RAMBOLL

ENVIRONMENT
& HEALTH

15 October 2024

Homes NSW
Attn: Andrew McConnell
4 Parramatta Square, 12 Darcy Street
Parramatta NSW 2150

By email: andrew.mcconnell@homes.nsw.gov.au

Dear Andrew

RE: INTERIM AUDIT ADVICE LETTER NO. 1 - REMEDIAL ACTION PLAN, 792-794 BOTANY ROAD AND 33-37 HENRY KENDALL CRESCENT, MASCOT NSW

1. INTRODUCTION

As a NSW Environment Protection Authority (EPA) accredited Contaminated Sites Auditor, on behalf of Homes NSW, I am conducting an Audit (LW-059) under the NSW *Contaminated Land Management Act 1997* (CLM Act) in relation to the Homes NSW Mascot Project located at 792-794 Botany Road and 33-37 Henry Kendall Crescent, Mascot, NSW. This initial review has been undertaken to provide an independent review of the suitability and appropriateness of a Remedial Action Plan (RAP) and the investigations undertaken at the site to date.

It is understood that Homes NSW intend to submit a State Significant Development application (SSD-72393459) for the construction of two residential apartment buildings, with a total of 126 social and affordable housing apartments over three to a maximum of eight residential storeys with on-grade car parking on the ground floor, and communal open space on the first floor. Planning Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning, Housing and Infrastructure on 24 July 2024 included the requirement for assessment of the potential for soil and groundwater contamination in accordance with Chapter 4 of SEPP (Resilience and Hazards) 2021 and "*demonstrate that the site is suitable (or will be suitable, after remediation) for the development.*". The Audit is currently non-statuary, however, may become statuary if it becomes a condition under a future development consent.

The objective of this interim audit advice (IAA) letter (IAA#1) is to document the audit review of the contamination investigations undertaken at the site and the suitability and appropriateness of the RAP which will be submitted to support the SSD submission in accordance with the SEARs.

IAA#1 is based on a review of the documents listed below, discussions with

Ramboll Australia Pty Ltd
Level 3, 100 Pacific Highway
PO Box 560
North Sydney NSW 2060

T +61 2 9954 8100
www.ramboll.com

Ref: 318002074

Audit Number: LW-059

Ramboll Australia Pty Ltd
ACN 095 437 442
ABN 49 095 437 442

Homes NSW and Alliance Geotechnical Pty Ltd (Alliance) who undertook the intrusive investigations and prepared the RAP, and observations made during a site inspection on 26 June 2024.

The reports reviewed were:

- 'Preliminary Site Investigation Report, 776 & 792-794 Botany Road & 33-37 Henry Kendall Crescent, Mascot, NSW 2020', dated 18 May 2023, Alliance (**the PSI**)
- 'Geotechnical Investigation & Acid Sulfate Soil Assessment, 776, 792-794 Botany Road & 33-37 Henry Kendall Crescent, Mascot', dated 29 April 2024, STS Geotechnics Pty Ltd (STS) (**the ASS Assessment**)
- 'Detailed Site Investigation Report, 792-794 Botany Road and 33-37 Henry Kendall Crescent, Mascot, NSW' dated 10 October 2024 (and draft versions dated 5 August and 20 September 2024), Alliance (**the DSI**)
- 'Remedial Action Plan, 792-794 Botany Road and 33-37 Henry Kendall Crescent, Mascot, NSW' dated 10 October 2024 (and draft version dated 20 September 2024), Alliance (**the RAP**)

I have reviewed the key documents against the requirements of guidelines made or approved under Section 105 of the CLM Act, including the following:

- Chapter 4 Remediation of Land in the Resilience and Hazards State Environment Planning Policy (SEPP) 2021 (R&H SEPP, formerly known as SEPP 55) and NSW Department of Urban Affairs and Planning and NSW EPA (1998) '*Managing Land Contamination, Planning Guidelines SEPP 55 - Remediation of Land*'
- NSW EPA (2017) '*Guidelines for the NSW Site Auditor Scheme (3rd Edition)'.*
- NSW EPA (2020) '*Contaminated Land Guidelines, Consultants Reporting on Contaminated Land'.*
- NSW EPA (2022) *'Contaminated Land Guidelines, Sampling design part 1 – application'* and *'Contaminated Land Guidelines, Sampling design part 2 – interpretation'.*
- National Environment Protection Council (NEPC) '*National Environment Protection (Assessment of Site Contamination) Measure 1999',* as Amended 2013 (NEPM 2013).
- Australia and New Zealand Heads of EPAs (HEPA 2020) *'PFAS National Environmental Management Plan, Version 2.0'* (NEMP).

2. SITE DETAILS

2.1 Location

The site location is shown in **Attachment 1** and the site details are as follows:

Street address:	792-794 Botany Road and 33-37 Henry Kendall Crescent, Mascot, NSW, NSW 2020
Identifier:	Lot A to E Deposited Plan (DP) 36472
Local Government:	Bayside Council
Owner:	Homes NSW
Site Area:	Approximately 4,904 m^2
Zoning:	R4 High Density Residential under Bayside Local Environmental Plan (LEP) 2021

The boundaries of the site are well defined by boundary fencing and adjoining properties and streets.

2.2 Adjacent Uses

The site is located within an area of mixed land uses including residential, commercial and open space. The surrounding site use includes:

North: Ambulance station to the northeast, including a former underground fuel storage tank (UST), and low and medium density residential land uses to northwest and further north

East: Botany Road then commercial and residential land uses

South: Coward Street then Mascot Memorial Park

West: Henry Kendall Crescent then low and medium density residential land uses

2.3 Site Condition

Based on observations made during walkover inspections undertaken for the PSI (February 2022) and DSI (June 2024), Alliance reported the following site conditions:

- The site was occupied by five occupied two storey residential buildings which were tenanted at the time of the inspection.
- Many of the properties contained adjoining outbuilding/sheds that were used as a laundry room and/or storage area for general household materials.
- There was no visual evidence of chemical handling and/or storage observed on the site however, there was visual evidence of empty paint containers observed in the northeast portion of Lot D located in the southeastern portion of the site.

Similar site conditions were observed by the Auditor during a site inspection on 26 June 2024 with the following also noted:

- The site was occupied by residential buildings surrounded by grassed garden areas and concrete driveway and footpaths. The grass cover was poor in some areas with the underlying silty sand profile visible. The buildings were tenanted which limited access to some areas.
- Several mature trees were present around the perimeter of the site with some mounded areas.
- Concrete scarring was observed in the driveway of the ambulance station offsite to the northeast in the area of the potential UST, no fill points were observed.

- Areas of stockpiled rubbish and household items were observed but no significant sources of contamination were identified.

2.4 Proposed Development

The proposed development comprises the demolition of existing buildings and construction of two new apartment buildings with 126 social and affordable housing dwellings over three to maximum eight residential storeys, with on-grade car parking on the ground floor, and communal open space on the first floor. Based on the supplied development plans, the ground floor slab will occupy the majority of the site as shown in **Attachment 2** with landscaped setback areas between the building and the site boundaries. Several mature trees are to be retained on the site boundaries.

For the purposes of this audit, the most conservative 'residential with gardens/accessible soil' land use scenario has been adopted based on the proposed residential use with communal landscaped areas.

3. SITE HISTORY

Alliance undertook a review of site history during the PSI which was based on aerial photographs, site photographs, Certificates of Title and a search of records held by SafeWork NSW for storage of Dangerous Goods. The PSI included assessment of the ambulance station site to the north east, identified as Lot 1 DP36486. Based on review of the PSI the Auditor has summarised the site history as follows:

- The existing five residential dwellings were constructed between 1951 and 1961, with the existing layout visible in historical aerial photographs since 1961. Prior to this time the site was generally open space with scattered structures across the southern portion of the site visible in aerial photographs from 1943 and 1951.
- Certificates of title noted that the site was owned by private individuals between 1925 and 1946 and then by the Municipality of Mascot Council between 1946 and 1951. Ownership then passed to The Housing Commission of New South Wales now Homes NSW. Alliance reported potential uses during the period of ownership by Council from 1946 to 1951 to include a Council works depot and storage of waste.
- Adjacent land to the northeast has been an ambulance station since 1957. Alliance completed a search of records held by SafeWork NSW to store Dangerous Goods during the PSI and identified that applications were made in May 1962, May 1977 and May 1988 for storage of petroleum hydrocarbons (petrol) in what was variously described as a 500 gallon, 2,300 or 2,500 L UST on the ambulance station. A letter dated 6 September 1999 was also identified that indicated that the 2,000 L UST had been decommissioned through backfilling with sand and removal of the dispensing pump. Based on the search results, Alliance concluded that, despite the variation in tank volume descriptions, the records likely related to one tank, rather than multiple tanks and that a decommissioned UST with associated pipework is likely to be located beneath the driveway at the east of the ambulance station, located offsite.
- Areas surrounding the site were gradually developed during the 1940s and 1950s as a residential area with commercial land uses to the east along Botany Road.

Alliance also undertook a preliminary desktop screening of the potential for per- and poly- fluoroalkyl substances (PFAS) to be on the site during the PSI. Alliance noted that there was a fire station located approximately 150 m to the southeast of the site. Based on Alliance's understanding of groundwater flow direction, Alliance did not consider this fire station warranted further assessment. No evidence of potential PFAS uses were identified.

Alliance reported in the PSI that the site had not been notified as a contaminated site under the CLM Act. There were also no records for the site or adjacent sites for any licensed activities under the

Protection of the Environment Operations Act 1997 (POEO Act). Alliance reported that a former shell service station located at 746 Botany Road, Mascot was present on the NSW EPA online contaminated land record of notices. This site is located approximately 125 m to the north of the site and was reported as being formerly regulated under the CLM Act. In addition, Alliance identified a landfill (Aston) located at 551-559 Gardeners Road, Mascot, located approximately 300m to the north of the site, which was reported as being under assessment.

3.1 Auditor's Opinion

In the Auditor's opinion, the site history provides an adequate indication of past activities. There is limited evidence based on aerial photographs to suggest the site has been used as a Council works depot or for storage of waste as suggested by Alliance in the PSI. The site has been used for residential purposes since the later 1950s and the most likely sources of contamination at the site are associated with importation of fill of unknown origin to accommodate the existing residential buildings, the historical use and weathering of structures containing hazardous building materials such as asbestos and lead based paint, historical use of pesticides in the vicinity of, and beneath structures and potential onsite migration of contaminated groundwater from offsite sources including the former UST on the adjoining ambulance station property and the former service station and landfill located to the north of the site.

4. CONTAMINANTS OF CONCERN

Based on the site history review and walkover inspection results, Alliance identified 13 areas of environmental concern (AECs) (AEC01 to AEC13) across the site and provided a list of the contaminants of concern and potentially contaminating activities in the PSI. The Auditor has summarised the land contaminating activities and associated contaminants of concern identified by Alliance in **Table 4.1**.

Table 4.1: Contaminants of Concern

Activity	Potential Contaminants
Onsite - Uncontrolled filling, potential use as council depot and waste storage	Metals, total petroleum hydrocarbons (TPH); benzene, toluene, ethyl benzene and xylenes (BTEX); polycyclic aromatic hydrocarbons (PAH); organochlorine pesticides (OCP); polychlorinated biphenyls (PCB) and asbestos
Onsite - Uncontrolled demolition, use of hazardous building materials and historic termite treatment	Metals, pesticides, asbestos and PCBs
Offsite – decommissioned UST and former bowser in adjacent ambulance station	Lead, TPH, BTEX, Methyl tert-butyl ether (MTBE) and PAHs
Offsite - Former service station located approximately 125m to the north of the site.	Lead, TPH, BTEX and PAHs
Offsite – Listed landfill contaminated site, located approximately 300m to the north of the site.	Metals, TPH, BTEX, PAHs, pesticides, PCBs, PFAS, chlorinated hydrocarbons and hazardous ground gas (methane, carbon dioxide, hydrogen sulphide).

The numbering of the 13 AEC identified by Alliance in the PSI was revised in the DSI and RAP. The RAP identifies 18 AEC (AEC01-AEC07 and AEC10 to AEC 20) relating to data gap areas requiring characterisation of soils for contaminants associated with potential uncontrolled filling, uncontrolled demolition, use of hazardous building materials, historic termite treatment and potential use as a council depot with contaminants identified as petroleum hydrocarbons, pesticides, PCBs, metals and asbestos.

Following review of groundwater flow direction (determined to be to the northwest), Alliance considered in the DSI that two of the potential offsite sources of contamination, the former service station and landfill, were located either down or cross gradient of the site and did not pose a potential risk of contamination at the site.

4.1 Auditor's Opinion

The Auditor considers that the analyte list used by Alliance adequately reflects the site history and condition. Use of uncontrolled fill and hazardous building materials has the potential to have contaminated the site. The potential for use as a council depot to have impacted the site is considered less likely based on review of historical aerial photographs and short duration of time the site was owned by council. Additionally, the decommissioned UST on the ambulance station adjacent to the northern boundary has potential to have contaminated the north-eastern portion of the site through migration of petroleum hydrocarbons in groundwater and/or soil vapour.

A desktop screening for sources of PFAS was undertaken by Alliance which did not identify PFAS related land contamination risks at the site, however, PFAS was identified as a potential contaminant associated with the offsite landfill. The groundwater analytical suite was limited and did not include PFAS. This is considered acceptable given the low potential for PFAS contamination at the site and in the context of the remaining groundwater results (no contaminant detections, refer **Section 10**).

5. STRATIGRAPHY AND HYDROGEOLOGY

5.1 Stratigraphy

Alliance reviewed geological maps and reported that the site is underlain by Quaternary aged deposits which typically comprises medium to fine grained 'marine' sand with podsols.

14 sample locations (BH01 to BH11, MW01, SV01 and SV02) were undertaken by Alliance during the DSI (**Attachment 3**). The sub-surface profile of the site has been summarised by the Auditor in **Table 5.1.**

Table 5.1: Stratigraphy

Depth (mbgl)	Subsurface Profile
0.0 – 1.0	Fill material or topsoil comprising sand, silty sand and clayey sand was identified in all locations from the surface. Anthropogenic inclusions were identified within fill in approximately 50% of sampling locations and included brick, concrete, plastic, glass and tile. The was no discernible pattern to sample locations with anthropogenic inclusions. SV02 was terminated in fill at a depth of 1 mbgl.
0.2 – 1.0 to depth (4.5 mbgl)	Natural alluvial sands were identified beneath the fill in all locations, except SV02, and extended to the termination depths of the sample location

mbgl – metres below ground level

Five boreholes (BH1 to BH5) were undertaken by STS for the ASS Assessment which extended to depths between 29.5 and 37.4 mbgl. Similar subsurface conditions were identified by STS, however natural sandy clay and clay were encountered at depths of approximately 20 mbgl overlying weathered sandstone bedrock.

Alliance reported that published acid sulfate soils (ASS) risk mapping indicates that the site is located within an area mapped as L4 (low probability of ASS at depths >3 mbgl). STS reported in the ASS Assessment that the Bayside Council LEP indicates that the site is located within a Class 4 ASS area. In Class 4 areas "*works more than 2 metres below the natural ground surface and works by which the water table is likely to be lowered more than 2 metres below the natural ground surface*" require assessment. Alliance completed field assessment for ASS during the DSI and concluded that, based on a weight of evidence approach using field observations and field and laboratory results "*the soils assessed are naturally occurring acidic soils, and not acid sulfate soils that require management*".

5.2 Hydrogeology

Alliance undertook a search for registered bores within a 500 m radius of the site during the PSI which identified 28 bores registered for a range of purposes including domestic, dewatering, remediation, monitoring and recreational purposes. The Auditor undertook a search for registered bores in October 2024 which identified the same 28 registered bores within a 500 m radius of the site. Two bores registered for domestic purposes were located to the west and northwest within 50 and 90 m of the site, respectively. In addition, a cluster of wells, approximately 100 m north of the site (assumed to be monitoring wells within the former shell service station discussed in **Section 3**), were registered for dewatering, remediation and monitoring purposes. Where information was available, the standing water level (SWL) for wells within 150 m of the site was reported between 1.7 and 4 mbgl in sand.

STS installed groundwater monitoring wells in two boreholes (STS-BH1 and STS-BH5 on **Attachment 3**) during the ASS Assessment while Alliance installed one groundwater monitoring well (MW101) during the DSI. In April 2024, STS measured the SWLs in the two wells to be 1.5 mbgl. During the DSI, Alliance measured the SWLs in the three wells at between 1.05 (BH1) and 1.27 (MW101) mbgl. Based on the measured SWLs, Alliance inferred the groundwater flow direction to be towards the northwest.

The site is located within Area 2 of the Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024 which prohibits all extraction of groundwater by residents for domestic purposes. Holders of industrial groundwater extraction licences listed in the Order and those using water for non-domestic purposes in Area 2 must also comply with conditions and requirements.

5.3 Auditor's Opinion

The Auditor considers that the site stratigraphy and hydrogeology are sufficiently well known for the purpose of remedial planning. The heterogeneity and extent of fill material has potential to impact the remediation of the site. Extraction of groundwater for beneficial use is restricted at the site under the Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024.

6. EVALUATION OF QUALITY ASSURANCE AND QUALITY CONTROL

The Auditor has assessed the overall quality of the data by review of the information presented in the referenced reports. The data sources are summarised in **Table 6.1**. Sample locations are shown on **Attachment 3**.

Table 6.1: Summary of Investigations

Investigations	Field Investigations	Analytical Data Obtained
DSI (Alliance, 2024) *Fieldwork date: June 2024*	14 soil sample locations (BH01 to BH11, MW01, SV01 and SV02) generally spaced for site coverage and targeting identified AEC which were accessible. Installation of one groundwater monitoring well (MW101) and two soil vapour wells (SV01 and SV02) targeted to the north-eastern portion of the site near the boundary where the offsite UST was located. Groundwater sampling from two wells (STS-BH1 and STS-BH5) installed by STS during the ASS Assessment and the newly installed well (MW101). Collection of two soil vapour samples (SV01 and SV02) using laboratory prepared Summa canisters.	Soil: • Metals, OCP and PCBs and PAHs (15 samples) • TRH and BTEX (14 samples) • PAHs (12 samples) • PFAS (4 samples) • Asbestos (presence/absence) (50 g sample) (11 samples) • ASS Field pH (40 samples) • ASS Chromium reducible sulfur (12 samples) Groundwater (three

		samples): • TRH, BTEX, VOCs and volatile chlorinated hydrocarbons (VCHs) Soil Vapour (two samples): • Isopropanol (IPA), TPH, BTEX and VCHs

The Auditor's assessment of data quality follows in **Tables 6.2 and 6.3**.

Table 6.2: QA/QC – Sampling and Analysis Methodology Assessment

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
Data Quality Objectives (DQO) Alliance defined specific DQOs in the DSI in accordance with the seven step process outlined in Schedule B2 of NEPM 2013. The following decisions for the DSI were identified in the DQOs: • Is the data collected for the project suitable for assessing land contamination exposure risks? • Do the detected concentrations of contaminants of potential concern identified in the conceptual site model (CSM) present an unacceptable exposure risk to the receptors identified in the CSM based on the proposed land use scenario? • Is the site suitable, in the context of land contamination, for the proposed land use scenario? • Is the data collected for the project, suitable for assessing acid sulfate soil risks at the site? • Do acid sulfate soils at the site (if identified) require management?	The DQOs identified in the DSI were considered adequate.
Sampling pattern and locations *Soil:* The sampling strategy adopted in the DSI assumed a basement construction across the central portion of the site which would remove fill and natural soils to depths of 3.0 m in this area, and hence limited sampling within the basement footprint was completed. Sample locations were targeted to characterise soils in areas where soils were to be retained, subject to access limitations. In addition, soil conditions adjacent to the site boundary with the ambulance station in the northeast were targeted to assess if soils had been impacted by the former UST located off-site to the northeast. The various fill units were generally targeted for sampling. *Groundwater and Soil Vapour:* targeted to the north-eastern portion of the site near the boundary where the offsite former UST was identified.	Sampling completed during the DSI focussed on areas outside of the basement footprint proposed at the time and outside of the existing building footprints. There are spatial soil sampling data gaps in the central portion of the site and below the existing building footprints. Further assessment of soils conditions in these areas is proposed in the RAP following site demolition (**Section 12**) to address these data gaps and confirm soils to be retained onsite are suitable. This is acceptable. The soil data available is sufficient to inform likely remediation requirements. The location of groundwater and soil vapour sample locations is adequate to assess potential contamination associated with the off-site UST.
Sampling density *Soil:* The sampling density of 14 locations over approximately 0.48 ha is marginally above the minimum recommended (13 for a 0.5 ha site) by EPA (2022) *Sampling Design Part 1 - Application*. However, samples were targeted to accessible areas around the site boundaries and data gaps are present below building footprints and within the central portion of the site as discussed above. The sampling density for asbestos was not in accordance with NEPM (2013) (Schedule B1) which recommends double density sampling if asbestos is likely to be present. *Groundwater*: A total of three groundwater wells were installed	The sampling densities are considered adequate for preliminary remediation planning purposes noting that further soil investigation is proposed in the RAP to target soils in building and shed footprints which were inaccessible and characterise soils in the area previously proposed to be excavated for construction of a basement. The density of groundwater wells is sufficient to assess the groundwater contamination status at the site. The density of soil vapour sample locations was sufficient to assess potential vapour risks

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
at the site. *Soil vapour:* A total of two vapour wells were installed on the site for assessing soil vapour.	associated with the off-site former UST.
Sample depths Samples were collected and analysed from a range of depths, with the primary intervals being within the surface fill (0-0.1 mbgl) and at 0.5 mbgl in fill and at changes in fill profile. Groundwater samples were collected by Alliance from the bottom 0.5-1 m of the water column within each well. Soil vapour samples were collected from approximately 0.5 to 0.7 mbgl.	In the Auditor's opinion, this sampling strategies were adequate to characterise the primary material types present on site for preliminary remediation planning purposes.
Well construction *Groundwater:* Construction details were not provided for the two wells installed by STS during the ASS Assessment, however during sampling by Alliance for the DSI these wells were reported to be approximately 6.3 to 6.7 m deep. The well installed by Alliance was constructed of class 18 uPVC screen and casing to the target depth (3.5 mbgl), with a 3 m long screen placed in 2 mm graded sand/gravel to 0.5 mbgl. Above the sand, a 0.3 m thick bentonite clay plug was installed to prevent top-down water ingress then grouted to the surface and finished with a steel gatic. The SWL intersects the screen interval in the well installed by Alliance. *Soil Vapour:* The soil vapour wells were installed to approximately 0.65 mbgl into boreholes drilled to a maximum depth of 1.0 mbgl which were backfilled approximately 0.35 m from the base of the borehole with 2 mm graded sand/gravel. A perforated stainless steel soil vapour sampling tip connected to 1/4" outer diameter (OD) teflon tubing was placed above and covered by 0.2 m of 2 mm graded sand/gravel. A 0.1 m layer of dry granular bentonite was then placed above followed by a nominal 0.35 m of hydrated granular bentonite, grout to the surface and finished with a steel gatic.	The Auditor notes that vapour wells were shallow and were screened within the top 1 m of the soil profile, which may be influenced by ingress of oxygen, however, a groundwater well was also installed in this area as an additional line of evidence with which to assess for volatile petroleum hydrocarbon contamination. Remaining well construction details were acceptable.
Sample collection method *Soil*: Sample collection was from a combination of hand augered boreholes, push tubes and solid flight augers. Samples were collected either directly from push tube liners or from the auger (avoiding soils in contact with the stem or flights), using a fresh pair of nitrile gloves. 10 litre bulk samples were not collected for field screening for asbestos as outlined in NEPM (2013) (Schedule B1). *Groundwater*: Wells installed by STS were constructed via solid flight augers while the well installed by Alliance was installed via hollow flight augers. Alliance developed the wells with a pump and samples were collected by low flow peristaltic pump with dedicated sample tubing. *Soil Vapour:* Samples were collected directly into evacuated Summa canisters provided by the laboratory (TO-15). Leak testing was undertaken by placing an IPA soaked cloth within a shroud placed over the well and sampling equipment. A carbon tube was used to sample the concentration of IPA in the shroud, however, detections of IPA were not reported on the tube by the laboratory which Alliance attribute to a field or laboratory error. Concentrations of IPA were reported in the vapour sample from SV02 (420 ug/L). Alliance considered the IPA results acceptable based on the low concentrations reported with respect to the anticipated concentration of IPA within the shroud assuming a concentration at half the PQL of the carbon tube and volume of air extracted onto the carbon tube (100 mg/m^3).	Soil sampling from hand augers and solid flight augers can result in loss of volatiles. In addition, sampling from boreholes may limit observations of fill and potential asbestos containing materials (ACM). This has been considered in interpretation of the results. The sampling methodology for soil vapour was adequate, however, it is noted that during the leak testing, the concentration of IPA in the shroud was not recorded correctly and the logic applied by Alliance to estimate a shroud concentration based on the PQL is flawed. However, the concentration of IPA detected in SV02 is sufficiently low compared to the likely concentration in the shroud based on the presence of an IPA soaked cloth to indicate that significant leakage was not occurring. The sampling methodology for groundwater was adequate.

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
Decontamination procedures *Soil:* Where re-useable sampling equipment was used, they were reported to be cleaned with detergent, tap water and then de-ionised water prior to sampling and between sampling events to prevent cross contamination. New gloves were reportedly used for each new sample. *Groundwater*: Dedicated sampling equipment was used for each well. New gloves were reportedly used for each new sample. Soil vapour: Clean cannisters were supplied by the laboratory.	Acceptable
Sample handling and containers Soil and groundwater samples were placed into prepared and preserved sampling containers provided by the laboratory and chilled during storage and subsequent transport to the labs. Samples for asbestos analysis were placed in plastic zip-lock bags. Groundwater samples to be analysed for heavy metals were field filtered. Soil vapour samples were collected in Summa canisters provided by the analytical laboratory.	Acceptable
Chain of Custody (COC) Completed COC forms were provided in the report.	Acceptable
Detailed description of field screening protocols *Soil:* Field screening for volatiles was undertaken using a photoionisation detector (PID). Soil sub-samples were placed in ziplock plastic bags and the headspace measured for VOCs after allowing time for equilibration. *Groundwater:* Field parameters were measured during well sampling but not development. *Soil vapour:* A PID was used during collection of soil vapour samples.	Acceptable
Calibration of field equipment The DSI reported that calibration of the PID had been undertaken prior to use and checks were performed during use. Calibration certificates from the equipment supplier were provided for the water quality meter, peristaltic pump, interface probe and the Summa canisters provided by the analytical laboratory.	Acceptable
Sampling logs Soil logs are provided within the reports, indicating sample depth, PID readings and lithology. With the exception of anthropogenic inclusions, the logs report no indications of contamination were found. Groundwater field sampling records were provided, indicating SWL, field parameters, methodology and observations. Soil vapour field sampling records were provided, including canister pressure, purge time, purge volume and PID readings.	Acceptable

Table 6.3: QA/QC – Field and Lab Quality Assurance and Quality Control

Field and Lab QA/QC	Auditor's Opinion
Field quality control samples Field quality control samples generally included trip blanks, trip spikes, field intra-laboratory and inter-laboratory duplicates. A rinsate blank was not collected during the soil and groundwater sampling events, however, soil samples were collected either	Acceptable

Field and Lab QA/QC	Auditor's Opinion
directly from the dedicated sleeves within the push tubes, or from soils avoiding those in contact with the auger stem or flights, using a fresh pair of nitrile gloves for each sample and groundwater samples were collected using dedicated sampling equipment. An inter-laboratory duplicate sample, trip spike and trip blank were not included during soil vapour sampling.	
Field quality control results The results of field quality control samples were generally within appropriate limits with some elevated relative percent difference calculations (RPDs) reported by Alliance for benzene and TRH F1 in soil vapour. Alliance reported that primary samples may have been taken prior to purge stabilisation parameters, which may have influenced the variability across samples. As a conservative measure, the samples reporting the higher detected concentration of relevant analytes was adopted when assessing potential land contamination risks at the site.	Overall, in the context of the dataset reported, the elevated RPD results are not considered significant and the field quality control results are acceptable.
NATA registered laboratory and NATA endorsed methods Laboratories used included: Eurofins | mgt (primary) and ALS (secondary). Laboratory certificates were NATA stamped.	Acceptable
Analytical methods Analytical methods were included in the laboratory test certificates. Both laboratories provided brief method summaries of in-house NATA accredited methods used based on USEPA and/or APHA methods (excluding asbestos) for extraction and analysis in accordance with NEPM (2013). Asbestos identification was conducted using polarised light microscopy with dispersion staining by method AS4964-2004 *Method for the Qualitative Identification of Asbestos Bulk Samples*.	The analytical methods are considered acceptable for the purposes of the site audit, noting that the AS4964-2004 is currently the only available method in Australia for analysing asbestos.
Holding times Review of the COCs and laboratory certificates indicate that the holding times had been met. Alliance also reported that holding times had been met.	Acceptable
Practical Quantitation Limits (PQLs) *Soil:* PQLs (except asbestos) were less than the threshold criteria for the contaminants of concern. *Asbestos:* The limit of detection for asbestos in soil was 0.01% w/w for presence/absence samples. *Groundwater and Soil vapour:* PQLs were less than the threshold criteria.	Overall the soil, groundwater and soil vapour PQLs are acceptable. *Asbestos:* For presence/absence samples (reported to 0.01% w/w) a positive result would be considered to exceed the *"no asbestos detected in soil"* criteria, providing this is applied within a weight of evidence approach to assess the significance of the exceedance, accounting for the history of the site and frequency of the occurrence.
Laboratory quality control samples Laboratory quality control samples including laboratory control samples, matrix spikes, surrogate spikes, blanks, internal standards and duplicates were undertaken by the laboratory.	Acceptable
Laboratory quality control results The results of laboratory quality control samples were generally within appropriate limits with some minor exceptions. The PQL for OCPs and PCBs in multiple soil samples was raised which was reported to be due to matrix interference. The raised PQLs were less than the criteria adopted, with the exception of various Arochlor PCB congeners. On the conservative approach that the concentrations of these congeners in samples with raised PQLs was 1, they were not an exceedance of the adopted criteria,	In the context of the datasets reported, the minor exceptions are not considered significant, and the laboratory quality control results are acceptable.

Field and Lab QA/QC	Auditor's Opinion
Data Quality Indicators (DQI) and Data Evaluation (completeness, comparability, representativeness, precision, accuracy) Predetermined data quality indicators (DQIs) were set for laboratory analyses including blanks, replicates, duplicates, laboratory control samples, matrix spikes, surrogate spikes and internal standards. These were discussed with regard to the five category areas. Alliance made the following DQI assessment conclusion in the DSI "*The DQI comparison results indicate that the field and laboratory data are not adequately complete, but are adequately comparable, representative, precise and unbiased (accurate), within the context and objectives of this project.*". The completeness of the data was considered incomplete due to inability to sample from inaccessible areas.	An assessment of the data quality with respect to the five category areas has been undertaken by the Auditor and is summarised in **Section 6.1** below.

6.1 Auditor's Opinion

In considering the data as a whole the Auditor concludes that:

- While data is likely to be generally representative of the overall conditions, several data gaps have been identified associated with a low density of sampling across the central portion of the site (assumed basement footprint during DSI) and beneath building/shed footprints that require further assessment following building demolition as proposed in the RAP. Sampling and analysis for ACM was not undertaken in accordance with the current guidelines (NEPM 2013) and results may not be representative of fill conditions.
- The data is considered adequately complete, however, several data gaps have been identified beneath building/shed footprints that require further assessment following building demolition as proposed in the RAP.
- There is a high degree of confidence that data is comparable for each sampling and analytical event.
- The laboratories have provided sufficient information to conclude that data is of sufficient precision.
- While most of the data is likely to be accurate, there is some doubt regarding possible loss of volatiles from sampling from hand augers and solid flight augers. The off-site UST is a potential point source of volatile contamination, therefore field observations and data from multiple media (soil,vapour and groundwater) from this area have been considered to assess potential impacts.

7. ENVIRONMENTAL QUALITY CRITERIA

The Auditor has assessed the results against Tier 1 criteria from NEPM (2013). Other guidance has been adopted where NEPM (2013) is not applicable or criteria are not provided. Based on the proposed development (**Section 2.4**), the most conservative human health criteria for 'residential with garden/accessible soil' and ecological criteria appropriate for 'urban residential and public open space' were adopted.

7.1 Soil Assessment Criteria

Human Health Assessment Criteria

The Auditor has adopted human health assessment criteria from the following sources:

- NEPM (2013) Health Investigation Levels (HILs) for 'Residential' (HIL-A) land use.
- NEPM (2013) Health Screening Levels (HSLs) for 'Low-High Density Residential' (HSL-A&B) land use. The HSLs assumed a sand soil type. Depth to source adopted was <1 m as an initial screen.

- NEPM (2013) Management Limits (MLs) for petroleum hydrocarbons for 'Residential and Open Space' land use and assuming coarse soil texture. Criteria are relevant for operating sites where significant sub-surface leakage of petroleum hydrocarbons has occurred and when decommissioning industrial and commercial sites.
- The presence/absence of asbestos.
- HEPA (2020) *PFAS National Environmental Management Plan*. Perfluorooctanesulfonic acid (PFOS)/perfluorohexane sulfonate (PFHxS) and perfluorooctanoic acid (PFOA) soil criteria developed for 'Residential with garden/opportunities for soil access (HIL A)' land use. These criteria assume 80% background exposure, i.e. 20% of the tolerable daily intake recommended by Food Standards Australia New Zealand (2017). The PFOS/PFHxS criteria is compared to the sum of the PFOS and PFHxS concentrations.

The above criteria are considered adequately protective of direct contact for residential land use, and vapour inhalation/direct contact pathways for intrusive maintenance workers when considering the Friebel & Nadebaum (2011) 'Health screening levels for petroleum hydrocarbons in soil and groundwater', published as CRC CARE Technical Report No. 10.

Ecological Assessment Criteria

The Auditor has adopted ecological soil assessment criteria from the following sources:

- NEPM (2013) Ecological Screening Levels (ESLs) for 'Urban Residential and Public Open Space' land use, assuming coarse soil.
- NEPM (2013) Ecological Investigation Levels (EILs) for 'Urban Residential and Public Open Space' land use. In the absence of site-specific soil data on pH, clay content, cation exchange capacity and background concentrations, the published range of the added contaminant limits (ACL) have been applied as an initial screen.
- Canadian Council of Ministers of the Environment (CCME) (2010) *Canadian soil quality guidelines: carcinogenic and other polycyclic aromatic hydrocarbons (PAHs)* soil quality guideline (SQG) for benzo(a)pyrene for 'Residential' land use. The SQG has been adopted in place of the NEPM (2013) ESL as it is based on a larger and more up-to-date toxicity database than the low reliability NEPM (2013) ESL.
- HEPA (2020) PFOS/PFHxS and PFOA 'interim soil ecological indirect exposure' and 'interim soil ecological direct exposure' criteria developed for all land uses.

Soil Aesthetic Considerations

The Auditor has considered the need for soil remediation based on 'aesthetic' contamination as outlined in *Section 3.6 Aesthetic Considerations* of NEPM (2013) Schedule B1, which acknowledges that there are no chemical-specific numerical aesthetic guidelines. Instead, site assessment requires a balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity.

7.2 Groundwater Assessment Criteria

Human Health Assessment Criteria

The NEPM (2013) HSLs are not appropriate for assessing risks from groundwater to human health at the site due to the potential for direct contact (groundwater is less than 2 mbgl). The Auditor has adopted human health assessment criteria from the following sources to assess risk from direct contact, inhalation and incidental ingestion:

- NHMRC (2011) *National Water Quality Management Strategy, Australian Drinking-Water Guidelines* (ADWG), Version 3.8 Updated September 2022 for potable use or where HSLs are not applicable.

These criteria were multiplied by a factor of 10 to assess potential risks associated with incidental exposure to groundwater, however the adjustment was not applied to volatile compounds where inhalation is the primary pathway of concern.

- USEPA Regional Screening Levels (RSLs) Residential Tap Water Criteria. Online database of assessment criteria that are current as of May 2024. Tap water assessment criteria derived for carcinogenic compounds were multiplied by a factor of 10 to adjust the target cancer risk level from 1:1,000,000 to 1:100,000 to be consistent with Australia's recommended target cancer risk level. For some chemicals, where a criteria has been derived using both non-cancer and cancer toxicity data, the lower criteria was adopted.

Ecological Assessment Criteria

- ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (www.waterquality.gov.au/anz-guidelines). Criteria for freshwater and 95% level of protection were adopted. Where the chemical is considered to bioaccumulate, the 99% level of protection was adopted. Low and moderate reliability trigger values were also adopted for some contaminants where high-reliability trigger values don't exist.

7.3 Soil Vapour Assessment Criteria

The Auditor has adopted soil vapour assessment criteria from the following sources:

- NEPM (2013) HSLs for 'Residential' land use (HSL A&B) were adopted. The HSLs assumed a sand soil type.
- NEPM (2013) interim soil vapour HILs for volatile organic chlorinated compounds. Interim HILs for 'Residential' land use (HIL A) were adopted.

7.4 Auditor's Opinion

The environmental quality criteria referenced by the Auditor are consistent with those adopted by Alliance with the exception of the following:

- Additional human health criteria for 'residential with minimal opportunities for accessible soil' (HIL B) were adopted by Alliance.
- Alliance did not undertake an ecological assessment of soil and groundwater.
- The US EPA vapour intrusion screening level (VISL) calculator was used by Alliance to derive project specific health screening levels to adopt as initial soil vapour screening criteria. A target hazard quotient of 1, a target risk of 10^{-5} and exposure time of 24 hours per day (as the site is proposed for residential use) are considered adequately conservative inputs for the purpose of initial screening criterion calculation.

Given the results obtained, the Auditor considers that these discrepancies do not affect the overall conclusions reached by Alliance and the Auditor.

8. EVALUATION OF SOIL RESULTS

As outlined in **Table 6.1**, Alliance undertook intrusive investigations in accessible areas of the site during the DSI. The DSI locations are shown on **Attachment 3**. The following sections outline the soil field and analytical results of the DSI investigation.

8.1 Field Results

As noted in **Table 5.1**, anthropogenic inclusions were identified within fill in approximately 50% of sampling locations and included brick, concrete, plastic, glass and tile. The was no discernible pattern to

sample locations with anthropogenic inclusions. Fragments of potential ACM were observed at an approximate depth of 0.1m during sampling of SV01. This material was tested by the laboratory for asbestos identification and found to contain chrysotile and amosite asbestos.

An organic odour was reported in soil samples collected from BH01 located on the western site boundary at depths of between 1.8 m and 4.5 m, becoming weaker from 3.0 m. No other visual or olfactory evidence (e.g. staining, odours, free phase product) was observed during the investigations to suggest the presence of contamination within the soils at the site, including in samples near the off-site UST.

Field screening of soil samples was completed using a PID to detect VOCs during the DSI. Alliance reported that PID readings were low with results ranging from 0.6 ppm to 2.7 ppm.

8.2 Analytical Results

The soil analytical results have been assessed against the environmental quality criteria listed in **Section 7** and are summarised in **Table 8.1**. Soil sampling locations are shown in **Attachment 3**.

Table 8.1: Evaluation of Soil Analytical Results – Summary Table (mg/kg)

Analyte	n	Detections	Maximum	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
Asbestos in soil	11	0	Not Detected	0 above 0.1 g/kg	
Asbestos trace analysis	11	0	Not Detected	-	-
Asbestos in materials	1	1	**Chrysotile and amosite Asbestos detected**	-	-
BTEXN	14	0	<PQL	0 above HSL A&B	0 above ESL
F1 (TRH C_6–C_{10} minus BTEX)	14	0	<PQL	0 above HSL A&B	0 above ESL (urban residential)
F2 (TRH >C_{10}–C_{16} minus naphthalene)	14	4	230	0 above HSL A&B	-
TRH C_6–C_{10}	14	0	<PQL	0 above ML	-
TRH >C_{10}–C_{16}	14	4	**230**	0 above ML	**2 above ESL 120 mg/kg**
TRH >C_{16}-C_{34}	14	13	**850**	0 above ML	**5 above ESL 300 mg/kg**
TRH >C_{34}-C_{40}	14	5	450	0 above ML	0 above ESL
Benzo(a)pyrene	12	5	**8.6**	-	0 above CCME SQG of 20 mg/kg
Benzo(a)pyrene Toxic Equivalency Quotient (TEQ)	12	5	**12**	**2 above HIL A 3 mg/kg**	-
Total PAHs	12	8	72	0 above HIL A 300 mg/kg	-
Arsenic	15	12	7.8	0 above HIL A 100 mg/kg	0 above generic EIL (urban residential) 100 mg/kg
Cadmium	15	5	0.5	0 above HIL A 20 mg/kg	-
Chromium	15	11	15	0 above HIL A 100 mg/kg	0 above most conservative ACL (urban residential) 190 mg/kg

Analyte	n	Detections	Maximum	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
Copper	15	15	**65**	0 above HIL A 6,000 mg/kg	**2 above most conservative ACL (urban residential) 60 mg/kg**
Lead	15	15	280	0 above HIL A 300 mg/kg	0 above generic ACL (urban residential) 1100 mg/kg
Mercury	15	10	0.3	0 above HIL A 40 mg/kg	-
Nickel	15	7	25	0 above HIL A 400 mg/kg	0 above most conservative ACL (urban residential) 30 mg/kg
Zinc	15	15	**370**	0 above HIL A 7,400 mg/kg	**14 above most conservative ACL (urban residential) 70 mg/kg**
PCB	15	0	<PQL	0 above HIL A 1 mg/kg	-
OCP	15	0	<PQL	0 above HIL A	0 above EIL
PFAS	4	1	0.0044	-	-
PFOA	4	0	<0.005	0 above HEPA (2020) HIL A 0.1 mg/kg	0 above HEPA (2020) direct exposure 10 mg/kg
PFOS	4	1	0.0041	0 above HEPA (2020) HIL A 0.01 mg/kg	0 above HEPA (2020) direct exposure 1 mg/kg, 0 above HEPA (2020) indirect exposure 0.01 mg/kg
PFHxS	4	0	<0.005	0 above HEPA (2020) HIL A 0.01 mg/kg	0 above HEPA (2020) direct exposure 1 mg/kg, 0 above HEPA (2020) indirect exposure 0.01 mg/kg

n number of samples
- No criteria available/used
NL Non-limiting
<PQL Less than the practical quantitation limit

In assessing the results, the Auditor makes the following observations:

- Asbestos was not detected in the samples analysed however potential ACM fragments were identified in surface fill (0.1 mbgl) during sampling at one location (SV01). Laboratory analysis confirmed the presence of asbestos in the material sampled.
- Concentrations of PFAS, BTEX, OCP and PCBs in soil were generally reported below the PQL and/or the applicable land use criterion.
- Elevated concentrations of BaP TEQ were identified in fill material at a depth of approximately 0.5 mbgl at two locations (BH04 and BH10) which were above the adopted residential land use human health criteria. The reported concentration at BH04 was >250% of the adopted residential land use human health criteria. Remaining PAH concentrations, where detected above the PQL, were below the adopted criteria.
- Elevated concentrations of TRH $>C_{10}–C_{16}$ and TRH $>C_{16}–C_{34}$ were identified above the adopted ecological criteria in surficial fill at two sample locations (BH05 and BH09). In addition, elevated concentrations of TRH $>C_{16}–C_{34}$ were also identified above the adopted ecological criteria in surficial fill at two sample locations (BH06 and SV01) and fill at depths of 0.5 mbgl at one location (BH04).

- Concentrations of metals were also generally low and below the adopted criteria however elevated concentrations of zinc were identified in the majority of samples above the adopted most conservative ACL. In addition, elevated concentrations of copper were identified above the most conservative ACL adopted in two surficial fill samples (BH09 and Dup 4 (duplicate sample from SV01)).

8.3 Auditor's Opinion

In the Auditor's opinion, the soil analytical results are consistent with the site history and field observations. The results indicate that the fill materials in some areas are impacted by BaP TEQ and asbestos that may pose a risk to human health. In addition, concentrations of TRH and copper were detected above ecological criteria in some samples and for zinc in most samples. An assessment of soil results for risks to ecological receptors was not undertaken by Alliance and therefore the elevated concentrations of TRH, copper and zinc identified by the Auditor were not identified by Alliance. An assessment of soil results for risks to ecological receptors is required and has been included in the scope of additional assessment required in the RAP. In addition, although asbestos has been identified, the assessment of asbestos was not undertaken in accordance with NEPM (2013) and there is potential that asbestos may be present in fill materials at a greater frequency than indicated by the results of the DSI.

There is the potential for localised areas of contamination to be present in areas that were not investigated during the DSI due to access constraints, including below building footprints and in areas within the previously proposed basement footprint. Further assessment is required to confirm soil conditions in these areas are suitable for use, or otherwise confirm if remediation is required. A scope for additional investigation of areas of concern following building demolition is provided in the RAP, reviewed in **Section 12**.

9. EVALUATION OF SOIL VAPOUR RESULTS

As part of the DSI, Alliance installed two shallow (approximately 0.7 mbgl) soil vapour wells to assess the potential for volatile petroleum hydrocarbons from the former UST located on the ambulance station to the north to have impacted the site. Analytical results measured during the DSI were compared against the screening criteria listed in **Section 7**. Soil vapour sampling locations are shown in **Attachment 3**.

In assessing the results, the Auditor makes the following observations:

- Concentrations of chlorinated VOCs were generally not detected above the PQL or adopted criteria in both vapour samples.
- Concentrations of BTEX and TPH were generally below the PQL however low concentrations of benzene were reported above the PQL for SV02 and DUP01 along with low concentrations of TRH C_6–C_{10} minus BTEX in the DUP01 sample. These low concentrations were orders of magnitudes below the adopted criteria.

Based on the results obtained, Alliance concluded that "*The detected concentrations of the relevant TRH, BTEXN, mono-aromatic hydrocarbon (MAH) and MTBE compounds in the soil vapour samples analysed from both soil vapour sampling points were less than the adopted human health vapour intrusion / inhalation assessment criteria.*

Further assessment of vapour intrusion / inhalation exposure to human health is considered not warranted.".

9.1 Auditors Opinion

In the Auditor's opinion, the soil vapour analytical results indicated that there are no soil vapour impacts at concentrations with the potential to result in vapour intrusion inhalation risks based on future residential site use.

10. EVALUATION OF GROUNDWATER RESULTS

As part of the DSI, Alliance installed a groundwater well to assess the potential for volatile compounds and TPH to have migrated on to the site from the former UST located off-site to the north. Analytical results measured during the DSI were compared against the screening criteria listed in **Section 7**. In addition, Alliance also sampled two groundwater monitoring wells installed by STS during the ASS Assessment. Groundwater monitoring well locations are shown in **Attachment 3**.

In assessing the results, the Auditor notes that concentrations of TPH, BTEX and VOCs were all below the PQL and the adopted criteria.

Based on the results obtained Alliance concluded that "*concentrations of TRH, benzene, toluene, ethyl benzene, xylenes in the groundwater samples analysed, were less than the adopted modified screening criteria by many orders of magnitude. Further assessment of TRH and BTEXN in groundwater direct contact (via the ingestion pathway) for intrusive maintenance workers (shallow trench) is considered not warranted.*".

10.1 Auditors Opinion

In the Auditor's opinion, the groundwater analytical results indicated that there are no groundwater impacts at concentrations with the potential to present a risk to human health or the environment.

11. EVALUATION OF CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a representation of the contaminant source, pathway and receptor (SPR) linkages at a site. A CSM was initially developed by Alliance following the PSI and has been updated as new information became available. Alliance included a CSM in the RAP to inform requirements for further investigation and remediation. The Auditor has summarised the CSM below.

Sources of contamination were identified as: uncontrolled filling and demolition practices; use of hazardous building materials and termite treatment; and potential use as a former Council depot. Alliance considered that contamination associated with the sources would be from a top-down mechanism and unlikely to be present at depths greater than 1 mbgl. The DSI identified elevated concentrations of BaP TEQ above adopted human health criteria at two sample locations at 0.5 mbgl and asbestos in fill at one location at 0.1 mbgl.

Receptors to the potential contamination were identified as current and future residents, and intrusive maintenance workers who could be exposed through dermal contact, ingestion and dust inhalation, and terrestrial ecosystems who could be exposed through uptake of contaminants. Based on the absence of onsite sources of volatile contamination (based on the DSI results), inhalation of vapours was not considered a complete exposure pathway.

Potentially complete exposure pathways were identified as exposure to contaminants in fill and from hazardous building materials in soils following redevelopment.

Alliance note in the RAP that the development design had been amended since completion of the DSI such that a basement level was no longer proposed, hence assessment of soils previously proposed to be excavated and disposed off-site to construct a basement is required and is identified as a data gap within the CSM. Areas that were inaccessible during the DSI below existing structures and areas of

hardstand are also identified as data gaps with respect to characterisation of soil conditions and identified as requiring further assessment.

11.1 Auditor's Opinion

The CSM presented in the RAP was lengthy and did not include a visual representation (e.g. cross section) of potential SPR linkages. The DSI identified elevated concentrations of BaP TEQ at two sample locations and asbestos at one location, but these areas are not specifically identified in the CSM as AEC. Instead, further assessment of soil conditions is proposed following building demolition to address data gaps with respect to soil conditions and it is assumed that these works will delineate the elevated BaP TEQ and asbestos impacts to inform the extent of remediation required.

While the CSM description in the RAP is not presented in a clear or concise format, the Auditor is of the opinion that it provides adequate information for identifying data gaps and assessing remedial requirements.

12. EVALUATION OF PROPOSED REMEDIATION

12.1 Supplementary Contamination Assessment and Inferred Extent of Remediation Required

Alliance considered in the RAP that contamination requiring remediation included fill soils impacted by BaP TEQ at BH04 and BH10 and fill soils impacted by ACM at SV01. Data gaps were identified in the CSM in relation to areas below building structures and in areas of the site previously presumed to be within the footprint of a proposed basement excavation. Alliance identify 18 AECs (AEC01 to AEC07 and AEC10 to AEC20) in the RAP which require further assessment, as shown in **Attachment 4**. The Auditor notes that AEC01 is designated as the entire site footprint and the other 17 AECs are located within AEC01.

The RAP includes requirements for a Supplementary Contamination Assessment (SCA) to be undertaken within the identified AECs following building demolition to determine and confirm the extent of any fill requiring remediation. The SCA includes the requirement for a grid-based walkover of the site including each former building, structure and hardstand footprint using north-south and east-west transects following demolition and removal of hardstand surfaces. Each transect will be set out on a nominal 1 m – 2 m spacing. The walkover will be undertaken to visually assess asbestos to be present in surface soils and confirm the proposed SCA sampling locations are still relevant and appropriate post demolition. Locations where evidence of visual asbestos or demolition materials beyond building/ structure footprints is observed will be recorded.

A summary of the proposed SCA works as described in the RAP is shown in **Attachment 6**. The proposed sample locations are shown in **Attachment 5**. The RAP notes that soil samples collected during the SCA will be from the surface and at regular intervals thereafter (typically at depth intervals of no more than 0.5 m), or where there is a change in lithology, or where there is visual/olfactory evidence of potential contamination. Samples will also typically be collected at the interface of fill and underlying natural soil. The target depth of locations is 0.3 m into natural or practical refusal. The RAP notes that the SCA works are to be completed following demolition of existing site structures.

The inferred extent of the BAP TEQ and asbestos impacts in soil requiring remediation is not clearly stipulated in the RAP, however, Alliance indicate that the results of the SCA will determine the extent of remediation required and inform preferred remediation strategies. The findings of the SCA will be presented in an addendum to the RAP.

An assessment of soil results for risks to ecological receptors was not undertaken during the DSI. An assessment of soil results for risks to ecological receptors is required and has been included in the scope of additional assessment required in the RAP. Remedial options are provided in the RAP for the identified

contamination and for potential additional soil contamination that is identified during the SCA, as summarised by the Auditor in **Table 10.1** below.

Table 10.1: Summary of Preferred Remedial Options

Description/Contamination Type	Preferred Remedial Option
TRH, BTEX, PAH, OCP, PCB and metals impacted soils	Excavation and off-site disposal
Asbestos (AF/FA) impacted soils	Excavation and off-site disposal
Asbestos (bonded ACM) impacted soils	Onsite treatment (raking and picking), validation and re-use. ACM to be disposed offsite.

Auditor's Opinion

The scope of the SCA is considered adequate to assess AECs following building demolition. The results of the SCA are to be provided in an addendum to the RAP that confirms the extent of remediation required and the remediation methodology. This is an acceptable approach given the current constraints around site access while the site is occupied by tenants.

The Auditor notes that there is potential for demolition to result in wider contamination of the ground surface with ACM and the walkover should be completed following controlled demolition and clearances to confirm absence of ACM in surface soils prior to excavation or topsoil stripping occurring. The main contaminants of concern associated with AEC are asbestos, PAH, OCPs and metals in shallow fill and sampling during the SCA should target surface soils as well as the depth of fill. The sampling density proposed to characterise fill materials during the SCA is high. Field observations should be considered when determining the requirements for analytical assessment of samples with analysis targeted to fill samples where anthropogenic inclusions are observed.

The scope of the SCA does not specifically propose to delineate identified impacts at BH04, BH10 and SV01. It is recommended that, should delineation sampling be required, that these works be carried out prior to the preparation of the addendum to the RAP to ensure the extent of remediation is adequately defined.

12.2 Evaluation of RAP

The Auditor has assessed the RAP by comparison with the checklist included in NSW EPA (2020) *Contaminated Land Guidelines, Consultants Reporting on Contaminated Land*. The RAP was found to address the required information, as detailed in **Table 10.2**, below.

Table 10.2: Evaluation of Remedial Action Plan

Remedial Action Plan	Auditor Comments
Remedial Goal/Remedial Objective/Data Quality Objectives (DQOs) The remediation objective is to remediate identified land contamination exposure risks to levels that do not present an unacceptable human health exposure risk, based on the proposed land use scenario for the site. DQOs were specified for both the SCA works required to be undertaken to address the identified data gaps and the validation of remedial works. Alliance defined specific DQOs in accordance with the seven-step process outlined in Schedule B2 of NEPM (2013). To achieve the remedial and validation objectives the following decisions were identified in the DQOs: • Is the data collected for the project suitable for assessing land contamination exposure risks? • Do the detected concentrations of contaminants of	The specified DQOs and decision statements for both the SCA and validation are considered appropriate and should ensure the remedial objective is achieved.

Remedial Action Plan	Auditor Comments
potential concern identified in the CSM present an unacceptable exposure risk to the receptors identified in the CSM based on the proposed land use scenario? • Has the remediation objective been achieved? • Is the site suitable, in the context of land contamination, for the proposed land use scenario?	
Discussion of the Extent of Remediation Required Based on the investigations previously completed and as discussed in **Section 8**, contamination requiring remediation included fill soils impacted by BaP TEQ at BH04 and BH10 and fill soils impacted by ACM. The inferred extent requiring remediation was not determined by Alliance, however it was reported that the results of the SCA to be completed following building demolition will determine extent of remediation required. The results of the SCA and the defined remediation extents are to be presented in an addendum to the RAP.	The inferred extent of remediation described in the RAP is adequate for this stage of remediation planning and is to be refined following the outcomes of the SCA in an addendum to the RAP. The addendum must confirm the extent of remediation required and confirm the remediation methodology to be adopted for each area/contaminant. The addendum to the RAP must be reviewed and endorsed by the Auditor prior to implementation.
Remedial Options Remedial options were assessed and discussed in Section 10.2 of the RAP which included: • Onsite treatment of contamination • Offsite treatment of contamination • Consolidation and isolation via onsite containment • Excavation and offsite disposal to approved facility • Implementation of an appropriate management strategy A number of other options have been listed as contingencies.	The Auditor considers that an appropriate range of options were considered.
Selected Preferred Option and Rationale Preferred conceptual options were discussed in the RAP for the identified BaP TEQ and asbestos contamination identified during the DSI and for potential contamination identified during the SCA as summarised by the Auditor in **Table 10.1** above and include excavation and off-site disposal of impacted soils or treatment to remove bonded ACM fragments and validation for re-use on site. Only limited information was provided as rationale for the preferred options.	The Auditor considers the preferred remedial options to be appropriate. Should any changes to the remediation strategies discussed in the RAP occur (e.g. a cap and containment strategy), a revised RAP would be required to be prepared, reviewed and endorsed by the Auditor prior to implementation.
Description of Remediation to be Undertaken Remedial excavation works will be undertaken by the remediation contractor with guidance provided by the appointed environmental consultant. The environmental consultant will assist the remediation contractor in setting out the inferred extents of remediation required, based on refined remedial extents arising from the SCA and documented in a subsequent addendum prepared for the RAP. The environmental consultant will provide guidance to the remediation contractor on where to extend remedial works beyond the inferred extent and when to stop remedial works, to allow validation works to be undertaken. Conceptual remedial options and methods were outlined in Table 11.1 of the RAP, consistent with **Table 10.1** above. Two alternate methodologies are described for onsite treatment of asbestos (in the form of ACM), comprising: • Insitu onsite treatment of surface soils via raking and picking (ACM). Systematic inspection of surface and hand picking of visible ACM fragments. Rake surface soils in one direction, to a depth of 0.1 m below ground level, using an excavator fitted with a tooth bucket. Systematic inspection of raked surface and hand picking of visible ACM fragments. Repeat this process in a direction 90° perpendicular to the first raking direction.	The description of remediation works provided in the RAP is adequate for this stage of remediation planning and is to be refined following the outcomes of the SCA. The extent of material to be remediated should be defined in an addendum to the RAP. Validation following treatment for ACM should only be conducted once consecutive passes of raking and inspection (at 90°) yield no ACM finds.

Remedial Action Plan	Auditor Comments
• Exsitu onsite treatment of impacted soils via spreading on treatment pad to thickness of <0.1 m, raking and picking (ACM) and systematic inspection as per methodology above. Reinstatement of treated soils at depths >0.1 m below finished surface level.	
Proposed Validation Criteria Outlined in Table 13.3 of RAP. NEPM (2013) criteria for residential with accessible soil and minimal opportunities for soil access land uses are proposed: HIL A (and B in areas of hardstand cover), HSL A&B, EIL and ESL for urban residential/public open space. Asbestos HSL A and B to be adopted for asbestos.	The proposed criteria are generally appropriate, although the Auditor notes that HIL A criteria are more conservative and are adequately protective of the NEPM 'B' land use scenario.
Proposed Validation Testing Table 13.7.1.1 of the RAP presents validation strategies to be adopted in the event that the SCA identifies contamination requiring remediation (**Attachment 7**). Validation strategies for imported materials were also included in Table 13.7.1.1 of the RAP for virgin excavated natural material (VENM), excavated natural material (ENM) and materials classified under a Resource Recovery Order/Exemption (RRO/RRE). These include visual assessment to confirm free of anthropogenic inclusions and are consistent with material description provided in the reviewed certification reports, laboratory analysis of samples as per Orders and Exemptions, including gravimetric assessment for asbestos.	The proposed validation strategies are considered appropriate. The Auditor notes that the density of validation sampling for imported materials is not specified but should be dependent on the source of the material and supplied documentation. Validation check samples are required for each source of recycled materials produced under a RRO/RRE.
Contingency Plan if Selected Remedial Strategy Fails Contingency procedures were provided in Table 12.6 of the RAP for unexpected finds and unsuccessful remedial strategies. These include stopping work, assessment by the consultant through intrusive investigations and preparation of an addendum to RAP if necessary. Alliance noted that further consideration of the need for assessment of groundwater conditions may be required if significant unexpected finds with potential to impact groundwater conditions are identified.	In the Auditor's opinion, the procedure for handling unexpected finds, which includes stopping work and identification of materials is appropriate and practical and can be implemented within the proposed remediation strategy. The RAP is not clear with regards to contingencies for unsuccessful validation, however, there are a range of options already described that would act as contingencies, including off-site disposal.
Interim Site Management Plan (before remediation) Interim Site Management Plan (before remediation) was not discussed in the RAP however it was reported that this was to be prepared separately.	The Auditor considers that interim site management measures should be considered prior to remediation and it is understood that Alliance have been engaged and are currently preparing a separate interim site management plan to be implemented.
Site Management Plan (operation phase) including stormwater, soil, noise, dust, odour and WH&S A site management plan (SMP) was outlined in Section 16 of the RAP which outlines requirements for asbestos management and control, soil and stormwater management, dust and noise control, stockpiling, excavation pump out, waste management, traffic management, vibration management and work health and safety requirements.	The Auditor notes that the RAP provides management plans that are directly applicable for the proposed works.
Remediation Schedule and Hours of Operation The extent of remedial works is currently uncertain and requires completion of the SCA to confirm remediation extents. The RAP notes that, based on previous experience on comparable sites, Alliance considers that the remedial works would not be likely to take more than three to six months to complete. Timeframes would be refined following appointment of a remediation contractor. The hours of operation at the site will be limited to Monday to Friday between 7:00am and 5:00pm, and Saturday between	The Auditor notes that the staging and scheduling of remediation will be determined based on the development design and that hours of operation will be determined by development planning consent conditions.

Remedial Action Plan	Auditor Comments
8:00am and 1:00pm however Alliance noted that days and times set out in the relevant development consent conditions will take precedent over the aforementioned days and times.	
Contingency Plans to Respond to Site Incidents Contingency plans and protocols to be implemented for site incidents including high levels of dust, noise and vibration or asbestos in air were presented in Section 16.14 of the RAP.	The Auditor notes that the RAP provides contingency plans that are directly applicable for the proposed works.
Licence and Approvals Alliance notes in the RAP that the remedial works are classified as Category 2 under SEPP R&H and do not require development consent. A notification of intent to undertake remedial works will be submitted to the relevant planning authority, 30 days prior to the date that remedial works (excluding any supplementary contamination assessment works where proposed) are intended to commence. Demolition works are to be undertaken by a contractor holding an appropriate SafeWork NSW demolition licence. Approvals are to be obtained (if required) from NSW Roads and Maritime Services (RMS) for works being undertaken adjacent to (or on) RMS identified assets. Asbestos removal works will be notified to SafeWork NSW by the remediation contractor. The asbestos removal works will be undertaken by a contractor holding a: • Class A licence for removal of friable asbestos / asbestos fines; and • Class B licence for removal of bonded asbestos. Within 30 days of completion of all remediation and validation works, a notice of completion of the remedial works will be submitted to the relevant planning authority. An appropriately licensed landfill should be selected and the material tracked from the site to the landfill.	Acceptable. A full hazardous materials building survey should be completed prior to demolition and asbestos clearances completed.
Contacts/Community Relations Occupants of properties adjoining the site and located immediately across the road from the site, will be provided with a notification of intent to undertake remedial works on the site, a minimum of two business days before commencing those remedial works. A register will be maintained on site, for the recording of remedial works related communications from the community. Communication received from the community about the remedial works will be directed to the project manager. The project manager will arrange for the communication to be responded to, in accordance with arrangements agreed to between the remediation contractor and the principal.	Acceptable
Staged Progress Reporting The results of the SCA are to be presented as an addendum to the RAP. The validation of the site is to be provided in a site validation report. Staged validation is not discussed.	Detailed reporting on the results of the SCA and the proposed extent of remediation based on the SCA results should be documented in an addendum to the RAP and be reviewed and approved by the Auditor prior to implementation. The number of stages required for development of the site is not specified in the RAP. It is assumed development of the site will be completed as one stage.
Long Term Environmental Management Plan Alliance noted that the SEARs require a long term environmental management plan (EMP) to be provided. On the basis that preferred conceptual remedial options do not involve	Should SCA works indicate a change in remediation strategy to one requiring ongoing management, then an addendum to the RAP would be required to be prepared and

Remedial Action Plan	Auditor Comments
management of any residual contamination, an EMP was considered not required. However, should the SCA works involve a change in remedial strategy that warrants the need for an EMP, then the validation of the site as suitable for the proposed land use will be contingent upon the implementation of an EMP to manage residual risks posed by contaminated material to future site users.	reviewed by the Auditor. Any onsite containment will require long term management under an EMP. Approval from the Consent Authority will be required if this approach is proposed and an enforcement mechanism for the EMP will be required. To allow for future enforceability of an EMP (if required), it would be appropriate for the Consent Authority to include conditions of consent that require conditions of any Site Audit Statement to become conditions of the consent or the site owner/operator to comply with the obligations of the EMP (if required) during site occupation.
Waste Management Waste management is discussed in Section 16.9 of the RAP and requires removal of materials from site for recycling and/or disposal, to be undertaken with reference to the relevant provisions of the POEO Act, SafeWork NSW (2022) and NSW EPA (2014) *Waste Classification Guidelines.* The remediation contractor is to maintain detailed records of materials removed from the site, including location of waste generation, classification, date/time of removal, quantities of materials, transport company details and vehicle registration details. The remediation contractor is to retain records verifying lawful disposal of the materials, including weighbridge/tipping dockets from the waste receiver. Waste disposal is to be to a facility licensed to accept the category of waste.	Acceptable. It is noted that, while a preliminary waste classification has been completed, additional data and observations obtained during the SCA should be used to confirm the waste classification.

Auditor's Opinion

In the Auditor's opinion, the proposed remediation strategies are considered appropriate for the BaP TEQ and asbestos impacted fill identified during the DSI and are likely to be suitable for potential contamination which may be identified during the SCA. The extent of soils requiring remediation is to be confirmed following the SCA. The findings of the SCA are to be documented in an addendum to the RAP which confirms the extent of remediation required and confirms the remediation strategy to be adopted in each area. An updated waste classification should be prepared for soils to be disposed off-site.

If adequately implemented, the RAP provides an adequate framework to ensure that the site is suitable for the proposed land uses. Successful validation will be required to confirm this.

13. CONCLUSIONS AND RECOMMENDATIONS

Alliance concluded in the RAP that "*Based on the assessment undertaken by Alliance of site history information, fieldwork observations and data, and laboratory analytical data, in the context of the proposed land use scenario and objectives of this project, Alliance considers that the remediation objective can be achieved and the site made suitable for the proposed land use scenario, subject to the:*

- *Implementation of the interim site management plan, to be prepared separately;*
- *Implementation of the strategies, methodologies, plans and procedures set out in this remediation action plan, if required, following the completion of the SCA proposed in Section 8; and*
- *Preparation of a site remediation and validation report (if required).".*

The RAP provides an adequate framework for further defining the extent of remediation required. The proposed remediation strategies of excavation and off-site disposal, or treatment of surface soils for removal of ACM, is appropriate to address identified contamination. The RAP includes a scope of works

for further assessment of the extent of remediation following removal of site structures and surfacing (the SCA) and contingency remediation/validation strategies for likely additional contamination finds.

In the Auditor's opinion, the RAP provides an adequate framework to ensure the site is made suitable for the proposed land use. Adequate implementation and successful validation will be required to confirm this. It is recommended that the following actions be completed to ensure the RAP is adequately implemented:

- Completion of a hazardous materials survey on all buildings to be demolished and completion of asbestos clearances following removal of hazardous materials.
- Documentation of the findings of the further investigation (the SCA) in an addendum to the RAP that defines the extent of remediation required and confirms remediation and validation requirements. An updated waste classification report should be prepared for any soil to be disposed off-site. The addendum to the RAP should be reviewed by the Auditor.
- If the remedial strategy changes to include cap and containment, the addendum to the RAP must include capping design and an outline of an environmental management plan (EMP). The revised remediation strategy must be approved by the Auditor and the consent authority.
- Implementation of the RAP and addendum to the RAP during redevelopment of the site.
- Preparation of a validation report at completion of the remediation works confirming the site is suitable for the proposed use.
- If a cap and containment remedial strategy was implemented during remediation and validation works, preparation of an EMP outlining long term management requirements for the capped residual contamination.
- Completion of a Section A site audit statement (SAS) and supporting site audit report (SAR), prior to occupation of the site.

To ensure the site remediation and development is completed in accordance with the RAP and to allow for future enforceability of an EMP (if required), it is recommended that the Consent Authority include conditions of consent that require:

- Completion of a Section A SAS prior to occupation of the development.
- Conditions of any SAS to become conditions of the consent or the site owner/operator to comply with the obligations of the EMP (if required) during site occupation.

14. LIMITATIONS

This interim audit advice was conducted on behalf of Homes NSW for the purpose of assessing the suitability and appropriateness of a remedial action plan (RAP). This summary report may not be suitable for other uses.

The Auditor has relied on the documents referenced in Section 1 in preparing the Auditor's opinion. The consultants included limitations in their reports. This interim audit advice must also be subject to those limitations. The Auditor has prepared this document in good faith but is unable to provide certification outside of areas over which the Auditor had some control or is reasonably able to check. If the Auditor is unable to rely on any of those documents, the conclusions of this interim audit advice could change.

It is not possible to present all data which could be of interest to all readers of this interim audit advice. Readers are referred to the referenced reports for further data. Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

* * *

Consistent with the NSW EPA requirement for staged 'signoff' of sites that are the subject of progressive assessment, remediation and validation, I advise that:

- This advice letter does not constitute a Site Audit Report or Site Audit Statement.
- At the completion of the remediation and validation I will provide a Site Audit Statement and supporting documentation.
- This interim advice will be documented in the Site Audit Report.

Yours faithfully
Ramboll Australia Pty Ltd

Louise Walkden
EPA Accredited Site Auditor 1903

D 02 9954 8138
M 0433 982 855
lwalkden@ramboll.com

Attachments: 1 Site Location

2 Proposed Development Ground Floor Layout

3 DSI Sample Location Plan

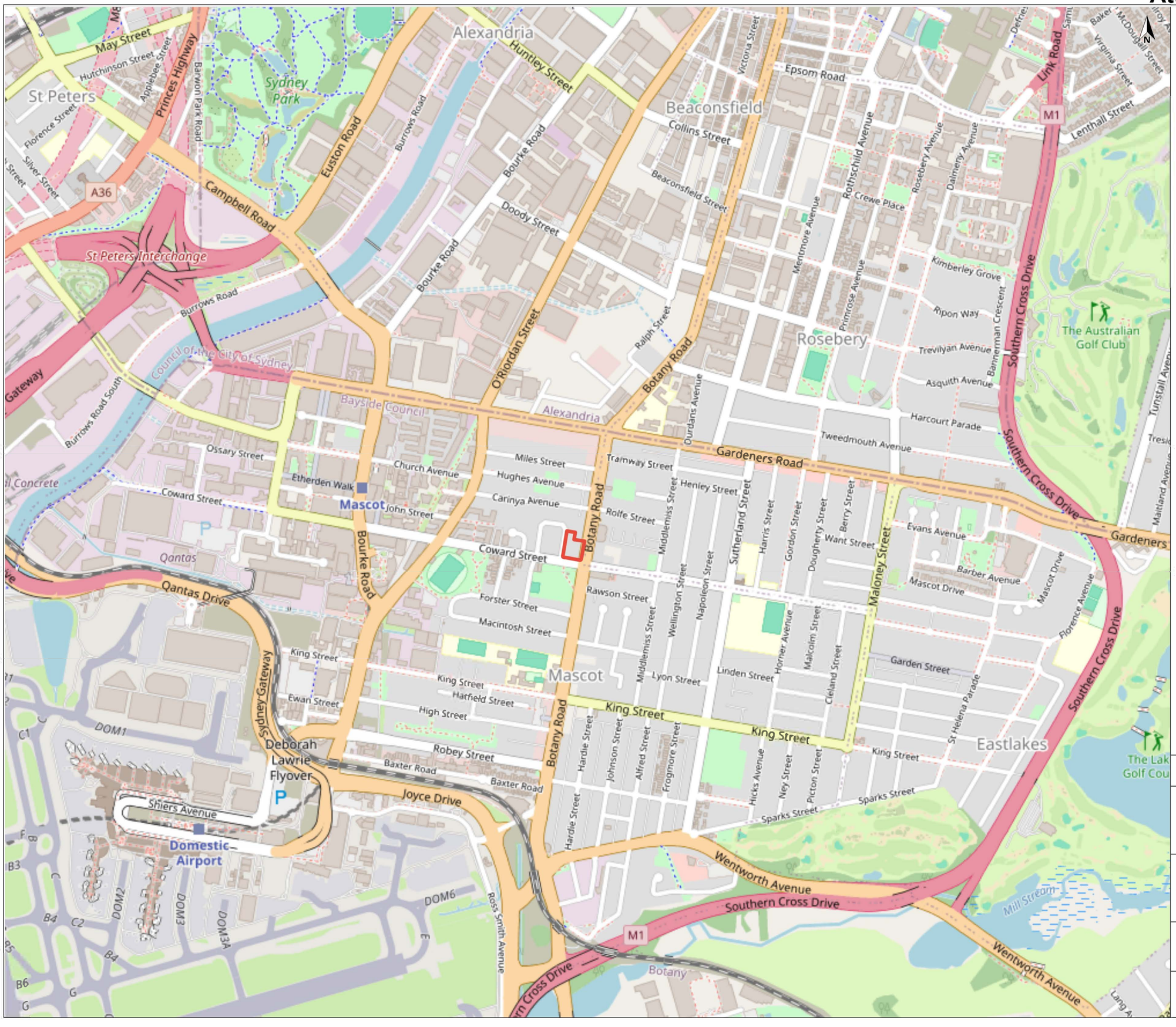
4 Areas of Environmental Concern for Supplementary Contamination Assessment

5 Proposed Supplementary Contamination Assessment Sample Locations

6 Proposed SCA Works

7 Conceptual Validation Strategies

Attachment 1: Site Location



Title: Site Location Plan		
Client: New South Wales Land and Housing Corporation		Size: A3
Project: 33 Henry Kendall Crescent Mascot	Drawn: SI	Figure No.: 1
Date: 18-09-2024	Checked: SW	
Proj No: 17716.3	Scale: 1:12352	Version: ER-1-2

Attachment 2: Proposed Development Ground Floor Layout

NOT FOR CONSTRUCTION

PRELIMINARY

0 2 4 10m
1:200 @A1

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

Rev	Date	Revision	By	Chk.
1	08.08.2024	Issued for Information	WG	WG
2	09.08.2024	Issued for Client Review	WG	WG
3	15.08.2024	For Client Review and Coordination	WG	WG
4	22.08.2024	For Client Review/Consultant Coordination	WG	WG
5	27.08.2024	Issued for Review and Coordination	WG	WG
6	03.09.2024	Issued for Information	WG	WG
7	10.09.2024	Issued for Information	WG	WG
8	16.09.2024	Issued for Information	BD	WG
9	17.09.2024	Issued for Review	JL	WG

NOTE: MINOR CHANGES TO FORM AND CONFIGURATION MAY BE REQUIRED WHEN DRAWINGS ARE SUBSEQUENTLY PREPARED FOR CONSTRUCTION PURPOSES AFTER THE GRANT OF DEVELOPMENT CONSENT.

Client: **HOMES NSW**

Project: 792-794 BOTANY ROAD AND 33-37 HENRY KENDALL CRESCENT, MASCOT

Drawing Name: FLOOR PLAN - GROUND

Date	Scale	Sheet Size
17.09.2024	1 : 200	A1
Drawn	Chk.	Job No.
Author	Checker	6956
Drawing No.		Revision
DA-1001		/ 9

SJB Architects
Level 2, 490 Crown Street
Surry Hills NSW 2010
T 61 2 9380 9911
www.sjb.com.au

Attachment 3: DSI Sample Location Plan

Legend

- STS Monitoring Wells
- Soil Vapour Locations
- Borehole Locations
- Site Boundary
- Proposed Extent of Basement

0 5 m 10 m

alliance

Produced by **Datanest.earth**

Title: Environmental Sampling Plan		
Client: New South Wales Land and Housing Corporation		Size: A3
Project: 33 Henry Kendall Crescent Mascot	Drawn: SI	Figure No.: 4
Date: 19-09-2024	Checked: SW	
Proj No: 17716.3	Scale: 1:463	Version: ER-1-1

Attachment 4: Areas of Environmental Concern for Supplementary Contamination Assessment

Legend

- AEC01 - Site Footprint

0 5 m 10 m

alliance

Produced by Datane tsearth

Title: Revised Areas of Environmental Concern		
Client: New South Wales Land and Housing Corporation		Size: A3
Project: 33 Henry Kendall Crescent Mascot	Drawn: SI	Figure No.: 5
Date: 18-09-2024	Checked: SW	
Proj No: 17716.3	Scale: 1:445	Version: ER-1-2

Attachment 5: Proposed Supplementary Contamination Assessment Sample Locations

Legend

- SCA Sampling Points

0 5 m 10 m

alliance

Produced by **Datanest.earth**

Title: SCA - Soil Sampling Point Layout Plan		
Client: New South Wales Land and Housing Corporation		Size: A3
Project: 33 Henry Kendall Crescent Mascot	Drawn: SI	Figure No.: 6
Date: 18-09-2024	Checked: SW	
Proj No: 17716.3	Scale: 1:436	Version: ER-1-2

Table 8.3.7.7 Schedule of Laboratory Analysis

ID	AEC	Sampling Point ID	TRH/BTEX	PAH	OCP	PCB	Metals (8)	Asbestos (0.001%)	Asbestos ID	Hardness	pH	CEC and clay content
AEC01	Site footprint (~4,878m^2)	TP01-TP13	8	8	8	8	8	13	1	-	-	-
AEC02	Residential Building 01 (~210m^2)	TP14-TP17	-	-	4	4	4	4	-	-	-	-
AEC03	Residential Building 02 (~210m^2)	TP18-TP21	-	-	4	4	4	4	-	-	-	-
AEC04	Residential Building 05 (~210m^2)	TP22-TP25	-	-	4	4	4	4	-	-	-	-
AEC05	Historic scattered small buildings / sheds and potential tents in the southeast portion of the site, observed from 1943 and removed by 1951 (~1,650m^2)	TP05, TP10[10], TP11, TP26, TP40, TP41, TP42, TP43	6	6	6	6	6	6	-	-	-	-
AEC06	Historic building in the southeast portion of the site, observed from 1951 and removed by 1961 (~150m^2)	TP10, TP18, TP26	Included within AEC03 and AEC05 Analysis									
AEC07	Historic scattered small sheds and/or wastes stored in the southwest portion of the site, observed from 1951 and removed by 1961 (~1,170m^2)	TP06, TP08, TP09, TP12, TP13 TP27, TP28, TP29,	TP27 and TP28 asbestos only, remaining sampling points analysis included within AEC01 and AEC11					2	-	-	-	-
AEC10	Residential Building 03 (~210m^2)	TP33-TP36	-	-	4	4	4	4	-	-	-	-
AEC11	Residential Building 04 (~210m^2)	TP29-TP32	-	-	4	4	4	4	-	-	-	-
AEC12	Shed structures (<25m^2)	TP42	Included within AEC05						-	-	-	-
AEC13	Shed 01(<10m^2)	TP26	Included within AEC05									
AEC14	Shed 02(<10m^2)	TP37	-	-	1	1	1	1	-	-	-	-
AEC15	Shed 03 (<10m^2)	TP38	-	-	1	1	1	1	-	-	-	-

Table 8.3.7.7 Schedule of Laboratory Analysis

ID	AEC	Sampling Point ID	TRH/BTEX	PAH	OCP	PCB	Metals (8)	Asbestos (0.001%)	Asbestos ID	Hardness	pH	CEC and clay content
AEC16	Shed 04 (<10m^2)	TP39	-	-	1	1	1	1	-	-	-	-
AEC17	Shed 05 (<10m^2)	TP41	Included within AEC05									
AEC18	Outbuilding 01 (<10m^2)	TP40	Included within AEC05									
AEC19	Outbuilding 02 (<10m^2)	TP43	Included within AEC05									
AEC20	Outbuilding 03 (<10m^2)	TP44	-	-	1	1	1	1	-	-	-	-
ABC[11]	Inferred natural soils	TP01, TP11					2				2	2

8.3.7.8 Analytical Methods, Limits of Reporting and Holding Times

The analytical methods, limits of reporting and sample holding times adopted for this project, are set out in **Table 13.7.8.**

8.4 SCA - Data Assessment and Reporting

The findings of the supplementary contamination assessment will be presented as an addendum to this RAP. The RAP addendum report will include:

- An executive summary;
- The scope of work undertaken;
- Site identification details;
- Information on supplementary contamination assessment works undertaken;
- Field and laboratory analytical data;
- Field and laboratory data QA/QC assessment;
- Supplementary site contamination assessment and characterisation;
- Information on revised inferred unacceptable contamination extents (if any);
- Information on revised inferred remediation extents (if any);
- Information on the revised remedial strategy (if any);

[10] Analysis for TP05 and TP10 included within AEC01
[11] Ambient background concentration

Table 13.7.1 Validation Sampling Point Densities and Locations

ID	Contamination Risk	Preferred Validation Strategy
-	Friable Asbestos (FA/AF)	A visual assessment of the residual remediation area and photographic record. Visual validation of excavation base and walls, and collection of: • one sample per 5m x 5m (25 m^2) of excavation base, minimum of two; and • one sample per five lineal metres of excavation wall, if greater than 0.1 m for each relevant stratum, or per vertical metre of excavation depth, whichever is greater. Laboratory analysis of all samples for asbestos (0.001% w/w). Clearance certificate from an LAA.
-	Surface soils (top 10cm) with asbestos containing materials	Works will be undertaken in a manner that avoids further damage or burial of the ACM by the process. A visual assessment of each phase of raking works. A visual assessment of the residual footprint following removal and photographic record. Clearance certificate from a licensed asbestos assessor (LAA) or competent person. If visual evidence of construction or demolition waste is observed in surface soils that have been remediated for visible asbestos, validation will include collection of one 10L sample per 5m x 5m (25 m^2) of area remediated for bonded ACM field screening.
-	Bonded Asbestos (ACM) deeper than surface soils (below 10cm)	A visual assessment of the residual remediation excavation footprint and photographic record. A visual inspection of each batch of treated material. Collect one representative 10L sample per spread or per 70m^3 of treated material for bonded ACM field screening Visual validation of excavation base and walls if exposed natural material, otherwise collect: • one 10L sample per 5m x 5m of excavation base; and • one 10L sample per ten lineal metres of excavation wall, for each relevant stratum, or per vertical metre of excavation depth, whichever is greater, minimum four. for bonded ACM field screening. Clearance certificate from a licensed asbestos assessor (LAA) or competent person.
	Chemical Contaminants	A visual assessment of the residual remediation area and photographic record. Visual validation of excavation base and walls, and collection of • one sample per 5 m x 5 m (25 m^2) of excavation base, minimum of two; and • one sample per five lineal metres of excavation wall, if greater than 0.1 m for each relevant stratum, or per vertical metre of excavation depth, whichever is greater. Laboratory analysis of all samples for COPC