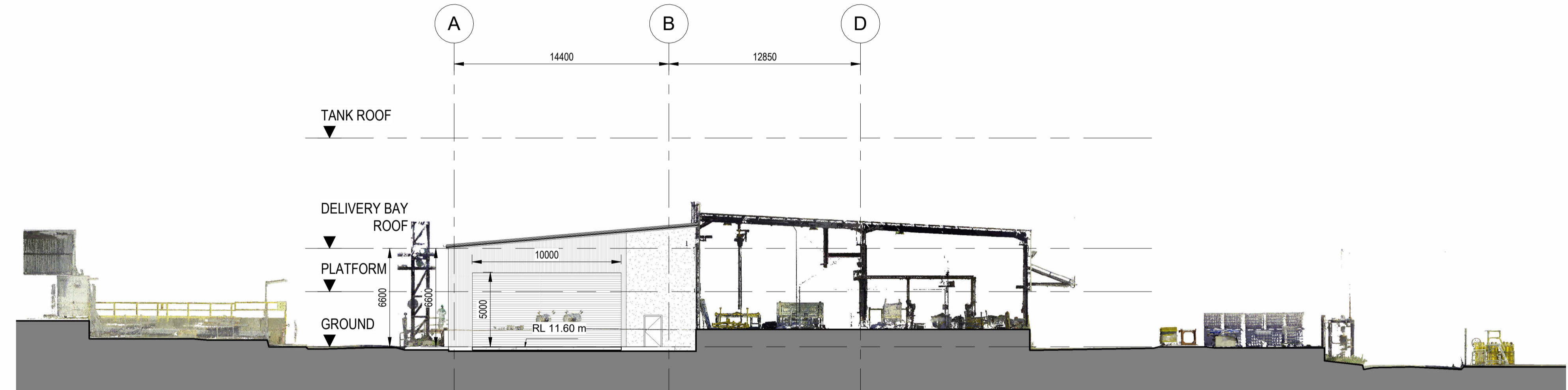
REVISION

FILE: C:\Users\sk146807\OneDrive - KBR\Documents\Project Gemini - Building - Jinh\_Son9KJ\K1.rvt  
DATE: 20/11/2024 11:31:02 AM  
© Kellogg Brown & Root

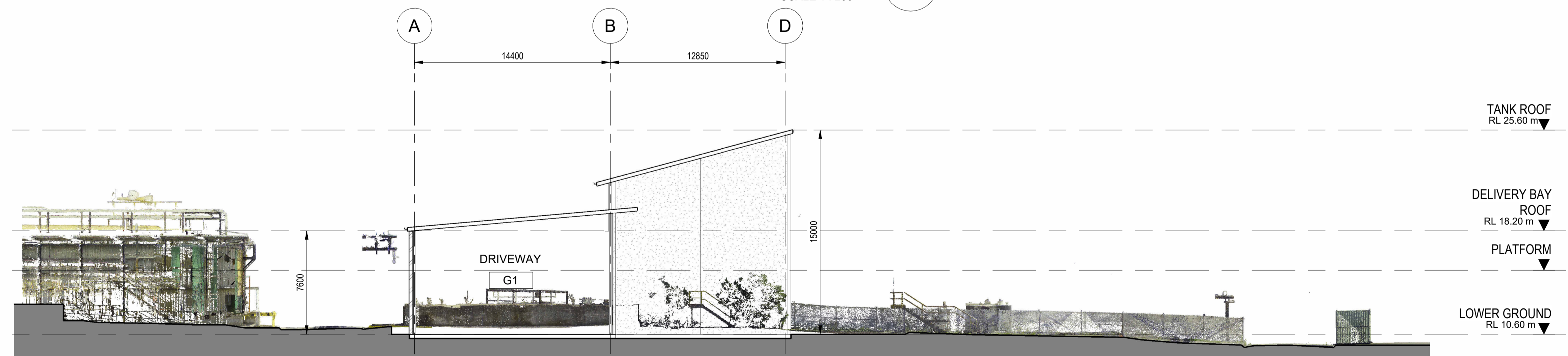
FILE: C:\Users\k166807\OneDrive - KBR\Documents\Project Gemini - Building - Jinh\_Song\K1.rvt  
 DATE: 20/11/2024 11:31:12 AM  
 © Kellogg Brown & Root



ELEVATION E4  
 SCALE 1 : 200



ELEVATION E5  
 SCALE 1 : 200



ELEVATION E6  
 SCALE 1 : 200



**CHECK PRINT - INCOMPLETE REVISION**  
 NOT AUTHORISED FOR USE  
 PLOT DATE: 20/11/2024 11:31:12 AM

**FOR INFORMATION**

REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING CHECK		
			ORIGINATE/ DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

NOT AUTHORISED FOR USE

**Kellogg Brown & Root Pty Ltd**

Kellogg Brown & Root Pty Ltd  
 ABN 91 007 660 317

DRAWING SCALE: 1 : 200  
 DRAFTER: Author

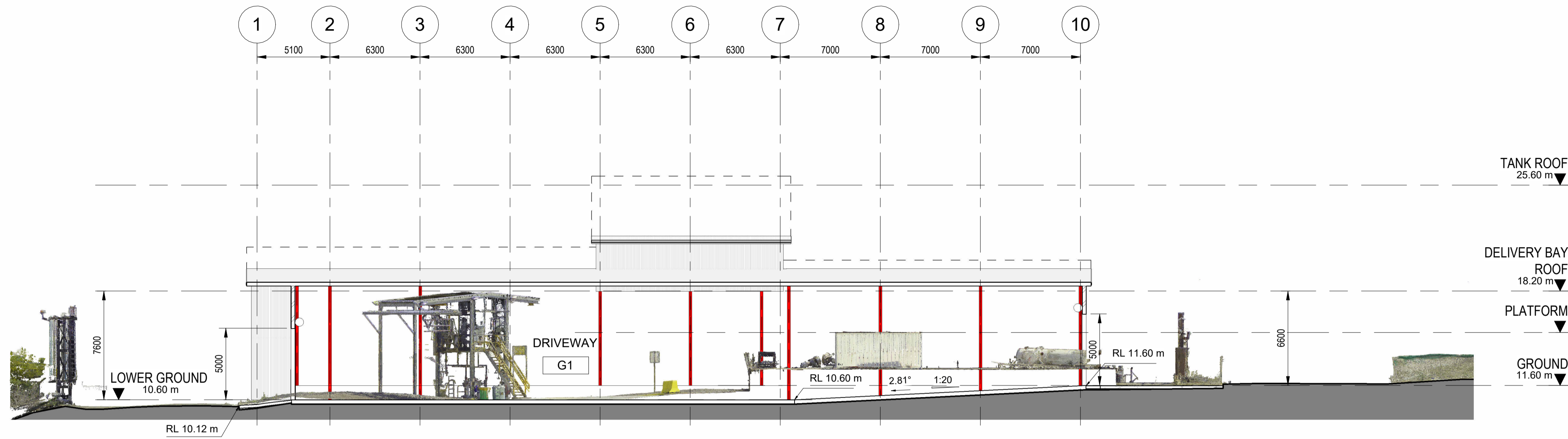
TITLE  
 IXOM OPERATIONS PTY. LTD.  
 PROJECT GEMINI  
 ARCHITECTURAL  
 GENERAL ARRANGEMENT - ELEVATIONS - SHEET 2

DRAWING NO.  
 PC.20301993-13-112

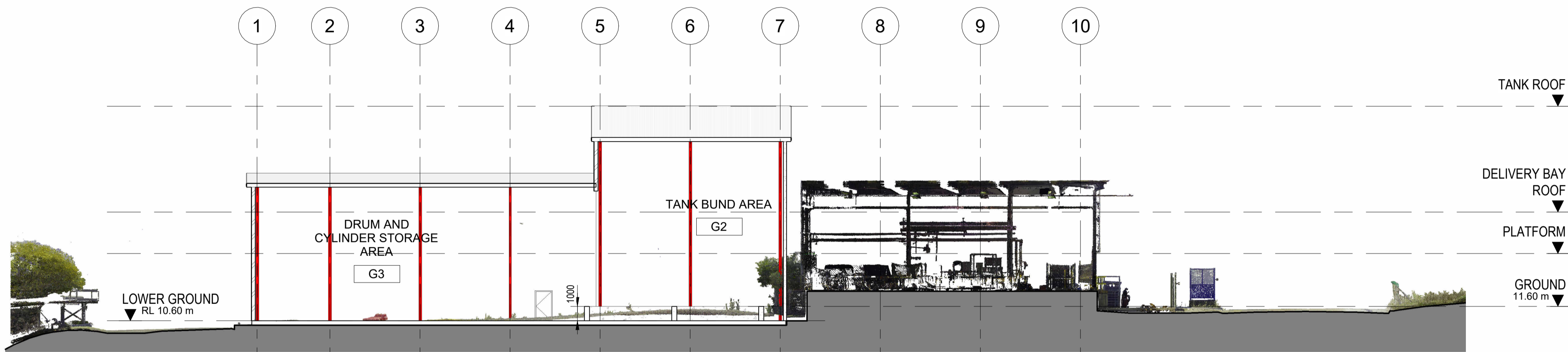
ORIG. SIZE: A1

REVISION

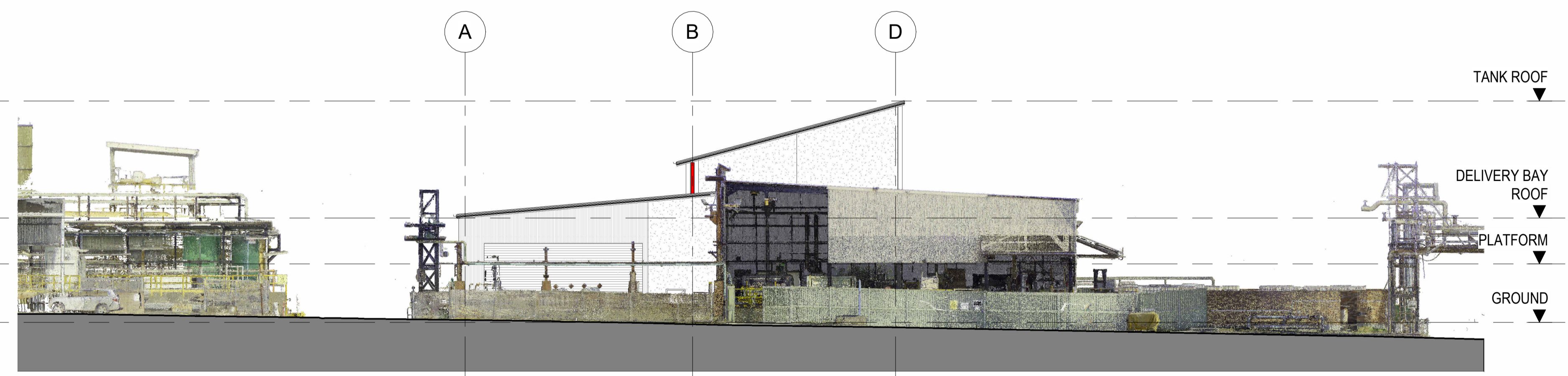
FILE: C:\Users\sk166807\OneDrive - KBR\Documents\Project Gemini - Building - Jinhua\_SongKu\K1.rvt  
 DATE: 20/11/2024 11:31:21 AM  
 © Kellogg Brown & Root



SECTION S1  
 SCALE 1 : 200



SECTION S2  
 SCALE 1 : 200



SECTION S6  
 SCALE 1 : 200



**CHECK PRINT - INCOMPLETE REVISION**  
 NOT AUTHORISED FOR USE  
 PLOT DATE: 20/11/2024 11:31:21 AM

**FOR INFORMATION**

REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING		
			CHECK		
			ORIGINATE/DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

**NOT AUTHORISED FOR USE**

**Kellogg Brown & Root Pty Ltd**

Kellogg Brown & Root Pty Ltd  
 ABN 91 007 660 317

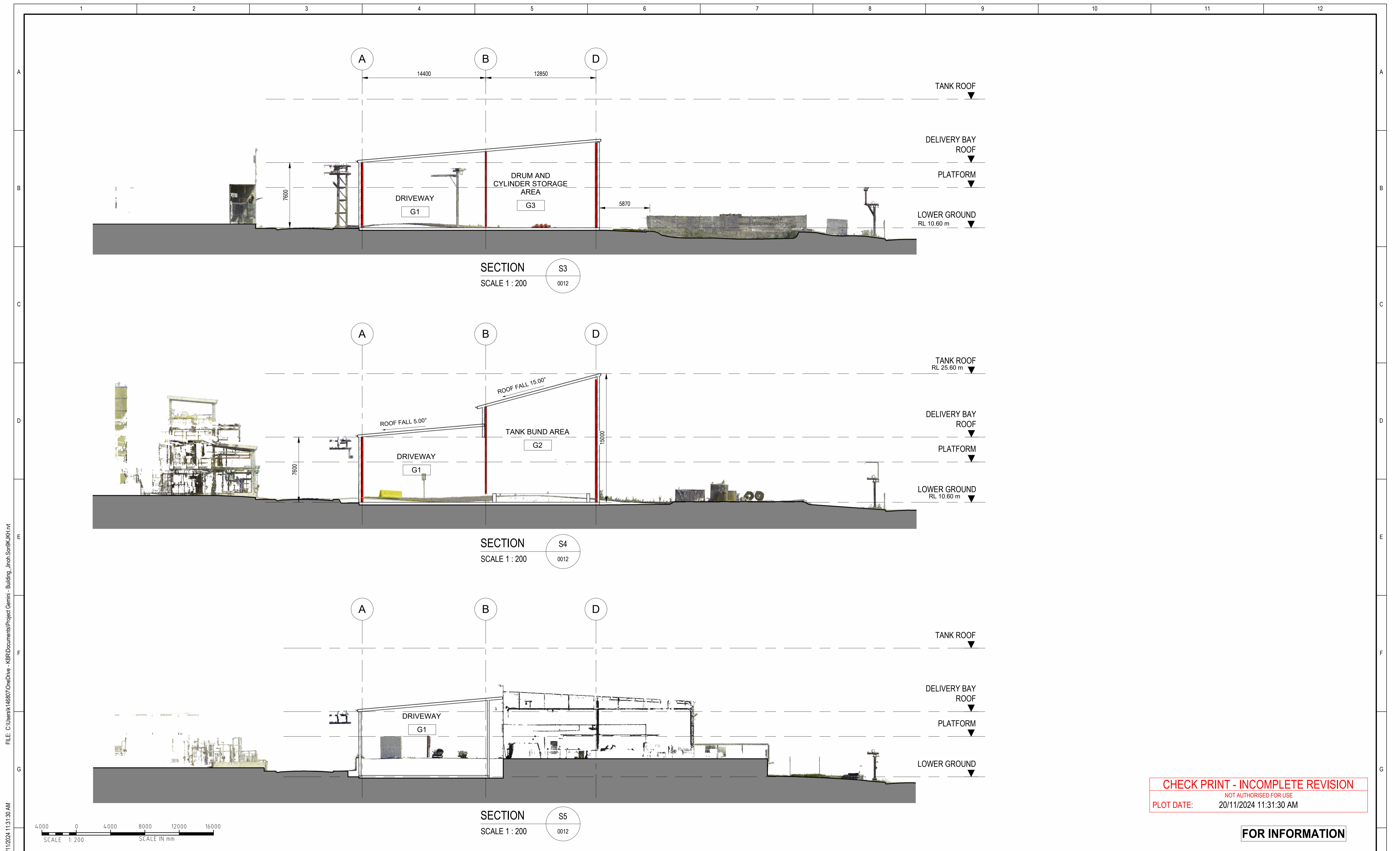
DRAWING SCALE: 1 : 200  
 DRAFTER: Author

TITLE  
 IXOM OPERATIONS PTY. LTD.  
 PROJECT GEMINI  
 ARCHITECTURAL  
 GENERAL ARRANGEMENT - SECTIONS - SHEET 1

DRAWING NO. PC.20301993-13-113

ORIG. SIZE: A1

REVISION



SECTION S3  
SCALE 1 : 200

SECTION S4  
SCALE 1 : 200

SECTION S5  
SCALE 1 : 200

**CHECK PRINT - INCOMPLETE REVISION**  
NOT AUTHORISED FOR USE  
PLOT DATE: 20/11/2024 11:31:30 AM

**FOR INFORMATION**



REV	DESCRIPTION	DATE	POSITION	NAME	SIGNATURE
			DRAFTING CHECK		
			ORIGINATE/DESIGN		
			INDEPENDENT CHECK		
			TECHNICAL APPROVAL		
			PROJECT APPROVAL		
			CLIENT APPROVAL		

NOT AUTHORISED FOR USE



TITLE  
IXOM OPERATIONS PTY. LTD.  
PROJECT GEMINI  
ARCHITECTURAL  
GENERAL ARRANGEMENT - SECTIONS - SHEET 2

DRAWING SCALE  
1 : 200  
DRAFTER: Author

ORIG. SIZE  
A1

DRAWING NO.  
PC.20301993-13-114

REVISION

FILE: C:\Users\k166807\OneDrive - KBR\Documents\Project Gemini - Building\_So99\K1.rvt DATE: 20/11/2024 11:31:30 AM © Kellogg Brown & Root

© JBS&G

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

#### Document Distribution

Rev No.	Copies	Recipient	Date
A	Electronic		30/01/2025

#### Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
A	Chris Bielby	Matthew Parkinson			30/01/2025



### Adelaide

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

### Brisbane

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

### Bunbury

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

### Canberra

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

### Darwin

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

### Hobart

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

### Melbourne

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

### Newcastle

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

### Perth

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

### Sydney

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

### Wollongong

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

