

EDSGEAR PTY LTD



Remediation Action Plan

28-38 Pacific Highway, St Leonards NSW

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Executive Summary

EI Australia (EI) was engaged by Edsgear Pty Ltd ('the client') to prepare a Remediation Action Plan (RAP) for 28-38 Pacific Highway, St Leonards NSW ('the site'), for the proposed redevelopment of the site.

The site is located within the local government area (LGA) of Lane Cove Municipal Council, as shown in **Figure 1, Appendix A** and is identified as Lot 1 in Deposited Plan (DP) 746012, Lots A and B in DP 418201 and Lot D in DP 419248, covering a total area of approximately 1,290 m² (**Figure 2, Appendix A**). At the time of preparation of this RAP, the site comprised two adjacent two-storey mixed-use buildings at 28-32 Pacific Highway, featuring three shops on the ground floor and three residential dwellings on the first floor. Additionally, the property at 34-38 Pacific Highway featured a three-storey unoccupied office building with a two-level basement car park.

Based on the client supplied architectural plans (**Appendix B**), the site redevelopment will involve the demolition of existing structures, followed by the construction of a ten storey hotel, overlying two levels of underground basement. Commercial/retail uses will be designated for the lower ground (LG) and ground floors, with hotel units specified for the upper levels.

This RAP has been prepared in response to a request from Lane Cove Council (Council) and is intended to establish a comprehensive and systematic approach for the investigation, remediation and validation of any contaminated soils and/or groundwater that may be identified during the proposed investigation phase, in accordance with the provisions of the *State Environmental Planning Policy (Resilience and Hazards) 2021*.

This RAP also outlines protocols for managing unexpected finds during remediation and validation works. If during these works residual contamination is identified, the procedures in **Section 8** will be followed until remediation goals are met and the site is deemed suitable for the proposed mixed commercial/residential (hotel and retail) use.

The preferred remediation approach involves excavation and off-site disposal of impacted soils at licensed facilities; however, the final method will depend on the results of the proposed soil and groundwater investigations.

It is envisaged that the investigation and remediation works will be implemented in stages, as follows:

- **Stage 1** – Preliminaries and site establishment;
- **Stage 2** – Pre-demolition Hazardous Materials Survey (HMS) and site demolition;
- **Stage 3** – Detailed Site Investigation (DSI);
- **Stage 4** – Remedial excavation and validation of impacted soils (if required);
- **Stage 5** – Bulk Excavation and Waste Classification; and
- **Stage 6** – Validation Reporting.

With consideration of EI's Statement of Limitations (**Section 10**), EI considers that the site can be made suitable for its proposed land use through the successful implementation of this RAP.

1. Introduction

1.1 Background

EI Australia (EI) was engaged by Edsgear Pty Ltd ('the client') to prepare a Remediation Action Plan (RAP) for 28-38 Pacific Highway, St Leonards NSW ('the site'), for the proposed redevelopment of the site.

The site is located within the local government area (LGA) of Lane Cove Municipal Council, as shown in **Figure 1, Appendix A** and is identified as Lot 1 in Deposited Plan (DP) 746012, Lots A and B in DP 418201 and Lot D in DP 419248, covering a total area of approximately 1,290 m² (**Figure 2, Appendix A**). At the time of preparation of this RAP, the site comprised two adjacent two-storey mixed-use buildings at 28-32 Pacific Highway, featuring three shops on the ground floor and three residential dwellings on the first floor. Additionally, the property at 34-38 Pacific Highway featured a three-story unoccupied office building with a two-level basement car park.

The site has been designated for redevelopment and this RAP was prepared in response to a request from Lane Cove Council (Council). The purpose of this RAP is to establish a comprehensive and systematic approach for the investigation, remediation and validation of any contaminated soils and/or groundwater that may be identified during the proposed investigation phase, in accordance with the provisions of the *State Environmental Planning Policy (Resilience and Hazards) 2021*.

1.2 Proposed Development

Based on the client supplied architectural plans (**Appendix B**), the site redevelopment will involve the demolition of existing structures, followed by the construction of a ten storey hotel, overlying two levels of underground basement. Commercial/retail uses will be designated for the lower ground (LG) and ground floors, with hotel units specified for the upper levels.

The basement will cover most of the site area, with a Finished Floor Level (FFL) of 68.9 metres Australian Height Datum (mAHD), or approximately 9 to 10 metres below ground level (mBGL). Locally deeper excavations might be required for footings, lift overrun pits, crane pads and service trenches. Limited set-back areas are proposed along the south-western site boundary.

1.3 Objectives of the RAP

The main objective of this RAP is to set the remediation goals and document the process to investigate and remediate the site (if remediation is required), including:

- To provide details on the potential contaminant sources and site impacts based on available information;
- To provide details of the proposed assessment of the nature and extent of soil and groundwater contamination (if present), by means of an intrusive sampling and laboratory analysis program;
- To detail the procedures to be implemented for site remediation (if remediation is required);
- To demonstrate that the proposed remediation strategy for the site is environmentally justifiable, practical and technically feasible, and will result in no unacceptable risks to future onsite and offsite receptors if successfully implemented;
- To define the remediation acceptance criteria (RAC) that will be adopted to validate the site as suitable for its proposed future land-use; and
- To outline site management practices to be implemented during remediation with respect to work health and safety, environmental management, and contingency actions that may be triggered should unexpected finds be discovered during the site remediation and validation process.

1.4 Scope of Works

To meet the objectives of the RAP, the following scope of work has been undertaken:

- Review of previous investigation reports completed for the site;
- Definition of remediation goals and acceptance criteria;
- Review of the literature on remediation technologies relevant to the site;
- Evaluation of available remediation options and selection of the most appropriate remedial strategy (or combination of strategies) if required for the site;
- Provision of information so that remedial works may be carried out in accordance with relevant laws and regulations;
- Provision of information to assist the contractor in preparation of a work health and safety plan (WHSP) and other site management/planning documents; and
- Development of a scope of works for intrusive investigation of the site for site assessment and post-remedial validation works.

1.5 Regulatory Framework

The following legislation and guidelines were considered during the preparation of this RAP:

Legislation

- *Contaminated Land Management Act 1997* (CLM Act);
- *Water Management Act 2000* (Water Act);
- *Protection of the Environment Operations Act 1997* (POEO Act) and associated regulations, including the *Waste Regulation 2014*;

- *State Environmental Planning Policy (Resilience and Hazards) (2021);*
- *Lane Cove Development Control Plan 2009;*
- *Lane Cove Local Environmental Plan 2009; and*
- *WHS Regulations (2017), Work Health and Safety Regulation 2017 - under Work Health and Safety Act 2011, Safework NSW 2017.*

Guidelines

- Australian and New Zealand Governments and Australian state and territory governments *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018);
- Department of Environment and Conservation *Guidelines for the Assessment and Management of Groundwater Contamination* (DEC, 2007);
- Heads of EPAs Australia and New Zealand *PFAS National Environmental Management Plan 3.0* (HEPA, 2025);
- NSW Environment Protection Authority *NSW EPA Waste Classification Guidelines* (NSW EPA, 2014a and 2014b);
- NSW EPA *Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2017);
- NSW EPA *Consultants reporting on contaminated land, Contaminated Land Guidelines* (NSW EPA, 2020a);
- NSW EPA *Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019* (NSW EPA, 2020b);
- NSW EPA *Sampling Design Part 1 – Application* (NSW EPA, 2022a);
- NSW EPA *Sampling Design Part 2 – Interpretation* (NSW EPA, 2022b);
- National Environment Protection Council (NEPC) *National Environment Protection (Assessment of Site Contamination) Amendment Measure* (NEPC, 2013); and
- Western Australia Department of Health *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (WADOH, 2009).

1.6 Deviations from RAP

During the course of the program, it may become necessary to vary the sequence and/or details of the site investigation, remediation and validation works to meet site conditions or constraints. If so, or if the proposed development design changes significantly, these changes must be properly documented, as required under the *Consultants reporting on contaminated land guidelines* (NSW EPA, 2020a). Additionally revision of this RAP may be required.

2. Site Description

2.1 Property Identification, Location, and Physical Setting

The site identification details and associated information are presented in **Table 2-1**.

Table 2-1 Site Identification

Attribute	Description
Street Address	28-38 Pacific Highway, St Leonards NSW
Location Description	The land is bounded by: - North: Pacific Highway, followed by commercial buildings; - East: Mixed commercial and residential apartment buildings, followed by Park ('Wadangari Park') and North Shore Railway Track ; - South: Marshall Lane followed by mixed commercial and residential buildings; and - West: Child care centre ('Only about children') and Medical diagnostic imaging centre ('Castlereagh Imaging St Leonards'), followed by Berry Road and sports complex ('Gore Hill Oval').
Site Coordinates	Northern-eastern corner of site (GDA2020-MGA56): - Easting: 332813.571 - Northing: 6255912.918 (Source: http://maps.six.nsw.gov.au)
Site Area	1,290 m ²
Lot and DP	- Lot 1 in DP 746012; - Lots A and B in DP 418201; and - Lot D in DP 419248.
State Survey Marks	Three state survey marks are situated in close proximity to the site: - SS39004: on the corner of Pacific Highway and Reserve Road (approximately 62m north-west of site); - SS39005: on the southern side of Pacific Highway (approximately 44m north-east of site); - SS38988 D: on the corner of Herbert Street and Pacific Highway (approximately 58m north-west of site). (Source: http://maps.six.nsw.gov.au)
LGA	Lane Cove Municipal Council
Current Zoning	E2 – Commercial Centre (Lane Cove Municipal Local Environmental Plan 2009)
Current Use	At the time of preparation of this RAP, the site consisted of two adjoining two-storey mixed-use buildings at 28–32 Pacific Highway, comprising three ground-floor retail tenancies and three first-floor residential units. The adjacent property at 34–38 Pacific Highway included a three-storey vacant office building with a two-level basement car park.

2.2 Local Land Use

The site is situated within a mixed residential and commercial area. The local receptors within close proximity to the site are identified in **Table 2-2**.

Table 2-2 Local Land Uses

Direction	Land Use Description	Sensitive Receptor (and distance from site)
North	Commercial buildings	Building occupants (25m north)
South	Mixed commercial and residential apartment	Residents (5m south) Building occupants (5m south)
East	Mixed commercial and residential apartment Wadangari Park	Residents (directly adjacent) Building occupants (directly adjacent) Pedestrians using Park (85m east) Ecological receptors (85m east)
West	Child care centre Commercial building Sports complex	Childcare workers and children (directly adjacent) Building occupants (23m west) Ecological receptors (78m west)

2.3 Regional Setting

Local topography, geological and soil landscape information are summarised in **Table 2-3**.

Table 2-3 Regional Setting

Attribute	Description
Topography	The site is gently sloping towards the south. Surface elevations range from 78 mAHD on the north-western boundary, to 74 mAHD on the southern boundary. (Source: https://meconemosaic.au/)
Site Drainage	Likely to be consistent with the general slope of the site. Stormwater is expected to be collected in stormwater pits and piped to the municipal collection system.
Regional Geology	The Department of Mineral Resources Sydney 1:100,000 <i>Geological Series Sheet 9130</i> (DMR, 1983) indicates the site is underlain by Ashfield Shale (Rwa) of the Wianamatta Group, comprising black to dark grey shale and laminite.
Soil Landscape	The NSW Department of Climate Change, Energy, the Environment and Water eSPADE v2.2 portal indicates that the site overlies Glenorie (gn) erosional landscape. This landscape is comprised of undulating to rolling low hills on Wianamatta Group shales. Local relief 50–80 m, slopes 5–20%. Narrow ridges, hillcrests and valleys. Extensively cleared tall open-forest (wet sclerophyll forests).
Acid Sulfate Soil (ASS) Risk	The <i>Lane Cove Local Environmental Plan 2009</i> has not mapped the site as a potential risk area with respect to acid sulfate soils (ASS). The <i>Prospect – Parramatta</i> acid sulfate soils (ASS) risk map (1:25,000 scale; Murphy, 1997), indicates the site lies within the map class description of <i>No known occurrence</i> . In such cases, ASS are not known or expected to occur and “ <i>land management activities are not likely to be affected by ASS materials</i> ”. Based on the above, the potential for ASS to be present on the site is considered to be low and further assessment or management actions are not deemed required.
Nearest Surface Water Feature	▪ Berry Creek (approximately 590 m south of the site). ▪ Lane Cove River (approximately 1.2 km south-west of the site).
Typical Soil Profile	The general site lithology encountered during a previous geotechnical investigation undertaken at the site by JK Geotechnics Pty Ltd (JKG, 2025) comprised a layer of silty clay filling (to 1.3 mBGL), overlying residual silty clay (between 1.3 and 3.0 mBGL) and low to medium strength sandstone bedrock extending to at least 18 mBGL. Geological maps suggested the site is within an area underlain by Ashfield Shale, however, it is relatively close to a boundary with Hawkesbury Sandstone.
Depth to	The standing water level (SWL) was recorded at a depth of 4.55 mBGL (70.8 mAHD)

Attribute	Description
Groundwater	(JKG, 2025).
Groundwater Bore Records	An online search for groundwater bores registered with WaterNSW was conducted on 17 July 2025 (https://realtime.data.watersnsw.com.au/water.stm). No registered bores were identified within a 500 m radius of the site.
Groundwater Flow Direction	Groundwater flow direction in the area is anticipated to be in a south-westerly direction towards Berry Creek, which flows into Lane Cove River, located approximately 1.2 km south-west of the site.

3. Site Characterisation

3.1 Previous Investigations

EI is aware of two previous investigations that have been completed for the site. The following reports were provided by the client and were reviewed as part of the preparation of this RAP:

- JKG (2025) *Preliminary Geotechnical Investigation, 28-38 Pacific Highway, St Leonards*, prepared by JK Geotechnics, Report No. 37122Lrptrev1, dated 27 March 2025; and
- EI (2025) *Preliminary Site Investigation, 28-38 Pacific Highway, St Leonards*, Report No. E26701.E01_Rev0, dated 31 March 2025.

A summary of the relevant information from these reports is provided in **Table 3-1**.

Table 3-1 Summary of Previous Reports

Project Task	Findings
Preliminary Geotechnical Investigation (PGI) (JKG, 2025)	
Purpose	To provide geotechnical advice and recommendations to assist in the preparation of designs for the proposed development.
Scope of Works	▪ Drilling of one borehole (BH1) and rock coring to a total depth of 18.06 mBGL. ▪ Conversion of borehole into groundwater monitoring well to allow groundwater level monitoring. ▪ Laboratory tests comprising Point Load Index Tests on rock cores. ▪ Visual appraisal of the site conditions and locality.
Key Findings	▪ The geological profile comprised a layer of silty clay filling (to 1.3 mBGL), overlying residual silty clay (between 1.3 and 3.0 mBGL) and low to medium strength sandstone bedrock extending to 18.06 mBGL. Geological maps suggested the site is within an area underlain by Ashfield Shale, however, it is relatively close to a boundary with Hawkesbury Sandstone. ▪ The standing water level (SWL) was recorded at a depth of 4.55 mBGL (70.8 mAHD). ▪ The report also addressed geotechnical considerations for the proposed development, including excavation conditions, shoring methods, groundwater management, footings, and basement slabs.
Preliminary Site Investigation (PSI) (EI, 2025)	
Objective	The objective of the investigation was to assess the environmental conditions of the site, by appraising the potential for contamination on the basis of field observations, historical land uses, anecdotal information and other documentary evidences.
Scope of Works	▪ Review of relevant topographical, geological and soil landscape maps; ▪ Review of site history, based on aerial photographs, council records, historical database, NSW WorkCover (SafeWork NSW) records and land title records; ▪ Review of previous investigation reports; ▪ Detailed site walkover; ▪ Development of preliminary Conceptual Site Model (CSM); ▪ Data interpretation and reporting.
Findings	At the time of site inspection on 25 March 2025, the site was occupied by two adjoining two-storey mixed-use buildings located at 28–32 Pacific Highway, comprising three ground-floor retail tenancies and three first-floor residential units. The neighbouring property at 34–38 Pacific Highway consisted of a vacant three-storey office building with a two-level basement car park.

Project Task	Findings
	Based on the CSM that was developed for the site, the following potential sources of contamination were identified; ▪ Hazardous building materials (including potential asbestos containing materials [ACM] and lead-based paint) present within the site structures; ▪ Historical commercial land-use (i.e. former pathology, radiology centre and dry cleaning facility); ▪ On-site migration from nearby (<250m) properties and historical land uses (including but not limited to printers, dry cleaners, motor painters, motor garages, service stations and chemical manufacturers); ▪ Potential pesticides application near building (footing) perimeters; and ▪ Leakage from vehicles at the car park area.
Conclusion and Recommendations	Based on the above findings, EI concluded that there is the potential for contamination to be present on the site, primarily due to its commercial use since the 1970s. Notably, the property at 34 Pacific Highway operated as a dry-cleaning facility circa 1972. Additional potential sources of contamination were considered to include migration of contaminants from offsite properties and the potential use of hazardous materials in historical and/or existing onsite structures. EI recommended that a Hazardous Materials Survey (HMS) and a Detailed Site Investigation (DSI) be undertaken before and following site demolition, respectively.

3.2 Preliminary Conceptual Site Model

In accordance with NEPC (2013) *Schedule B2 - Guideline on Site Characterisation*, EI developed a conceptual site model (CSM) assessing plausible linkages between potential contamination sources, migration pathways and receptors. This section of the report presents the preliminary CSM for the site.

3.2.1 Summary of Site History

Based on the previous investigations (**Section 3.1**), the site was primarily used for residential purposes until the early 1970s. Since then, the site has been occupied by various commercial enterprises, including electrical engineering services, banking institutions and trustee services. Database records also show that the western portion of the site (36 Pacific Highway) operated as a dry-cleaning facility circa 1972.

Council documents for 34–38 Pacific Highway note that the ground floor previously accommodated a radiology centre, pathology collection centre, and laboratory, while the upper floors were used as an oncology centre. Additionally, 28–30 Pacific Highway was occupied by a bakery and pie shop in 1999.

Some of the historical and/or existing building structures on the site were constructed prior to the mid-1980s, at a time when the use of asbestos in building materials and lead paint was not yet restricted or prohibited in Australia. Therefore, hazardous building materials may be present on-site including potential ACM and lead-based paint.

The surrounding area has predominantly been residential since the 1940s, with the exception of the Royal North Shore Hospital located to the north and several commercial buildings to the west. By 1970, the area had transitioned into a mix of residential, commercial, and light industrial uses. Historical records indicate that surrounding land uses include but are not limited to printers, dry cleaners, motor painters, motor garages, service stations and chemical manufacturers.

3.2.2 Subsurface Conditions

The general site lithology encountered during the previous investigations was a layer of filling (down to 1.3 mBGL), overlying residual silty clay (down to depths of 1.3 to 3.0 mBGL) and low

to medium strength sandstone bedrock extending to 18.06 mBGL. Borehole logs prepared by JKG (2025) are attached in **Appendix C**.

3.2.3 Existing Site Contamination

Based on the findings of previous investigations (**Section 3.1**), the following potential site contamination sources have been identified:

- Hazardous building materials (including potential ACM and lead-based paint) present within the site structures;
- Historical commercial land-use (i.e. former pathology, radiology centre and dry cleaning facility);
- On-site migration from nearby neighbouring properties and historical land (including but not limited to printers, dry cleaners, motor painters, motor garages, service stations and chemical manufacturers);
- Potential pesticides application near building (footing) perimeters; and
- Leakage from vehicles at the car park area.

3.2.4 Contaminants of Potential Concern

The contaminants of potential concern (COPC) for the site are considered to be:

- Priority Metals (PM) - arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;
- Total Recoverable Hydrocarbons (TRH);
- Volatile Organic Compounds (VOC); including the monocyclic aromatic hydrocarbons Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and chlorinated VOCs (CVOC);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Organochlorine and Organophosphorus Pesticides (OCP/OPP);
- Polychlorinated Biphenyls (PCBs);
- Per- and Poly- Fluoroalkyl Substances (PFAS); and
- Asbestos.

3.2.5 Sources, Exposure Pathways and Receptors

The potential sources of contamination, exposure pathways and receptors considered relevant to the site and this RAP are summarised in **Table 3-2**.

Table 3-2 Conceptual Site Model

Potential Source	Medium	COPC	Sensitive Receptor	Exposure Pathway
Hazardous building materials	Soil	PM, TRH, BTEXN, PAH, CVOC, OCP, OPP, PFAS, PCBs and asbestos	Current and future site users	Dermal Contact
Former and current site uses (including dry cleaning)			Demolition/construction workers	Ingestion
			Adjacent site users	Inhalation of vapours
			Future intrusive workers	Inhalation of particulate
Leakage from vehicles	Groundwater	PM, TRH, BTEXN, PAH, CVOC, OCP, OPP, PCBs and PFAS	Ecological receptors in areas of exposed soil/landscaping	
			Current and future site users	Inhalation of vapours
			Demolition/construction workers	Ingestion
			Adjacent site users	Dermal contact
Migration from off-site sources			Future intrusive workers	Biota uptake
Application of pesticides			Ecological communities in the Berry Creek	

3.2.6 Data Gaps

The following data gaps have been identified, which require further assessment:

- Potential risks posed by soils at the site (including underneath the existing buildings and slabs) with respect to contaminants and hazardous materials (if present);
- Potential risks posed by groundwater contamination (if present);
- Potential risks posed by hazardous building materials used in former and existing site structures (if present); and
- Appropriate classification of waste materials and surplus soils to be removed from the site.

Due to these data gaps and the potential for contamination to exist at the site, the following is considered necessary:

- A Hazardous Materials Survey (HMS) and clearance inspection prior to and post demolition, respectively (refer **Section 6.3**); and
- A Detailed Site Investigation (DSI) following site demolition. The purpose of the DSI would be to assess the nature and degree of any site contamination (if present), by means of soil and groundwater sampling and laboratory analyses for the contaminants of potential concern (COPC) relevant to the site. The proposed scope for the DSI is provided in **Section 6.4**).

The works detailed in **Sections 6** of this RAP are expected to assist with closing the data gaps listed above.

4. Remediation Goal and Criteria

4.1 Remediation Goal

The remediation goal is to address potentially unacceptable risks to site receptors from soil and groundwater contamination (if present) and render the site suitable, from a contamination perspective, for the proposed development.

4.2 Remediation Acceptance Criteria

The following remediation acceptance criteria (RAC) should be adopted for the site, as outlined in **Table 4-1**. These were selected from NSW EPA endorsed guidelines, with consideration of the exposure scenario that is expected for the site, the likely exposure pathways and the identified potential site receptors.

Table 4-1 Remediation Acceptance Criteria

Medium	Guidelines	Rationale
Soil	NEPC (2013) HILs, HSLs, EILs, ESLs and Management Limits for TRH	Soil Health-based Investigation Levels (HILs) NEPC (2013) HIL-D thresholds for commercial / industrial settings. Soil Health-based Screening Levels (HSLs) NEPC (2013) HSL-D thresholds for vapour intrusion at commercial and industrial sites will be applied to assess potential human health impacts from residual vapours resulting from petroleum, BTEX and naphthalene. This is as per Section 2.4.8 of NEPC (2013) Schedule B1 which states that for multistorey buildings where non-residential uses (e.g. car parking or commercial use) exist in a basement or at ground level, then land use category D (commercial/industrial) should be applied. <u>For asbestos:</u> ▪ Bonded ACM - HSL-D for building footprint and paved areas; ▪ Friable Asbestos: 0.001% w/w in all areas of the site; ▪ No visible asbestos on soil surface in all areas of the site. Ecological Investigation Levels (EILs) / Ecological Screening Levels (ESLs) NEPC (2013) EILs/ESLs for urban residential land uses settings were adopted, to assess the potential impact to proposed landscaping areas, where plants could be exposed to soils and where precipitation may result in subsurface infiltration and resulting leaching of soil impacts to groundwater. EILs / ESLs were considered relevant for any retained deep soils on the site. EILs / ESLs only apply to the top 2 m (root zone). EILs were derived from Ecological Investigation Level Calculation Spreadsheet developed by CSIRO for the National Environment Protection Council for a high traffic NSW suburb and NEPC (2013) Schedule B1 Guideline on Investigation Levels for Soil by the addition of site specific Added Contaminant Limit (ACL) and the Ambient

Medium	Guidelines	Rationale
		Background Concentration (ABC) for a high traffic NSW suburb. The adopted ESL criteria were based on coarse grained criteria, as a conservative approach. Management Limits for Petroleum Hydrocarbons Where the HSLs and ESLs for petroleum hydrocarbons are exceeded, sample results will be assessed against the NEPC (2013) Management Limits for the F1-F4 TRH fractions, to assess propensity for phase-separated hydrocarbons (PSH), fire and explosive hazards and adverse effects on buried infrastructure. National Environmental Management Plan (NEMP) The PFAS National Environmental Management Plan (NEMP) provides guideline values for PFAS compounds for human health and ecological scenarios. The guideline scenarios replicate those of the NEPM (NEPC, 2013), and therefore a HIL-B human health scenario should be adopted.
Groundwater	ANZG (2018) GILs for Fresh Waters and NEPC (2013) Groundwater HSLs	Groundwater Investigation Levels (GILs) for Fresh Waters ANZG (2018) provides GILs for typical, slightly-moderately disturbed aquatic ecosystems, Trigger Values (TVs) for the 95% level of protection of aquatic ecosystems; however, the 99% TVs will be applied for the bio-accumulative analytes. Health-based Screening Levels (HSLs) The NEPC (2013) groundwater HSLs for vapour intrusion will be used to assess potential human health impacts from residual vapours resulting from petroleum, BTEX and naphthalene impacts. The HSL-D thresholds for commercial and industrial settings will be applied. National Environmental Management Plan (NEMP) The PFAS National Environmental Management Plan (NEMP) provides guideline values for PFAS compounds in aquatic ecosystems. Based on the proximity of surface water receptors to the site (Berry Creek / Lane Cove River), the values for slightly-moderately disturbed fresh water ecosystems (95% species protection) have been selected.

4.2.1 Waste Classification Criteria

Any waste disposed off-site must be classified in accordance with:

- NSW EPA *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, 2014a);
- NSW EPA *Waste Classification Guidelines, Part 2: Immobilisation of Waste* (NSW EPA, 2014b); and
- NSW EPA *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste* (NSW EPA, 2016).

Disposal of waste must be to an appropriately licensed waste facility, as per the *Protection of the Environment Operations Act 1997* (POEO Act) and the *Protection of the Environment (Waste) Regulation 2014*.

Alternatively, certain wastes can be classified under a relevant NSW EPA *Resource Recovery Order* (RRO) and can then be used on other sites under the requirements of the corresponding NSW EPA *Resource Recovery Exemption* (RRE).

Further detail is provided in **Section 6.6**.

5. Remediation Technology

5.1 Regulatory Overview

Under the NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure*, the preferred hierarchy for site remediation and/or management is:

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

When deciding which option to choose, the sustainability (environmental, economic, and social) of each should be considered, in terms of achieving an appropriate balance between the benefits and effects of undertaking the method.

For this site, a number of remediation options were reviewed to examine the suitability of each method, the surrounding properties, geological and hydrogeological limitations and the following considerations:

- Development requirements;
- Prioritisation of works in areas of most concern;
- Ability of remedial method to treat contamination with respect to material and infrastructure limitations;
- Remedial timeframes;
- Defensible method to ensure the site is remediated to RAC; and
- Regulatory compliance.

5.2 Remediation Technologies Review

Various soil remediation options were reviewed to examine the suitability of each method, with due regard for the surrounding land uses, as well as the (hydro) geological limitations. Each of the available remediation technologies is summarised in terms of its suitability in **Table 5-1**. Notwithstanding, the final determination of the most appropriate remediation technology will be contingent upon the findings of the intrusive investigation.

Table 5-1 Remedial Technology Review - Soils

Remediation Methodology	Description	Advantages	Disadvantages	Suitability
No Action	'No Action' can be considered if: - There is no measurable contamination (i.e. contaminant concentrations are below adopted criteria); or - Exposure is unlikely and contaminants are not mobile.	No remediation costs. Creates minimal disturbance to the site.	Would pose limitations on land use options. May require an Environmental Management Plan (EMP) and ongoing monitoring.	Potentially Suitable – Should the results of the intrusive investigation indicate the absence of contamination in soil and groundwater, no further action will be required.
On-site bioremediation	Excavated soils are thoroughly broken down and aerated, mixed with reagents to help microorganism populations grow, stockpiled and aerated above ground.	Cost effective if soils are reused on site. Lower disposal costs (if any). Limited requirement to import fill material to site.	Material handling area required. Longer remediation timeframes. Potential for odour problems.	Potentially Suitable – May be utilised for (volatile) hydrocarbon impacted soils, but not suitable for asbestos. This may be more cost effective than off-site disposal; however this will be dependent on the volume of impacted material.
<i>In situ</i> treatment	<i>In situ</i> treatment of impacted soils within the vadose and saturated zones using forced advection or abiotic injection methods, such as soil vapour extraction, in situ chemical oxidation, etc.	Minimal disturbance (no excavation). Cost effective for large scale site remediation of lighter petroleum hydrocarbons. Potential to simultaneously remediate soil and groundwater (if impacted).	High establishment costs (equipment and installation). Potential for odour and/or health and safety problems. Requires detailed design and pilot trials.	Potentially Suitable – this method is designed for widespread hydrocarbon impacted soils. Furthermore, asbestos contamination cannot be addressed by this remediation option.
Consolidation and/or capping	Risk minimisation approach, where impacted soils are managed on-site by capping the ground surface with geotextiles and/or a clean, impermeable layer of fill material.	Effectively removes risk to human health by eliminating exposure pathways.	Requires detailed capping design. Would pose limitations on land use. Typically requires an EMP.	Potentially suitable – Retention and capping of asbestos can be completed. This option may be a viable option once established that contaminants are not leachable.
Excavation and off-site disposal	Excavate impacted materials. Transport directly to a licensed landfill facility. Reinstate site with imported clean fill material.	Fast, as the impacted material can be removed immediately. Reduced vapour/odour issues as impacted materials removed from site. Minimal design and management costs.	Transfer of waste to another location (licensed waste facility). High costs associated with the disposal of waste soils and importation of clean backfill). Requires waste classification prior to disposal, keeping of thorough waste records, waste tracking and reporting. Sustainability issues related with disposal	Suitable – Would render the site suitable for future use without the need for ongoing monitoring. Bulk excavation of surplus soil will be required under the proposed (basement) development, regardless. This will remove potentially leachable contamination source and prevent vertical migration to the groundwater

Remediation Methodology	Description	Advantages	Disadvantages	Suitability
			to landfill.	system.
Natural attenuation	Allowing the contaminants to biodegrade naturally while systematically monitoring the contamination plume behaviour.	Minimal disturbance (no excavation). Sustainable and cost-effective remediation method.	Longer remediation timeframes. Potential for further impacts on the groundwater aquifer and nearby environmental receptors. Typically requires an EMP.	<u>Not Suitable</u> – As the key objective of the remedial strategy is to make the site suitable for all future land uses without the need for ongoing monitoring. If asbestos is a contaminant concern and is not amendable to natural attenuation.

5.3 Preferred Remediation Option

Based on the available remedial technologies, the proposed site development (demolition of existing structures, followed by the construction of a ten storey hotel and commercial/retail space, overlying two levels of underground basement), the potential risks to human health and the environment, as well as the relative cost effectiveness of feasible remedial techniques, the preferred remedial option for the site was selected as follows:

- Excavation and off-site disposal of impacted / waste materials within basement excavation;

All wastes shall be transported to appropriate, NSW EPA-licensed facilities, after formal classification. All excavated (remediation) areas shall be validated by base and wall soil sampling. Where required, the site will be reinstated with validated, imported (or recovered) excavated natural materials.

Note: If the DSI identifies significant potential contaminants, the remediation strategy will be revised accordingly, and a revised RAP or an addendum to this RAP will be prepared.

5.4 Remediation Works Category, Consent and Planning

5.4.1 Consent Requirements

In accordance with the *State Environmental Planning Policy* (Resilience and Hazards) (SEPP) (2021), the category of the remediation works defines whether consent is required prior to commencement. Under *SEPP 2021*, works where there is the potential for significant environmental impact are classed as *Category 1* and require development consent. *Category 2* works pose a low potential for environmental impact and do not therefore require prior consent. The determination for the site is outlined in **Table 5-2**.

Table 5-2 Remediation Works Category Determination

Significant Environment Impact	Yes/No	Category
Designated Development or State Significant Development	No	2
Critical or threatened species habitat	No	2
Impact on threatened species, populations, ecological communities or their habitats	No	2
In area identified environmental significance such as scenic areas, wetlands (see list*)	No	2
Comply with a policy made under the contaminated land planning guidelines by the council	No	2
Is work ancillary to designated development	No	2

Notes: * Environmental significance list -coastal protection, conservation or heritage conservation, habitat area, habitat protection area, habitat or wildlife corridor, environment protection, escarpment, escarpment protection or escarpment preservation, floodway, littoral rainforest, nature reserve, scenic area or scenic protection, or wetland.

Based on the above determination, the remediation works for the site are considered Category 2 and will not require development consent. Nevertheless, 30 days prior to commencement of remediation, notification to the consent authority (Lane Cove Municipal Council) will be made. Council has the right of intervention after that time for a breach of the *NSW EPA Act 1997* or non-compliance with *SEPP 2021*. The notification will also serve as the basis for updating Council records on properties in the local government area and will:

- Be in writing;
- Provide contact details for the notice;
- Briefly describe the remediation work;
- Show why the work is considered Category 2 remediation work;

- Specify the property description and street address on which the remediation work is to be carried out;
- Provide a location map; and
- Provide estimates for commencement and completion dates of the work.

Provision of this RAP, as well as an indication of commencement and completion dates of the works in writing, is usually sufficient to meet the requirements of this notification.

5.4.2 Development Consent and Control Plans

All works must be in accordance with *Lane Cove Development Control Plans (DCPs)* and any specific consent conditions issued for the development.

5.4.3 Planning Requirements

The appointed site contractor must prepare a site-specific Work Health and Safety Plan (WHSP) and Construction Environmental Management Plan (CEMP) for the project, covering human / environmental health and safety issues, as well as all measures required under Council's Development Application (DA) approval and DCPs.

Where asbestos removal is required, an asbestos management plan (AMP) should be drafted and the appointed contractor must be appropriately licensed to perform such works. The appointed contractor must notify SafeWork NSW in writing at least five days before the remedial work commences.

Construction of the proposed basement is expected to intercept the local groundwater system, therefore temporary groundwater dewatering of the site will be required. A Dewatering Management Plan (DMP) should be prepared prior to the commencement of construction dewatering activities at the site.

6. Remediation Works

Intrusive investigations have not been conducted at the site to date due to access constraints. Consequently, the nature and extent of potential soil and groundwater contamination at the site remains as a data gap. Further intrusive investigation is required to assess site suitability following site demolition.

Should contamination be identified, appropriate management measures will be necessary to ensure the site is suitable for the proposed future development.

6.1 Remediation Sequence

The site remediation works will include (though not necessarily be limited to):

- **Stage 1** – Preliminaries and site establishment;
- **Stage 2** – Pre-demolition Hazardous Materials Survey (HMS) and site demolition;
- **Stage 3** – Detailed Site Investigation;
- **Stage 4** – Remedial excavation and validation of impacted soils (if required);
- **Stage 5** – Bulk Excavation and Waste Classification;
- **Stage 6** – Validation Reporting.

Contingency Action

Should additional impacted soils be encountered or unexpected finds be discovered during the course of the remediation program, or should any phase of the validation identify residual, gross contamination requiring additional remediation, then the procedures described under the Unexpected Finds Protocol (**Section 7.6**) and/or the validation plan (**Section 8**) will be implemented, until the remediation goals have been achieved and the site is deemed suitable for the intended land use.

6.2 Stage 1 – Preliminaries and Site Establishment

Council Notification

Notice must be given to Council at least 30 days prior to the commencement of remediation works as outlined in **Section 5.4.1**. A list of all required work permits must be obtained from Council and arrangements are to be made to obtain the necessary approvals from the relevant regulatory authorities.

Site Preparation and Planning

The site should be prepared in accordance with the general requirements of the site management details outlined in **Section 7**. Before site works commence, the site contractor will prepare site specific plans including a work health and safety plan (WHSP), construction environment management plan (CEMP) and an asbestos management plan (AMP) (if required).

It will also be necessary to establish environmental controls, site access, security, fencing and any required warning signage prior to works commencement.

A project plan should also be developed to outline engineering design for excavation support (if required), water treatment requirements and design (if required), staging of excavation works, stockpiling, waste stabilisation, waste material loading, traffic management and waste tracking.

The Project Plan should incorporate a staging plan that outlines the basic stages of the remediation works. The staging plan should include, but not be limited to:

- Staging of areas to be excavated;
- Areas designated for waste segregation, screening and storage (stockpiling), amenities, soil and groundwater treatment (if required);
- Truck movements to allow loading to mitigate impacts to surrounding land users and council infrastructure; and
- Details of any required environmental management measures such as, dust control.

Remediation Workshop

As part of the site preparation phase, a remediation workshop should be conducted with the appointed contractor(s) to further develop required remedial measures, excavation plans, waste classifications, and environmental management requirements. It would be appropriate for the appointed environmental consultant to be present at the workshop to provide guidance in relation to environmental management measures to be applied during the remediation and site validation activities.

6.3 Stage 2 – Pre-demolition Hazardous Materials Survey and Site Demolition

A Hazardous Materials Survey (HMS) will be required prior to demolition of any existing structures, to ensure that hazardous materials that may have been used within the structures are identified and appropriately managed during demolition to prevent potential spreading of contamination and potential health risk to site workers.

The removal of hazardous materials shall be completed by a suitably qualified contractor. Building demolition should be in accordance with Australian Standard AS2601-2001 and wherever possible, waste should be segregated into metal, wood and brick / concrete.

Following the demolition works, a site inspection is to be conducted by a qualified and experienced environmental consultant to assess any visual signs of contamination, such as supplementary asbestos contamination on surface fill soils, buried building waste and foreign materials. Where the clearance inspection indicates hazardous materials remain on the site, further removal and re-clearance inspections might be required

6.4 Stage 3 – Detailed Site Investigation

A DSI is required to assess the soil and groundwater at the site, as recommended in the EI PSI (2025). The proposed scope of work for the intrusive investigation is as follows:

- Sampling of fill and natural soils from eight borehole locations distributed across the site in a broad grid pattern across the site to characterise *in-situ* fill and natural soils. The boreholes should be advanced to a minimum of 9 to 10 mBGL (i.e. the proposed basement excavation depth). At least one of the boreholes should target the footprint of the former dry cleaners at 36 Pacific Highway;
- Installation of three groundwater monitoring wells, both upgradient and downgradient of the proposed redevelopment area. The wells should be installed into the top of bedrock or the proposed depth of basement excavation as a minimum (whichever comes first). At least one of the wells should be down-gradient of the former dry cleaners at 36 Pacific Highway; and

- Groundwater sampling from the newly installed wells and the existing well (BH1) to assess groundwater quality beneath the site and offsite migration potential.

This scope will enable the appropriate characterisation of the site. Suggested borehole locations are presented in **Figure 2, Appendix A**.

A separate DSI report will be prepared following the scope described above. If soil or groundwater is found to be impacted, they might potentially pose risks to site receptors. These risks should be discussed in a RAP addendum to be prepared (if required). Such risks (if identified) might also trigger the implementation of protection measures (e.g. basement tanking), additional investigation and/or the preparation and implementation of an Environmental Management Plan (EMP) for the site.

6.4.1 Soil Assessment

The sampling rationale for soil sampling is to obtain representative samples of strata underlying the entire site using a broad grid pattern. Given the site area of approximately 0.12 hectare, a minimum of eight intrusive investigation locations is recommended, in accordance with the Minimum Sampling Points for Site Characterization outlined in the NSW EPA (2022) *Sampling Design Guidelines*. The assessment will follow;

- Construction of 8 boreholes to extend down to 'clean' natural soils;
- Multiple level sampling of fill and natural soils at each of the boreholes;
- Representative samples are to be analysed for the potential contaminants identified in the previous investigations (heavy metals, TRH, BTEXN, PAH, CVOC, OCP, OPP, PFAS and asbestos). If further contamination of potential risk is identified, further remedial works may be required and will be addressed via an addendum to this RAP;
- Should any visual or olfactory evidence (i.e. staining and/or odours) of contamination be identified during sampling, additional sampling of the material may be required. Pending review of the results, additional leachability analysis may also be required;
- Proposed locations are shown in **Figure 2, Appendix A**. Quality Control (QC) samples will be collected, as specified in the Validation Sampling and Quality Plan (**Section 8**).
- The laboratory analytical results may also be used for waste classification purposes.

6.4.2 Groundwater Assessment

Three new groundwater monitoring wells will be installed, as shown in **Figure 2, Appendix A**. A single groundwater monitoring event (GME) is proposed, to be undertaken on both the newly installed wells and the existing monitoring wells. The GME will involve:

- Measurement of standing water levels (SWLs) and base of well gauging, inspection for light and dense non-aqueous phase liquids (LNAPL/DNAPL). A photo-ionisation detector (PID) will be used to collect headspace readings from the top collar of each monitoring well. All results will be recorded on field data sheets.
- Sequential sampling of previously installed and the newly constructed wells using low flow methods. Calibrated sampling equipment will be decontaminated between each location. Groundwater will initially be purged and field parameters (pH, temperature, electro-conductivity (EC), dissolved oxygen (DO) and oxidation-reduction potential (ORP)) measured. Sampling will take place after field parameters have stabilised, as defined by three consecutive readings with variations not exceeding pH ± 0.1 , EC $\pm 5\%$, ORP $\pm 10\text{mV}$ and temperature $\pm 0.2^\circ\text{C}$.

- Samples will be collected for the analysis of priority metals, TRH, BTEXN, PAH, CVOC and PFAS. Industry-standard methods for sample collection, handling and transport will be adhered to. This includes field filtering water for dissolved metal analysis, using a 0.45 µm pore-size membrane. Laboratory-supplied sample containers shall be used.
- QC samples will be collected, as specified in the Validation Sampling and Quality Plan (**Section 8**).

Should further contamination of potential risk be identified, further investigation (such as soil vapour sampling) and/or remedial works may be required and will be addressed via an addendum to this RAP.

6.5 Stage 4 – Remedial Excavation of Impacted Soils (If required)

Should any localised impacts be identified during detailed site investigation, appropriate management measures will be necessary to ensure the site is suitable for the proposed site redevelopment.

The methodology for remediating such areas is as follows:

- Mark out the location and initial excavation extent. Segregate an area of approximately 5m x 5m centred on the impacted sampling location (if identified).
- Using onsite machinery, excavate all soil materials from within the defined area beyond the known impact depth to the depth that impact is no longer observed.
- Stockpiles generated by these excavations should be placed on hardstand or builders plastic and covered to prevent cross contamination. If impacts are still observed or if validation is not achieved, then the excavation should be extended lateral or vertically in the direction of impact (chase out').
- The removal of asbestos impacted soil (if identified) shall only be carried out by experienced asbestos contractors holding the appropriate SafeWork NSW (minimum) Class B licence. Generators and transporters of Asbestos Waste have a legal obligation to ensure waste is transported to a lawful place under Clauses 76 and 79 of the *Protection of the Environment (Waste) Regulation 2014*. The NSW EPA (2015) *Asbestos and Waste Tyres Guideline* states that consignors and transporters of Asbestos Waste, and facilities receiving these wastes, must use the Integrated Waste Tracking Solution (IWTS) online platform to provide information to the NSW EPA regarding waste movement within NSW.
- Validation samples will be collected from excavation surfaces (walls and base) of the excavation pit and analysed for contaminants of concern. Validation assessment requirements are detailed in **Section 8.1**.
- Waste classification of stockpiled soil shall be completed in accordance with the NSW EPA (2014) *Waste Classification Guidelines*.
- Once classified, impacted soils will be directly loaded into trucks for off-site disposal to a licensed waste facility authorised to accept the waste.

Clearance Inspections

A clearance inspection will be required at the conclusion of any asbestos removal works on site. This inspection will be conducted by a licensed asbestos assessor (LAA) (for friable and/or non-friable) and/or a competent person (non-friable only), as defined under in the SafeWork NSW *How to Safely Remove Asbestos* code of practice.

Asbestos clearances will include a final visual inspection of the asbestos soil removal exclusion zone. Once satisfied that the area is free of asbestos, the LAA (or competent person, in the case of non-friable asbestos) will issue a clearance certificate.

6.6 Stage 5 – Bulk Excavation and Waste Classification

Bulk excavation is required to construct the basement facilities. Material handling and management procedures will be implemented as detailed in **Section 7** for any excavated material. Any material designated for offsite disposal must be classified in accordance with NSW EPA (2014) *Waste Classification Guidelines*.

The procedure for waste classification will occur as follows:

6.6.1 Waste Classification – Stockpile

- Stockpiled materials designated for waste classification would be collected at a rate of one sample per 25 m³ (minimum of three samples) up to 250 m³. For stockpiles exceeding 250 m³ but less than 2,500 m³, a minimum of 10 samples is required and 95% UCL statistical calculations of contaminant concentrations may be used for classification (note: UCL calculations are not applicable to asbestos).
- The analytical suite for waste classification will include eight priority metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAH, OCP, OPP, PCB and asbestos, with toxicity characteristic leaching procedure (TCLP) testing (as required) and any additional chemicals of potential concern (COPCs) that may be identified during site remediation.
- Preparation of a Waste Classification report detailing the interpreted soil waste classification for each stockpile, NSW EPA (2014) *Waste Classification Guidelines*, to enable appropriate off-site disposal.
- Stockpiles from different remediation areas and different soil profiles shall be kept separate. Stockpiles should be placed on either intact hardstand pavement or high density polyethylene (HDPE) plastic liner and limited to a maximum height of 2 m. Stockpiles should be surrounded by star pickets and marking tape, or other suitable material, to clearly delineate boundaries. Stockpiles shall be lightly conditioned by water sprinkler to prevent dust blow and/or covered with tarp if longer duration is required. Where stockpiles are to remain onsite for a period >24 hours, silt fences or hay bales should be erected around each stockpile to prevent losses from surface erosion (runoff).

6.6.2 Waste Management

The general process for conducting appropriate waste characterisation, transport and disposal is as follows:

- Surplus fill and natural soil to be disposed from the site must be classified according to NSW EPA (2014) *Waste Classification Guidelines*.
- Waste Classification reports must be issued by the environmental consultant according to the assessed classification and quantity, prior to off-site disposal.

- The earthworks contractor must identify suitably licenced waste landfill premises for disposal of waste materials and confirm that the premises will accept the waste in accordance with its Environmental Protection License.
- Waste classified soils for disposal shall be loaded onto NSW EPA-licensed waste vehicles for transport to the designated landfill premises.
- Waste transport contractors must carry a copy of the relevant Waste Classification report with every transported load.
- The waste must be transferred to the designated premises in accordance with applicable legislation.
- Transport of contaminated material should be via a clearly designated haul route from the site to the landfill premises that minimises exposure to sensitive communities. The proposed waste transport route should be notified to Council and truck dispatch shall be logged and recorded by the contractor for each load leaving the site.
- The earthworks contractor must supply the individual waste dockets for each waste load to the environmental consultant via the Site Manager, in a timely manner. The waste dockets will be later required for validation reporting purposes.
- Additional waste classification may be necessary for suspicious materials which exhibit odours or appear stained or discoloured. The discovery of such soils should be treated as “unexpected finds” and will trigger application of the Unexpected Finds Protocol provided in **Section 7.6**. In this situation, the Environmental Consultant should be immediately consulted for evaluation and waste characterisation of the materials.
- A site log shall be maintained by the contractor for each discrete excavation (numbered locations) to enable the tracking of disposed loads against on-site origin and location of the materials.
- Environmental controls must be implemented to prevent exposure to workers and the public and are described further in **Section 7** of this RAP.

6.6.3 Management of VENM

During site works, virgin excavated natural materials (VENM), as defined in the NSW EPA (2014) *Waste Classification Guidelines*, may be identified as suitable for off-site re-use. Confirmation of the VENM waste classification must be made with the concurrence of appointed environmental consultant. The re-use of VENM at an off-site location must be approved in writing by the receiving site land owner before it is transported from the site.

The earthworks contractor must provide the following to the environmental consultant and client for reporting purposes:

- All approval documents and correspondence from the receiving site authority and approver;
- Details of VENM volumes excavated from the site, including the measured depth below existing ground level, or surveyed elevation of the VENM at the top and bottom excavation levels;
- Laboratory results from samples of designated material verifying a classification as VENM;
- A description of the VENM that was sent to the receiving site; and
- Copies of VENM weighbridge dockets, trip tickets and/or consignment disposal confirmation that confirms the date, exit time, and truck license plate and operator for each load.

In advance of VENM excavation, VENM must be protected from exposure to site contamination activities or materials. Measures to protect VENM from exposure to contamination may include:

- Covering VENM in-situ or in stockpile with plastic sheeting;
- Placing stockpiled VENM on top of protective plastic sheeting;

- Minimising time of exposure to the site environmental conditions; and
- Relocating contaminated soils and/or contaminating activities (i.e. plant refuelling) away from VENM.

6.6.4 Management of ENM

If the volume of natural soils to be removed includes up to 2% of foreign materials, then a classification of *excavated natural material* (ENM) might be achievable, subject to compliance with the ENM classification. This classification must be verified by sampling and laboratory analysis to confirm that the materials meet the specific chemical and other material requirements detailed in the NSW EPA *Excavated natural material order 2014*; and *The excavated natural material exemption 2014*.

6.6.5 Dewatering Management

Dewatering will likely be required during the construction of the proposed basement. Therefore, a Dewatering Management Plan (DMP) should be prepared, and a formal application for a licence for groundwater take will be required, prior to the commencement of construction dewatering activities at the site.

6.7 Stage 6 – Validation Reporting

All remediation works and validation results shall be presented in a Site Validation Report, prepared by the Environmental Consultant in accordance with the NSW EPA (2020a) *Consultants Reporting on Contaminated Land: Contaminated Land Guidelines*. The report will document all aspects of the remediation and site validation program, include an assessment of the environmental data for remaining site soils against the RAC and provide a clear conclusion that the site has been remediated to a suitable standard for the proposed land uses.

Further details on what will be included in the validation report are provided in **Section 8.4**.

6.8 Remedial Contingencies

It is anticipated that the proposed remedial technology will be effective in dealing with the identified contamination; however, remedial contingencies may be required should the scenarios detailed in **Table 6-1** arise.

Table 6-1 Remedial Contingencies

Scenario	Remedial Contingencies/Actions Required
Highly contaminated soils not identified during previous investigations are encountered, particularly at site boundaries	Work to be suspended until the Environmental Consultant can further assess impacted soils/ materials and associated risks. Follow the unexpected finds protocol as detailed in Section 7.6 of this RAP.
Abandoned underground storage tanks (USTs) are encountered at the site	Should unexpected USTs be identified at the site, a GPR survey and visual inspection may be conducted by a certified and experienced service locator, to confirm the presence / absence of any UPSS and any unknown subsurface infrastructure. Systems to be removed and the excavations appropriately validated and backfilled by experienced contractor. Tank removal works reported by appropriate environmental consultant in accordance with NSW EPA (2020b) <i>Guidelines for the implementation of the POEO (underground petroleum storage systems) Regulation 2019</i> and Australian Standard AS4976 (2008). Follow the unexpected finds protocol as detailed in Section 7.6 .
Asbestos wastes are encountered	Work to be suspended and asbestos work removed by a suitably qualified contractor, in accordance with SafeWork

Scenario	Remedial Contingencies/Actions Required
	NSW regulations. Follow the unexpected finds protocol as detailed in Section 7.6 .
Contaminated groundwater (including LNAPL or DNAPL) encountered	Review groundwater conditions on site (if required) and assess the need for further investigation (e.g. soil vapour sampling), remediation and/or a long term environmental management plan. Any dewatering may require approval under the <i>Water Management Act 2000</i>. Remedial options may include natural attenuation, extraction, bio-remediation, phase-separated hydrocarbons (PSH) recovery using active pumping (including hydraulic control), installation of a groundwater permeability barrier, in situ oxidation or stabilisation. Amendment of the RAP would be required.
Groundwater contaminant plume is identified and is migrating off-site, or there are increases in concentration due to increased infiltration	Review contaminant increase and analytes. Review active remediation alternatives (if necessary). Ensure down-gradient monitoring is undertaken. Carry out fate and transport modelling (if required) and assess the need for further action. Amendment to RAP required.
Contamination is identified near heritage items or significant trees (if identified)	Stop work. Review contaminant concentrations and risks to heritage items / flora. Assess human health and environmental risks if contamination remains in place. Review natural attenuation options.
Changes in proposed excavation depth or lateral extent	Review remediation works for the site.
Changes in proposed land use(s) at the site	Review remediation works for the site.

7. Site Management

7.1 Roles and Responsibilities

The responsibilities for the various parties involved with the remediation program are outlined in **Table 7-1**.

Table 7-1 Site Management Responsibilities

Responsible Party	Details/Contacts	Responsible for:
Project Manager	Edsgear Pty Ltd	Overall management of the site remedial activities.
Property Owner and Site Contractor	Edsgear Pty Ltd and/or Principal Contractor	- Notification of site conditions to the EPA under the duty to report contamination under the <i>Contaminated Land Management Act 1997</i>. - Registration of details of Site Audit Statement (if Auditor engaged). - Implementation of and compliance with the RAP. - Notification to contractors of the existence of RAP. - Provision of copies of the RAP.
Environmental Management Coordinator (EMC) / Remediation Supervisor	Edsgear Pty Ltd (and/or Principal Contractor) and Environmental Consultant	- Ensuring site remediation works are carried out in an environmentally responsible manner. - Liaison between the appointed Environmental Consultant and Council, providing regular updates and informing of any problems encountered. - Ensuring all environmental protection measures are in place and functioning correctly during site remediation works. - Reporting any environmental issues to owner.
Environmental Consultant	EI Australia	- Preparation of the RAP. - On-site management and guidance of the remedial works. - Coordination of validation works, documentation, notifications and permits required to conduct remedial works to a standard suitable of obtaining approval from the NSW EPA. - Completing validation sampling and monitoring as requested by the Remediation Contractor and dictated by the RAP. - Liaison between remediation contractor and the client. - Preparation and submission of supporting documentation for Site Auditor review (if one is engaged).
Earthworks or Remediation Contractor	Engaged by Edsgear Pty Ltd and/or Principal Contractor	- Ensuring all operations are carried out as identified in the RAP (remediation), as directed by the Project Manager and EMC. - Inducting all employees, subcontractors and authorised visitors on procedures with respect to site works, WHS and environmental management procedures. - Reporting any environmental issues to EMC. - Maintaining site induction, site visitor and

Responsible Party	Details/Contacts	Responsible for:
		complaint registers. - Ensuring that fugitive emissions and dust potentially leaving the confines of the site are suitably controlled and minimised. - Ensuring that water containing any suspended matter or contaminants is minimised, does not leave the site and is suitably controlled, so as not to pollute the environment. - Ensuring that vehicles are cleaned and secured so that no mud, soil or water is deposited on any public roadways or adjacent areas. - Ensuring that noise and vibration levels at the site boundaries comply with the legislative requirements. - Preparation of site-specific plans including WHSP, CEMP and AMP (if required) as stated in Section 7.2.
Local Council	Lane Cove Municipal Council	- Ensuring requirements of Development Consent and other planning instruments are met. - Registration of details of a Site Audit Statement (if a requirement) on Planning Certificate.
Qualified Independent Consultant – NSW Accredited Site Auditor (if one is engaged)	Engaged by Edsgear Pty Ltd and/or Principal Contractor	- Review of RAP, Site Validation Report. - Preparation of Site Audit Statement and Site Audit Report. - Review of updates, revisions or amendments as applicable. - Provide interim Audit advice of consultant or client submissions. - Conduct inspections during remedial works.

7.2 Materials Handling and Management

Table 7-2 summarises the measures that should be implemented in respect of materials handling during remedial and excavation works at the site.

Table 7-2 Materials Handling and Management Requirements

Item	Description/ Requirements
Earthworks contractors	Excavation of fill materials should be completed by a suitably qualified contractor to ensure: - All employees and contractors are aware of the environmental and health and safety requirements to be adhered to. - There is no discernible release of dust into the atmosphere as a consequence of the works. - There is no discernible release of contaminated soil into any waterway as a consequence of the works. - There are no pollution incidents, health impacts or complaints. - All site-specific management plans such as CEMP and AMP (if required) should be followed.
Stockpiling of materials	All stockpiles will be maintained as follows: - Stockpiles must be located on sealed surfaces such as sealed concrete, asphalt, or high density polyethylene. - Should stockpiles be placed on bare soils, which may occur adjacent to remediation areas, bare soil should be lined with builder's plastic before stockpile placement in locations that do not pose any environmental risk, and covered with builder's plastic.

Item	Description/ Requirements
Loading of material	- Excavated soils should be stored in an orderly and safe condition ($\leq 2\text{m}$ height). - Stockpiles should be battered with sloped angles to prevent collapse. - Stockpiles should be covered after being lightly conditioned by water sprinkler to prevent dust blow and control odours. - Air emissions to be controlled by using a hydrocarbon mitigation agent, such as BioSolve®, Pinkwater®, Anotech® or an equivalent product selected by the contractor, in combination with the fine mist spraying. - Should the stockpile remain <i>in situ</i> for over 24 hours, silt fences or hay bales should be erected around each stockpile to prevent losses from surface erosion (runoff). - Stockpiles shall be strategically located to mitigate environmental impacts while facilitating material handling requirements. Loading of stockpiles / materials will be as follows: - Transport of contaminated material off the site is to be via a clearly distinguished haul route. - Measures shall be implemented to ensure that no contaminated material is spilled onto public roadways or tracked off-site on vehicle wheels. Such measures should include the use of a wheel washing/cleaning facility, placed before the egress point on the site, and should be able to handle all vehicles and plant operating on-site. - Residue from the cleaning facility should be collected and either dewatered on site in a contained / bunded area, or disposed as a slurry to an approved facility. Such residue will be deemed contaminated unless proven otherwise.
Transport of materials	Prior to being assigned to an appropriate waste disposal facility, all waste fill/soils will be classified in accordance with the NSW EPA (2014) <i>Waste Classification Guidelines</i>. If prior immobilisation treatment of the waste soils is required, disposal consent will be obtained from the NSW EPA prior to spoil transport. - All trucks transporting soils from the site are to be covered with tarpaulins (or equivalent). - All haulage routes for trucks transporting soil, materials, equipment and machinery shall comply with all road traffic rules, minimise noise, vibration and odour to adjacent premises, utilise state roads and minimise use of local road. - All deliveries of soil, materials equipment or machinery should be completed during the approved hours of remediation and exit the site in a forward direction. - Removal of waste materials from the site shall only be carried out by a recognised contractor holding the appropriate EPA NSW licenses, consents and approvals. - Waste materials must be transported less than 150km from the source (POEO 1997, NSW EPA 2014) and landfills are required to be licensed for the category of waste they are scheduled to receive. Additional conditions apply to material that is classified as Hazardous Waste.
Material tracking	Materials excavated from the site should be tracked from the time of excavation until disposal. Tracking of the excavated materials should be completed by recording the following: - Origin of material; - Material type; - Approximate volume; and - Truck registration number. Disposal locations will be determined by the remediation contractor. Disposal location, waste disposal documentation (weighbridge dockets) and the above listed information should be provided to the remediation consultant for reporting purposes. The NSW EPA 2015 Asbestos and Waste Tyres Guidelines state that consignors and transporters of Asbestos Waste, and facilities receiving these wastes, must use the Integrated Waste Tracking Solution (IWTS) online

Item	Description/ Requirements
	platform to provide information to the EPA regarding their movement within NSW. Further information about the "WasteLocate" system is available online from the NSW EPA Website at: https://wastelocate.epa.nsw.gov.au/ .
Material visual inspection prior to validation sampling.	Following the completion of remedial works as specified within this RAP, the following applies: ▪ A suitably qualified environmental consultant should undertake a visual inspection of the work area. If visual observations indicate contamination, the earthworks contractors should rectify any issues arising from the inspection (i.e. further excavation or 'chasing out' until soils show no evidence of contamination based on visual inspection and/or odours). ▪ Following satisfactory completion of the visual inspection, validation sampling of soils should be completed. Validation sampling is discussed in Section 8. Only following satisfactory validation will remedial works be deemed as completed.

7.3 Environmental Management

All remediation work must be undertaken with due regard to the minimisation of environmental effects and meet all statutory environmental and safety requirements. The WHSP, CEMP and AMP (if required) must therefore address the issues identified in **Table 7-3**.

Table 7-3 Environmental Management Requirements

Category	Preventive/Corrective Measures
Demolition (including Asbestos Management)	Appropriate measures shall be taken to ensure that demolition works are completed in accordance with SafeWork NSW Standards and Codes of Practice. Any asbestos identified should be managed in accordance with SafeWork NSW Codes of Practice and Australian Standards. Clearance inspection advised to verify removal of demolition waste including fall out to ground surface.
Site Stormwater Management and Control	Appropriate measures shall be taken to ensure that potentially contaminated water does not leave the site. Such measures should include, but not be limited to: ▪ Diversion and isolation of any stormwater from any contaminated areas; ▪ Provision of sediment traps including geotextiles or hay bales; and ▪ Discharge of any water to drains and water bodies must meet the appropriate effluent discharge consent condition under the <i>Protection of the Environmental Operations Act 1997</i>.
Soil Management	Appropriate measures shall be taken to ensure soils are excavated using an appropriate methodology to reduce nuisance dust and odours from leaving the boundary, and soils are disposed of in accordance with the NSW Government <i>Protection of the Environment Operations (Waste) Regulation 2014</i>.
Dust and Odour	Control of dust and odour during the course of the remediation works shall be maintained by the contractor to ensure no nuisance dust or odours are received at the site boundary according to requirements of the Lane Cove DCP. Action levels and specific control measures would be described in the site CEMP and may include, but not necessarily be limited to the following: ▪ Site wide water spraying, as and when appropriate, to eliminate wind-blown dust; ▪ Use of mist sprays, and/or sprinklers on stockpiles, fill screening areas and loaded fill to lightly condition the material; ▪ Use of tarpaulin or tack-coat emulsion or sprays to prevent dust blow from stockpiles or from vehicle loads; ▪ Covering of stockpiles or loads with polythene or geotextile membranes; ▪ Restriction of stockpile heights to 2m above surrounding site level; ▪ Ceasing works during periods of inclement weather such as high winds or heavy rain; and

Category	Preventive/Corrective Measures
	Regular checking of the fugitive dust and odour issues to ensure compliance with the CEMP requirements, undertaking immediate remedial measures to rectify any cases of excessive dust or odour (e.g. use of misting sprays or odour masking agent). It is advised that all site workers use adequate dust masks during soil excavation and that machine operators remain within an enclosed, air conditioned cabin.
Noise and Vibration	Noise and vibration will be restricted to reasonable levels. All plant and machinery used on site will be noise muffled to ensure emissions do not breach statutory levels as defined within the Lane Cove DCP.
Hours of Operation	Working hours will be restricted to those specified in the site-specific DA conditions.
Community Engagement	Community engagement should be carried out in accordance with Schedule B(8) of the NEPC (2013). Prior to the commencement of any remediation works at the site, every owner and occupier of any land located either wholly or partly within 100m of the boundary of the premises (including local council and the RMS) should be notified at least 30 days in advance. The notice should include: - Advice of demolition and excavation work to be carried out on the premises; - State the time and date such work is to commence; - Indicate that the works are being conducted to minimise the risk of site contamination impacting on off-site receptors; - Provide appropriate site signage at an easily readable location on the site fencing, including site contact name and phone number to be contacted should any matter arise; and - Provide contact information and procedure for registering any complaints.
Incident Management and Community Relations	While various environmental management and occupational safety plans will be developed to protect human health and the environment, incidents may occur which pose a risk to the various stakeholders. To mitigate these risks and ensure that a suitable response is carried out quickly, a response plan to any incident that may occur on site should be prepared and various responsibilities assigned. The site health and safety plan and environmental management plan should document these procedures and responsibilities, and incident contact numbers should be maintained in an on-site register. All other relevant emergency contact numbers such as Police, Fire Brigade, and Hospital should be listed in the Health and Safety Plan and posted on-site for easy access.

7.4 Contingency Plan for Environmental Incidents

A contingency plan to deal with incidents that could arise during the proposed remediation works must form part of the site-specific plans: WHSP, CEMP and AMP (if required). Refer to **Table 7-4** for a selection of potential issues that may require specific management. The Unexpected Finds Protocol (**Section 7.6**) should also be followed should an incident occur.

Table 7-4 Contingency Management

Anticipated Problems	Preventive/Corrective Actions
Chemical / Fuel Spill	Stop work, notify above site project manager. Use accessible soil or appropriate absorbent material on site to absorb the spill (if practicable). Stockpile the impacted material in a secure location, sample and determine the appropriate disposal/treatment option.
Excessive Dust	Use water sprays to suppress the dust or stop site activities generating the dust until it abates. Air monitoring shall be conducted during the asbestos remedial works.
Excessive Noise	Identify the source, isolate the source if possible, modify the actions of the source or erect temporary noise barriers if required.
Excessive Odours / Vapours	Stage works to minimise odours/vapours. If excessive organic odours/vapours

	are being generated, stop works and monitor ambient air across site for organic vapours with a Photo-ionisation Detector (PID) and odours at site boundaries. Implement control measures including respirators for on-site workers, use of odour suppressants, wetting down of excavated material. No nuisance odours shall be detected at any site boundary as part of the remedial works. Should odour emissions be detected at or beyond the site boundary, it is recommended, as part of the CEMP and community consultation, that the Remediation Contractor and the Project Manager notify the owners and occupiers of premises adjoining and across the road from the site regarding potential odour issues. Notification should be in writing. In the notification, as well as on street signage, provide contact details of the site personnel for anyone who may be concerned by odour emission during the remediation. Temporarily pause site works to allow for excess odour to subside to a level acceptable by off-site receptors, should it be necessary, after implementation of the above-listed control measures. Record logs for volatile emissions and odours. Such records should be kept on-site and made available for inspection on request. In regard to off-site impact from petroleum vapour, odour is generally detected at concentrations much lower than what will constitute a health-based risk. Measures listed above for odour control (Table 7-2) may also be applied for vapour control.
Excessive Rainfall	Ensure sediment and surface water controls are operating correctly. If possible divert surface water away from active work areas or excavations.
Water in Excavations	Collect samples and assess against relevant POEO requirements to enable disposal options to be formulated.
Leaking Machinery or Equipment	Stop the identified leak (if possible). Clean up the spill with absorbent material. Stockpile the impacted material in a secure location, sample and determine the appropriate disposal/treatment option.
Failure of Erosion or Sedimentation Control Measures	Stop work, repair failed control measure.
Unearthing Unexpected Materials, Fill or Waste	Stop activities, contact the site project manager. Follow the unexpected finds protocol as detailed in Section 7.6 of this RAP. Prepare a management plan if required, to address the issue.
Identification of Cultural or Building Heritage Items	Stop work and notify site project manager. Follow the unexpected finds protocol as detailed in Section 7.6 of this RAP. Prepare action or conservation plan as required.
Equipment Failures	Ensure that spare equipment is on hand at site, or that the failed equipment can be serviced by site personnel or a local contractor.
Complaint Management	Notify Client, Project Managers and Environmental Consultant (if required) following complaint. Report complaint as per management procedures. Implement control measures to address reason of complaint (if possible). Notify complainant of results of remedial actions.

7.5 Work Health and Safety Plan

As required by the NSW *Work Health and Safety Act 2011* and associated regulations, a WHSP should be prepared, to manage the health and safety of site workers and nearby residents, and address such issues as site security, exclusion zones, excavation safety, vibration, noise, odour and dust levels. The plan should address the risks during the remediation works and cover site specific requirements associated with the contaminants present within the site soils and groundwater.

The site officer responsible for implementing health and safety procedures should induct all site personnel so that they are aware of and comply with, the requirements of this document. It is the contractor's responsibility, with assistance from client/owner(s) of the site to ensure that all

other permits, approvals, consents or licences are current. The following hazards and mitigation measures relevant to the remedial works are summarised in **Table 7-5**.

Table 7-5 Remedial Hazards

Anticipated Problems	Preventive/Corrective Actions
Chemical Hazards	Contaminated sites have chemical compounds, substances or materials that may present a risk to human health and the environment (especially asbestos). Chemicals of concern and associated risks are as detailed within the Conceptual Site Model, within Section 3 . The site specific WHSP and AMP should set out controls to mitigate any potential risks.
Physical Hazards	The following hazards are associated with conditions that may be created during site works: ▪ Heat exposure; ▪ Buried services; ▪ Noise, vibration and dust; ▪ Electrical equipment; and ▪ The operation of heavy plant equipment.
Personal Protective Equipment and Monitoring	Personnel should, wherever possible, avoid direct contact with potentially contaminated material. Workers are to ensure that surface waters or groundwater is not ingested or swallowed and that direct skin contact with soil and water is avoided. Standard PPE with the addition of disposable P2 dust masks as specified for the contractor will be sufficient for the prescribed remedial works. Standard PPE includes: ▪ Long sleeve shirt and trousers; ▪ Steel-toe footwear; ▪ Safety glasses (as required); ▪ Helmet (as required); ▪ Hi-vis vest/clothing (as required).

Contingent asbestos assessment procedure is described below:

Asbestos Assessment Procedure:

In addition to the above, should additional asbestos be suspected or identified in soil during the walkover inspections or remediation excavation, further assessment for asbestos, preferably using test pitting, should be carried out prior to disturbance of site soils. The assessment procedure is described below:

1. Follow the Unexpected Finds Protocol (**Section 7.6**) and notify the appointed Environmental Consultant.
2. The appointed consultant to design investigation program to delineate asbestos impacts in soil in accordance with relevant, NSW EPA-endorsed, asbestos assessment guidelines.
3. If not already prepared, an Asbestos Management Plan should be prepared by the appointed remediation contractor for the remedial works program.
4. Areas impacted by asbestos should be segregated from the remainder of the site, and marked by prominent features that withstand weathering (e.g. star picket and danger tape).
5. Undertake separate waste classification assessments for areas impacted by asbestos and the remainder of the site.
6. Soils from asbestos-impacted areas will need to be excavated and disposed of separately from the remainder of the site. Should temporary stockpiling be required, the material handling and management requirements in **Section 7.2** should be followed.
7. Validate underlying materials after complete removal of asbestos-impacted soils on site.

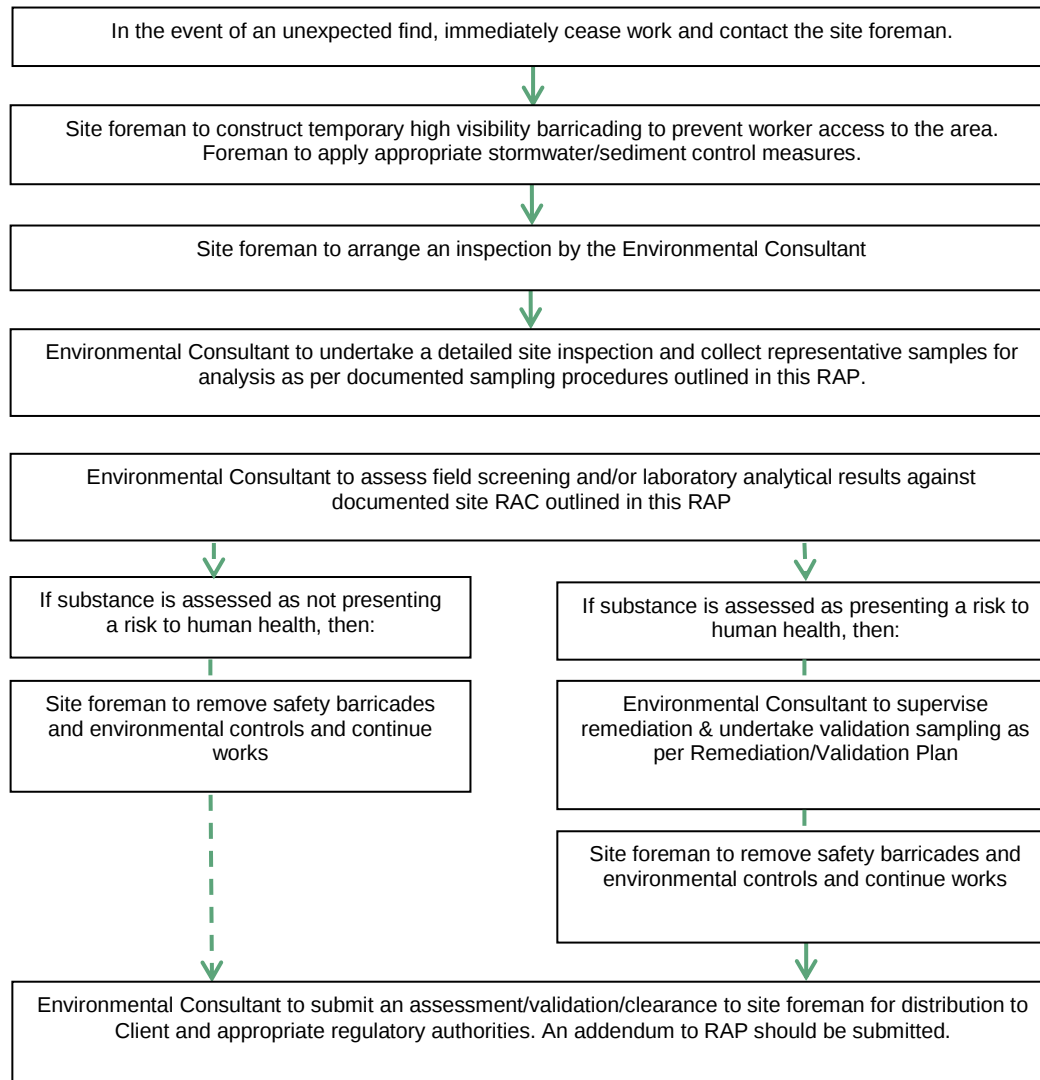
8. Asbestos Assessment:

- Asbestos quantification analysis will be conducted in newly constructed boreholes, validation locations and other areas earmarked for excavation and disposal.

7.6 Unexpected Finds Protocol

Should unexpected finds be encountered, the approach in **Table 7-6** should be followed.

Table 7-6 Unexpected Finds Protocol



8. Validation Strategy

In addition to the sampling required for detailed site investigation (**Section 6.4**), validation sampling is required to confirm the suitability of material retained at the site for the proposed use.

Remediation of the site will be deemed acceptable based on the achievement of the following validation objectives:

- **Remedial Excavations**– Validation of all remedial excavation areas and classification of the resulting stockpiles will involve sampling and analysis, to ensure that COPC concentrations are below the RAC (**Section 4.2**).
- **Soils to be retained onsite** – Should existing soils kept onsite, validation would be required to verify their suitability for the proposed land use.
- **Imported Materials** – Validation of imported (or reused) materials used for backfilling remediated areas would be required to verify their suitability for their proposed land use.

The sampling and analysis quality plan (SAQP) will be crucial to the site validation phase. It must ensure that the data are representative and provide a robust basis for site decisions.

8.1 Sampling Analysis and Quality Plan

The SAQP for the validation works described in this RAP includes:

- Definition of the data quality objectives (DQO);
- Investigation methodology and rationale, including media to be sampled, details of parameters to be monitored and a description of intended sampling points;
- Sampling methods and procedures;
- Analysis methods;
- Sample handling, preservation and storage; and
- Quality assurance / quality control (QA/QC).

8.2 Validation Requirements

Validation of the remediation phase will be achieved when:

- All stages of the RAP are confirmed as completed;
- Each “hold point” inspection / clearance has been completed;
- All laboratory analytical results for validation samples comply with the RAC;
- The asbestos clearance certificate has been completed by the environmental consultant (if required);
- The Site Validation Report has been prepared and submitted for approval.

8.3 Validation Sampling Methodology

Validation sampling will be undertaken following the removal of any identified contaminated material to ensure that the vertical and lateral extent of the contamination has been delineated, as outlined in **Table 8-1**. Should additional contamination be identified, it would be ‘chased out’

where appropriate until material exceeding the RAC has been removed. Soil sampling and handling of the collected samples will be as described in **Table 8-2**.

Table 8-1 Validation Sampling Design

Remediation Area	Sampling Density	Chemicals of Concern
Test bore holes / test pits as part of detailed site investigation	A total of eight sampling locations to be selected and distributed in a systematic grid across the accessible areas of the site. Multiple level soil sampling within fill and natural soils (judgemental).	Priority metals, TRH, BTEX, PAH, OCP/OPP, PCB, CVOC, PFAS and Asbestos.
Groundwater	A total of three monitoring wells to be constructed, both upgradient and downgradient. One sample per monitoring well during a GME from existing wells and new monitoring wells.	Priority metals, TRH, BTEX, PAH, CVOC and PFAS
Hotspot areas (if identified)	Wall – 1 sampling location per wall or per 5m length of excavation wall Base – 1 sample per 25m ²	To be confirmed following the detailed site investigation (Section 6.4)
<u>Stockpiled materials</u> - Impacted fill soils for off-site disposal	Any soil material stockpiled on-site for off-site disposal (not pre-classified) or for potential onsite re-use, will be sampled for waste classification purposes at a rate of one per 25m ³ (with a minimum of 3 samples for stockpiles <75m ³) For stockpiles exceeding 250m ³ but less than 2,500m ³ , collect minimum 10 samples. Calculate and 95% UCL of contaminant concentrations for comparison against the RAC. Note: UCL calculations are not applicable to asbestos.	Priority metals, TRH, BTEX, PAH, OCP, OPP, PCB and asbestos.
<u>Stockpiled materials</u> - natural soils for on-site reuse and/or off-site disposal as ENM	Stockpiled natural material must comply with the sampling regime under NSW EPA (2014) <i>The Excavated Natural Material Order/Exemption</i> .	Priority metals, TRH, BTEX, PAH, asbestos, EC and foreign material to comply with the NSW EPA (2014) <i>The Excavated Natural Material Order/Exemption</i> .
Natural ground surface following contaminated fill removal	Surface validation sampling meeting the densities prescribed in the EPA (2022a) <i>Part 1: Sampling Design Guidelines</i> .	Priority metals, TRH, BTEX, PAH, OCP, OPP, PCB and asbestos
Imported soil materials	If material is required to be sourced from off-site to reinstate excavations, it will be certified suitable for the intended use.	Priority metals, TRH, BTEX, PAH, OCP, OPP, PCB and asbestos

Excavation of identified contaminated material shall continue until the analytical results indicate compliance with the RAC (i.e. either the concentrations of all contaminants are within the RAC, or the 95% upper confidence limit (UCL) of the average concentration for each detected parameter (except for asbestos) is within the corresponding criterion). If results indicate that additional excavation is necessary, the excavation shall be extended until the excavation surface samples indicate that the location is validated as meeting the RAC for each respective contaminant.

Table 8-2 Validation Sample Collection and Handling Procedures

Action	Description of Required Works
Sample Collection	Both detailed site investigation sampling (refer to Section 6.4) and soil validation sampling will be directly from the exposed (excavated) surface, or from the material brought to the surface by the backhoe / excavator bucket. Sampling data shall be recorded to comply with routine chain of custody requirements. Soil samples will be field screened for the presence of volatiles on site using a PID. Analysis of the head-space within a snap lock bag filled with sampled soil (at an approximate 1:5 soil to air ratio) and left to equilibrate. A small hole is made through the snap lock seal and the probe of the PID inserted. The VOC reading for the sample is recorded and provides information as a guide to vapour impacts to site. Groundwater sampling is to be conducted using a low-flow method to minimise drawdown while sampling. Analysis of groundwater will be completed for HMs, TRH, PAHs, BTEX, PFAS and VOCs. Water level gauging, well purging and field testing of water quality parameters will be collected and data shall be recorded to comply with routine chain of custody requirements.
Sampling, Handling, Transport and Tracking	▪ Disposable (one time use) sampling consumables will be used whenever possible. ▪ All sampling equipment (including hand tools or excavator parts) to be washed in a 3% solution of phosphate free detergent (Decon 90), followed by a rinse with potable water prior to each sample being collected. ▪ Direct transfer of the sample into new glass jars, bottles, vials or plastic bags is preferred, with each plastic bag individually sealed to eliminate cross contamination during transportation to the laboratory. ▪ Label sample containers with individual and unique identification including Project No., Sample No., depth, date and time of sampling. ▪ Place sample containers into a chilled, enclosed, and secure container for transport to the laboratory. ▪ Provide chain of custody documentation to ensure that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to the laboratory.
Field QA/QC	Quality assurance (QA) and quality control (QC) procedures will be adopted throughout the field sampling program, to ensure sampling precision and accuracy, which will be assessed through the analysis of 10% field duplicate/replicate samples. Appropriate sampling procedures will be undertaken to prevent cross contamination, in accordance with EI's Standard Operating Procedures Manual. This will ensure: ▪ Standard operating procedures are followed; ▪ Site safety plans are developed prior to works commencement; ▪ Split duplicate field samples are collected and analysed; ▪ Samples are stored under secure, temperature-controlled conditions; ▪ Chain of custody documentation is employed for the handling, transport and delivery of samples to the contracted environmental laboratory; and ▪ Contaminated soil, fill or groundwater originating from the site area is disposed in accordance with relevant regulatory guidelines. In total, field QA/QC will include one in 20 samples to be tested as intra-laboratory, blind field duplicates, one in 20 samples to be tested as inter-laboratory, split field duplicates, as well as one VOC trip blank, one VOC spike sample per sample batch and one equipment wash blank (rinsate blank) per sample day.

Action	Description of Required Works
Laboratory Quality Assurance and Quality Control	The contracted laboratory will conduct in-house QA/QC procedures involving the routine analysis of: ▪ Reagent blanks; ▪ Matrix spike and surrogate recoveries; ▪ Laboratory duplicates; ▪ Calibration standards and blanks; ▪ Control standards; and ▪ Statistical analysis of each QC measure.
Achievement of Data Quality Objectives	DQOs (Table 8-3) are to be achieved and an assessment of the overall data quality should be presented in the final validation report, in accordance with the NSW EPA (2017) <i>Guidelines for the NSW Site Auditor Scheme</i> .

8.4 Data Quality Objectives

In accordance with EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd edition)*, Data Quality Objectives (DQO) were derived to assess the quality of data collected in the future, and will be compared to the objectives as documented in **Table 8-3**.

Table 8-3 Data Quality Objectives

Step	Description
State the Problem	Site redevelopment involves the demolition of existing structures, followed by the development and construction of a 10 storey hotel, overlying two levels of underground basement. Commercial/retail uses will be designated for the lower ground (LG) and ground floors, with hotel units specified for the upper levels. Based on the proposed land use, a generic NEPC (2013) setting of commercial / industrial applies. Previous investigations (EI, 2025) identified the potential for soil and/or groundwater contamination due to various possible sources, as listed in Section 3.2. A CSM has been developed (Table 3-2). Intrusive investigation has not been completed due to accessibility limitations. Contamination, if encountered, will need to be managed in order for the site to be considered suitable for future development.
Identify the Goal of the Study / Identify the Decision	Based on the remedial objectives outlined in Section 1.3 the following goals are identified for this RAP: ▪ Define the nature and extent of the remediation works that need to be completed to make the site suitable for its future proposed use, and result in no unacceptable risks to future onsite and offsite receptors if successfully implemented.
Identify Inputs to the Decision	Inputs to the decision process include: ▪ Previous investigation works; ▪ Details of the proposed site use; ▪ Understanding of current site use and historic activities that have occurred, to identify the source of impacts identified on the site; ▪ Geological and hydrogeological data relevant to the area; ▪ Contaminant concentrations in soil validation samples confirming effective removal of identified impacts; and ▪ Sample collection and handling, field and laboratory QA/QC and confirmation that data quality indicators (DQIs) were achieved.

Step	Description
Define the Boundary of the Assessment	Lateral – Works are limited to the site boundaries (Figure 2, Appendix A). Vertical – From existing ground surface, underlying fill and natural soil horizons, to the base of contaminated soil, including the underlying water-bearing zones (to be confirmed during intrusive investigation). Temporal – The results will be valid on the day samples are collected and will remain valid if no changes to site use occur, and contamination (if present) is demonstrated not to be migrating from off-site sources. Constraints of sampling requiring consideration include access restrictions (due to site operations and/or conditions) and presence of both above and underground services / structures.
Develop a Decision Rule	The decision rules for validation are: - Is the site suitable for the proposed land use? <i>If the concentrations of contaminants that remain are below the relevant criteria for the intended land use; then the site will be deemed suitable for the proposed development.</i> - Is additional information required to assess the suitability of the site for its proposed use? <i>Should additional information be required as determined by the conceptual site model (CSM), then appropriate recommendations will be provided.</i> Decision criteria for analytical data are defined by the Data Quality Indicators (DQI) in Table 8-4.
Specify Acceptable Limits on Decision Errors	Specific limits for this project are to be in accordance with NEPM, appropriate data quality indicators (DQIs) for assessing the useability of the data, and EI standard procedures for field sampling and handling. To assess the useability of the data, pre-determined DQIs for completeness, comparability, representativeness, precision and accuracy, as presented below in Table 8-4. If any of the DQIs are not met, further assessment will be necessary to determine whether the non-conformance will significantly affect the useability of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of samples.
Optimise the Design for Obtaining Data	- Written instructions will be issued to guide field personnel in the required fieldwork activities. - Soil excavation is to be performed as per Section 6.5 and 7.3. Soil validation sampling is to be completed as per the methodology prescribed in Section 8 - Validation sampling procedures that would be implemented to optimise data collection for achieving the DQOs. - Review of the results will be undertaken to assess whether further excavation and additional sampling is warranted. Additional investigations would be warranted where soil concentrations are found to exceed remediation criteria endorsed by the NSW EPA, relevant to the proposed land use(s).

8.5 Data Quality Indicators

To ensure that the data collected is of an acceptable quality, the data set will be evaluated against the data quality indicators (DQI) outlined in **Table 8-4**, which related to both field and laboratory-based procedures.

Table 8-4 Data Quality Indicators

QA/QC Component	Data Quality Indicator(s)
Precision	Data precision was assessed by reviewing the performance of blind field

QA/QC Component	Data Quality Indicator(s)
A quantitative measure of the variability (or reproducibility) of data	duplicate sample sets, through calculation of relative percentage differences (RPD). Data precision was deemed acceptable if RPDs were found to be less than 30%. RPDs that exceeded this range were considered acceptable where: - Results were less than 10 times the limits of reporting (LOR); - Results were less than 20 times the LOR and the RPD was less than 50%; or - Heterogeneous materials or volatile compounds were encountered.
Accuracy A quantitative measure of the closeness of reported data to the “true” value	Data accuracy was assessed through the analysis of: - Split field duplicate sample sets; - Field and method blanks, analysed for the analytes targeted in the primary samples; - Matrix spike and matrix spike duplicate sample sets; and - Laboratory control samples.
Representativeness The confidence (expressed qualitatively) that data are representative of each medium present onsite	To ensure the data produced by the laboratory were representative of conditions encountered in the field, the following measures were taken: - Blank samples run in parallel with field samples, to confirm there were no unacceptable instances of laboratory artefacts; - Review of relative percentage differences (RPD) values for field and laboratory duplicates to provide an indication that the samples were generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities; and - The appropriateness of collection methodologies, handling, storage, and preservation techniques was assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation / transport methods).
Completeness A measure of the amount of useable data from a data collection activity	Analytical data sets acquired during the DSI were evaluated as complete upon confirmation that: - Standard operating procedures (SOPs) for sampling protocols were adhered to; and - Copies of all chain of custody (COC) documentation were included and found to be properly completed. It could therefore be considered whether the proportion of “useable data” generated in the data collection activities was sufficient for the purposes of the land use assessment.
Comparability The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Data sets from separate sampling episodes were required and issues of comparability were reduced through adherence to standard operating procedures (SOPs) and regulator-endorsed or published guidelines and standards on each data gathering activity. In addition the data were collected by experienced samplers and National Association of Testing Authorities (NATA) accredited laboratory methodologies will be employed.

8.6 Validation Reporting

All fieldwork, chemical analyses, discussions, conclusions and recommendations will be documented in a validation report for the site. The validation report will be prepared in general accordance with requirements of the NSW EPA (2020) *Guidelines for Consultants Reporting on Contaminated Sites* and NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme* and will provide a conclusion on whether the site has been remediated to a suitable standard for the proposed development.

The Site Validation Report will be submitted for Council/Planning Panel and/or Site Auditor (if any is assigned for the site) review at the completion of the remediation works program.

9. Conclusion

This Remedial Action Plan (RAP) outlines the process for investigating and, if necessary, remediating the site at 28–38 Pacific Highway, St Leonards NSW, to support compliance with the Contaminated Land Management Act 1997 and SEPP (Resilience and Hazards) 2021 in relation to the proposed site redevelopment. It sets out a staged approach for the assessment, remediation (if required), and validation of any contaminated soil or groundwater (if identified during the DSI) that may pose an unacceptable risk to site receptors.

This RAP also outlines protocols for managing unexpected finds during remediation and validation works. If during these works residual contamination is identified, the procedures in Section 8 will be followed until remediation goals are met and the site is deemed suitable for the proposed mixed commercial/residential (hotel and retail) use.

The preferred remediation approach involves excavation and off-site disposal of impacted soils at licensed facilities; however, the final method will depend on the results of the proposed soil and groundwater investigations.

It is envisaged that the investigation and remediation works will be implemented in stages, as follows:

- **Stage 1** – Preliminaries and site establishment;
- **Stage 2** – Pre-demolition Hazardous Materials Survey (HMS) and site demolition;
- **Stage 3** – Detailed Site Investigation (DSI);
- **Stage 4** – Remedial excavation and validation of impacted soils (if required);
- **Stage 5** – Bulk Excavation and Waste Classification; and
- **Stage 6** – Validation Reporting.

With consideration of EI's Statement of Limitations (Section 10), In conclusion, EI considers that the site can be made suitable for its proposed land use through the successful implementation of the site remediation and validation process described in this RAP.

10. Limitations

This report has been prepared for the exclusive use of Edsgear Pty Ltd (the client), being the only intended beneficiaries of our work. The scope of the RAP is limited to that agreed with our client.

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this report must be read in conjunction with the whole of this report, including its appendices and attachments.

The methods and conclusions presented in this report are based on a limited investigation of conditions, with specific sampling locations chosen to be as representative as possible under the given circumstances.

EI's professional opinions are reasonable and based on its professional judgment, experience, training and results from analytical data. EI may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified by EI.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation, observations, or validation testing and analysis during remedial activities. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

References

- Australian and New Zealand Governments and Australian state and territory governments (ANZG, 2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.
- Department of Environment and Conservation (DEC, 2007) *Guidelines for the Assessment and Management of Groundwater Contamination*.
- DCCEEW (2024) eSPADE v2.2 Portal, NSW Department of Climate Change, Energy, the Environment and Water, Retrieved from <https://www.dcceew.gov.au/>
- DMR (1983) *Sydney 1:100,000 Geological Series Sheet 9130*, Geological Survey of New South Wales, Department of Mineral Resources.
- JK Geotechnics Pty Ltd (2025) *Preliminary Geotechnical Investigation, 28-38 Pacific Highway, St Leonards*, Report No. 37122Lrptrev1, dated 27 March 2025 (JKG, 2025).
- EI Australia (2025) *Preliminary Site Investigation, 28-38 Pacific Highway, St Leonards*, Report No. E26701.E01_Rev0, dated 31 March 2025 (EI, 2025).
- Heads of EPAs Australia and New Zealand (HEPA, 2025) *PFAS National Environmental Management Plan 3.0*
- Murphy CL (1997) *Acid Sulfate Soil Risk of the Parramatta / Prospect Sheet (2nd Edition)*, Department of Land and Water Conservation, Sydney (supplied by the Sydney South Coast, Geographical Information Systems Unit).
- NEPC (2013) *Schedule B1 Guideline on Investigation Levels for Soil and Groundwater, Schedule B2 Guideline on Site Characterisation and Schedule B4 Guideline on Site-Specific Health Risk Assessments*, from the *National Environment Protection (Assessment of Site Contamination) Amendment Measure*, National Environment Protection Council, April 2013.
- NSW (2021) *State Environmental Planning Policy (Resilience and Hazards) (2021) (formerly SEPP 55 – Remediation of Land)*, last modified 2 March 2022.
- NSW EPA (2014a) *Waste Classification Guidelines – Part 1: Classifying Waste*, Environment Protection Authority of New South Wales, EPA 2014/0796, November 2014.
- NSW EPA (2014b) *Waste Classification Guidelines, Part 2: Immobilisation of Waste*.
- NSW EPA (2014c) *The Excavated natural material order 2014*.
- NSW EPA (2014d) *The Excavated natural material exemption 2014*
- NSW EPA (2016) *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste*.
- NSW EPA (2017) *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme* (3rd Edition), NSW EPA, October 2017.
- NSW EPA (2020a) *Consultants Reporting on Contaminated Land: Contaminated Land Guidelines*, NSW EPA 2020P2233, April 2020.
- NSW EPA (2020b) *Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation*, NSW EPA 2020P2700, December 2020.
- NSW EPA (2022a) *Sampling Design Part 1 - Application: Contaminated Land Guidelines*, Environment Protection Authority of New South Wales, EPA 2022P3915, August 2022.
- NSW EPA (2022b) *Sampling Design Part 2 – Interpretation: Contaminated Land Guidelines*, Environment Protection Authority of New South Wales, EPA 2022P3916, August 2022.

NSW Government (2009) Lane Cove Local Environmental Plan 2009. Retrieved from <http://legislation.nsw.gov.au>.

Standards Australia (2001) *Australian Standard AS 2601-2001 The Demolition of Structures*, Standards Australia, 2001.

Standards Australia (2017) *Australian Standard AS 1726-2017 Geotechnical Site Investigations*, Standards Australia AS 1726-2017, 2017.

USEPA (2000a) *Guidance for the Data Quality Objectives Process - EPA QA/G-4*, United States Environmental Protection Agency, EPA/600/R-96/055, August 2000.

USEPA (2000b) *Data Quality Objectives Process for Hazardous Waste Site Investigations - EPA QA/G-4HW*, United States Environmental Protection Agency, EPA/600/R-00/007, January 2000.

USEPA (2006) *Data Quality Assessment: A Reviewers Guide - EPA QA/G-9R*, United States Environmental Protection Agency, Office of Environmental Information, EPA/240/B-06/002, February 2006.

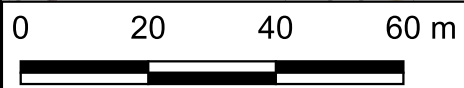
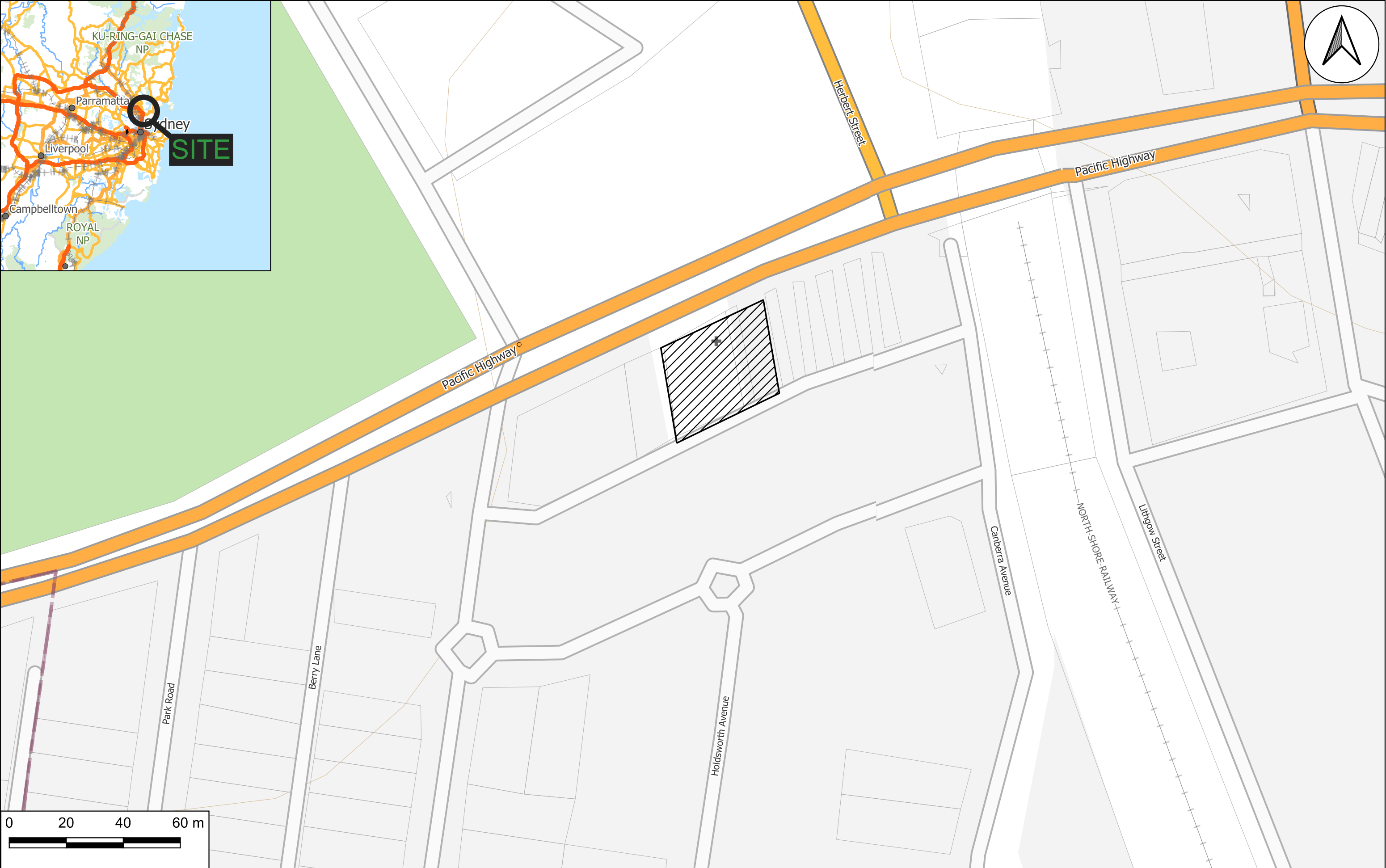
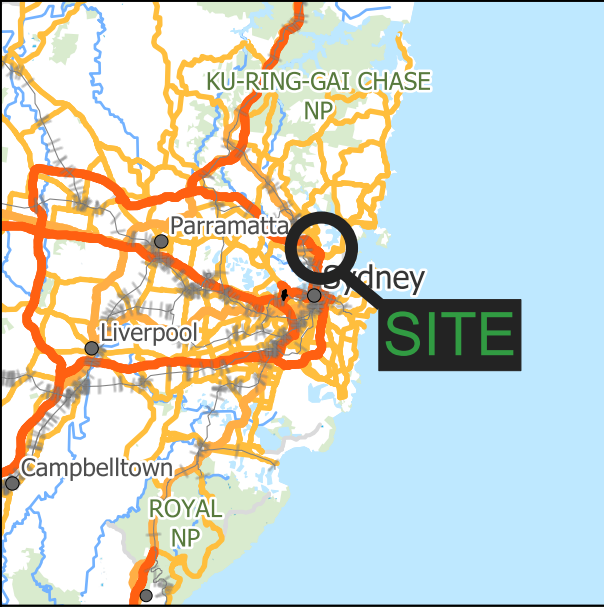
WADOH (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, Western Australian Department of Health.

Abbreviations

ACM	Asbestos-Containing Materials
AMP	Asbestos Management Plan
AS	Australian Standard
ASS	Acid Sulfate Soils
B(α)P	Benzo(α)Pyrene (a PAH compound)
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CLM	Contaminated Land Management
COC	Chain of Custody
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compounds (a sub-set of the VOC suite)
DA	Development Application
DCP	Development Control Plan
DNAPL	Non-Aqueous Phase Liquid
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
EMC	Environmental Management Coordinator
EMP	Environmental Management Plan
ENM	Excavated Natural Material
NSW EPA	NSW Environment Protection Authority
GPR	Ground Penetrating Radar
TRH-F1	C ₆ -C ₁₀ TRH fraction, less sum of BTEX concentrations
TRH-F2	>C ₁₀ -C ₁₆ TRH fraction, less naphthalene
TRH-F3	>C ₁₆ -C ₃₄ TRH fraction
TRH-F4	>C ₃₄ -C ₄₀ TRH fraction
HDPE	High Density Polyethylene
HIL	Health-based Investigation Level
HSL	Health-based Screening Level
LDPE	Low Density Polyethylene
LEP	Local Environmental Plan
LGA	Local Government Area
LNAPL	Light Non-Aqueous Phase Liquid (also referred to as PSH)
LOR	Limit of Reporting (of laboratory analytical method)
LPG	Liquefied Petroleum Gas
m	Metres
mAHD	Metres Australian Height Datum
mBGL	Metres Below Ground Level
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NSW	New South Wales
OCP	Organochlorine Pesticides
OPP	Organophosphate Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Poly-Chlorinated Biphenyls
PFAS	Per- and Poly-Fluoroalkyl Substances
PID	Photo-ionisation Detector
POEO	Protection of the Environment Operations Act
PPE	Personal Protective Equipment

PQL	Practical Quantitation Limit (limit of detection for laboratory method)
PSH	Phase-Separated Hydrocarbons (also referred to as LNAPL / DNAPL)
QA/QC	Quality Assurance / Quality Control
RAP	Remediation Action Plan
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan
SEPP	State Environmental Planning Policy
SOP	Standard Operating Procedure
SRA	Sample Receipt Advice
SWL	Standing Water Level
TCLP	Toxicity Characteristics Leaching Procedure
TEQ	Toxicity Equivalent Quotient
TRH	Total Recoverable Hydrocarbons (non-specific petroleum hydrocarbon fractions)
UCL	Upper Confidence Limit of the Mean
UPSS	Underground Petroleum Storage System
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compounds
WHSP	Work Health and Safety Plan

Appendix A - Figures

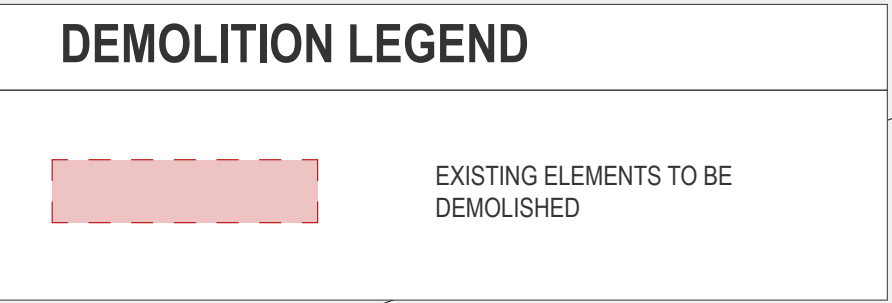


LEGEND Note: All locations are approximate Site Location	 eiaustralia Practical Solutions for Built Environments Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088	Drawn:	J.M.	Edsgear Pty Ltd Remediation Action Plan 28 -38 Pacific Highway, St Leonards NSW	Figure:
		Approved:	A.S.		1
		Date:	22/07/2025		
		Site Locality Plan			



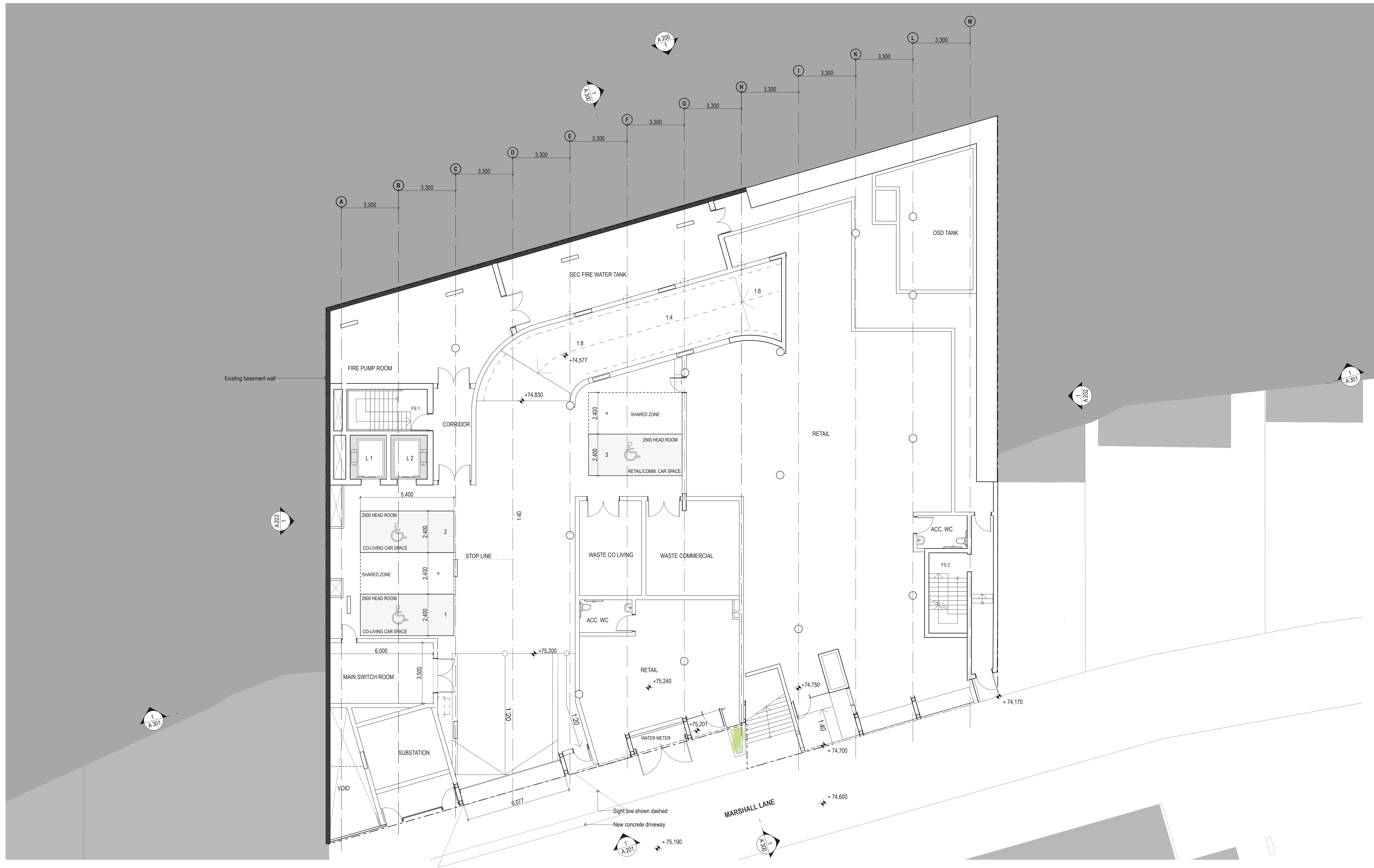
LEGEND Note: Areas are approximate		 Practical Solutions for Built Environments Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088		Edsgear Pty Ltd Remediation Action Plan 28 - 38 Pacific Highway, St Leonards NSW Proposed Sampling Location Plan		Figure: 2	
 Site Boundary	 Proposed Borehole Location						
 Proposed Basement Boundary	 Proposed Groundwater Monitoring Well						
 Approximate Location of Former Dry Cleaner (36 Pacific Highway)	 Previous Monitoring Well (JKG, 2025)	Drawn: J.M.		Approved: A.S.		Project: E26701.E06	
		Date: 31/07/2025					

Appendix B - Proposed Development Plans



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				ESD Consultant Dsquared Consulting	Quantity Surveyor Berco Consulting	Access + BCA BM+G	Nominated Architects Peter Tonkin NSW Registration 4147 Tim Greer NSW Registration 5603				



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Phase
DEVELOPMENT APPLICATION

Job No.
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Drawing Title

**GENERAL ARRANGEMENT PLAN -
LG**

Drawing No. Rev No.

A 102 01 - WIP

Scale 1:100@A1 1:200@A3

Timeline diagram showing cash flows for two projects, A1 and A3, over 8 periods. Project A1 has cash flows of 0, 1, 2, and 4 at periods 0, 1, 2, and 4 respectively. Project A3 has cash flows of 0, 2, 4, and 8 at periods 0, 2, 4, and 8 respectively.

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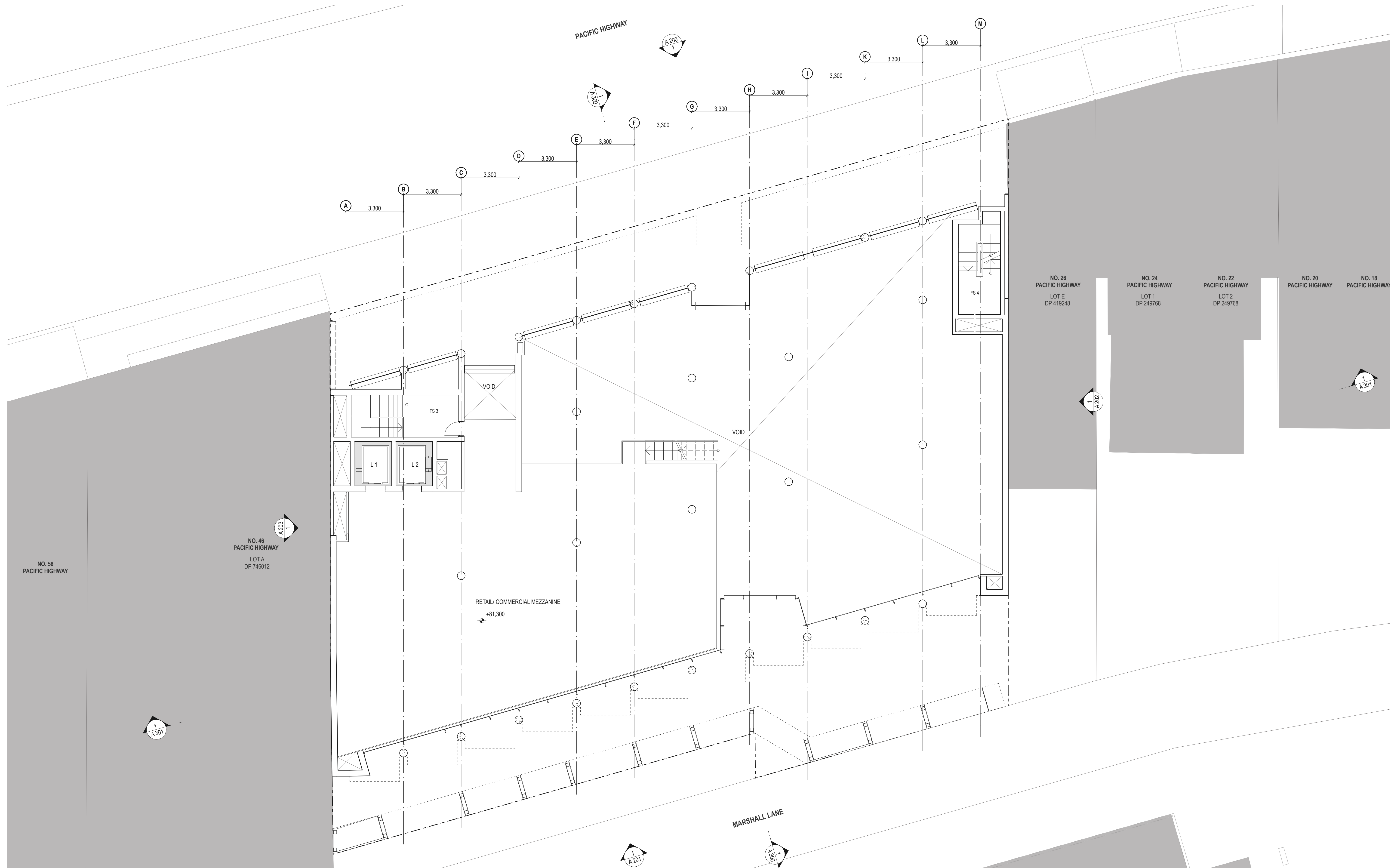
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The diagram illustrates the mapping of a 4-bit input m to an 8-bit output m' . The input m is represented by a horizontal line with tick marks at 0, 1, 2, and 4, labeled "m @A1". The output m' is represented by a horizontal line with tick marks at 0, 2, 4, and 8, labeled "m' @A3". The mapping shows that the input value 1 corresponds to the output value 2, and the input value 2 corresponds to the output value 4, indicating a scaling by a factor of 2.

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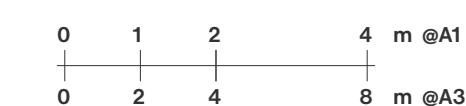
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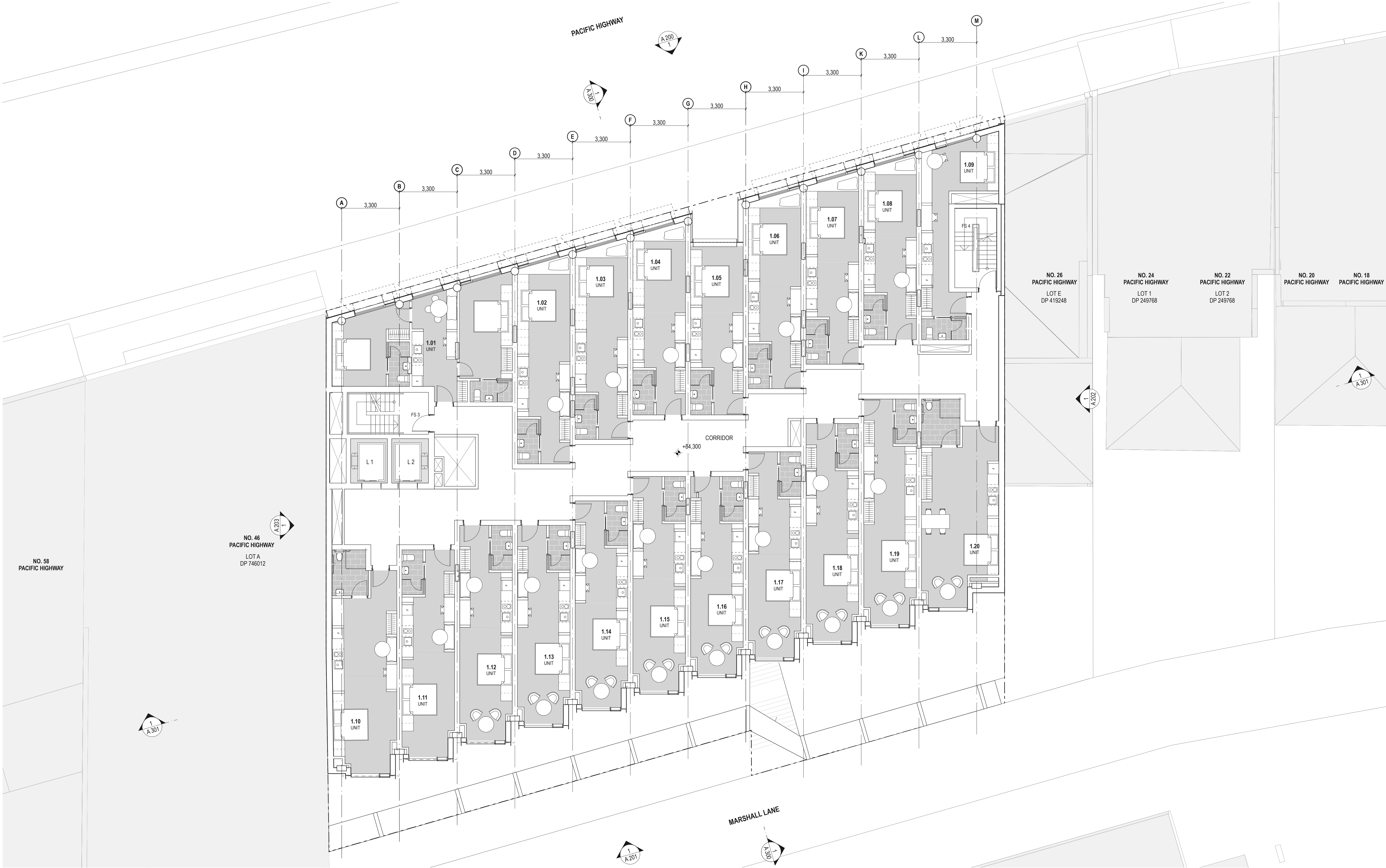
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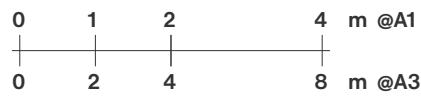
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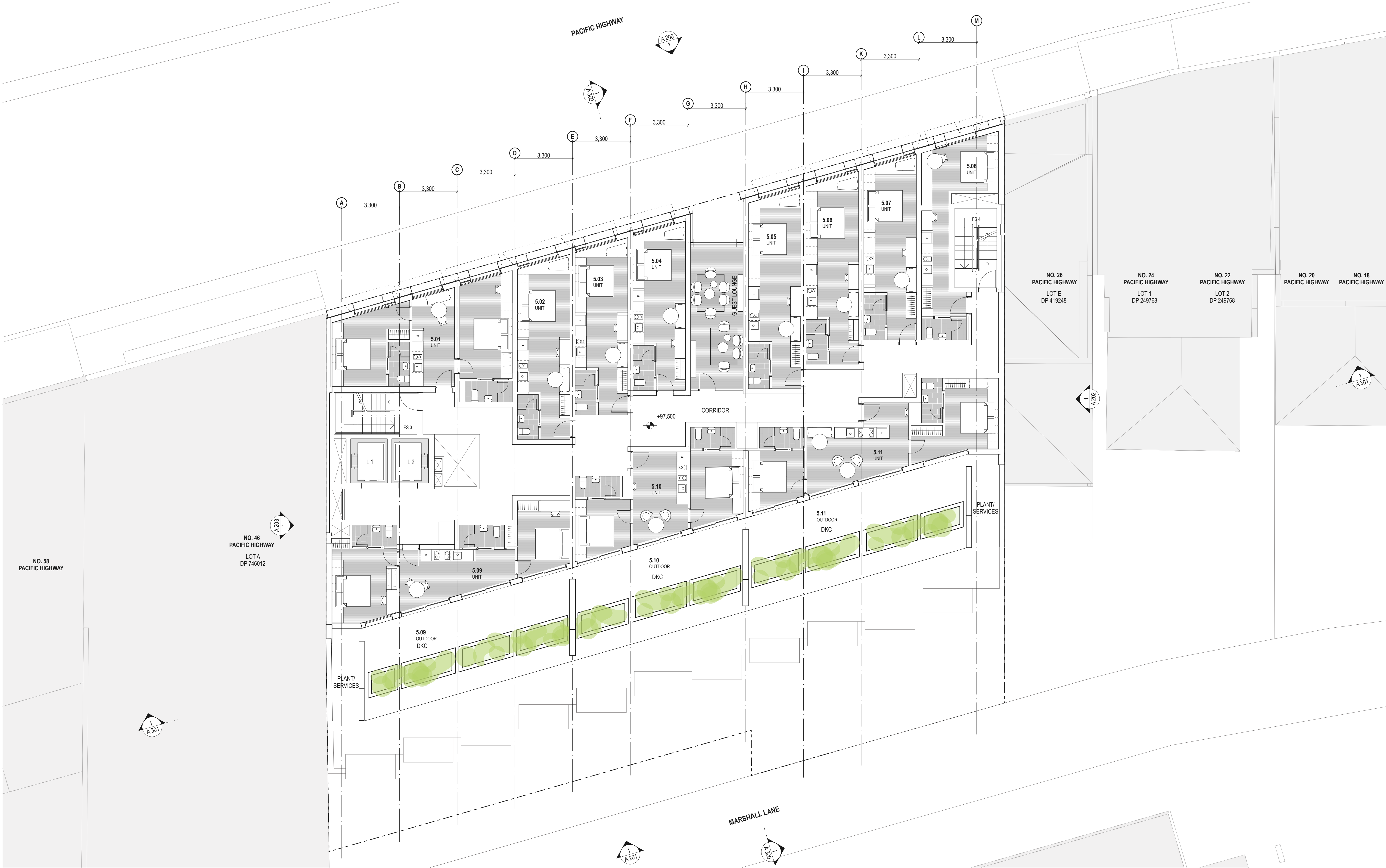
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Checked
TG

Date
WIP

North

FOR COSTING 17/03/2025





DATE	ISSUE	DESCRIPTION:
	01 - WIP	ISSUE FOR DA

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Structure + Civil Engineer Northrop Consulting Engineers
Services Engineer O&S Consulting
Town Planner Paro Consulting
ESD Consultant Dsquared Consulting

Fire Engineer Voss Grace + Partners
Landscape Architects Melissa Wilson Landscape Architects
Vertical Transport JHA Consulting Engineers
Quantity Surveyor Berco Consulting

Traffic CJP Consulting Engineers
Waste Engineer MRA Consulting Group
Acoustic Engineer PWNA
Access + BCA BM+G

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Client
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Project
38 PACIFIC HIGHWAY

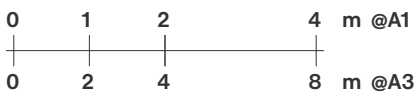
Phase
DEVELOPMENT APPLICATION

Job No.
20019

Drawing Title
**WESTERN ELEVATION -
BOUNDARY**
Drawing No.
A 203

Rev No.
01 - WIP

Scale
1:100@A1 1:200@A3



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Appendix C – Borehole Logs (JKG, 2025)

BOREHOLE LOG

Client: EDSGEAR PTY LTD
Project: PROPOSED MIXED USE DEVELOPMENT
Location: 28-38 PACIFIC HIGHWAY, ST LEONARDS, NSW

Job No.: 37122L **Method:** SPIRAL AUGER **R.L. Surface:** ~75.3 m
Date: 28/10/24 **Datum:** AHD
Plant Type: JK308 **Logged/Checked By:** S.W./L.S.

Groundwater Record	SAMPLES				Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
	ES	U50	DB	DS										
DRY ON COMPLETION OF AUGERING						75			-	CONCRETE: 90mm.t FILL: Silty clay, medium plasticity, brown, trace of fine grained igneous gravel, trace of fine to medium grained sand.	w>PL			5mm DIA. REINFORCEMENT, 30mm BOTTOM COVER
					N = 3 1,2,1		1			FILL: Silty clay, medium plasticity, light brown and grey, trace of fine grained ironstone gravel and fine to medium grained sand.	w-PL		100 120 140	APPEARS POORLY COMPACTED
						74			CI	Silty CLAY: medium plasticity, light grey and red brown, trace of fine to medium grained sand.	w>PL	St		RESIDUAL
					N = 13 4,4,9		2				w-PL	Hd	150 160 180 410 460 490	
						73								
							3			Extremely Weathered sandstone: silty CLAY, medium plasticity, light grey and red brown.	XW	Hd	>600 >600 >600	HAWKESBURY SANDSTONE
					N > 28 6,14,14/ 100mm REFUSAL					SANDSTONE: fine to medium grained, purple brown.	MW	M		MODERATE TO HIGH 'TC' BIT RESISTANCE
							4			REFER TO CORED BOREHOLE LOG				'TC' BIT REFUSAL
						71								GROUNDWATER MONITORING WELL INSTALLED TO 16.36m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 4.36m TO 16.36m. CASING 0.06m TO 4.36m. 2mm SAND FILTER PACK 4.0m TO 16.36m. BENTONITE SEAL 2.0m TO 4.0m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						70	5							
							6							
						69								

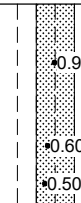
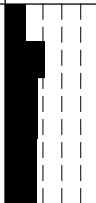
Borehole No.
1
2 / 4

[illegible]

CORED BOREHOLE LOG

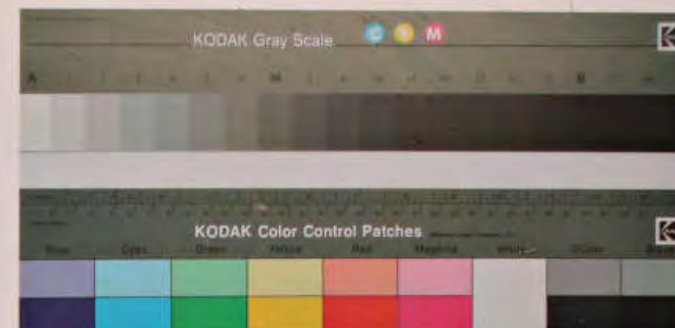
Client: EDSGEAR PTY LTD												
Project: PROPOSED MIXED USE DEVELOPMENT												
Location: 28-38 PACIFIC HIGHWAY, ST LEONARDS, NSW												
Job No.: 37122L					Core Size: NMLC				R.L. Surface: ~75.3 m			
Date: 28/10/24					Inclination: VERTICAL				Datum: AHD			
Plant Type: JK308					Bearing: N/A				Logged/Checked By: S.W./L.S.			
Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50) VL-0.1 L-0.3 M-1 H-3 VH-10 EH	SPACING (mm) 600 200 60 20	DEFECT DETAILS		Formation
										DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness		
										Specific	General	
90% RETURN		65			SANDSTONE: fine to medium grained, light grey, with grey laminae, bedded at 0-15°. (continued)	SW	L - M	0.60			(9.94m) XWS, 0°, 20 mm.t	Hawkesbury Sandstone
								0.40				
			11		as above, but with grey laminae, bedded at 0-10°.	FR	M - H	1.0			(10.57m) CS, 0°, 5 mm.t (10.61m) CS, 0°, 55 mm.t	
			64					1.5				
								1.5				
			12					0.80				
								1.1				
			63					1.1				
			13					0.90			(13.52m) Be, 10°, Un, R, Cb Ct	
								0.90				
			14								(14.11m) J, 30°, Ir, R, Cb Ct	
			61					1.0			(14.35m) Be, 20°, P, R, Cn	
											(14.81m) Be, 20°, P, R, Clay Ct	
			15					0.60				
			60					0.80			(15.52m) Be, 20°, P, R, Cn	
								1.0				
			16					1.6			(16.31m) Be, 20°, P, R, Cn	
			59								(16.62m) Be, 20°, P, R, Cn	
								0.90				

CORED BOREHOLE LOG

Client: EDSGEAR PTY LTD													
Project: PROPOSED MIXED USE DEVELOPMENT													
Location: 28-38 PACIFIC HIGHWAY, ST LEONARDS, NSW													
Job No.: 37122L					Core Size: NMLC				R.L. Surface: ~75.3 m				
Date: 28/10/24					Inclination: VERTICAL				Datum: AHD				
Plant Type: JK308					Bearing: N/A				Logged/Checked By: S.W./L.S.				
Water Loss/Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX I _s (50)	DEFECT DETAILS				Formation
									SPACING (mm)	DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness			
90% RETURN		58	18		SANDSTONE: fine to medium grained, light grey, with grey laminae, bedded at 0-10°.	FR	M - H			Specific			General
										(17.20m) Be, 0°, P, R, Clay Ct (17.39m) XWS, 0°, 65 mm.t (17.71m) J, 30°, Ir, R, Cn			
		57			END OF BOREHOLE AT 18.06 m								
			19										
		56											
			20										
		55											
			21										
		54											
			22										
		53											
			23										
		52											



Job No: 37122L
Borehole No: BH1
Depth: 3.70m to 12.00m



37122L BH1 START CORING AT: 3.70m

3

4

5

← NO CORE 0.62m.t →

6

7

8

← NO CORE: 0.43m.t

9

10

11



Job No: 37122L
Borehole No: BH1
Depth: 12.00m to 18.06m

