

Transcend Property Pty Ltd

Remedial Action Plan

241 Grafton Road, Armidale NSW

Report No:

2785-RAP-01-250326.v1f

Report Date:

25 March 2026

 info@egau.com.au

 **NSW:** 36E Fitzroy Street, Marrickville, NSW 2204
VIC: 88 Langridge St, Collingwood VIC 3066

DOCUMENT RECORD

Revision	Date	Author	Reviewer
v1f	25 March 2026	Nicholas Jessup	Isabelle Figatowski

Author Signature		Reviewer Signature	
Name	Nicholas Jessup	Name	Isabelle Figatowski
Credentials	B. Engineering Sci. (Civil)	Credentials	B. Sc. (Env. Consulting)
Title	Environmental Scientist	Title	Senior Environmental Scientist

Document Title:	Remedial Action Plan, 241 Grafton Road, Armidale NSW
Site Address:	241 Grafton Road, Armidale NSW
Client Name:	Transcend Property Pty Ltd
Site Size:	≈ 44.55 ha
Reference Number:	2785-RAP-01-250326.v1f
Project Type:	Remedial Action Plan
Project Type Abbreviation:	RAP
Document Draft:	FINAL
Document Revision No.	v1

Prepared by Environmental Group Australia Pty Ltd ABN: 83 671 599 143

EXECUTIVE SUMMARY

Environmental Group Australia Pty Ltd (EGA) was engaged by Transcend Property Pty Ltd (hereafter referred to as 'the client'), to prepare a Remedial Action Plan for the property located at Lot 1, DP1209469, Lot 69 & 70 DP755808 and Lot 8 DP240862, 241 Grafton Road, Armidale NSW. The site location is provided in **Figure 1** and the site layout, in **Figure 2**.

Requirement for a Remedial Action Plan

The site is planned for redevelopment and previous environmental site assessments have indicated contamination is present and requires remediation. The objective of the remediation works as defined in this RAP, is to make the site suitable, from a contamination perspective, for the planned redevelopment.

A RAP is necessary to define the nature and extent of the contamination requiring remediation; to document the intended remediation methods and the validation criteria to be used, and to outline the necessary environmental controls to ensure environmental protection.

Site Description

- The site is identified as Lot 1, DP1209469, Lot 69 & 70 DP755808 and Lot 8 DP240862;
- The site covers an area of approximately 44.55 ha;
- The site is currently zoned as RU4: Primary Production Small Lots and R2: Low Density Residential;
- The site is currently utilised within a rural residential land use setting; and
- The site is located within a low-density rural residential area.

The site is a rural residential property just outside of Armidale, comprised mostly of open farmland and empty paddocks. A single main dwelling exists in the southern portion of site. The site is bordered along the northern elevation by Dumaresq Creek

Summary of Site Contamination

Previous environmental site assessments (refer Section 4) have indicated that the following contamination requires remediation or management to render the site suitable for the proposed low-density residential and mixed use commercial land use:

- Non-friable asbestos on the site's surface in the vicinity of former test pit location 'TP12';
- Non-friable asbestos in filling material on-site in the vicinity of former test pit location 'TP05';
- Pathogens within dam sediments and water;
- Aesthetic risks across the site footprint; and
- Risks associated with potential fill materials beneath existing structures and hazardous building materials utilised within existing structures.

The Proposed Site Re-development

EGA has been advised that the site is proposed for redevelopment comprising subdivision of the land into 72 low-density residential lots and two-hundred and 252 mixed use commercial lots. EGA has not been provided with specific development plans, however it has been assumed that basements will not be part of the redevelopment works.

Summary of Identified Contaminants, Risks and Remedial Actions

Previous environmental site assessments have shown that existing contamination requires remediation or management to render the site suitable for the proposed mixed use low density residential and commercial land use.

For the site's current un-remediated environmental condition the contaminants, environmental and human health risks, and the remediation measures required to render the site suitable for the planned

land use redevelopment, are itemised in Table E.1. Each contaminant type and area is identified as a specific area of environmental concern (AEC). Locations of the AECs are provided in **Figure 2**.

Table E1. Areas of Environmental Concern. Contaminants, Risks & Remedial Actions Required

Contaminant	Receptor	Exposure Pathway	Risk Type	Risk mitigation or elimination
Asbestos in soil	On-site workers & intrusive maintenance workers. Future site occupants if not remediated	Disturbance of soil causing asbestos fibres in dust.	Fibre inhalation	Requires exposure management or remediation
Asbestos and pesticides in soils beneath building footprints	On-site workers during remediation	Dermal and oral contact and inhalation during works	Dermal and oral contact and inhalation	Work practice controls and PPE
Pathogens in dam sediments	On-site workers during remediation	Dermal and oral contact during works	Dermal and oral contact with sediments	Work practice controls and PPE
Foreign Materials	Future residents or site occupants	Visual amenity	Aesthetic	Removal and management of aesthetic risks

Preferred Remediation Plan

The preferred and selected remedial strategy for the identified contaminants and areas of contamination are listed in **Table E2**.

Table E2. Selected Remediation Strategies

Contamination Type	Preferred Remediation Strategy
Current Identified Areas of Environmental Concern	
Surficial non-friable asbestos containing materials	<i>In-situ</i> raking and picking; and removal from site
Asbestos within the soil profile (asbestos within fill)	<i>Ex-situ</i> raking and picking and beneficial reuse within the site; or Excavation and disposal off-site
Surficial foreign materials	<i>In-situ</i> raking and picking; and removal from site
Subject to Hazardous Building Materials Survey	
Hazardous Building Materials (<i>if identified</i>)	Removal and Disposal Off-Site

Conclusion

Based on the information presented in the historical contamination assessment reports, EGA concludes that the remedial goal can be achieved, and the site made suitable for the proposed land use setting, subject to:

- Implementation of the strategies, methodologies and measures set out in this remedial action plan;
- Should newly identified unacceptable land contamination risks be identified during development works, modifications to the remediation plan presented in this RAP may be necessary. Changes to the planned remediation processes will require oversight by a suitably experienced environmental consultant;
- Prior to any removal of soils from site for offsite disposal during remedial works, a waste classification for those soils must be prepared by a suitably experienced environmental consultant;

- Tracking of all waste soils removed from the site and imported clean materials must be recorded by the remediation contractor; and
- Monitoring and validation sampling of remedial works must be carried out by a suitably experienced environmental consultant.

TABLE OF CONTENTS

1.	INTRODUCTION.....	9
1.1.	Purpose	9
1.2.	Site Description	9
1.3.	Description of Proposed Site Re-development.....	9
1.4.	Summary of Site Contamination	9
1.5.	The Site's Regulatory Status	10
2.	SITE IDENTIFICATION	11
3.	PHYSICAL SITE CONDITIONS.....	12
4.	PREVIOUS CONTAMINATION ASSESSMENTS.....	14
4.1.	SE 2024 – Stage 1 Preliminary Site Investigation.....	14
4.2.	EGA (2025) - Stage 2 Detailed Site Investigation.....	15
4.3.	Site Analytical Data Summary Tables	17
5.	SUMMARY OF SITE'S CURRENT CONTAMINATION	18
5.1.	AECs and Contaminants of Concern	18
5.2.	Data Gaps	18
6.	CONCEPTUAL SITE MODEL.....	19
6.1.	Contaminants of Concern	19
6.2.	Contaminant Sources – Migration Pathways – Receptor Linkages – Risks	19
7.	SITE VALIDATION CRITERIA	20
7.1.	Sources of Remediation Validation Criteria Selected for Use	20
7.2.	Rationale for Validation Criteria Selected for Use	20
8.	REMEDIAL STRATEGY OPTIONS DISCUSSION.....	21
8.1.	Remediation Goal	21
8.2.	Areas and Contaminants Requiring Remediation	21
8.3.	Remediation Options	21
8.3.1.	Asbestos in soil	21
8.3.2.	Remediation of Dam Sediments.....	21
8.3.3.	Foreign Materials.....	22
9.	CHOSEN OPTIONS FOR REMEDIATION AND MANAGEMENT	23
9.1.	Rationale for the Chosen Remediation Methods.....	23
9.2.	Summary of Preferred Remediation Options.....	23
10.	REMEDIAL WORKS PLAN	24
10.1.	Remedial Goal.....	24
10.2.	Data Gap Investigation	24
10.2.1.	Investigation of soils beneath building slabs	24
10.3.	Notifications and Approvals	24
10.4.	Remediation Extent	24
10.5.	Sequence of Works for Remediation	25
10.5.1.	Remediation schedule.....	25

10.5.2.	Demolition of remaining building structures – Hazardous Building Materials Survey ...	25
10.5.3.	Surficial non-friable asbestos containing materials	25
10.5.4.	Excavation of asbestos in soil profile	26
10.5.5.	Dam dewatering and sediment remediation	26
10.5.6.	Aesthetic Impacts	26
10.5.7.	Backfilling	26
10.6.	Unexpected Finds Protocol	27
11.	VALIDATION QUALITY ASSURANCE PLANNING	29
11.1.	DQO Planning	29
12.	VALIDATION SAMPLING	31
12.1.	Validation Sampling Methods and Rates	31
12.2.	Asbestos in Soil Sampling Methodology	34
12.3.	Contingency for Validation Sample Failure	34
12.4.	Decontamination	34
12.5.	Field QA for Validation Sampling	34
12.6.	Laboratory Analysis Quality Assurance / Quality Control	35
12.7.	Laboratory Holding Times, Analytical Methods and Limits of Reporting	35
13.	Waste Classification & Tracking	36
14.	ONGOING MONITORING OR MANAGEMENT	37
15.	REPORTING	38
15.1.	Site Validation Report	38
16.	SITE MANAGEMENT PLAN	39
16.1.	Soil and Stormwater Management	39
16.1.1.	Site Access & Egress	39
16.1.2.	Stockpiles	39
16.1.3.	Excavation Pump Out	39
16.1.4.	Rehabilitation and Landscaping	39
16.2.	Waste Management	40
16.3.	Groundwater Management	40
16.4.	Noise Control	40
16.5.	Dust Control	41
16.6.	Odour Control	41
16.7.	Traffic Management	42
16.8.	Vibration Management	42
16.9.	Fill Importation	42
16.10.	Work Health and Safety	42
16.10.1.	Safe Work Method Statement	42
16.10.2.	Personal Protective Equipment	43
16.10.3.	Decontamination of Personnel, Plant and Equipment	43
16.11.	Site Signage	43
16.12.	Site Security	43

16.13.	Site Hours of Operation	44
16.14.	Community Relations and Complaints	44
16.15.	Emergency Preparedness	44
16.16.	Register of Contacts	44
16.17.	Interim Site Management Plan	44
17.	CONCLUSIONS	46
18.	STATEMENT OF LIMITATIONS	47
19.	REFERENCES	48

FIGURES

Figure 1	Site Locality
Figure 2	Site Layout & Remedial Extents
Figure 3	Proposed Data Gap Assessment Sampling Plan

APPENDICES

A	Site Assessment Data Summary Tables
B	Remediation Validation Criteria
C	Validation Data – Evaluation of QA/QC

LIST OF ABBREVIATIONS

A list of the common abbreviations used throughout this report is provided below:

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AST	Aboveground storage tank
bgl	Below ground level
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CoC	Chain of Custody
CSM	Conceptual Site Model
DSI	Detailed Site Investigation
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
GS	Geological Survey of NSW
HIL	Health Investigation Levels
HSL	Health Screening Levels
LOR	[Laboratory] Limit of reporting
NATA	National Association of Testing Laboratories
NA	Not applicable
ND	Not detected
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NSW EPA	NSW Environment Protection Authority
OCP	Organochlorine Pesticide
OPP	Organophosphorus Pesticide
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PID	Photo-ionisation detector
PSI	Preliminary Site Investigation
QA/QC	Quality assurance/Quality control
RPD	Relative percentage difference
SAQP	Sampling Analysis and Quality Plan
SE	Sydney Environmental Group Pty Ltd
SVOC	Semi-volatile organic compound
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
UST	Underground storage tank
VOC	Volatile organic compound

1. INTRODUCTION

Environmental Group Australia Pty Ltd (EGA) was engaged by Transcend Property Pty Ltd (hereafter referred to as 'the client'), to prepare a Remedial Action Plan for the property located at Lot 1, DP1209469, Lot 69 & 70 DP755808 and Lot 8 DP240862, 241 Grafton Road, Armidale NSW (hereafter referred to as 'the site') (refer to **Figure 1** and **Figure 2**).

1.1. Purpose

The site is planned for redevelopment and previous environmental site assessments have indicated contamination is present and requires remediation. The objective of the remediation works as defined in this RAP, is to make the site suitable, from a contamination perspective, for the planned redevelopment.

The purpose of the RAP is to define the nature and extent of the contamination requiring remediation; to document the intended remediation methods and the validation criteria to be used, and to outline the necessary environmental controls needed to ensure environmental protection. This RAP also identifies remediation options available and possible, and their respective methodologies, and selects the preferred approach, given the site's physical conditions and considerations relating to the development. Principles of ecologically sustainable development are considered.

1.2. Site Description

- The site is identified as Lot 1, DP1209469, Lot 69 & 70 DP755808 and Lot 8 DP240862;
- The site covers an area of approximately 44.55 ha;
- The site is currently zoned as RU4: Primary Production Small Lots and R2: Low Density Residential;
- The site is currently utilised within a rural residential land use setting; and
- The site is located within a low-density rural residential area.

The site is a rural residential property just outside of Armidale, comprised mostly of open farmland and empty paddocks. A single main dwelling exists in the southern portion of site. The site is bordered along the northern elevation by Dumaresq Creek.

1.3. Description of Proposed Site Re-development

EGA has been advised that the site is proposed for redevelopment comprising subdivision of the land into 72 low-density residential lots and two-hundred and 252 mixed use commercial lots. EGA has not been provided with specific development plans, however it has been assumed that basements will not be part of the redevelopment works.

1.4. Summary of Site Contamination

Previous environmental site assessments (refer Section 4) have indicated that the following contamination requires remediation or management to render the site suitable for the proposed low-density residential and mixed use commercial land use:

- Non-friable asbestos on the site's surface in the vicinity of former test pit location 'TP12';
- Non-friable asbestos in filling material on-site in the vicinity of former test pit location 'TP05';
- Pathogens within dam sediments and water;
- Aesthetic risks across the site footprint; and
- Risks associated with potential fill materials beneath existing structures and hazardous building materials utilised within existing structures.

Table 1.1 identifies the contaminating activities for the areas of environmental concern (AEC) and the contaminants associated with those areas.

Table 1.1 Areas of Environmental Concern (AEC) and Contaminants of Concern

AEC	Contaminating Activity & Area of Concern	Contaminants of Potential Concern
AEC01A	Fill Materials Associated with 'TP05'	Asbestos human health – dust inhalation
AEC01B	Surficial ACM Fragments	Asbestos human health – dust inhalation
AEC03	Sediments & Water within On-site Dam	Pathogens human health – direct contact
AEC05	Aesthetic Wastes across the Site Footprint	Foreign materials
AEC07A	On-Site Structures - Hazardous Building Materials	Asbestos, SMF, Lead human health risk – dust inhalation and dermal contact for future site occupants
AEC07B	On-Site Structures – Underlying Soil Materials	OCPs, OPPs, Asbestos human health – dermal contact and ingestion

1.5. The Site's Regulatory Status

The NSW EPA's Public Register shows no listing of notices relating to environmental matters, no declaration of contamination and no Pollution Control Licences, applying to the site.

2. SITE IDENTIFICATION

The site identification details and associated information are presented in **Table 2.1**.

Table 2.1 Site Identification Information

Attribute	Description
Street Address	241 Grafton Road, Armidale NSW
Lot and Deposited Plan (DP)	Lot 1, DP1209469 Lot 69 & 70 DP755808 Lot 8 DP240862
Geographical Coordinates	30° 31' 02" S 151° 42' 13" E (approximate centre of site)
Site Area	≈ 44.55 ha
Local Government Area (LGA)	Armidale Regional
Parish	Armidale
County	Sandon
Zoning	RU4: Primary Production Small Lots (northern portion of the site) R2: Low Density Residential <i>Armidale Regional Local Environmental Plan 2012</i>

The locality of the site is set out in **Figure 1**.

The general layout and boundary of the site is set out in **Figure 2**.

3. PHYSICAL SITE CONDITIONS

Regional geology, topography, soil landscape and hydrogeological information are presented in **Table 3.1**.

Table 3.1 Regional Setting Information

Attribute	Description
Geology	A review of the Environment NSW 'eSpade V2.2' web application (environment.nsw.gov.au/eSpade2WebApp, accessed 16 March 2026), indicated that the site is likely to be underlain by Sandon Beds. Greywacke is the main rock type with chert, slate and ferricrete. Some Gurrakool Beds (Coffs Harbour Association) with a similar lithology underlie parts of this landscape. The soil materials encountered within the Stage 2 Detailed Site Investigation (EGA, 2025) indicated that the materials within the site comprise a silty clay topsoil underlain by natural clay materials.
Acid Sulfate Soils	A review of the Environment NSW 'eSpade V2.2' web application (environment.nsw.gov.au/eSpade2WebApp, accessed 16 March 2026), indicates that the site lies in an area mapped as 'No Known Occurrence' with respect to acid sulfate soils. This infers that land management activities are not likely to be affected by acid sulfate soils. Further assessment of acid sulfate soils in the context of this investigation is considered by EGA as not warranted.
Topography	Generally the local landscape consists of mostly rolling low hills and occasional hills with slopes ranging from 10–30 %. Very occasional steep slopes with slope gradients >30%. Some footslopes have slopes < 10 %. Slopes are typically 200 m –400 m long. Elevation ranges up to 1 170 m. Local relief is 30 m –80 m. Typical landform elements include crests, hillslopes, occasional rolling to steep footslopes and narrow drainage lines. Common angular rock outcrop on some crests and upper slopes. Rock outcrop is generally in the order of 2–10 %. The site is located at an elevation approximately 1002 m to 964m Australian Height Datum (AHD) and slopes gradually to the north.
Hydrology and Hydrogeology	Surface water courses proximal to the site Dumaresq Creek, located along the northern boundary of the site. Several man-made dams are located within the site, as well as on neighbouring sites. Based on distances to the nearest surface water course and the site topography, groundwater flow in the vicinity of the site is considered likely to be towards the north-east. A review of the NSW Office of Water groundwater database undertaken on 28 October 2024 indicated there were 12 registered groundwater features located within a 500 m radius of the site: • GW966477 – stock bore, located approximately 340 m south-west of the site, 6.00 Standing Water Level (SWL), total well depth: 20.00 m; • GW047498 – domestic, industrial, irrigation bore, located approximately 510 m west of the site, SWL not specified, total well depth: 45.70 m; • GW058964 – domestic, stock bore, located approximately 30 m east of the site, SWL not specified, total well depth: 32.70 m; • GW044268 – domestic, stock bore, located approximately 60 m south-east of the site, SWL not specified, total well depth: 41.10 m; • GW060774 – domestic, stock bore, located approximately 120 m south-east of the site, SWL not specified, total well depth: 52.00 m; • GW304472 – domestic bore, located approximately 45 m east of the site, 15.00 m SWL, total well depth: 28.00 m; • GW065212 – domestic bore, located approximately 160 m east of the site, SWL not specified, total well depth: 28.00 m; • GW306198 – domestic bore, located approximately 300 m south-east of the site, 4.90 SWL, total well depth: 94.20 m; • GW309913 – domestic bore, located approximately 330 m east of the site, 18.00 SWL, total well depth: 36.00 m; • GW303881 – irrigation bore, located approximately 290 m north-west of the site, SWL not specified, total well depth: 50.00 m; • GW303939 – irrigation bore, located approximately 370 m north-west of the site, SWL not specified, total well depth: 3.50 m; and

Attribute	Description
	GW033493 – domestic bore, located approximately 160 m south of the site, SWL not specified, total well depth: 55.30 m.
Adjacent Sensitive Receptors	A review of the Bureau of Meteorology Groundwater Dependent Ecosystem Map was undertaken to determine the closest sensitive ecological receptors. The closest ecological receptor is Dumaresq Creek, located on the northern boundary of the site, and noted as a moderate groundwater dependent ecosystem (BoM GED Atlas). The closest sensitive human receptors are the residential properties surrounding the site's boundary and any future onsite construction workers.
Perfluoroalkyl Substances (PFAS)	A review of the publicly available NSW Government PFAS Investigation Program mapping information was reviewed 16 March 2026. The review was undertaken to identify any investigation localities that may affect the site. The site is not considered to be affected by any PFAS investigation programs. Armidale – Fire and Rescue NSW, located approximately 700 m south-west of the site at 2-16 Mann Street, Armidale NSW, is under ongoing investigation and management by Fire and Rescue New South Wales to assess the nature of the PFAS contamination in and around the site. Given the ongoing management and investigation of the Fire and Rescue NSW site, and its distance from the site at 241 Grafton Road, Armidale, EGA does not consider there to be a reasonable risk to warrant further investigation into PFAS contamination as a part of this assessment.
Unexploded Ordnance (UXO)	A review of the publicly available Unexploded Ordnance (UXO) mapping information was reviewed 16 March 2026. The review was undertaken to identify any recorded UXO-related constraints or risks applicable to the site and its surrounding area at the time of reporting. The site is not considered to be affected by UXO.

4. PREVIOUS CONTAMINATION ASSESSMENTS

The following reports were reviewed and are the source of information for the preparation of this RAP. A summary of scope of the investigations, and the findings of each of the available site assessment reports are presented in this section.

4.1. SE 2024 – Stage 1 Preliminary Site Investigation

Sydney Environmental Group Pty Ltd (SE) was engaged by Transcend Property Pty Ltd, to undertake a Stage 1 Preliminary Site Investigation of the property located at 241 Grafton Road, Armidale NSW.

SE had the following project appreciation:

- The site covers an area of approximately 44.55 ha;
- The site is utilised within a rural residential land use setting;
- The site is proposed for redevelopment comprising subdivision of the land into 72 low-density residential lots and 252 mixed use commercial lots; and
- A contamination assessment was required to identify any contamination that may be present and to provide advice on the suitability of the site for any proposed future land-use.

The objectives of the project were to:

- Assess the potential for contamination to be present on the site as a result of past and current land use activities;
- Provide advice on whether the site would be suitable (in the context of land contamination) for the proposed residential land use setting; and
- Provide recommendations for further investigation, management and/or remediation (if warranted).

SE undertook the following activities to address the project objectives:

- A desktop review of relevant information pertaining to the site;
- A site walkover to understand current site conditions; and
- Data assessment and reporting.

Based on SE's assessment and desktop review information, fieldwork data and laboratory analytical data, in the context of the proposed redevelopment scenario, SE made the following conclusions:

- Historical land titles indicated that the site had been owned by a number of private individuals and there was potential for contaminating activities to have been taken onsite from 1969 to 1991 and 2021 to date requiring further investigation;
- Review of historical aerial imagery indicated that the site had been utilised within a rural residential land use for quite some time. One structure appeared to have been demolished; several dams appeared to have been filled in and stockpiling of uncontrolled filling was evident;
- A review of publicly available contaminated land databases indicated that the site was not the subject of any licences, applications, notices under Section 308 of the *Protection of the Environment Operations Act 1997*. The site is not notified under Section 60 of the *Contaminated Land Management Act 1997*. The site is not the subject of any notifications recorded under Section 58 of the *Contaminated Land Management Act 1997*;
- A review of council certification indicated that the site was not registered as:
 - Significantly contaminated land;
 - Subject to a management order;
 - The subject of an approved voluntary management proposal;
 - Subject to an ongoing maintenance order; or
 - The subject of a site audit statement.
- Based on the desktop review and site inspection, 7 potential areas of environmental concern were identified within the site and are presented in **Table 4.1** below.

Table 4.1. Potential Areas of Environmental Concern (EGA, 2024)

ID	Potential Area of Environmental Concern	Land Use Activity	Contaminants of Potential Concern	Risk
PAEC01	Fill Materials and Potential Asbestos Containing Materials South of the Main Residence	Uncontrolled Filling	Heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB & Asbestos	Moderate – High
PAEC02	Fill Materials within Former Dams	Uncontrolled Filling	Heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB & Asbestos	Moderate
PAEC03	Dams Across the Site Footprint	Uncontrolled Filling	Heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos, Pathogens	Moderate – High
PAEC04	Fill Materials associated with Landscaping around the Main Residence	Uncontrolled Filling	Heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB & Asbestos	Moderate
PAEC05	Aesthetic Wastes across the Site Footprint	-	Aesthetics	Low
PAEC06	Beneath Former Building Footprints	Uncontrolled Demolition	Heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB & Asbestos	Moderate
PAEC07	Beneath Existing Building Footprints	Uncontrolled Filling	Heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB & Asbestos	Low – Moderate

Based on the conclusions stated above, SE recommended the following:

- A Stage 2 Detailed Site Investigation should be undertaken within the identified potential areas of environmental concern to further characterise potential contamination, and inform whether further management or remediation is required prior to redevelopment works commencing on-site;
- A hazardous building material survey of the structures present on-site should be undertaken prior to demolition (if required);
- Following removal of hazardous building materials (if identified), a clearance inspection must be undertaken by an appropriately qualified occupational hygienist or SafeWork NSW LAA;
- A waste classification assessment should be carried out on any soil materials proposed for disposal off-site as per the NSW EPA Waste Classification Guidelines (2014); and
- Records of the transport and disposal of any materials off-site should be maintained.

4.2. EGA (2025) - Stage 2 Detailed Site Investigation

Environmental Group Australia Pty Ltd (EGA) was engaged by Transcend Property Pty Ltd (hereafter referred to as 'the client'), to undertake a Stage 2 Detailed Site Investigation of the property located at Lot 1, DP1209469, Lot 69 & 70 DP755808 and Lot 8 DP240862, 241 Grafton Road, Armidale NSW.

The Stage 2 Environmental Investigation was required to assess the extent to which the site has been contaminated by past or present activities and to evaluate the degree of contamination. The assessment was required to:

- investigate the possibility that contamination may be present at the site as previously identified in the Stage 1 Preliminary Site Investigation (SE, 2024);
- to the extent possible within the agreed scope of the investigation, investigate and determine the extent and level of impact of contamination identified;
- determine whether the site is suitable, from a site contamination perspective, for the proposed mixed low-density residential and commercial redevelopment.

The objectives of this project were to:

- Provide advice on whether the site would be suitable (in the context of land contamination) for the proposed mixed low-density residential and commercial future land use; and
- Provide recommendations for further investigation, management or remediation (if required).

EGA undertook the following scope of works to address the project objectives:

- A desktop review of relevant information pertaining to the site;
- A site inspection to understand current site conditions;
- Conduct intrusive testing of site soils to examine the nature and extent of land contamination; and
- An assessment of the contamination status of the site and the recommendation of any remedial requirements associated with the redevelopment of the site (if necessary).

Based on EGA's assessment of the desktop review information, fieldwork data and laboratory analytical data, in the context of the proposed redevelopment scenario, EGA made the following conclusions.

The searches for information on the historical uses of the site, and the site inspection, indicated a moderate potential for contamination of the site to have occurred.

The intrusive on-site testing of contaminants in soil, sediments and water across the site indicated that the majority of the site was not impacted by contaminants, however the investigation confirmed the presence of some contaminants, presenting potential risks for the land use proposed following redevelopment.

The contaminants and areas of environmental concern (AEC), requiring either further assessment, remediation or risk management, were ; listed as follows:

Fill Materials Associated with 'TP05' (AEC-1A)

The fill soils identified between 0.4 m and 2.0 m bgs within 'TP05' were heavily impacted by anthropogenic materials, including asbestos containing fibre cement, posing an unacceptable human health risk to future users at the site. The extent of the fill was observed to be approximately 25 m² and 2.0 m vertically. It was recommended that a Remedial Action Plan (RAP) be developed to assess the remediation and validation options that must be taken to address the asbestos contamination.

Surficial ACM Fragments (AEC01B)

The surface soils have been impacted by fragments of fibre-cement materials, some visible on the surface, and therefore require remediation. Health screening level (HSL) for surface soils , as specified in the NEPM 2013, is for *No Visible Asbestos for Surface Soils*, which applies to all land uses for development sites. It was recommended that a Remedial Action Plan (RAP) be developed to assess the remediation and validation options that must be taken to address the asbestos contamination.

Sediments within On-site Dam (AEC03)

The detected concentrations of *E. Coli* and Thermotolerant Coliforms within the sediments of the on-site dam was assessed as posing an unacceptable human health risk to future users at the site. It was recommended that a Dam Dewatering Assessment (DDA) be prepared to advise on the dewatering and sediment management strategies that should be adopted to address this contamination.

Aesthetic Wastes across the Site Footprint (AEC05)

Aesthetic risks in the form of waste material across the site should be managed prior to the proposed development. It was recommended that waste material be sent off-site to a licensed waste receiving facility.

On-site building structures – containing hazardous materials (AEC7A)

It was recommended that a Hazardous Building Materials Survey (HBMS) be carried out to assess the materials within the structures prior to demolition by an appropriately qualified occupational hygienist or NSW LAA. Following demolition, a hazardous materials clearance inspection should be carried out by an appropriately qualified occupational hygienist or NSW LAA. It was recommended that contaminated land consultant be present during demolition of building structures to advise on controls to prevent contamination of site soils.

Contaminated soil beneath existing building footprints (AEC-7B)

The soil beneath building footprints could not be assessed at the time of the investigations due to access restrictions. It was recommended that after building demolition and removal floor slabs, underlying soils be sampled and tested for organochlorine and organophosphate pesticides which were commonly applied to building foundations for pest control. Asbestos containing materials may also be present as a result of past sub-grade filling or from asbestos containing products used in the laying of the foundations.

Pesticides or asbestos impacted soils, if found, would require off-site disposal to landfill with waste classification in accordance with the NSW EPA Waste Classification Guidelines (2014) documentation.

Waste soils removal

Waste materials would require removal from site in accordance with the NSW EPA Waste Classification Guidelines (2014) and waste tracking.

Data Gaps

Other than the testing of soils beneath the building footprints, as listed above, no further testing for site suitability was considered necessary prior to the remediation works.

Conclusion on Site Suitability

From the findings of the Phase 1 site investigation and the Phase 2 intrusive testing, EGA concluded that the site can be made suitable, with respect to land contamination, for the intended development under a low density residential sensitive land use setting, subject to the required actions listed in the report.

It was recommended that a Remedial Action Plan be prepared to document the necessary remedial actions and to ensure the work is completed with due consideration for environmental protection and health and safety

4.3. Site Analytical Data Summary Tables

Site assessment data tables, included in **Appendix A**, obtained from previous site assessments, described above, formed the basis of the planned remediation strategy.

5. SUMMARY OF SITE'S CURRENT CONTAMINATION

The site requires further remediation, management and assessment as part of the redevelopment works to ensure the site is suitable (in the context of land contamination) for the proposed low-density residential and mixed use commercial land use.

The following contamination requires remediation and further management as part of the redevelopment works:

- Asbestos impacts above the site adopted criteria within fill materials associated with test pit location 'TP05' and across surficial soil materials in the vicinity of test pit location 'TP12';
- Removal and management of unacceptable aesthetic risks currently present within the site;
- Dewatering of the on-site dam, and excavation and on-site treatment of sediments impacted by faecal coliforms;
- remediation of fill materials beneath existing structures (if contaminants found); and
- controlled removal of hazardous building materials within existing structures (if found).

EGA notes the pathogens present within dam sediments and water will be managed per the recommendations outlined within the site's Dam Dewatering Assessment. However, validation of the remediation of dam sediments must be managed as part of the remediation works.

5.1. AECs and Contaminants of Concern

The areas of environmental concern (AECs) that require remediation or management, are summarised in **Table 5.1**.

Table 5.1 AECs and Contaminants of Concern

AEC	Contaminating Activity & Area of Concern	Contaminants of Potential Concern	Potential or Actual Risk
AEC01A	Fill Materials Associated with 'TP05'	Asbestos	Human health: Asbestos fibre dust inhalation
AEC01B	Surficial ACM Fragments	Asbestos	Human health: Asbestos fibre dust inhalation
AEC03	Sediments & Water within On-site Dam	Pathogens	If sediments and water are reused on site – Human health: Dermal contact
AEC05	Aesthetic Wastes across the Site Footprint	Aesthetics	-
AEC07A	On-Site Structures – Hazardous Building Materials	Asbestos, SMF, Lead	Human health: Dermal contact; dust inhalation
AEC07B	On-Site Structures – Underlying Soil Materials	OCPs, OPPs, Asbestos	Human health: Dermal contact; dust inhalation

Analytical results from previous site assessments, from which the above defined AECs were identified, are provided in **Appendix A**.

5.2. Data Gaps

Further assessment of AEC07A (possible presence of hazardous building materials) and AEC07B (possible contaminants beneath site structures) is required to confirm the extent of remediation required.

The additional assessment data to address AEC07A will be undertaken prior to demolition works. The additional assessment data to required to address AEC07B will be collected following demolition works once access to soil materials beneath existing hardstand footprints is provided.

Data gaps requiring further investigations are defined in **Section 10.2**.

6. CONCEPTUAL SITE MODEL

The following description of the Conceptual Site Model (CSM) focuses on the contaminant – source – pathway – receptor linkages and potential risks, that are relevant to the site's remediation and future land use. The potential risks listed in the CSM are those that may exist prior to any contaminant remediation or management measures and are based on information gained from environmental assessment reports completed in the past.

The site's physical conditions relevant to contaminant exposure pathways have been described in **Section 3**.

6.1. Contaminants of Concern

The contaminants of concern, prior to remediation and redevelopment are:

- Asbestos in soil – in the form of non-friable and friable asbestos within soil matrix
- Foreign materials – present across the surface of the site
- Faecal coliforms in dam sediments
- Contaminants (asbestos and pesticides) beneath building footprints (if found).

6.2. Contaminant Sources – Migration Pathways – Receptor Linkages – Risks

In its pre-remediated condition, the following contaminant – pathway – risks or potential risk exist:

- Asbestos in soil: – dust inhalation – human health
- Dermal contact with residual pesticides in soils beneath building footprints (if found to be present);
- Contact with faecal coliforms in dam sediments during excavations for dam remediation; and
- Foreign materials: – aesthetic risk

Results from previous environmental assessments have indicated that there are unlikely to be any risks to on-site or off-site ecological receptors. The Stage 2 Detailed Site Investigation did not indicate any contaminant migration beyond the site boundaries or any unacceptable risks to the existing ecological environment within the site.

A summary of the contaminant – receptors exposed – exposure pathways –risks, that are addressed in this RAP, is presented in **Table 6.1**.

Table 6.1 Contaminants, Receptors, Exposure Pathways and Risks

Contaminant	Receptor	Exposure Pathway	Risk Type	Risk mitigation or elimination
Asbestos in soil	On-site workers & intrusive maintenance workers. Future site occupants if not remediated	Disturbance of soil causing asbestos fibres in dust.	Fibre inhalation	Requires exposure management or remediation
Asbestos and pesticides in soils beneath building footprints	On-site workers during remediation	Dermal and oral contact and inhalation during works	Dermal and oral contact and inhalation	Work practice controls and PPE
Pathogens in dam sediments	On-site workers during remediation	Dermal and oral contact during works	Dermal and oral contact with sediments	Work practice controls and PPE
Foreign Materials	Future residents or site occupants	Visual amenity	Aesthetic	Removal and management of aesthetic risks

7. SITE VALIDATION CRITERIA

7.1. Sources of Remediation Validation Criteria Selected for Use

Criteria for the validation to show site suitability have been adopted from the following sources:

Asbestos

For human health inhalation:

- Soil HSLs in Table 7 of NEPM ASC 2013
- Section 11 of Schedule B2 NEPM ASC 2013
- Soil HSLs in Table 3 of Western Australia Department of Health (WA DoH) 2009, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, WA DoH

Aesthetics – the ASC NEPM 2013 revision, Section 3.6.3 states there are no specific numeric aesthetic guidelines, however 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.

Given the site is intended for redevelopment for mixed use comprising low-density residential and commercial, the applicable guidance are the HIL A and HSL A criteria, and other criteria relating to sensitive land uses.

EGA considers it appropriate to adopt the criteria for 'HIL A and HSL A - Low-Density Residential' per guidance provided in Section 2.2 of Schedule B (1) of the ASC NEPM 2013 revision, in order to assess the site for the proposed land use.

Applicable criteria are listed in the data summary tables provided in **Appendix B**.

7.2. Rationale for Validation Criteria Selected for Use

The criteria presented in the references listed in **Section 7.1** are considered appropriate and suitable as validation criteria for the remediation of the site.

8. REMEDIATION STRATEGY OPTIONS DISCUSSION

8.1. Remediation Goal

The overall goal of the planned remediation works is to render the site suitable, from a land contamination perspective, for the planned development. For the site, this equates to meeting the selected criteria for low density residential land use (including other sensitive land uses specified in the NEPM 2013).

Consideration is given to the remediation options available and possible, having regard to the site's physical conditions, the site setting, and development requirements. Principles of ecologically sustainable development are considered.

8.2. Areas and Contaminants Requiring Remediation

Based on information provided within **Table 5.1**, the following AECs require remediation:

- AEC01A, AEC01B – non-friable asbestos
- AEC03 – remediation of dam sediments for faecal coliforms
- AEC05 – foreign materials

8.3. Remediation Options

The following sub-sections comprise a review of each of the soil remediation options that are considered possible for each of the AECs requiring remediation. The remedial options considered are based on the information available on those AECs which has been drawn from the existing available environmental reports.

8.3.1. Asbestos in soil

Non-friable (bonded) asbestos containing materials present on the surface or near-surface, can be tilled and raked to allow physical collection of all asbestos containing materials (ACM). This practice is appropriate and cost effective where ACM is relatively minor in total amount and can be effectively hand collected.

Alternatively, surface soils containing ACM can be removed and disposed off-site to a licensed landfill in line with appropriate waste classification documentation.

Where asbestos is classified as friable (both crushable by hand pressure, fibrous asbestos and asbestos fines (fibre bundles and fragments that pass through a 7 mm screen), surface tining and raking with hand collection of fragments, is not practicable and not appropriate. As such, friable asbestos will be removed and disposed off-site to a licensed landfill in line with appropriate waste classification documentation.

Where asbestos, in any form, has been mixed into the deeper soil, or is present on the site within soil filling material, the options for remediation and management are:

- Excavation and disposal off-site in line with appropriate waste classification documentation;
- Excavation, onsite treatment and burial at a depth of at least 2 m below ground surface (bgs) following successful validation; or
- Capping and containment using a marker layer fabric and a designed capping layer.

8.3.2. Remediation of Dam Sediments

Excavation of dam sediments will be excavated and spread to a 300 mm thick layer for exposure to natural UV exposure. The materials will require daily tining and turning to ensure all materials associated with the sediments are remediated. The timeframe for effective remediation will depend on weather suitability (optimum conditions will be dry and warm); and the frequency of raking and respreading.

8.3.3. Foreign Materials

Aesthetic risks associated with the surficial asbestos containing materials require removal off-site to a licensed waste receiving facility.

9. CHOSEN OPTIONS FOR REMEDIATION AND MANAGEMENT

9.1. Rationale for the Chosen Remediation Methods

The site is planned for mixed use comprising low density residential and commercial redevelopment. The low density residential land use is a sensitive land use. Redevelopment expectations are that the site will be remediated to a level such that it no longer contains legacy contaminants above applicable criteria. As such, all soils containing asbestos above criteria will be subject to either onsite treatment, subsequent validation and beneficial reuse within the site, or excavation and disposal off-site to a licensed receiving facility.

In areas where asbestos and foreign materials have been confirmed as only being present on surface soils and in the bonded form, remediation will consist of surface raking and hand collection, followed by validation that no surface asbestos in any form remains.

Remediation of pathogens in dam sediments can effectively and reliably achieved through the tining of excavated sediments when spread across surface soils and exposed to ultra ultraviolet light. The process of on-site surface remediation requires measures to ensure rainwater runoff is controlled.

The remediation options selected for the contamination present within the site will ensure no risks are present to future receptors at the site, following the redevelopment works. Following completion of the remediation and validation works, in accordance with this RAP, the site will be suitable for its intended use and will not present an unacceptable risk to human health or the environment and therefore, the implementation of a long-term environmental management plan will not be required.

In assessing the options for remediation, the principal of ecologically sustainable development was considered in the context of the proposed development for sensitive land use.

9.2. Summary of Preferred Remediation Options

Table 9.1 below summarises the preferred remediation strategies with regard to the identified contamination within the site.

Table 9.1 Selected Remediation Strategies

Contamination Type	Preferred Remediation Strategy
Current Identified Areas of Environmental Concern	
Surficial non-friable asbestos containing materials	<i>In-situ</i> raking and picking; and removal from site
Asbestos within the soil profile (asbestos within fill)	<i>Ex-situ</i> raking and picking and beneficial reuse within the site; or Excavation and disposal off-site
Pathogens within excavated dam sediments	Spreading of sediments and raking for UV exposure.
Surficial foreign materials	<i>In-situ</i> raking and picking; and removal from site
Subject to Hazardous Building Materials Survey	
Hazardous Building Materials (<i>if identified</i>)	Removal and Disposal Off-Site

Areas subject to remediation are shown in **Figure 3**.

10. REMEDIATION WORKS PLAN

10.1. Remedial Goal

Given that the intended land use following site remediation and redevelopment is sensitive land use for low density residential, the remediation strategy is to reduce the concentrations of all legacy contamination to a suitable concentration such that notification of remaining contamination on the site is not required on the site's 10.7 Planning Certificate, and removing the need for a long-term environmental management plan (LTEMP).

10.2. Data Gap Investigation

A data gap assessment is required beneath the existing structure footprints following demolition works. The purpose of the data gap assessment is to ensure no unacceptable risks are present within fill materials present beneath the structure footprints.

10.2.1. Investigation of soils beneath building slabs

Prior to soil remediation works soil sampling beneath the remaining building footprints will be required to assess whether or not unacceptable concentrations of organochlorine and organophosphate pesticides and asbestos containing materials are present. Due to the relatively small area of the building footprints, only 4 soil samples will be required across the 2 building footprints. Samples will be collected from the near-surface (sub floor lab, when removed), since the contaminants of concern will be surface based.

If detections of contaminants are found in the sub-slab soils of the building footprints, validation sampling will be required in conformance with Sections 11 & 12.

10.3. Notifications and Approvals

The proposed remediation works is considered Category 2 under State Environmental Planning Policy (SEPP) 'Resilience and Hazards', which do not require consent from the planning authority. Notification of an intention to undertake remediation works on the site, will be submitted to the relevant planning consent authority, 30 days prior to remediation works commencing.

The following information will be provided to the planning consent authority, Council, 14 days prior to the commencement of remediation works:

- Copies of the contamination assessment report and this RAP; and
- Contact details of the contractor appointed to undertake the remediation works; and
- Contact details of the parties responsible (if not the remediation contractor) for ensuring remediation works comply with relevant regulatory requirements.

A notification will be submitted to SafeWork NSW prior to undertaking asbestos removal works. Asbestos remediation works will be undertaken in accordance with the *Work Health and Safety Act 2011*, *WHS Regulations 2017*, *How to Manage and Control Asbestos in the Workplace Code of Practice* (SafeWork 2022a) and *How to Safely Remove Asbestos Code of Practice* (SafeWork 2022b).

Removal of friable asbestos will require the contractor to hold a Class A Asbestos Removal Licence; and Removal of non-friable asbestos will require the contractor to hold a Class B Asbestos Removal Licence.

Within one month of completion of remediation and validation works, a notification will be submitted to the planning consent authority.

10.4. Remediation Extent

The extent of contamination within the site is considered to be outlined within **Table 10.1** below.

Table 10.1 Approximate Remedial Extents

ID	Area of Environmental Concern	Dimensions	Depth	Volume or Mass
AEC01A	Fill Materials Impacted by Non-Friable Asbestos	≈ 45 m ²	1.3 m bgl	58.5 m ³ or 105 tonnes
AEC01B	Surficial Non-Friable Asbestos Fibre Cement Fragments	≈ 640 m ²	Surficial	TBC
AEC03	Sediment & Water Within On-site Dam	≈ 400 m ²	0.3 m bgl	≈ 120 m ³ or 215 tonnes
AEC05	Aesthetic Wastes	≈ 120 m ² (irregular)	Surficial	TBC
AEC07A	On-Site Structures – Building Materials	Subject to Findings of the Hazardous Building Materials Survey		
AEC07B	On-Site Structures – Underlying Soil Materials	Subject to Findings of the Data Gap Assessment		

Notes to Table: N/A: Not Applicable, TBC: To Be Confirmed, ^A Indicative volume provided based on proximity to Underground Fuel Storage Tanks and results from soil testing. A pragmatic approach should be utilised during remediation. Evidence of staining and odour as well as field screen testing using a calibrated photoionisation device should direct the extent of remediation onsite.

Figure 2 indicates the areas subject to remediation.

The lateral extent of remediation may be altered, during remedial works based on site observations and validation soil sample analytical laboratory results.

10.5. Sequence of Works for Remediation

Remedial works will be guided and monitored by the environmental consultant. The environmental consultant will assist the remediation contractor in setting out the inferred lateral extent of the identified AEC. The environmental consultant will monitor remedial works and provide guidance to the remedial contractor on:

- When to pause remedial works in an AEC, to allow validation works to be undertaken; and
- Where to extend remedial works in an AEC beyond the inferred extent (if observations or analytical results indicate a need for ‘chasing out’ additional contamination).

The following remediation works outlined in **Section 10.5.1**, are based on data available at the time of preparing this RAP.

The validation strategy for each identified AEC is outlined in **Section 9.2**.

10.5.1. Remediation schedule

Based on the extent and complexity of soil materials treatment, an estimated time-frame for remedial works is considered to be 1 month. It is expected that remediation timeframes will be further refined following appointment of the remediation contractor, and the staging of the remediation tasks in the contractor’s works program.

10.5.2. Demolition of remaining building structures – Hazardous Building Materials Survey

A pre-demolition hazardous building materials survey is to be undertaken prior to any demolition of on-site structures. Above ground structures and hardstand pavements will be demolished by a suitably licensed contractor, and associated wastes removed from site for recycling or disposal. The remediation contractor will retain transport and disposal records for all demolition wastes removed off site.

10.5.3. Surficial non-friable asbestos containing materials

Surficial asbestos containing materials will be hand-picked by a licensed asbestos removalist contractor. The top 100 mm soil materials will then be tined and asbestos containing materials emu-picked. The

soil materials will be tined and picked twice to ensure all surficial asbestos containing materials have been removed.

Following removal of asbestos containing materials, the residual soil materials will be subject to the collection of validation samples.

Non-friable ACM fragments will be removed from site, for offsite disposal to a licensed receiving facility, in accordance with the relevant waste classification.

10.5.4. Excavation of asbestos in soil profile

Excavation will be extended vertically to the base of fill and laterally to the edge of fill or to the site boundary (whichever occurs first).

Pending on the remedial strategy adopted for the materials, the remediation will comprise either Option 1, Option 2 or a combination of Option 1 and 2 below.

1. Disposal off-site to a licensed waste receiving facility will be in accordance with the NSW EPA *Waste Classification Guidelines (2014)*.
2. Fill soils will be spread out to a maximum thickness of 100 mm on a suitably prepared pad (e.g. concrete slab, or a cleared area onsite with a suitable barrier layer between underlying soils and the spread soils) and subject to taking (where practical) to a depth of 100 mm below the surface, using a rake with teeth spaced ≤ 7 mm apart and > 100 mm long, and fragments of bonded ACM handpicked. At least two passes of raking and picking shall be undertaken, with a 90° direction change between each pass, and using a grid pattern. All emu-picked asbestos will be removed off-site to a licensed receiving facility.

Following removal of asbestos containing materials, the excavation footprint will be subject to the collection of validation samples.

Where Option 2 is selected, the remediated soil materials will be subject to validation to ensure suitability for reuse onsite.

The remediation contractor must retain transport and disposal records for all wastes removed off site.

10.5.5. Dam dewatering and sediment remediation

Sequence of works will comprise the de-watering by application to on-site land, followed by excavation of dam sediments. The sediments will be spread to a 300 mm thick layer for exposure to natural UV radiation. The materials will be subject to daily tining and turning to ensure all sediments are exposed to UV radiation to allow for remedial works to occur. Duration of remediation will be dependent on weather conditions.

10.5.6. Aesthetic Impacts

Aesthetic impacts, in addition to asbestos containing materials, will be removed from site under an appropriate waste classification.

10.5.7. Backfilling

Materials for excavations requiring backfilling will be limited to:

- Virgin excavated natural material (VENM);
- Excavated natural material (ENM);
- Other material that is the subject of a resource recovery exemption and the placement of that material is within the lawful constraints of the resource recovery exemption (and does not present an unacceptable exposure risk to human health or the environment, within the context of the proposed land use setting); or
- Site won natural soil materials – those being soil materials excavated from the natural soil horizon and validated as suitable for the site's planned use.

Consideration will be given to geotechnical engineering requirements associated with backfilling; however, those requirements will be provided by the project's geotechnical advisors.

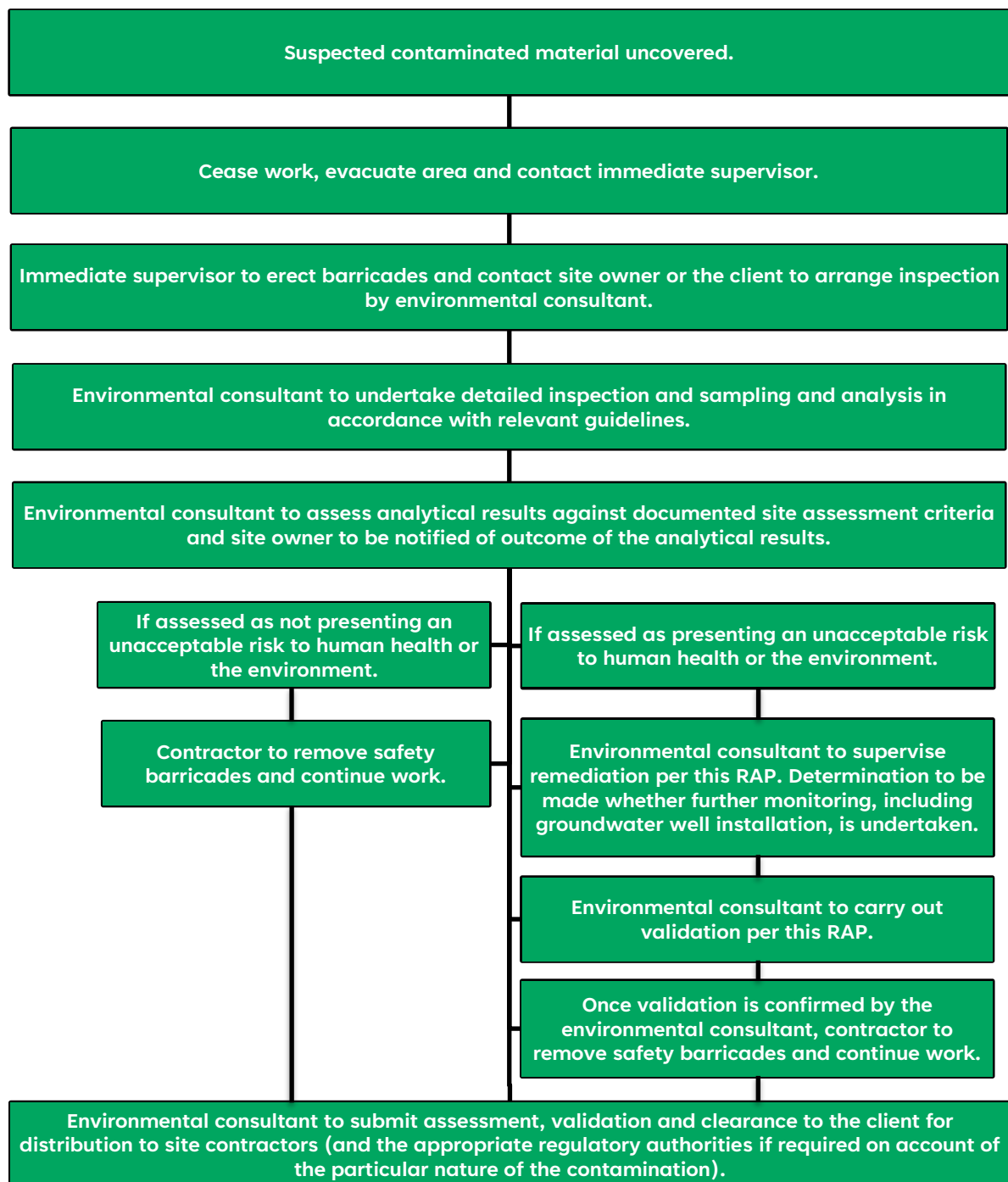
10.6. Unexpected Finds Protocol

It is possible that contaminants that have not been identified previously may be discovered during the remediation works. An Unexpected Finds Protocol has been compiled to guide response in the event of unexpected finds. Unexpected finds could include:

- Other underground storage tanks that are previously not identified;
- Buried containers and drums;
- Phase separated hydrocarbons;
- Powders and other suspicious buried material;
- Potentially hazardous materials; and
- Evidence of contamination including significant staining, odours and discolouration.

In the event that any material suspected of containing potentially hazardous substances is found during remediation works, the following Unexpected Finds Protocol is to be followed:

Unexpected Finds Protocol



11. VALIDATION QUALITY ASSURANCE PLANNING

At the data quality project planning stage, a process of establishing data quality objectives (DQO) for validation sampling and analysis (and investigations to fill data gaps) was followed. The approach adopted followed the process presented in the NEPM (2013) and the US EPA's seven step DQO planning procedures. Planning steps in the US EPA's DQO process for the remediation and validation works are described below. That DQO stepwise process has been described in Appendix B of the ASC NEPM 2013 revision.

The DQO for this project are set out below.

11.1. DQO Planning

The USEPA 2000 document, *Data Quality Objectives Process for Hazardous Waste Site Investigations* provides guidance on the data quality assurance (DQO) process. The US EPA's DQO process describes a seven-step process designed to support systematic planning of an environmental program.

Step 1: The 'problem'

This step involves clarification of the issues to be resolved. For the remediation validation works, the issue is to determine and demonstrate that the site's contamination has been sufficiently remediated or managed to render the site suitable for the planned mixed use low density residential and commercial redevelopment.

Step 2: Identify the decision of the study

On completion of the remediation and validation, the primary decision to be made is whether the validation data are sufficient to conclude that the remediation was effective and whether the contaminant management process was successful in isolating the remaining contamination. A key element of this is the design of the validation sampling protocols.

A specific and crucial decision to be made at the conclusion of validation sampling is whether the validation data are suitably reliable and complete to allow a decision on the suitability of the site for the planned use.

Step 3: Identify the information inputs

The third step involves identifying the information needed to support decisions and whether new environmental data will be needed.

The inputs required to make the decisions set out in **Step 2**, will include:

- Data obtained in previous contamination assessments;
- The nature and extent of remediation validation sampling, including both density and distribution;
- Analytical results of the validation sampling;
- Samples of relevant site media;
- The measured physical and chemical parameters of the site media samples (including field screening and laboratory analysis, where relevant); and
- Applicability of the assessment criteria adopted for each of the media sampled.

Step 4: Define the boundaries of the study

In this step the spatial and temporal limits to the investigation are defined. For the remediation and validation of the site, the temporal boundaries are those of the planned development. The spatial boundaries are those of the development site.

Step 5: Develop the analytical approach (or decision rule)

These steps involve a decision on how the results data will be evaluated in order to make a decision on the acceptance of the data and on risk or site suitability, or need for further investigations. Acceptance of the quality of the data, which will be based on quality assurance metrics, is a necessary prerequisite for a decision on the suitability of the data for forming a decision. Published values for acceptable exposure levels and risk levels, and site-specific criteria, will be used as the basis for a decision.

Step 6: Specify the performance or acceptance criteria

Acceptance criteria for the validation data are the factors that provide confidence that the measurement results are sufficiently robust to avoid an incorrect decision on site suitability. Factors such as completeness of the validation data, its consistency and indicators of quality, are inputs to the decision on data acceptance and the consequential decision on site suitability.

Indicators of the quality (reliability) of the data include the analytical data's precision, accuracy, representativeness, completeness and comparability. From these measures a level of confidence in the data can be obtained. Those indicators, and how they are obtained, are described below:

Precision

A measure of how closely a result can be reproduced by another sample analysis. Calculation of the relative percent differences (RPDs) of replicate samples provides a measure of precision.

Accuracy

A measure of how close the measurement value is to the true value. A laboratory's 'accuracy' is indicated by its performance against reference standards. This can be evaluated through the laboratory's proficiency results. The laboratory's Control Samples – of spike sample extractions can also provide an indication of accuracy.

Representativeness

Representativeness of the results relies on a suitable sampling pattern designed to sufficiently represent the true condition of the medium being sampled. Appropriate sampling density and patterns are the means by which this can be achieved.

Comparability

Comparability refers to the degree to which two or more data sets are comparable. A high degree of comparability is dependent on factors such as consistency in the use of sampling techniques and equipment, data handling and analytical methods.

Sensitivity

Sensitivity concerns the appropriateness of analytical methods. This aspect of data quality planning is usually adequately managed through the use of NATA accredited laboratories.

Step 7: Optimisation of the Design for Obtaining Data

This step involves processes and considerations for designing a resource effective sampling and analysis program. The validation sampling and analysis methods, and the timing of data collection must be compatible with and coordinated with the remediation processes and schedules. **Section 12** describes the sampling and analysis plan used for this project.

The validation sampling design, including the field QA sampling, is provided in **Table 12.1, Section 12**.

12. VALIDATION SAMPLING

12.1. Validation Sampling Methods and Rates

The validation sampling methodology, sampling densities, and analytes for this project are presented in **Table 12.1**.

Table 12.1 Validation Sampling Design, Methods, Analytes

Remediation Area	Item	Sampling Densities	Sampling Method	Analytes
AEC01B Surficial Non-Friable Asbestos Impacted Soil Materials	Surface Soil	1. Base: 1 x 10 L sample and 1 x 500 mL sample per 25 m ² with a minimum of 3 samples	Visual inspection and clearance of residual surface by a suitably experienced occupational hygienist. At least one pass of treated material, using a rake with teeth spaced ≤ 7 mm apart and > 100 mm long. Visual inspection of 1 x 10 L sample collected from each sample location and a subsequent 500 mL sample for quantitative asbestos analysis. Visual inspection of excavation footprint to confirm removal of fill. Photographic record of residual soil surface following removal. Waste records provided for asbestos materials removed from site surface.	Asbestos (0.001 % w/w)
AEC01A Non-friable (Bonded) ACM in Fill	Excavation pit validation	1. Base: 1 x 10 L sample and 1 x 500 mL sample per 25 m ² with a minimum of 3 samples 2. Walls: 1 x 10 L sample and 1 x 500 mL sample per 10 lineal metres for each vertical 1 m of excavation depth	Visual inspection and clearance of residual excavation footprint by a suitably experienced occupational hygienist. Visual inspection of 1 x 10 L sample collected from each sample location and a subsequent 500 mL sample for quantitative asbestos analysis. Visual inspection of excavation footprint to confirm removal of fill. Photographic record of residual excavation footprint following removal. Waste records provided for asbestos materials removed from site.	Asbestos (0.001 % w/w)
AEC01A Non-friable (Bonded) ACM in Fill	Excavated soil – ex-situ validation	1. Stockpiled Materials: 1 x 10 L and 1 x 500 mL sample per 30 m ³ stockpiles	Visual inspection of 1 x 10 L sample per 30 m ³ of treated material, screened for fragments of ACM > 7 mm and a subsequent 500 mL sample for quantitative asbestos analysis. Visual inspection of excavation footprint to confirm removal of fill. Visual inspection of remediated soil materials to confirm removal of visible asbestos containing materials. Photographic records of treated soil.	Asbestos (0.001 % w/w)
AEC03 Remediation of excavated dam sediments	Excavated sediments	1. 1 per 100 m ² of treatment area (minimum sample number of 3)	Collection of treated soils by hand trowel. Samples placed in 100 mL laboratory jars for biological samples. Photographic records of treated soil.	
AEC05 Aesthetic Impacts	Residual Footprint	NA	Visual inspection following removal works. Photographic record of footprint following removal.	NA

Remediation Area	Item	Sampling Densities	Sampling Method	Analytes
Imported Fill (VENM)	NA	1 soil sample per 100 m ³ or 3 samples per stockpile	Visual inspection to confirm consistency with VENM source	If required: TRH, BTEX, PAH, Heavy Metals, OCP and Asbestos Bulk ID
Imported Fill (ENM)	NA	Quantity dependent – refer to the NSW EPA 2014 ‘Excavated Natural Material (ENM) exemption/order’ for further detail.	Visual inspection to confirm consistency with ENM source	If required: TRH, BTEX, PAH, Heavy Metals, Asbestos Bulk ID, EC, pH, Foreign Materials (Type III)
Imported Resource Recovery Order/Exemption (RRO/RRE)	NA	Quantity dependent – refer to the relevant exemption/order for further detail.	Visual inspection to confirm consistency with RRO/RRE source	If required, sampling is to be undertaken in accordance with the relevant RRO/RRE and additional Asbestos (0.001 % w/w) to be undertaken
Hazardous building materials	NA	To be determined by the Occupational Hygienist or Licensed Asbestos Assessor (LAA)	Visual inspection following removal works by a SafeWork NSW Licensed Asbestos Assessor (LAA) or appropriately experienced occupational hygienist. Photographic record following removal. Waste records provided for impacted materials disposed of off-site to licensed receiving facility.	To be determined by the Occupational Hygienist or LAA

Investigations to resolve data gaps will be undertaken as shown in **Table 12.2**.

Table 12.2 Data Gap Investigations Sampling, Methods, Analytes

Data Gap	Item	Sampling design	Sampling method	Analytes
Contaminants beneath remaining building footprints	3 building footprints	4 sample locations	Sampling of surficial soils by hand trowel	Pesticides (OCP & OPP) Asbestos (0.001 % w/w)

12.2. Asbestos in Soil Sampling Methodology

To address validation for AEC01A and AEC01B, validation soil samples will be collected from pit excavations and treated material stockpiles (where applicable). The asbestos validation methodology will comprise the following.

The asbestos in soil sampling method will consist of a 10 L bulk soil sample collected from each validation location and stockpile. Each bulk soil sample will be screened for the presence of potential asbestos containing materials (ACM) greater than 7 mm in size. Potential ACM greater than 7 mm will be weighed and placed in separate laboratory supplied zip lock bags. At each location a 500 mL sub-sample will be collected in a laboratory supplied zip lock bag for quantification of asbestos content as asbestos fines and friable asbestos.

Soil samples will be collected at each required sampling point directly from the base and walls of the excavation pit areas as detailed in **Table 12.1**. Soil samples will also be collected from treated asbestos stockpile materials, where ex-situ treatment and beneficial reuse is the selected remedial strategy.

All samples will be collected using a clean pair of nitrile gloves and placed in the appropriate laboratory provided sampling zip lock bags.

Observations of the materials encountered during sampling will be recorded on the relevant field observation log with photographic record.

12.3. Contingency for Validation Sample Failure

In the event that validation samples return results above the site adopted criteria for the relevant contaminant of concern, soil materials in the location of the failed sample will require further remediation until the extent of the contamination is removed. Additional validation testing will be required in the location to confirm the area has been remediated.

Where treated stockpiles result in non-friable asbestos above the adopted site criteria, the materials will be subject to additional emu picking works prior to re-validation.

Where treated stockpiles result in friable asbestos above the adopted site criteria, the materials will require disposal offsite to a licensed receiving facility.

12.4. Decontamination

In the event that non-disposable sampling equipment is used, the equipment will be decontaminated before and in between sampling events, to mitigate potential for cross contamination between samples collected. The decontamination methodology to be adopted for this project will include:

- Washing relevant sampling equipment using potable water with a phosphate free detergent (i.e. Decon 90 or similar) mixed into the water;
- Rinsing the washed non-disposable sampling equipment with distilled or de-ionised water; and
- Air drying as required.

12.5. Field QA for Validation Sampling

For the remediation and validation works, the only field sampling and analysis proposed will comprise the collection of samples for quantification of asbestos content. The QA/QC analyses typically carried out for chemical contaminants, comprise the collection and analyses of field duplicates, field blanks, rinsate blanks and trip blanks. Those procedures cannot be applied to the sampling and analysis of soil for asbestos content.

For the data gap assessment, sampling to enable evaluation of field quality assurance (QA) will consist of the following.

Trip blanks

For bulk soil samples and Headspace-in-Vial samples, one trip blank sample will be collected for analysis for each day of sampling. Analytes for trip blanks will be volatile hydrocarbons: TRH (C₆-C₁₀) and BTEX.

Trip spikes

For each day that samples of bulk soil for petroleum hydrocarbons and other VOCs are collected, one trip spike sample, supplied by the primary laboratory, will be included with the sample batch. Analytes for trip blanks will be volatile hydrocarbons: TRH (C₆-C₁₀) and BTEX.

Inter- and Intra-Laboratory Duplicates

Inter- and Intra-laboratory field duplicates will each be collected at a rate of one per twenty (5 %) site samples collected. Duplicate sampling does not apply to asbestos samples.

For Headspace-in-Vial analysis, no interlaboratory sample can be collected for analysis, as the method is NATA accredited only at Leeder Analytical Laboratories at the time of this project. As such, only intra-laboratory samples will be collected.

The relevant percent difference (RPD) of concentrations of relevant analytes, between the parent sample and the duplicate will be calculated.

The Relative Percentage Differences (RPDs) for bulk soil and soil vapours will be calculated for the primary and duplicate samples for assessment of the data quality, in particular for assessment of the reproducibility of the analytical data measurements or 'precision' given the adopted field and laboratory methods.

Acceptability of an RPD value is dependent on measured concentrations, relative to the detection limit. Generally, where the measured concentration is more than one order of magnitude greater than the detection limit, RPDs within 100% are acceptable. When the detection limits for vapour measurements are at trace levels, even an RPD of 100% is entirely acceptable for values 10 times the detection limit because both values are still at very minor levels. The value of RPDs becomes significant only when one or both of the measured concentrations are within a factor of two or three of the unacceptable risk levels. (Duplicates differing by a factor of two result in an RPD of 67%).

The RPDs were calculated using the formula below.

$$RPD\% = \frac{|Ro - Rd|}{|(Ro + Rd) / 2|} \times 100\%$$

Where Ro is the primary sample and Rd is the duplicate or the triplicate sample.

12.6. Laboratory Analysis Quality Assurance / Quality Control

The analytical laboratory QA/QC program will typically include laboratory method blank samples, matrix spike samples, surrogate spike samples, laboratory control samples, and laboratory duplicate samples.

Samples of soil Headspace-in-Vial analysed by Leeder Analytical laboratories will include analyses of two laboratory control samples and a method blank. The laboratory control samples comprise analyses of samples prepared from laboratory standards which are expressed as percentage recovery for each of the compounds from the analytical suite.

12.7. Laboratory Holding Times, Analytical Methods and Limits of Reporting

The laboratory holding times, analytical methods and limits of reporting (LOR) being used for this project, are presented in **Appendix C**.

13. WASTE CLASSIFICATION & TRACKING

All soil materials transported off-site must be waste classified by the Environmental Consultant, prior to removal from the site. Waste Classification will be undertaken in accordance with the NSW EPA guidelines: Waste Classification Guidelines – Part 1: Classifying Waste, November 2014.

The quantity and movement of all waste materials excavated and removed offsite will be tracked by the remedial contractor. All waste disposal dockets issued by the suitably licensed waste receiving facility must be retained by the remedial contractor for reconciliation against the material tracking records, and for inclusion in the validation report. This will demonstrate that the waste was appropriately disposed to licensed facilities.

14. ONGOING MONITORING OR MANAGEMENT

The remediation and validation process described herein will remove the need for further management and monitoring. As such, the site will not require the implementation of a long-term environmental management plan at the completion of remediation works.

15. REPORTING

15.1. Site Validation Report

At the completion of remediation works, a site validation report will be prepared with reference to the relevant sections of NSW EPA 2020, '*Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*'.

The validation report will document the sampling undertaken and present the analytical results demonstrating that the goals of the remediation works were achieved and the site was made suitable for its planned use.

16. SITE MANAGEMENT PLAN

A site management plan must be prepared by the remediation contractor prior to the commencement of remediation works. The plan must identify controls designed to ensure environmental protection during the works. The following outline of a site management plan presents items requiring consideration in the plan.

16.1. Soil and Stormwater Management

16.1.1. Site Access & Egress

Vehicle access and egress to the site will be stabilised to prevent tracking of sediment onto roads and footpaths. Soil, mud and other similar materials will be removed from the roadway adjacent the access - egress point by sweeping, shovelling or a means other than washing, on a daily basis, or as required.

Trucks will be loaded adjacent to the remediation excavation (where practical). Spills of excavated soil will be scraped or swept up and combined with the soil being disposed offsite.

Soil and sediment will be broomed or washed off vehicles and plant tyres and tracks, prior to vehicles and plant leaving the remediation works zone. This soil and sediment will be scraped or swept up and managed onsite or disposed, depending on its contamination status.

A site-specific sediment and erosion control plan will be prepared and maintained by the remediation contractor, to suit staging of the remediation works. Erosion and sediment control measures will be maintained in a functional condition. Sediment laden stormwater runoff will be controlled using measures outlined in Landcom 2004, *'Managing Urban Stormwater - Soils and Construction'* (the Blue Book).

16.1.2. Stockpiles

Stockpiles of soil or other materials:

- Will not be placed on footpaths or nature strips, unless approved by Council;
- Will be placed away from gutters, stormwater pits and other drainage lines;
- Will be stored in a secure area and be covered if remaining on site for more than 24 hours; and
- Will generally be constructed as low elongated mounds on level surfaces.

16.1.3. Excavation Pump Out

Should excavations require pumping out, water will be analysed for total suspended solids, pH, metals and petroleum hydrocarbons. Should analytical results be less than relevant marine ecosystem groundwater investigation levels specified in *Australian & New Zealand Guidelines for Fresh & Marine Water Quality* (ANZWQG) (2019), excavation water may be discharged to stormwater.

Should analytical results exceed criteria, other options for disposal will be considered, including:

- Discharge to sewer (with prior approval from Sydney Water with a Trade Waste Agreement); and
- Removal and offsite disposal by a liquid waste contractor;
- On-site use for dust control if contaminant type and contaminant levels are suitable.

16.1.4. Rehabilitation and Landscaping

Stabilisation of exposed areas on the site, where required, will be undertaken in a progressive manner, as stages of remediation works are completed. Stabilisation will be maintained until such time as site redevelopment works commence.

As site redevelopment works are expected to be undertaken in conjunction with remediation works, revegetation of the site is considered unlikely to be required.

16.2. Waste Management

Removal of materials from site for recycling or disposal, will be undertaken with reference to the relevant provisions of the *Protection of the Environment Operations Act (1997)* and *NSW EPA Waste Classification Guidelines (2014)*.

If waste classification is required for site material, the following are required (as a minimum):

- Waste classification documentation;
- Material source and description;
- Sampling density, pattern, COPCs;
- Result summary, including appropriate table with comparison to acceptance criteria; and
- Waste classification.

If offsite disposal is required for site material, the following are required (as a minimum):

- Source location;
- Estimated volume (based on excavation size);
- Actual volume of disposal;
- Waste classification;
- Transporter;
- Final destination, POEO licence;
- Reconciliation of waste dockets with actual disposal volume; and
- Reconciliation of actual disposal volume and the estimated volume of disposal (based on excavation size).

The remediation contractor will maintain detailed records of materials removed from the site, including date and time of removal, quantities of materials, transport company details and vehicle registration details.

The remediation contractor will retain records verifying lawful disposal of the materials, including date and time the waste left site, approximate volume per load, the classified of the waste contained in each individual load, transport vehicle registration details, weighbridge tipping dockets with receipt dates and times and tipped waste classification from the waste receiving facility.

Material placed onsite (stockpiles or moved to other location) must be tracked so that the source of material can be identified should unexpected finds be encountered.

16.3. Groundwater Management

Should dewatering of excavations (extraction of groundwater or stormwater) be required, development consent may be required from the planning consent authority. Dewatering may also require approvals from the NSW Department of Planning and Infrastructure, and the NSW Department of Primary Industry – Water.

Further, should unexpected significant contamination be encountered during remediation that may affect groundwater (e.g. the presence of unknown underground storage tanks), additional groundwater assessment may be required.

16.4. Noise Control

Noise levels from the site during the project will not exceed the limits indicated in AS2436-1981.

No 'offensive noise' as defined under the *Protection of the Environment Operations Act 1997* will be created during remediation works.

Plant and equipment will be fitted with noise attenuation devices (e.g. mufflers on exhausts). Consideration will be given to use of reversing alarms other than the standard pulsed tonal alarms.

Vehicle access roads will be designed in such a way to minimise the need for plant and vehicles to reverse (e.g. provision of a turning circle adjacent to the remediation works zone).

16.5. Dust Control

Dust may be generated during remediation works and associated tasks. To mitigate risk of dust emissions migrating beyond the site boundary, consideration will be given to implementing the following procedures:

- Erection of dust screens around the perimeter of the site (e.g. fencing with shade cloth attached);
- Securely covering all loads entering or exiting the site;
- Use of water sprays across the site to suppress dust;
- Covering stockpiles of contaminated soil remaining on site for more than 24 hours;
- Keeping excavation surfaces moist;
- Wetting down of placed fill material during spreading;
- Sweeping of hardstand surfaces;
- Minimising soil disturbance works during windy days; and
- Retaining stabilised site access and egress points for vehicles.

Airborne fibre monitoring will be implemented during all remedial works involving friable asbestos at the site, and will be carried out in accordance with SafeWork NSW (2022) *Code of Practice – How to Safely Remove Asbestos*. EGA recommends that airborne fibre monitoring be implemented during works involving non-friable asbestos within the site, this however is not explicitly required but is highly recommended by SafeWork NSW.

Portable battery-operated air monitors are to be placed within static positions approximately 1.5 m above the ground surrounding the work areas. The air sample analysis shall be carried out by a NATA-accredited laboratory. The results of asbestos air monitoring should be provided to the Site Project Management Representative the day following the removal or handling works. Project management will display results of air monitoring on the site's safety notice board for a period of 24hr.

Concentrations of asbestos fibres shall be dealt with as follows:

Table 16.1 Airborne Asbestos Fibre Concentration Action Levels

Action Level (airborne asbestos fibres/ml)	Action
< 0.01 fibres / ml	Continue with control measures
≥ 0.01 fibres / ml < 0.02 fibres / ml	Review control measures, Investigate the cause, Implement new controls to prevent further release.
≥ 0.02 fibres / mL	Stop removal works, Notify the relevant regulator that work has ceased, Investigate the cause, Extend the isolation area and implement controls to minimise further exposure, Do not recommence work until fibre levels are at or below 0.01 fibres / ml.

16.6. Odour Control

Generation of significant odours during the remediation works is considered to be unlikely.

If odours are generated, odours will be monitored at the site boundary. Should unacceptable odours be detected at the site boundary, consideration will be given to implementing the following procedures:

- Use of appropriate covering techniques such as plastic sheeting to cover excavation faces or stockpiles;
- Use of fine mist sprays (which may incorporate deodorizing agents);
- Use of hydrocarbon mitigating agents on impacted areas and materials; and
- Adequate maintenance of equipment and machinery to minimise exhaust emissions.

A record of unacceptable odours and corrective action taken, will be maintained by the remediation contractor.

16.7. Traffic Management

Haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site will be selected by the remediation contractor and will meet the following objectives:

- Compliance with all traffic road rules;
- Minimisation of noise, vibration and odour to adjacent premises; and
- Utilisation of state roads and minimisation of use of local roads.

The remediation contractor will ensure that site vehicles:

- Conduct deliveries of soil, materials, equipment or machinery during the hours of remediation work identified;
- Securely cover all loads to prevent dust or odour emissions during transportation;
- Exit the site in a forward direction; and
- Do not track soil, mud or sediment onto the road.

16.8. Vibration Management

Vibration emissions during remediation works will be controlled to mitigate risk of potential damage to assets on adjacent properties, and to mitigate unreasonable loss of amenity to nearby residents.

16.9. Fill Importation

Material proposed to be imported to site as engineered fill, will be limited to materials certified as:

- Virgin Excavated Natural Material (VENM); or
- Excavated Natural Material (ENM).

VENM certification will be undertaken with reference to NSW EPA (1995). ENM certification will be undertaken with reference to NSW EPA Excavated Natural Material Exemption (2014).

The remediation contractor will maintain detailed records of all fill imported to the site, including details of the supplier, the source of the fill, the quantities of the fill, vehicle registration numbers and the dates and times the fill was received on site.

The remediation contractor will inspect every load of material imported to site, to check the material is consistent with the material described in the VENM or ENM certification and each load is free of visual anthropogenic materials, staining or odours. The remediation contractor will maintain a documented record of each inspection.

16.10. Work Health and Safety

16.10.1. Safe Work Method Statement

Each contractor and sub-contractor undertaking remediation works, or working within a remediation works zone, will prepare a project specific safe work method statement (SWMS), which will include, but not be limited to:

- The tasks to be undertaken;
- Hazards identified for each of the tasks to be undertaken;
- An assessment of risk for each hazard, considering likelihood and consequence; and
- Control measures to eliminate or mitigate risks associated with each identified hazard.

16.10.2. Personal Protective Equipment

The following minimum personal protective equipment (PPE) should be worn by all persons working in or visiting the remediation works zone:

- Long sleeves and long pants;
- High visibility vests (or clothing);
- Safety boots;
- Hard hats; and
- Eye protection (e.g. safety glasses).

Additional PPE may be required in accordance with task specific control measures in SWMS for asbestos handling and removal works.

The following minimum personal protective equipment (PPE) are to be worn by any persons entering a non-friable asbestos impacted remediation works zone:

- Disposable coveralls;
- Minimum P2 respirator;
- Disposable boot covers; and
- Disposable gloves.

Should friable asbestos be identified during the works, the following minimum PPE are to be worn by any persons entering a friable asbestos impacted remediation works zone:

- Disposable coveralls;
- Minimum P3 half-face respirator (Higher protection may be required during works. Refer to the licensed asbestos assessor on-site for further details);
- Disposable boot covers; and
- Disposable gloves.

Additionally, a 3 stage (minimum) decontamination unit must be present at the egress point to the friable asbestos works area and used by all personnel entering and exiting the area.

16.10.3. Decontamination of Personnel, Plant and Equipment

Personnel undertaking remediation tasks, or entering the remediation works zone, will be required to decontaminate upon exiting the remediation works zone. Decontamination of plant and equipment used to remediate will also need to be decontaminated upon exiting the remediation work zones. Decontamination procedures will include:

- Removal of all disposable PPE;
- Cleaning down of protective footwear (including removal of soil from the soles);
- Washing of hands and exposed dermal areas; and
- Decontamination of plant and equipment (as applicable).

16.11. Site Signage

A sign will be posted on the boundary of the site, adjacent to the site access point, which will include 24-hour contact details of the remediation contractor and appropriate notification of asbestos remediation works (in progress).

16.12. Site Security

Site security will be maintained throughout the duration of the remediation works, with appropriate boundary fencing and gate locks. Other security measures may be implemented, if the need arises.

16.13. Site Hours of Operation

Remediation works can be undertaken on Monday to Friday between the hours of 7:00 am to 5:00 pm, and Saturday between the hours of 8:00 am and 1:00 pm.

Remediation works will not be undertaken outside the hours stated above, or on Sundays or public holidays.

16.14. Community Relations and Complaints

Owners, occupants and tenants of properties adjoining the site and across the road from the site, will be provided with notification of remediation works, at least two days prior to those works commencing.

Personnel undertaking remediation works on the site, will direct all third-party communications including complaints to the Project Manager. The Project Manager will arrange for the communication to be assessed, a response prepared, corrective actions implemented (if necessary).

A register will be maintained on site for the recording of communications including complaints from third parties, including but not limited to, local residents and local businesses.

16.15. Emergency Preparedness

An emergency assembly point will be established at the site egress point. This point will be communicated to all site workers and visitors, during relevant site induction processes.

In the event of an emergency, site workers and visitors will assemble here and await further instructions from the site supervisor, project manager or emergency services.

Spill control kits and fire extinguishers will be located on site, as and where required.

Contact details to be used in the event of an emergency, are presented below.

16.16. Register of Contacts

A register of contacts for the project is presented in **Table 16.2** below.

Table 16.2 Register of Contacts

Project Role	Person	Organisation	Contact
Emergency Services	-	Fire / Police / Ambulance	000
Project Manager	Alistair Palmer	Transcend Property	0414 629 926
Planning Consent Authority	TBC	Armidale Regional Council	1300 136 833
WHS Regulatory Authority	-	SafeWork NSW	131 050
Environmental Regulatory Authority	-	NSW EPA	131 500
Remediation Contractor	TBC	TBC	TBC
Environmental Consultant	Steven Wallace	Environmental Group Australia	1300 884 164

16.17. Interim Site Management Plan

Prior to the implementation of the remedial action plan, the following site management activities will be enforced to reduce the contamination risk to human health and the environment:

- Site Isolation:
 - Site access and egress will be limited to nil (if possible) to prevent the tracking of contaminants outside of the site boundaries.

- Appropriate boundary fencing with locked gates will be installed (if not already present), regularly maintained and remained locked when site is not in use.
- Signage will be posted on the boundary of the site, adjacent to the site access point, which will include 'keep out, asbestos contamination' (or similar).
- Safe Work Method Statement:
 - Each contractor and sub-contractor gaining access to the site, will prepare a project specific safe work method statement (SWMS), which will include, but not be limited to:
 - The tasks to be undertaken;
 - Hazards identified for each of the tasks to be undertaken;
 - An assessment of risk for each hazard, considering likelihood and consequence; and
 - Control measures to eliminate or mitigate risks associated with each identified hazard.
- Personal Protective Equipment:
 - The following minimum personal protective equipment (PPE) should be worn by all persons working in or visiting the remediation works zone:
 - Hard hat;
 - Long sleeves and long pants;
 - High visibility vest (clothing);
 - Safety boots;
 - Gloves;
 - Eye protection (safety glasses); and
 - Respiratory protection (Only within asbestos impacted remediation areas).
- Decontamination of Personnel equipment:
 - Cleaning down of protective footwear (including removal of soil from the soles); and
 - Washing of hands.

17. CONCLUSIONS

Based on the information presented in the historical contamination assessment reports, EGA concludes that the remedial goal can be achieved, and the site made suitable for the proposed land use setting, subject to:

- Implementation of the strategies, methodologies and measures set out in this remedial action plan;
- Should newly identified unacceptable land contamination risks be identified during development works, modifications to the remediation plan presented in this RAP may be necessary. Changes to the planned remediation processes will require oversight by a suitably experienced environmental consultant;
- Prior to any removal of soils from site for offsite disposal during remedial works, a waste classification for those soils must be prepared by a suitably experienced environmental consultant;
- Tracking of all waste soils removed from the site and imported clean materials must be recorded by the remediation contractor; and
- Monitoring and validation sampling of remedial works must be carried out by a suitably experienced environmental consultant.

This report must be read in conjunction with the limitations set out in **Section 18**.

18. STATEMENT OF LIMITATIONS

Scope of services

This remedial action plan (the Report) has been prepared for Transcend Property Pty Limited (the client) in accordance with the scope of services set out in the contract, or as otherwise agreed, between the client and EGA. In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and site disturbance constraints.

Within the limitations imposed by the scope of services, the environmental testing, sampling and preparation of the Report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for benefit of client

The Report has been prepared for the benefit of the client and no other party. EGA assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the Report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the Report.

Other parties should not rely upon the Report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

Reliance on data

In preparing the Report, EGA has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations. Except as otherwise stated in the Report, EGA has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and recommendations in the Report are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the supplied data. EGA will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to EGA.

The statements, opinions, facts, information, conclusions and recommendations in the Report are applicable to the condition of the site at the completion of EGA's contracted works, and not beyond that time. EGA will not be liable to update or revise the Report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the conclusion of EGA's contracted works.

Disclaimer

To the fullest extent permitted at law, EGA, its officers, employees and agents assume no liability and will not be liable to any third party for, or in relation to, any losses, damages or expenses (including any indirect, consequential or punitive losses or damages or any amounts for loss of income or profit, revenue or loss of opportunity to earn profit, loss of production, loss of contract, increased operational costs, loss of business opportunity, business interruption and pure economic loss) of any kind (and whether arising in contract, tort (including negligence), under statute, in equity or otherwise, suffered or incurred by a potential purchaser (or any other third party) arising out of or in connection with any matter outside the ambit of the Permitted Purpose in relation to the Report or findings expressed in the Report.

19. REFERENCES

Australian and New Zealand (ANZWQG), *Guidelines for Fresh and Marine Water Quality*

Landcom 2004, *Managing Urban Stormwater - Soils and Construction* (the Blue Book);

National Environment Protection Council (NEPC), *Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013*

National Environment Protection Council (NEPC), *Schedule B(2) Guideline on Site Characterisation, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013*

National Health and Medical Research Council, *National Water Quality Management Strategy Australian Drinking Water Guidelines 6 2011 Version 3.5 Updated August 2018*

NSW DECCW 2009, *Decommissioning, Abandonment and Removal of UPSS*

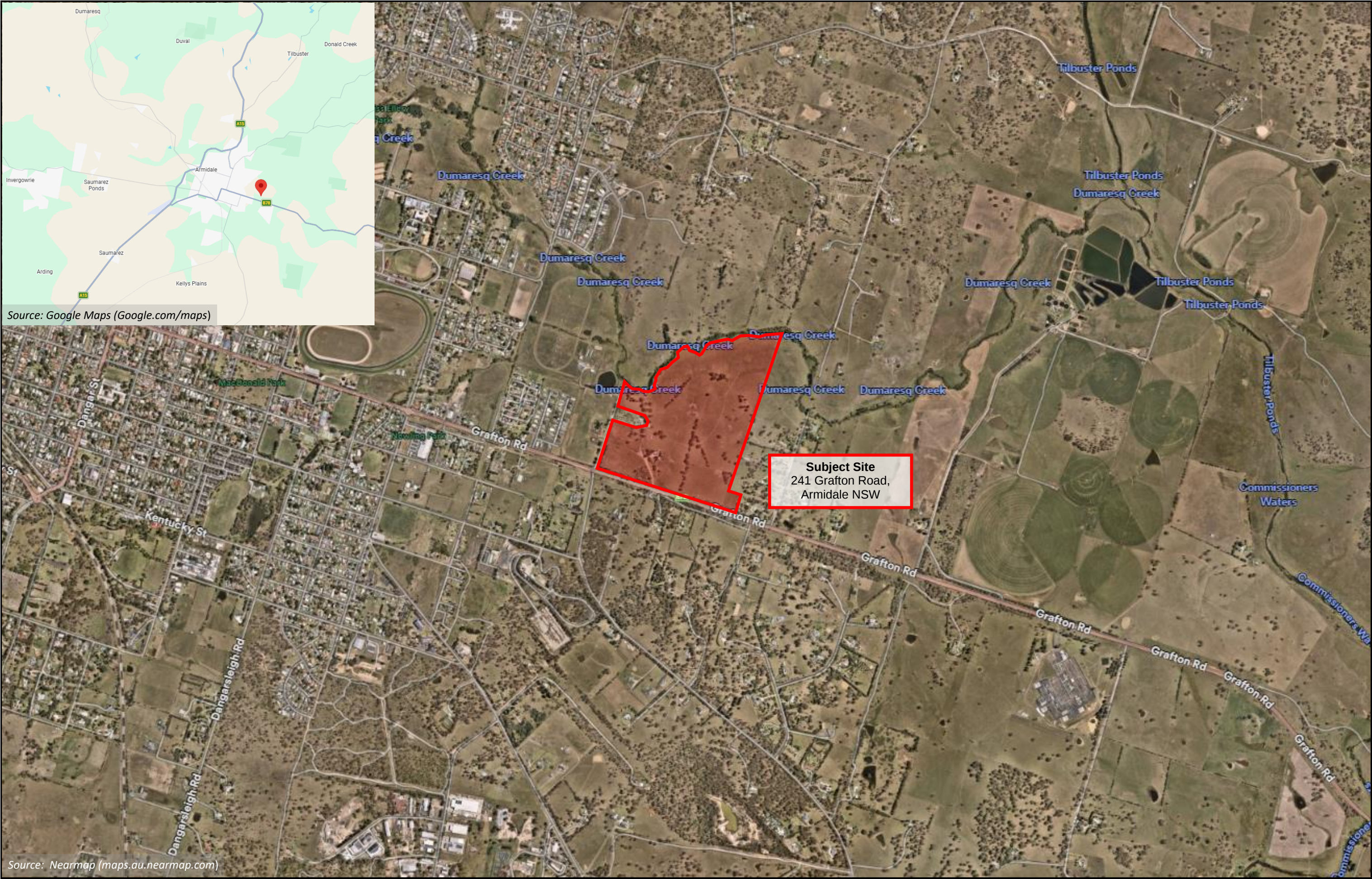
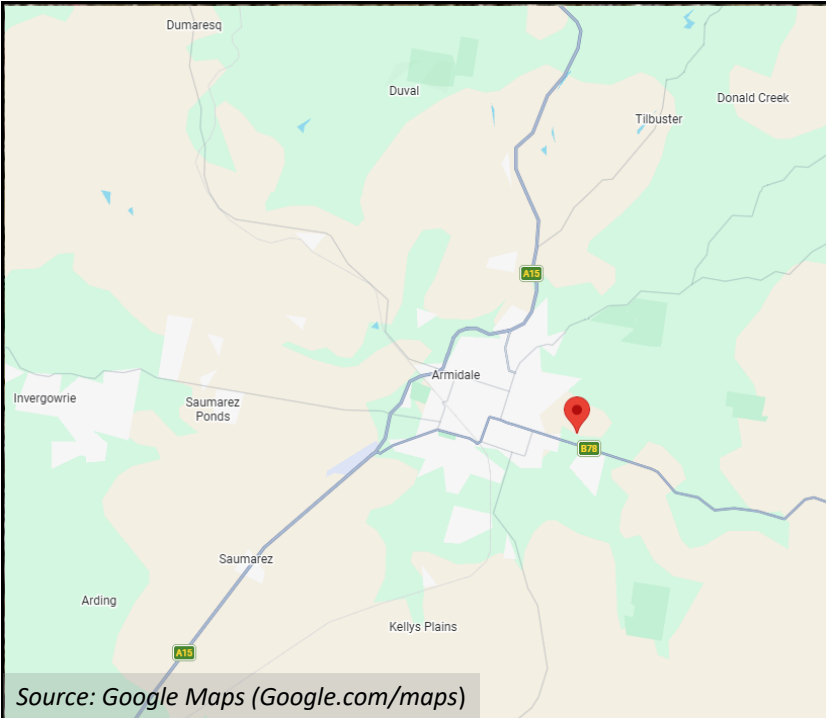
NSW EPA 2022, *Contaminated Sites: Sampling Design Guidelines*

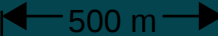
NSW EPA 2017, *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (3rd edition)

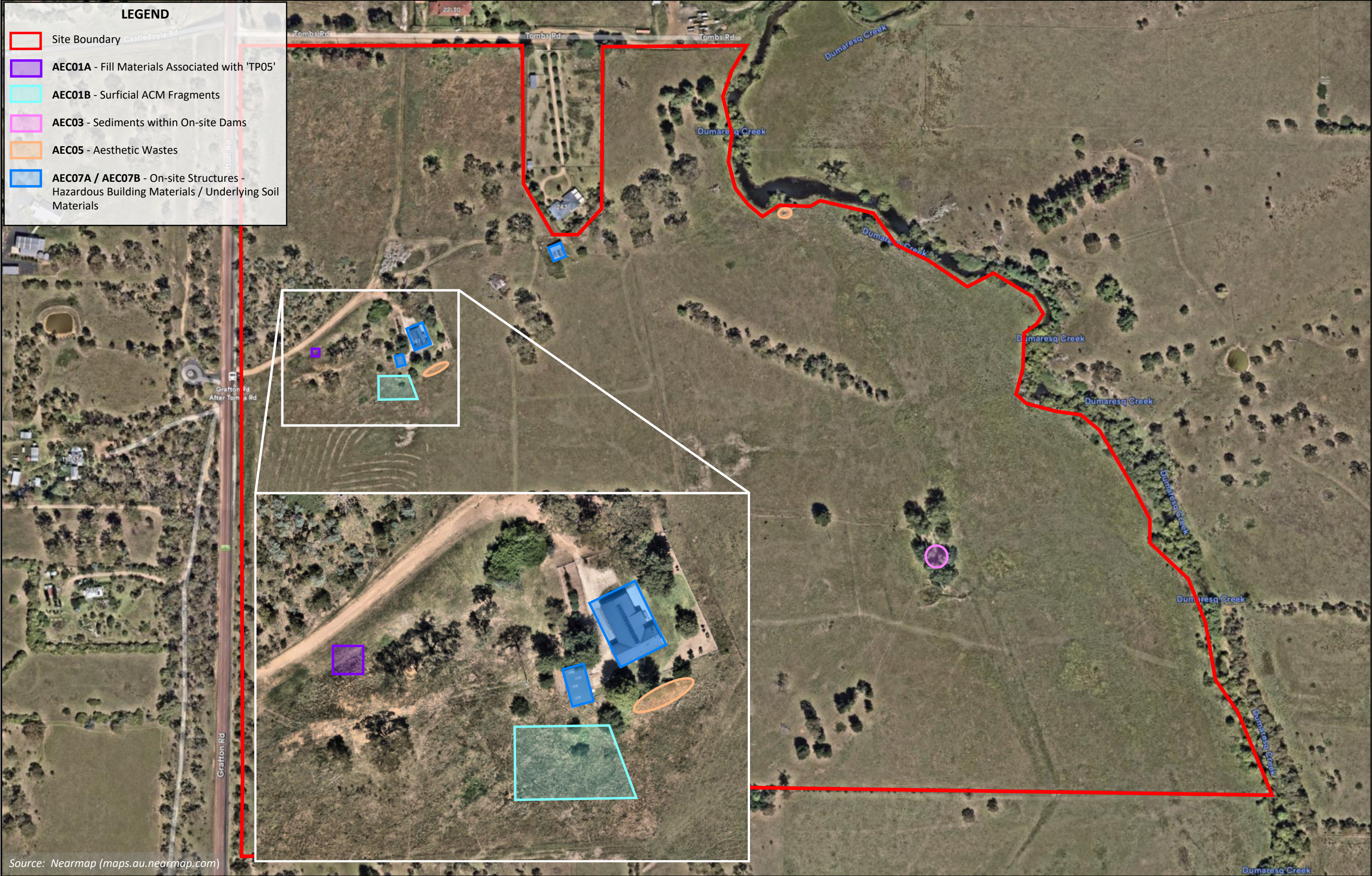
NSW EPA 2020, *'Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*

WA DOH 2021, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*

FIGURES



	Scale: 		Site Locality		
	Client Name:	Transcend Property Pty Ltd		Figure Number:	1
	Project Name:	Remedial Action Plan		Figure Date:	16 March 2026
	Project Location:	241 Grafton Road, Armidale NSW		Report Number:	2785-RAP-01-250326.v1f



Scale:		AECs
Client Name:	Transcend Property	
Project Name:	Remedial Action Plan	
Project Location:	241 Grafton Road, Armidale NSW	



Figure Number:	2
Figure Date:	4 March 2026
Report Number:	2785-RAP-01-250326.v1f

APPENDIX A

SITE ASSESSMENT DATA SUMMARY TABLES

[illegible]

General Notes to Table: - = Not Analysed | BTEX = Benzene, Toluene, Ethylbenzene, and Xylene | OCP = Organochlorine Pesticides | NC = Not Calculated | ND = Non-Detect | NL = Not Limiting | PAH = Polyaromatic Hydrocarbon

General Notes to Table: * = Not Analyzed | BTX = Benzene, Toluene, Ethylbenzene, and Xylene | OCP = Organochlorine Pesticides | NC = Not Calculated | ND = Non-Detect | NL = Not Limiting | PAH = Polycyclic Aromatic Hydrocarbon | PCBs = Polychlorinated Biphenyls | PCL = Practical Quantification Limit | TRH = Total Recoverable Hydrocarbons | TEQ = Toxicity Equivalence Quotient | UCL = Upper Confidence Limit

Notes to Statistical Calculations: The average and Standard Deviation are calculated with non-detects replaced with a null (0) proxy value. Where all values are non-detect, a "NC" value is outputted.

Additional Notes: ¹ HIL limits are for Chromium (VI) only, and EIL limits are for Chromium (III) only, total Chromium measured for initial screening ² Non-detect values are replaced with a proxy value with the proxy value being: Low: 0, Medium: 1/2 PQL, and

[illegible]

Value	Highlighted concentration exceeds the site adopted criteria (HIL/HSL)
--------------	---

Value	Highlighted concentration exceeds the site adopted criteria (EIL/ESL)
-------	---

Value	Highlight concentration exceeds the site adopted criteria (Petroleum Management Limit)
-------	--

Value	Highlighted concentration exceeds multiple site adopted criterion
--------------	---

Table 2 - Asbestos Laboratory Summary Table
Summary of Asbestos Laboratory Results



	Group	Asbestos		
		Analyte	Asbestos Sample Mass/Dimensions	Asbestos Sample Description
		Units	Mass (g) / Dimensions (mm)	ACM
		PQL	-	% w/w
		Health Scening Level (HSL)	-	0.01
Sample ID	Reference / Sample Date	Site Adopted Criteria Residential A		
TP01-0.1-0.2	ES2606853010 03/03/2026		65.3	A soil sample.
TP02-0.1-0.2	ES2606853011 03/03/2026		52.7	A soil sample.
TP03-0.1-0.2	ES2606853012 03/03/2026		37.8	A soil sample.
TP04-0.1-0.2	ES2606853013 03/03/2026		68.4	A soil sample.
TP05-0.1-0.2	ES2606853014 03/03/2026		52.7	A soil sample.
TP06-0.1-0.2	ES2606853015 03/03/2026		76.1	A soil sample.
TP07-0.1-0.2	ES2606853016 03/03/2026		78.0	A soil sample.
TP08-0.1-0.2	ES2606853017 03/03/2026		67.1	A soil sample.
TP09-0.1-0.2	ES2606853018 03/03/2026		55.1	A soil sample.
TP10-0.1-0.2	ES2606853019 03/03/2026		65.5	A soil sample.
TP11-0.1-0.2	ES2606853020 03/03/2026		27.7	A soil sample.
TP12-0.1-0.2	ES2606853021 03/03/2026		65.7	A soil sample.
TP13-0.1-0.2	ES2606853022 03/03/2026		74.0	A soil sample.
TP14-0.1-0.2	ES2606853023 03/03/2026		59.3	A soil sample.
TP15-0.1-0.2	ES2606853024 03/03/2026		71.8	A soil sample.
TP16-0.1-0.2	ES2606853025 03/03/2026		73.0	A soil sample.
TP17-0.1-0.2	ES2606853026 03/03/2026		58.4	A soil sample.
TP18-0.1-0.2	ES2606853027 03/03/2026		63.5	A soil sample.
TP19-0.1-0.2	ES2606853028 03/03/2026		81.3	A soil sample.
TP20-0.1-0.2	ES2606853029 03/03/2026		62.7	A soil sample.
TP21-0.1-0.2	ES2606853030 03/03/2026		69.7	A soil sample.
TP22-0.1-0.2	ES2606853031 03/03/2026		70.1	A soil sample.
TP23-0.1-0.2	ES2606853032 03/03/2026		67.7	A soil sample.
TP24-0.1-0.2	ES2606853033 03/03/2026		70.0	A soil sample.
TP25-0.1-0.2	ES2606853034 03/03/2026		65.6	A soil sample.
TP26-0.1-0.2	ES2606853035 03/03/2026		76.6	A soil sample.
TP27-0.1-0.2	ES2606853036 03/03/2026		53.0	A soil sample.
TP28-0.1-0.2	ES2606853037 03/03/2026		76.5	A soil sample.
TP29-0.1-0.2	ES2606853038 03/03/2026		72.5	A soil sample.
TP30-0.1-0.2	ES2606853039 03/03/2026		57.4	A soil sample.
TP31-0.1-0.2	ES2606853040 03/03/2026		63.1	A soil sample.

Table 3 - QA/QC Summary Table
Summary of Quality Assurance and Quality Control Data



Stage 2 Detailed Site Investigation
241 Grafton Road, Armidale NSW
2785-DSI-01-240326.v1f

		Sample ID																				
		Reference /Sample Date				ES2606853010 03/03/26	ES2606853001 03/03/26				ES2606853010 03/03/26	S26-Ma0115212 03/03/26			ES2606853011 03/03/26	ES2606853002 03/03/26			ES2606853011 03/03/26	S26-Ma0115213 03/03/26		
Group	Analyte	Units	Eurofin s PQL	ALS PQL																		
Metals	Arsenic	mg/kg	2	5	6	< 5	NL	NC	6	6.9	NL	14	< 5	< 5	NL	NC	< 5	4	NL	NC		
	Cadmium	mg/kg	0.4	1	< 1	< 1	NL	NC	< 1	< 0.4	NL	NC	< 1	< 1	NL	NC	< 1	< 0.4	NL	NC		
	Chromium (Total)	mg/kg	5	2	14	14	NL	0	14	17	NL	19	20	15	NL	29	20	16	NL	22		
	Copper	mg/kg	5	5	12	10	NL	18	12	13	NL	8	11	13	NL	17	11	12	NL	9		
	Lead	mg/kg	5	5	8	7	NL	13	8	12	NL	40	12	13	NL	8	12	11	NL	9		
	Nickel	mg/kg	5	5	3	3	NL	0	3	< 5	NL	NC	5	9	NL	57	5	5	NL	6		
	Zinc	mg/kg	5	0.1	12	9	NL	29	12	13	NL	8	10	11	NL	10	10	10	NL	0		
PAH	Mercury (Inorganic)	mg/kg	0.1	2	< 0.1	< 0.1	NL	NC	< 0.1	< 0.1	NL	NC	< 0.1	< 0.1	NL	NC	< 0.1	< 0.1	NL	NC		
	Naphthalene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Acenaphthylene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Acenaphthene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Fluorene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Phenanthrene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Anthracene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Fluoranthene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Pyrene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Benzo(a)anthracene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Chrysene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Benzo(b+j)fluoranthene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Benzo(k)fluoranthene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Benzo(a)pyrene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Indeno(1,2,3.cd)pyrene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Dibenz(a,h)anthracene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Benzo(g,h,i)perylene	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Total PAH (18)	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	0.5	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC	< 0.5	< 0.5	NL	NC		
	Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.6	0.6	0.6	0.6	NL	0	0.6	0.6	NL	0	0.6	0.6	NL	0	0.6	0.6	NL	0		
Benzo(a)pyrene TEQ (LOR)	mg/kg	1.2	1.2	1.2	1.2	NL	0	1.2	1.2	NL	0	1.2	1.2	NL	0	1.2	1.2	NL	0			

General Notes to Table: | - = Not Analysed | NC = Not Calculated | ND = Non-Detect | PAH = Polyaromatic Hydrocarbon |

| PQL = Practical Quantification Limit | RPD = Relative Percentage Difference | TEQ = Toxicity Equivalence Quotient |

Notes to RPD limits: Limits vary according based on a comparison of the parent sample concentration and the PQL for each analyte.

The following RPD limits apply: analyte concentration < 10x PQL: No RPD limit; > 10x < 20x PQL, 50% RPD limit; > 20x PQL, 30% RPD limit.

Value Highlighted value exceeds the site adopted RPD criteria

TRIP SPIKE		TRIP BLANK	
ES2606853003 23/02/2026		ES2606853004 25/02/2026	
Soil		Soil	
Recovery (%)		Concentration	
Analyte	%	mg/kg	
Benzene	100	<0.2	
Toulene	85	<0.5	
Ethylbenzene	86	<0.5	
m/p-Xylene	86	<0.5	
o-Xylene	85	<0.5	
Total Xylenes	85	<0.5	

Value Value outside assessment criteria

						Sample ID							DAM01-W
						Reference / Sample Date							ES/06/03/2025 03/03/2026
Group	Analyte	Units	PQL	Fresh Waters 95 % Species Protection (ANZG 2015)	# Samples	# Detects	Minimum	Average	Standard Deviation	95% UCL	Maximum		
Metals	Arsenic	µg/L	1	24	1	1	3	3	NC	-	3	3	
	Cadmium	µg/L	0.1	0.2	1	0	ND	NC	NC	-	ND	<0.1	
	Chromium (Total) ¹	µg/L	1	3.3	1	0	ND	NC	NC	-	ND	<1	
	Copper	µg/L	1	1.4	1	0	ND	NC	NC	-	ND	<1	
	Lead	µg/L	1	3.4	1	1	2	2	NC	-	2	2	
	Nickel	µg/L	1	11	1	1	2	2	NC	-	2	2	
	Zinc	µg/L	5	8	1	1	13	13	NC	-	13	13	
	Mercury (Inorganic)	µg/L	0.1	0.06	1	0	ND	NC	NC	-	ND	<0.1	
PAH	Naphthalene	µg/L	1	16	1	0	ND	NC	NC	-	ND	<1.0	
	Acenaphthylene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Acenaphthene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Fluorene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Phenanthrene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Anthracene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Fluoranthene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Pyrene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Benzo(a)anthracene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Chrysene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Benzo(b+j)fluoranthene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Benzo(k)fluoranthene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Benzo(a)pyrene	µg/L	0.5	0.2	1	0	ND	NC	NC	-	ND	<0.5	
	Indeno(1.2.3.cd)pyrene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
	Dibenz(a,h)anthracene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0	
Benzo(g,h,i)perylene	µg/L	1	-	1	0	ND	NC	NC	-	ND	<1.0		
	Total PAH (18)	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
TRH	TRH C6-C9	µg/L	20	-	1	0	ND	NC	NC	-	ND	<20	
	TRH C10-C14	µg/L	50	-	1	0	ND	NC	NC	-	ND	<50	
	TRH C15-C28	µg/L	100	-	1	1	110	110	NC	-	110	110	
	TRH C29-C36	µg/L	50	-	1	1	90	90	NC	-	90	90	
	TRH C10-C36 Total	µg/L	50	-	1	1	200	200	NC	-	200	200	
	TRH C6-C10	µg/L	20	-	1	0	ND	NC	NC	-	ND	<20	
	TRH C6-C10 minus BTEX (F1)	µg/L	20	-	1	0	ND	NC	NC	-	ND	<20	
	TRH >C10-C16 (F2)	µg/L	100	-	1	0	ND	NC	NC	-	ND	<100	
	TRH >C16-C34 (F3)	µg/L	100	-	1	1	170	170	NC	-	170	170	
	TRH >C34-C40 (F4)	µg/L	100	-	1	0	ND	NC	NC	-	ND	<100	
	TRH C10-C40 Total (F bands)	µg/L	100	-	1	1	170	170	NC	-	170	170	
	TRH >C10-C16 (F2) - Naphthalene	µg/L	100	-	1	0	ND	NC	NC	-	ND	<100	
BTEX	Benzene	µg/L	1	950	1	0	ND	NC	NC	-	ND	<1	
	Toluene	µg/L	2	180	1	0	ND	NC	NC	-	ND	<2	
	Ethylbenzene	µg/L	2	80	1	0	ND	NC	NC	-	ND	<2	
	m/p-xylene	µg/L	2	75	1	0	ND	NC	NC	-	ND	<2	
	o-xylene	µg/L	2	-	1	0	ND	NC	NC	-	ND	<2	
	Total Xylenes	µg/L	2	-	1	0	ND	NC	NC	-	ND	<2	
OCP	alpha-BHC	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Hexachlorobenzene (HCB)	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	beta-BHC	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	gamma-BHC - (Lindane)	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	delta-BHC	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Heptachlor	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Aldrin	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Heptachlor epoxide	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	trans-Chlordane	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	alpha-Endosulfan	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	cis-Chlordane	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Dieldrin	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	4,4'-DDE	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Endrin	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	beta-Endosulfan	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	4,4'-DDD	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Endrin aldehyde	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Endosulfan sulfate	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	4,4'-DDT	µg/L	2	-	1	0	ND	NC	NC	-	ND	<2.0	
	Endrin ketone	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Methoxychlor	µg/L	2	-	1	0	ND	NC	NC	-	ND	<2.0	
	Total Chlordane (sum)	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Sum of DDD + DDE + DDT	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
	Sum of Aldrin + Dieldrin	µg/L	0.5	-	1	0	ND	NC	NC	-	ND	<0.5	
Pathogens	Thermotolerant Coliforms	CFU/100mL	1	-	1	1	30	30	NC	-	30	30	
	Escherichia coli	CFU/100mL	1	-	1	1	30	30	NC	-	30	30	
PCBs	Total PCBs	µg/L	1.0	-	1	0	ND	NC	NC	-	ND	<1	

General Notes to Table: | - = Not Analysed | BTEX = Benzene, Toluene, Ethylbenzene, and Xylene | OCP = Organochlorine Pesticides | NC = Not Calculated | ND = Non-Detect | NL = Not Limiting | PAH = Polyaromatic Hydrocarbon |

| PCBs = Polychlorinated Biphenyls | PQL = Practical Quantification Limit | TRH = Total Recoverable Hydrocarbons | TEQ = Toxicity Equivalence Quotient | UCL = Upper Confidence Limit |

Notes to Statistical Calculations: The average and Standard Deviation are calculated with non-detects replaced with a null (0) proxy value. Where all values are non-detect, a "NC" value is outputted.

Additional Notes: ¹ HIL limits are for Chromium (VI) only, and EIL limits are for Chromium (III) only, total Chromium measured for initial screening

² ANZECC 2000 Short-term trigger value (up to 20 years)

³ DECC 2006 Non-food crops (silviculture, turf, and cotton) restricted public access

Value Highlighted concentration exceeds the Fresh Waters 95 % Species Protection

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.119/03/2026 4:16:39 PM								
5	From File			WorkSheet.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	C0											
12												
13	General Statistics											
14	Total Number of Observations				12		Number of Distinct Observations				10	
15							Number of Missing Observations				0	
16	Minimum				8		Mean				52.83	
17	Maximum				209		Median				16	
18	SD				64.97		Std. Error of Mean				18.76	
19	Coefficient of Variation				1.23		Skewness				1.562	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.748		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.859		Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.277		Lilliefors GOF Test					
25	5% Lilliefors Critical Value				0.243		Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
30	95% Student's-t UCL				86.52		95% Adjusted-CLT UCL (Chen-1995)				92.72	
31							95% Modified-t UCL (Johnson-1978)				87.93	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				0.922		Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value				0.762		Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.258		Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value				0.254		Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)				0.842		k star (bias corrected MLE)				0.687	
42	Theta hat (MLE)				62.77		Theta star (bias corrected MLE)				76.93	
43	nu hat (MLE)				20.2		nu star (bias corrected)				16.48	
44	MLE Mean (bias corrected)				52.83		MLE Sd (bias corrected)				63.75	
45						Approximate Chi Square Value (0.05)				8.304		
46	Adjusted Level of Significance				0.029		Adjusted Chi Square Value				7.434	
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))				104.9		95% Adjusted Gamma UCL (use when n<50)				117.1	
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic				0.849		Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value				0.859		Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic				0.237		Lilliefors Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
55	5% Lilliefors Critical Value					0.243	Data appear Lognormal at 5% Significance Level						
56	Data appear Approximate Lognormal at 5% Significance Level												
57													
58	Lognormal Statistics												
59	Minimum of Logged Data					2.079	Mean of logged Data					3.267	
60	Maximum of Logged Data					5.342	SD of logged Data					1.231	
61													
62	Assuming Lognormal Distribution												
63	95% H-UCL					193.9	90% Chebyshev (MVUE) UCL					109.6	
64	95% Chebyshev (MVUE) UCL					136.2	97.5% Chebyshev (MVUE) UCL					173.1	
65	99% Chebyshev (MVUE) UCL					245.7							
66													
67	Nonparametric Distribution Free UCL Statistics												
68	Data appear to follow a Discernible Distribution at 5% Significance Level												
69													
70	Nonparametric Distribution Free UCLs												
71	95% CLT UCL					83.68	95% Jackknife UCL					86.52	
72	95% Standard Bootstrap UCL					82.69	95% Bootstrap-t UCL					109.8	
73	95% Hall's Bootstrap UCL					97.06	95% Percentile Bootstrap UCL					83.83	
74	95% BCA Bootstrap UCL					91.33							
75	90% Chebyshev(Mean, Sd) UCL					109.1	95% Chebyshev(Mean, Sd) UCL					134.6	
76	97.5% Chebyshev(Mean, Sd) UCL					170	99% Chebyshev(Mean, Sd) UCL					239.5	
77													
78	Suggested UCL to Use												
79	95% Chebyshev (Mean, Sd) UCL					134.6							
80													
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
82	Recommendations are based upon data size, data distribution, and skewness.												
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												
85													

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.119/03/2026 4:36:11 PM								
5	From File			WorkSheet_a.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	C0											
12												
13	General Statistics											
14	Total Number of Observations				12		Number of Distinct Observations				11	
15							Number of Missing Observations				0	
16	Minimum				7		Mean				39.83	
17	Maximum				296		Median				13.5	
18	SD				81.22		Std. Error of Mean				23.45	
19	Coefficient of Variation				2.039		Skewness				3.384	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.42		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.859		Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.415		Lilliefors GOF Test					
25	5% Lilliefors Critical Value				0.243		Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
30	95% Student's-t UCL				81.94		95% Adjusted-CLT UCL (Chen-1995)				102.9	
31							95% Modified-t UCL (Johnson-1978)				85.76	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				1.942		Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value				0.764		Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.355		Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value				0.254		Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)				0.788		k star (bias corrected MLE)				0.646	
42	Theta hat (MLE)				50.56		Theta star (bias corrected MLE)				61.62	
43	nu hat (MLE)				18.91		nu star (bias corrected)				15.51	
44	MLE Mean (bias corrected)				39.83		MLE Sd (bias corrected)				49.55	
45						Approximate Chi Square Value (0.05)				7.62		
46	Adjusted Level of Significance				0.029		Adjusted Chi Square Value				6.792	
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))				81.1		95% Adjusted Gamma UCL (use when n<50)				90.98	
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic				0.773		Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value				0.859		Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic				0.251		Lilliefors Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
55	5% Lilliefors Critical Value				0.243	Data Not Lognormal at 5% Significance Level						
56	Data Not Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59	Minimum of Logged Data				1.946	Mean of logged Data						2.93
60	Maximum of Logged Data				5.69	SD of logged Data						0.994
61												
62	Assuming Lognormal Distribution											
63	95% H-UCL				73.33	90% Chebyshev (MVUE) UCL						55.75
64	95% Chebyshev (MVUE) UCL				67.85	97.5% Chebyshev (MVUE) UCL						84.65
65	99% Chebyshev (MVUE) UCL				117.6							
66												
67	Nonparametric Distribution Free UCL Statistics											
68	Data do not follow a Discernible Distribution (0.05)											
69												
70	Nonparametric Distribution Free UCLs											
71	95% CLT UCL				78.4	95% Jackknife UCL						81.94
72	95% Standard Bootstrap UCL				76.88	95% Bootstrap-t UCL						467.2
73	95% Hall's Bootstrap UCL				255.4	95% Percentile Bootstrap UCL						85.67
74	95% BCA Bootstrap UCL				110.6							
75	90% Chebyshev(Mean, Sd) UCL				110.2	95% Chebyshev(Mean, Sd) UCL						142
76	97.5% Chebyshev(Mean, Sd) UCL				186.3	99% Chebyshev(Mean, Sd) UCL						273.1
77												
78	Suggested UCL to Use											
79	95% Chebyshev (Mean, Sd) UCL				142							
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.119/03/2026 4:39:29 PM								
5	From File			WorkSheet_b.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	C0											
12												
13	General Statistics											
14	Total Number of Observations				12		Number of Distinct Observations				3	
15							Number of Missing Observations				0	
16	Minimum				0.5		Mean				0.575	
17	Maximum				1.1		Median				0.5	
18	SD				0.186		Std. Error of Mean				0.0538	
19	Coefficient of Variation				0.324		Skewness				2.555	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.479		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.859		Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.49		Lilliefors GOF Test					
25	5% Lilliefors Critical Value				0.243		Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
30	95% Student's-t UCL				0.672		95% Adjusted-CLT UCL (Chen-1995)				0.706	
31							95% Modified-t UCL (Johnson-1978)				0.678	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				3.181		Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value				0.731		Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.5		Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value				0.245		Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)				14.5		k star (bias corrected MLE)				10.93	
42	Theta hat (MLE)				0.0397		Theta star (bias corrected MLE)				0.0526	
43	nu hat (MLE)				347.9		nu star (bias corrected)				262.2	
44	MLE Mean (bias corrected)				0.575		MLE Sd (bias corrected)				0.174	
45						Approximate Chi Square Value (0.05)				225.8		
46	Adjusted Level of Significance				0.029		Adjusted Chi Square Value				220.6	
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))				0.668		95% Adjusted Gamma UCL (use when n<50)				0.684	
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic				0.486		Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value				0.859		Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic				0.493		Lilliefors Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
55	5% Lilliefors Critical Value					0.243	Data Not Lognormal at 5% Significance Level						
56	Data Not Lognormal at 5% Significance Level												
57													
58	Lognormal Statistics												
59	Minimum of Logged Data					-0.693	Mean of logged Data					-0.588	
60	Maximum of Logged Data					0.0953	SD of logged Data					0.254	
61													
62	Assuming Lognormal Distribution												
63	95% H-UCL					0.663	90% Chebyshev (MVUE) UCL					0.699	
64	95% Chebyshev (MVUE) UCL					0.756	97.5% Chebyshev (MVUE) UCL					0.836	
65	99% Chebyshev (MVUE) UCL					0.992							
66													
67	Nonparametric Distribution Free UCL Statistics												
68	Data do not follow a Discernible Distribution (0.05)												
69													
70	Nonparametric Distribution Free UCLs												
71	95% CLT UCL					0.664	95% Jackknife UCL					0.672	
72	95% Standard Bootstrap UCL					N/A	95% Bootstrap-t UCL					N/A	
73	95% Hall's Bootstrap UCL					N/A	95% Percentile Bootstrap UCL					N/A	
74	95% BCA Bootstrap UCL					N/A							
75	90% Chebyshev(Mean, Sd) UCL					0.736	95% Chebyshev(Mean, Sd) UCL					0.81	
76	97.5% Chebyshev(Mean, Sd) UCL					0.911	99% Chebyshev(Mean, Sd) UCL					1.111	
77													
78	Suggested UCL to Use												
79	95% Student's-t UCL					0.672	or 95% Modified-t UCL					0.678	
80													
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
82	Recommendations are based upon data size, data distribution, and skewness.												
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												
85													

APPENDIX B

REMEDIATION VALIDATION CRITERIA



Validation Criteria – Health Screening Levels for Asbestos

Analyte	Health Screening Level Residential A (Residential Lots)
Non-friable Asbestos	0.01 (% w/w)
Friable Asbestos (Asbestos Fines / Fibrous Asbestos)	0.001 (% w/w)
All Forms of Asbestos	No visible asbestos on surface soils

Validation Criteria for Pathogens

Analyte	Stabilisation Grade A Microbiological Standards (MPN/g)
E.Coli	100
Thermotolerant Coliforms	1000

APPENDIX C

VALIDATION DATA - EVALUATION OF QA/QC

Performance and Acceptance Criteria Summary

Completeness			
Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Critical locations sampled	Refer Section 12.1	Critical samples analysed according to DQO	Refer Section 12.1
Critical samples collected	Refer Section 12.1	Analytes analysed according to DQO	Refer Section 12.1
SOPs appropriate and complied with	100%	Appropriate laboratory analytical methods and LORs	Refer Section 12.1
Field documentation complete	All sampling point logs, calibration logs and chain of custody forms	Sample documentation complete	All sample receipt advices, all certificates of analysis
Sample Holding Times	Laboratory holding times provided by laboratory	Sample extraction and holding times complied with	Refer Appendix C
Comparability			
Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Same SOPs used on each occasion	100%	Same analytical methods used by primary laboratory	Refer Appendix C
Climatic conditions	Samples stored in applicable sampling vessels. Volatile samples will be chilled.	Same LORs at primary laboratory	Refer Section Asbestos in Soil Sampling Methodology12
Same types of samples collected, and handled/preserved in same manner	All soil samples same size, all stored applicable sampling vessels	Same laboratory for primary sample analysis	All primary samples to Leeder Analytical / ALS Environmental
Analytical measurement units consistent	All measurement units the same between same analytes	Same analytical measurement units	Refer Appendix C
Representativeness			
Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Appropriate media sampled according to SAQP	Refer Section 12.1	Samples analysed according to SAQP	Refer Section 12.1
Media identified in SAQP sampled	Refer Section 12.1	Nil	Nil
Precision			
Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Field duplicate	Minimum 5% duplicates and triplicates No limit for results <10 times LOR 50% for results 10-20 times LOR 30% for results >20 times LOR	Laboratory duplicates	No exceedances of laboratory acceptance criteria
SOPs appropriate and complied with	100%	Nil	Nil
Accuracy (bias)			
Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Rinsate blanks	<i>Disposable sampling equipment used. No rinsate blanks required.</i>		
Field trip spikes (BTEX only)	Recoveries between 60% and 140%	Matrix spike recovery	No exceedances of acceptance criteria
Field trip blanks (BTEX only)	Analyte concentration <LOR None collected for asbestos.	Surrogate spike recovery	No exceedances of acceptance criteria

Laboratory Holding Times, Analytical Methods and Limits of Reporting

Laboratory Holding Times, Analytical Methods, and Limits of Reporting (ALS)

Analyte	Holding Time	Analytical Method	Limit of Reporting (mg/kg)
Asbestos Quantitative	No limit	WA DOH 2021 / NEPM 2013	0.001% w/w
Metals	6 months	ALS Method EG005T, EG035T	0.1-5
TRH >C ₁₀ -C ₄₀	14 days	ALS Method EP071	10-100
BTEX and TRH C ₆ -C ₁₀	14 days	ALS Method EP080	0.1-10
Phenols	14 days	LTM-ORG-2130	0.5-20

Laboratory Holding Times, Analytical Methods, and Limits of Reporting (Leeder Analytical)

Analyte	Holding Time	Analytical Method	Limit of Reporting (ug/m ³)
TRH >C ₆ -C ₁₅ & VOCs	1 month	LA-26AHS Volatile Organic Compounds	30 (for VOC compounds) 100 for TRH

Laboratory Holding Times, Analytical Methods, and Limit of Reporting (Eurofins)

Analyte	Holding Time	Analytical Method	Limit of Reporting (mg/kg)
Metals	6 months	USEPA 8015B & C	0.05-5
TRH >C ₆ -C ₄₀	14 days	LTM-ORG-2010	20-100
BTEX	14 days	LTM-ORG-2010	0.1-0.3