REPORT TO

TIME AND PLACE

ON

REMEDIATION ACTION PLAN

FOR

PROPOSED MIXED-USE DEVELOPMENT

AT

45-53 MACLEAY STREET, POTTS POINT, NSW

Date: 12 February 2025

Ref: E34303Brpt4.Rev2-RAP

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Executive Summary

This Remediation Action Plan (RAP) has been prepared by JK Environments (JKE) on behalf of Time and Place Ltd (the Applicant) to accompany a Concept State Significant Development Application (SSDA) for a mixed-use development at 45-53 Macleay Street, Potts Point (the site).

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 7 February 2025 issued for the SSDA (SSD-79316759). Specifically, this report has been prepared to respond to the SEARS requirement issued below.

Table – SERAs Requirement

Item	Description of Requirement	Section Reference (this report)
11. Contamination and Remediation	In accordance with Chapter 4 of the State Environmental Planning Policy (Resilience and Hazards) 2021, assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable (or will be suitable, after remediation) for the development.	This is a RAP report addresses the third stage of the contamination assessment process. The conclusions and recommendations of the RAP are presented in Section 10.

JKE understand that the client has engaged Ms Rowena Salmon, NSW EPA accredited site auditor to undertake a site audit with regards to the Contaminated Land Management (CLM) Act (1997). The RAP should be issued to the auditor for review as part of the audit process.

The RAP has been prepared based on the previous investigations undertaken by JKE at the site. The RAP makes reference to the following reports:

- JKE (2021), Report to Time and Place on Preliminary (Stage 1) Site Contamination Investigation for Proposed Boutique Residential Units at 45-53 Macleay Street, Potts Point, NSW. (reference: E34303Brpt, dated 10 September 2021) (referred to as PSI). The PSI has since been updated to address the SEARs;
- JKE (2023a), Report to Time and Place on Sampling Analysis Quality Plan for Detailed Site Investigation for Proposed Residential Development at 45-53 Macleay Street, Potts Point, NSW. (reference: E34303Brpt2-SAQP, dated 31 July 2023) (referred to as SAQP); and
- JKE (2023b), Report to Time and Place on Detailed Site Investigation for Proposed Residential Development at 45-53 Macleay Street, Potts Point, NSW. (reference: E34303Brpt3-DSI, dated 8 September 2023) (referred to as DSI). The DSI has since been updated to address the SEARs.

This RAP should be read in conjunction with the above reports. A summary of relevant information pertaining to the RAP is included in Section 2.1. Preliminary geotechnical assessment and a geotechnical investigation were completed at the site by JK Geotechnics (JKG) for the proposed development. The results of the geotechnical investigations are presented in two separate reports (Ref: 34303Rrpt, dated 26 August 2021 and Ref: 34303RErpt, dated 1 September 2023). The JKG reports have since been updated to address the SEARs.

The goal of the remediation is to render the site suitable for the proposed development from a contamination viewpoint. The primary aim of the remediation at the site is to reduce the human health and environmental risks posed by site contamination to an acceptable level. The primary objectives of the RAP are to:

- Summarise previous contamination investigations and historical contamination data;
- Identify any data gaps and provide recommendations for addressing the data gaps;
- Provide a methodology to remediate and validate the site;
- Provide a contingency plan and unexpected finds protocol (UFP) for the remediation works; and
- Outline site management procedures to be implemented during remediation.

Previous investigations identified fill contaminated with Carcinogenic Polycyclic Aromatic Hydrocarbons (PAHs) and Total Recoverable Hydrocarbons (TRHs) in two locations. The fill at the site will be remediated via an 'excavation and off-site disposal' strategy. Prior to this occurring, and following demolition, a Data Gap Investigation (DGI) will occur to

better characterise the fill given that there were access constraints during the DSI. The DGI requirements are specified in Section 4 of this RAP.

Some heavy metals and low concentrations of benzene were detected in groundwater at concentrations that were above the investigation SAC during the DSI, but were considered unlikely to pose an unacceptable risk. However, the reported concentrations warranted further assessment. This RAP includes provisions to further assess the risks associated with groundwater (as specified in Section 4), and to undertake remediation should it be required.

Remediation will occur concurrently with the built form of the development as it is anticipated that shoring associated with the proposed basement and site boundaries will need to be constructed to facilitate the excavation and off-site disposal of the contaminated fill. This must be considered by the consent authority in the context of when remediation is deemed to be complete and the validation report can be prepared. The validation report is expected to be prepared following commencement of construction, but prior to the issue of any occupation certificate or use of the site for the intended purpose.

Capping contamination on-site is not the preferred approach. However, the RAP acknowledges that it may not be possible to remove all fill from the setback areas to the east and west of the basement. If the DGI identifies contaminated fill in these areas that cannot be practicably removed, the RAP has provided a framework for remediating these areas via a 'cap and contain' approach. This will trigger a need for further reporting and preparation/implementation of a long-term Environmental Management Plan (EMP).

We are of the opinion that the site can be made suitable for the proposed development via remediation. The RAP has met the objectives outlined in Section 1.4. The regulatory requirements applicable for the site are outlined in Section 10.1.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.

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Attachments

Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Asbestos Management Plan	**AMP**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Above Ground Storage Tank	**AST**
Below Ground Level	**BGL**
Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Bureau of Meteorology	**BOM**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
Contaminated Land Management	**CLM**
Construction Environmental Management Plan	**CEMP**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Development Application	**DA**
Detailed Site Investigation	**DSI**
Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
Douglas Partners	**DP**
Ecological Investigation Level	**EIL**
Ecological Screening Level	**ESL**
Environmental Management Plan	**EMP**
Excavated Natural Material	**ENM**
Environment Protection Authority	**EPA**
Environment Protection Licence	**EPL**
Environmental Site Assessment	**ESA**
Ecological Screening Level	**ESL**
Excavated Natural Material	**ENM**
Health Investigation Level	**HILs**
Health Screening Level	**HSL**
Human Health Risk Assessment	**HHRA**
JK Environments	**JKE**
JK Geotechnics	**JKG**
Licensed Asbestos Assessor	**LAA**
Map Grid of Australia	**MGA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Polycyclic Aromatic Hydrocarbons	**PAH**
Polychlorinated Biphenyls	**PCB**
Per-and Polyfluoroalkyl Substances	**PFAS**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Preliminary Site Investigation	**PSI**
Quality Assurance	**QA**
Quality Control	**QC**
Remediation Action Plan	**RAP**

Restricted Solid Waste	**RSW**
Relative Percentage Difference	**RPD**
Remedial Works Plan	**RWP**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
Source, Pathway, Receptor	**SPR**
Standing Water Level	**SWL**
Total Recoverable Hydrocarbons	**TRH**
Upper Confidence Limit	**UCL**
United States Environmental Protection Agency	**USEPA**
Unexpected Finds Protocol	**UFP**
Underground Storage Tank	**UST**
Validation Assessment Criteria	**VAC**
Virgin Excavated Natural Material	**VENM**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millilitres	**ml or mL**
Milligrams per Kilogram	**mg/kg**
Percentage	**%**
Percentage weight for weight	**%w/w**

1 INTRODUCTION

This Remediation Action Plan (RAP) has been prepared by JK Environments (JKE) on behalf of Time and Place Ltd (the Applicant) to accompany a Concept State Significant Development Application (SSDA) for a mixed-use development at 45-53 Macleay Street, Potts Point (the site).

The site within the City of Sydney Local Government Area (LGA). It has an area of 1,289sqm and is legally described as SP 934. The site currently accommodates a 12-storey residential flat building comprising 80 studio apartments, and associated car parking (refer Plate 1).

The site is in Potts Point, which is well serviced by public amenities such as a supermarket, cafes, destination retail shops and a library. Further afield is the Sydney CBD and the Royal Botanic Gardens to the west, and Elizabeth Bay and Rushcutters Bay to the east.

The site is within convenient walking distance (750m) of Kings Cross Train Station which provides rail connections to Bondi Junction and South Sydney. It also benefits from access to local bus services along Macleay Street which run every 10 minutes on average throughout the day and connect the site with Potts Point, Central Station and Barangaroo.

Plate 1 – Aerial Photograph of the Site (Source: Nearmap)

The project seeks concept approval pursuant to section 4.22 of the EP&A Act for a 13-storey mixed- use shop-top housing development comprising three levels of basement car parking, ground floor retail and residential above.

The project will include 15% affordable housing for a 15-year period to utilise the height and floor space bonuses in the Housing SEPP. The proposal will comply with the maximum height and FSR controls for the site when utilising the bonuses provisioned for under the Housing SEPP for affordable housing provision, and the Sydney LEP 2012 for design excellence.

Table 1-1: Project Information

Descriptor	Project Details
Proposed Use	Shop Top Housing / Commercial Premises
Project Description	Construction of 13 storey mixed-use development comprising 3 levels of basement, ground floor retail and residential above
Gross Floor Area	Maximum 5,529.8m^2
Building height	Maximum 50.05m (inclusive of 30% affordable housing bonus and 10% design excellence bonus)
Floor Space Ratio	Maximum 4.29:1 (inclusive of 30% affordable housing bonus and 10% design excellence bonus)
Vehicle Access	Vehicle access to be provided off McDonald Street

1.1 Response to SEARs

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 7 February 2025 issued for the SSDA (SSD-79316759). Specifically, this report has been prepared to respond to the SEARS requirement issued below.

Table 1-2: SERAs Requirement

Item	Description of Requirement	Section Reference (this report)
11. Contamination and Remediation	In accordance with Chapter 4 of the State Environmental Planning Policy (Resilience and Hazards) 2021, assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable (or will be suitable, after remediation) for the development.	This is a RAP report addresses the third stage of the contamination assessment process. The conclusions and recommendations of the RAP are presented in Section 10.

1.2 RAP Report Introduction

JKE understand that the client has engaged Ms Rowena Salmon, NSW EPA accredited site auditor to undertake a site audit with regards to the Contaminated Land Management (CLM) Act (1997) [1]. The RAP should be issued to the auditor for review as part of the audit process.

[1] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

The RAP has been prepared based on the previous investigations undertaken by JKE at the site. The RAP makes reference to the following reports:

- JKE (2021), Report to Time and Place on Preliminary (Stage 1) Site Contamination Investigation for Proposed Boutique Residential Units at 45-53 Macleay Street, Potts Point, NSW. (reference: E34303Brpt, dated 10 September 2021) (referred to as PSI). This report has been since updated to make reference to the SEARs;
- JKE (2023a), Report to Time and Place on Sampling Analysis Quality Plan for Detailed Site Investigation for Proposed Residential Development at 45-53 Macleay Street, Potts Point, NSW. (reference: E34303Brpt2-SAQP, dated 31 July 2023) (referred to as SAQP); and
- JKE (2024), Report to Time and Place on Detailed Site Investigation for Proposed Residential Development at 45-53 Macleay Street, Potts Point, NSW. (reference: E34303Brpt3-DSI, dated 12 February 2024) (referred to as DSI). This report has been since updated to make reference to the SEARs.

This RAP should be read in conjunction with the above reports. A summary of relevant information pertaining to the RAP is included in Section 2.1. Preliminary geotechnical assessment and a geotechnical investigation were completed at the site by JK Geotechnics (JKG) for the proposed development. The results of the geotechnical investigations are presented in two separate reports (Ref: 34303Rrpt, dated 26 August 2021[2] and Ref: 34303RErpt Rev1, dated 5 February 2024)[3], which should also be read in conjunction with this RAP. The JKG reports have been since updated to make reference to the SEARs.

1.3 Proposed Development Details

Based on a review of the supplied information, we understand that following demolition, the proposed development will include construction of a thirteen-level mixed-use building over three basement levels which will extent to the northern, eastern and southern boundaries.

A deep soil planter bed which is approximately 3.8m wide is proposed along the western site boundary. Excavation to a maximum depth of approximately 10.5m below current surface levels will be required to achieve the finished floor level of the lowest basement level (i.e. Basement Level 3) at RL17.75m. Selected development plans issued to JKE are attached in the appendices.

1.4 Remediation Goal, Aims and Objectives

The goal of the remediation is to render the site suitable for the proposed development from a contamination viewpoint. The primary aim of the remediation at the site is to reduce the human health and environmental risks posed by site contamination to an acceptable level.

[2] JKG, (2021). *Report to Time and Place Development Pty Ltd on Preliminary Geotechnical Assessment for Proposed Redevelopment at 45-53 Macleay Street, Potts Point, NSW.* (referred to as JKG 2021 report)

[3] JKG, (2024). *Report to Time and Place Development Pty Ltd on Geotechnical Investigation for Proposed Redevelopment at 45-53 Macleay Street, Potts Point, NSW.* (referred to as JKG 2024 report)

The primary objectives of the RAP are to:

- Summarise previous contamination investigations and historical contamination data;
- Identify any data gaps and provide recommendations for addressing the data gaps;
- Provide a methodology to remediate and validate the site;
- Provide a contingency plan and unexpected finds protocol (UFP) for the remediation works; and
- Outline site management procedures to be implemented during remediation.

1.5 Scope of Work

The RAP was prepared generally in accordance with a JKE proposal (Ref: EP59464B) of 9 October 2023 and written acceptance from the client via email dated 9 October 2023. The scope of work included: review of previous investigation reports prepared for the site; review of proposed development plans; review of Conceptual Site Model (CSM); consultation with the client to discuss the remediation options; and preparation of the RAP.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[4], SEPP Resilience and Hazards 2021 and other guidelines made under or with regards to the CLM Act 1997, including the Consultants Reporting on Contaminated Land (2020)[5] guidelines.

A list of reference documents/guidelines is included in the appendices.

[4] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

[5] NSW EPA, (2020). *Consultants reporting on contaminated land, Contaminated Land Guidelines.* (referred to as Consultants Reporting Guidelines)

2 SITE INFORMATION

2.1 Review of Background Information

2.1.1 Summary of PSI Report

JKE was commissioned to undertake a PSI for the proposed development. The primary aims of the PSI were to: identify past or present potentially contaminating activities at the site; identify the potential for site contamination; and assess the need for further investigation.

The objectives of the PSI were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and land use by completing a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Prepare a CSM; and
- Assess whether an intrusive investigation is required.

The scope of works included: review of site information, including background and site history information from various sources outlined in the report; walkover site inspection; and preparation of a PSI report presenting the results of the assessment, including a CSM.

Based on the site history assessment, JKE identified the site and surrounds have historically been used for a mixture of residential and commercial purposes. Historical businesses registered at the site had included a medical practitioner and hotel. In more recent time, the site has been used for activities such as hotel and high-rise residential.

Potential AEC identified at the site included:

- Fill material (i.e. historically imported soil) at the site (entire site);
- Use of pesticides within the site;
- Hazardous building materials within current and former buildings/structures; and
- Current and historical dry cleaners located up-gradient and within close proximity of the site.

The PSI recommended that the following to be undertaken at the site:

- A DSI should be undertaken to characterise the site contamination conditions and establish whether the site is suitable for the proposed development, or whether remediation is required;
- An acid sulfate soil (ASS) assessment to establish the potential for actual or potential ASS to be present, and assess the need to prepare an ASS management plan (ASSMP); and
- A hazardous building materials survey undertaken prior to demolition of the buildings. Following demolition of the buildings (and preferably prior to removal of the hardstand), an asbestos clearance certificate should be obtained.

The PSI also recommend that a waste classification be undertaken to classify material to be excavated for the proposed development.

2.1.2 Summary of JKG Geotechnical Reports

JKG was commissioned in 2021 to undertake a preliminary desktop geotechnical assessment for the proposed development. The purpose of the assessment was to review JKG database of nearby geotechnical investigations and complete a site inspection.

The report identified the following likely subsurface conditions at the site:

- Sandy fill below the paved surfaces estimated to extent to a depth of approximately 1.5mBGL;
- An intermittent layer of residual clayey or sandy soils of an estimated maximum thickness of approximately 0.5m;
- Below the fill and/or residual soils, weathered sandstone bedrock is expected to be encountered at a maximum depth of approximately 1.5mBGL. On first contact, the sandstone is expected to be of variable quality ranging between extremely weathered and highly weathered and typically of very low to low strength with soil strength bands associated with the extremely weathered bedrock. Below approximately 2m to 4m depth, the sandstone is expected to improve to typically moderately to slightly weathered and of low to medium strength. The defects in the sandstone are expected to comprise sub-horizontal clay seams, extremely weathered seams and steeply inclined joints; and
- Localised very small quantities of groundwater seepage may be encountered within the soil profile at the soil-bedrock interface and possibly along discrete defects within the rock mass.

JKG was commissioned in 2023 to undertake a geotechnical investigation for the proposed development. The investigation included drilling three boreholes (BH1 to BH3), excavation of two test pits (TP4 and TP5) and completion of two Dynamic Cone Penetration (DCP) tests (DCP4 & DCP5) at selected locations. A summary of the subsurface conditions encountered during the JKG 2023 investigation is presented in the DSI report summarised below.

2.1.3 JKE DSI

JKE was commissioned to complete a DSI for the proposed development. The primary aims of the DSI were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make an assessment of the soil, soil vapour and groundwater contamination conditions in order to inform site remediation (if required). The DSI was also designed to assess the potential for ASS to be disturbed during the development and to provide preliminary waste classification data for off-site disposal of soil waste which may be generated during the proposed development works.

The DSI objectives were to:

- Provide a summary of the past site use(s) based on a review of the PSI report;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Investigate the potential contamination sources/AEC and CoPC identified in the PSI;
- Assess the soil, soil vapour and groundwater contamination conditions via implementation of a sampling and analysis program;
- Update and reassess the CSM;

- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Assess the potential for ASS to be disturbed during the proposed development works and if an ASSMP is required for the proposed development;
- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

The scope of work included the following:

- Review of site information, including background and site history information presented in the PSI report;
- Preparation of a CSM and SAQP;
- Implementation of the SAQP;
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a DSI report including a Tier 1 risk assessment.

The DSI included a review of existing project information, a site inspection, soil sampling from nine locations including seven boreholes and two test pits, soil vapour sampling from five sub-slab vapour pins and groundwater sampling from three monitoring wells. The DSI sampling locations are shown on Figure 2. The following potential contamination sources were identified at the site: fill material; use of pesticides; hazardous building materials from existing or former structures; and off-site dry cleaners with the closest one located approximately 60m to the south of the site.

The sampling locations encountered fill materials to depths of approximately 0.15mBGL to 0.85mBGL, underlain by sandstone bedrock. The sandstone was at shallow depths occurring below the concrete pavement in BH3. The fill contained inclusions of igneous and sandstone gravel, slag, roots and root fibres, trace of brick, concrete and plastic fragments and clay fine. There was no fibre cement fragments (FCF) or asbestos containing material (ACM) identified in any of the bulk asbestos quantification field screening samples.

The DSI identified potential health risks associated with carcinogenic polycyclic aromatic hydrocarbons (PAHs) in fill soil. Potential ecological risks from total recoverable hydrocarbons (TRHs) in fill soil were also identified. The results above the SAC are shown on Figure 3. Risks associated with soil vapour and groundwater were assessed to be low based on the DSI data. However, due to the presence of benzene in groundwater sample MW2, the DSI recommended further sampling and risk assessment under the provisions of the RAP.

The DSI identified that remediation of the site will be required. Additional investigation is also required to address the data gaps identified in the DSI. However, the DSI report stated that it would be reasonable to include the requirements for further investigation within the RAP because a large portion of this work will

need to occur after demolition. It was expected that remediation will include the removal/off-site disposal of fill associated with the basement excavation.

The DSI stated that the site can be made suitable for the proposed development via remediation. The DSI recommended the following:

- Preparation and implementation of a RAP. The RAP must include a data gap investigation (DGI) to address the data gaps identified in Section 7.4 of the DSI; and
- Preparation of a validation assessment report for the remediation works undertaken at the site.

The DSI also recommended undertaking a Hazardous Building Materials Assessment (Hazmat) for the existing buildings/structures at the site prior to the commencement of demolition work.

The analytical data summary tables from the DSI are attached in the appendices.

2.2 Interim Audit Advice (IAA) Letter No. 2

IAA Letter No. 2 was issued by the auditor dated, 6 October 2023. The IAA included a review of the JKE DSI report. The IAA recommended the following:

1. Completion of a hazardous building materials survey for the existing building/structure prior to the demolition works;
2. Development of a RAP incorporating a detailed scope for the recommended DGI. Review and approval of the RAP by an EPA Accredited Site Auditor;
3. Completion of the DGI post building demolition and provision of a RAP Addendum documenting the DGI works and confirming the RAP strategy. Review and approval of the RAP Addendum by an EPA Accredited Site Auditor;
4. Validation of the remediation works. This is required to be documented in a Validation Report confirming that the works have been undertaken in accordance with the RAP and certifying the suitability of the site post-remediation. Review and approval of the Validation Report by an EPA Accredited Site Auditor; and
5. Preparation of a Section A Site Audit Statement (SAS) and accompanying Site Audit Report (SAR) by a NSW EPA accredited Site Auditor confirming the site suitability for the intended use and any long-term management requirements at the completion of the remediation validation.

2.3 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	The owners of Strata Plan No. 934
Site Address:	45-53 Macleay Street, Potts Point, NSW
Lot & Deposited Plan:	SP934

Current Land Use:	Residential
Proposed Land Use:	Mixed Use - Residential and commercial (ground floor retail)
Local Government Authority (LGA):	City of Sydney
Current Zoning:	B4 – Mixed use
Site Area (m^2) (approx.):	1,300
RL (AHD in m) (approx.):	27-28
Geographical Location (decimal degrees) (approx. centre of site):	Latitude: -33.86839 Longitude: 151.22548
Site Plans:	See Figures attached in Appendix A

2.4 Site Condition and Surrounding Environment

2.4.1 Location and Regional Setting

The site is located in a predominantly residential and commercial area of Potts Point and is bound by Macleay Street to the east and accessed from McDonald Street to the north. The site is located approximately 170m to the west of Elizabeth Bay. Department of Defence facility (HMAS Kuttabul) is located to the north of the site.

2.4.2 Topography

The regional topography is characterised by a plateau that falls towards the east and west. The regional topography declines steeply towards the east and west at points located approximately 100m away from the site. The site is located on the peak of the plateau and generally falls to the north at approximately 1°-2°. Parts of the site appear to have been levelled to account for the slope and accommodate the existing development.

2.4.3 Site Inspection

A walkover inspection of the site was undertaken by JKE for the DSI on 31 July 2023. The inspection was limited to accessible areas of the site and immediate surrounds. An internal inspection of buildings was not undertaken. A summary of the inspection findings is outlined below:

2.4.3.1 Current Site Use and/or Indicators of Former Site Use

At the time of the DSI inspection, the site was occupied by a large residential apartment building including paved common areas used for access and resident vehicle parking. An under-croft parking was located beneath the residential building which provided access to the upper floors of the apartment. No indicators of former site use were observed during the inspection.

2.4.3.2 Buildings, Structures and Roads

The site was occupied by a ten-storey residential apartment building of concrete construction. With the exception of landscaped areas located along the northern and eastern street frontages, the open areas of the site were concrete paved and used as a car park associated with the residential apartments. Basements were not observed during the inspection. The onsite building and pavements generally appeared in good condition based on a cursory external inspection. There was considered to be a potential for hazardous building materials to be present based on the age of the building.

2.4.3.3 Boundary Conditions, Soil Stability and Erosion

The site boundaries were defined by adjacent building walls to the south, onsite building wall to the north, landscaped area to the east and steel post fencing to the west. Evidence of soil instability or erosion were not observed onsite during the inspection.

2.4.3.4 Presence of Drums/Chemical Storage and Waste

Access into the apartment building was not possible during the inspection. However, based on the residential use of the site and the lack of indicators for sources of contamination, JKE is of the opinion that there is unlikely to be drums, significant quantities of chemicals and/or waste stored at the site that may cause potential onsite contamination.

2.4.3.5 Evidence of Cut and Fill

The site appeared to have been levelled to accommodate for the current development. Based on the JKG desktop review, fill is anticipated to be present below the pavements at the site. Fill was also evident in the landscaped areas.

2.4.3.6 Visible or Olfactory Indicators of Contamination (odours, spills etc)

Visible or olfactory indicators of contamination, including indicators of potential above or underground fuel storage tanks (ASTs/USTs) were not observed the site during the inspection.

2.4.3.7 Drainage and Services

Surface water generated from rainfall would generally be expected to be intercepted and collected by onsite building guttering and routed to the local stormwater infrastructure. Excess rainfall forming overland flow would be expected to flow overland across impermeable site surfaces (concrete pavements) towards the north in sympathy of the site topography. Landscaped areas located along the northern and eastern site boundaries would be expected to allow infiltration of effective rainfall and any surface runoff generated from up-gradient areas. Onsite stormwater drains are also expected to collect and intercept runoff to the local municipal stormwater infrastructure.

2.4.3.8 Sensitive Environments

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds. Elizabeth Bay is located approximately 170m to the east and cross-gradient of the site.

2.4.3.9 Landscaped Areas and Visible Signs of Plant Stress

Native and exotic vegetation including ground cover, shrubs and small trees approximately 1m to 3m in height were observed in the landscaped areas at the site. Based on a cursory inspection, visible stress or dieback were not observed from the onsite vegetation.

2.4.4 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – Macdonald Street, residential apartments and HMAS Kuttabul located further to the north;
- South – Residential apartments with ground floor retail businesses including a hotel (Holiday Lodge), bar/restaurant (Yellow) and two dry cleaners (Challis Avenue Laundry & Dry Cleaning and Macleay Street Laundrette) located further to the south;
- East – Macleay Street, residential apartments and Elizabeth Bay located further to the east; and
- West – Macdonald Lane, residential apartments and Sydney Cove located further to the west.

JKE is of the opinion that the adjacent dry cleaners located to the south of the site is a potential off-site contamination source as the closest dry cleaner (Challis Avenue Laundry & Dry Cleaning) is located approximately 60m of the site boundary and is up-gradient (shown on Figure 2).

2.4.5 Climatic Conditions

In the lead up to the DSI, JKE noted that the rainfall between May and July 2023 ranged from 17.8mm (June) to 61.6mm (May).

2.5 Summary of Geology, Soils and Hydrogeology

2.5.1 Regional Geology

Review of regional geological information undertaken for the DSI indicates that the site is underlain by Hawkesbury Sandstone, which typically consists of medium to coarse grained quartz sandstone with minor shale and laminite lenses. Subsurface information encountered during the DSI is summarised in Section 2.1.3.

2.5.2 Acid Sulfate Soil (ASS) Risk and Planning

Review of ASS information undertaken for the DSI indicates that the site is located within a Class 5 ASS risk area. Works in a Class 5 risk area that could pose an environmental risk in terms of ASS include works within 500m of adjacent Class 1,2,3,4 land which are likely to lower the water table below 1m AHD on the adjacent Class 1,2,3,4 land. ASS Class 1 and 2 areas are located within 500m to the north, west and east of the site.

The DSI concluded that the risks from the disturbance of actual or potential ASS materials was very low in the context of the proposed development. Therefore, an ASSMP was not considered necessary for the proposed development.

2.5.3 Hydrogeology

Hydrogeological information was reviewed for the DSI. The report indicates that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. There was a total of 64 registered bores within the report buffer of 2,000m. In summary:

- The nearest registered bore was located approximately 170m to the east of the site. This was utilised for domestic purposes;
- The majority of the bores were registered for monitoring and domestic purposes;
- There were no nearby bores (i.e. within 500m) registered for recreational or irrigation uses; and
- The drillers log information from the closest registered bores typically identified fill soil to depths of 0.5-1.5m, underlain by sandstone bedrock and deep sands. Standing water level (SWL) in the bores ranged from approximately 0.1mBGL to 1mBGL.

The information reviewed for the DSI indicates that the subsurface conditions at the site are likely to consist of relatively low permeability (residual) soils overlying shallow bedrock. The potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be relatively low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Use of groundwater is not proposed as part of the development.

2.5.4 Receiving Water Bodies

Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is Elizabeth Bay located approximately 170m to the east of the site. This is down-gradient from site and considered to be a potential receptor.

3 SITE CHARACTERISATION AND CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the previous investigation data, site history and site information presented in Section 2.

3.1 Summary of Contamination - Site Characterisation

A review of the DSI report indicated the following SAC elevations (also shown on Figure 3 in the appendices):

- Fill sample BH7 (0.3-0.4m) encountered a Carcinogenic PAHs elevation of 26mg/kg, above the health-based SAC. The source of contamination was assessed to likely be associated with the slag includes in the fill. Statistical calculations were run on the fill dataset for Carcinogenic PAHs. The 95% upper confidence limit (UCL) for Carcinogenic PAHs was above the health-based SAC, the standard deviation (SD) was greater than 50% of the health-based SAC and the concentration was greater than 250% of the SAC. Considering the proposed development would include the removal of fill in this section of the site, the risk to the proposed development was considered to be low and can be managed under the RAP framework;
- TRH F3 was encountered in fill soil above the ecological SAC in two locations (BH7 and TP10) during the DSI. Silica-gel cleanup results indicated a general decrease in the TRH F3 and F4 concentrations in both samples indicating a non-petroleum source of TRH likely exists. This was also supported by the absence of staining, TRH odours and high PID results in the soil samples. The presence of slag in the fill soil can also be a potential source for mid-heavy fraction TRH. Majority of the fill soil will be excavated during the proposed basement excavation and the proposed development will include importation of landscaping material which will reduce the risk to future ecological receptors. The occurrence of TRHs in fill can be addressed under the RAP framework and the RAP includes importation criteria for landscaping material required for the proposed development;
- Groundwater sample MW2 and associated lab and field duplicates encountered elevated concentration of benzene above the site-specific assessment (SSA) health screening level (HSL) SAC that were adopted (refer to Figure 3). The concentration was only marginally above the HSL-SSA. The samples also detected chloroform. Soil vapour sample SV1 located in the vicinity of the MW2 also detected traces of benzene, however, the benzene in soil vapour was at concentrations that were well below the SAC. The potential source of the benzene detection can be associated with localised leaks form the sewer main located to the immediate west of the site. As the groundwater at MW2 was relatively shallow, the DSI considered that the soil vapour results are representative of the volatilisation risks associated with traces of benzene in groundwater. The benzene in soil vapour concentrations were orders of magnitude below the soil vapour SAC, therefore the risks from benzene in groundwater (in the context of vapour intrusion) are likely to be low and acceptable in the context of the proposed development. Notwithstanding, provisions for additional groundwater sampling and assessment are included in the RAP to confirm this assessment;
- The groundwater samples encountered concentrations of copper, mercury, nickel and zinc above the ecological SAC (refer to Figure 3). The copper and zinc exceedances were generally consistent across the monitoring wells and are considered to be associated with regional factors. The nickel and mercury concentration in field duplicate of MW2 may be attributed to localised leaks form the sewer main.

However, the DSI notes that the exceedance of the ecological SAC is minor and there are no nearby receiving waterbodies which could be easily impacted via subsurface groundwater migration, particularly as the groundwater will mix with other groundwater before entering the bay. Risks may increase where discharge of groundwater occurs to the stormwater system (which is expected to discharge into the bay), however, this is a construction-phase risk that is expected to be managed as part of the dewatering process; and

- The pH of the groundwater from MW1 and MW2 was outside the range generally accepted for both human health and ecological receptors.

3.2 Review of CSM

The table below includes a review of the CSM used to design the remediation strategy. The CSM will require further review if additional site data becomes available.

Table 3-1: Review of CSM

Contaminant source(s) and contaminants of concern	Contamination sources: fill material (slag inclusion); and off-site sewer main. Contaminants of concern for the RAP include: PAHs and TRHs in fill; and BTEX and heavy metals in groundwater. The CoPC for waste classification and DGI are outlined in Section 4.
Affected media	Soil (fill), and potentially groundwater. The DSI identified localised impacted of fill soil with Carcinogenic PAHs and TRH F4. The concentrations were considered likely to be associated with the inclusions of slag in fill. The RAP includes a procedure to remediate the contaminated fill. The groundwater identified heavy metals and benzene (VOC compound). The heavy metal concentrations were considered likely to be a regional/background issue and/or associated with leaks from the off-site sewer main. The RAP includes a framework for additional investigation, and for further assessment of groundwater-related risks and remediation, should it be required. Soil vapour results were below the SAC. Hence, not considered as an affected media in the RAP.
Receptor identification	Human receptors include site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users, and recreational water users within Elizabeth Bay. The risk of benzene contamination (VOC) to future site users (including accumulating in confined spaces and buildings) must be addressed in relation to the proposed development and by completing the DGI and subsequent steps. The majority of the site is currently paved and there are not considered to be terrestrial ecological receptors in the existing layout. Ecological receptors in the context of the proposed development include terrestrial organisms and plants within the unpaved areas. It is noted however that the basements will extend across the majority of the site. Marine ecology in Elizabeth Bay is also identified as ecological receptor.

Exposure pathways and mechanisms	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, VOCs and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings and basements. Exposure to groundwater contamination is unlikely to occur in Elizabeth Bay through direct migration as there would be some level of dilution as the water travels 170m to the bay. However, groundwater has the potential to enter the bay via the stormwater system (which is expected to discharge into the bay) in a drained basement scenario, or during temporary construction-phase dewatering. The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed basement and/or building (volatilisation of contaminants from groundwater); • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas; • Contact with groundwater during construction, or possibly in the proposed basement in a drained basement scenario; and • Migration of groundwater off-site and into nearby water bodies, including aquatic ecosystems and those being used for recreation.
Evaluation of data gaps	The DSI identified a range of data gaps which are summarised in Section 4. A DGI is required to address these data gaps. The scope of works required for the DGI is outlined in Section 4.

3.3 Remediation Extent

The RAP applies to the site as a whole, to the site boundaries as shown on the attached Figure 2. The final extent of remediation is to be confirmed following completion of the DGI. However, at this point, soil remediation will extend across the entire site and to the base of the fill/top of the underlying natural soil (or bedrock, whichever is shallower). The soil remediation area is indicated on Figure 4.

Regarding groundwater, the DGI includes provisions for further sampling and risk assessment to establish whether remediation is needed. This includes provisions for a Tier 2 Human Health Risk Assessment (HHRA). Notwithstanding, potential options for the remediation and/or management of groundwater are discussed in the RAP at a high-level.

4 DATA GAP INVESTIGATION

4.1 Identified Data Gaps

The DSI identified data gaps that require additional investigation. The data gaps included the following:

- Due to the access constraints, probabilistic/grid-based sampling was not practicable on this site. It is also noted that sampling occurred mainly from boreholes which poses limitation for identifying asbestos in fill, and sampling was not undertaken beneath the buildings/structures and in some areas which was subject to legal constraints associated with existing tenants. Further investigation of the fill will be required following demolition of the buildings/structures and when access becomes available to assess the full extent of risks associated with this AEC. However, in our opinion, we consider it is likely that the fill conditions beneath the buildings will be consistent with those encountered in the DSI. It is recommended that additional sampling is undertaken from test pits if practicable;
- Sampling and analysis for pesticides beneath the building/structure footprint and/or in close proximity to the building/structure was not undertaken due access constrains. Additional testing for organochlorine pesticides (OCPs) for waste classification purposes is required prior to the commencement of excavation works;
- An additional round of groundwater sampling and analysis is to be undertaken. The analysis should also include the mandatory testing parameters outlined in Table A2 of the *NSW Government Minimum requirements for building site groundwater investigations and reporting, information for developers and consultants (2022)* document, in order to assess groundwater treatment requirements during temporary dewatering associated with the basement excavation. If there is any uncertainty regarding the final risk assessment relating to groundwater, a site-specific risk assessment is to occur;
- The buildings and structures on the site are of an age indicative of housing hazardous building materials (i.e. asbestos fibre cement and lead paint). JKE is not aware of a hazardous building materials register for the site; and
- As the proposed development will retain some fill in setback areas along the east and west site boundaries, additional soil sampling is to be undertaken in these areas post demolition when site access is available.

In addition to the above, a surface inspection must occur following removal of the slabs.

4.2 Scope of Field Work

To address the above data gaps, a DGI must occur and is to include the following:

- Consultation with the client and other relevant stakeholders so that the following requirements are factored into the project timeline;
- Preparation of a SAQP for the DGI. The DGI SAQP must be provided to the site auditor for review and comment prior to commencement of the investigation work, and the DGI SAQP must be updated to the auditor's satisfaction prior to it being implemented;
- Development of and an additional round of groundwater sampling from the existing monitoring wells. The monitoring wells must also be surveyed to calculate the groundwater RLs and flow directions at the site. This should occur prior to demolition as there is a high potential that the existing wells will be damaged during the demolition process;

- A detailed site inspection following demolition of the buildings and also following removal of the existing floor slabs/pavements to identify unexpected finds and/or confirm conditions are as expected;
- Soil sampling from nine test pits positioned on a grid-based sampling plan with a grid size of 11m to address the minimum sampling requirements outlined in Table 2 in EPA Sampling Design Guidelines 2022 (we note that nine locations will fit more appropriately in the square-shaped site area). We expect that at least two of these locations will fall within the existing building footprint, i.e. the building being demolished;
- Asbestos field screening in the fill soil (10L bulk screening) to address the NEPM 2013 sampling requirements for asbestos;
- Additional soil sampling along the east and west site boundaries where fill may potentially be retained post development. This sampling must occur every 5m lineal along both the western and eastern boundaries; and
- Provisions for additional sampling/analysis if any visual or olfactory indicators of potential contamination are observed during the DGI.

The proposed DGI sample locations are shown on the attached Figure 4.

4.3 Laboratory Analysis

One soil sample per fill profile encountered (at each location) is to be analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH/BTEX, PAHs, OCPs, OPPs and asbestos (500mL quantification sample). A surface sample must be analysed for heavy metals and OCPs from the two (minimum) locations positioned in the building footprint. A bulk (10L) sample (to the extent achievable based on sample return) from each fill profile encountered (at each location) is to be screened in the field for the presence of asbestos.

One sample of the natural profile is to be collected from each sampling location. A selection of the natural samples (approximately eight to 10 samples) is to be analysed for the above mentioned contaminants (except asbestos) for preliminary waste classification purposes. The samples are to be selected based on the results of the fill soil analysis and field observations. It is noted however that as the fill is impacted by contaminants, the final waste classification for the natural soil and bedrock will need to occur following removal of the fill.

One groundwater sample per monitoring well is to be analysed for the following:

- Alkalinity (bicarbonate, carbonate, hydroxide and total), electrical conductivity (EC), pH, redox potential (Eh) and dissolved oxygen (DO);
- Turbidity, total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC) and sodium absorption ratio (SAR);
- Ionic balance, which includes major anions and the cation suite (including hardness);
- Metals including Aluminium (Al), antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), boron (B), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), lithium (Li), manganese (Mn), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), silica (dissolved SiO2), silver (Ag), strontium (Sr), uranium (U), vanadium (V), zinc (Zn);

- Nutrient suite, including Ammonia (NH3), nitrate (NO3), total nitrogen (N), oxidised nitrogen (N), total phosphorus (P) and reactive phosphorus (P);
- Faecal coliforms, faecal streptococci, Escherichia (E) coli; and
- PAHs; TRH; BTEX; and VOCs.

In the event that the additional round of groundwater sampling does not occur prior to demolition, and if the existing groundwater monitoring wells cannot be located or are unserviceable (i.e. compromised, destroyed) after demolition works, replacement monitoring wells are to be installed in accordance with the SAQP within close proximity (i.e. 5m) from the previously existing wells. All monitoring wells are to be surveyed to determine the groundwater flow directions.

QA/QC samples are to be obtained to meet the NEPM 2013 requirements and must be outlined in the SAQP. The laboratory results should be assessed against the relevant site assessment criteria (SAC) for the proposed development as outlined in the SAQP (similar to those adopted for the DSI). The DGI should also include an assessment against the relevant ecological SAC for the soil to be retained on site as part of the development.

4.4 Reporting

On completion of the DGI, a stand-alone report is to be prepared in accordance with the Consultants Reporting Guidelines. If the DGI is staged, for example to include groundwater investigation prior to demolition and soil investigation post-demolition, it would be reasonable to produce a separate DGI report for each stage of investigation. The DGI report(s) must document the Tier 1 risk assessment, evaluate the extent of remediation and the contaminants of concern being validated under the scope of this RAP, and comment on the need for a site-specific HHRA.

Based on the findings of the DGI, a HHRA may be required to better assess the risks posed by contamination, and outline specific remediation/management measures to be implemented during the proposed development in order to mitigate the risk posed to site receptors. If the remediation approach varies from this RAP, a remedial works plan (RWP) is to be prepared and must consider the findings of the HHRA.

At this point in time and for the purposes of soil remediation, it has been assumed that the fill in the setback areas to the east and west of the basement footprint is contaminated. In the event that the DGI demonstrates that this fill is not contaminated, a case can be made in the DGI report to retain this fill on site where it is appropriate to do so (i.e. the DGI must demonstrate that the fill being retained does not pose an unacceptable risk).

In the event the DGI finds contamination in the fill soil in the setbacks and if the project team establishes that the fill in these areas cannot be removed (e.g. for structural/stability reasons, or to protect underground services etc), then the fill may need to be capped in-situ. In this event, the DGI report will need to include a discussion about this. Reference must be made to the cap and contain contingency outlined in Section 8.1 for further details.

5 REMEDIATION OPTIONS

5.1 Soil Remediation

The NSW EPA follows the hierarchy set out in NEPM 2013 for the remediation of contaminated sites. The preferred order for soil remediation and management is as follows:

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

Or if the above are not practicable:

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

For simplicity herein, the above hierarchy are respectively referred to as Option 1, Option 2, Option 3 etc.

The NEPM 2013 and Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)[6] prefer the following asbestos remediation hierarchy:

1. Minimisation of public risk;
2. Minimisation of contaminated soil disturbance; and
3. Minimisation of contaminated material/soil moved to landfill.

The NSW EPA Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd Edition) (2017)[7] provides the following additional requirements to be taken into consideration:

- Remediation should not proceed in the event that it is likely to cause a greater adverse effect than leaving the site undisturbed; and
- Where there are large quantities of soil with low levels of contamination, alternative strategies should be considered or developed.

The table below discusses and assesses a range of soil remediation options:

[6] Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

[7] NSW EPA, (2017). *Contaminated land Management, Guidelines for the NSW Site Auditor Scheme (3rd ed.).* (referred to as Site Auditor Guidelines 2017)

Table 5-1: Consideration of Soil Remediation Options

Option	Discussion	Assessment/Applicability
Option 1 **On-site treatment of contaminated soil**	On-site treatment can provide a mechanism to reuse the processed material, and in some instances, avoid the need for large scale earthworks. Treatment options are contaminant-specific and can include bio-remediation, soil washing, air sparging and soil vapour extraction, thermal desorption and physical removal of bonded ACM fragments. Depending on the treatment option, licences may be necessary for specific individual waste streams due to the potential for air pollution and the formation of harmful by-products during incineration processes. Licences for re-use of treated material/waste may also be required.	Not applicable for the contaminants encountered in the fill soil. Also considering the proposed development will include earthworks for the proposed basement, a majority of the fill will require off-site disposal by default.
Option 2 **Off-site treatment of contaminated soil**	Contaminated soils are excavated, transported to an approved/licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site, transported to an alternative site or disposed to an approved landfill facility. This option is also contaminant-specific. The cost per tonne for transport to and from the site and for treatment is considered to be relatively high. The material would also have to be assessed in terms of suitability for reuse as part of the proposed development works under the waste and resource recovery regulatory framework.	Not a feasible option for the reasons noted above.
Option 3 **Consolidation and isolation of impacted soil by cap and containment**	This would include the consolidation of impacted soil within an appropriately designed cell, followed by the placement of an appropriate barrier over the material to reduce the potential for future disturbance. The capping and/or containment must be appropriate for the specific contaminants of concern. Depending on the concentrations of contaminants being encapsulated, an ongoing environmental management plan (EMP) will be required and will need to be publicly notified and made to be legally enforceable (e.g. via listings in the Section 10.7 planning certificate and on the land title).	Not likely to be a practicable solution for a majority of the fill considering the extent of the proposed basement. Capping contaminated fill in-situ may be appropriate if contamination exists in setback areas and if excavation/removal of such fill cannot occur. This is not preferred, however, has been included as a contingency (see Section 8.1) which will be guided by the outcome of the DGI.
Option 4 **Removal of contaminated material to an appropriate facility and reinstatement with clean material**	Contaminated soils would be classified in accordance with NSW EPA guidelines for waste disposal, excavated and disposed of off-site to a licensed landfill. The material would have to meet the requirements for landfill disposal. Landfill gate fees (which may be significant) would apply in addition to transport costs.	This option is the most applicable for the site and largely aligns with the construction work (i.e. bulk excavation is required for the proposed basement).

Option	Discussion	Assessment/Applicability
Option 5 Implementation of management strategy	Contaminated soils would be managed in such a way to reduce risks to the receptors and monitor the conditions over time so that there is an on-going minimisation of risk. This may occur via the implementation of monitoring programs.	Management strategies may be applicable if measures such as 'cap and contain' are implemented. Monitoring/management plans may also be applicable in relation to groundwater; however, this would need to be further evaluated following the DGI and as part of any associated reporting.

5.2 Groundwater Remediation

The preferred order for the remediation and management of contaminated groundwater presented in the NSW EPA Contaminated Sites Guidelines for the Assessment and Management of Groundwater Contamination (2007)[8] is outlined below:

1. Clean-up so that the natural background water quality is restored;
2. Clean-up to protect the environmental, human and ecological health; and
3. Clean-up to the extent practicable.

Various strategies for the mitigation/management of groundwater contamination risks may be applicable for the proposed development. The groundwater mitigation/management options will be considered following completion of the DGI, and (if required) the HHRA. The mitigation/management options and the implementation and validation methodologies are to be outlined in a site specific RWP.

The remediation options for consideration are outlined in the following table:

Table 5-2: Consideration of Groundwater Remediation Options

Option	Discussion	Assessment/Applicability
Option 1 In-Situ Treatment	In-situ treatment options may include: Bio-remediation: Addition of oxygen and nutrient compounds to accelerate the natural process of organic compound decay within the environment. Chemical Oxidation: Addition of chemical compounds to oxidise the hydrocarbons in groundwater into compounds that are less harmful to the environment. Air Sparging and Extraction: Air is forced through the contaminated groundwater system to volatilise organic compounds. The air is then extracted and captured for	Not suitable for long-term treatment as the set-up, on-going costs and licencing requirements would be onerous.

[8] NSW EPA, (2007). *Contaminated Sites Guidelines for the Assessment and Management of Groundwater Contamination.* (referred to as Groundwater Contamination Guidelines 2007)

Option	Discussion	Assessment/Applicability
	treatment leaving reduced contaminant concentrations within the sub-strata.	
Option 2 **Ex-Situ Treatment**	Ex-situ treatment options may include: Washing: Groundwater is stripped of contaminants via a leaching process, with the concentrated contaminated liquid product retained for disposal or additional treatment. Bioreactors: Groundwater is pumped into an above-ground tank and treated with inorganic nutrients. Oxygen is introduced into the tank by sparging. Hydrocarbons are broken down by naturally occurring bacteria. Off-site Treatment: Contaminated groundwater is transported to an approved/licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site or transported to an alternative facility for disposal.	Ex-situ treatment of groundwater impacted by metals and benzene is a potential option. The costs involved in transporting and disposal of contaminated groundwater would be expensive.
Option 3 **On-going Management & Monitoring**	Measures to manage groundwater contamination may include: • Notifying appropriate government agencies, owners of subsurface facilities and any other appropriate parties of the presence of groundwater contamination; • Plume containment; • Active or passive clean-up of contaminated groundwater; • Ongoing monitoring of natural attenuation; • Implementing management or contingency plans to reduce risks; and • Restricting groundwater use in and down-gradient of the contaminated plume.	This option would require the implementation of a legally enforceable long-term EMP. This option would likely be the preferred remediation approach and will be informed by the HHRA.

5.3 Rationale for the Preferred Option for Remediation

The preferred option for soil remediation is Option 4 which includes excavation and off-site disposal of all fill from the site. The potential to retain some fill in the basement setbacks will be further evaluated as part of the DGI process as outlined in Section 4.

The capping and management of contaminated fill on site is not the preferred option as the fill is relatively shallow and we consider that the potential stigma of site contamination and the need for a long-term EMP to be in place for the site would be unfavourable. Notwithstanding, this will be further evaluated as part of the DGI process and the capping of fill is included as a contingency in Section 8.1.

The preferred option for remediation is considered to be appropriate on the basis that:

- The majority of the site will be excavated to construct the proposed basements and will therefore include the removal of fill from the basement footprint. The removal of additional fill in the setbacks will not constitute substantial additional works in our opinion and removal of all fill will avoid the need for an EMP to manage soil contamination over the long-term;
- There is no room on site to construct a containment cell and it would not be acceptable practice to place the fill beneath the proposed basements as this will be below the observed groundwater levels;
- Attempting to cap the fill in the set back areas may be problematic as these areas would require a reasonably thick clean soil cap. To accommodate the cap, the areas would most likely need to be cut down/excavated anyway, which by default would largely remove the fill from these areas; and
- The removal of fill provides for a relatively short program of work that broadly aligns with the construction requirements for the basement.

The preferred option for groundwater remediation will require further assessment based on the results of the DGI and HHRA. In our opinion, the current dataset indicates that there is a relatively low potential that remediation of groundwater will be needed to mitigate associated risks in the context of the proposed land use. Notwithstanding, the requirements for further investigation and risk assessment, as outlined in this RAP, are robust and will enable this to be further considered.

JKE acknowledge that an EMP may be needed for contaminated fill remaining on-site and that this will be evaluated as part of the DGI and UFP process (see Section 8.1).

6 REMEDIATION DETAILS

6.1 Roles and Responsibilities

Table 6-1: Roles and Responsibilities

Role	Responsibility
Site Owner / Developer	Time and Place Contact: TBA The site owner / developer is required to appoint the project team for the remediation and must provide all investigation reports including this RAP to the project manager, remediation contractor, consent authority and any other relevant parties involved in the project.
Project Manager	To be appointed. The project manager is required to review all documents prepared for the project and manage the implementation of the procedures outlined in this RAP. The project manager is to take reasonable steps so that the remediation contractor and others have understood the RAP and will implement it in its totality. The project manager will review the RAP and other documents and will update the parties involved of any changes to the development or remediation sequence (in consultation with the validation consultant). The project manager must ensure that the contamination-related reports are provided to the site auditor for review.
Remediation Contractor	To be appointed. The remediation contractor is required to review all documents prepared for the project, apply for any relevant removal licences or permits and implement the remediation requirements outlined in this RAP. The remediation contractor may also be the construction contractor. The remediation contractor is required to collect all necessary documentation associated with the remediation activities and forward this documentation onto the client, project manager and validation consultant as they become available. The remediation contractor is required to advise the validation consultant at key points in the remediation and validation programme, and implement various aspects of the validation plan assigned to them.
Validation Consultant	To be appointed. The validation consultant[9] provides consulting advice and validation services in relation to the remediation, DGI, RWP, site validation report, management plans (if required) and any other associated documentation such as the Asbestos Management Plan (AMP). The validation is required to review any deviation to this RAP or in the event of unexpected finds if and when encountered during the site work. It is recommended that the validation consultant has a Licensed Asbestos Assessor (LAA) on staff. The validation consultant is required to liaise with the client, project manager and remediation contractor on all matters pertaining to the site contamination, remediation and validation, carry out the required site inspections during capping, and collect validation samples for imported materials.

[9] The validation consultant must have an in-house Certified Environmental practitioner Site Contamination specialist (CEnvP SC), or equivalent, to sign off on all related reports

Role	Responsibility
Site Auditor	Ms Rowena Salmon, NSW EPA Auditor Contact: **RSALMON@ramboll.com** The site auditor provides the SAR and SAS on completion of the remediation and validation works. However, prior to this, the site auditor is to review the DSI and the DGI SAQP and provide any comments. The comments on the DGI SAQP must be addressed to the auditor's satisfaction prior to commencing the investigation. Any additional reports (e.g. RWP, HHRA) triggered under the provisions of this RAP must also be provided to, and reviewed by, the site auditor.

6.2 Pre-commencement

The project team is to have a pre-commencement meeting to discuss the sequence of DGI, HHRA, remediation, and the remediation and validation tasks. The site management plan for remediation works (see Section 9) must be reviewed by the project manager and remediation contractor, and appropriate steps are to be taken to ensure the adequate implementation of the plan.

6.3 Remediation and Associated Tasks

The following general sequence of works is anticipated:

- Site establishment, removal of hazardous building materials and demolition (note that some aspects of the DGI could be undertaken prior to demolition, as noted in Section 4);
- **Hold Point** – A site inspection must be completed by the validation consultant on completion of demolition to identify any additional sources of contamination (such as ACM etc). Any such areas identified should be targeted as part of the DGI works and addressed as part of the associated reporting requirements;
- **Hold Point** – Complete the DGI, HHRA (as required) and prepare RWP (as required) for the proposed development;
- General earthworks and site preparations, followed by remediation of the site concurrently with the proposed development works;
- Excavation and off-site disposal of contaminated soil from basement excavation area;
- Based on the results of the DGI, implementing contingency measures as outlined in Section 8.1;
- Validation of the works would occur progressively throughout the remediation program; and
- Preparation of site validation report and EMP if required.

Details in relation to the above are outlined in the following subsections:

6.3.1 Site Establishment and Demolition

The remediation contractor is to establish on site as required to facilitate the remediation. Consideration must be given to the work sequence and extent of remediation so that the site establishment (e.g. site sheds, fencing, access points etc) does not inhibit the remediation works.

All hazardous building materials in the existing structures should be removed by a licensed asbestos contractor prior to the commencement of demolition, demolished in accordance with the relevant codes and standards. A clearance certificate is to be provided by a LAA following the removal of any hazardous materials. It is acknowledged that the LAA can be independent of the validation consultant and engaged by the demolition contractor if preferred.

All waste from the demolition is to be disposed to facilities that are licenced by the NSW EPA to accept the waste. The demolition contractor is to maintain adequate records and retain all documentation for such activities including:

- A summary register including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste. Legible dockets are to be provided for all waste materials so they can be reconciled with the register.

The above information is to be supplied to the validation consultant for assessment and inclusion in the site validation report.

6.3.2 Remediation of Contaminated Fill Soil

The procedure for remediation of fill soil is outlined below. This should be reviewed based on the results of the DGI and (where required) the HHRA:

Table 6-2: Remediation Details – Excavation and disposal of contaminated fill soil

Step	Primary Role/ Responsibility	Procedure
1.	Remediation contractor	Address Stability Issues and Underground Services: Geotechnical advice must be sought regarding the stability of the adjacent structures and/or adjacent areas prior to commencing remediation (as required). Stability issues must be addressed to the satisfaction of a suitably qualified geotechnical engineer. We anticipate this will require the installation of a shoring system to facilitate the excavation works associated with remediation and construction of the basement, and possibly also additional shoring along the boundaries to facilitate the removal of all fill from the setback areas to the east and west of the basement footprint. Fill must be removed across the entire site footprint, not just the basement footprint. Any waste generated during the shoring works (i.e. piling spoil) must be managed appropriately in accordance with the provisions of this RAP. All underground services are to be appropriately disconnected or rerouted to facilitate the works.

Step	Primary Role/ Responsibility	Procedure
2.	Remediation contractor	<u>Removal of contaminated fill from proposed basement footprint:</u> Excavation of the remediation area will be undertaken as follows: • Submit an application to dispose the fill (in accordance with the assigned waste classification) to a landfill licensed by the NSW EPA to receive the waste and obtain authorisation to dispose; • A water system will need to be in place to spray the excavated soil during excavation/ remediation works and to decontaminate trucks entering the work area. The general site area should be kept damp during remediation works to minimise the generation of dust; • The proposed basement footprint must be excavated to the base of the fill and down to the surface of the underlying natural soil. The details of the excavation works will need to be agreed with the remediation contractor. The works should be done in the most efficient manner that minimises cross contamination. We note that the natural soil and bedrock levels may vary across the site and provisions will need to be made for careful, detailed excavation and removal of all fill; • Load the fill onto trucks and dispose in accordance with the assigned waste classification. The receiving licenced landfill facility should be licensed to accept waste stream; and • All documents including landfill dockets should be retained and forwarded to the client and validation consultant for inclusion into the validation report.
3.	Remediation contractor Validation consultant	<u>Fill in Areas Outside the Basement Footprint:</u> As part of the DGI, additional testing is proposed for fill remaining outside the basement footprint (see Figure 4). Based on the results of the DGI, the suitability of retaining the fill should be assessed by the validation consultant. In the event the fill is contaminated and is considered to pose a risk to site receptors, it should be removed from the site as per Step 2 above. If complete removal of contaminated material is not possible due to site constraints, the contingency measures outlined in Section 8.1 should be adopted.
4.	Remediation contractor Validation consultant	<u>Validation of Excavation Walls and Base:</u> • Once all fill is removed, the walls and base of the excavation must be validated (by the validation consultant) in accordance with Section 7; • If the validation fails, and the contamination cannot be chased out, reference should be made to the capping contingency in Section 8.1; and • If the validation is successful, the excavation can be continued to achieve the finished levels of the basement (additional waste classification documentation will be required to dispose or reuse the underlying natural soil/bedrock).
5.	Remediation contractor Validation consultant	<u>Reinstatement of remediation excavations, where required:</u> As the remediation of basement involves removal of all fill, and then the basement will continue to be excavated deeper to achieve the design levels, we do not anticipate that reinstatement of the basement excavation will be required. We anticipate that reinstatement of the setback areas to the east and west of the basement footprint will be required following the removal of fill from these areas. Preferably these areas will be backfilled using clean (validated) site-won natural soil/bedrock excavated from the adjoining basement area, subject to such material being geotechnically suitable and appropriate in the context of the proposed landscaping works). Alternative, clean/validated imported materials could be utilised for reinstatement. Where materials are imported for the reinstatement, they must be validated (by the validation consultant) in accordance with Section 7.

6.3.3 Remediation of Contaminated Groundwater

The DGI procedures in Section 4 of this RAP will be used to establish whether groundwater contamination requires remediation. The high-level framework for assessing and (if required) remediating contaminated groundwater is outlined below:

Table 6-3: Remediation Framework – Contaminated Groundwater

Step	Primary Role/ Responsibility	Procedure
1.	Validation Consultant	Identify the Extent of Contamination: Additional testing of groundwater will be required in order to confirm the nature and extent of groundwater contamination. The additional testing will be undertaken as part of the DGI, as discussed in Section 4.
2.	Validation Consultant (and risk assessor, as required)	Assessment of Remediation Options: Based on the findings of the DGI, if risks are found to be unacceptable or if there is any uncertainty around the Tier 1 risk assessment outcome, a HHRA should be prepared to better assess the risks posed by the contamination, and identify appropriate remediation options (if required). Further site-specific ecological risk assessment may also be required. Potential remediation approaches are outlined in Section 5.2, however the DGI and HHRA will be used to further evaluate remediation options and design the remediation approach. Where remedial actions are necessary, a RWP will be prepared to outline the remediation and/or management approach for contaminated groundwater. It is acknowledged that groundwater remediation may not be deemed necessary once Steps 1 and 2 are complete. However, management of groundwater during construction dewatering will be required.
3.	Remediation contractor (or their nominated sub-contractor)	Implementation of the RWP: The remediation contractor is responsible for completing the remediation in accordance with the conditions and requirements specified in the RWP.
4.	Validation consultant	Validation sampling and documentation, as outlined in the RWP.

6.4 Remediation Documentation

The remediation contractor must retain all documentation associated with the remediation, including but not limited to:

- Waste register (see below);
- Asbestos management documentation (where applicable), including all relevant notifications and monitoring reports;
- Photographs of remediation works;
- Waste tracking documentation (where applicable); and

- Imported materials documentation from suppliers, including any routine analysis reports, product specifications and dockets for imported materials.

Copies of these documents must be forwarded to the project manager and the validation consultant on completion of the remediation for inclusion in the validation report.

Additional documentation requirements will be specified in the RWP(s), as required.

6.4.1 Waste Register

All waste removed from the site is to be appropriately tracked and managed in accordance with the relevant regulations. The remediation contractor (and/or their nominated construction contractor) is to maintain adequate records and retain all documentation for waste disposal activities including:

- A summary register including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste. Legible dockets are to be provided for all waste materials so they can be reconciled with the register.

Any soil waste classification documentation is to be prepared in accordance with the reporting requirements specified by the NSW EPA. Reports are to include:

- The full name, address, Australian Company Number (ACN) or Australian Business Number (ABN) of the organisation and person(s) providing the waste classification;
- Location of the site where the waste was generated, including the source site address;
- History of the material and the processes and activities that have taken place to produce the waste;
- Potential contaminating activities that may have occurred at the site where the waste was generated;
- Description of the waste, including photographs, visible signs of contamination, such as discolouration, staining, odours, etc;
- Quantity of the waste;
- Number of samples collected and analysed;
- Sampling method including pattern, depth, locations, sampling devices, procedures, and photos of the sample locations and samples;
- Contaminants tested;
- Laboratory documentation – chain-of-custody (COC), sample receipt, laboratory report;
- All results regardless of whether they are not used in the classification process;
- Results of sample mean, sample standard deviation and the 95% upper confidence limit (UCL) where relevant;
- Brief summary of findings including discussion of results; and
- A clear statement of the classification of the waste as at the time of the report.

A soil volume analysis must be undertaken on completion of remediation and reconciled with the quantities shown on the soil disposal dockets. This information is to be reviewed by the validation consultant on completion of the works and an assessment of the quantities of soil disposed off-site (e.g. comparison with the estimated and actual volumes) is to be included in the validation report. A review of the disposal facility's licence issued under the Protection of the Environment Operations (POEO) Act (1997)[10] must also be undertaken to assess whether the facility is appropriately licensed to receive the waste.

6.4.2 Imported Materials Register

The remediation contractor (and/or their nominated construction contractor) is to maintain for the duration of the project an imported material register. This must include a register (preferably in Microsoft Excel format) with details of each imported material type, supplier details, summary record of where the imported materials were placed on site, and importation docket numbers and a tally of quantities (separated for each import stream). Legible dockets for imported materials are to be provided electronically so these can be reconciled with the register.

The above information is to be provided to the validation consultant for inclusion in the validation report. It is recommended that the register be set up at the beginning of the project and provided to the validation consultant regularly (say on a monthly or two-monthly basis) so the details can be checked and any rectification of the record keeping process can occur in a timely manner.

[10]NSW Government, (1997)). *Protection of Environment Operations Act.*(referred to as POEO Act 1997)

7 VALIDATION PLAN

Validation is necessary to demonstrate that remedial measures described in the RAP have been successful and that the site is suitable for the intended land use. The sampling program for the validation is outlined in Section 7.1. This is the minimum requirement based on the remedial strategies provided. Additional validation sampling may be required based on observations made during remediation or in the event of an unexpected find.

7.1 Validation Sampling and Documentation

The table below outlines the validation requirements for the site. Reference should be made to Section 8.1 for validation details of fill remaining on-site managed by in-situ capping (as required).

Table 7-1: Validation Requirements

Aspect	Sampling	Analysis	Observations and Documentation
Remediation of Contaminated Fill			
Excavation Base	Samples positioned on a square grid spacing with 11m between sampling points (consistent with the minimum sampling density for the site recommended in the EPA Sampling Design Guidelines 2022).	PAHs and mid-heavy fraction TRHs (F2-F4 inclusive). Based on the results of the DGI, additional contaminants may be included. These would be outlined in the RWP, where required.	A sample location plan is to be produced and a sample description is to be recorded for each location. Samples to be screened using photo-ionisation detection (PID) meter. Observations of staining and odour to be recorded. Observations to include removal of all fill from the base. Photographs to be taken. Disposal dockets to be retained.
Excavation Walls	It is considered unlikely that the excavation walls will be exposed and able to be sampled for validation purposes as it is anticipated that a shoring wall will be constructed around the basement excavation and also possibly along the eastern and western site boundaries. The following is to be applied if soils are exposed on the excavation walls: One sample per 10m lateral length of excavation wall and one sample per vertical metre	As above.	As above. It is acknowledged that wall sampling may not be possible if shoring exists on the excavation walls.

Aspect	Sampling	Analysis	Observations and Documentation
	and/or change in fill profile.		
Groundwater			
Groundwater	To be determined based on the DGI and RWP.	To be determined based on the DGI and RWP.	To be determined based on the DGI and RWP.
Imported Materials – validation of imported materials is required for any materials imported onto the site during the remediation and to the point in time that the site validation report is prepared (e.g. general fill to raise the site levels or reinstate remedial excavations, imported materials to create piling platform, gravels for site preparation, material used for capping layers etc).			
Imported VENM backfill (if required) Imported garden mix/topsoil and mulches	Minimum of three samples per material type up to 75m^3, and one sample per 100m^3 thereafter. The sampling density should be reviewed based on the source/material type.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRHs, BTEX, PAHs, OCPs, OPPs, PCBs and asbestos (500ml). Additional analysis may be required depending on the site history of the source property. Analysis of mulch can be limited to visual observations to confirm there is limited anthropogenic material and no visible asbestos materials.	**Remediation contractor** to supply existing VENM documentation/report (report to be prepared in accordance with the NSW EPA waste classification reporting requirements). A hold point remains until the **validation consultant** approves the material for importation or advises on the next steps. **Remediation contractor** to supply existing documentation/product specification for landscaping materials. A hold point remains until the **validation consultant** approves the material for importation or advises on the next steps. Material is to be inspected upon importation by the **validation consultant** to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation. Photographic documentation and an inspection log are to be maintained. Where check sampling occurs by the **validation consultant** due to deficiencies or irregularities in existing documentation, the following is required: • Date of sampling and description of material sampled; • An estimate of the volume of material imported at the time of sampling; • Sample location plan; and • Analytical reports and tabulated results with comparison to the

Aspect	Sampling	Analysis	Observations and Documentation
			Validation Assessment Criteria (VAC).
Imported engineering materials such as recycled aggregate, road base etc or ENM	Minimum of three samples per material type up to 75m^3, and one sample per 100m^3 thereafter. The sampling density should be reviewed based on the source/material type. Additional testing may be required for ENM to meet the specification within the ENM Order.	Heavy metals (as above), TRHs, BTEX, PAHs, OCPs, OPPs, PCBs and asbestos (500ml). Additional testing may be required for ENM (e.g. foreign materials, pH and electrical conductivity) depending on available documentation.	**Remediation contractor** to provide product specification and documentation to confirm the material has been classified with reference to a relevant Resource Recovery Order/Exemption. A hold point remains until the **validation consultant** approves the material for importation or advises on the next steps. Review of the facility's Environment Protection Licence (EPL). Material is to be inspected by the **validation consultant** upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation. Where check sampling occurs by the **validation consultant** due to deficiencies or irregularities in existing documentation, the following is required: • Date of sampling and description of material sampled; • An estimate of the volume of material imported at the time of sampling; • Sample location plan; and • Analytical reports and tabulated results with comparison to the VAC.
Imported engineering materials comprising only natural quarried products.	At the validation consultant's discretion based on robustness of supplier documentation. As a general guide, minimum of three samples per material type up to 75m^3, then one sample per 100m^3 thereafter.	At the validation consultant's discretion based on robustness of supplier documentation.	**Remediation contractor** to provide documentation from the supplier confirming the material is a product comprising only natural soil or rock (i.e. natural quarried product). A hold point remains until the **validation consultant** approves the material for importation or advises on the next steps. Review of the quarry's EPL. Material is to be inspected by the **validation consultant** upon importation to confirm it is free of

Aspect	Sampling	Analysis	Observations and Documentation
			anthropogenic materials, visible and olfactory indicators of contamination, and is consistent with documentation. Where check sampling occurs by the **validation consultant** due to deficiencies or irregularities in existing documentation, the following is required: • Date of sampling and description of material sampled; • An estimate of the volume of material imported at the time of sampling; • Sample location plan; and • Analytical reports and tabulated results with comparison to the VAC.

7.2 Validation Assessment Criteria and Data Assessment

The VAC to be adopted for the validation assessment are outlined in the table below:

Table 7-2: VAC

Validation Aspect	VAC
Soil Criteria	Validation will include testing of the natural soil and/or bedrock (whichever is exposed at the base/walls of the excavation following fill removal) for the contaminants of concern outlined in Section 7.1. The VAC for TRHs and PAHs includes the laboratory PQLs (we expect these to be in the order of 0.5mg/kg for PAHs and 50-100mg/kg for TRHs). Whilst it is acknowledged that these VAC are conservative from a human health and ecological risk perspective, they are intended to demonstrate that there are no residual impacts from PAHs/TRHs from the overlying fill, and this will assist from a waste classification perspective with regards to the additional soil/bedrock being excavated from the basement (a waste classification for this natural material will be required to facilitate the remaining basement excavation works which forms part of the construction). See Section 7.3.5.1 below for further commentary in this regard. Based on the results of the DGI, testing for additional contaminants may be required. The VAC for any other contaminants of concern would be outlined in the RWP, where required.
Waste classification	In accordance with the procedures and criteria outlined in Waste Classification Guidelines, Part 1: Classifying Waste (2014)[11] and any other exemptions/approvals as required.
Groundwater criteria	To be established in the RWP, where required.

[11] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)

Validation Aspect	VAC
Imported materials	Material imported as general fill must only be VENM or ENM. VENM is defined in the Protection of the Environment Operations Act (1997)[12] as material: • That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette. ENM and recycled materials are to meet the criteria of the relevant exemption/order under which they are produced. Analytical results for VENM and other imported materials will need to be consistent with expectations for those materials. For VENM, it is expected that: • Heavy metal concentrations are to be less than the most conservative ACL concentrations for an 'Urban residential public open spaces' (URPOS) exposure setting presented in Schedule B1 of the NEPM 2013, except for lead which should be nominally less than 100mg/kg. We note the lead ACL is 1,100mg/kg and this concentration is not deemed to be representative of VENM; and • Organic compounds are to be less than the laboratory PQLs and asbestos to be absent. All materials imported onto the site must also be adequately assessed as being appropriate for the final use of the site. A risk-based assessment approach is to be adopted with regards to the tier 1 screening criteria presented in Schedule B1 of NEPM 2013. Aesthetics: All imported materials are to be free of staining and odours.

Data should initially be assessed as above or below the VAC. Statistical analysis may be applied if deemed appropriate by the consultant and undertaken in accordance with the NEPM 2013.

7.3 Validation Sampling, Analysis and Quality Plan (SAQP)

Appropriate QA/QC samples will be obtained during the validation (where applicable) and analysed for the same suite of contaminants as the primary samples. As a minimum, QA/QC sampling will include duplicates (5% inter-laboratory and 5% intra-laboratory), trip spikes and trip blanks. Spikes and blanks are to be taken for each day of sampling. Rinsate samples should be obtained if re-usable sampling equipment is utilised.

Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) should be clearly outlined and assessed as part of the validation process. A framework for the DQO and DQI process is outlined below and should be reflected in the validation report.

DQOs have been broadly established for the validation with regards to the seven-step process outlined NEPM (2013). The seven steps include the following which are detailed further in the following subsections:

- State the problem;

[12] Protection of Environment Operations Act 1997 (NSW) (POEO Act 1997)

- Identify the decisions/goal of the study;
- Identify information inputs;
- Define the study boundary;
- Develop the analytical approach/decision rule;
- Specify the performance/acceptance criteria; and
- Optimise the design for obtaining the data.

DQIs are to be assessed based on field and laboratory considerations for precision, accuracy, representativeness, completeness and comparability.

7.3.1 Step 1 - State the Problem

Validation data is required to demonstrate that the remediation is successful and that the site is suitable for the proposed land use described in Section 1.3.

7.3.2 Step 2 - Identify the Decisions of the Study

The remediation goal, aims and objectives are defined in Section 1.4. The decisions to be made reflect these objectives and are as follows:

- Was the remediation undertaken in accordance with the RAP and (where applicable) the RWP?
- If there were any deviations, what were these and how do they impact the outcome of the validation?
- Are any of the validation results above the VAC?
- Is the site suitable for the proposed development from a contamination viewpoint?

7.3.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Existing relevant data from previous reports;
- Site information, including site observations, inspections, waste and imported materials registers;
- Site-specific risk assessment (e.g. HHRA);
- DGI and validation data;
- Validation sampling of imported materials; and
- Field and laboratory QA/QC data.

7.3.4 Step 4 - Define the Study Boundary

The remediation and validation will be confined to the site boundaries as shown in Figure 2. At this point in time, the remedial excavation associated with the removal of fill will extend horizontally to all site boundaries and be limited vertically to the approximate depth of fill (fill depths range from approximately 0.15m to 0.85mBGL). Further consideration of the study boundary will be defined in the RWP(s) based on the results of the DGI as required.

7.3.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

7.3.5.1 VAC

The validation data will be assessed in accordance with the requirements outlined in Section 7.2.

Validation data will be assessed initially as above the VAC (fail) or below the VAC (pass). Statistical analysis is not proposed.

For the validation associated with the fill removal from the basement footprint, it is noted that relatively conservative VAC will apply based on the laboratory detection limits for TRHs and PAHs. If the VAC are exceeded in a sample collected from the natural soil/bedrock at the base or walls of the excavation, this may not necessarily imply that there is an unacceptable human health risk associated with the natural soil/bedrock. So should a failure occur, then the concentration is also to be evaluated against the NEPM (2013) (Schedule B1) HILs, HSLs and management limits for a 'low-high density residential' exposure scenario (HSL-A & HSL-B) to assess whether unacceptable risks exist. If the reported concentrations are below these criteria, then the validation will be deemed to have passed.

Notwithstanding the above, we note that the presence of organic compounds in samples collected from the base of the remedial excavation would compromise any attempted VENM classification for the natural soil/bedrock if the impacted material were not removed. Therefore, the validation results from the base of the basement footprint must also be considered in the context of the waste classification process for the bulk excavation of natural soil/bedrock being removed from the site to construct the basement.

7.3.5.2 Field and Laboratory QA/QC

Field QA/QC is to include analysis of inter-laboratory duplicates (5% frequency), intra-laboratory duplicates (5% frequency), trip spike, trip blank and rinsate samples (one each for the assessment, per day of sampling, to demonstrate adequacy of standard sampling/handling procedures). Field QA/QC samples are to be analysed for the contaminants of concern, except asbestos. The trip spike will only be analysed for BTEX.

DQIs for field and laboratory QA/QC samples are defined below:

Field Duplicates

Acceptable targets for precision of field duplicates will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Trip Blanks

Acceptable targets for trip blank samples will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to the reference material used as the blank medium.

Trip Spikes

Acceptable targets for trip spike samples will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data will be assessed against the laboratory QA/QC criteria. These criteria are developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the typical limits is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics; and
- 60-140% recovery acceptable for organics.

Surrogate Spikes

- 60-140% recovery acceptable for general organics.

Method Blanks

- All results less than PQL.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence will be reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is to be undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, the validation consultant is to adopt the most conservative concentration reported.

7.3.5.3 Appropriateness of PQLs

The PQLs must be in the order of 0.5mg/kg or less for PAHs and 50-100mg/kg or less for TRHs.

7.3.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is to be undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

7.3.7 Step 7 - Optimise the Design for Obtaining Data

The design is to be optimised via the collection of validation data to demonstrate the success of the key aspects of the remediation. Data collection will be via various methods including inspections and sampling.

7.3.8 Sampling Plan

The proposed sampling plan for the validation is described in Section 7.1.

7.4 Validation Report

As part of the site validation process, a validation report will be prepared by the validation consultant. The report will present the results of the validation assessment and will be prepared in accordance with the Consultants Reporting Guidelines.

The need for any additional validation-related reporting will be documented in the RWP(s), where required. The on-going management or mitigation of contamination-related risks may require a long-term EMP. This will be assessed based on the results of the DGI and HHRA, and will be confirmed in the RWP(s). If required, the RWP will include an outlined of the EMP.

Where long-term management is required, the notification and enforcement mechanisms are to include notation on the planning certificate under Section 10.7 of the Environmental Planning and Assessment Act (1979) and/or a covenant registered on the title to land under Section 88B of the Conveyancing Act (1919).

8 CONTINGENCY PLAN

A contingency plan for the remediation is provided below:

8.1 Complete Removal of Contaminated Material Not Achievable – Capping Contingency

In the event that contaminated fill/soil cannot be practicably removed from areas where the material will be retained, an assessment must be made by the validation consultant regarding the risks posed by this material in the context of the proposed development. Where this contingency is triggered and alternative remedial approaches are deemed necessary, a RWP or addendum to the RAP must be prepared, and issued to the auditor and the consent authority.

In the event that the fill does not pose an unacceptable risk to receptors if it were to be capped and managed, the material must be capped in-situ with a capping layer and managed under a long-term EMP. The fill can be capped under hardstand (e.g. pavements and slabs) or beneath adequate clean soil layers. The minimum capping requirements are as follows:

- Installation of a brightly coloured (i.e. orange) geotextile marker layer over the contaminated fill. This includes lining the base and walls of any underground service trenches in these areas;
- Installation/construction of new hardstands directly over the top of the geotextile marker in accordance with the engineering requirements for the project;
- In landscaped areas, a minimum of 500mm of clean soil above the marker layer provided that all new plantings are shallow and occur within this 500mm layer of clean soil. For larger/deep rooted trees or larger plantings that cannot be accommodated in this clean soil layer, a 'tree pit' must be excavated to remove all fill from the zone around the root ball and beneath the root ball. The walls of such pits must also be lined with the marker material.

The proposed remediation and validation steps associated with in-situ capping are outlined in the following table.

Table 8-1: Remediation Details – In-situ Capping Contingency

Step	Primary Role/ Responsibility	Procedure
1.	Remediation contractor	Service Trenching, Piling/Footings and other Minor Excavations: The remediation contractor is to undertake the relevant site preparation works, piling/footing excavations and other minor excavations required to facilitate the capping procedures. Any surplus excavated material must be managed and disposed off-site appropriately in accordance with the relevant requirements outlined previously in this RAP.
2.	Remediation contractor	Installation of Marker Layers and Survey of site levels: After completion of works, a geotextile marker is to be installed over the fill and secured appropriately using 'U' nails, pegs or other means. A pre-capping levels survey is to be completed by the remediation contractor prior to the placement of any new pavements and/or landscaping. The purpose of the survey is to provide factual information of the site levels, and the horizontal extent of the geotextile marker, prior to installation of the capping layer. Survey points must be taken at appropriate frequencies say every 5m lineal for narrow areas, a 5m

Step	Primary Role/ Responsibility	Procedure
		grid for broader areas, at the corners/edges of the geotextile, and more frequently for significant change in surface elevation. The pre-capping levels survey is to be provided to the client/project manager and the validation consultant prior to any further capping works commencing. Any tree pits must also be surveyed. An inspection must occur and photo-documentation must be maintained confirming that all fill has been removed to expose natural soil or bedrock at the base of the tree pit.
3.	Validation consultant and remediation contractor	Importation of Capping Materials: Imported materials are to be validated in accordance with Section 7. Validated materials can then be used to achieve the capping requirements for the project.
4.	Remediation contractor	Post-Capping Survey of site levels: After completion of capping, a post-capping levels survey is to be completed by the remediation contractor. The purpose of the survey is to provide factual information regarding the capping thickness and confirm that the capping requirements have been achieved. Survey points must be taken at appropriate frequencies as noted for the pre-capping survey. The post-capping levels survey is to be provided to the client/project manager and the validation consultant.

The validation requirements are outlined below:

Table 8-2: Validation Requirements – In-situ Capping Contingency

Aspect	Sampling	Analysis	Observations and Documentation
Capping	Not required	Not required	Validation consultant to carry out inspections to document the installation of the cap. Key hold points for inspections include: • Geotextile installation; • Base of tree pit excavations; • During importation of materials used above the marker layer; and • Finished surface levels. A photographic record is to be maintained by the remediation contractor and validation consultant. Pre- and post-capping surveys are to be undertaken by the remediation contractor or their chosen sub-contractor. As-built details for the development are to be documented on as-built drawings by the remediation contractor and provided to the validation consultant. As a minimum these must include: • Pre- and post-capping levels surveys, including surveys, and surveys of the horizontal extent of geofabric; • The location and depth of any underground services;

Aspect	Sampling	Analysis	Observations and Documentation
			• Finished surface details (e.g. pavements, concrete, landscaping etc).

A long-term EMP will be required to manage the contamination capped at the site and the long-term EMP will be documented as part of the overall validation process. Public notification and enforcement mechanisms for the long-term EMP are to be arranged as outlined in Section 7.4.

The long-term EMP will include requirements for passive management of the capping system that will focus on maintaining the capping layers to minimise the potential of exposure to the underlying fill. The long-term EMP will also include contingencies for managing minor intrusive works in the event that the capping system is breached.

8.2 Unexpected Finds

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. The procedure to be followed in the event of an unexpected find is presented below:

- In the event of an unexpected, contamination-related find, all work in the immediate vicinity should cease and the remediation contractor should contact the validation consultant, the client and the project manager;
- Temporary barricades should be erected to isolate the area from access to workers;
- The validation consultant is to attend the site, adequately characterise the contamination and provide advice in relation to site management and remediation. In the event that remediation differs from the procedures outlined in this RAP, an addendum RAP or RWP must be prepared in consultation with the project stakeholders and submitted to the consent authority. Such documentation must also be provided to the site auditor for review, comment and approval prior to its implementation; and
- Contamination should be remediated and validated in accordance with the advice provided, and the results must be included in the validation report.

A summary of the unexpected finds protocol (UFP) is provided in the appendices.

8.3 Importation Failure for VENM or other Imported Materials

Where material to be imported onto the site does not meet the importation VAC detailed in Section 7.2, the material should not be imported. Alternative material must be sourced that meets the importation requirements.

8.4 Changes to Remediation Strategy

Any material change to the proposed remediation strategy will require a RWP or a revision of the RAP. This must not occur without appropriate consultation and approvals from the client, consent authority, site auditor and other relevant parties.

9 SITE MANAGEMENT PLAN FOR REMEDIATION WORKS

The information outlined in this section of the RAP is for the remediation work only. The client should make reference to the development consent for specific site management requirements for the overall development of the site.

9.1 Asbestos Management Plan (AMP)

The need for an AMP for soil-related remediation works is to be assessed based on the results of the DGI. If an AMP is required, it should be prepared by a LAA and implemented by the remediation contractor (and their nominated subcontractors where relevant) throughout the remediation.

9.2 Project Contacts

Emergency procedures and contact telephone numbers should be displayed in a prominent position at the site entrance gate and within the main site working areas. The available contact details are summarised in the following table:

Table 9-1: Project Contacts

Role	Company	Contact Details
Developer	To be appointed	-
Project Manager	To be appointed	-
Remediation Contractor	To be appointed	-
Validation Consultant	To be appointed	-
Site Auditor	Ramboll	E: RSALMON@ramboll.com P: (02) 9954 8100
Certifier	To be appointed	-
NSW EPA	Pollution Line	131 555
Emergency Services	Ambulance, Police, Fire	000

9.3 Security

Appropriate fencing should be installed as required to secure the site. Warning signs should be erected, which outline the personal protective equipment (PPE) required for remediation work.

9.4 Timing and Sequencing of Remediation Works

The anticipated sequence of remediation works is outlined in Section 6.3. Remediation will occur concurrently with the development works as we expect that the built form of the development will need to commence in order to construct the shoring system to facilitate the basement excavation and associated fill remediation to the extent of the site boundaries.

This must be considered by the consent authority in the context of when remediation is deemed to be complete and the validation report can be prepared. The validation report is expected to be prepared following commencement of construction, but prior to the issue of any occupation certificate or use of the site for the intended purpose.

9.5 Site Soil and Water Management Plan

The remediation contractor must prepare a detailed soil and water management plan prior to the commencement of site works and this should consider the requirements of the AMP, as applicable. Silt fences must be used to control the surface water runoff at all appropriate locations of the site and appropriate measures are to be implemented to manage soil/water disturbance to the satisfaction of the regulator/consent authority. Reference should be made to the consent conditions for further details.

All stockpiled materials must be placed within an erosion containment boundary with silt fences and sandbags employed to limit sediment movement. The containment area should be located away from drainage lines/low-points, gutters, stormwater pits and inlets and the site boundary. No liquid waste or runoff can be discharged to the stormwater or sewerage system without the approval of the appropriate authorities.

9.6 Noise and Vibration Control Plan

The guidelines for minimisation of noise on construction sites outlined in AS-2460 (2002)[13] should be adopted. Other measures specified in the consent conditions should also be complied with. Noise producing machinery and equipment should only be operated between the hours approved by the consent authority (refer to consent documents).

All practicable measures should be taken to reduce the generation of noise and vibration to within acceptable limits. In the event that short-term noisy operations are necessary, and where these are likely to affect residences, notifications should be provided to the relevant authorities and the residents by the project manager, specifying the expected duration of the noisy works.

9.7 Dust Control Plan

All practicable measures must be taken to reduce dust emanating from the site. Factors that contribute to dust production are:

[13] Australian Standard, (2002). *AS2460: Acoustics - Measurement of the Reverberation Time in Rooms.*

- Wind over a cleared surface;
- Wind over stockpiled material; and
- Movement of machinery in unpaved areas.

Visible dust should not be present at the site boundary. Measures to minimise the potential for dust generation include:

- Use of water sprays on unsealed or exposed soil surfaces;
- Covering of stockpiled materials and excavation faces (particularly during periods of site inactivity and/or during windy conditions) or alternatively the erection of hessian fences around stockpiled soil or large exposed areas of soil;
- Establishment of dust screens consisting of a 2m high shade cloth or similar material secured to a chain wire fence;
- Maintenance of dust control measures to keep the facilities in good operating condition;
- Stopping work during strong winds;
- Loading or unloading of dry soil as close as possible to stockpiles to prevent spreading of loose material around the development area; and
- Geofabric/geotextile could be placed over exposed soils in the event that excavation is staged.

If stockpiles are to remain on-site or soil remains exposed for a period of longer than several days, dust monitoring should be undertaken at the site. If excessive dust is generated all site activities should cease until either wind conditions are more acceptable or a revised method of excavation/remediation is developed.

Dust is also produced during the transfer of material to and from the site. All material must be covered during transport and should be properly disposed of on delivery. No material is to be left in an exposed, un-monitored condition.

All equipment and machinery must be brushed or washed down before leaving the site to limit dust and sediment movement off-site. In the event of prolonged rain and lack of paved areas all vehicles should be washed down prior to exit from the site, and any soil or dirt on the wheels of the vehicles removed. Water used to clean the vehicles should be collected and tested prior to appropriate disposal under the relevant waste classification guidelines.

9.8 Dewatering

Based on the excavation depths and the SWL encountered during the DSI, dewatering is anticipated to be required during the excavation works for the proposed basement. However, dewatering is not expected to be required within the current scope of remediation as the groundwater levels are below the fill. Hence, dewatering does not form part of the remedial requirements.

Management of groundwater during the construction process will be required, therefore, JKE recommend preparing a Dewatering Management Plan (DMP) for the proposed development works. Any seepage/ground water encountered during excavation works should be tested on site and treated (if required) prior to

pumping to stormwater. Approvals must be obtained by the relevant authorities prior to pumping to stormwater.

9.9 Air Monitoring

Reference is to be made to the AMP for details regarding asbestos air fibre monitoring, where applicable. Air monitoring must only be carried out by personnel registered and accredited by NATA (National Association of Testing Authorities). Filter analysis must only be carried out within a NATA certified laboratory. The monitoring results must conform to the requirements of the NOHSC Guidance note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)].

A monitoring program will be used to assess whether the control procedures being applied are satisfactory and that criteria for airborne asbestos fibre levels are not being exceeded. The following levels will be used as action criteria during the air monitoring:

- <0.01 Fibres/ml: Work procedures deemed to be successful;
- 0.01 to 0.02 Fibres/ml: Inspection of the site and review of procedures; and
- >0.02 Fibres/ml: Stop work, inspection of the site, review of procedures, clean-up, rectification works where required and notify the relevant regulator.

9.10 Odour Control Plan

All activities undertaken at the site should be completed in a manner that minimises emissions of smoke, fumes and vapour into the atmosphere and any odours arising from the works or stockpiled material should be controlled. Control measures may include:

- Maintenance of construction equipment so that exhaust emissions comply with the Clean Air Regulations issued under the Protection of the Environment Operations Act (1997) (POEO);
- Demolition materials and other combustible waste should not be burnt on site;
- The spraying of a suitable proprietary product to suppress any odours that may be generated by excavated materials; and
- Use of protective covers (e.g. builder's plastic).

All practicable measures must be taken to reduce fugitive emissions emanating from the site so that associated odours do not constitute a nuisance and that the ambient air quality is not adversely impacted.

The following odour management plan should be implemented to limit the exposure of site personnel and surrounding neighbours to unpleasant odours:

- Excavation and stockpiling of odorous material must be scheduled during periods with low winds if possible;
- Where necessary, a suitable proprietary product could be sprayed on material during excavation and following stockpiling to reduce odours (subject to an appropriate assessment of the product by the validation consultant);
- All complaints from workers and neighbours should be logged and a response provided. Work should be rescheduled as necessary to minimise odour problems;

- The site foreman should consider the following odour control measures:
  - reduce the exposed surface of the odorous materials;
  - time excavation activities to reduce off-site nuisance (particularly during strong winds); and
  - cover exposed excavation faces overnight or during periods of low excavation activity.
- If continued complaints are received, alternative odour management strategies should be considered and implemented.

9.11 Work Health and Safety (WHS) Plan

A site specific WHS plan must be prepared by the remediation contractor for all work to be undertaken at the site. The WHS plan must meet all the requirements outlined in SafeWork NSW WHS regulations.

As a minimum requirement, personnel must wear appropriate protective clothing, including long sleeve shirts, long trousers, steel cap boots and hard hats. If an AMP is prepared and implemented for any soil disturbance activities, additional asbestos-related PPE will be required and this will be specified in the AMP, where applicable. Washroom and lunchroom facilities must also be provided to allow workers to remove potential contamination from their hands and clothing prior to eating or drinking.

9.12 Waste Management

Prior to commencement of remedial works and excavation for the proposed development, the remediation contractor should develop a waste management or recycling plan to minimise the amount of waste produced by the site. Consideration should be given to re-use material wherever possible.

Reference is to be made to Section 6.4.1 for further details regarding waste classification requirements in the context of the site remediation.

9.13 Incident Management Contingency

The validation consultant must be contacted if any unexpected conditions are encountered at the site. This should enable the scope of remedial/validation works to be adjusted as required. Similarly, if any incident occurs at the site, the validation consultant must be advised to assess potential impacts on contamination conditions and the remediation/validation timetable.

9.14 Hours of Operation

Hours of operation should be between those approved by the consent authority under the development approval process.

9.15 Community Consultation and Complaints

The remediation contractor should provide details for managing community consultation and complaints within their Construction Environmental Management Plan (CEMP).

10 CONCLUSIONS

The RAP has been prepared based on the previous investigations undertaken by JKE for the proposed development of the site. The RAP has been prepared to address the requirements outlined under Contention No. 2 of the LEC proceeding (case number 2023/00115313) with regards to Chapter 4 of SEPP Resilience and Hazards 2021.

Previous investigations identified fill contaminated with Carcinogenic PAHs and TRHs in two locations. The fill at the site will be remediated via an 'excavation and off-site disposal' strategy. Prior to this occurring, and following demolition, a DGI will occur to better characterise the fill given that there were access constraints during the DSI. The DGI requirements are specified in Section 4 of this RAP.

Some heavy metals and low concentrations of benzene were detected in groundwater at concentrations that were above the investigation SAC during the DSI, but were considered unlikely to pose an unacceptable risk. However, the reported concentrations warranted further assessment. This RAP includes provisions to further assess the risks associated with groundwater (as specified in Section 4), and to undertake remediation should it be required.

Remediation will occur concurrently with the built form of the development as it is anticipated that shoring associated with the proposed basement and site boundaries will need to be constructed to facilitate the excavation and off-site disposal of the contaminated fill. This must be considered by the consent authority in the context of when remediation is deemed to be complete and the validation report can be prepared. The validation report is expected to be prepared following commencement of construction, but prior to the issue of any occupation certificate or use of the site for the intended purpose.

Capping contamination on-site is not the preferred approach. However, the RAP acknowledges that it may not be possible to remove all fill from the setback areas to the east and west of the basement. If the DGI identifies contaminated fill in these areas that cannot be practicably removed, the RAP has provided a framework for remediating these areas via a 'cap and contain' approach. This will trigger a need for further reporting and preparation/implementation of a long-term EMP.

The RAP has met the objectives outlined in Section 1.4. The regulatory requirements applicable for the site are outlined in Section 10.1.

10.1 Regulatory Requirements

The regulatory requirements applicable for the remediation are discussed in the following table:

Table 10-1: Regulatory Requirement

Guideline / Legislation / Policy	Applicability
SEPP Resilience and Hazards 2021	The site is listed as an Environmental Planning Instrument (EPI) Heritage Item on the Sydney Local Environmental Plan 2012. JKE is of the opinion that the remediation is classed as Category 1 remediation work, requiring development consent. Approval is required from

Guideline / Legislation / Policy	Applicability
	the consent authority for Category 1 remediation work. This should be assessed and confirmed by the client's expert planner. Under Section 4.14 of Resilience and Hazards SEPP, a notice of completion of remediation work is to be given to council within 30 days of completion of the work regardless of whether the remediation is classed as Category 1 or Category 2 remediation work. The notice of completion of remediation works must be in accordance with Section 4.15 of SEPP Resilience and Hazards.
POEO Act 1997	Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner. Appropriate waste tracking is required for all waste that is disposed off-site. Activities should be carried out in a manner which does not result in the pollution of waters.
POEO (Waste) Regulation 2014	Part 7 of the POEO Waste Regulation 2014 set outs the requirements for the transportation and management of asbestos waste and Clause 79 of the POEO Waste Regulation requires waste transporters to provide information to the NSW EPA regarding the movement of any load in NSW of more than 10 square meters of asbestos sheeting, or 100 kilograms of asbestos waste. To fulfil these legal obligations, asbestos waste transporters must use WasteLocate.
SafeWork NSW Code of Practice: How to manage and control asbestos in the workplace (2019)	Sites with asbestos become a 'workplace' when work is carried out there and require a register and AMP. Appropriate SafeWork NSW notification will be required for licensed (e.g. Class A or B) asbestos removal works or handling. Asbestos in soil has not been identified at this stage and the applicability of this code of practice is to be evaluated following the DGI or in the event of an unexpected find.
Work Health and Safety Regulation 2017	An appropriate WHS plan must be documented and implemented for the remedial works. Where asbestos is identified at a workplace or is likely to be present at a workplace from time to time, Clause 429 of the regulation requires a written AMP to be prepared and in place. The remediation must also consider the other provisions in the regulation relating to WHS during the proposed works. Asbestos in soil has not been identified at this stage and the applicability of this code of practice is to be evaluated following the DGI or in the event of an unexpected find.

11 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Important Information About This Report

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors
This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data
Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Assessment Limitations
Although information provided by a site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Site Assessments by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Assessment Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site assessment is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: JKE Report Figures

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the Environmental report.

Title: **SITE LOCATION PLAN**

Location: 45-53 MACLEAY STREET, POTTS POINT, NSW

Project No: E34303B

Figure No: 1

JKEnvironments

PLOT DATE: 10/09/2021 10:01:46 AM DWG FILE: Z:\5 EIS\5C EIS JOBS\34000'S\E34303B POTTS POINT\CAD\E34303B.DWG

LEGEND

APPROXIMATE SITE BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
TP(Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
SV1	SOIL VAPOUR PIN LOCATION AND NUMBER

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 3 6 9 12 15

SCALE 1:300 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN**

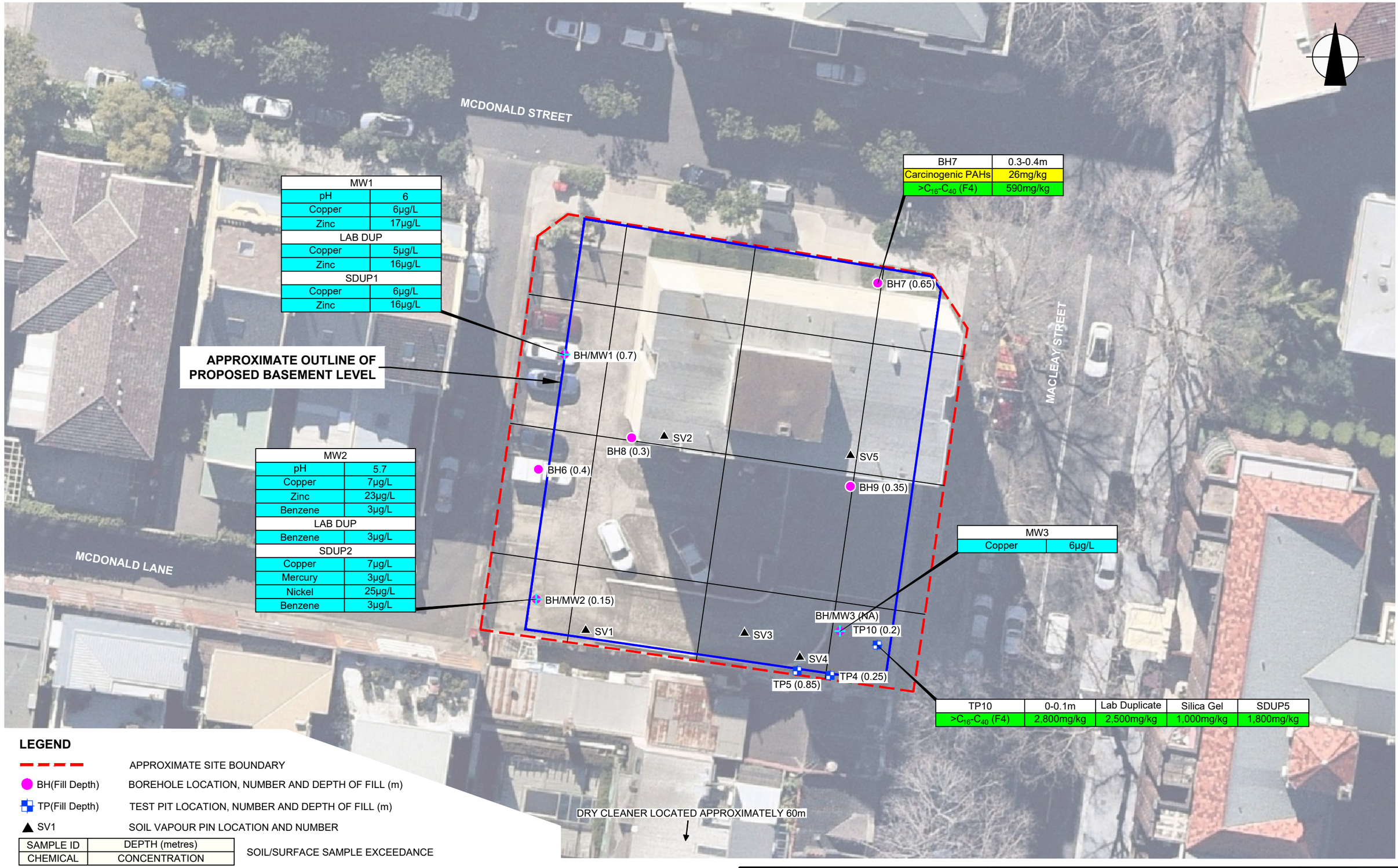
Location: 45-53 MACLEAY STREET, POTTS POINT, NSW

Project No: E34303B

Figure No: 2

JKEnvironments

PLOT DATE: 9/02/2024 8:53:30 AM DWG FILE: K:\5C EIS JOBS\34000'S\E34303B POTTS POINT\CAD\E34303B.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- TP(Fill Depth) — TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
- SV1 — SOIL VAPOUR PIN LOCATION AND NUMBER

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

SOIL/SURFACE SAMPLE EXCEEDANCE

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

- SOIL/SURFACE CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK
- SOIL CONTAMINATION ABOVE SAC FOR ECOLOGICAL RISK
- GROUNDWATER CONTAMINATION ABOVE SAC

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 3 6 9 12 15

SCALE 1:300 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAC EXCEEDANCE PLAN**

Location: 45-53 MACLEAY STREET, POTTS POINT, NSW

Project No: E34303B

Figure No: 3

JKEnvironments

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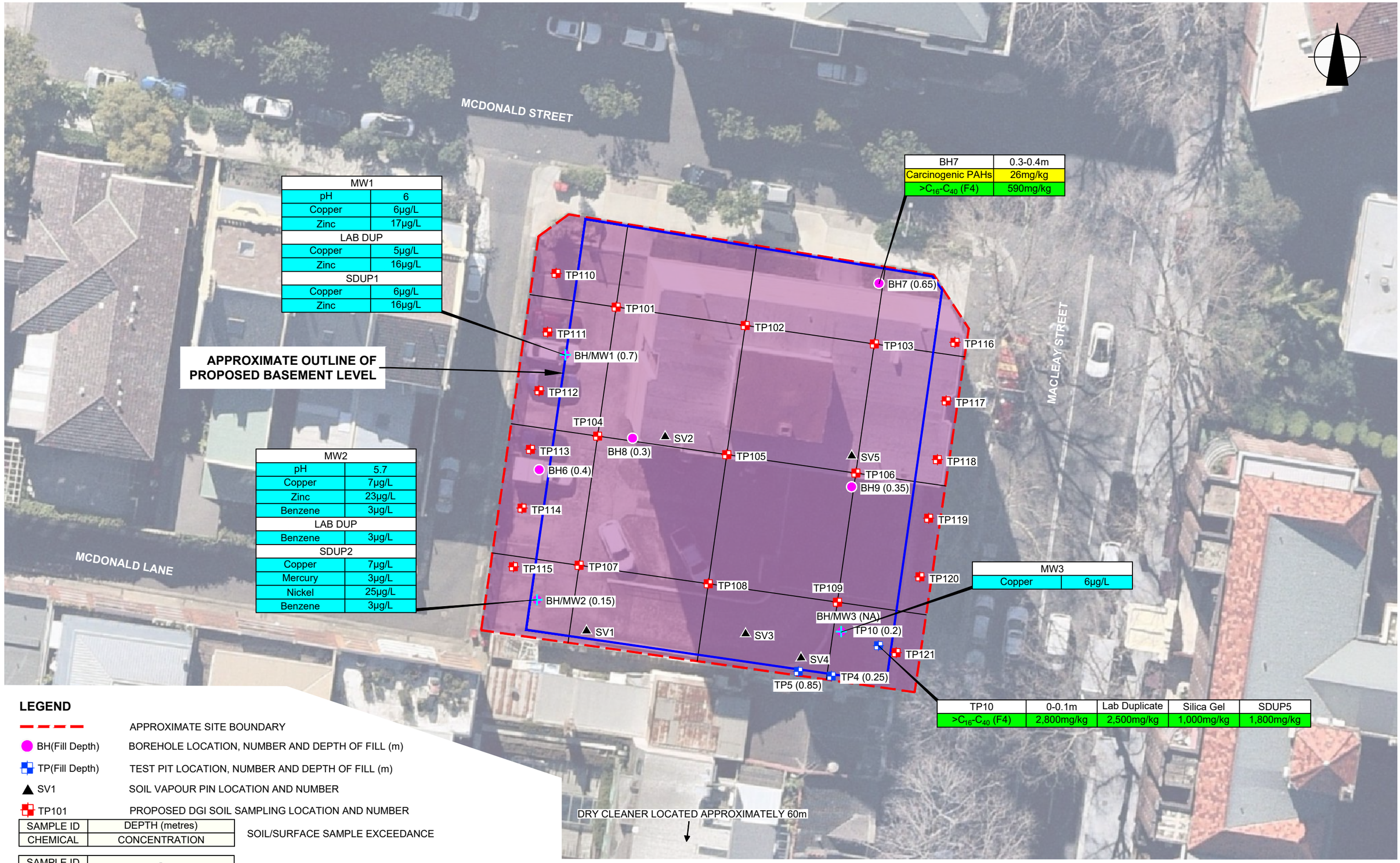


LEGEND

- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- TP(Fill Depth) — TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
- SV1 — SOIL VAPOUR PIN LOCATION AND NUMBER
- TP101 — PROPOSED DGI SOIL SAMPLING LOCATION AND NUMBER

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

SOIL/SURFACE SAMPLE EXCEEDANCE

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

- SOIL/SURFACE CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK
- SOIL CONTAMINATION ABOVE SAC FOR ECOLOGICAL RISK
- GROUNDWATER CONTAMINATION ABOVE SAC
- PROPOSED REMEDIATION AREA

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 3 6 9 12 15
SCALE 1:300 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **REMEDIATION PLAN**

Location: 45-53 MACLEAY STREET, POTTS POINT, NSW

Project No: E34303B

Figure No: 4

JKEnvironments

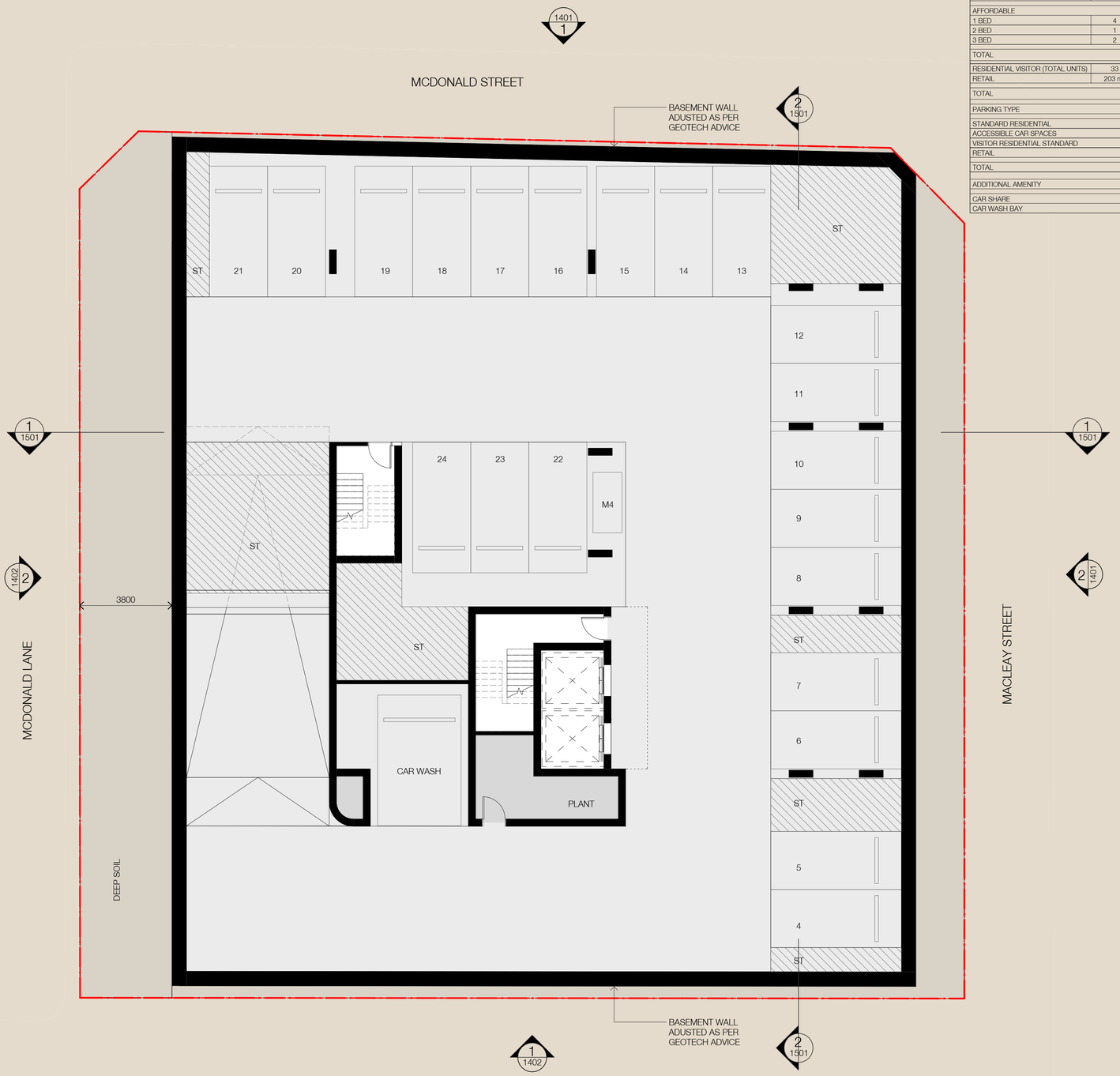
PLOT DATE: 9/02/2024 8:54:20 AM DWG FILE: K:\SC EIS \JOBS\34000\SE34303B POTTS POINT\CAD\E34303B.DWG

Appendix B: Proposed Development Plans

Nominated Architects: Adam Haddow-7188 | John Pradel-7004

CAR PARKING

TYPOLOGY	NO. OF UNITS	RATE	REQUIRED
NON-AFFORDABLE			
1 BED	0	0.5	0
2 BED	0	1	0
3 BED	27	1.5	40.5
AFFORDABLE			
1 BED	4	0.4	1.6
2 BED	1	0.5	0.5
3 BED	2	1	2
TOTAL			44.6
RESIDENTIAL VISITOR (TOTAL UNITS)	33	0.167	5.34
RETAIL	203 m²	0.02	4.06
TOTAL			9.4
PARKING TYPE			PROVIDED
STANDARD RESIDENTIAL			45
ACCESSIBLE CAR SPACES			4 (INCL 1 VISITOR)
VISITOR RESIDENTIAL STANDARD			5
RETAIL			4
TOTAL			58
ADDITIONAL AMENITY			PROVIDED
CAR SHARE			2
CAR WASH BAY			1



FOR INFORMATION

Rev	Date	Revision	By	Chk.
1	05.02.2025	FOR INFORMATION	JM	DM

Client

TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

FLOOR PLAN B3-B2

Date	Scale	Sheet Size
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DM	AH

Job No.	Drawing No.	Revision
6253-A	DA-1001	/ 1

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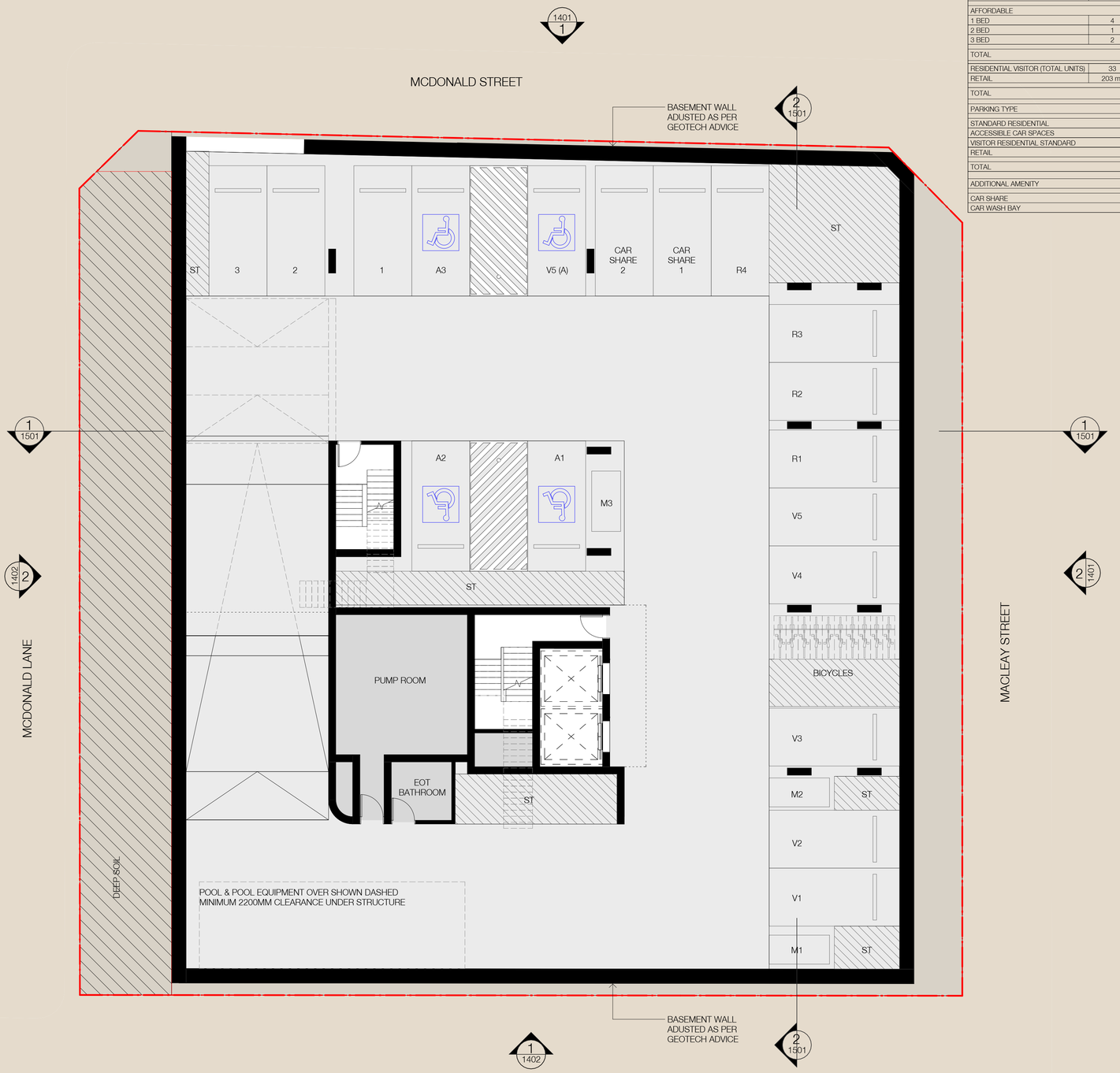
CAR PARKING

TYPOLOGY	NO. OF UNITS	RATE	REQUIRED
NON-AFFORDABLE			
1 BED	0	0.5	0
2 BED	0	1	0
3 BED	27	1.5	40.5
AFFORDABLE			
1 BED	4	0.4	1.6
2 BED	1	0.5	0.5
3 BED	2	1	2
TOTAL			44.6
RESIDENTIAL VISITOR (TOTAL UNITS)	33	0.167	5.34
RETAIL	203 m²	0.02	4.06
TOTAL			9.4
PARKING TYPE			PROVIDED
STANDARD RESIDENTIAL			45
ACCESSIBLE CAR SPACES			4 (INCL 1 VISITOR)
VISITOR RESIDENTIAL STANDARD			5
RETAIL			4
TOTAL			58
ADDITIONAL AMENITY			PROVIDED
CAR SHARE			2
CAR WASH BAY			1



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Drawing Name

FLOOR PLAN B1

Date	Scale	Sheet Size
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Drawn	Chk.	
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Job No.	Drawing No.	Revision
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MCDONALD STREET

MCDONALD LANE

MACLEAY STREET

7 MCDONALD STREET

9 MCDONALD STREET

10B CHALLIS AVENUE

10C CHALLIS AVENUE

55 MACLEAY STREET

57-59 MACLEAY STREET

FFL 26.41

FFL 26.67

FFL 26.72

FFL 26.84

FFL 27.15

FFL 27.48

FFL 27.84

FFL 27.88

FFL 28.00

7250

2709

DRIVEWAY WIDTH EXTENDED

CARPARK & LOADING DOCK ENTRY

SUBST

LOADING

5500

DEEP SOIL ZONE 129m²

WASTE AREA 1

RETAIL 202 m²

AWNING OVER SHOWN DASHED

WASTE AREA 2

SERVICES

BASEMENT EGRESS

RESIDENTIAL EGRESS

SERVICES

COMMUNAL OPEN SPACE 270 m²

3800

BUILDING LINE OVER SHOWN DASHED

MAILBOXES

ENTRY

BASEMENT EGRESS

1500

3000

6000

AWNING & PUBLIC ART OVER ENTRY DETAILS TBC

3 x 10m POOL

BASEMENT WALL BELOW

1401 / 1

2 / 1501

1 / 1501

1402 / 2

1 / 1402

2 / 1501

1 / 1501

2 / 1401

Client

TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

FLOOR PLAN GROUND

Date	Scale	Sheet Size
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Drawn	Chk.
DM	AH

Job No.	Drawing No.	Revision
6253-A	DA-1003	/ 1

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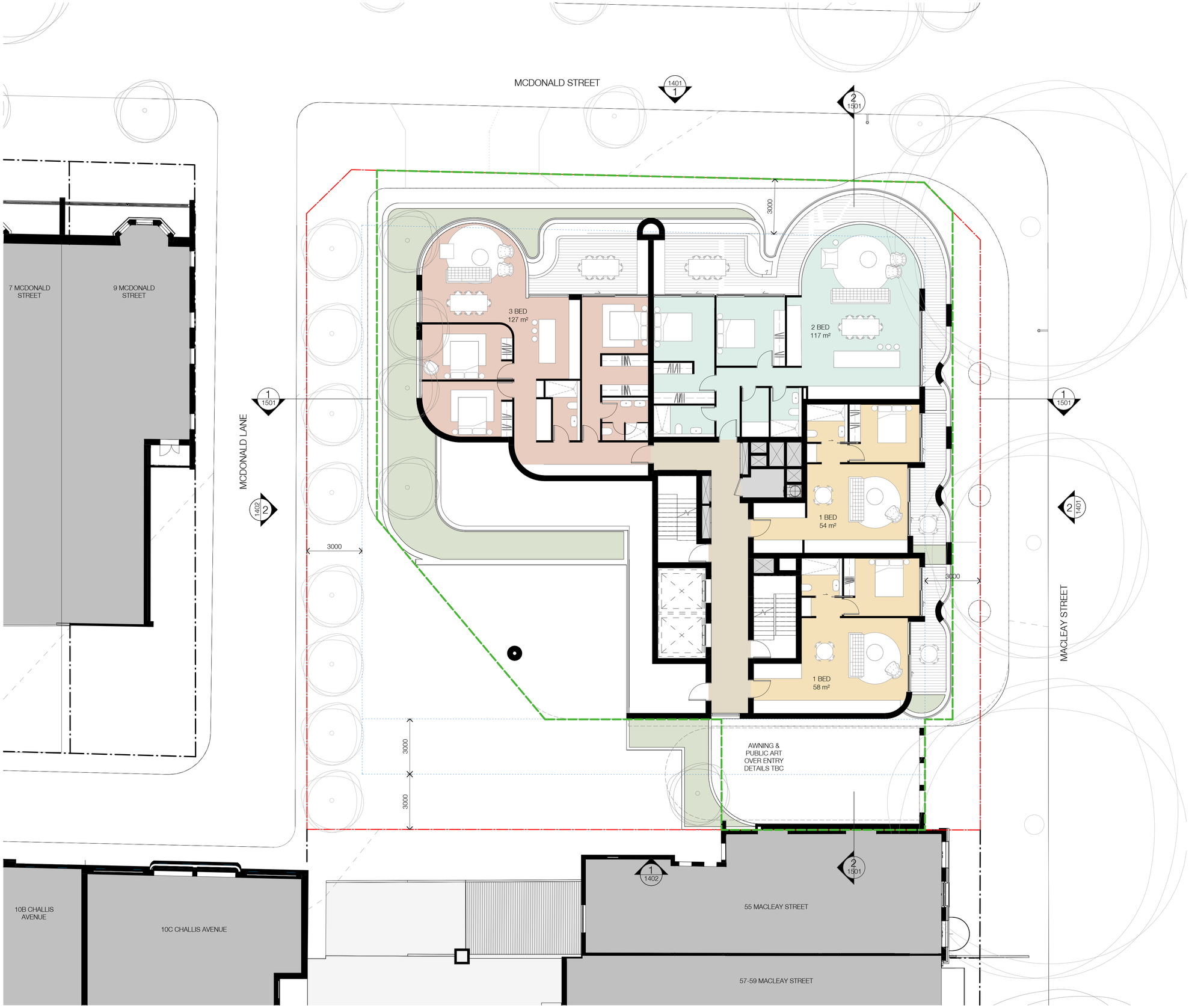

Client

TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

FLOOR PLAN L1

Date	Scale	Sheet Size
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Drawn	Chk.	
DM	AH	
Job No.	Drawing No.	Revision
6253-A	DA-1004	/ 1

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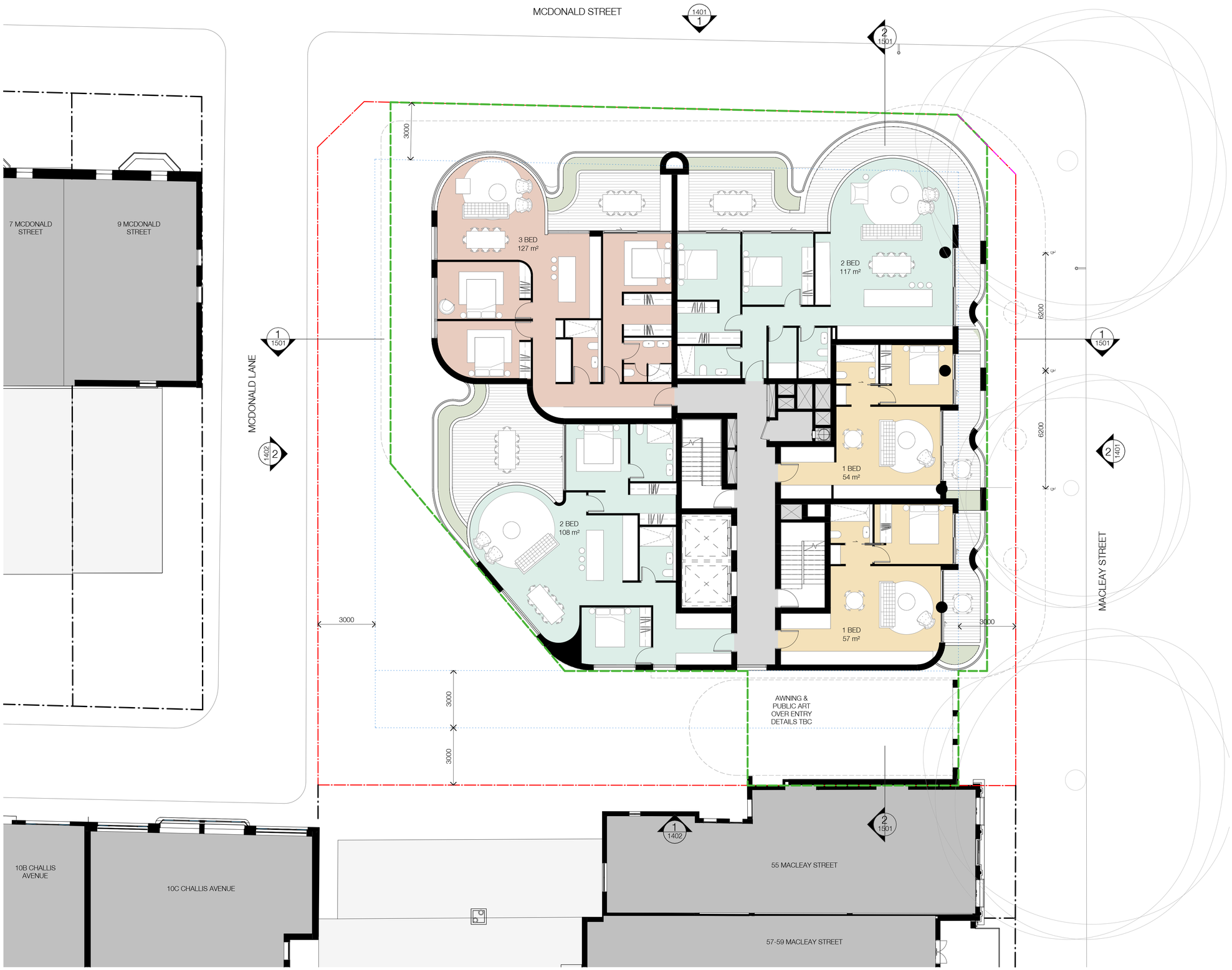

LEVEL 2

Client

TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

FLOOR PLAN L2

0 0.5 2.5 5m
1:500 @A1

Date	Scale	Sheet Size
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Drawn	Chk.
Author	Checker

Job No.	Drawing No.	Revision
6253-A	DA-1005	/ 1

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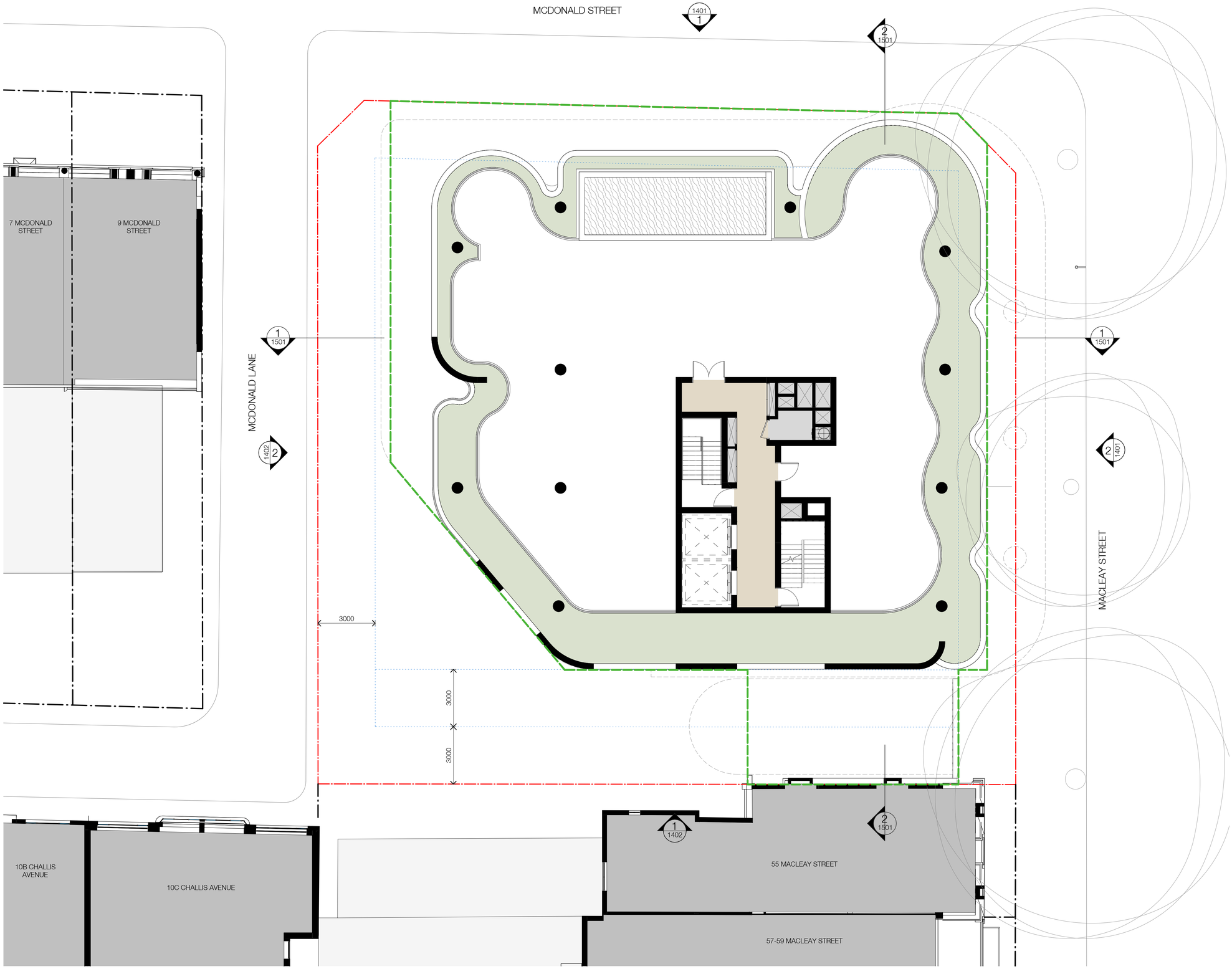

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TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

FLOOR PLAN L3

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6253-A	DA-1006	/ 1

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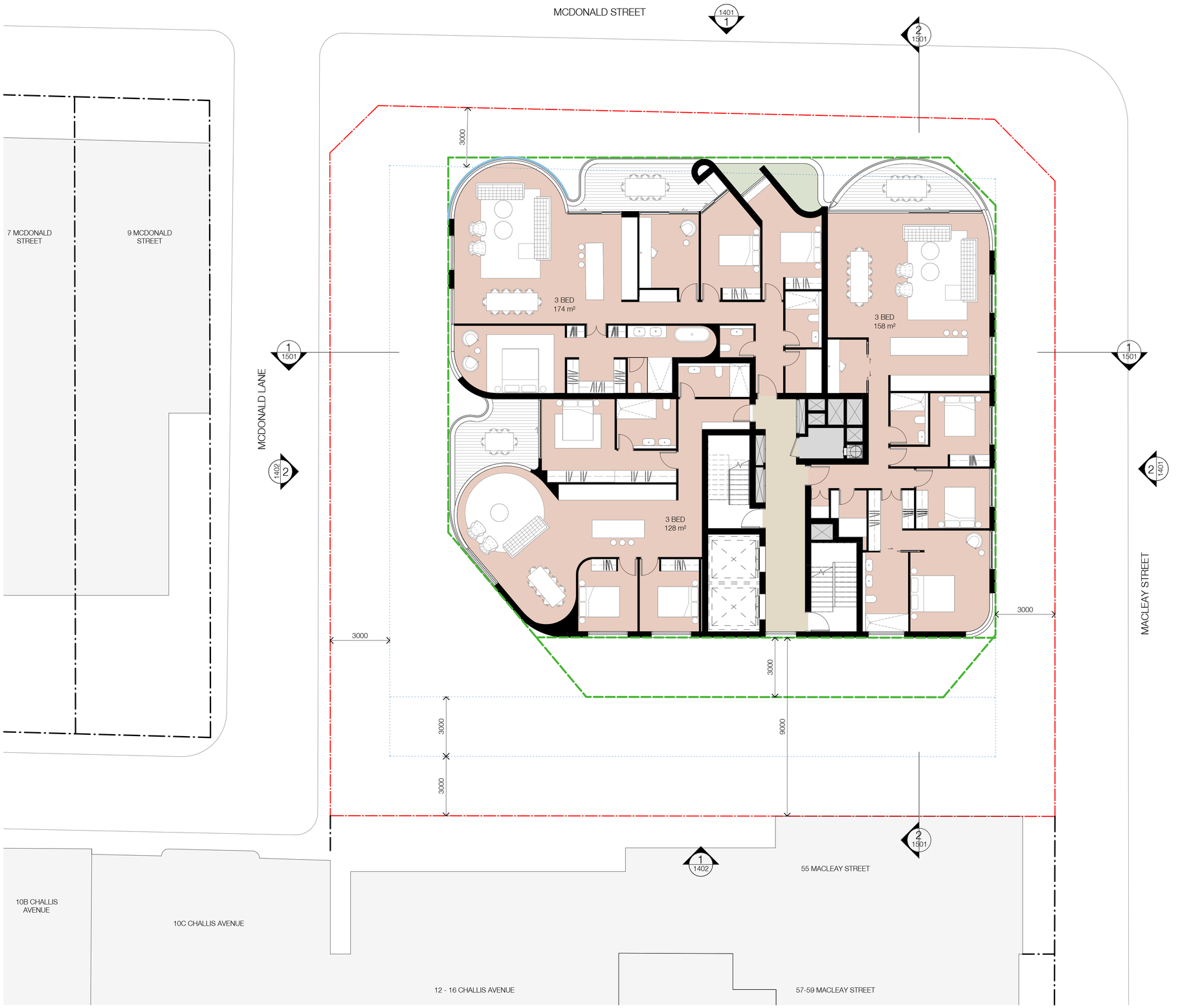

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TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

FLOOR PLAN L4-L10

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DM	AH

Job No.	Drawing No.	Revision
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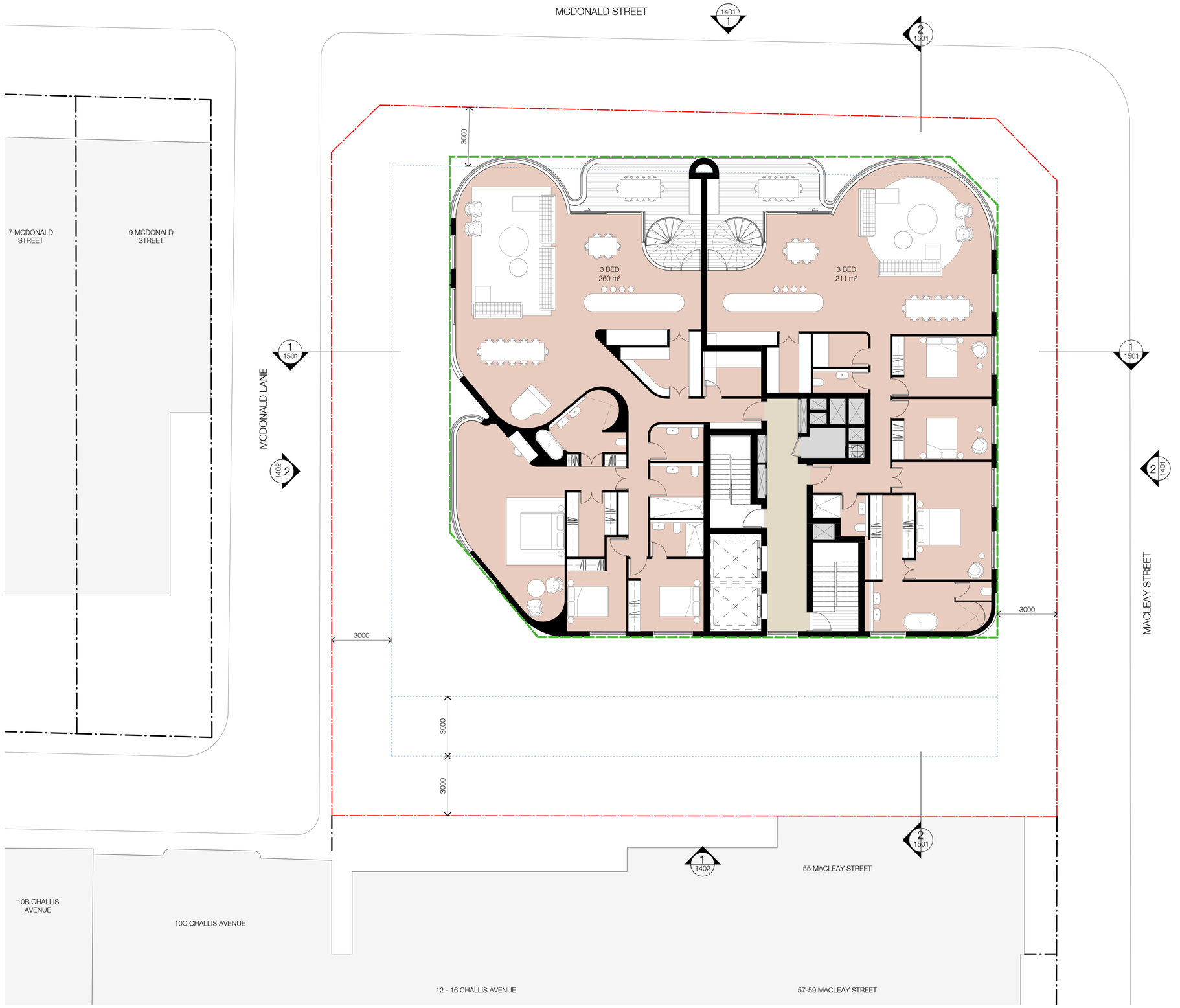

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TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

FLOOR PLAN L12

Date	Scale	Sheet Size
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DM	AH	
Job No.	Drawing No.	Revision
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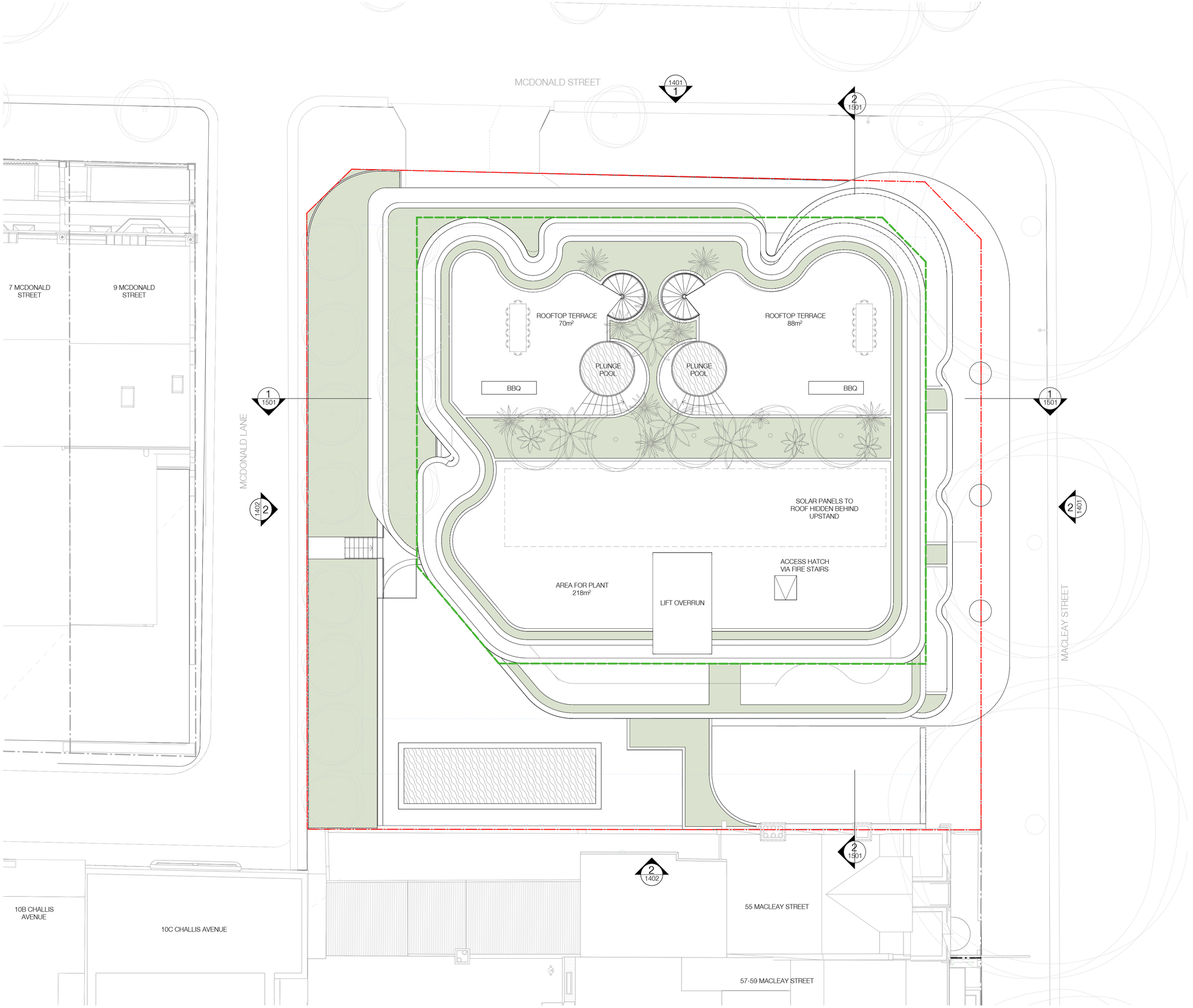

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TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

ROOF

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Drawn	Chk.
DM	AH

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6253-A	DA-1010	/ 1

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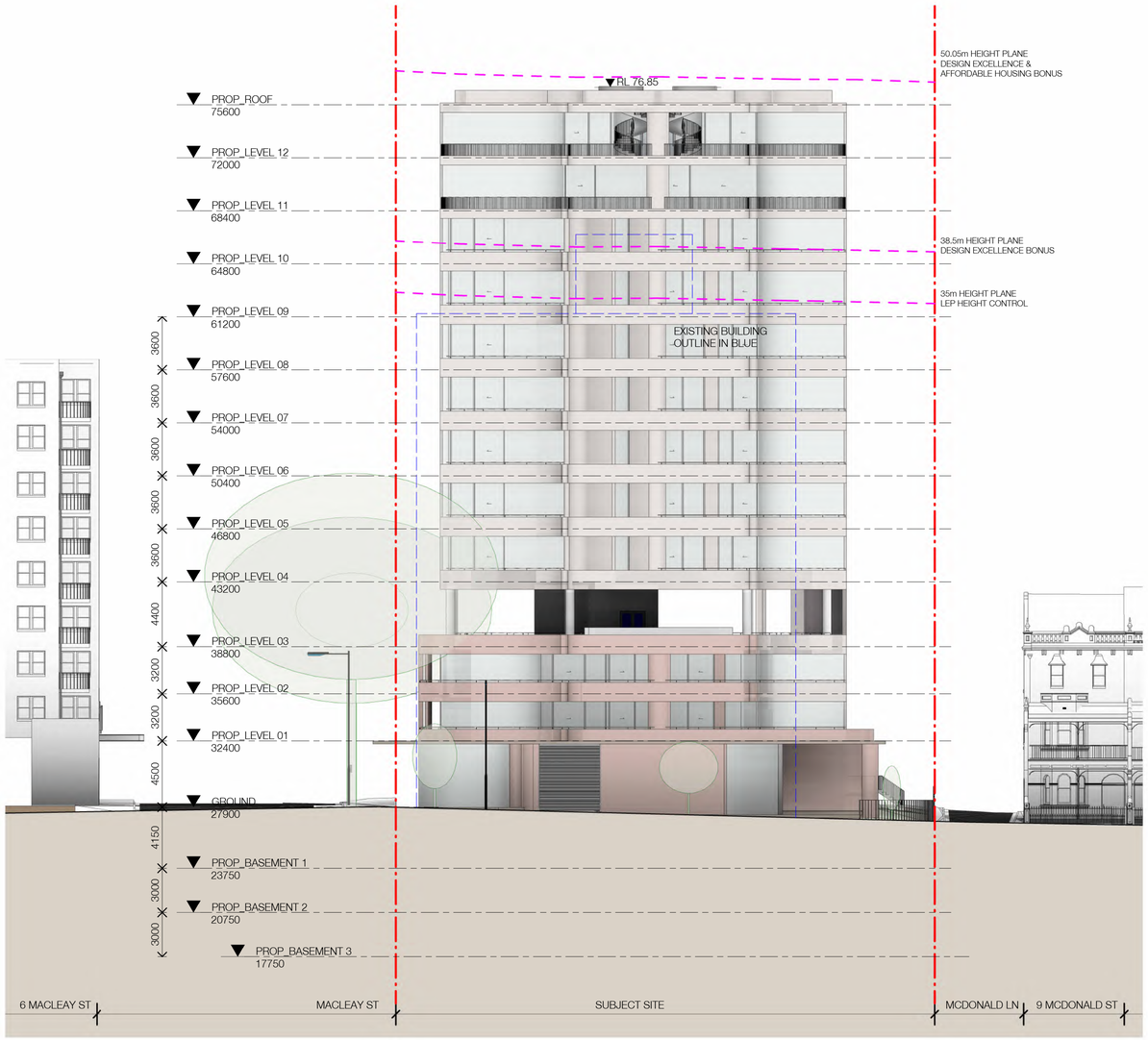

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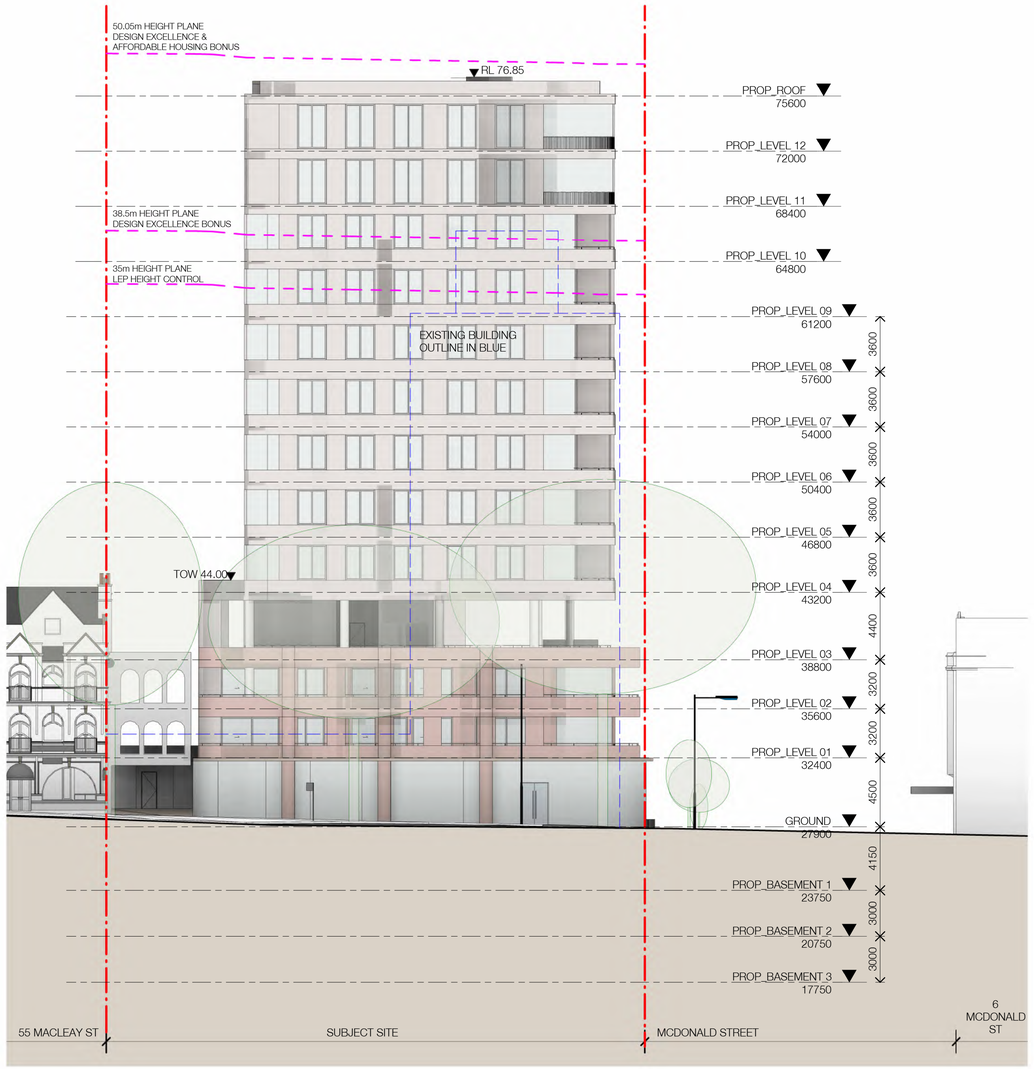

2 ELEVATION_EAST
1 : 200

Client
TIME & PLACE

Project
MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name
ELEVATIONS NORTH &
EAST

Date	Scale	Sheet Size
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6253-A	DA-1401	/ 1

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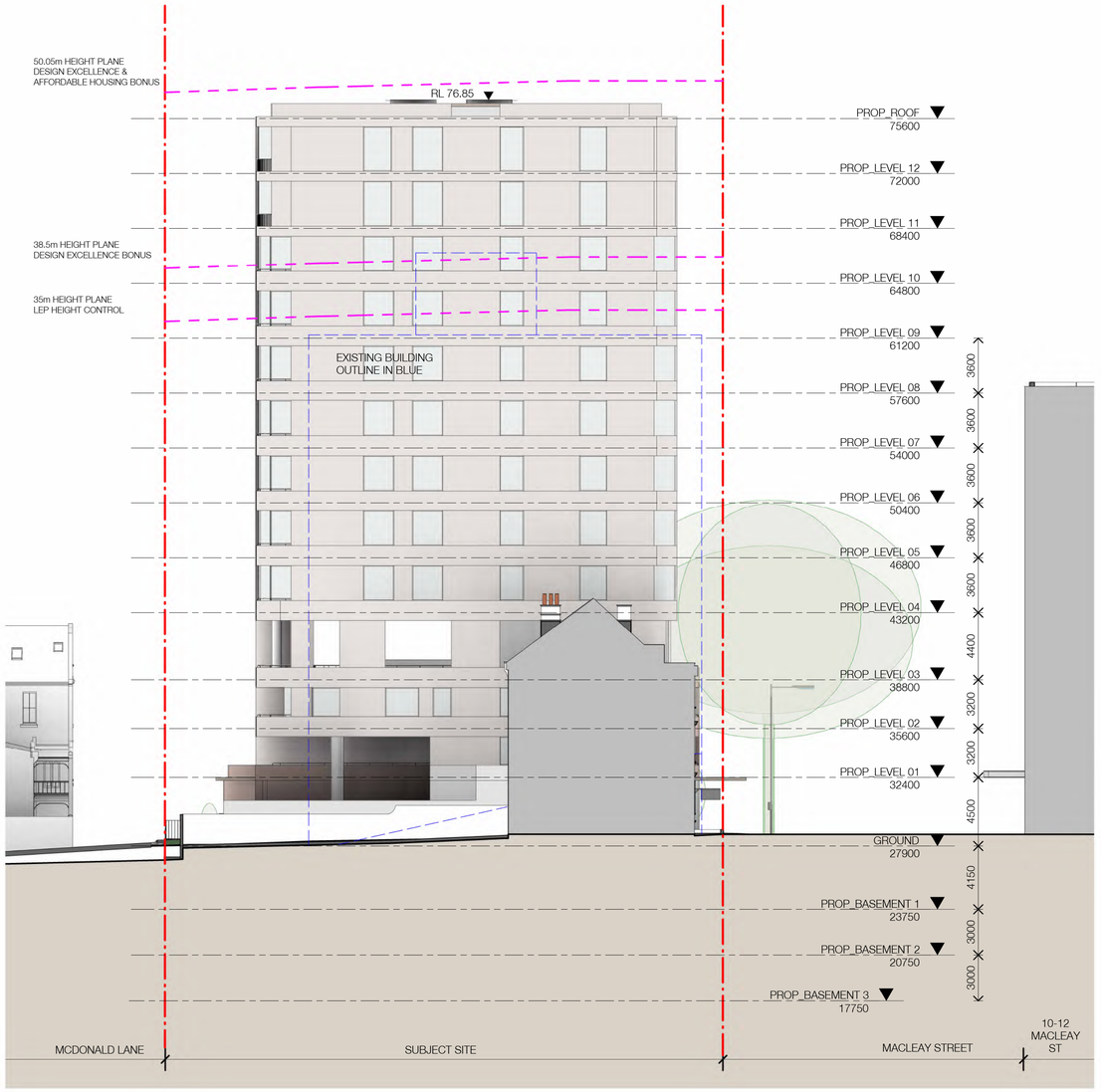

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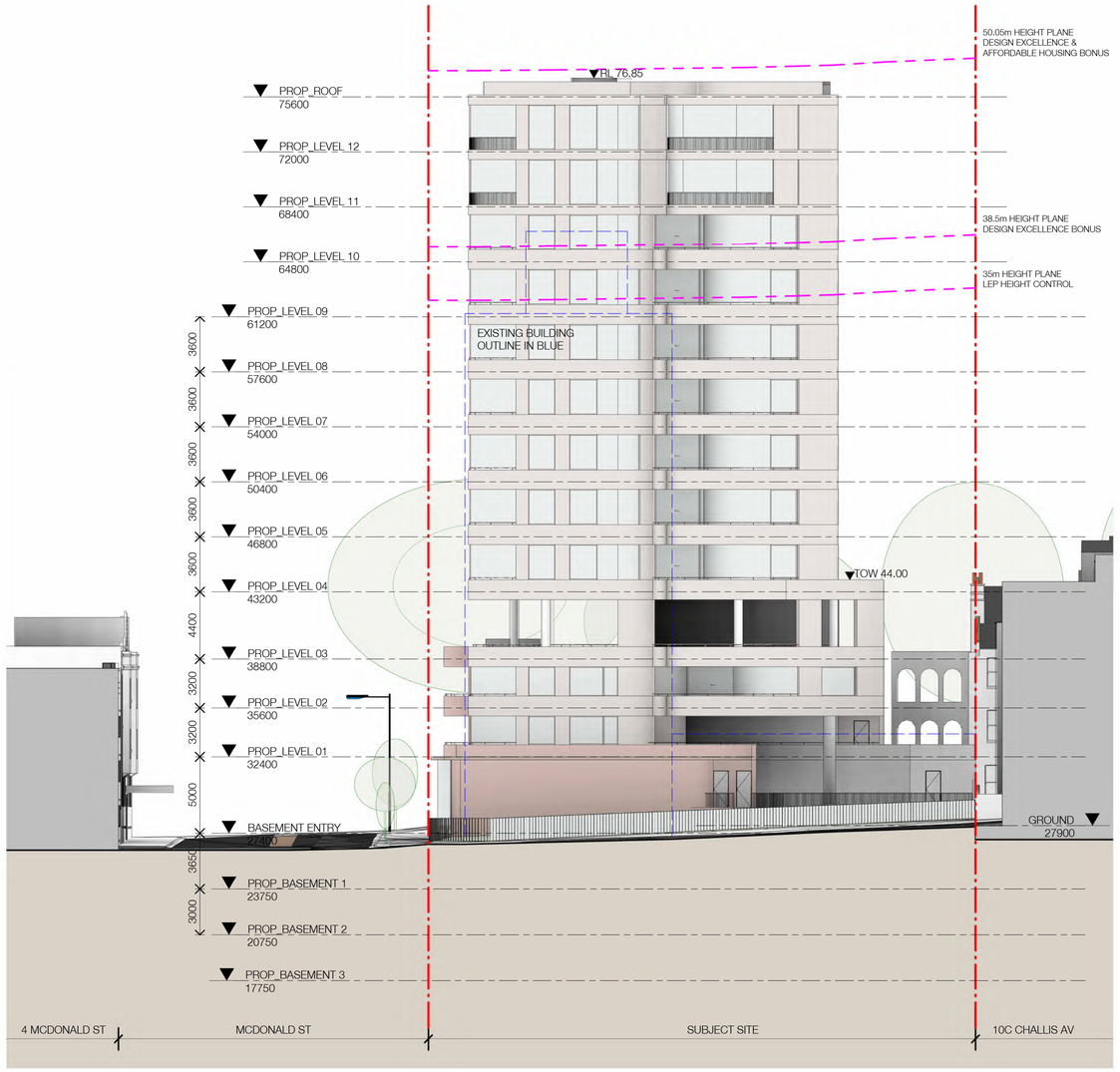

2 ELEVATION_WEST
1 : 200

Client
TIME & PLACE

Project
MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name
ELEVATIONS SOUTH &
WEST

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Drawn	Chk.
DM	AH

Job No.	Drawing No.	Revision
6253-A	DA-1402	/ 1

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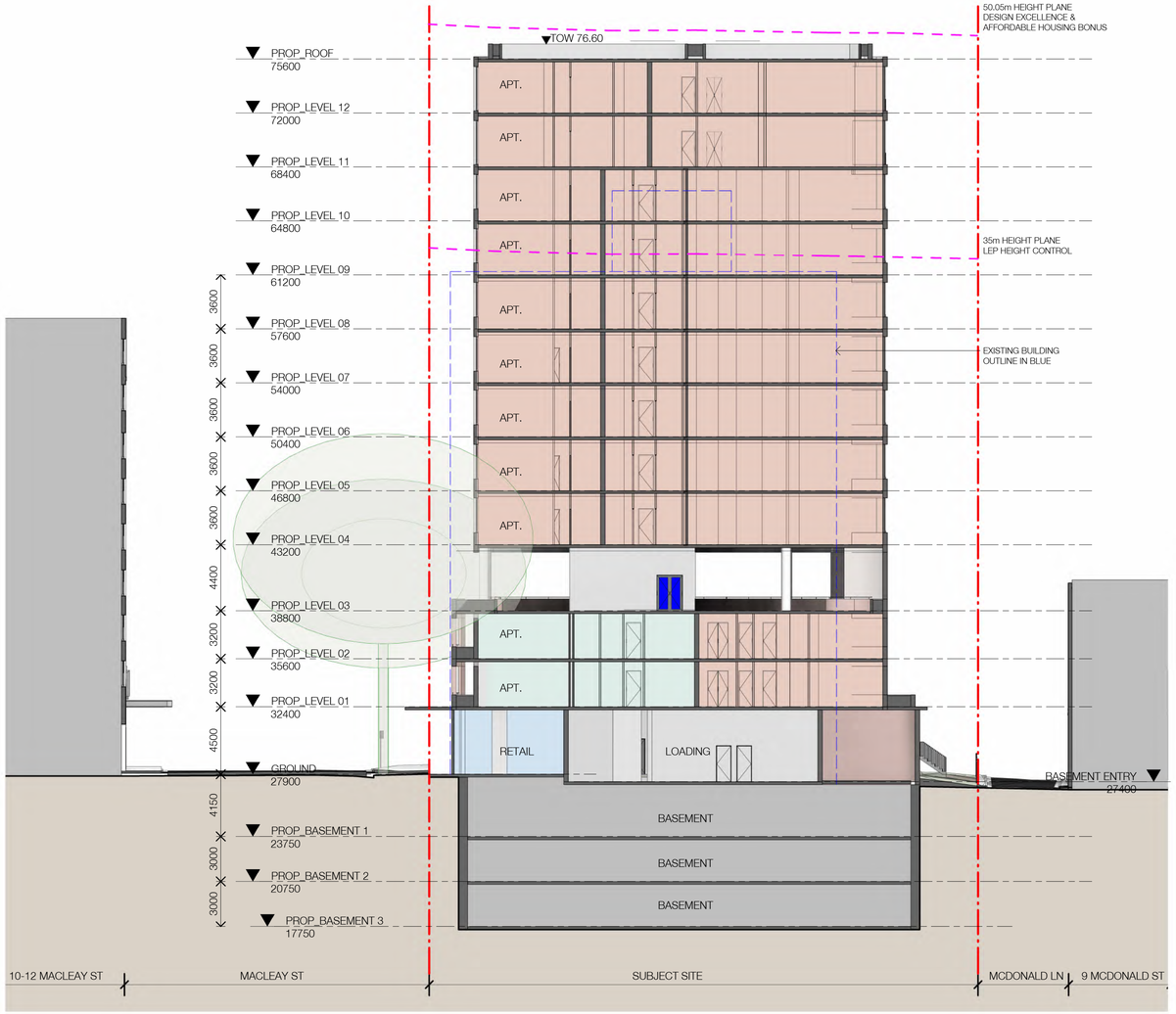

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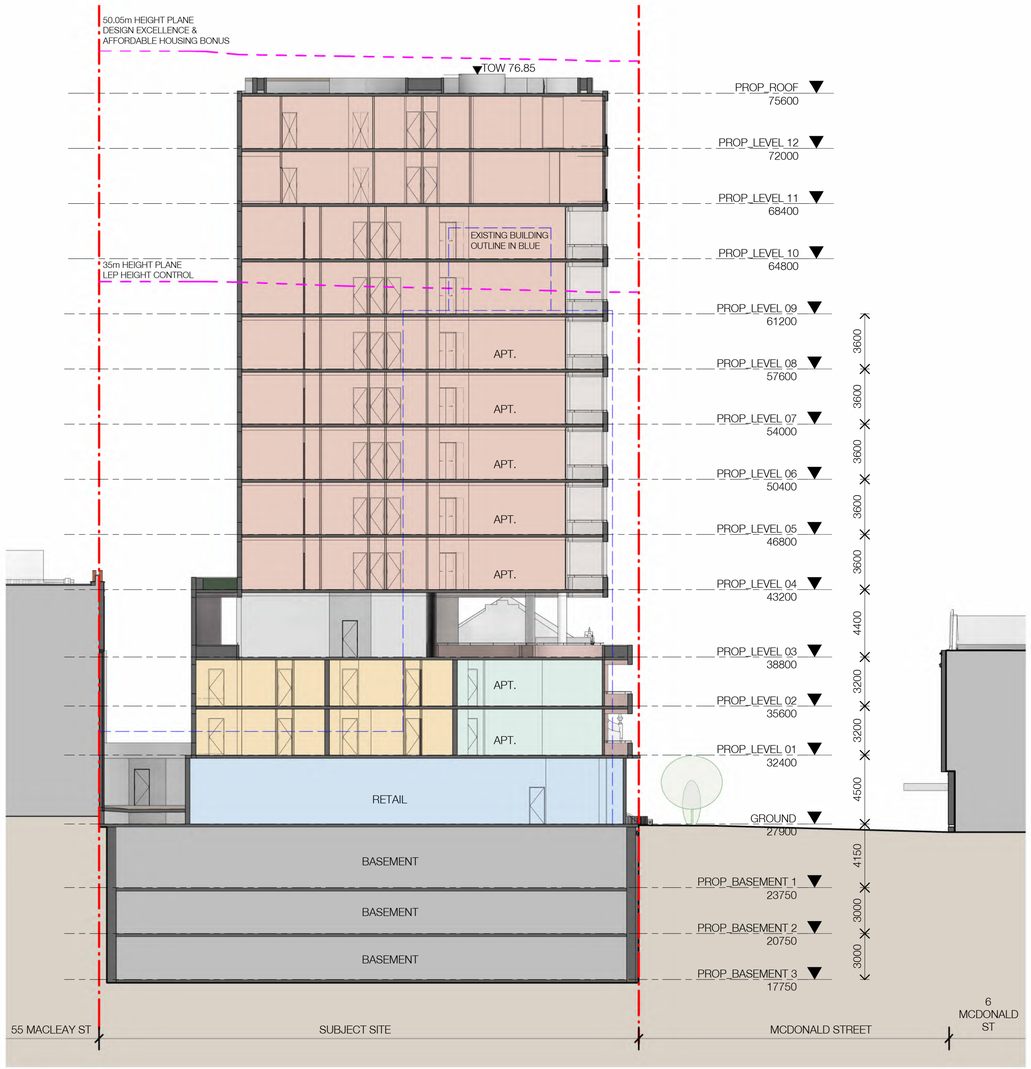

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1	05.02.2025	FOR INFORMATION	JM	DM

Client

TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

SECTIONS AA & BB

Date	Scale	Sheet Size
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Drawn	Chk.
DM	AH

Job No.	Drawing No.	Revision
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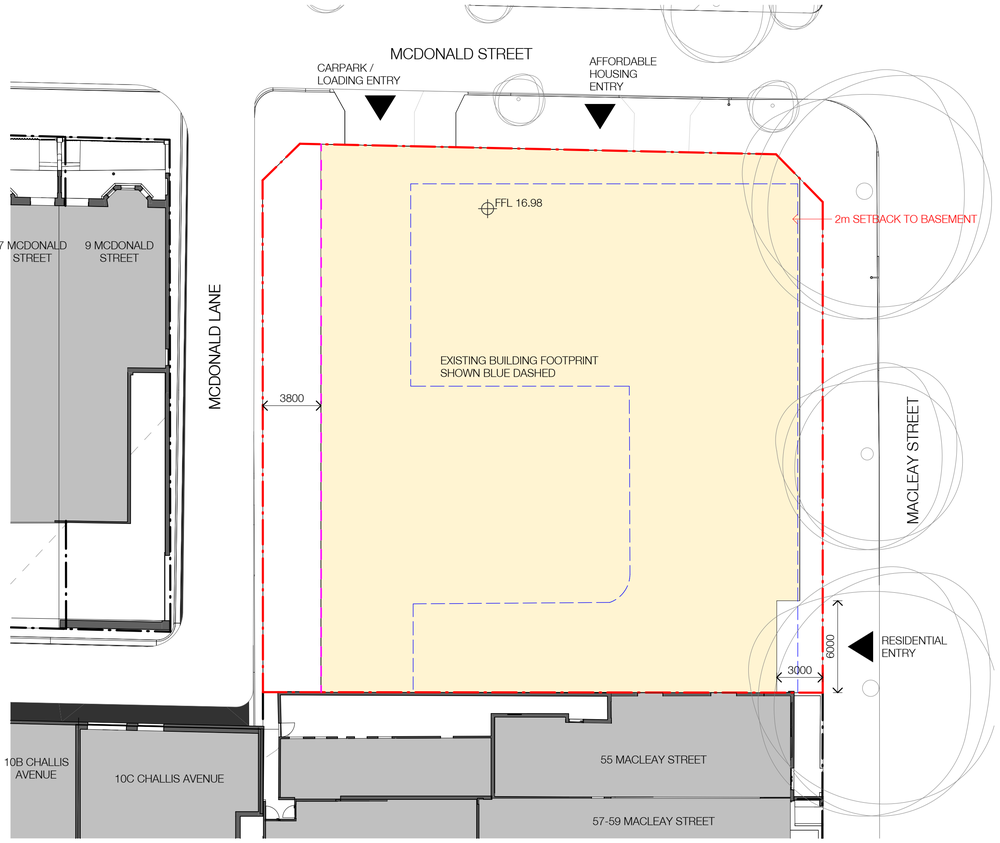

1 ENVELOPE PLAN - GROUND FLOOR & BELOW
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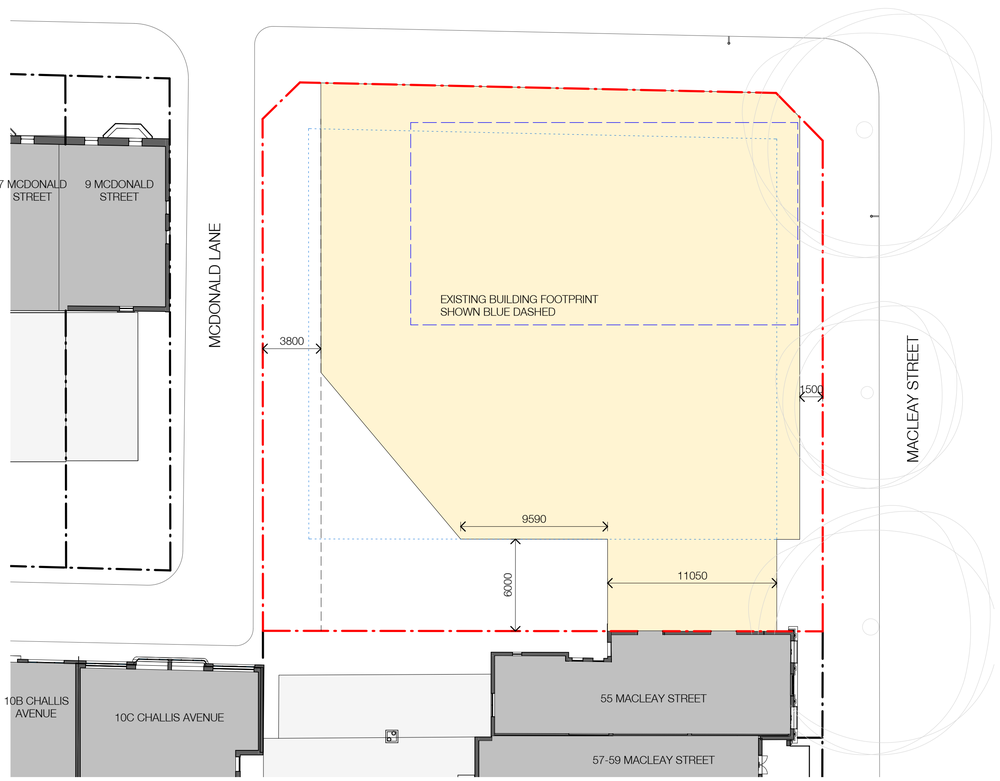
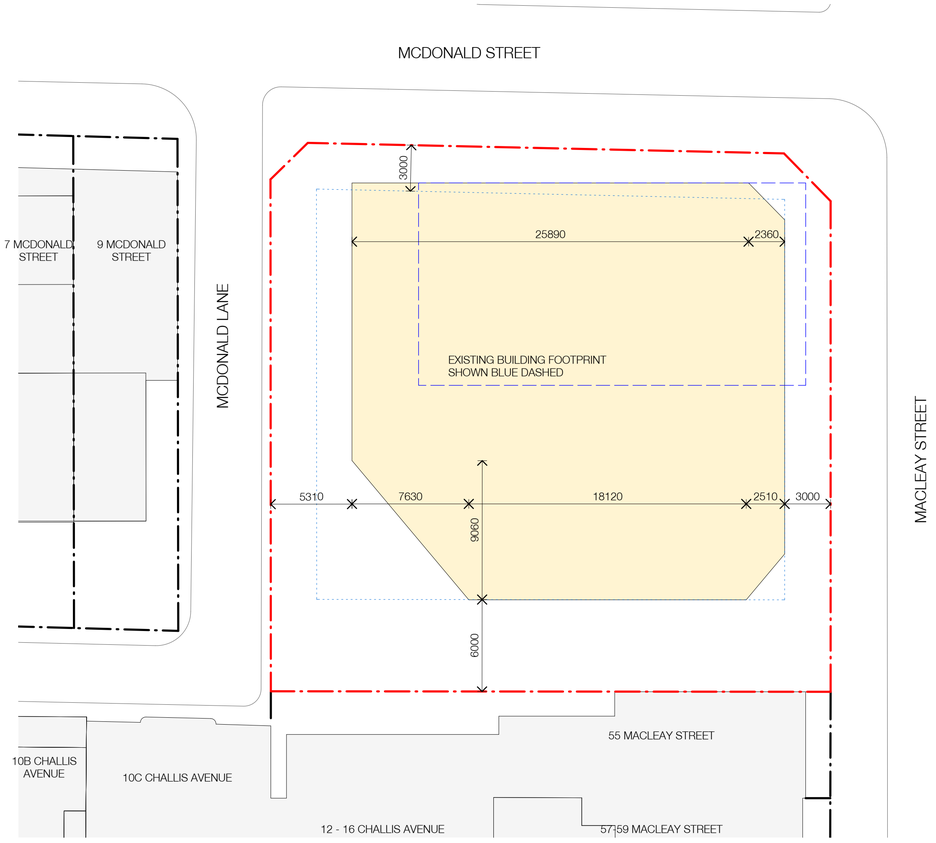
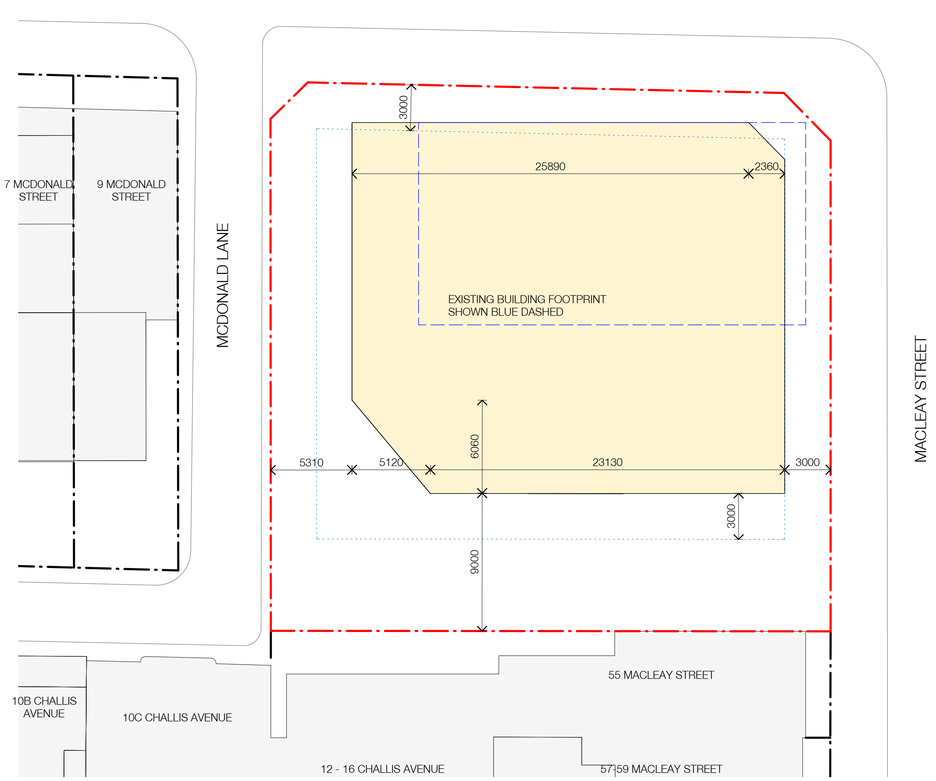


2 ENVELOPE PLAN - LEVEL 1-2.
1 : 200



3 ENVELOPE PLAN - LEVEL 3
1 : 200



4 ENVELOPE PLAN - LEVEL 4-12
1 : 200

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1	05.02.2025	FOR INFORMATION	JM	DM

LEGEND

RESIDENTIAL

EXISTING BUILDING OUTLINE (DEMOLISHED)

Client
TIME & PLACE

Project
MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name
ENVELOPE CONCEPT
SSDA - PLAN

Date	Scale	Sheet Size
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Drawn	Chk.	
DM	AH	
Job No.	Drawing No.	Revision
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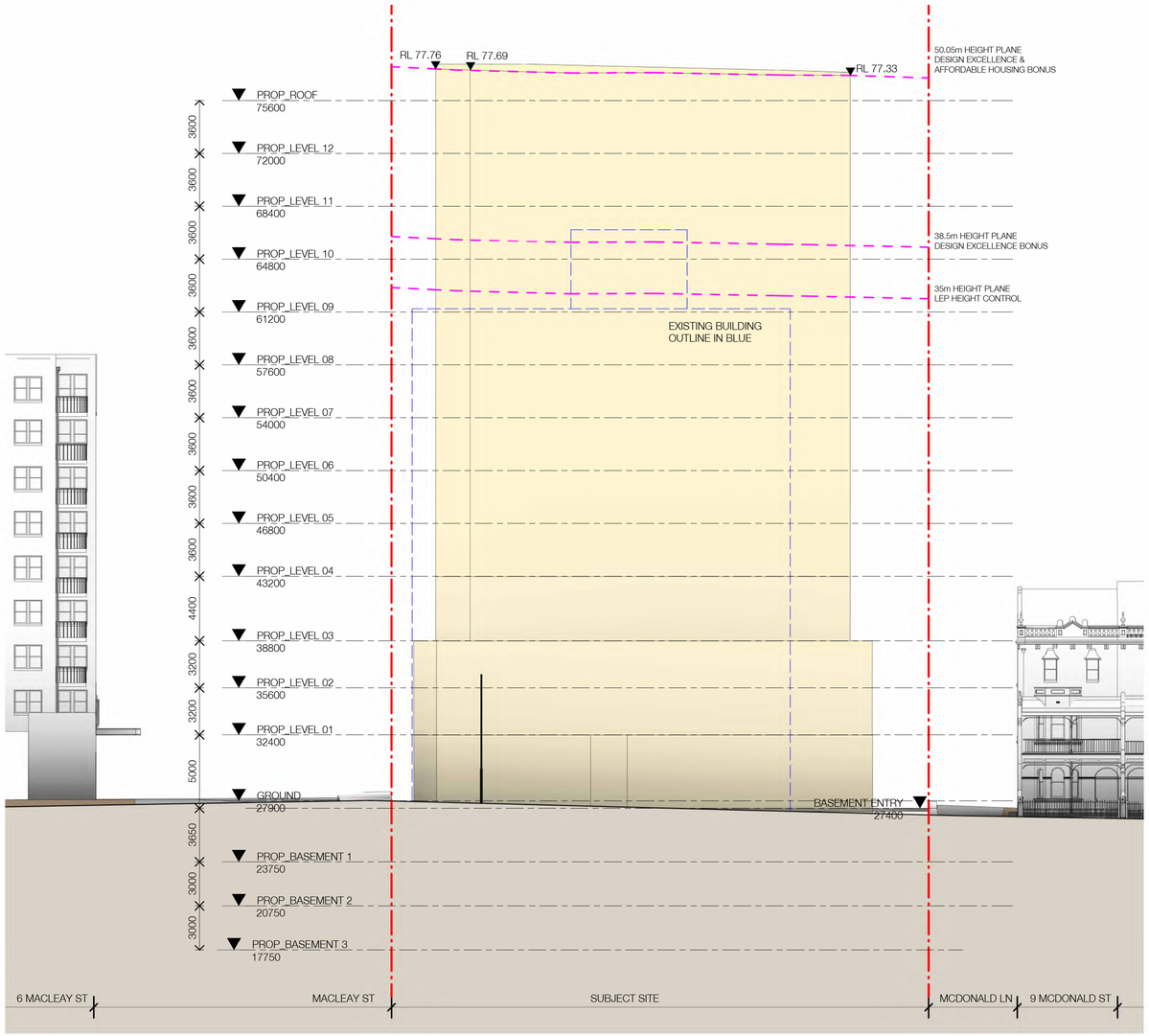

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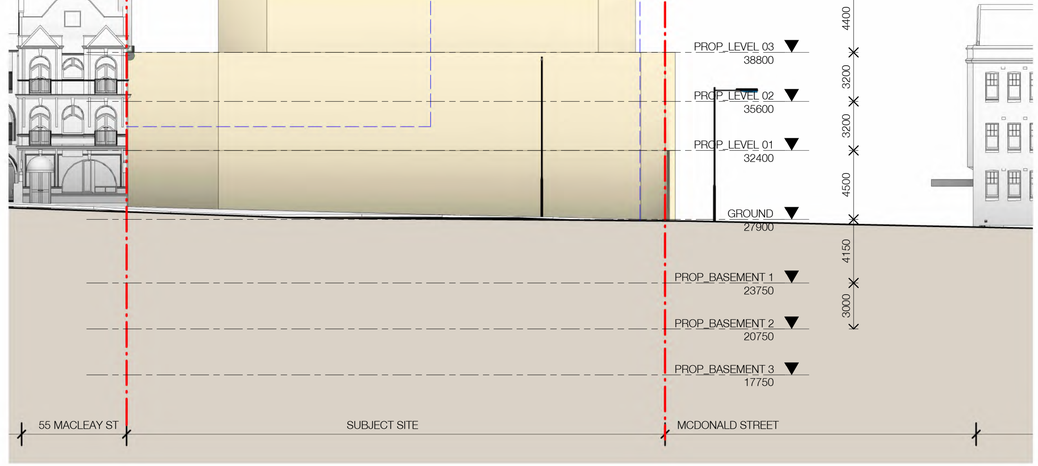

2 ENVELOPE - ELEVATION_EAST
1 : 200

LEGEND

- RESIDENTIAL
- EXISTING BUILDING OUTLINE (DEMOLISHED)

Client

TIME & PLACE

Project

MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name

ENVELOPE CONCEPT
SSDA - ELEVATION

Date	Scale	Sheet Size
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Drawn	Chk.	
DM	AH	
Job No.	Drawing No.	Revision
6253-A	DA-6061	/ 1

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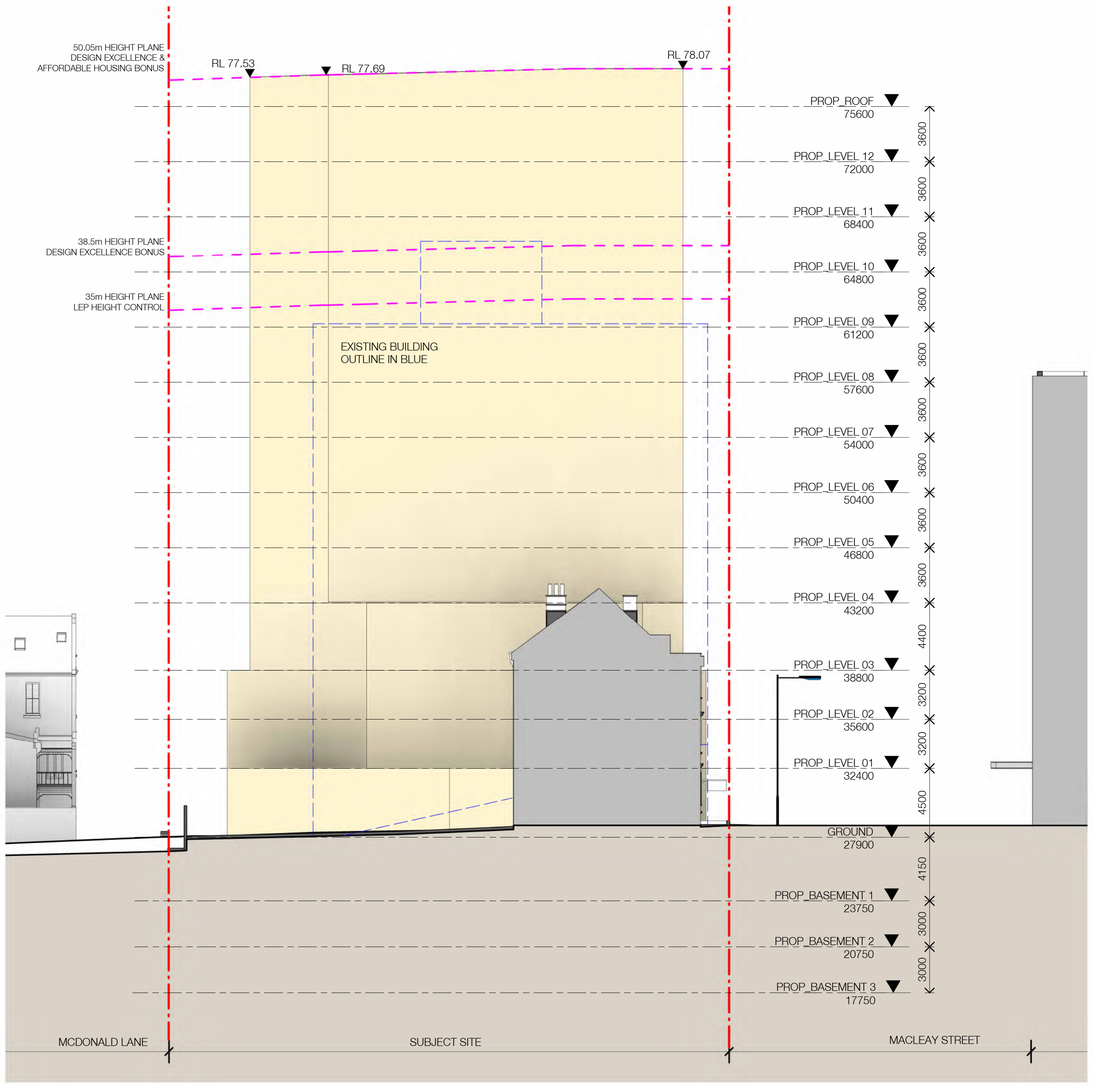

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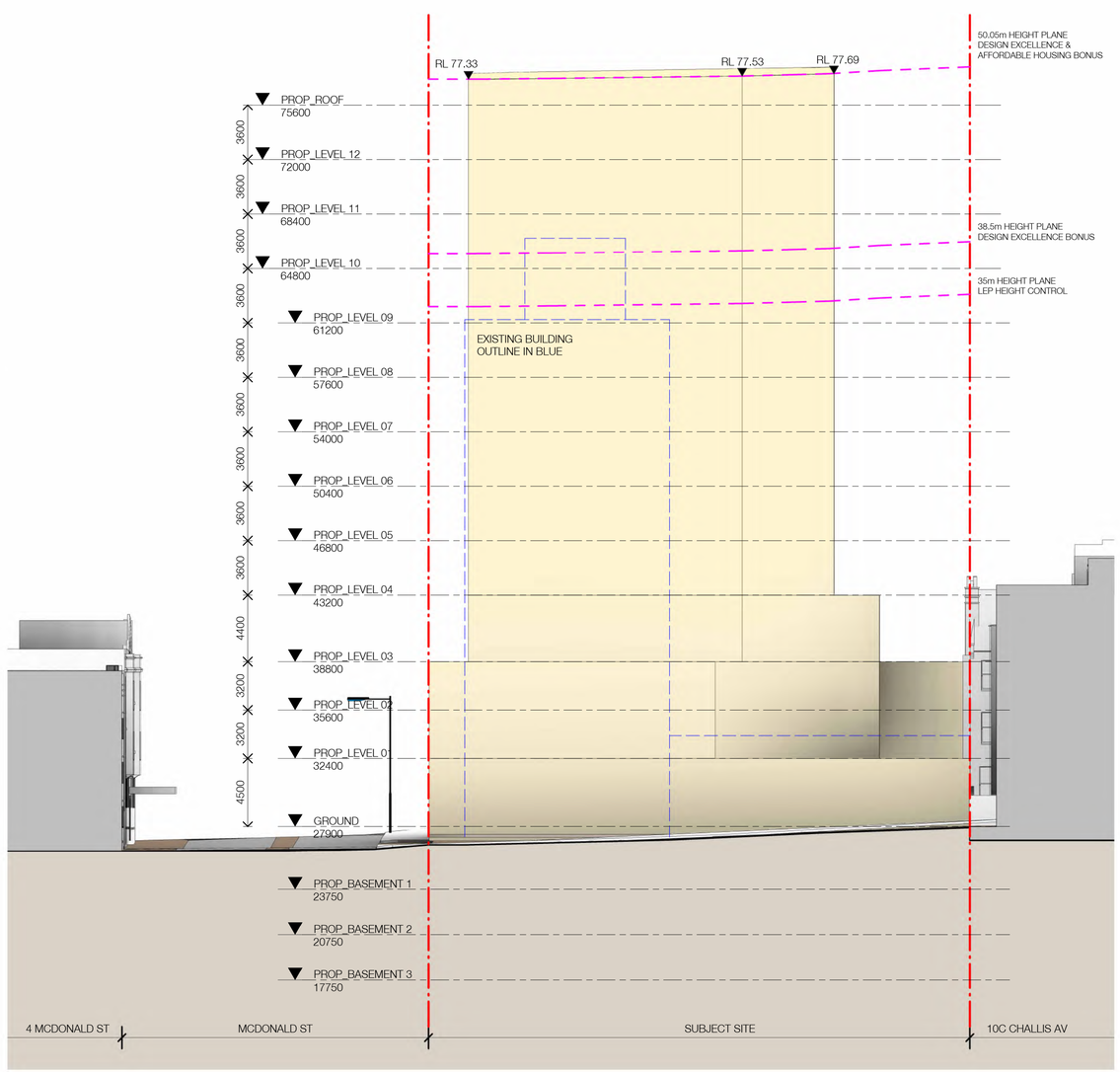

2 ENVELOPE - ELEVATION_WEST
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LEGEND

RESIDENTIAL

EXISTING BUILDING OUTLINE (DEMOLISHED)

Client
TIME & PLACE

Project
MACLEAY STREET

45-53 MACLEAY STREET
POTTS POINT NSW

Drawing Name
ENVELOPE CONCEPT
SSDA - ELEVATION

Date	Scale	Sheet Size
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Drawn	Chk.
Author	Checker

Job No.	Drawing No.	Revision
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Appendix C: JKE DSI Report Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
ADWG:	AustralianDrinking Water Guidelines
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GIL:	Groundwater Investigation Levels
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
pH_{KCL} :	pH of filtered 1:20, 1M KCL extract, shaken overnight
pH_{ox} :	pH of filtered 1:20 1M KCl after peroxide digestion
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
S_{Cr}:	Chromium reducible sulfur
S_{POS}:	Peroxide oxidisable Sulfur
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TPA:	Total Potential Acidity, 1M KCL peroxide digest
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
TSA:	Total Sulfide Acidity (TPA-TAA)
UCL:	Upper Level Confidence Limit on Mean Valu
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with high traffic have been quoted).

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

JKEnvironments

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-B: 'Residential with minimal opportunities for soil access; including dwellings with fully/permanently paved yards like high-rise buildings'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			500	150	500	30000	1200	120	1200	60000	400	4	15	400	500	10	90	600	10	340	1	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH1	0.2-0.3	Fill - Silty Sand	<4	<0.4	<1	<1	**1**	<0.1	<1	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH1	0.2-0.3	Lab Duplicate	<4	<0.4	<1	<1	<1	<0.1	<1	**4**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH1	0.7-1.0	Sandstone	<4	<0.4	**1**	<1	**2**	<0.1	<1	<1	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2	0.15-0.3	Fill - Gravel	<4	<0.4	**4**	**2**	**1**	<0.1	<1	<1	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH3	0.2-0.4	Sandstone	<4	<0.4	**4**	**6**	**6**	<0.1	**1**	**10**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP5	0.1-0.2	Fill - Silty Sand	<4	<0.4	**13**	**70**	**250**	<0.1	**27**	**140**	**0.53**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP5	0.4-0.5	Fill - Clayey Sand	<4	<0.4	**2**	**2**	**22**	<0.1	<1	**5**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH6	0.1-0.3	Fill - Silty Sand	<4	<0.4	<1	**1**	**7**	<0.1	<1	**24**	**4.6**	**0.6**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH7	0-0.1	Fill - Silty Sand	<4	<0.4	**13**	**110**	**90**	**0.2**	**8**	**160**	**8.3**	**1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH7	0.3-0.4	Fill - Silty Sand	<4	<0.4	**8**	**47**	**130**	**0.1**	**4**	**220**	**190**	**26**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH8	0.1-0.2	Fill - Silty Sand	<4	<0.4	**4**	**22**	**29**	**0.1**	**15**	**32**	**2.2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.4**	Not Detected
BH9	0.12-0.2	Fill - Silty Sand	<4	<0.4	**3**	**5**	**25**	<0.1	**3**	**23**	**0.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH9	0.2-0.35	Fill - Silty Sand	<4	<0.4	**2**	**2**	**14**	<0.1	**2**	**5**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP10	0-0.1	Fill - Silty Sand	<4	**0.9**	**24**	**99**	**280**	**0.2**	**15**	**410**	**1.8**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.6**	Not Detected
TP10	0-0.1	Lab Duplicate	<4	**0.9**	**24**	**100**	**250**	**0.2**	**16**	**390**	**2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.7**	NA
SDUP1 (intra-lab)	0.7-1.0	Field Duplicate of BH1	<4	<0.4	**2**	<1	**2**	<0.1	<1	**1**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP3 (intra-lab)	0-0.1	Field Duplicate of BH7	<4	<0.4	**14**	**99**	**93**	**0.2**	**10**	**150**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP4 (Inter-lab)	0.2-0.4	Field Duplicate of BH3	<4	<0.4	**3**	**7**	**2**	<0.1	<1	**3**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP5 (Inter-lab)	0-0.1	Field Duplicate of TP10	<4	**1**	**26**	**91**	**370**	**0.3**	**15**	**390**	**1.7**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.9**	NA
Total Number of Samples			19	19	19	19	19	19	19	19	19	19	13	13	13	13	13	13	13	13	13	9
Maximum Value			<PQL	1	26	110	370	0.3	27	410	190	26	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.9	Not Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S2
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH1	0.2-0.3	Fill - Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.3
BH1	0.2-0.3	Lab Duplicate	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.3
BH1	0.7-1.0	Sandstone	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.6
BH2	0.15-0.3	Fill - Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.8
BH3	0.2-0.4	Sandstone	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1
TP5	0.1-0.2	Fill - Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.1
TP5	0.4-0.5	Fill - Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.7
BH6	0.1-0.3	Fill - Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	3.1
BH7	0-0.1	Fill - Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.7
BH7	0.3-0.4	Fill - Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1.8
BH7 (Silica Gel)	0.3-0.4	Fill - Silty Sand	0m to <1m	Sand	NA	<50	NA	NA	NA	NA	NA	1.8
BH8	0.1-0.2	Fill - Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	3.1
BH9	0.12-0.2	Fill - Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	3
BH9	0.2-0.35	Fill - Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	2.9
TP10	0-0.1	Fill - Silty Sand	0m to <1m	Sand	<25	**97**	<0.2	<0.5	<1	<1	<1	0.4
TP10	0-0.1	Lab Duplicate	0m to <1m	Sand	<25	**110**	<0.2	<0.5	<1	<1	<1	0.4
TP10 (Silica Gel)	0-0.1	Fill - Silty Sand	0m to <1m	Sand	NA	<50	NA	NA	NA	NA	NA	0.4
SDUP1 (intra-lab)	0.7-1.0	Field Duplicate of BH1	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP3 (intra-lab)	0-0.1	Field Duplicate of BH7	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP4 (Inter-lab)	0.2-0.4	Field Duplicate of BH3	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP5 (Inter-lab)	0-0.1	Field Duplicate of TP10	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples					19	21	19	19	19	19	19	17
Maximum Value					<PQL	110	<PQL	<PQL	<PQL	<PQL	<PQL	3.1

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
BH1	0.2-0.3	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1	0.2-0.3	Lab Duplicate	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1	0.7-1.0	Sandstone	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0.15-0.3	Fill - Gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0.2-0.4	Sandstone	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP5	0.1-0.2	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP5	0.4-0.5	Fill - Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	0.1-0.3	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7	0-0.1	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7	0.3-0.4	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7 (Silica Gel)	0.3-0.4	Fill - Silty Sand	0m to <1m	Sand	NA	110	NA	NA	NA	NA	NA
BH8	0.1-0.2	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH9	0.12-0.2	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH9	0.2-0.35	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP10	0-0.1	Fill - Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP10	0-0.1	Lab Duplicate	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP10 (Silica Gel)	0-0.1	Fill - Silty Sand	0m to <1m	Sand	NA	110	NA	NA	NA	NA	NA
SDUP1 (intra-lab)	0.7-1.0	Field Duplicate of BH1	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP3 (intra-lab)	0-0.1	Field Duplicate of BH7	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP4 (Inter-lab)	0.2-0.4	Field Duplicate of BH3	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP5 (Inter-lab)	0-0.1	Field Duplicate of TP10	0m to <1m	Sand	45	110	0.5	160	55	40	3

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	$>C_{10}$-C_{16} (F2) plus napthalene	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**COMMERCIAL/INDUSTRIAL**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH1	0.2-0.3	Coarse	<25	<50	<100	<100
BH1	0.2-0.3	Coarse	<25	<50	<100	<100
BH1	0.7-1.0	Coarse	<25	<50	<100	<100
BH2	0.15-0.3	Coarse	<25	<50	<100	<100
BH3	0.2-0.4	Coarse	<25	<50	<100	<100
TP5	0.1-0.2	Coarse	<25	<50	<100	<100
TP5	0.4-0.5	Coarse	<25	<50	<100	<100
BH6	0.1-0.3	Coarse	<25	<50	<100	<100
BH7	0-0.1	Coarse	<25	<50	**260**	**110**
BH7	0.3-0.4	Coarse	<25	<50	**590**	**160**
BH7 (Silica Gel)	0.3-0.4	Coarse	NA	<50	<100	<100
BH8	0.1-0.2	Coarse	<25	<50	<100	<100
BH9	0.12-0.2	Coarse	<25	<50	<100	<100
BH9	0.2-0.35	Coarse	<25	<50	<100	<100
TP10	0-0.1	Coarse	<25	**97**	**2800**	**1300**
TP10	0-0.1	Coarse	<25	**110**	**2500**	**1200**
TP10 (Silica Gel)	0-0.1	Coarse	NA	<50	**1000**	**430**
SDUP1 (intra-lab)	0.7-1.0	Coarse	<25	<50	<100	<100
SDUP3 (intra-lab)	0-0.1	Coarse	<25	<50	**290**	**130**
SDUP4 (Inter-lab)	0.2-0.4	Coarse	<25	<50	<100	<100
SDUP5 (Inter-lab)	0-0.1	Coarse	<25	<50	**1800**	**840**
Total Number of Samples			19	21	21	21
Maximum Value			<PQL	110	2800	1300

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	$>C_{10}$-C_{16} (F2) plus napthalene	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)
BH1	0.2-0.3	Coarse	700	1000	3500	10000
BH1	0.2-0.3	Coarse	700	1000	3500	10000
BH1	0.7-1.0	Coarse	700	1000	3500	10000
BH2	0.15-0.3	Coarse	700	1000	3500	10000
BH3	0.2-0.4	Coarse	700	1000	3500	10000
TP5	0.1-0.2	Coarse	700	1000	3500	10000
TP5	0.4-0.5	Coarse	700	1000	3500	10000
BH6	0.1-0.3	Coarse	700	1000	3500	10000
BH7	0-0.1	Coarse	700	1000	3500	10000
BH7	0.3-0.4	Coarse	700	1000	3500	10000
BH7 (Silica Gel)	0.3-0.4	Coarse	NA	1000	3500	10000
BH8	0.1-0.2	Coarse	700	1000	3500	10000
BH9	0.12-0.2	Coarse	700	1000	3500	10000
BH9	0.2-0.35	Coarse	700	1000	3500	10000
TP10	0-0.1	Coarse	700	1000	3500	10000
TP10	0-0.1	Coarse	700	1000	3500	10000
TP10 (Silica Gel)	0-0.1	Coarse	NA	1000	3500	10000
SDUP1 (intra-lab)	0.7-1.0	Coarse	700	1000	3500	10000
SDUP3 (intra-lab)	0-0.1	Coarse	700	1000	3500	10000
SDUP4 (Inter-lab)	0.2-0.4	Coarse	700	1000	3500	10000
SDUP5 (Inter-lab)	0-0.1	Coarse	700	1000	3500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		5,600	4,200	5,800	8,100	140	21,000	5,900	17,000	2,200	
Site Use		HIGH DENSITY RESIDENTIAL - DIRECT SOIL CONTACT									
Sample Reference	**Sample Depth**										
BH1	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**1.3**
BH1	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**1.3**
BH1	0.7-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.6**
BH2	0.15-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.8**
BH3	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**1**
TP5	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**1.1**
TP5	0.4-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**1.7**
BH6	0.1-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**3.1**
BH7	0-0.1	<25	<50	**260**	**110**	<0.2	<0.5	<1	<1	<1	**1.7**
BH7	0.3-0.4	<25	<50	**590**	**160**	<0.2	<0.5	<1	<1	<1	**1.8**
BH7 (Silica Gel)	0.3-0.4	NA	<50	<100	<100	NA	NA	NA	NA	NA	**1.8**
BH8	0.1-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**3.1**
BH9	0.12-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**3**
BH9	0.2-0.35	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**2.9**
TP10	0-0.1	<25	**97**	**2800**	**1300**	<0.2	<0.5	<1	<1	<1	**0.4**
TP10	0-0.1	<25	**110**	**2500**	**1200**	<0.2	<0.5	<1	<1	<1	**0.4**
TP10 (Silica Gel)	0-0.1	NA	<50	**1000**	**430**	NA	NA	NA	NA	NA	**0.4**
SDUP1 (intra-lab)	0.7-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP3 (intra-lab)	0-0.1	<25	<50	**290**	**130**	<0.2	<0.5	<1	<1	<1	NA
SDUP4 (Inter-lab)	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP5 (Inter-lab)	0-0.1	<25	<50	**1800**	**840**	<0.2	<0.5	<1	<1	<1	NA
Total Number of Samples		19	21	21	21	19	19	19	19	19	17
Maximum Value		<PQL	110	2800	1300	<PQL	<PQL	<PQL	<PQL	<PQL	3.1

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-B: Residential with minimal opportunities for soil access

FIELD DATA															LABORATORY DATA											
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample refeference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
SAC			**No**					**0.04**			**0.001**			**0.001**											**0.04**	**0.001**
31/07/2023	BH1	0.13-0.2	No	10	2,500	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	329662	BH1	0.2-0.3	418.28	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
1/08/2023	TP5	0.1-0.3	No	10	6,700	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	329662	BH2	0.15-0.3	871.11	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
1/08/2023	TP5	0.3-0.85	No	10	11,230	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/08/2023	BH6	0.1-0.4	No	10	3,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	329662	TP5	0.1-0.2	658.96	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
1/08/2023	BH7	0-0.2	No	10	10,180	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	329662	BH6	0.1-0.3	837.7	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
1/08/2023	BH7	0.2-0.65	No	10	10,270	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	329662	BH7	0-0.1	435.93	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
2/08/2023	TP10	0-0.1	No	10	10,950	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	329662	BH8	0.1-0.2	756.95	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
2/08/2023	TP10	0.1-0.2	No	10	1,780	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	329662	BH9	0.12-0.2	826.43	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	329662	TP10	0-0.1	514.34	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001

Concentration above the SAC **VALUE**

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																		
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																			
BH1	0.2-0.3	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	<1	<1	**1**	<1	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1	0.2-0.3	Lab Duplicate	Coarse	**7.07**	**18.67**	NA	<4	<1	<1	<1	<1	**4**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1	0.7-1.0	Sandstone	Coarse	**7.07**	**18.67**	NA	<4	**1**	<1	**2**	<1	<1	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH2	0.15-0.3	Fill - Gravel	Coarse	**7.07**	**18.67**	NA	<4	**4**	**2**	**1**	<1	<1	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH3	0.2-0.4	Sandstone	Coarse	**7.07**	**18.67**	NA	<4	**4**	**6**	**6**	**1**	**10**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP5	0.1-0.2	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	**13**	**70**	**250**	**27**	**140**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.08**
TP5	0.4-0.5	Fill - Clayey Sand	Coarse	**7.07**	**18.67**	NA	<4	**2**	**2**	**22**	<1	**5**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH6	0.1-0.3	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	<1	**1**	**7**	<1	**24**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.3**
BH7	0-0.1	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	**13**	**110**	**90**	**8**	**160**	<1	<0.1	<25	<50	**260**	**110**	<0.2	<0.5	<1	<1	**0.7**
BH7	0.3-0.4	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	**8**	**47**	**130**	**4**	**220**	<1	NA	<25	<50	**590**	**160**	<0.2	<0.5	<1	<1	**20**
BH7 (Silica Gel)	0.3-0.4	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<100	<100	NA	NA	NA	NA	NA
BH8	0.1-0.2	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	**4**	**22**	**29**	**15**	**32**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
BH9	0.12-0.2	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	**3**	**5**	**25**	**3**	**23**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.09**
BH9	0.2-0.35	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	**2**	**2**	**14**	**2**	**5**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP10	0-0.1	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	<4	**24**	**99**	**280**	**15**	**410**	<1	<0.1	<25	**97**	**2800**	**1300**	<0.2	<0.5	<1	<1	**0.2**
TP10	0-0.1	Lab Duplicate	Coarse	**7.07**	**18.67**	NA	<4	**24**	**100**	**250**	**16**	**390**	<1	<0.1	<25	**110**	**2500**	**1200**	<0.2	<0.5	<1	<1	**0.2**
TP10 (Silica Gel)	0-0.1	Fill - Silty Sand	Coarse	**7.07**	**18.67**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	**1000**	**430**	NA	NA	NA	NA	NA
SDUP1 (intra-lab)	0.7-1.0	Field Duplicate of BH1	Coarse	**7.07**	**18.67**	NA	<4	**2**	<1	**2**	<1	**1**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP3 (intra-lab)	0-0.1	Field Duplicate of BH7	Coarse	**7.07**	**18.67**	NA	<4	**14**	**99**	**93**	**10**	**150**	<1	<0.1	<25	<50	**290**	**130**	<0.2	<0.5	<1	<1	<0.05
SDUP4 (Inter-lab)	0.2-0.4	Field Duplicate of BH3	Coarse	**7.07**	**18.67**	NA	<4	**3**	**7**	**2**	<1	**3**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP5 (Inter-lab)	0-0.1	Field Duplicate of TP10	Coarse	**7.07**	**18.67**	NA	<4	**26**	**91**	**370**	**15**	**390**	<1	<0.1	<25	<50	**1800**	**840**	<0.2	<0.5	<1	<1	**0.14**
Total Number of Samples				21	21	21	19	19	19	19	19	19	19	13	19	21	21	21	19	19	19	19	19
Maximum Value				7.07	18.67	<PQL	<PQL	26	110	370	27	410	<PQL	<PQL	<PQL	110	2800	1300	<PQL	<PQL	<PQL	<PQL	20

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH1	0.2-0.3	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH1	0.2-0.3	Lab Duplicate	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH1	0.7-1.0	Sandstone	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	--	180	120	300	2800	50	85	70	105	20
BH2	0.15-0.3	Fill - Gravel	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH3	0.2-0.4	Sandstone	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
TP5	0.1-0.2	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
TP5	0.4-0.5	Fill - Clayey Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	--	180	120	300	2800	50	85	70	105	20
BH6	0.1-0.3	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH7	0-0.1	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH7	0.3-0.4	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	--	180	120	300	2800	50	85	70	105	20
BH7 (Silica Gel)	0.3-0.4	Fill - Silty Sand	Coarse	7.07	18.67	NA	--	--	--	--	--	--	--	--	--	120	300	2800	--	--	--	--	--
BH8	0.1-0.2	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH9	0.12-0.2	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
BH9	0.2-0.35	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	--	180	120	300	2800	50	85	70	105	20
TP10	0-0.1	Fill - Silty Sand	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
TP10	0-0.1	Lab Duplicate	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
TP10 (Silica Gel)	0-0.1	Fill - Silty Sand	Coarse	7.07	18.67	NA	--	--	--	--	--	--	--	--	--	120	300	2800	--	--	--	--	--
SDUP1 (intra-lab)	0.7-1.0	Field Duplicate of BH1	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	--	180	120	300	2800	50	85	70	105	20
SDUP3 (intra-lab)	0-0.1	Field Duplicate of BH7	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20
SDUP4 (Inter-lab)	0.2-0.4	Field Duplicate of BH3	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	--	180	120	300	2800	50	85	70	105	20
SDUP5 (Inter-lab)	0-0.1	Field Duplicate of TP10	Coarse	7.07	18.67	NA	100	200	240	1300	280	820	170	180	180	120	300	2800	50	85	70	105	20

TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled	PCBs	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
BH1	0.2-0.3	Fill - Silty Sand	<4	<0.4	<1	<1	**1**	<0.1	<1	**5**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH1	0.2-0.3	Lab Duplicate	<4	<0.4	<1	<1	<1	<0.1	<1	**4**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH1	0.7-1.0	Sandstone	<4	<0.4	**1**	<1	**2**	<0.1	<1	<1	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH2	0.15-0.3	Fill - Gravel	<4	<0.4	**4**	**2**	**1**	<0.1	<1	<1	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH3	0.2-0.4	Sandstone	<4	<0.4	**4**	**6**	**6**	<0.1	**1**	**10**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP5	0.1-0.2	Fill - Silty Sand	<4	<0.4	**13**	**70**	**250**	<0.1	**27**	**140**	**0.53**	**0.08**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP5	0.4-0.5	Fill - Clayey Sand	<4	<0.4	**2**	**2**	**22**	<0.1	<1	**5**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH6	0.1-0.3	Fill - Silty Sand	<4	<0.4	<1	**1**	**7**	<0.1	<1	**24**	**4.6**	**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH7	0-0.1	Fill - Silty Sand	<4	<0.4	**13**	**110**	**90**	**0.2**	**8**	**160**	**8.3**	**0.7**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	**140**	**170**	**310**	<0.2	<0.5	<1	<1	Not Detected
BH7	0.3-0.4	Fill - Silty Sand	<4	<0.4	**8**	**47**	**130**	**0.1**	**4**	**220**	**190**	**20**	NA	NA	NA	NA	NA	<25	<50	**440**	**240**	**680**	<0.2	<0.5	<1	<1	NA
BH7 (Silica Gel)	0.3-0.4	Fill - Silty Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<100	<100	<50	NA	NA	NA	NA	NA
BH8	0.1-0.2	Fill - Silty Sand	<4	<0.4	**4**	**22**	**29**	**0.1**	**15**	**32**	**2.2**	**0.2**	<0.1	<0.1	<0.1	<0.1	**0.4**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH9	0.12-0.2	Fill - Silty Sand	<4	<0.4	**3**	**5**	**25**	<0.1	**3**	**23**	**0.4**	**0.09**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH9	0.2-0.35	Fill - Silty Sand	<4	<0.4	**2**	**2**	**14**	<0.1	**2**	**5**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
TP10	0-0.1	Fill - Silty Sand	<4	**0.9**	**24**	**99**	**280**	**0.2**	**15**	**410**	**1.8**	**0.2**	<0.1	<0.1	<0.1	<0.1	**0.6**	<25	**92**	**1200**	**2200**	**3492**	<0.2	<0.5	<1	<1	Not Detected
TP10	0-0.1	Lab Duplicate	<4	**0.9**	**24**	**100**	**250**	**0.2**	**16**	**390**	**2**	**0.2**	<0.1	<0.1	<0.1	<0.1	**0.7**	<25	**100**	**1100**	**1900**	**3100**	<0.2	<0.5	<1	<1	NA
TP10 (Silica Gel)	0-0.1	Fill - Silty Sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	**480**	**700**	**1180**	NA	NA	NA	NA	NA
SDUP1 (intra-lab)	0.7-1.0	Field Duplicate of BH1	<4	<0.4	**2**	<1	**2**	<0.1	<1	**1**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP3 (intra-lab)	0-0.1	Field Duplicate of BH7	<4	<0.4	**14**	**99**	**93**	**0.2**	**10**	**150**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	**140**	**210**	**350**	<0.2	<0.5	<1	<1	NA
SDUP4 (Inter-lab)	0.2-0.4	Field Duplicate of BH3	<4	<0.4	**3**	**7**	**2**	<0.1	<1	**3**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP5 (Inter-lab)	0-0.1	Field Duplicate of TP10	<4	**1**	**26**	**91**	**370**	**0.3**	**15**	**390**	**1.7**	**0.14**	<0.1	<0.1	<0.1	<0.1	**0.9**	<25	<50	**820**	**1300**	**2120**	<0.2	<0.5	<1	<1	NA
Total Number of Samples			19	19	19	19	19	19	19	19	19	19	13	13	13	13	13	19	21	21	21	21	19	19	19	19	9
Maximum Value			<PQL	1	26	110	370	0.3	27	410	190	20	<PQL	<PQL	<PQL	<PQL	0.9	<PQL	100	1200	2200	3492	<PQL	<PQL	<PQL	<PQL	Not Detected

Concentration above the CT1 — **VALUE**
Concentration above SCC1 — **VALUE**
Concentration above the SCC2 — **VALUE**
Concentration above PQL — **Bold**

VALUE

TABLE S8
SOIL LABORATORY TCLP RESULTS
All data in mg/L unless stated otherwise

			Arsenic	Cadmium	Chromium	Lead	Mercury	Nickel	B(a)P
PQL - Envirolab Services			0.05	0.01	0.01	0.03	0.0005	0.02	0.001
TCLP1 - General Solid Waste			5	1	5	5	0.2	2	0.04
TCLP2 - Restricted Solid Waste			20	4	20	20	0.8	8	0.16
TCLP3 - Hazardous Waste			>20	>4	>20	>20	>0.8	>8	>0.16
Sample Reference	**Sample Depth**	**Sample Description**							
TP5	0.1-0.2	Fill - Silty Sand	NA	NA	NA	<0.03	NA	NA	NA
TP5	0.1-0.2	Lab Duplicate	NA	NA	NA	<0.03	NA	NA	NA
BH7	0.3-0.4	Fill - Silty Sand	NA	NA	NA	**0.03**	NA	NA	<0.001
TP10	0-0.1	Fill - Silty Sand	NA	NA	NA	<0.03	NA	NA	NA
Total Number of samples			0	0	0	4	0	0	1
Maximum Value			NA	NA	NA	0.03	NA	NA	<PQL

General Solid Waste	**VALUE**
Restricted Solid Waste	**VALUE**
Hazardous Waste	**VALUE**
Concentration above PQL	**Bold**

JKEnvironments

TABLE QS1
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene
	PQL Envirolab SYD		25	50	100	100	0.2	0.5	1	2	1
	PQL Envirolab VIC		25	50	100	100	0.2	0.5	1.0	2.0	1.0
Intra	BH1	0.7-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
laboratory	SDUP1 (intra	0.7-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH7	0-0.1	<25	<50	260	110	<0.2	<0.5	<1	<2	<1
laboratory	SDUP3 (intra	0-0.1	<25	<50	290	130	<0.2	<0.5	<1	<2	<1
duplicate	MEAN		nc	nc	275	120	nc	nc	nc	nc	nc
	RPD %		nc	nc	11%	17%	nc	nc	nc	nc	nc
Inter	BH3	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
laboratory	SDUP4 (Inter	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	TP10	0-0.1	<25	97	2800	1300	<0.2	<0.5	<1	<2	<1
laboratory	SDUP5 (Inter	0-0.1	<25	<50	1800	840	<0.2	<0.5	<1	<2	<1
duplicate	MEAN		nc	61	2300	1070	nc	nc	nc	nc	nc
	RPD %		nc	118%	43%	43%	nc	nc	nc	nc	nc
Trip	TB-S1	31/07/2023	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
Blank	31/07/23										
Trip	TB-S2	1/08/2023	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
Blank	1/08/23										
Field	FR1-SPT	µg/L	<10	<50	<100	<100	<1	<1	<1	<2	<1
Rinsate	31/07/23										
Field	FR2-HA	µg/L	17	<50	<100	<100	<1	<1	<1	<2	<1
Rinsate	1/08/23										
Trip	TS-S1		-	-	-	-	101%	100%	100%	100%	100%
Spike	31/07/23										
Trip	TS-S2		-	-	-	-	97%	96%	96%	97%	97%
Spike	1/08/23										

			Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthen	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cen	Benzo(g,h,i)perylene
	PQL Envirolab SYD		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.05	0.1	0.1	0.1
	PQL Envirolab VIC		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Intra	BH1	0.7-1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP1 (intra	0.7-1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH7	0-0.1	<0.1	0.1	<0.1	<0.1	0.8	0.2	1.7	1.5	0.8	0.6	1	0.7	0.3	<0.1	0.5
laboratory	SDUP3 (intra	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	0.075	nc	nc	0.425	0.125	0.875	0.775	0.425	0.325	0.55	0.3625	0.175	nc	0.275
	RPD %		nc	67%	nc	nc	176%	120%	189%	187%	176%	169%	164%	186%	143%	nc	164%
Inter	BH3	0.2-0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP4 (Inter	0.2-0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	TP10	0-0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.3	0.3	0.2	0.2	0.3	0.2	<0.1	<0.1	0.2
laboratory	SDUP5 (Inter	0-0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.2	0.3	0.1	0.1	0.3	0.14	0.2	<0.1	0.2
duplicate	MEAN		nc	nc	nc	nc	0.1	nc	0.25	0.3	0.15	0.15	0.3	0.17	0.125	nc	0.2
	RPD %		nc	nc	nc	nc	0%	nc	40%	0%	67%	67%	0%	35%	120%	nc	0%
Trip	TB-S1	31/07/2023	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
Blank	31/07/23																
Trip	TB-S2	1/08/2023	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
Blank	1/08/23																
Field	FR1-SPT	µg/L	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1
Rinsate	31/07/23																
Field	FR2-HA	µg/L	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1
Rinsate	1/08/23																
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	31/07/23																
Trip	TS-S2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/08/23																

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PQL Envirolab VIC		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Intra	BH1	0.7-1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
laboratory	SDUP1 (intra	0.7-1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH7	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP3 (intra	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH3	0.2-0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP4 (Inter	0.2-0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	TP10	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP5 (Inter	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Trip	TB-S1	31/07/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	31/07/23																					
Trip	TB-S2	1/08/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	1/08/23																					
Field	FR1-SPT	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	31/07/23																					
Field	FR2-HA	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	1/08/23																					
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	31/07/23																					
Trip	TS-S2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/08/23																					

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS
	PQL Envirolab SYD		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PQL Envirolab VIC		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Intra	BH1	0.7-1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
laboratory	SDUP1 (intra	0.7-1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH7	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP3 (intra	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH3	0.2-0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP4 (Inter	0.2-0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	TP10	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6
laboratory	SDUP5 (Inter	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.75
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	40%
Trip	TB-S1	31/07/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	31/07/23														
Trip	TB-S2	1/08/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	1/08/23														
Field	FR1-SPT	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	31/07/23														
Field	FR2-HA	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	1/08/23														
Trip	TS-S1		-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	31/07/23														
Trip	TS-S2		-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	1/08/23														

			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		4	0.4	1	1	1	0.1	1	1
	PQL Envirolab VIC		4.0	0.4	1.0	1.0	1.0	0.1	1.0	1.0
Intra	BH1	0.7-1.0	<4	<0.4	1	<1	2	<0.1	<1	<1
laboratory	SDUP1 (intra	0.7-1.0	<4	<0.4	2	<1	2	<0.1	<1	1
duplicate	MEAN		nc	nc	1.5	nc	2	nc	nc	0.75
	RPD %		nc	nc	67%	nc	0%	nc	nc	67%
Intra	BH7	0-0.1	<4	<0.4	13	110	90	0.2	8	160
laboratory	SDUP3 (intra	0-0.1	<4	<0.4	14	99	93	0.2	10	150
duplicate	MEAN		nc	nc	13.5	104.5	91.5	0.2	9	155
	RPD %		nc	nc	7%	11%	3%	0%	22%	6%
Inter	BH3	0.2-0.4	<4	<0.4	4	6	6	<0.1	1	10
laboratory	SDUP4 (Inter	0.2-0.4	<4	<0.4	3	7	2	<0.1	<1	3
duplicate	MEAN		nc	nc	3.5	6.5	4	nc	0.75	6.5
	RPD %		nc	nc	29%	15%	100%	nc	67%	108%
Inter	TP10	0-0.1	<4	0.9	24	99	280	0.2	15	410
laboratory	SDUP5 (Inter	0-0.1	<4	1	26	91	370	0.3	15	390
duplicate	MEAN		nc	0.95	25	95	325	0.25	15	400
	RPD %		nc	11%	8%	8%	28%	40%	0%	5%
Trip	TB-S1	31/07/2023	<4	<0.4	3	<1	4	<0.1	<1	2
Blank	31/07/23									
Trip	TB-S2	1/08/2023	<4	<0.4	4	<1	5	<0.1	<1	2
Blank	1/08/23									
Field	FR1-SPT	µg/L	<0.05	<0.01	<0.01	<0.01	<0.03	<0.0005	<0.02	<0.02
Rinsate	31/07/23									
Field	FR2-HA	µg/L	<0.05	<0.01	<0.01	0.08	<0.03	<0.0005	<0.02	<0.02
Rinsate	1/08/23									
Trip	TS-S1		-	-	-	-	-	-	-	-
Spike	31/07/23									
Trip	TS-S2		-	-	-	-	-	-	-	-
Spike	1/08/23									

Result outside of QA/QC acceptance criteria: Value

Rinsate metals results in mg/L

TABLE SV1
SOIL VAPOUR LABORATORY RESULTS COMPARED TO HSLs
All data in mg/m^3 unless stated otherwise

				C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
PQL - Envirolab				0.2	0.04	0.0016	0.0019	0.0022	0.0065	0.0026
NEPM 2013 Land Use Category				**LOW/HIGH DENSITY RESIDENTIAL**						
Sample Reference	**Sample Depth**	**Depth Category**	**Soil Category**							
SV1	Sub-slab	0m to <1m	Sand	<0.2	<0.04	**0.002**	**0.010**	<0.0022	<0.0065	<0.0026
SV1 (Lab Dup)	Sub-slab	0m to <1m	Sand	<0.2	<0.04	**0.002**	**0.010**	<0.0022	<0.0065	<0.0026
SV2	Sub-slab	0m to <1m	Sand	<0.2	<0.04	<0.0016	**0.005**	<0.0022	<0.0065	<0.0026
SV3	Sub-slab	0m to <1m	Sand	<0.2	<0.04	<0.0016	**0.003**	<0.0022	<0.0065	<0.0026
SV4	Sub-slab	0m to <1m	Sand	<0.2	<0.04	<0.0016	<0.0019	<0.0022	<0.0065	<0.0026
SV5	Sub-slab	0m to <1m	Sand	<0.2	**0.14**	<0.0016	**0.005**	<0.0022	<0.0065	<0.0026
SVDUP1 (SV4)	Sub-slab	0m to <1m	Sand	<0.2	**0.04**	<0.0016	<0.0019	<0.0022	<0.0065	<0.0026
Total Number of Samples				7	7	7	7	7	7	7
Maximum Value				<PQL	0.14	0.002	0.01	<PQL	<PQL	<PQL

Concentration above the SAC — **VALUE**
Concentration above PQL — **Bold**

HSL SOIL VAPOUR ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
SV1	Sub-slab	0m to <1m	Sand	180	130	1	1300	330	220	0.8
SV1 (Lab Dup)	Sub-slab	0m to <1m	Sand	180	130	1	1300	330	220	0.8
SV2	Sub-slab	0m to <1m	Sand	180	130	1	1300	330	220	0.8
SV3	Sub-slab	0m to <1m	Sand	180	130	1	1300	330	220	0.8
SV4	Sub-slab	0m to <1m	Sand	180	130	1	1300	330	220	0.8
SV5	Sub-slab	0m to <1m	Sand	180	130	1	1300	330	220	0.8
SVDUP1	Sub-slab	0m to <1m	Sand	180	130	1	1300	330	220	0.8

TABLE SV2

SOIL VAPOUR LABORATORY RESULTS COMPARED TO INTERIM HILs FOR VOCC

All data in mg/m^3 unless stated otherwise

			TCE	1,1,1-TCA	PCE	cis 1,2 dichloro-ethene	Vinyl chloride
PQL - Envirolab			0.0027	0.0027	0.0034	0.002	0.0013
NEPM 2013 Site Assessment Criteria (SAC)			0.02	60	2	0.08	0.03
Land Use			**LOW/HIGH DENSITY RESIDENTIAL**				
Sample Reference	**Sample Depth**	**Sample Description**					
SV1	Sub-slab	Soil Vapour	<0.0027	<0.0027	<0.0034	<0.002	<0.0013
SV1 (Lab Dup)	Sub-slab	Lab Duplicate	<0.0027	<0.0027	<0.0034	<0.002	<0.0013
SV2	Sub-slab	Soil Vapour	<0.0027	<0.0027	<0.0034	<0.002	<0.0013
SV3	Sub-slab	Soil Vapour	<0.0027	<0.0027	<0.0034	<0.002	<0.0013
SV4	Sub-slab	Soil Vapour	**0.004**	<0.0027	<0.0034	<0.002	<0.0013
SV5	Sub-slab	Soil Vapour	<0.0027	<0.0027	<0.0034	<0.002	<0.0013
SVDUP1	Sub-slab	Field Duplicate at SV4	<0.0027	<0.0027	<0.0034	<0.002	<0.0013
Total Number of Samples			7	7	7	7	7
Maximum Value			0.004	<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above PQL **Bold**

TABLE SV3

SOIL VAPOUR LABORATORY RESULTS COMPARED TO USEPA SCREENING CRITERIA FOR VOCC

All data in µg/m3 unless stated otherwise

			Propylene	Ethanol	Acetone	Isopropyl Alcohol	Ethyl Acetate	Chloroform	1,2,4-Trimethylbenzene
PQL			0.9	9	11.9	12	1.8	2.4	2.5
USEPA#			104000	NSL	NSL	6950	2430	40.7	2090
Land Use			**LOW/HIGH DENSITY RESIDENTIAL**						
Sample Reference	**Sample Depth**	**Sample Description**							
SV1	Sub-slab	Soil vapour	**2**	**90**	**150**	<12	<1.8	**3**	**3**
SV1 (Lab Dup)	Sub-slab	Soil vapour	**2**	**91**	**150**	**10**	<1.8	**3**	**3**
SV2	Sub-slab	Soil vapour	**3**	**40**	**100**	<12	<1.8	**3**	<2.5
SV3	Sub-slab	Soil vapour	<0.9	**30**	<11.9	**20**	<1.8	**8**	<2.5
SV4	Sub-slab	Soil vapour	<0.9	**80**	**30**	<12	<1.8	<2.4	<2.5
SV5	Sub-slab	Soil vapour	<0.9	**150**	**60**	**510**	**20**	<2.4	**4**
SVDUP1	Sub-slab	Field Duplicate of SV4	<0.9	**150**	**40**	**10**	<1.8	<2.4	<2.5
Total Number of Samples			7	7	7	7	7	7	7
Maximum Value			3	150	150	510	20	8	4

Concentration above the SAC
Concentration above PQL
Target Sub-Slab and Near-sourceSoil Gas Concentration (TCR=1E-05or THQ=1) Csg,Target (µg/m3)

TABLE QSV4
SOIL VAPOR QA/QC SUMMARY

		TRH C6 - C10	TRH >C10-C16	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	TCE	1,1,1-TCA	PCE	cis 1,2 dichloro-ethene	Vinyl chloride	Propylene	Ethanol	Acetone	Isopropyl Alcohol
Intra	SV4	<0.2	<0.04	<0.0016	<0.0019	<0.0022	<0.0043	<0.0026	0.004	<0.0027	<0.0034	<0.002	<0.0013	<0.9	80	30	<12
laboratory	SVDUP1	<0.2	0.04	<0.0016	<0.0019	<0.0022	<0.0043	<0.0026	<0.0027	<0.0027	<0.0034	<0.002	<0.0013	<0.9	150	40	10
duplicate	MEAN	nc	0.03	nc	nc	nc	nc	nc	0.003	nc	nc	nc	nc	nc	115	35	8
	RPD %	nc	67%	nc	nc	nc	nc	nc	99%	nc	nc	nc	nc	nc	61%	29%	50%

Result outside of QA/QC acceptance criteria **VALUE**

RPDs calculated for detectable results of other VOCs only

Shroud Leak Test	Isopropanol (Shroud)		SV1	SV1 (Lab Dup)	SV2	SV3	SV4	SV5	SVDUP1
Isopropanol (ug/m3)	860,000		<12	10	<12	20	<12	510	10

Result outside of QA/QC acceptance criteria Value

ABBREVIATIONS AND EXPLANATIONS FOR ACID SULFATE SOIL TABLE

Abbreviations used in the Tables:

ANC_{BT}	Acid Neutralising Capacity - Back Titration
ANCE	Excess Acid Neutralising Capacity
$CaCO_3$	Calcium Carbonate
kg	kilogram
mol H^+/t	moles hydrogen per tonne
pHF	Field pH
pHFOX	Field peroxide pH
pH_{KCl}	Pottasium chloride pH
S	Sulfur
SCr	The symbol given to the result from the Chromium Reducible Sulfur method
S_{NAS}	Net Acid Soluble Sulfur
% w/w	Percentage by mass

Results have been assessed against the criteria specified in Table 1.1 of National Acid sulfate Soil Guidance - National acid sulfate soil identification and laboratory method manual. Water Quality Australia. June 2018

TABLE A
SUMMARY OF LABORATORY RESULTS - ACID SULFATE SOIL ANALYSIS

Soil Texture: Coarse		Analysis	pH_F and pH_{FOX}				pH_{KCL}	Actual Acidity (Titratable Actual Acidity - TAA)	Potential Sulfidic Acidity		Retained Acidity	Acid Neutralising Capacity (ANC_{BT})	a-Net Acidity without ANCE	s-Net Acidity without ANCE	Liming Rate - without ANCE
			pH_F	pH_{FOX}	Reaction	pH_F - pH_{FOX}		(mol H^+/t)	(% SCr)	(mol H^+/t)	(%S_{NAS})	(% $CaCO_3$)	(mol H^+/t)	(%w/w S)	(kg $CaCO_3$/tonne)
National Acid Sulfate Soils Guidance (2018)			-	-	-	-	-	-	-	-	-	-	18	0.03	-
Sample Reference	**Sample Depth (m)**	**Sample Description**													
BH1	0.7-1.0	Sandstone	6.1	6.4	Low reaction	-0.3	6.7	<5	0.007	4	NA	1	<5	0.007	<0.75
BH2	0.15-0.3	Sandstone	8.2	6.5	Medium reaction	1.7	6.3	<5	0.01	8	NA	NA	7.8	0.012	<0.75
BH2	0.8-1.0	Sandstone	5.6	6.1	Low reaction	-0.5	5.3	<5	<0.005	<3	NA	NA	<5	0.006	<0.75
BH3	0.2-0.4	Sandstone	8.6	6.8	Medium reaction	1.8	7.5	<5	0.006	4	NA	0.4	<5	0.006	<0.75
BH3	1.0-1.1	Sandstone	5.7	4.1	Medium reaction	1.6	4.5	26	0.01	7	NA	NA	**32.0**	**0.052**	2.4
Total Number of Samples			5	5	5	5	5	5	5	5	-	2	5	5	5
Minimum Value			5.6	4.1	-	-0.5	4.5	<5	0.006	4	-	0.40	7.8	0.006	<0.75
Maximum Value			8.6	6.8	-	1.8	7.5	26	0.01	8	-	1.00	32.0	0.052	2.4

Values Exceeding Action Criteria **VALUE**

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ADWG: AustralianDrinking Water Guidelines
ANZG Australian and New Zealand Guidelines
B(a)P: Benzo(a)pyrene
CRC: Cooperative Research Centre
ESLs: Ecological Screening Levels
GIL: Groundwater Investigation Levels
HILs: Health Investigation Levels
HSLs: Health Screening Levels
HSL-SSA: Health Screening Level-SiteSpecific Assessment
NA: Not Analysed
NC: Not Calculated
NEPM: National Environmental Protection Measure
NHMRC: National Health and Medical Research Council
NL: Not Limiting
NSL: No Set Limit
OCP: Organochlorine Pesticides
OPP: Organophosphorus Pesticides
PAHs: Polycyclic Aromatic Hydrocarbons
ppm: Parts per million
PCBs: Polychlorinated Biphenyls
PCE: Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
PQL: Practical Quantitation Limit
RS: Rinsate Sample
RSL: Regional Screening Levels
SAC: Site Assessment Criteria
SSA: Site Specific Assessment
SSHSLs: Site Specific Health Screening Levels
TB: Trip Blank
TCA: 1,1,1 Trichloroethane (methyl chloroform)
TCE: Trichloroethylene (Trichloroethene)
TS: Trip Spike
TRH: Total Recoverable Hydrocarbons
UCL: Upper Level Confidence Limit on Mean Value
USEPA United States Environmental Protection Agency
VOCC: Volatile Organic Chlorinated Compounds
WHO: World Health Organisation

TABLE G1
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	ANZG 2018 Marine Waters	SAMPLES							
			MW1	MW1 (Lab Duplicate)	MW2	MW2 (Lab Duplicate)	MW3	SDUP1 (MW1)	SDUP2 (MW2)	SDUP2 (Lab Duplicate)
Inorganic Compounds and Parameters										
pH		7 - 8.5	6	NA	5.7	NA	7.6	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**170**	NA	**170**	NA	**420**	NA	NA	NA
Turbidity (NTU)		NSL	NA	NA	NA	NA	NA	NA	NA	NA
Metals and Metalloids										
Arsenic (As III)	1	2.3	<1	<1	**1**	[NT]	**1**	**1**	**1**	NA
Cadmium	0.1	0.7	<0.1	<0.1	<0.1	[NT]	<0.1	<0.1	<0.1	NA
Chromium (SAC for Cr III adopted)	1	27	**2**	**2**	**2**	[NT]	<1	**2**	**2**	NA
Copper	1	1.3	**6**	**5**	**7**	[NT]	**6**	**6**	**7**	NA
Lead	1	4.4	<1	<1	**1**	[NT]	<1	<1	**1**	NA
Total Mercury (inorganic)	0.05	0.1	<0.05	[NT]	<0.05	<0.05	<0.05	<0.05	**3**	NA
Nickel	1	7	**1**	<1	**2**	[NT]	**2**	**1**	**25**	NA
Zinc	1	15	**17**	**16**	**23**	[NT]	**6**	**16**	<0.05	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)										
Benzene	1	500	<1	NA	**3**	**3**	<1	<1	**3**	NA
Toluene	1	180	<1	NA	<1	<1	<1	<1	<1	NA
Ethylbenzene	1	5	<1	NA	<1	<1	<1	<1	<1	NA
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2	NA
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1	NA
Total xylenes	2	NSL	<2	NA	<2	<2	<2	<2	<2	NA
Volatile Organic Compounds (VOCs), including chlorinated VOCs										
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
Chloromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
Vinyl Chloride	10	100	<10	NA	<10	<10	<10	<10	<10	NA
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
1,1-Dichloroethene	1	700	<1	NA	<1	<1	<1	<1	<1	NA
Trans-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,1-dichloroethane	1	250	<1	NA	<1	<1	<1	<1	<1	NA
Cis-1,2-dichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Bromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Chloroform	1	370	<1	NA	2	2	<1	<1	2	NA
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichloroethane	1	1900	<1	NA	<1	<1	<1	<1	<1	NA
1,1,1-trichloroethane	1	270	<1	NA	<1	<1	<1	<1	<1	NA
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Carbon tetrachloride	1	240	<1	NA	<1	<1	<1	<1	<1	NA
Benzene	1	500	<1	NA	**3**	**3**	<1	<1	**3**	NA
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichloropropane	1	900	<1	NA	<1	<1	<1	<1	<1	NA
Trichloroethene	1	330	<1	NA	<1	<1	<1	<1	<1	NA
Bromodichloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
trans-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
cis-1,3-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,1,2-trichloroethane	1	1900	<1	NA	<1	<1	<1	<1	<1	NA
Toluene	1	180	<1	NA	<1	<1	<1	<1	<1	NA
1,3-dichloropropane	1	1100	<1	NA	<1	<1	<1	<1	<1	NA
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Tetrachloroethene	1	70	<1	NA	<1	<1	<1	<1	<1	NA
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Chlorobenzene	1	55	<1	NA	<1	<1	<1	<1	<1	NA
Ethylbenzene	1	5	<1	NA	<1	<1	<1	<1	<1	NA
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
m+p-xylene	2	75	<2	NA	<2	<2	<2	<2	<2	NA
Styrene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,1,2,2-tetrachloroethane	1	400	<1	NA	<1	<1	<1	<1	<1	NA
o-xylene	1	350	<1	NA	<1	<1	<1	<1	<1	NA
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Isopropylbenzene	1	30	<1	NA	<1	<1	<1	<1	<1	NA
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,3-dichlorobenzene	1	260	<1	NA	<1	<1	<1	<1	<1	NA
Sec-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,4-dichlorobenzene	1	60	<1	NA	<1	<1	<1	<1	<1	NA
4-isopropyl toluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichlorobenzene	1	160	<1	NA	<1	<1	<1	<1	<1	NA
n-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dibromo-3-chloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2,4-trichlorobenzene	1	20	<1	NA	<1	<1	<1	<1	<1	NA
Hexachlorobutadiene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2,3-trichlorobenzene	1	3	<1	NA	<1	<1	<1	<1	<1	NA
Polycyclic Aromatic Hydrocarbons (PAHs)										
Naphthalene	0.2	50	<0.2	<0.2	<0.2	NA	<0.2	<0.2	<0.1	NA
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Fluorene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Phenanthrene	0.1	0.6	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Anthracene	0.1	0.01	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Fluoranthene	0.1	1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Pyrene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Chrysene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2	NA	<0.2	<0.2	<0.2	NA
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

TABLE G2
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILs
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	SAMPLES							
			MW1	MW1 (Lab Duplicate)	MW2	MW2 (Lab Duplicate)	MW3	SDUP1 (MW1)	SDUP2 (MW2)	SDUP2 (Lab Duplicate)
Inorganic Compounds and Parameters										
pH		6.5 - 8.5	6	NA	5.7	NA	7.6	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**170**	NA	**170**	NA	**420**	NA	NA	NA
Turbidity (NTU)		NSL	NA	NA	NA	NA	NA	NA	NA	NA
Metals and Metalloids										
Arsenic (As III)	1	100	<1	<1	**1**	[NT]	**1**	**1**	**1**	NA
Cadmium	0.1	20	<0.1	<0.1	<0.1	[NT]	<0.1	<0.1	<0.1	NA
Chromium (total)	1	500	**2**	**2**	**2**	[NT]	<1	**2**	**2**	NA
Copper	1	20000	**6**	**5**	**7**	[NT]	**6**	**6**	**7**	NA
Lead	1	100	<1	<1	**1**	[NT]	<1	<1	**1**	NA
Total Mercury (inorganic)	0.05	10	<0.05	[NT]	<0.05	<0.05	<0.05	<0.05	**3**	NA
Nickel	1	200	**1**	<1	**2**	[NT]	**2**	**1**	**25**	NA
Zinc	1	30000	**17**	**16**	**23**	[NT]	**6**	**16**	<0.05	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)										
Benzene	1	10	<1	NA	**3**	**3**	<1	<1	**3**	NA
Toluene	1	8000	<1	NA	<1	<1	<1	<1	<1	NA
Ethylbenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	NA
m+p-xylene	2	NSL	<2	NA	<2	<2	<2	<2	<2	NA
o-xylene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Total xylenes	2	6000	<2	NA	<2	<2	<2	<2	<2	NA
Volatile Organic Compounds (VOCs), including chlorinated VOCs										
Dichlorodifluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
Chloromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
Vinyl Chloride	10	3	<10	NA	<10	<10	<10	<10	<10	NA
Bromomethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
Chloroethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
Trichlorofluoromethane	10	NSL	<10	NA	<10	<10	<10	<10	<10	NA
1,1-Dichloroethene	1	300	<1	NA	<1	<1	<1	<1	<1	NA
Trans-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1	<1	<1	NA
1,1-dichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Cis-1,2-dichloroethene	1	600	<1	NA	<1	<1	<1	<1	<1	NA
Bromochloromethane	1	2500	<1	NA	<1	<1	<1	<1	<1	NA
Chloroform	1		<1	NA	2	2	<1	<1	2	NA
2,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichloroethane	1	30	<1	NA	<1	<1	<1	<1	<1	NA
1,1,1-trichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,1-dichloropropene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Cyclohexane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Carbon tetrachloride	1	30	<1	NA	<1	<1	<1	<1	<1	NA
Benzene	1	10	<1	NA	**3**	**3**	<1	<1	**3**	NA
Dibromomethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Trichloroethene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Bromodichloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
trans-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1	<1	<1	NA
cis-1,3-dichloropropene	1	1000	<1	NA	<1	<1	<1	<1	<1	NA
1,1,2-trichloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Toluene	1	8000	<1	NA	<1	<1	<1	<1	<1	NA
1,3-dichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Dibromochloromethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dibromoethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Tetrachloroethene	1	500	<1	NA	<1	<1	<1	<1	<1	NA
1,1,1,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Chlorobenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	NA
Ethylbenzene	1	3000	<1	NA	<1	<1	<1	<1	<1	NA
Bromoform	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
m+p-xylene	2	NSL	<2	NA	<2	<2	<2	<2	<2	NA
Styrene	1	300	<1	NA	<1	<1	<1	<1	<1	NA
1,1,2,2-tetrachloroethane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
o-xylene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2,3-trichloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Isopropylbenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Bromobenzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
n-propyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
2-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
4-chlorotoluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,3,5-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
Tert-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2,4-trimethyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,3-dichlorobenzene	1	200	<1	NA	<1	<1	<1	<1	<1	NA
Sec-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,4-dichlorobenzene	1	400	<1	NA	<1	<1	<1	<1	<1	NA
4-isopropyl toluene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichlorobenzene	1	15000	<1	NA	<1	<1	<1	<1	<1	NA
n-butyl benzene	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dibromo-3-chloropropane	1	NSL	<1	NA	<1	<1	<1	<1	<1	NA
1,2,4-trichlorobenzene	1	300	<1	NA	<1	<1	<1	<1	<1	NA
1,2,3-trichlorobenzene	1		<1	NA	<1	<1	<1	<1	<1	NA
Hexachlorobutadiene	1	7	<1	NA	<1	<1	<1	<1	<1	NA
Polycyclic Aromatic Hydrocarbons (PAHs)										
Naphthalene	0.2	NSL	<0.2	<0.2	<0.2	NA	<0.2	<0.2	<0.1	NA
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Fluorene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Phenanthrene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Anthracene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Fluoranthene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Pyrene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Chrysene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2	NA	<0.2	<0.2	<0.2	NA
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

TABLE G3
GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NHMRC ADWG 2011	WHO 2008	USEPA RSL Tapwater 2017	SAMPLES							
					MW1	MW1 (Lab Duplicate)	MW2	MW2 (Lab Duplicate)	MW3	SDUP1 (MW1)	SDUP2 (MW2)	SDUP2 (Lab Duplicate)
Total Recoverable Hydrocarbons (TRH)												
C_6-C_9 Aliphatics (assessed using F1)	10	-	100	-	<10	NA	<10	<10	<10	<10	<10	NA
>C_9-C_{14} Aliphatics (assessed using F2)	50	-	100	-	<50	[NT]	<50	NA	<50	<50	<50	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)												
Benzene	1	1	-	-	<1	NA	**3**	**3**	<1	<1	**3**	NA
Toluene	1	800	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Ethylbenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Total xylenes	2	600	-	-	<2	NA	<2	<2	<2	<2	<2	NA
Polycyclic Aromatic Hydrocarbons (PAHs)												
Naphthalene	1	-	-	6.1	<1	NA	<1	<1	<1	<1	<1	NA
Volatile Organic Compounds (VOCs), including chlorinated VOCs												
Dichlorodifluoromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	NA
Chloromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	NA
Vinyl Chloride	10	0.3	-	-	<10	NA	<10	<10	<10	<10	<10	NA
Bromomethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	NA
Chloroethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	NA
Trichlorofluoromethane	10	-	-	-	<10	NA	<10	<10	<10	<10	<10	NA
1,1-Dichloroethene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Trans-1,2-dichloroethene	1	60	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,1-dichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Cis-1,2-dichloroethene	1	60	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Bromochloromethane	1	250	-	-	<1	NA	**<1**	**<1**	<1	<1	**<1**	NA
Chloroform	1		-	-	<1	NA	**2**	**2**	<1	<1	**2**	NA
2,2-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichloroethane	1	3	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,1,1-trichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,1-dichloropropene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Cyclohexane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Carbon tetrachloride	1	3	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Benzene	1	1	-	-	<1	NA	**3**	**3**	<1	<1	**3**	NA
Dibromomethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Trichloroethene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Bromodichloromethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
trans-1,3-dichloropropene	1	100	-	-	<1	NA	<1	<1	<1	<1	<1	NA
cis-1,3-dichloropropene	1	100	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,1,2-trichloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Toluene	1	800	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,3-dichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Dibromochloromethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dibromoethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Tetrachloroethene	1	50	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,1,1,2-tetrachloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Chlorobenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Ethylbenzene	1	300	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Bromoform	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
m+p-xylene	2	-	-	-	<2	NA	<2	<2	<2	<2	<2	NA
Styrene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,1,2,2-tetrachloroethane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
o-xylene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2,3-trichloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Isopropylbenzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Bromobenzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
n-propyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
2-chlorotoluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
4-chlorotoluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,3,5-trimethyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Tert-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2,4-trimethyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,3-dichlorobenzene	1	20	-	-	<1	NA	<1	<1	<1	<1	<1	NA
Sec-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,4-dichlorobenzene	1	40	-	-	<1	NA	<1	<1	<1	<1	<1	NA
4-isopropyl toluene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dichlorobenzene	1	1500	-	-	<1	NA	<1	<1	<1	<1	<1	NA
n-butyl benzene	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2-dibromo-3-chloropropane	1	-	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2,4-trichlorobenzene	1	30	-	-	<1	NA	<1	<1	<1	<1	<1	NA
1,2,3-trichlorobenzene	1		-	-	<1	NA	<1	<1	<1	<1	<1	NA
Hexachlorobutadiene	1	7	-	-	<1	NA	<1	<1	<1	<1	<1	NA

Concentration above the SAC	**VALUE**
Concentration above the PQL	**Bold**
GIL >PQL	Red

TABLE QW1
GROUNDWATER QA/QC SUMMARY

		Dichlorodifluoromethane	Chloromethane	Vinyl Chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Trans-1,2-dichloroethene	1,1-dichloroethane	Cis-1,2-dichloroethene	Bromochloromethane	Chloroform	2,2-dichloropropane	1,2-dichloroethane	1,1,1-trichloroethane	1,1-dichloropropene	Cyclohexane	Carbon tetrachloride	Benzene	Dibromomethane	1,2-dichloropropane	Trichloroethene	Bromodichloromethane	trans-1,3-dichloropropene	cis-1,3-dichloropropene	1,1,2-trichloroethane	Toluene	1,3-dichloropropane	Dibromochloromethane	1,2-dibromoethane	Tetrachloroethene	1,1,1,2-tetrachloroethane	Chlorobenzene	Ethylbenzene	Bromoform	m+p-xylene	Styrene	1,1,2,2-tetrachloroethane	o-xylene	1,2,3-trichloropropane	Isopropylbenzene	Bromobenzene	n-propyl benzene	2-chlorotoluene	4-chlorotoluene	1,3,5-trimethyl benzene	Tert-butyl benzene	1,2,4-trimethyl benzene	1,3-dichlorobenzene	Sec-butyl benzene	1,4-dichlorobenzene	4-isopropyl toluene	1,2-dichlorobenzene	n-butyl benzene	1,2-dibromo-3-chloropropane	1,2,4-trichlorobenzene	Hexachlorobutadiene	1,2,3-trichlorobenzene
	PQL Envirolab SYD	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW1	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	SDUP1 (MW1)	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	MW2	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	SDUP2 (MW2)	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	2	nc	nc	nc	nc	nc	nc	3	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	nc	nc	nc	nc	nc	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Trip Blank	TB-W1 10/08/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Rinsate	FR-W1 10/08/2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

		TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD	*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
	PQL Envirolab VIC	*10*	*50*	*100*	*100*	*1.0*	*1.0*	*1.0*	*2.0*	*1.0*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
Intra	MW1	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	2	6	<1	<0.05	1	17
laboratory	SDUP1 (MW1)	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	<0.1	2	6	<1	<0.05	1	16
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.75	nc	2	6	nc	nc	1	16.5
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	0%	0%	nc	nc	0%	6%
Inter	MW2	<10	<50	<100	<100	3	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	<0.1	2	7	1	<0.05	2	23
laboratory	SDUP2 (MW2)	<10	<50	<100	<100	3	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	1	<0.1	2	7	1	3	25	<0.05
duplicate	MEAN	nc	nc	nc	nc	3	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1	nc	2	7	1	1.5125	13.5	11.75
	RPD %	nc	nc	nc	nc	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	0%	0%	0%	197%	170%	191%
Trip Blank	TB-W1 10/08/2023	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	<1	<1	<0.05	<1	<1
Field Rinsate	FR-W1 10/08/2023	89	<50	<100	<100	<1	<1	<1	<2	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<1	760	1	<0.05	<1	5
Trip Spike	TS-W1 10/08/2023	-	-	-	-	113%	104%	113%	103%	103%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Result outside of QA/QC acceptance criteria: Value

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

CT:	Contaminant Threshold
FTS:	Fluorotelomer sulfonic acid
NA:	Not Analysed
NC:	Not Calculated
NEMP	National Environmental Management Plan
NSL:	No Set Limit
PFAS	Per- and polyfluoroalkyl substances
PFHxS	Perfluorohexanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
TB:	Trip Blank
TCLP:	Toxicity Characteristics Leaching Procedure
Trip	Trip Spike
UCL:	Upper Level Confidence Limit on Mean Value

Table Specific Explanations:

Groundwater Ecology Tables:

- 95% refers to a concentration that has been derived to protect 95% of aquatic species
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

Waste Classification and TCLP Table:

- Data assessed using the Addendum to the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014) -October 2016

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TABLE PW1
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - ECOLOGY
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2018 Interim 95% Marine	SAMPLES						
			MW1	MW1 (Lab Duplicate)	MW2	MW3	SDUP1 (MW1)	SDUP2 (MW2)	SDUP2 (Lab Duplicate)
PFAS Compound									
Perfluorobutanesulfonic acid	0.1	NSL	**0.0082**	**0.0082**	**0.0089**	**0.01**	**0.0082**	**0.0055**	**0.0055**
Perfluoropentanesulfonic acid	0.1	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	**0.0085**	**0.0086**	**0.0068**	**0.013**	**0.0085**	**0.0065**	**0.0065**
Perfluoroheptanesulfonic acid	0.1	NSL	**0.001**	**0.001**	<0.001	<0.001	**0.001**	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	0.1	0.13	**0.042**	**0.039**	**0.015**	**0.047**	**0.041**	**0.015**	**0.015**
Perfluorodecanesulfonic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	0.2	NSL	**0.025**	**0.025**	**0.02**	**0.021**	**0.025**	**0.02**	**0.02**
Perfluoropentanoic acid	0.2	NSL	**0.04**	**0.041**	**0.01**	**0.044**	**0.039**	**0.01**	**0.01**
Perfluorohexanoic acid	0.1	NSL	**0.043**	**0.042**	**0.018**	**0.057**	**0.041**	**0.015**	**0.016**
Perfluoroheptanoic acid	0.1	NSL	**0.014**	**0.013**	**0.0063**	**0.019**	**0.013**	**0.0057**	**0.0059**
Trip	0.1	220	**0.027**	**0.025**	**0.012**	**0.027**	**0.026**	**0.014**	**0.013**
Perfluorononanoic acid	0.1	NSL	**0.003**	**0.003**	**0.002**	**0.007**	**0.003**	**0.002**	**0.002**
Perfluorodecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	**0.007**	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	0.5	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	0.5	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	5	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	0.1	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	0.1	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	0.1	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	0.1	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	1	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	1	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	1	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Positive PFHxS & PFOS	0.1	NSL	**0.051**	**0.048**	**0.022**	**0.061**	**0.05**	**0.022**	**0.022**
Total Positive PFOS & PFOA	0.1	NSL	**0.069**	**0.065**	**0.028**	**0.075**	**0.067**	**0.029**	**0.028**
Total Positive PFAS	0.1	NSL	**0.21**	**0.21**	**0.095**	**0.25**	**0.21**	**0.094**	**0.094**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

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TABLE PW2
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - HUMAN HEALTH
All results in µg/L unless stated otherwise.

	PQL	NEMP 2020	SAMPLES						
	Envirolab Services	Recreational	MW1	MW1 (Lab Duplicate)	MW2	MW3	SDUP1 (MW1)	SDUP2 (MW2)	SDUP2 (Lab Duplicate)
PFAS Compound									
Perfluorobutanesulfonic acid	0.1	NSL	**0.0082**	**0.0082**	**0.0089**	**0.01**	**0.0082**	**0.0055**	**0.0055**
Perfluoropentanesulfonic acid	0.1	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	**0.0085**	**0.0086**	**0.0068**	**0.013**	**0.0085**	**0.0065**	**0.0065**
Perfluoroheptanesulfonic acid	0.1	NSL	**0.001**	**0.001**	<0.001	<0.001	**0.001**	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	0.1	NSL	**0.042**	**0.039**	**0.015**	**0.047**	**0.041**	**0.015**	**0.015**
Perfluorodecanesulfonic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	0.2	NSL	**0.025**	**0.025**	**0.02**	**0.021**	**0.025**	**0.02**	**0.02**
Perfluoropentanoic acid	0.2	NSL	**0.04**	**0.041**	**0.01**	**0.044**	**0.039**	**0.01**	**0.01**
Perfluorohexanoic acid	0.1	NSL	**0.043**	**0.042**	**0.018**	**0.057**	**0.041**	**0.015**	**0.016**
Perfluoroheptanoic acid	0.1	NSL	**0.014**	**0.013**	**0.0063**	**0.019**	**0.013**	**0.0057**	**0.0059**
Trip	0.1	10	**0.027**	**0.025**	**0.012**	**0.027**	**0.026**	**0.014**	**0.013**
Perfluorononanoic acid	0.1	NSL	**0.003**	**0.003**	**0.002**	**0.007**	**0.003**	**0.002**	**0.002**
Perfluorodecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	**0.007**	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	0.5	NSL	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	0.5	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	5	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	0.1	NSL	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	0.1	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	0.1	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	0.1	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	1	NSL	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	1	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	1	NSL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Positive PFHxS & PFOS	0.1	2	**0.051**	**0.048**	**0.022**	**0.061**	**0.05**	**0.022**	**0.022**
Total Positive PFOS & PFOA	0.1	NSL	**0.069**	**0.065**	**0.028**	**0.075**	**0.067**	**0.029**	**0.028**
Total Positive PFAS	0.1	NSL	**0.21**	**0.21**	**0.095**	**0.25**	**0.21**	**0.094**	**0.094**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

TABLE PS1
SUMMARY OF PFAS CONCENTRATIONS IN SOIL - ECOLOGY
Units are µg/Kg unless stated otherwise.

	PQL Envirolab Services	NEMP 2020 Direct exposure All land use	BH1 0.2-0.3 Fill - Silty Sand	BH1 0.2-0.3 Lab Duplicate	BH2 0.15-0.3 Fill - Gravel	TP5 0.1-0.2 Fill - Silty Sand	BH6 0.1-0.3 Fill - Silty Sand	BH7 0-0.1 Fill - Silty Sand	BH8 0.1-0.2 Fill - Silty Sand	BH9 0.12-0.2 Fill - Silty Sand	TP10 0-0.1 Fill - Silty Sand	TP10 0-0.1 Lab Duplicate	SDUP3 (intra-lab) 0-0.1 Field Duplicate of BH7	SDUP5 (inter-lab) 0-0.1 Field Duplicate of TP10
PFAS Compound														
Perfluorobutanesulfonic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanesulfonic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	**0.2**	<0.1	<0.1	**0.4**	**0.6**	**0.3**	**0.2**
Perfluoroheptanesulfonic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	0.1	1000	<0.1	<0.1	<0.1	**0.8**	<0.1	**14.0**	**1.0**	**0.3**	**6.7**	**6.5**	**14.0**	**4.3**
Perfluorodecanesulfonic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	**2.0**	<0.2	<0.2	**0.2**	<0.2	**2.0**	**0.3**
Perfluorobutanoic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	**0.3**	<0.2	<0.2	<0.2	<0.2	**0.4**	<0.2
Perfluoropentanoic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	**0.8**	<0.2	<0.2	**0.3**	**0.4**	**0.9**	**0.2**
Perfluorohexanoic acid	0.1	NSL	<0.1	<0.1	<0.1	**0.2**	<0.1	**0.5**	<0.1	<0.1	**0.1**	**0.1**	**0.5**	<0.5
Perfluoroheptanoic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	**0.3**	<0.1	<0.1	<0.1	<0.1	**0.4**	<0.1
Trip	0.1	10,000	<0.1	<0.1	<0.1	**0.3**	<0.1	**0.9**	<0.1	<0.1	**0.3**	**0.4**	**1.0**	**0.2**
Perfluorononanoic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	**0.4**	<0.1	<0.1	**0.2**	**0.1**	**0.4**	**0.1**
Perfluorodecanoic acid	0.5	NSL	<0.5	<0.5	<0.5	**0.6**	<0.5	**2.0**	<0.5	<0.5	**0.8**	**0.8**	**2.0**	**0.7**
Perfluoroundecanoic acid	0.5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5	<0.5	**0.7**	<0.5
Perfluorododecanoic acid	0.5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	**1.0**	<0.5	<0.5	**1.0**	**1.0**	**1.0**	**1.0**
Perfluorotridecanoic acid	0.5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Perfluorotetradecanoic acid	5	NSL	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4:2 FTS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6:2 FTS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
8:2 FTS	0.1	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
10:2 FTS	0.1	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Perfluorooctane sulfonamide	1	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Methyl perfluorooctane sulfonamide	1	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Ethyl perfluorooctanesulfon amide	1	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Me perfluorooctanesulfonamid oethanol	1	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Et perfluorooctanesulfonamid oethanol	5	NSL	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
Total Positive PFHxS & PFOS	0.1	NSL	<0.1	<0.1	<0.1	**0.8**	<0.1	**14.0**	**1.0**	**0.3**	**7.1**	**7.0**	**15.0**	**4.5**
Total Positive PFOS & PFOA	0.1	NSL	<0.1	<0.1	<0.1	**1.1**	<0.1	**15.0**	**1.0**	**0.3**	**7.0**	**6.9**	**15.0**	**4.5**
Total Positive PFAS	0.1	NSL	<0.1	<0.1	<0.1	**1.9**	<0.1	**23.0**	**1.0**	**0.3**	**10.0**	**10.0**	**24.0**	**7.0**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

JKEnvironments

TABLE PS2
SUMMARY OF PFAS CONCENTRATIONS IN SOIL - HUMAN HEALTH
Units are µg/Kg unless stated otherwise.

	PQL Envirolab Services	NEMP 2020 Residential min. access	BH1 0.2-0.3 Fill - Silty Sand	BH1 0.2-0.3 Lab Duplicate	BH2 0.15-0.3 Fill - Gravel	TP5 0.1-0.2 Fill - Silty Sand	BH6 0.1-0.3 Fill - Silty Sand	BH7 0-0.1 Fill - Silty Sand	BH8 0.1-0.2 Fill - Silty Sand	BH9 0.12-0.2 Fill - Silty Sand	TP10 0-0.1 Fill - Silty Sand	TP10 0-0.1 Lab Duplicate	SDUP3 (intra lab) 0-0.1 Field Duplicate of BH7	SDUP5 (inter lab) 0-0.1 Field Duplicate of TP10
PFAS Compound														
Perfluorobutanesulfonic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanesulfonic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	**0.2**	<0.1	<0.1	**0.4**	**0.6**	**0.3**	**0.2**
Perfluoroheptanesulfonic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	0.1	NSL	<0.1	<0.1	<0.1	**0.8**	<0.1	**14.0**	**1.0**	**0.3**	**6.7**	**6.5**	**14.0**	**4.3**
Perfluorodecanesulfonic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	**2.0**	<0.2	<0.2	**0.2**	<0.2	**2.0**	**0.3**
Perfluorobutanoic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	**0.3**	<0.2	<0.2	<0.2	<0.2	**0.4**	<0.2
Perfluoropentanoic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	**0.8**	<0.2	<0.2	**0.3**	**0.4**	**0.9**	**0.2**
Perfluorohexanoic acid	0.1	NSL	<0.1	<0.1	<0.1	**0.2**	<0.1	**0.5**	<0.1	<0.1	**0.1**	**0.1**	**0.5**	<0.5
Perfluoroheptanoic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	**0.3**	<0.1	<0.1	<0.1	<0.1	**0.4**	<0.1
Trip	0.1	20,000	<0.1	<0.1	<0.1	**0.3**	<0.1	**0.9**	<0.1	<0.1	**0.3**	**0.4**	**1.0**	**0.2**
Perfluorononanoic acid	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	**0.4**	<0.1	<0.1	**0.2**	**0.1**	**0.4**	**0.1**
Perfluorodecanoic acid	0.5	NSL	<0.5	<0.5	<0.5	**0.6**	<0.5	**2.0**	<0.5	<0.5	**0.8**	**0.8**	**2.0**	**0.7**
Perfluoroundecanoic acid	0.5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5	<0.5	**0.7**	<0.5
Perfluorododecanoic acid	0.5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	**1.0**	<0.5	<0.5	**1.0**	**1.0**	**1.0**	**1.0**
Perfluorotridecanoic acid	0.5	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Perfluorotetradecanoic acid	5	NSL	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4:2 FTS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6:2 FTS	0.1	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
8:2 FTS	0.1	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
10:2 FTS	0.1	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Perfluorooctane sulfonamide	1	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Methyl perfluorooctane sulfonamide	1	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Ethyl perfluorooctanesulfon amide	1	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Me perfluorooctanesulfonamid oethanol	1	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Et perfluorooctanesulfonamid oethanol	5	NSL	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
Total Positive PFHxS & PFOS	0.1	2,000	<0.1	<0.1	<0.1	**0.8**	<0.1	**14.0**	**1.0**	**0.3**	**7.1**	**7.0**	**15.0**	**4.5**
Total Positive PFOS & PFOA	0.1	NSL	<0.1	<0.1	<0.1	**1.1**	<0.1	**15.0**	**1.0**	**0.3**	**7.0**	**6.9**	**15.0**	**4.5**
Total Positive PFAS	0.1	NSL	<0.1	<0.1	<0.1	**1.9**	<0.1	**23.0**	**1.0**	**0.3**	**10.0**	**10.0**	**24.0**	**7.0**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

JKEnvironments

TABLE PS3
SUMMARY OF PFAS CONCENTRATIONS IN SOIL - WASTE CLASSIFICATION
Units are µg/Kg unless stated otherwise.

	PQL Envirolab Services	SCC1	SCC2	BH1 0.2-0.3 Fill - Silty Sand	BH1 0.2-0.3 Lab Duplicate	BH2 0.15-0.3 Fill - Gravel	TP5 0.1-0.2 Fill - Silty Sand	BH6 0.1-0.3 Fill - Silty Sand	BH7 0-0.1 Fill - Silty Sand	BH8 0.1-0.2 Fill - Silty Sand	BH9 0.12-0.2 Fill - Silty Sand	TP10 0-0.1 Fill - Silty Sand	TP10 0-0.1 Lab Duplicate	SDUP3 (intra-lab) 0-0.1 Field Duplicate of BH7	SDUP5 (inter lab) 0-0.1 Field Duplicate of TP10
PFAS Compound															
Perfluorobutanesulfonic acid	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanesulfonic acid	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.4	0.6	0.3	0.2
Perfluoroheptanesulfonic acid	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	0.1	NSL	NSL	<0.1	<0.1	<0.1	0.8	<0.1	14.0	1.0	0.3	6.7	6.5	14.0	4.3
Perfluorodecanesulfonic acid	0.2	NSL	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	2.0	<0.2	<0.2	0.2	<0.2	2.0	0.3
Perfluorobutanoic acid	0.2	NSL	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	0.4	<0.2
Perfluoropentanoic acid	0.2	NSL	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	<0.2	<0.2	0.3	0.4	0.9	0.2
Perfluorohexanoic acid	0.1	NSL	NSL	<0.1	<0.1	<0.1	0.2	<0.1	0.5	<0.1	<0.1	0.1	0.1	0.5	<0.5
Perfluoroheptanoic acid	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	0.4	<0.1
Trip	0.1	18,000	72,000	<0.1	<0.1	<0.1	0.3	<0.1	0.9	<0.1	<0.1	0.3	0.4	1.0	0.2
Perfluorononanoic acid	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	0.2	0.1	0.4	0.1
Perfluorodecanoic acid	0.5	NSL	NSL	<0.5	<0.5	<0.5	0.6	<0.5	2.0	<0.5	<0.5	0.8	0.8	2.0	0.7
Perfluoroundecanoic acid	0.5	NSL	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
Perfluorododecanoic acid	0.5	NSL	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	1.0	<0.5	<0.5	1.0	1.0	1.0	1.0
Perfluorotridecanoic acid	0.5	NSL	NSL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Perfluorotetradecanoic acid	5	NSL	NSL	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4:2 FTS	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6:2 FTS	0.1	NSL	NSL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
8:2 FTS	0.1	NSL	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
10:2 FTS	0.1	NSL	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Perfluorooctane sulfonamide	1	NSL	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Methyl perfluorooctane sulfonamide	1	NSL	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Ethyl perfluorooctanesulfon amide	1	NSL	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Me perfluorooctanesulfonamid oethanol	1	NSL	NSL	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-Et perfluorooctanesulfonamid oethanol	5	NSL	NSL	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	NSL	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1
Total Positive PFHxS & PFOS	0.1	1800	7,200	<0.1	<0.1	<0.1	0.8	<0.1	14.0	1.0	0.3	7.1	7.0	15.0	4.5
Total Positive PFOS & PFOA	0.1	NSL	NSL	<0.1	<0.1	<0.1	1.1	<0.1	15.0	1.0	0.3	7.0	6.9	15.0	4.5
Total Positive PFAS	0.1	NSL	NSL	<0.1	<0.1	<0.1	1.9	<0.1	23.0	1.0	0.3	10.0	10.0	24.0	7.0

Result above SCC1 Criteria **Bold**
Result above SCC2 Criteria **Bold**

JKEnvironments

TABLE PQS1
SUMMARY OF PFAS FIELD QA/QC IN SOIL
Units are µg/Kg unless stated otherwise.

			Perfluorobutanesulfonic acid	Perfluoropentanesulfonic acid	Perfluorohexanesulfonic acid - PFHxS	Perfluoroheptanesulfonic acid	Perfluorooctanesulfonic acid PFOS	Perfluorodecanesulfonic acid	Perfluorobutanoic acid	Perfluoropentanoic acid	Perfluorohexanoic acid	Perfluoroheptanoic acid	Perfluorooctanoic acid PFOA	Perfluorononanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctanesulfon amide	N-Me perfluorooctanesulfonamid oethanol	N-Et perfluorooctanesulfonamid oethanol	MePerfluorooctanesulf-amid oacetic acid	EtPerfluorooctanesulf-amid oacetic acid	Total Positive PFHxS & PFOS	Total Positive PFOS & PFOA	Total Positive PFAS
PQL Envirolab			*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.5*	*0.5*	*0.5*	*0.5*	*5*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*1*	*1*	*1*	*5*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
PQL Envirolab VIC			*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.5*	*0.5*	*0.5*	*0.5*	*5*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*1*	*1*	*1*	*5*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	BH7	0-0.1	0.1	<0.1	0.2	<0.1	14	2	0.3	0.8	0.5	0.3	0.9	0.4	2	0.8	1	<0.5	<5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<5	<0.2	<0.2	14	15	23
	SDUP3 (intra-lab)	0-0.1	<0.1	<0.1	0.3	<0.1	14	2	0.4	0.9	0.5	0.4	1	0.4	2	0.7	1	<0.5	<5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<5	<0.2	<0.2	15	15	24
	MEAN		0.075	nc	0.25	nc	14	2	0.35	0.85	0.5	0.35	0.95	0.4	2	0.75	1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	14.5	15	23.5
	RPD %		67%	nc	40%	nc	0%	0%	29%	12%	0%	29%	11%	0%	0%	13%	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	7%	0%	4%
Inter laboratory duplicate	TP10	0-0.1	<0.1	<0.1	0.4	<0.1	6.7	0.2	<0.2	0.3	0.1	<0.1	0.3	0.2	0.8	<0.5	1	<0.5	<5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<5	<0.2	<0.2	7.1	7	10
	SDUP5 (inter-lab)	0-0.1	<0.1	<0.1	0.2	<0.1	4.3	0.3	<0.2	0.2	<0.5	<0.1	0.2	0.1	0.7	<0.5	1	<0.5	<5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<5	<1	<1	4.5	4.5	7
	MEAN		nc	nc	0.3	nc	5.5	0.25	nc	0.25	0.075	nc	0.25	0.15	0.75	nc	1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	5.8	5.75	8.5
	RPD %		nc	nc	67%	nc	44%	40%	nc	40%	67%	nc	40%	67%	13%	nc	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	45%	43%	35%
Trip Blank	TB-S1	31/07/2023	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<5	<0.2	<0.2	<0.1	<0.1	<0.1
	31/07/2023																																
Trip Blank	TB-S2	1/08/2023	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<5	<0.1	<0.1	<0.2	<0.2	<1	<1	<1	<1	<5	<0.2	<0.2	<0.1	<0.1	<0.1
	1/08/2023																																
Field Rinsate	FR1-SPT	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1	<0.5	<0.01	<0.01	<0.02	<0.02	<0.1	<0.05	<0.1	<0.05	<0.5	<0.02	<0.02	<0.01	<0.01	<0.01
	31/07/2023																																
Field Rinsate	FR2-HA	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1	<0.5	<0.01	<0.01	<0.02	<0.02	<0.1	<0.05	<0.1	<0.05	<0.5	<0.02	<0.02	<0.01	<0.01	<0.01
	1/08/2023																																

Result outside of QA/QC acceptance criteria Value

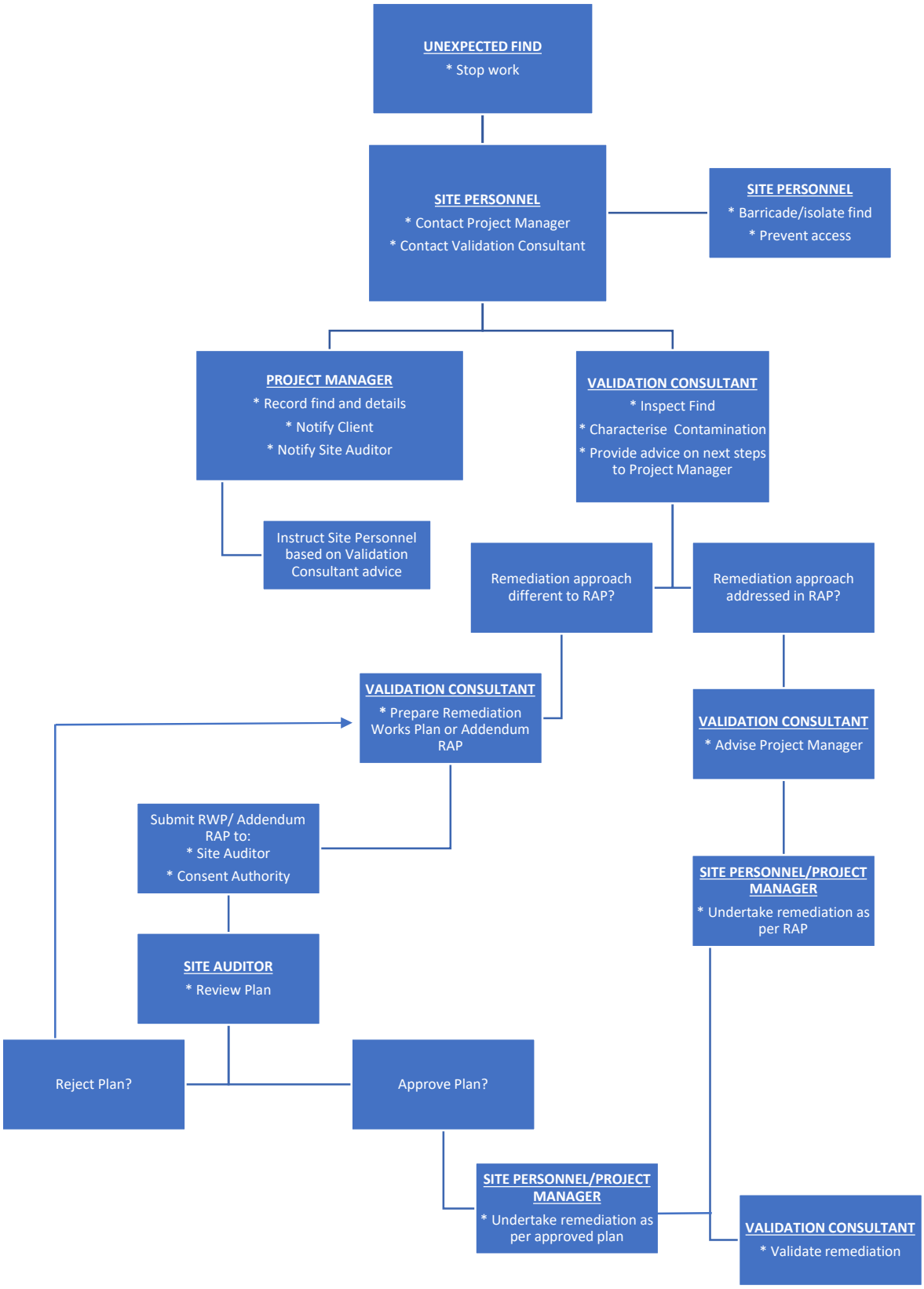
TABLE
SUMMARY OF PFAS FIELD QA/QC IN GROUNDWATER
Units are µg/L unless stated otherwise.

		Perfluorobutanesulfonic acid	Perfluoropentanesulfonic acid	Perfluorohexanesulfonic acid - PFHxS	Perfluoroheptanesulfonic acid	Perfluorooctanesulfonic acid PFOS	Perfluorodecanesulfonic acid	Perfluorobutanoic acid	Perfluoropentanoic acid	Perfluorohexanoic acid	Perfluoroheptanoic acid	Perfluorooctanoic acid PFOA	Perfluorononanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctanesulfon amide	N-Me perfluorooctanesulfonamid oethanol	N-Et perfluorooctanesulfonamid oethanol	MePerfluorooctanesulf-amid oacetic acid	EtPerfluorooctanesulf-amid oacetic acid	Total Positive PFHxS & PFOS	Total Positive PFOS & PFOA	Total Positive PFAS
PQL Envirolab		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.5*	*0.5*	*0.5*	*0.5*	*5*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*1*	*1*	*1*	*5*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.5*	*0.5*	*0.5*	*0.5*	*5*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*1*	*1*	*1*	*5*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	MW1	0.0082	<0.001	0.0085	0.001	0.042	<0.002	0.025	0.04	0.043	0.014	0.027	0.003	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.051	0.069	0.21
	SDUP1 (MW1)	0.0082	<0.001	0.0085	0.001	0.041	<0.002	0.025	0.039	0.041	0.013	0.026	0.003	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.05	0.067	0.21
	MEAN	0.0082	nc	0.0085	0.001	0.0415	nc	0.025	0.0395	0.042	0.0135	0.0265	0.003	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.0505	0.068	0.21
	RPD %	0%	nc	0%	0%	2%	nc	0%	3%	5%	7%	4%	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	2%	3%	0%
Inter laboratory duplicate	MW2	0.0089	<0.001	0.0068	<0.001	0.015	<0.002	0.02	0.01	0.018	0.0063	0.012	0.002	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.022	0.028	0.095
	SDUP2 (MW2)	0.0055	<0.001	0.0065	<0.001	0.015	<0.002	0.02	0.01	0.015	0.0057	0.014	0.002	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.022	0.029	0.094
	MEAN	0.0072	nc	0.0067	nc	0.015	nc	0.02	0.01	0.0165	0.006	0.013	0.002	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.022	0.0285	0.0945
	RPD %	47%	nc	5%	nc	0%	nc	0%	0%	18%	10%	15%	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	4%	1%
Trip Blank	TB-W1 10/08/2023	NA	NA	<0.0002	NA	<0.0002	NA	NA	NA	NA	NA	<0.0002	NA	NA	NA	NA	NA	NA	NA	<0.0004	<0.0004	NA	NA	NA	NA	NA	NA	NA	NA	<0.0002	<0.0002	<0.0002
Field Rinsate	FR-W1 10/08/2023	NA	NA	<0.0002	NA	<0.0002	NA	NA	NA	NA	NA	<0.0002	NA	NA	NA	NA	NA	NA	NA	<0.0004	<0.0004	NA	NA	NA	NA	NA	NA	NA	NA	<0.0002	<0.0002	<0.0002

Result outside of QA/QC acceptance criteria Value

Appendix D: JKE Unexpected Finds Procedure

UNEXPECTED FINDS PROTOCOL FLOW-CHART



Appendix E: Guidelines and Reference Documents

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NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

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