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REMEDIAL ACTION PLAN (RAP):

154-158 Pacific Parade Dee Why NSW 2099

Lot 1 in DP 34753

Prepared for:
Harrington Dee Why Pty Ltd

(Report ID : EBG-04006.RAP.03.25.R00)

21 March 2025

CONTENTS

APPENDIX:

- SITE LOCATION (FIGURE NO 1: RAP-04001-F01)
- BOREHOLE LOCATION AND AREA OF ENVIRONMENTAL CONCERN BOUNDARY (FIGURE NO 2: RAP-04001-F02)

Abbreviations	
AEC	Area of Environmental Concern
As	Arsenic
B(a)P	Benzo (a) pyrene (a component of PAHs)
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BH	Borehole
Cd	Cadmium
Cr	Chromium
DSI	Detailed Site Investigation
EIL	Ecological Investigation Level
EPA (NSW)	Environmental Protection Agency (NSW)
ESA	Environmental Site Assessment
DECCW(NSW)	Dept. Environment, Climate Change & Water (NSW)
HIL	Health Investigation Levels
Hg	Mercury
MAH	Mono Aromatic Hydrocarbons
NEPM	National Environment Protection Measure
Ni	Nickel
OCPs	Organochlorine pesticides
OE&H	Office of the Environment & Heritage (NSW)
OPPs	Organophosphate Pesticides
PCBs	Polychlorinated Biphenyls
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PID	Photo Ionisation Detector
QA/QC	Quality Assurance and Quality Control
RAP	Remedial Action Plan
RPD	Relative Percentage Difference
TCLP	Toxicity Characteristics Leaching Procedure
TRH	Total Recoverable Hydrocarbons
UST	Underground storage tank
VOCs	Volatile Organic Compounds

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SECTION 1: INTRODUCTION

1.1 Authorization

This investigation was authorized by Joanne Erickson and Matt Davison on behalf of client Harrington Dee Why Pty Ltd. The investigation was conducted on one lot identified as Lot 1 in DP 34753 and shall be referred to in this report as the 'Site'. The property is located between the 14 and 12 metre AHD contours. The land slopes away gradually to the north east. It is likely that the surface water and groundwater shall follow the topography, and flow south toward beach sands (ocean).

1.2 Consultants Brief

The Remedial Action Plan complies where appropriate with the *NEPM* 2013, Local Council *State Environmental Planning Policy (Resilience and Hazards) 2021* and *EPA NSW Guidelines for Consultants Reporting on Contaminated Sites (May 2020).*

Previous investigations:

- *Stage 1 Preliminary Site Investigation* (*EBG-03089.Stage1.PSI.09.24.R00)* October 2024
- *Stage 2 Detailed Site Investigation* (*EBG-03070/03094.Stage2.DSI.12.24.R00)* December 2024

Stage 2 DSI Executive Summary:

Soil - Sampling and Analysis

- *The seven-step DQO process (defined in Section 4) as outlined in the NEPM 2013 was employed to assess the property in regard to contamination of the soil.*
- *The area of the lot is 550 square metres. As such according to EPA NSW Sampling design part 1 – application (Aug 2022) a minimum of 8 sampling points was required to characterise the site. One sample was taken of the fill layer (0.1 – 0.5 m) and one from the deeper substratum where possible. Deeper samples were taken from two borehole >2.0 metres.*
- *The detailed site investigation was undertaken using a mechanical augur and hand equipment. Fifteen (16) primary soil samples were collected. Five (5) QA/QC samples were also analysed.*

- *The soil sample laboratory analysis results were assessed against the relevant guidelines listed in the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) May 2013.*
- *All soil samples were analysed for 'contaminants of concern' by Envirolab Services in Chatswood (NATA accredited laboratory).*
- *The soil sample laboratory analysis results confirm that heavy metals (x8), PAH, TRH, BTEX, OCPs and PCBs analysis results did not exceed the HIL D Commercial / Industrial criteria, the ESLs, the EILs and management criteria (hydrocarbons) in accordance with the NEPM 2013. (ie: See Section 7).*
- *All VOC analysis results were below detection levels.*
- *The metals copper and zinc analysis results did exceed the aged EILs (Ecological Investigation Levels) within shall fill samples of two boreholes. Levels have been derived for selected metals and organic compounds and are applicable for assessing risk to terrestrial ecosystems). This fill shall be removed (possibly as part of remediation to deal with asbestos cement fragment/s) but principally as part of a two basement level excavation. As the shallow fill material shall be removed it is considered that the exceedance above the Ecological Investigation Levels shall not be an issue.*
- *A PID reading to assess volatile content was taken of a duplicate of the primary samples. The PID readings did not exceed the action level of 30ppm (No reading exceeded 0.1 ppm – see table in Section 4.3).*
- *Asbestos fibres and/or fines were not detected in the analysed samples at reporting limit of 0.1 g/kg. No respirable fibres detected.*
- *A fragment of fibreboard was located within the surficial fill (depth 0.25m) of BH01. This borehole is located within the 'pebble landscaped' area between the two cafes (centre of the property). The fragment on analysis contained chrysotile and crocidolite asbestos.*
- *Suspected natural sands and silts were identified in all boreholes beneath the shallow upper fill sands.*

Groundwater – Sampling and Analysis

- *The seven-step DQO process (defined in Section 4) as outlined in the NEPM 2013 was employed to assess the property with regard to groundwater contamination.*
- *Three established groundwater wells located along The Strand were sampled. These wells were originally established as part of the groundwater investigation monitoring / sampling of the UPSS leak of the adjacent service station. The wells were originally identified in these reports as MW06, MW07 and MW09. The wells were renamed as MW01, GW02 and GW03 (respectively) for this investigation. A summary of the original groundwater reports is provided in Appendix E.*
- *All three wells were sealed and in good condition. The wells were bailed using individual disposable bailers on 7 February 2025 (4 days before sampling using a peristaltic pump sampling unit). The water was relatively clear with no odour.*
- *The groundwater wells were located adjacent to the north/south 'down-gradient' direction (with respect to groundwater).*
- *On 11 February 2025, 3 groundwater wells were sampled. 4 duplicate QA/QC samples were also analysed.*
- *All groundwater samples were analysed for 'contaminants of concern' by Envirolab Services in Chatswood (NATA accredited laboratory) and the results assessed against the relevant guidelines listed in the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) May 2013.*
- *The groundwater sample laboratory analysis results confirm that the metals (x8), BTEX, PAHs and VOC analysis results were all below detection, and as such <u>did not exceed</u> the Groundwater Investigation Levels (GILs) and Groundwater HSLs for Vapour Intrusion in accordance with the NEPM 2013. (ie: See Section 7).*
- *Historical Setting: UPSS Monitoring of Adjacent Service Station (Rpt WSP 2017) :*
    - *Elevated levels of BTEX (benzene >criteria) and F1 (C6-C10) and F2 (C10-C16) hydrocarbons detected in MW09 (GW03) in 2017*
    - *Elevated levels of F1 (C6-C10) (>criteria) and F2 (C10-C16) hydrocarbons in MW06 (GW01) in 2014. See Appendix E.*

- *Low level elevation of F2 (C10-C16) was detected in the two groundwater samples taken from GW01 (F2 – 140 ug/L) and GW03 (66 ug/L). Both these were well below the NEPM criteria for residential of 1000 ug/L but still above detection levels.*

Recommendations

Suitability of the Site for the Proposed Development

This report is in accordance with:

- *National Environment Protection (Assessment of Site Contamination) Measure (NEPM), (1999 amended 2013);*
- *State Environmental Planning Policy (Resilience and Hazards) 2021;*
- *EPA NSW Guidelines for Consultants Reporting on Contaminated Sites 1997 Reprinted August 2011.*

Elevated 'contaminants of concern' above the nominated criteria that may impact the proposed development, were not identified during this Detailed Site Investigation. It is the opinion of EBG that ***the site shall be suitable for the proposed development:***

- *Demolition of an existing buildings and construction of a new development with a mixed use building consisting of two levels of basement parking accessed by a car lift from street level. The ground floor consists of two retail tenancies and a residential lobby leading to 9 sole occupancy units across three split level storeys.*

IMPORTANT NOTE: *The above is given with the understanding that the* ***'recommendations'*** *below are undertaken:*

Recommendation #1: Remedial Action Plan

A Remedial Action Plan shall be prepared to remove the fill/soil impacted with potential asbestos cement fragments identified in the shallow fill of BH01 and possibly other areas to accordance with the NEPM 2013, Local Council State Environmental Planning Policy (Resilience and Hazards) 2021 and EPA NSW Guidelines for Consultants Reporting on Contaminated Sites (May 2020) to deal with the areas of environmental concern. Refer to Section 10.2.2

Recommendation #2: Sub Floor Vapour (hydrocarbon) Assessment

The detected low hydrocarbon results shall not affect the recommendation that the site is suitable for the proposed development. However, considering the historical setting (past investigations), it shall be deemed prudent to undertake a Soil Vapour Assessment to provide design guidance in the event of sub-basement vapour accumulation risk. Considering the current landuse, this investigation shall be undertaken after demolition of the current buildings. The investigation shall be undertaken in accordance with Vapour Intrusion : Technical Practice Note, DECCW (EPA NSW) Sept 2010. Refer to Section 10.2.3

Recommendation #3: Hazardous Material Audit on Buildings

Recommendation #4: General Excavation of Fill / Soil – Waste Classification Requirements

Recommendation #5: Imported Soil - VENM

Recommendation #6: Unexpected Finds Protocol – Unknown Contaminated Soil

1.3 Limitations of the Report

This RAP has been prepared to meet the requirements outlined in the scope of work. It does not include evaluation of any other issues. EBG performed the services in a professional manner, in accordance with relevant guidelines and standards, and generally accepted industry practices. EBG does not make any other warranty, expressed or implied, as to the professional advice contained in this report.

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SECTION 2: PHYSICAL SETTING & SITE INFORMATION

ADDRESS	154 – 158 Pacific Parade, Dee Why NSW
LOCAL GOVERNMENT AUTHORITY	Northern Beaches
LOT & DEPOSITED PLAN	Lot 1 in DP 34753
PARISH	Manly Cove
COUNTY	Cumberland
SITE AREA	Total investigation area of approx. 550 m^2
SOIL LANDSCAPE	The site lies within the Newport (aeolian) soil landscape group.
GEOLOGY	Q_avf Alluvial Fan Deposits - lithic sand, silt, gravel, clay Tuth Hawkesbury Sandstone - Medium- to coarse-grained quartz sandstone with minor shale and laminite lenses.
HYDROGEOLOGY & TOPOGRAPHY	The property is located between the 14 and 12 metre AHD contours. The land slopes away gradually to the north east. It is likely that the surface water and groundwater shall follow the (limited) topography, and flow south toward beach sands (ocean).
ACID SULFATE SOIL RISK	The site is located not located within an ASS zone. It is our opinion that PASS (potential acid sulfate soils) shall not be an issue affecting the site.
EPA NSW – LIST OF NSW NOTIFIED CONTAMINATED SITES	The Site is not listed.
EPA NSW – RECORD OF NOTICES	The Site is not listed.
PROPOSED DEVELOPMENT	The proposed development is a mixed use building consisting of two levels of basement parking accessed by a car lift from street level. The ground floor consists of two retail tenancies and a residential lobby leading to 9 sole occupancy units across three split level storeys.
LGA NORTHERN BEACHES COUNCIL – PLANNING CERTIFICATE 10.7	Matters arising Section 59(2) under the Contaminated Lands Management Act 1997 prescribes the following matters that are to be specified in a Planning Certificate: *(a) The land is not significantly contaminated,* *(b) The land is not subject to a management order,* *(c) The land is not subject of an approved voluntary management proposal*

	(d) The land is not subject of an ongoing voluntary management proposal, *(e) The land is not subject to a site audit statement*
BUILDING CONDITION AND USE	The development consists of one lot and DP identified as Lot 1 in DP 34753. The site is generally triangular and occupies a total area of 550 square metres. Two cafés / restaurants are presently located on site. The larger one facing Pacific Parade is suspected to have been the chemist then laundry. Described as 'Dee Why Coin Laundry' in a web search. The shop is quite small and suspected to be a 'dry cleaning' drop off point. Dry cleaning facilities not suspected on site in the past. The buildings are constructed predominately of brick masonry and concrete (with some fibreboard), with a metal roof. The internal floor of the building is suspected concrete slab and timber.
UNDERGROUND & WASTE STORAGE TANKS	Not identified and not suspected to be located on site.
FILL MATERIAL	The exact nature of the sub-surface material is not known. The land appear to generally conform to the natural levels of the land in the area and the general topography of the properties facing Pacific Parade. Considering the slope of the land to the north (down to the beach), some filling may have occurred prior to the construction of the former residence now restaurant facing Pacific Parade.

SECTION 3: DATA QUALITY OBJECTIVES (DQO)

3.1 Outline of DQO Process

The EPA NSW *Guidelines for the NSW Site Auditor Scheme* (2nd Edition – April 2006) describes the DQO process thus:

> *The process used to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of the site. The DQOs provide a systematic approach for defining the criteria that a data collection design should satisfy, including when, where and how to collect samples or measurements; determination of tolerable decision error rates; and the number of samples or measurements that should be collected.*

The DQOs are achieved by employing a seven-step process:

Table 3

	STEP	SECTION
1	Define the Problem	Section 3.1.2 1.2 Consultants Brief & Scope of Works
2	Identify the Decisions	Section 3.1.3 Sections 2 : Physical & Site Info Section 2 : Proposed Development
3	Identify the Inputs to the Decision	Section 3.1.4 Sections 4 & 5: Section 7.3: Health Screening Levels for Asbestos
4	Define the Study Boundaries	Section 3.1.5 Section 2 : Site Identification Section 2 : Soil Landscape & Geology Section 2 : : Physical & Site Info
5	Develop a Decision Rule	Section 3.1.6 Section 2 : : Proposed Development Section 3: Data Quality Objectives (DQO) & Assessment
6	Specify Limits of Decision Errors	Section 3: Data Quality Objectives (DQO) & Assessment
7	Optimise the Design for Obtaining Data	Section 3.1.8 Section 2: Proposed Development Sections 8: Validation Soil Sampling Analysis QA/QC Procedure

3.2 Step 1 - Define the Problem

As there is a possibility that the past land uses may have impacted on the sub-soil, a Stage 2 DSI soil sampling programme and analysis was carried out.

See:

- *Section 2.1.2*
- *1.2 Consultants Brief & Scope of Works*

3.3 Step 2 - Identify the Decisions

The primary decision statement that this report shall attempt to resolve is:

> Analysed samples taken from the property shall be assessed against the maximum criteria from the landuse as defined by *National Environment Protection (Assessment of Site Contamination) Measure (NEPM)* 1999 (Amended 2013*) for Commercial / Industrial HIL D*. By using the results and guidelines the consultant shall make a decision if the property is suitable for the proposed landuse, and if not, the appropriate management or remediation necessary to achieve this end.

See:

- *Section 2.1.3*
- *Sections 2 : Physical Settings & Site Information*

3.4 Step 3 – Identify the Inputs to the Decision

The primary inputs used to assess the contamination were:

- Define the site boundaries by the use of survey maps and site inspection.
- Review of the site history and site conditions, including the geology, hydrogeology and topography.
- Assessing contamination identified with the Phase 2 report to facilitate the remediation procedures.
- Using appropriate soil sampling procedures to ensure correct representative data.
- Using correct analytical methods (NATA etc) with quantitation limits below the site assessment criteria.

See:

- Section 2.1.4
- Sections 4 & 5
- Section 7.3: Health Screening Levels for Asbestos

3.5 Step 4 – Define the Study Boundaries

The boundaries of the site are documented in *2.1 Site Identification*. The sub surface study boundaries within the above site boundary shall be within the fill down to natural material.

See:

- Section 2.1.5
- *Sections 2 : Physical Settings & Site Information*

3.6 Step 5 – Develop a Decision Rule

The purpose of this step was to define the parameter of interest, specify the action level and combine the outputs of the previous steps into an "if …….., then….." decision rule that defines the conditions that would cause the decision maker to choose alternative actions.

The following decision rules may be applied:

- Comparison of the results of the validation samples to the criteria (ie: '**If** the results are above criteria **then** remediation may be necessary')
- **If** field QA/QC samples (blanks, spikes etc) are found to contain chemicals of concern **then** further action extra sampling, investigation of procedure shall be undertaken.
- **If** the laboratory QA/QC samples (matrix spikes, reagent blanks) fall outside the acceptance criteria (See 2.7 - DQI) **then** the laboratory shall be contacted, and/or the *samples shall be re-analysed.*

See:

- *Section 2.1.6*
- Section 2 *: Proposed Development*
- *Section 3: Data Quality Objectives (DQO) & Assessment*

3.7 Step 6 – Specify Acceptable Limits on Decision Errors – Data Quality Indicators (DQIs)

The project DQIs address 'Step 6', and have been established to set acceptance limits on field and laboratory data collected as part of the investigation:

DQI	FIELD	LABORATORY	ACCEPTANCE LIMITS
Accuracy	Procedures standard Rinsate blanks	Analysis of: Rinsate blanks Matrix spike Lab control sample Lab duplicate <5xPQL Lab duplicate >5xPQL	As per Envirolab Procedures Not detect 70 to 130% 70 to 130% Any RPD is acceptable 0-50% RPD is acceptable
Precision	Standard procedures appropriate to job and applied Collection of split (Inter-lab) duplicate and field (Intra-lab) duplicate	Analysis of: Field (Intra-lab) duplicate Split (Inter-lab) duplicate	 0-50% RPD is acceptable 0-50% RPD is acceptable
Represent-ativeness	Correct material sampled as per RAP or ESA All material needing to be sampled was sampled	All samples analysed in accordance with 'Chain of Custody'	
Compara-bility	Correct sampling protocol applied Sampler appropriately trained Similar climate conditions	Standard procedures used for all labs Similar analytical methods employed by all labs involved	As per NATA requirements As per EBG and DECCW requirements
Complete-ness	All critical locations sampled Samples collected from surface or depth where appropriate	All samples analysed according to procedures Correct methods employed Correct PQLs employed Chain of custody requirements acted upon Lab holding times appropriate	As per appropriate regulations and guidelines

- PQLs – Practical Quantitation Limits
- RPD – Relative Percentage Difference
- RAP – Remedial Action Plan

3.8 Step 7 - Optimise the Design for Obtaining Data

EPA (2006) - *Identify the most resource-effective sampling and analysis design for general data that are expected to satisfy the DQOs.*

This is documented in:

- Section 2 : Proposed Development
- *Section 3: Data Quality Objectives (DQO) & Assessment*
- Sections 8: Validation Soil Sampling Analysis QA/QC Procedure

SECTION 4: UPDATED CONCEPTUAL SITE MODEL

4.1 Potential Receptors

The site inspection revealed a number of potential receptors for off-site migration of potential contamination:

- Adjacent residential properties (houses and apartments).
- Dee Why beach (ocean) – 150 metres to the northeast.

4.2 Potential Areas of Environmental Concern (PAECs)

POTENTIAL CONTAMINATION SOURCE	CONTAMINATING ACTIVITY	CONTAMINANTS OF CONCERN	PAEC LIKELIHOOD
On site: commercial activities – café restaurants	Oils etc	Hydrocarbons	Unlikely
Post Investigation Update: Hydrocarbon (total petroleum hydrocarbons) were not identified during the investigation within the soil samples.			
Historical commercial activity. A laundry business was located on the corner of Pacific Parade & The Strand (described as 'coin operated laundry') 1975 to around 2010.	Use of dry cleaning fluids / leakage / unknown disposal	Chlorinated hydrocarbons, volatile organic compounds.	Unlikely – the business was a coin operated laundry - not a 'dry cleaners'.
Post Investigation Update: Volatile Organic Compounds (VOCs) were not identified within the three soil samples or within the groundwater taken from the three bores along The Strand.			
Service station located across the road, 148 Pacific Parade. Located on site from around 1971 to present day. Listed on EPA NSW contaminated list.	Petroleum products held in USTs, workshop oils etc – confirmed leakage (since remediated) but remnants of 'plume' still possible.	Heavy metals, Hydrocarbons TRH+BTEXN, VOC,	Possible soil impact and needs investigation. Note: 4 groundwater monitoring wells located on The Strand footpath adjoining property.
Post Investigation Update: Heavy metals (metalsx8), BTEXN and Volatile Organic Compounds (VOCs) were not identified within the soil samples or within the groundwater taken from the three bores along The Strand. Hydrocarbons (F2 : C10-C36) were detected in GW01 and GW03 samples. The levels were marginally above detection but well below the guidelines.			

POTENTIAL CONTAMINATION SOURCE	CONTAMINATING ACTIVITY	CONTAMINANTS OF CONCERN	PAEC LIKELIHOOD
Subsurface fill with building debris (past demolition)	Identified during geotechnical investigations	PAH, Heavy metals, asbestos	Possible - Not likely in any substantial quantity but needs to be investigated
Post Investigation Update: A fragment of asbestos cement fibreboard was identified in shallow subsoil in the BH01. Fill located in all boreholes at varying depths between 0.2 – 0.8 metres.			

4.3 Risk of Potentially Affected Media (PCM)

The potentially contaminated media on site are:

- Risk of hydrocarbon contamination from service station across road (listed on EPA contaminated sites database). The site is not considered to be down gradient to the source of contamination (old fuel tanks). However it could be considered to be adjacent to the northeast direction of the groundwater flow. The soil is sandy and porous – lateral movement of the hydrocarbon plume could have been (and possibly could be) possible. Heavy metals (metalsx8), BTEXN and Volatile Organic Compounds (VOCs) were not identified within the soil samples or within the groundwater taken from the three bores along The Strand. Hydrocarbons (F2 : C10-C36) were detected in GW01 and GW03 samples. The levels were marginally above detection but well below the guidelines. **LOW Risk.**
- Soil/Fill material – under concrete slab/s of building and within rear yard. Potential for fill to be imported to site (presently unknown) – Asbestos cement fragment identified within the shallow fill of BH01.
- Groundwater –considering groundwater direction. Four groundwater wells are located on the footpath adjoining the property (MW06, 7, 8 & 9). Hydrocarbon levels were detected (see below) - Hydrocarbons (F2 : C10-C16) were detected in GW01 and GW03 samples. The levels were marginally above detection but well below the guidelines. **LOW** Risk (considering very low levels).
- **Important Note**: Elevated levels of ethylbenzene and xylenes detected in MW09 in 2017 and F1 (C6-C10) and F2 (C10-C16) hydrocarbons in MW06 in 2014. Odour levels

affecting the property but below criteria still a possibility. See Appendix B – UPSS Monitoring Q3 2017 – WSP.

4.4 Potential Exposure Pathways

PATHWAY	CONTAMINANTS	POTENTIAL RISK / LIKELIHOOD
Airborne contaminant particles	Heavy metals, volatile components, asbestos	Update: Low levels of metals and hydrocarbons detected. Low risk from asbestos cement fragment located in BH01 surficial fill.
Dermal contact	Heavy metals, hydrocarbons, asbestos etc	Unlikely for onsite construction workers
Airborne vapours	Volatile contaminants, hydrocarbons	Possible onsite occupants via sub floor soil vapour accumulation within proposed development basement. Low levels of F2 (C10-C16) detected in two groundwater samples well below the guidelines. Soil Vapour Assessment shall be recommended upon demolition.

4.5 Human and Ecological Receptors

TYPE	RECEPTORS	LIKELIHOOD
HUMAN	Current and future occupants and landholders	Sub floor vapour accumulation and intrusion with planned basements. Low levels of F2 (C10-C16) detected in two groundwater samples well below the guidelines. Soil Vapour Assessment shall be recommended upon demolition.
	Construction and maintenance workers particularly involved in potential excavation works	Sub floor vapour accumulation and intrusion with planned basements. Low levels of F2 (C10-C16) detected in two groundwater samples well below the guidelines. Soil Vapour Assessment shall be recommended upon demolition.
	Adjoining residential and commercial properties	Off-site contamination originating from the Site not considered an issue.
	Pacific Ocean – 150 metres to northeast	Unlikely - Identified asbestos cement fragment and low level oils not considered a risk.

ECO-LOGICAL	Adjacent residential properties	Unlikely - Identified asbestos cement fragment and low level oils not considered a risk.
	Adjacent gardens, trees and scrubs	Unlikely - Identified asbestos cement fragment and low level oils not considered a risk.

4.6 Assessment of Data Gaps

DATA GAPS	COMMENTS
Status of the soil with respect to on-site contaminating activities	Asbestos cement fragment located in surficial fill of BH01
Status of the soil with respect to adjacent contaminating activities	EPA listed contaminated site (service station) approx. 15 metres west of site. Low levels of F2 (C10-C16) detected in two groundwater samples well below the guidelines. Soil Vapour Assessment shall be recommended upon demolition.
Status of subsurface with respect to potential vapour intrusion	At present unknown. EPA listed contaminated site (service station) approx. 15 metres west of site. Low levels of F2 (C10-C16) detected in two groundwater samples well below the guidelines. Soil Vapour Assessment shall be recommended upon demolition.
Status of groundwater with respect to on site or offsite contaminating activities	Elevated levels of ethylbenzene and xylenes detected in MW09 in 2017, and F1 (C6-C10) and F2 (C10-C16) hydrocarbons in MW06 in 2014. No odour detected. Low levels of F2 (C10-C16) detected in two groundwater samples well below the guidelines. Soil Vapour Assessment shall be recommended upon demolition.

SECTION 5: IDENTIFIED CONTAMINATION, AREAS OF ENVIRONMENTAL CONCERN & REMEDIAL OPTIONS

5.1 Identified Contamination

Seven samples of soil were analysed for asbestos fibre content. No asbestos detected at reporting limit of 0.1 g/kg. No respirable fibres detected.

One fragment of asbestos cement fibreboard was located within the fill material (depth 0.2 m) of BH01. Borehole #1 was located in rear courtyard of the 'Beach Burrito Co.' Café. the eastern centre of the property,

The fragment was analysed for asbestos content. The fragment contained chrysotile and crocidolite asbestos.

It is recommended that formal classification be undertaken on separated stockpiles during construction works to enable appropriate removal of the upper fill to a licensed disposal facility if needed as per EPA guidelines.

5.2 Area/s of Environmental Concern (AEC)

The asbestos cement fragment was located within the shallow fill extracted using a hand augur from the centre of the property. Other building debris (fragments of concrete and brick etc) was also located within this fill material. It is thought that the fill material was originally part of the rear yard of the old original residence (top café). This impacted fill material may extend under the buildings and/or under the concrete slab floors and rear yards.

See Figure 2 : RAP-04001-F02 in Appendix A.

5.3 Remediation Options and Goals

The preferred order of options for site remediation and management is documented in the *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites as:*

- on-site treatment of the soil so the contaminant is either encapsulated, destroyed or the hazard reduced to an acceptable level,
- off-site removal or treatment of excavated soil and depending on the residual levels of contamination it may be then returned to the site, removed to a waste facility or used as landfill.

5.3.1 Option 1: Encapsulation of Asbestos Contaminated Soil and Instigation of a Long Term Environmental Management Plan (cap and contain)

- Procedure #1: Remedial Measures – Removal of Upper Surface Asbestos Impacted Soils
- Procedure #2: Asbestos Management Plan (Undertaken during Construction)
- Procedure #3: Long Term Environmental Management Plan (Attached to Property's Planning Certificate 10.7)

Procedure #1: Remedial Measures – Removal of Upper Surface Asbestos Pieces

In accordance with the *Work Health and Safety Act 2011 (WHS Act)* and *Work Health and Safety Regulation 2011 (WHS Regulation)* the remedial work shall be undertaken by an Asbestos Removalist who holds a *Friable (Class A) Asbestos Removal Licence*.

Procedure #2 : Asbestos Management Plan (ASM)

Considering the asbestos found on site, and the potential to be found on site during the construction process, a management plan shall be provided to the Council and contractors (excavation, builders and associated trades) in the event that asbestos cement fibreboard pieces are located with the disturbed soil within the construction area. The ASP shall detail (but is not limited to):

- excavation procedures and potentially asbestos contaminated soil
- removal of asbestos cement pieces from excavation surface ('emu picking')
- on-going inspections and reports
- classifying soil to be removed from site
- validation or similar reports after removal of asbestos pieces
- Regulations

Procedure #3: Long Term Environmental Management Plan (LTEMP)

The LTEMP shall be attached to property's Planning Certificate 10.7, and shall inform future owners, construction contractors or builders of the potential to encounter asbestos cement fibreboard within subsurface excavations.

The purpose of this LTEMP is to document the procedures to be implemented to ensure that the site is maintained and that any minor (small-scale) sub-surface invasive works are

managed in an appropriate manner. This ensures the protection of the health for site occupiers, visitors and contractors.

These minor invasive works could include excavations for underground services, landscaping, replacement roadworks, concrete hardstand etc.

This LTEMP would not apply to major excavations or construction activities, such as the construction of new buildings. These large-scale works would require a more detailed management plan to be prepared, and possibly Development Consent from Council.

This LTEMP will apply indefinitely for future site operations.

5.3.2 Option 2: Removal of Asbestos Contaminated Soil

Fill soil contaminated with asbestos cement fibreboard and/or fibres is removed from site. The procedure would be documented within a Remedial Action Plan (RAP) as per NEPM 2013 and EPA NSW guidelines. The RAP would be prepared by a Certified Environmental Practitioner (Site Contamination Specialist) or similar.

- At the conclusion of the remediation, validation sampling of the remaining soil shall be undertaken to confirm that all contaminants have been removed. The design of the validation sampling program shall be undertaken using *National Environment Protection (Assessment of Site Contamination) Measure (NEPM*) – Schedule B1 (1999 amended 2013 and *EPA NSW Sampling Design Guidelines* September 1995.
- A validation report shall be prepared following successful removal of contaminated fill and validation of the property.

5.3.3 Preferred Remedial Option

Considering the soil shall be removed as part of the basement excavation the client has chosen remedial Option 2. This option shall achieve two primary outcomes:

- Removal of the asbestos cement fibreboard pieces and soil contaminated with asbestos pieces from site to reduce the hazard to an acceptable level;
- Negate the need for an on-going Environmental Management Plan that would need to be attached to the land title Planning Certificate 10.7.

5.4 Remedial Goals

The remedial goal and remediation strategy shall provide the client a site suitable for the proposed development. Considering the above the remediation option chosen was to remove the contaminated material from site and dispose of the material at an appropriate facility.

As such the remedial goals for this RAP shall be:

- that the validation sample analysis results of the remaining soil (prior to any further basement excavation) shall be compared to the threshold concentrations in the *National Environment Protection (Assessment of Site Contamination) Measure (NEPM*) – Schedule B1 (1999 amended 2013).
- that there shall be minimal demonstrated or perceived risk to human health on the site or emanating from it.

5.5 Remediation Area & Contaminant of Concern within Soil (CofC)

To achieve the remediation aim there must be minimal demonstrated or perceived risk to human health on or off the site.

The extent of the impacted surface fill (remedial area) shall be determined after the removal of the buildings and concrete flooring/s. All fill material containing building debris (concrete and brick fragments, broken tiles, glass etc) shall be suspected of also containing asbestos fragments as per industry standard.

5.6 Notice of Remediation to Council

A formal Notice of Remediation is to be sent to Northern Beaches Council stating that the proposed works meet the criteria for *Category 2 Remediation ('work not needing consent' under SEPP 55)*.

SECTION 6: REMEDIATION METHODOLOGY FOR AREA OF ENVIRONMENTAL CONCERN

6.1 Licence Requirements for Asbestos Removal Work

The supervising removal/remediation contractor shall be a licensed asbestos removalist who is appropriately licensed to carry out the work:

- A Class B AS licence (bonded asbestos) is required for the removal.

6.2 Notifying Safework NSW Licensed Asbestos Removal Work

The licensed asbestos contractor/removalist must notify Safework NSW in writing at least five days before the licensed asbestos removal work commences in accordance with the contractor's Class B AS licence requirements.

6.3 Personal Protection Equipment (PPE)

- The removalist contractors shall wear disposable overalls of 100% synthetic material or a mixed natural/synthetic fabric capable of providing adequate protection against fibre penetration.
- Disposable, half-face particulate respirators or half-face, particulate filter (cartridge) respirators with a P1 or P2 filter type.
- Workers shall also wear rubber or rubber impregnated (or similar) gloves during removal of any fragments.

6.4 Limiting Access / Barricades

A combination of barricades and signs shall be installed to limit access to the asbestos removal area. All people who have access to the removal area should comply with any direction given by the licensed asbestos removalist.

Warning signs at the boundaries of the road should be labelled "ASBESTOS WORKING AREA - NO UNAUTHORISED ENTRY". The signs at entry points to an asbestos removal area should also contain the additional words "RESPIRATORY PROTECTION ESSENTIAL". Signs should conform with the Australian Standard 1319 - 1983 - *Safety Signs for the Occupational Environment*.

6.5 Removal of Contaminated Fill Material

1. The remediation works on site shall entail the removal of the asbestos contaminated fill / soil and all visible building debris and rubbish.
2. The buildings shall be demolished. The timber and concrete flooring, and all surface debris are to be removed to provide access to the soil / fill material.
3. The soil / fill shall be visually inspected. Considering an asbestos cement fragment has been located within one borehole in the centre of the property, it is considered likely that further fragments may be encountered in conjunction with the observed building debris in the upper soil fill.
4. Considering the above, all soil fill containing building debris shall be regarded as being impacted with asbestos fragments unless proven otherwise. The fill shall be removed from site as per Waste Classification (*Special Waste – Asbestos*).
5. The excavation contractor shall be vigilant and have a Class B AS experienced worker/supervisor on site at all times.
6. Dust suppression shall occur during the entire removal operations. A work method procedure shall be presented to the client by the removal contractor prior to commencement of operations.
7. All soil excavated shall be stockpiled close to the excavation works. The stockpile shall be checked (visually) on a regular basis to ascertain its status with regard to asbestos content.
8. In sensitive areas (the site is located adjacent to residential areas), it is recommended that air monitoring be carried out during all removal works where there is a potential for asbestos to be uncovered. This is usually interpreted as one shift per day during removal operations. Air monitoring shall be undertaken in accordance with:

   Section 6.7 – Specifications for Air Monitoring for Airborne Asbestos Fibre

9. The excavated asbestos contaminated soil shall be placed in a plastic lined skip or tip truck. Any stockpile shall be covered during the works (or overnight if not removed that day) with plastic sheeting. Any loose pieces of asbestos cement sheeting shall be placed in plastic bags. It is recommended that a maximum bag size of 1200mm (length) x 900mm (width) be observed. Bags should be filled to no more than 50% capacity. The bags shall be marked, *Caution - Asbestos: Do Not Inhale Dust, Do Not Open Bag*. The

top of the bag when full shall be twisted, folded down and taped. The bag shall then be place in the plastic lined skip bin or alternatively 'doubly bagged'. Workers overalls and masks shall also be bagged after use, within an appropriately licenced asbestos bag as described above.

10. The contaminated soil and bags shall be transported to an appropriate disposal facility.

NOTE: Considering the potential asbestos content, the soil shall be provisionally classified as SPECIAL WASTE as per *Waste Classification Guidelines (Part 1 : Classifying Waste – Department of Environment & Climate Change NSW (April 2008).*

6.6 Classification of Excavated Material

It may be necessary for further classification of the contaminated fill during removal operations. This shall be undertaken in accordance with the *Waste Classification Guidelines (Part 1 : Classifying Waste – EPA NSW (Nov 2014)*

Classification samples of the soil shall be taken by the Environmental Consultant from in situ prior to excavation or from within the stored stockpile as per the requirements below:

Sampling of Stockpiled Material	
Quantity (m^3)	**Number of samples**
<75	3
75 - <100	4
100 - <125	5
125 - <150	6
10 - <175	7
175 - <200	8

***In Situ* Sampling at surface**			
Size of *in situ* area (m^2)	**Number of systematic sampling points recommended**	**Grid size** (m)	**Diameter of the hot spot that can be detected with 95% confidence** (m)
500	8	8	9.3
1000	8	11	13.2
2000	8	16	18.7
3000	9	18	21.5
4000	11	19	22.5
5000	13	20	23.1
6000	15	20	23.6
7000	17	20	23.9
8000	19	21	24.2
9000	20	21	25.0
10,000	21	22	25.7

All samples shall be analysed for

- Asbestos
- Metals (As, Ag, Be, Cd, Cu, Cr, Hg, Mo, Ni, Pb, Se, Zn),
- PAHs.
- BTEX & TRHs

Selected samples shall be analysed for OCPs & PCBs (limited).

6.7 Air Monitoring for Airborne Asbestos Fibre During Removal of Asbestos Contaminated Soil

6.7.1 Introduction

It is a prudent measure to conduct monitoring for airborne asbestos fibres in sensitive areas where asbestos is being removed. Due to the work area proximity to residential areas monitoring shall be conducted during removal operations. The results of air monitoring can be used: to identify failures in containment; to identify poor work practices; to provide proof of containment for occupiers and regulatory authorities and to provide evidence of good work practices for both present and future needs.

6.7.2 Definitions

One monitoring shift is defined as collection of a set of one or more samples in accordance with the Worksafe Australia membrane filter method over a period less than 8 hours.

Clearance monitoring is defined as a collection of a set of one or more samples in accordance with the Worksafe Australia membrane filter method over a short period of between 1 and 4 hours after asbestos removal has been completed and prior to removal of the containment used to isolate the area.

6.7.3 Method

Monitoring shall be conducted in accordance with the Worksafe Australia Membrane Filter Method. The laboratory conducting air monitoring for airborne asbestos fibre shall be registered with the National Association of Testing Authorities (NATA) to perform this test.

The air samples are collected by drawing a measured quantity of air through a membrane filter via a sampling pump. The filters are transformed in the laboratory into transparent specimen slides. The fibres are then sized and counted using a phase contrast microscope and eyepiece graticule. The result is expressed as fibres per millilitre of air, calculated from the number of fibres on the filter and the measured volume of air sampled.

Each sample filter is examined in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC:3003 (2005)]* and NATA requirements.

6.7.4 Action Levels

Action levels are defined as a course of action taken where the air monitoring level is higher than background levels.

If airborne fibre levels reach 0.01 fibres/mL the source of fibre escape is to be found and rectified. Work in the removal area does not have to stop.

If airborne fibre levels reach 0.02 fibres/mL work in the removal area should stop. The affected area should be cleaned and clearance monitoring conducted if required.

6.7.5 Frequency of Air Monitoring

Considering the location, situated next to a commercial hotel, air monitoring shall be conducted each day during removal of the contaminated soil and once as a Clearance Monitoring shift after all contaminated soil has been removed from site.

Air monitoring tests shall normally be of less than an eight hour duration. Extra shifts may be required if the contractor elects to work longer hours.

6.7.6 Air Monitoring Locations

Routine monitoring may be conducted in the following areas:

- The fence boundaries of the work area
- Change and/or lunch room

Subject to the works defining the position of barriers and occupancy of adjacent areas additional monitoring shall be conducted at:

- All approaches to the work area
- Any other areas requested by the Client.

SECTION 7: VALIDATION ASSESSMENT, NEPM VALIDATION CRITERIA AND RAP CONCLUSIONS

7.1 Validation of Remediation Excavation – Sampling and Analysis Plan

Validation sampling of the remaining soil shall be undertaken to confirm that the impacted fill above the allowable criteria has been removed prior to the main basement excavation. The sampling shall be by the NEPM 2013 Method (see section 7.2). The design of the validation sampling program shall be undertaken using *National Environment Protection (Assessment of Site Contamination) Measure (NEPM*) – Schedule B1 (1999 amended 2013 and *EPA NSW Sampling design part 1 – application (Aug 2022)*.

Validation Sampling* and Analysis Plan (VSAP) for each of the three AECs		
Description	**Number / Frequency**	**Analysis**
Floor of excavation	The area of the lot is 550 square metres. As such according to *EPA NSW Sampling design part 1 – application* (Aug 2022) a minimum of 8 sampling points is required to characterise the site (based on a 95% confidence to detect a hot spot of 9.3 - 13.2 metre circumference for a site of between 500 and 1,000 sqm). This is consistent with a 'systematic sampling' of grid size approximately 8m x 8m as per *EPA NSW Sampling design part 1 – application* (Aug 2022)	Asbestos (with primary sample of duplicates analysed for metals x8)
NOTE:		
QA/QC Samples		
Intra laboratory duplicate	1 duplicate for each 20 samples (5%)	Metals x8
Inter laboratory triplicate	1 duplicate for each 20 samples (5%)	Metals x8
Rinsate	1 duplicate for each 20 samples (5%)	Metals x8
Trip Blank	1 included in in esky for each sample day	BTEX

* Validation sampling shall follow EPA NSW *Sampling design part 1 – application* (Aug 2022) &

National Environment Protection (Assessment of Site Contamination) Measure (NEPM), (1999 amended 2013) where appropriate.

7.2 Validation of Remediated Soils – NEPM 2013 Method

Ten (10) litres of soil shall be collected from the surface of each sampling location (8 in total). The 10 litres of soil shall be collected from an area of approximately 0.3 m x 0.3 m and depth 0.15 m. Each soil sample shall be sieved using a 7mm stainless steel sieve. Any material greater than 7mm fraction shall be inspected and any ACM fragments weighed (g). A sub-sample of the soil >500g of the sub 7mm fraction of soil shall be analysed by a NATA accredited laboratory to check the concentration of fibrous asbestos (FA – friable and fibrous material), and asbestos fines (AF – sub-7mm material including free fibre), if any, to evaluate the nature of the contamination

7.3 Health Screening Levels for Asbestos Contamination in Soil (NEPM 2013)

Form of asbestos	Health Screening Level (w/w)			
	Residential A[1]	Residential B[2]	Recreational C[3]	Commercial / Industrial D[4]
Bonded (non-friable) ACM	0.01%	0.04%	0.02%	**0.05%**
FA and AF (friable asbestos)	0.001%			
All forms of asbestos	No visible asbestos for surface soil			

- Residential A with garden/accessible soil also includes children's day care centres, preschools and primary schools.
- Residential B with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
- Recreational C includes public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and unpaved footpaths.
- Commercial/industrial D includes premises such as shops, offices, factories and industrial sites.

Guidance on recommended sampling methods is given in Schedule B2 and is based on the WA DoH guidelines (2021).

As outlined in enHealth *(*2005*),* the quantity of asbestos in soil may be estimated as follows:

$$\%\text{w/w asbestos in soil} = \frac{\%\text{ asbestos content x bonded ACM (kg) /}}{\text{soil volume (L) x soil density (kg/L)}}$$

In the example included in enHealth (2005) it was assumed that:

> % asbestos content (within bonded ACM) = 15% and soil density (for sandy/silty clays) = 1.8 kg/L

Bonded ACM (kg): The assumption of 15% asbestos by weight in bonded ACM for sites contaminated with cement bonded ACM only is acceptable because typical compositions for bonded ACM products used in Australia are 10-15% asbestos by weight.

Soil Density: Soil densities are typically around 1.8 kg/L (1800 kg/m^3) for clays and soils located within the Sydney region.

7.4 Validation of Backfill Material

NOTE: Provision and validation of backfill soil is outside the present Scope of Works. The procedure below is to be used if and when the excavation area is to be re-filled.

After removal of contaminated soil the area may be backfilled with clean validated material. The importation of any fill material is optional, and the amount and depth of any imported fill shall be at the discretion of the client.

Backfill material shall be suitably validated clean using a frequency of one (1) sample for every twenty five cubic metres (25m^3). Each discrete sample analysed shall consist of a composite of these 5 sub-samples collected and mixed in a stainless steel tray. Each sample shall be analysed for PAH, metals (x8), TRH, BTEX, OCPs, and PCBs as per EPA guidelines.

The backfill material shall be (virgin) excavated natural material sourced from a reputable soil / landscaping supplier or excavation contractor. Verification samples shall be taken from the source at the above frequency and the samples analysed as stated.

The results of the verification samples analyses are to be provided prior to the material being imported onto the site.

The results are to be compared Section 8 : Soil Contaminated Threshold Concentrations.

Approval for the importation of the fill material to the site is to be provided only after the analytical results show the material to be clean fill is received.

The imported material delivered to the site must be inspected prior to backfilling to ensure that it is consistent with the material originally sampled. These observations should be documented in the validation assessment report. A verification sample should be taken from the delivered material and analysed for contaminants of concern. The results of the analysis should be compared to the sample results from the original sample.

7.5 Validation Report

A report shall be prepared following successful removal of fill and validation of the property. This report shall contain all relevant information and where appropriate conform to:

- *EPA NSW Guidelines for Consultants Reporting on Contaminated Sites*. May 2020.
- *National Environment Protection (Assessment of Site Contamination) Measure (NEPM*) – Schedule B1 (1999 amended 2013).
- *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in W.A* (Dept of Health - Western Australia 2009 (2021)
-

NOTE: All tip receipts for the removal of contaminated soil/fill from the site must be included with the Validation Report.

7.6 RAP Conclusions

In accordance with *State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)* and *EPA NSW Guidelines for Consultants Reporting on Contaminated Sites* (November 1997), it is the opinion of EBG that if the remediation and validation procedures are carried out as described in this document, the site shall be suitable for the proposed residential re-development.

SECTION 8: VALIDATION SAMPLING ANALYSIS QA/QC PROCEDURE

8.1 Objectives of Analysis Laboratory Quality Assurance Procedures

All laboratories used in this project shall utilize their own QA procedures for analysis. The objectives of the laboratory internal QA programme is to provide data on the accuracy and precision of the analytical results. A description of the methods are listed below:

Reagent Blank: Sample free agents carried through the preparation / digestion procedure and analysed at the beginning of every sample batch analysis. For larger projects, a reagent blank is prepared and analysed with every 20 samples.

Matrix Spike Duplicates: Sample replicates spiked with identical concentrations of target analyte(s). The spiking occurs during the sample preparation and prior to the extraction / digestion procedure. They are used to document the precision and bias of a method in a given sample matrix. Where there is not enough sample available to prepare a spiked sample, another known soil/sand or water may be used. (It is usual for a duplicate spiked sample to be prepared at least every 20 samples).

Surrogate Spike: Added to all samples re requiring analysis for organics (where relevant) prior to extraction. Used to determine the extraction efficiency. They are organic compounds which are similar to the target analyte(s) in chemical composition and behaviour in the analytical process, but which are not normally found in environmental samples.

Internal Standard: Added to all samples requiring analysis for organics (where relevant) after extraction process; the compounds serve to give a standard of retention time and response, which is invariant from run to run with the instruments.

Duplicate: A separate portion of a sample being analysed that is treated as the same as the other samples in the batch. Usually a duplicate is prepared at least every 20 samples.

Control Standards: Prepared from a source independent of the calibration standards. At least one control standard is included in each run to confirm calibration validity.

8.2 NATA Registration of Laboratories

The analysis of the samples shall be undertaken by a laboratory accredited by the National Association of Testing Authorities (NATA). This ensures that these laboratories methodology testing and development is performed in accordance with NATA requirements. NATA

accreditation includes compliance with ISO Guide 17025 *General requirements for the competence of testing and calibration laboratories.*

Laboratories meeting the requirements of this guide comply, for calibration and testing activities, with the relevant requirements for the ISO 9000 series of standards, including those of the model described in ISO 9002 (AS 3902 is the Australian equivalent) when they are acting as suppliers producing calibration and test results.

All analyses are performed in accordance with Australian Standards ("AS"), American Public Health Association ("APHA"), US-EPA or other standards approved by the EPA NSW, the Water Board or other statutory authority.

8.3 Inter Laboratory Analysis

An inter laboratory duplicate shall be taken when undertaking the validation sampling. This is a sample taken from the same point and the same time as the other samples and analysed by a separate and independent laboratory than the primary samples. This provides some degree of confidence that the analyses conducted by the main laboratory has been undertaken according to acceptable reproducible standards.

The inter laboratory samples/duplicates shall be collected at a minimum rate of one in 20 primary samples (5% replicate). Where samples are analysed in duplicate, the quality of the results is assessed by calculating the relative percent difference (RPD) between the reported and repeated results. The RPD is calculated as follow - $RPD = 200 * X_1 - X_2 / X_1 + X_2$

Where X_1 and X_2 are the results obtained for the samples and its duplicate. The results of the duplicate shall be included in the results table. A relative level of difference up to 50% is considered acceptable. Where the results are below the detection limits a calculation shall not be possible. The duplicate sample shall be analysed for asbestos and metals x8.

8.4 Field QA/QC Procedure

8.4.1 Objectives of Field QA/QC Procedure

The objectives of the field QA/QC programme are to minimize all potential sources of error and check the reliability of results.

8.4.2 Field Duplicates (Intra Laboratory Duplicate)

An intra laboratory duplicate shall be taken when undertaking the validation sampling. This field duplicate is a QC sample that is used to determine the precision associated with all or part of the

sample collection. Field duplicates are independent samples that are collected from the same point as the primary sample. The field duplicate shall be analysed for the same analytes as the primary sample. The field duplicates shall be collected at a minimum rate of one in 20 primary samples (ie: 5% of primary samples)

The laboratories precision, or reproducibility is measured from the differences observed in the analysis of duplicate samples. Where samples are analysed in duplicate, the quality of the results is assessed by calculating the relative percent difference (RPD) between the reported and repeated results.

The RPD is calculated as follow - RPD = 200 * X_1 - X_2 / X_1 + X_2

Where X_1 and X_2 are the results obtained for the samples and its duplicate. The results of the duplicate shall be included in the results table. A relative level of difference up to 50% is considered acceptable. Where the results are below the detection limits a calculation shall not be possible. The duplicate sample shall be analysed for asbestos and metals x8.

8.4.3 Equipment Rinsate Samples

An equipment rinsate sample shall be taken during the sampling procedure. An equipment rinsate sample is a sample of demineralised water that is poured over or through field sampling equipment that is considered ready to collect or process a sample. The purpose of the rinsate blank is to assess the adequacy of the decontamination process and/or the cleanliness of the sampling. The rinsate samples shall be collected at a minimum rate of one in 20 primary samples (ie: 5% of primary samples). The rinsate sample shall be analysed for Metals (x8).

8.4.4 Trip Blank

A laboratory prepared clean glass jar is filled with clean soil (sand) supplied by the analysing laboratory and is stored within the sample 'esky' and transported to the laboratory with the other samples. The purpose of the trip blank is to detect any sample contamination due to transport activities.

SECTION 9: SITE AND REMEDIAL MANAGEMENT

9.1 Remedial Management Plan

A 'Remedial Management Plan' shall be provided to the client by the excavation contractor and provided to Council if needed. The site excavation works aim to effectively deal with the contaminated soil located on site.

During remediation procedures the soil shall be excavated and stored on plastic and/or placed directly in the transporting truck or waste bin and transported to the waste management facility. Permission to dispose of the material at the relevant waste management facility shall be provided by the contractor.

In summary the management plan shall include:

- Excavation of the contaminated soil within the designated areas of the property.
- Transporting of soil to waste facility.
- Transporting of clean validated material (VENM) to the site. (if needed)

All removal works will be carried out in a cautious and safe manner, abiding by all relevant standards and guidelines.

9.2 Remediation Schedule

The remediation of the site shall proceed when the appropriate documentation has been provided. It is estimated that the remediation shall be completed within one month of the commencement date.

9.3 Hours of Operation

The proposed hours of operation for the excavation and associated truck activities shall be between 7am to 5pm Monday to Friday, and 7am to 1pm Saturdays. No activities are planned on Sundays or public holidays. The proposed hours are subject to approval from Council.

9.4 Site Security

Site security shall be maintained by temporary fencing to prevent unauthorised access. Signs will be erected during the excavation works to warn the public and adjacent site workers not to enter the site. Contact information for site security and other management issues will be displayed by the contractor at the access gate.

9.5 Dust Control

The works will be undertaken in a manner designed to reduce dust generation. Dust has the potential to be generated during the on-site and transport works. The main areas of concern are:

- removal of contaminated material,
- loading of the contaminated soils to a bin or truck,
- excavation of contaminated soil,
- transporting soil,
- backfilling with validated fill.

Dust will be suppressed at all times. Dusty areas or areas where there is a potential for dust emission shall be wetted down using fine mist sprays. The excavated material shall be lightly sprayed prior to leaving the site.

9.6 Noise

The main contractor shall educate all personnel in relation to the management and reduction of noise generated during all mechanical operations and during the works. The noise issue is particularly sensitive where there is a close proximity to adjoining inhabited residences. All equipment will be kept in good working order in relation to its potential to create noise.

9.7 Stormwater Control

Surface water shall be contained on site. This will be accomplished with appropriate silt fencing and hay bales. Stormwater shall be diverted away from the excavations by bunds if necessary until the excavation has been re-filled. Also contaminated water runoff shall be controlled or remediated in a sediment pond where necessary.

The excavated material whilst on site shall be bunded to prevent water runoff from the site and prevent adjacent areas from becoming contaminated as a result of the remediation works. Stormwater drains, sumps or pits located near the remediation works which have a potential to

receive run off from the excavation area or excavated material are to be isolated and protected by sediment fences. These are to be built of geotextile and/or hay bales and/or sand bags.

9.8 Truck and Equipment Wash

The excavation equipment shall be washed at the end of the day's work. If the excavation equipment is dirty it shall be thoroughly washed, with special attention to the wheels and undercarriage for any trucks or excavators involved.

In the event that some mud is deposited on the road, the road will be swept clean and the soil returned to the site. This returned soil shall be collected and placed on plastic or in a bin. At the end of the job the material shall be removed as per the contaminated soil.

9.9 Sediment and Washwater Disposal

Any sediment collected by silt control devices from water moving off site (ie: in the event of a major rain shower) shall be collected and disposed of as contaminated material.

All general washwater shall be collected and disposed of as contaminated material. Alternatively the water may be passed through a filter approved by the EPA. Any collected sediment from this filter shall then be disposed of as contaminated material.

SECTION 10: OCCUPATIONAL HEALTH AND SAFETY PLAN

10.1 General Occupational Health and Safety and Regulations

All personnel involved in the removal of the earthworks who may come in contact with the contaminated soil shall wear protective rubber gloves and disposable overalls. All work shall proceed in accordance with:

- *Australian Standard AS 2601, 2001. Demolition of Structures.*
- *Waste Classification Guidelines (Part 1 : Classifying Waste – EPA NSW (Nov 2014).*
- *Work Health and Safety Act, 2011.*
- *Work Health and Safety Regulation, 2011.*
- *Protection of the Environment Operations (Waste) Regulations, 1996 updated 1 December 2000.*
- *Protection of the Environment Operations Act, 1997*.

10.2 Personal Hygiene

Smoking, eating or drinking shall not be permitted in areas where there is a possibility that workers may come in contact with the contaminated material. Hand washing facilities shall be provided by the contractor.

10.3 Personal Protection Equipment

All workers shall ensure that there is minimal contact with contaminated material.

All workers on site shall wear the following at all times:

- Steel capped boots
- Hard hats meeting AS1801-1988
- Safety vest.

The following safety equipment shall be made available as necessary:

- Hearing protection meeting AS1270-1988
- Safety glasses, goggles and disposable overalls when directly dealing with the contaminated material
- Disposable latex gloves when directly dealing with the contaminated material
- Disposable, half-face particulate respirators or half-face, particulate filter (cartridge) respirators with a P1 or P2 filter type are required for removal of non- friable asbestos.

SECTION 11: CONTINGENCY PLANNING

11.1 Excavation Contingency Planning

Conditions when excavating are uncertain, as sub-surface conditions, field conditions and weather may change from the expected. The following anticipated problems shall be corrected as detailed:

Excessive Rain: Maintain access, cover working areas with plastic where practicable, if excessive runoff work shall stop until the water is more manageable. Inspect and maintain sediment control and silt fences.

Excessive Mud in Excavation Area: Improve drainage, possibly add geo-textile in problem areas, remove mud if possible.

Excessive Drainage: Increase on-site wastewater storage or decrease work area.

Excessive Dust: Use a water spray to settle dust, or stop and decrease dust generating activities, cover truck loads.

Excessively Wet Materials: Stockpile and dewater on site, possibly add absorbents.

Equipment Failures: Maintain spare parts, keep rental options available, shut down operations until repairs are made

Release of Fuel / Oil from Machinery: Correct or remove source,

Silt Fence Fails: Stop work, repair.

Excessive Noise: Identify source, review equipment, provide silencers where necessary on offending equipment.

Excessive Odours: Monitor for volatiles using air sampling equipment and upgrade PPE as necessary. Use odour and volatile suppressing agents to eliminate or reduce odours.

11.2 Sampling Contingency Planning

Excessive Odours: Monitor for volatiles using air sampling equipment and upgrade PPE as necessary. Use odour and volatile suppressing agents to eliminate or reduce odours.

Excessive Noise: Identify source, review equipment, provide silencers where necessary on offending equipment.

Rain During Sampling: Cover working areas with plastic where practicable, if excessive runoff work shall stop until the water is more manageable. Inspect and maintain sediment control and silt fences from borehole spoil.

Damage to Water or Gas Line: Work should cease immediately. The relevant gas company or Sydney Water should be called immediately when water or gas leaks are detected.

11.3 Unexpected Finds Protocol – Unknown Contaminated Soil

If during excavation or remediation soil is uncovered that is noticeably stained, has an odour or is suspected to be contaminated (outside the known scope), then work should cease in that area. The soil or material should be assessed by an Environmental Geologist/Engineer and sampled for known or possible contaminants. A further report and/or special procedures may have to be undertaken if significant contamination is found on laboratory analysis.

11.4 Emergency Procedures

Emergency procedures may be initiated in the case of:

- small or large scale oil or contaminant spillage
- fire
- electrical wires accidentally interfered with
- failure of control structures like fences or silt control
- industrial accident

The first priority is the safety of personnel whether working on site or the general public. The contractor is to provide an Occupational Health and Safety Plan in the submission to the client that addresses the possibility of and emergency operation or accident. The contractor shall take all necessary action to minimise any environmental damage by using containment booms, fences or the like, or the reinstatement of the appropriate control structure.

11.5 Emergency Contact Details

MEDICAL	HOSPITAL	NORTHERN BEACHES HOSPITAL 105 FRENCHS FOREST RD FRENCHS FOREST NSW 2086 PH(02) 9105 5000
EMERGENCY	FIRE, AMBULANCE AND POLICE	PH: 000.
ELECTRICAL	ENERGY AUSTRALIA	PH: 131 388.
WATER ISSUES	SYDNEY WATER	PH: 132 090.
GAS ISSUES	AGL	PH: 131 909

SECTION 12: REFERENCES AND LEGISLATION

- *Guideline on Investigation Levels for Soil & Groundwater : Schedule B1 – National Environment Protection (Assessment of Site Contamination) Measure (NEPM)*, (1999 amended 2013).
- NSW *Contaminated Land Management Act* 2008 No.11.
- *State Environmental Planning Policy (Resilience and Hazards) 2021;*
- *Waste Classification Guidelines (Part 1 : Classifying Waste – EPA NSW (Nov 2014)*
- *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in W.A (Dept of Health - Western Australia 2009 (2021)*
- *Australian and New Zealand Guidelines from the Protection of Aquatic Organisms – 95% Protection of Species for Fresh and Marine Water* (ANZECC 2000).
- EPA NSW Sampling design part 1 – application (Aug 2022).
- EPA NSW *Guidelines for Consultants Reporting on Contaminated Sites* April 2020 Updated May 2020.
- *Work Health and Safety Act 2011 (WHS Act)* and *Work Health and Safety Regulation 2011 (WHS Regulation)*
- *Guidelines for Implementing the POEO (Underground Petroleum Storage Systems) Regulation 2008* – Dept. of Environment, Climate Change & Water – OEH NSW and;
- *UPSS Technical Note: Decommissioning, abandonment, and removal of underground petroleum storage systems (DECCW 2010b).*

APPENDIX

LEGEND:

- SITE LOCATION

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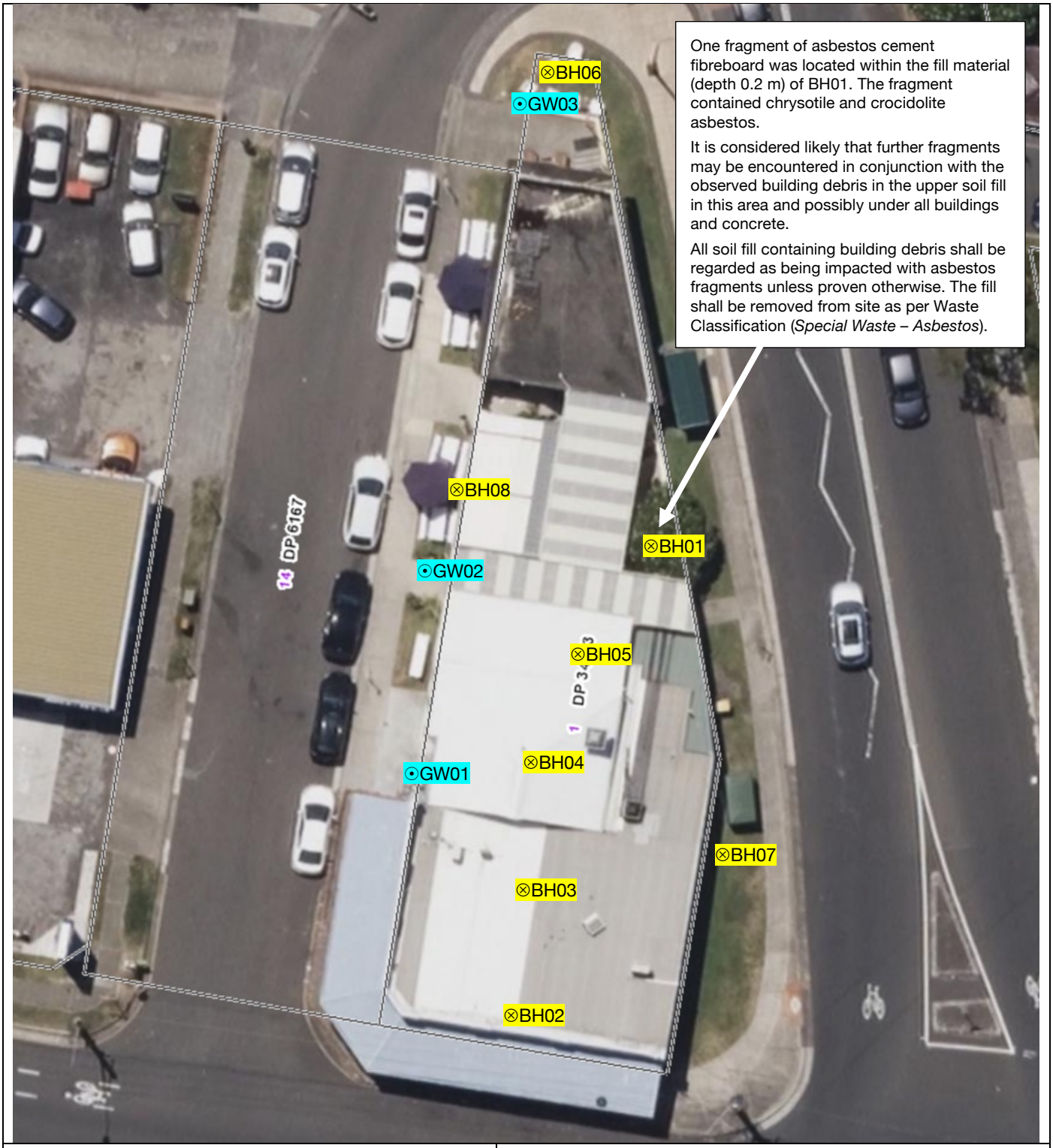
FIG NO.	FIGURE NO. 1 : 04006-F01	LOCATION	154-158 PACIFIC PARADE DEE WHY NSW 2099
SOURCE	NEARMAP - IMAGERY 2016 CNES / ASTRIUM, DIGITALGLOBE	CLIENT	HARRINGTON DEE WHY PTY LTD
DRAWN	M.E	PROJECT	REMEDIAL ACTION PLAN
APPROVED	M.E	TITLE	SITE LOCATION



LEGEND:

⊗BH0# – BOREHOLE LOCATION

⊙GW0# - GROUNDWATER WELL LOCATION

EBG Environmental Geoscience

FIG NO.	FIGURE NO. 2 : 04006-F02	LOCATION	154-158 PACIFIC PARADE DEE WHY NSW 2099
SOURCE	NEARMAP - IMAGERY 2016 CNES / ASTRIUM, DIGITALGLOBE	CLIENT	HARRINGTON DEE WHY PTY LTD
DRAWN	M.E	PROJECT	REMEIAL ACTION PLAN
APPROVED	M.E	TITLE	BOREHOLE & GROUNDWATER WELL LOCATION