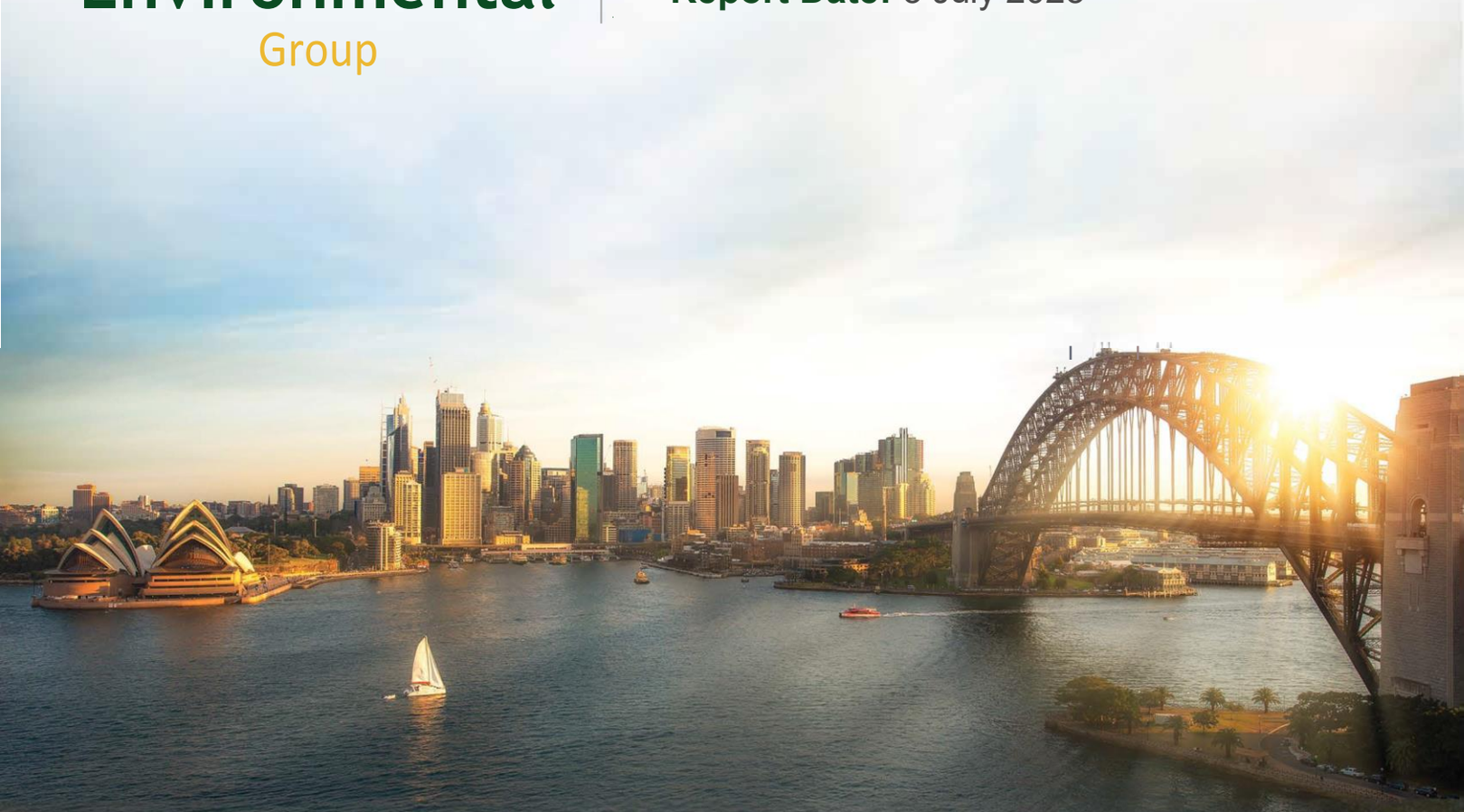
Sydney Environmental Group

Remedial Action Plan

771-781 & 783-797 Mamre Road, Kemps Creek NSW

GPT Group

Report No: 1495-RAP-01-230322.v2f
Report Date: 3 July 2023



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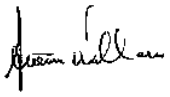
DOCUMENT RECORD

Revision	Date	Author	Reviewer
v1f	23 March 2022	Isabelle Figatowski	Steven Wallace
v2f	3 July 2023	Isabelle Figatowski	Steven Wallace

Author Signature		**Reviewer Signature**	
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Document Title:	Remedial Action Plan, 771-781 & 783-797 Mamre Road, Kemps Creek NSW
Site Address:	771-781 & 783-797 Mamre Road, Kemps Creek NSW
Client Name:	GPT Group
Site Size:	38.56 Ha
Reference Number:	1495-RAP-01-230322.v2f
Project Type:	Remedial Action Plan
Project Type Abbreviation:	RAP
Document Draft:	FINAL
Document Revision No.	v2

Prepared by Sydney Environmental Group Pty Ltd ABN: 14 631 026 214

EXECUTIVE SUMMARY

Sydney Environmental Group (SE) were engaged by GPT Group (the client), to prepare a Remedial Action Plan (RAP) for the property located at 771-781 & 783-797 Mamre Road, Kemps Creek NSW (refer **Figure 1** with the 'site' boundaries outlined in **Figure 2**).

SE has the following project appreciation:

- The entirety of the site covers an area of approximately 38.56 ha;
- The site is proposed for redevelopment, comprising demolition of existing structures and commercial/industrial development;
- An Environmental Assessment was prepared for the site in July 2021 by KPMG (KPMG 2021a);
- A Preliminary Site Investigation with limited sampling was undertaken for the site in October 2021 by KPMG (KPMG 2021b);
- A Hazardous Building Material Survey was undertaken for the site in February 2022 by SE (SE 2022);
- A Remedial Action Plan is required to address the Areas of Environmental Concern identified within the site.

The objectives of this project are to:

- Undertake a desktop review of the previous contamination assessments undertaken by KPMG (2021a & 2021b) and SE (2022);
- Prepare a Remedial Action Plan (RAP) to address AECs identified within the site and to provide a strategy to mitigate the potential unacceptable human health and environmental risks from residual soil by exploring available remediation options that will effectively and efficiently provide this outcome; and
- Achieve an acceptable outcome that is technically, logistically and financially feasible.

The scope of the RAP has been established on the basis of findings from the previous contamination investigations completed by KPMG and SE, with the RAP aimed at providing:

- An appropriate remedial strategy, which comprises a supplementary contamination assessment and localised remedial actions so as to render the site suitable for the proposed commercial/industrial land-use;
- Appropriate requirements for the validation and verification of the successful implementation of the remediation strategy and the remediation acceptance criteria to be adopted;
- Appropriate environmental safeguards required to conduct the remediation works in an environmentally acceptable manner; and
- OH&S procedures required to conduct the remediation works in a manner that will not pose a threat to the health of site workers or users.

The available site data was assessed within the objectives of this investigation and in the context of the proposed development works. That assessment identified areas of environmental concern (AECs) and contaminants of potential concern (COPC) which have the potential to be present on site. The AECs identified are presented in attached **Figure 3** and associated COPC are presented in **Table 5.1.1.**

Table 5.1.1 Areas of Environmental Concern and Associated Contaminants of Potential Concern.

ID	Stage ID	Area of Environmental Concern	Source	Contaminants of Concern	Affected mediums	Exposure risk
AEC01	Stage 2	Fill materials characterised by TP107 (KPMG 2021b)	Uncontrolled Filling	Heavy Metals	Soil	Ecological

ID	Stage ID	Area of Environmental Concern	Source	Contaminants of Concern	Affected mediums	Exposure risk
AEC02	Stage 1	Fill materials characterised by TP202 (KPMG 2021b)	Uncontrolled Filling	PAH	Soil	Ecological
AEC03	Stage 1	Fill Material Stockpiles in the vicinity of TP202 (KPMG 2021b)	Uncontrolled Stockpiling / Demolition	Asbestos	Soil	Human Health & Aesthetics
AEC04	Stage 1	Building Footprints	Uncontrolled Filling / Demolition	Heavy Metals, TRH, BTEX, PAH, Asbestos	Soil	Human Health, Ecological & Aesthetics
AEC05	Stage 2	In-situ Building Demolition Waste	Uncontrolled Demolition Waste Storage	N/A	N/A	Aesthetics
AEC06	Stage 1	Surficial Asbestos Fragments	Uncontrolled Demolition / Filling	Asbestos	Soil	Human Health & Aesthetics
AEC07	Stage 1	Surficial Horticultural Wastes	Uncontrolled Horticultural Wastes	N/A	N/A	Aesthetics

The remedial goal for this site is to remediate potential contamination (where identified) to a level that does not present an unacceptable human health exposure and environmental risks, based on the proposed land use setting. SE notes that the client, would prefer that the remedial works be undertaken in a manner that does not result in the need for:

- Notation on a planning certificate for the site;
- A covenant registered on the title to the land; or
- A long-term environmental management plan (EMP).

The extent of contamination within the site is presented in **Table 7.2.1** below. SE note that further remedial extents may be included following the results of the supplementary contamination assessment of AEC04 and AEC06.

Table 7.2.1 Approximate Remedial Extents

ID	Area of Environmental Concern	Approximate Extent
AEC01	Fill materials characterised by TP107 (KPMG 2021b)	Approximately ≈ 5 m x 5 m bgs. Total Area: ≈ 25 m^2
AEC02	Fill materials characterised by TP202 (KPMG 2021b)	Approximately ≈ 5 m x 5 m bgs. Total Area: ≈ 25 m^2
AEC03	Fill Material Stockpiles in the vicinity of TP202 (KPMG 2021b)	Total Area: ≈ 2536 m^2
AEC04	Building Footprints	Total Area: ≈ 833 m^2
AEC05	Building Demolition Waste	Approximately ≈ 5 m x 5 m bgs. Total Area: ≈ 25 m^2

ID	Area of Environmental Concern	Approximate Extent
AEC06	Surficial Asbestos Fragments	Total Area: ≈ 210 m^2
AEC07	Surficial Horticultural Wastes	Total Area: ≈ 5000 m^2

Refer to **Figure 3**, for an indication of the areas and lateral extents that will be subject to remediation.

It is noted that the lateral extent of remediation may be altered during remedial works based on site observations and validation soil sample analytical laboratory results.

Taking into consideration the client's objectives for the site, and the nature and extent of the proposed site redevelopment works, the preferred remedial options are outlined in **Table 6.2.1** below.

Table 6.2.1 Table 6.3.1 Selected Remediation Strategies

Contamination Risk	Preferred Remediation Strategy
Soil materials impacted with non-friable (bonded) asbestos	In-situ / ex-situ raking / picking or Excavation and disposal off-site
Soil materials impacted with heavy metals, hydrocarbons and/or friable asbestos (FA) / asbestos fines (AF) above human health criteria	Removal and disposal off-site
Soil materials impacted with heavy metals and hydrocarbons above ecological criteria	Burial beneath proposed roadways
Hazardous building materials (if identified) and aesthetic impacts	Removal and disposal off-site

Based on the information presented in the historical contamination assessment reports, SE 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; and
- Should newly identified unacceptable land contamination risks be identified during supplementary assessment works, an addendum to this RAP may be required. The addendum should be prepared 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 should be prepared by a suitably experienced environmental consultant; and
- Future remedial works should be monitored and validated by a suitably experienced environmental consultant.

This report must be read in conjunction with the limitations set out in **Section 12**.

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FIGURES

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
Bgs	Below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
Btoc	Below top of casing
CoC	Chain of Custody
CSM	Conceptual Site Model
DSI	Detailed Site Investigation
EC	Electrical conductivity
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
GS	Geological Survey of NSW
HIL	Health Investigation Levels
HSL	Health Screening Levels
IL	Investigation Levels
LOR	[Laboratory] Limit of reporting
NATA	National Association of Testing Laboratories
N/A	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
PSH	Phase separated hydrocarbon
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
USCS	Unified Soil Classification System
UST	Underground storage tank
VOC	Volatile organic compound

1. INTRODUCTION

1.1. Background

Sydney Environmental Group (SE) were engaged by GPT Group (the client), to prepare a Remedial Action Plan (RAP) for the property located at 771-781 & 783-797 Mamre Road, Kemps Creek NSW (refer **Figure 1** with the 'site' boundaries outlined in **Figure 2**).

SE has the following project appreciation:

- The entirety of the site covers an area of approximately 38.56 ha;
- The site is proposed for redevelopment, comprising demolition of existing structures and commercial/industrial development;
- An Environmental Assessment was prepared for the site in July 2021 by KPMG (KPMG 2021a);
- A Preliminary Site Investigation with limited sampling was undertaken for the site in October 2021 by KPMG (KPMG 2021b);
- A Hazardous Building Material Survey was undertaken for the site in February 2022 by SE (SE 2022);
- A Remedial Action Plan is required to address the Areas of Environmental Concern identified within the site.

1.2. Proposed Development

SE understand the site is proposed for commercial/industrial redevelopment works. SE further understand that the works proposed will be undertaken in a staged approach. Stage 1 will be undertaken with regards to the eastern portion of the site, adjacent to Mamre Road, and Stage 2 works will be undertaken within the western portion of the site (refer to **Figure 2**).

The redevelopment scenario is consistent with the definition of 'HIL D – Commercial / Industrial' across the majority of the site and with 'HIL C – Open Space' relevant within 'RE1 – Public Recreation' and 'ENZ – Environment and Recreation' areas as per ASC NEPM 2013 (refer to **Figure 2**).

1.3. Objectives

The objectives of this project are to:

- Undertake a desktop review of the previous contamination assessments undertaken by KPMG (2021a & 2021b) and SE (2022);
- Prepare a Remedial Action Plan (RAP) to address AECs identified within the site and to provide a strategy to mitigate the potential unacceptable human health and environmental risks from residual soil by exploring available remediation options that will effectively and efficiently provide this outcome; and
- Achieve an acceptable outcome that is technically, logistically and financially feasible.

1.4. Scope of Remedial Action Plan

The scope of the RAP has been established on the basis of findings from the previous contamination investigations completed by KPMG and SE, with the RAP aimed at providing:

- An appropriate remedial strategy, which comprises a supplementary contamination assessment and localised remedial actions so as to render the site suitable for the proposed commercial/industrial land-use;
- Appropriate requirements for the validation and verification of the successful implementation of the remediation strategy and the remediation acceptance criteria to be adopted;
- Appropriate environmental safeguards required to conduct the remediation works in an environmentally acceptable manner; and
- OH&S procedures required to conduct the remediation works in a manner that will not pose a threat to the health of site workers or users.

2. SITE IDENTIFICATION

The site identification details and associated information are presented in **Table 1.4.1.**

Table 1.4.1 Site Identification Information

Attribute	Description
Street Address	771-781 & 783-797 Mamre Road, Kemps Creek NSW
Lot and Deposited Plan (DP)	Lot 23 in DP258414, Lot 24 in DP258414
Geographical Coordinates	33°50’18.1"S 150°46'28.3"E (Centre of site)
Site Area	38.56 ha
Local Government Area (LGA)	Penrith City Council
Parish	Claremont
County	Cumberland
Zoning	IN1 General Infrastructure (eastern portion of the site) RE1 Public Recreation (centre portion of the site) ENZ Environment and Recreation (western portion of the site) *(State Environmental Planning Policy (Western Sydney Aerotropolis) 2020)*

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. GEOLOGY, ACID SULFATE SOILS, TOPOGRAPHY AND HYDROGEOLOGY

Regional geology, meteorology, topography, soil landscape and hydrogeological information are presented in **Table 1.4.1** Table 1.4.1**.**

Table 1.4.1 Regional Setting Information

Attribute	Description
Geology	A review of the Environment NSW 'eSpade V2.1' web application (environment.nsw.gov.au/eSpade2WebApp, accessed 17 March 2022), indicated that the site is likely to be underlain by Middle Triassic aged Wiannamatta Group Ashfield Shale, comprising laminite and dark grey siltstone, Bringelly Shale, comprising occasional calcareous claystone, laminite, and infrequent coal, and Minchinbury Sandstone, comprising fine-medium grained quartz lithic sandstone within the eastern portion of the site. The western portion of the site appears to be underlain by quaternary alluvium derived from Wianamatta Group Shales and Hawkesbury Sandstone.
Acid Sulfate Soils (ASS)	A review of the Environment NSW 'eSpade V2.1' web application (environment.nsw.gov.au/eSpade2WebApp, accessed 17 March 2022), 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 soil materials. Further assessment of acid sulfate soils in the context of this investigation is considered by SE as not warranted.
Topography	Generally, the local landscape consists of greatly undulating rises on Wianamatta Group Shales with local relief to 30 m and broad rounded crests and ridges with gently inclined slopes. The local landscape within the western portion of the site consists of floodplains, valley flats and drainage depressions of the channels on the Cumberland Plan. The site topography slopes downward to the east. SE understands that the site is located at an elevation ranging between approximately 32 m to 41 m Australian Height Datum (AHD).
Hydrogeology	Surface water courses proximal to the site included South Creek along the western boundary of the site, and Kemps Creek, located approximately 930 m south-west of the site. Several manmade dams were observed on neighbouring properties. 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 west. A review of the NSW Office of Water groundwater database undertaken on 21 March 2022 indicated there were no registered groundwater features located within a 500m radius of the site.
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 to the site included South Creek, located along the western boundary of the site. The closest sensitive human receptors are the residential properties surrounding the site's boundary and any future onsite construction workers / builders.

4. PREVIOUS CONTAMINATION ASSESSMENTS

The following reports were reviewed during the project:

- KPMG (2021a), 'Environmental Assessment – 771-781 & 783-797 Mamre Road, Kemps Creek, NSW – EA', dated 19 July, Ref: 397835 – 771-781 & 783-797 Mamre Road, Kemps Creek, NSW - EA;
- KPMG (2021b), 'Preliminary Site Investigation, 771-781 & 783-797 Mamre Road, Kemps Creek, NSW', dated 25 October, Ref: 397835 – 771-781 & 783-797 Mamre Road, Kemps Creek, NSW – Preliminary Site Investigation – KPMG Final 25-10-21; and
- SE (2022), 'Hazardous Building Materials Survey, 771-781 & 783-797 Mamre Road, Kemps Creek NSW', dated 23 February, Ref: 1495-HBMS-01-230222.v1f.

A summary of the previous assessments is presented in **Section 2** to **Section 4.3**.

4.1. KPMG (2021a)

KPMG Property & Environmental Services Pty Ltd (KPMG) was engaged by GPT to undertaken an Environmental Assessment (EA) at 771-781 & 783-797 Mamre Road, Kemps Creek, NSW (the site). KPMG understand that GPT are considering acquisition of the site with consideration for future rezoning and redevelopment for an industrial land use. The aim of the EA was to assess the potential for current and historical site uses to have resulted in chemical of concern (COC) impact to underlying soil or groundwater.

Based upon the findings of the EA, KPMG considered that the site presents a moderate environmental risk for future commercial/industrial land use. The risk ratings are defined within Appendix B Environmental Risk Ratings for Commercial/Industrial Sites.

KPMG recommended the following:

- An environmental investigation should be undertaken at the site prior to redevelopment to assess the presence and nature of COCs, including demolition waste, within soil at the site.

4.2. KPMG (2021b)

KPMG Property & Environmental Services Pty Limited (KPMG) was engaged by GPT to undertake a Preliminary Site Investigation (PSI) at 771-781 & 783-797 Mamre Road, Kemps Creek, NSW (the site). The site is legally described as Lots 23 & 24 in DP258414. KPMG previously produced an Environmental Assessment (EA) report for the site on 19 July 2021 which recommended that an environmental investigation be undertaken at the site prior to redevelopment to assess the presence and nature of chemicals of concern (COCs), including demolition waste, within soil at the site. It is understood that the site includes areas currently zoned "IN1 – General Industrial", "RE1 – Public Recreation", "ENZ – Environmental Zone", and "SP2 – Special Purpose Zone" as defined in the zoning map by Boxall Surveyors dated 17 May 2021.

Based on the information reviewed, it is understood that the site was undeveloped land, likely used for agricultural (e.g. animal grazing) purposes, since at least 1961 until sometime between 1971 and 1983 when the site appeared to be used for rural residential and horticultural (e.g. market garden) purposes. A creek, that runs through the site, appeared to have been partially infilled during the 1960's with potential infilling of a dam at 771-781 Mamre Road. Large areas of the site continued to be used for horticultural (e.g. market garden) purposes until circa 2004, however greenhouse areas, located within the eastern section of 783-797 Mamre Road, continued to be visible until the mid-2010's. Waste materials were noted around residential buildings located across the site from 2004 to 2021, in particular at 771-781 Mamre Road. No publicly available government records were identified to indicate the presence of contamination at the site. The primary areas of environmental concern (AEC) were identified as areas of potential fill importation, vehicle and equipment storage areas, areas where former buildings/structures have been demolished, and former horticultural areas. No offsite sources of COCs have been identified by KPMG.

The PSI involved the sampling of soil from 20 test pits and stockpiled material. Investigation locations targeted the identified AECs and provided general site coverage. Concentrations of organic COCs in all soil samples analysed were below the adopted guidelines with the exception of one (1) soil sample (TP202_0.1-0.2), collected from fill in the north-eastern section of 783-797 Mamre Road, which contained benzo(a) pyrene at a concentration which exceeded the criteria for the protection of ecological receptors. A layer of black gravelly bitumen was noted within this area to a depth of 0.2 mbgl and the elevated concentration of benzo(a) pyrene is likely attributable to bitumen material observed within the soil sample. KPMG expect that this material could be removed from the site by a shallow surface scrape during site preparation earthworks. Concentrations of inorganic COCs in the majority of soil samples analysed were below the adopted guidelines with the exception of zinc within a soil sample (TP07_0.1-0.2) collected from a location within "ENZ - Environmental Zone". The elevated zinc was identified within a layer of fill material containing building demolition waste located in the north-western section of 771-781 Mamre Road within TP07. Large quantities of building demolition waste (e.g. concrete blocks, steel reinforcing bar, bricks) were observed in this area on the edge of an embankment that falls downwards towards a creek that transects the site.

Approximately 12 stockpiles of soil intermixed with building demolition waste and two (2) stockpiles of soil suspected to be natural material, understood to have been illegally dumped, were identified in the north-eastern section of 783-797 Mamre Road in the vicinity of sampling locations SP01, SP02, and SP03. Asbestos cement material fragments were observed on the surface of two (2) of the stockpiles and on the ground surface of the driveway at 783-797 Mamre Road. Plastic sheeting and waste materials were noted on the ground surface of areas formerly used for horticultural (e.g. market garden) purposes at 783-797 Mamre Road.

Buildings and structures suspected as containing hazardous building materials, including asbestos were identified across the site.

Based upon the findings of the PSI, KPMG considered that the site is generally suitable for the industrial, public recreational, and environmental zone land use subject to the following works being undertaken:

- Removal of stockpiles, asbestos containing materials, and bitumen (vicinity of sampling location TP202) located in the north-eastern section of 783-797 Mamre Road;
- Removal of building demolition wase from the north-western section of 771-781 Mamre Road in the vicinity of sampling location TP107;
- Removal of buildings and structures located onsite; and
- Validation sampling of the above areas following removal to confirm they are suitable for proposed land use.

4.3. SE (2022)

Sydney Environmental Group Pty Ltd (SE) were engaged by GPT Group Pty Ltd (the client), to undertake a Hazardous Building Materials Survey of the residential structures located within 771-781 and 783-797 Mamre Road, Kemps Creek NSW prior to demolition works commencing.

SE had the following project appreciation:

- The structures within the site are proposed for demolition;
- A hazardous building materials survey is required prior to demolition to identify and document hazardous building materials within the structures situated within the site.

The objectives of the investigation were to:

- Confirm the presence/ absence of hazardous building materials (HBM) within accessible areas of the structures on site;
- Provide a qualitative risk assessment of the hazardous building materials identified (if any);
- Provide recommendations on control measure and strategies for removal; and
- Prepare a Hazardous Materials Register for the site to ensure legislative compliance.

The scope of works undertaken to address the investigation objectives, included:

- Fieldwork, including investigation of subject areas within the residences (or portions thereof);
- Collection of suspect building materials (as required);
- Analysis of samples by a NATA accredited laboratory;
- Review of laboratory analytical results;
- Provide recommendations for the removal of identified hazardous building materials where identified; and
- Prepare a Hazardous Building Materials Register for the site, detailing to location and type of hazardous building materials present at the site.

For the report, HBM were limited to the following:

- Asbestos Containing Materials (ACM);
- Lead Containing Paint (LCP);
- Lead Containing Dust (LCD);
- Polychlorinated Biphenyls (PCBs); and
- Synthetic Mineral Fibres (SMF).

Summary of Results:

Asbestos Containing Materials (ACM)

At the time of inspection, ACM was identified, presumed, or suspected to be present within the site in the following locations:

- No. 771-781, main residence, southern exterior, power distribution box backing board, presumed to contain non-friable asbestos fibre cement backing board;
- No. 783-789, north-eastern residence, northern interior, small storage room adjacent living area, non-friable asbestos fibre cement wall lining;
- No. 783-789, north-eastern residence, northern exterior, non-friable asbestos fibre cement eaves;
- No. 783-789, south-western residence, residential exterior, non-friable asbestos fibre cement eaves;
- No. 783-789, south-western residence, residential interior, laundry, non-friable asbestos fibre cement wall and ceiling lining.
- No 783-789, south-western residence, eastern exterior, power distribution box backing board. Presumed to contain non-friable asbestos fibre cement backing board.

Lead Containing Paint (LCP)

At the time of inspection, no LCP was identified, presumed, or suspected to be present within the site.

Lead Containing Dust (LCD)

At the time of inspection, no LCD was identified, presumed, or suspected to be present within the site.

Polychlorinated Biphenyls (PCBs)

At the time of inspection, no PCBs were identified, presumed, or suspected to be present within the site.

Synthetic Mineral Fibres (SMF)

At the time of inspection, the following SMF was identified, presumed, or suspected to be present:

- No. 771-781, residence exterior, hot water unit, internal insulation presumed to contain SMF;
- No. 771-781, residence exterior, air conditioning units and associated ducting internal insulation presumed to contain SMF; and
- No. 783-789, south-western residence, exterior, living room, hallway and master bedroom, air-conditioning units presumed to contain SMF.

5. CONCEPTUAL SITE MODEL

5.1. Areas of Environmental Concern and Contaminants of Concern

The available site data was assessed within the objectives of this investigation and in the context of the proposed development works. That assessment identified areas of environmental concern (AECs) and contaminants of concern which have the potential to be present on site. The AECs identified are presented in attached **Figure 3** and associated contaminants of concern are presented in **Table 5.1.1**. SE note AEC02, AEC03, AEC04, AEC06 and AEC07 are present within the Stage 1 portion of the site. SE further note that AEC01 and AEC05 will be addressed within the proposed Stage 2 works.

Table 5.1.1 Areas of Environmental Concern and Associated Contaminants of Potential Concern

ID	Stage ID	Area of Environmental Concern	Source	Contaminants of Concern	Affected mediums	Exposure risk
AEC01	Stage 2	Fill materials characterised by TP107 (KPMG 2021b)	Uncontrolled Filling	Heavy Metals	Soil	Ecological
AEC02	Stage 1	Fill materials characterised by TP202 (KPMG 2021b)	Uncontrolled Filling	PAH	Soil	Ecological
AEC03	Stage 1	Fill Material Stockpiles in the vicinity of TP202 (KPMG 2021b)	Uncontrolled Stockpiling / Demolition	Asbestos	Soil	Human Health & Aesthetics
AEC04	Stage 1	Building Footprints	Uncontrolled Filling / Demolition	Heavy Metals, TRH, BTEX, PAH, Asbestos	Soil	Human Health, Ecological & Aesthetics
AEC05	Stage 2	In-situ Building Demolition Waste	Uncontrolled Demolition Waste Storage	N/A	N/A	Aesthetics
AEC06	Stage 1	Surficial Asbestos Fragments	Uncontrolled Demolition / Filling	Asbestos	Soil	Human Health & Aesthetics
AEC07	Stage 1	Surficial Horticultural Wastes	Uncontrolled Horticultural Wastes	N/A	N/A	Aesthetics

The potential contamination pathways are considered to be as follows:

- Inhalation/ingestion of contaminants released in dust during redevelopment by site workers;
- Direct contact, ingestion or inhalation of soil by future site inhabitants; and
- Migration of contaminants within surface and groundwater to neighbouring properties and water bodies.

Relevant potential receptors are considered to include:

- Onsite construction and maintenance workers;
- Third parties during construction (adjacent site users and adjacent residents);
- Future residents/end users;
- Neighbouring residential land users; and
- On-site flora and fauna

5.2. Land Use Setting

SE understand the site is proposed for commercial/industrial redevelopment works. SE further understand that the works proposed will be undertaken in a staged approach. Stage 1 will be undertaken with regards to the eastern portion of the site, adjacent to Mamre Road, and Stage 2 works will be undertaken within the western portion of the site (refer to **Figure 2**).

The redevelopment scenario is consistent with the definition of 'HIL D – Commercial / Industrial' across the majority of the site and with 'HIL C – Open Space' relevant within 'RE1 – Public Recreation' and 'ENZ – Environment and Recreation' areas as per ASC NEPM 2013 (refer to **Figure 2**).

Based on the proposed development works and guidance provided in NEPM ASC 2013, SE considers it reasonable to adopt the *'HIL D – commercial/industrial'* and the '*HIL C – open* space' land use setting for the purpose of assessing land contamination exposure risks. The HIL D (Commercial/ Industrial) land use includes shops, offices, factories and industrial sites. The HIL C land use includes developed open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths.

SE notes that the proposed development includes a mix of hardstand, open space turfed areas and landscaped areas across the site.

5.3. Direct Contact – Human Health

SE notes that the proposed development includes building footprints and hardstand pavement areas across majority of the site, which would act as a direct contact barrier between potential land contamination and onsite receptors during operation of the site.

The open space turfed / landscaping areas would act as a direct contact barrier assuming intrusive disturbance of the physical barrier was not undertaken following installation.

During construction, the public and construction employees, may complete the direct contact exposure pathway between potential contamination and receptors.

SE recommends a pragmatic approach during the course of any required intrusive / excavation works. If contamination is suspected, works should stop, an unexpected finds protocol should be followed and further investigation of the fill materials should be carried out by a suitably qualified environmental consultant.

5.4. Inhalation / Vapour Intrusion – Human Health

In order for a potentially unacceptable inhalation / vapour intrusion human health exposure risk to exist, a primary vapour source (e.g. underground storage tank) or secondary vapour source (e.g. significantly contaminated soil or groundwater) must be present onsite. The historical evidence reviewed indicated a very low likelihood for a potential primary source to be present on the site.

Potential sources of groundwater contamination in the immediate vicinity of the site (e.g. service stations) were not observed. A groundwater source of vapours was considered not possible at the site.

Asbestos containing material fragments were present within the stockpiled soil materials in the vicinity of TP202 as observed within KPMG (2021b), asbestos fibre cement fragments have been identified in AEC03 and may be identified in AEC04 following further characterisation of the site. Further consideration of this value is necessary.

5.5. Management Limits for Petroleum Hydrocarbon Compounds

NEPM ASC 2013 notes that there are a number of policy considerations which reflect the nature and properties of petroleum hydrocarbons:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosive hazards; and

- Effects on buried infrastructure (e.g. penetration of or damage to, in-ground services by hydrocarbons).

Schedule B1 of NEPM ASC 2013 includes 'management limits' to avoid or minimise these potential effects. Application of the management limits requires consideration of site-specific factors such as the depth of building basements and services and depth to groundwater, to determine the maximum depth to which the limits should apply. NEPM ASC 2013 also notes that management limits may have less relevance at operating industrial sites which have no or limited sensitive receptors in the area of potential impact, and when management limits are exceeded, further site-specific assessment and management may enable any identified risk to be addressed.

5.6. Aesthetics – Human Health

Section 3.6.3 of NEPM ASC 2013 advises that 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.

SE notes that the proposed development includes building footprints and hardstand pavement areas across majority of the site, which would act as a direct contact barrier. The open space turfed areas would act as a direct contact barrier assuming intrusive disturbance of the physical barrier was not undertaken following installation.

During construction, the public and construction employees, may complete an aesthetics exposure pathway between potential contamination and receptors.

Any fill material that may be retained on site will need to be assessed for an asbestos contamination risk, given that KPMG 2021b observed asbestos contamination within AEC03 and AEC06 and waste storage in AEC05 and AEC07. Further consideration of this value is considered necessary.

5.7. Terrestrial Ecosystems – Ecological Health

Section 3.4.2 of Schedule B1 NEPM ASC 2013, advises a pragmatic risk-based approach should be taken when assessing ecological risks in residential and commercial / industrial land use settings.

SE notes that the proposed development would include landscaped areas on site as part of the redevelopment works. KPMG 2021b identified heavy metal and PAH exceedances at the site, as outlined in AEC01 and AEC02 and further exceedances may be identified in AEC04 following further characterisation of the site. Further ecological assessment is considered warranted.

5.8. Drinking Water Use

Expected poor regional water quality as a result of historical regional agricultural land use activities and disturbance, is considered likely to prevent groundwater from being a drinking water resource of value.

There are no groundwater bores onsite or down-gradient of the site, registered for drinking water use. It is noted that a reticulated mains potable water supply is available in the area.

Further consideration of this value is deemed unnecessary.

5.9. Recreational Water Use

Surface water courses proximal to the site included South Creek along the western boundary of the site, and Kemps Creek, located approximately 930 m south-west of the site. Several manmade dams were observed on neighbouring properties.

There is potential, albeit low, that the usage of these surface water courses within proximity to the site would include swimming, fishing for consumption and/or water sports.

As a precautionary measure, this pathway should be considered and further assessed based on the results of the supplementary contamination assessment, in the event contamination is identified.

5.10. Aquatic Ecosystems

Surface water courses proximal to the site included South Creek along the western boundary of the site, and Kemps Creek, located approximately 930 m south-west of the site. Several manmade dams were observed on neighbouring properties.

As a precautionary measure, this pathway should be considered and further assessed based on the results of the supplementary contamination assessment, in the event contamination is identified.

6. REMEDIATION STRATEGY OPTIONS DISCUSSION

A range of soil remediation options have been considered for the site. The options considered include only those which are proven to be effective on past remediation or related projects. The following section comprises a review of each of the soil remediation options considered and outlines the selection process used.

6.1. Remediation Strategy Development Rationale

Given the distribution of contamination is within defined areas and thus visually identifying and delineating the areas of contamination can be considered possible, it is recommended that various remediation options should be considered.

Due to the nature and distribution of the contaminants in the underlying soil matrix and building materials, an effective remediation approach for the site must be tailored towards the key impacted sources, which is the impacted / reworked / imported fill material and identified hazardous building materials within the site. A discussion of remediation options for these areas is provided in the below sections.

6.2. Remediation Options for Impacted Soil

The potential list of remediation options associated with impacted soil is extensive. Consequently, only relevant remediation strategies that have been considered which include the following:

- On-site treatment and beneficial reuse; and
- Off-site landfill disposal – excavation / removal and disposal.

A summary of the advantages and disadvantages to these remediation options is provided overleaf in **Table 6.3.2** overleaf.

6.3. Preferred Remediation Option

Based on SE's assessment detailed above, the most suitable remedial strategy will comprise of a combination of 'on-site treatment (in-situ / ex-situ raking / picking)' and 'off-site removal / disposal' as it will be consistent the ultimate end land use of the site. **Table 6.3.1** below summarises the preferred remediation strategies with regards to the identified contamination within the site.

Table 6.3.1 Selected Remediation Strategies

Contamination Risk	Preferred Remediation Strategy
Soil materials impacted with non-friable (bonded) asbestos	In-situ / ex-situ raking / picking or Excavation and disposal off-site
Soil materials impacted with heavy metals, hydrocarbons and/or friable asbestos (FA) / asbestos fines (AF) above human health criteria	Removal and disposal off-site
Soil materials impacted with heavy metals and hydrocarbons above ecological criteria	Burial beneath proposed roadways
Hazardous building materials (if identified) and aesthetic impacts	Removal and disposal off-site

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

Table 6.2 Remedial Options Summary

Treatment Option	Description	Advantages			Disadvantages		
		Technical	Financial	Logistical	Technical	Financial	Logistical
On-site Treatment	Soil raked and picked of physical contaminants. Treated and validated materials beneficially reused within the site.	Direct access to soil will be restricted by local roadways, foot paths and park areas with the appropriate mitigation measures	Potentially lower costs through with efficient / strategical methodology	Moderate excavation is required to remove all the AECs across the entire site Limited environmental management required during the works (e.g. dust, noise)	Treated and validated materials would remain on-site. Materials to be beneficially re-used within limited access areas (beneath roadways, parks, and footpaths)	Moderate to high labour costs during raking / picking of soils	Treated and validated material would remain on-site indefinitely.
Excavation and Offsite Disposal	Removal of contaminated soil to an EPA licensed facility. Validation sampling to demonstrate the conditions of the residual soil impact. Reinstatement of excavated areas with material validated as suitable for the intended land use.	Protective of human health including future tenants and construction workers. Facilitate future development of the entire site. No long-term EMP will be required.	No onsite operation and maintenance required.	No ongoing management required as the impacted soil will have been removed offsite.	Based on the soil investigation results, for off-site disposal purposes, the impacted soil to be excavated and removed offsite would require waste classification in accordance with the NSW EPA *Waste Classification Guidelines 2014.*	High remedial cost incurred to remediate the entire site.	Major excavation is potentially required. Odour, vapour and dust management required during the excavation works. May increase truck traffic in area to transport contaminated soil for a short period of time.

7. REMEDIAL ACTION PLAN

7.1. Remedial Goal

The remedial goal for this site is to remediate potential soil contamination (where identified) to a level that does not present an unacceptable human health exposure and environmental risks, based on the proposed land use setting. SE notes that the client would prefer that the remedial works be undertaken in a manner that does not result in the need for:

- Notation on a planning certificate for the site;
- A covenant registered on the title to the land; or
- A long-term environmental management plan (EMP).

7.2. Remediation Extent

The extent of contamination within the site is considered to is outlined within **Table 7.2.1** below. SE note that further remedial extents may be included following the results of the supplementary contamination assessment of AEC03 and AEC04.

Table 7.2.1 Approximate Remedial Extents

ID	Area of Environmental Concern	Approximate Extent
AEC01	Fill materials characterised by TP107 (KPMG 2021b)	Approximately ≈ 5 m x 5 m bgs. Total Area: ≈ 25 m^2
AEC02	Fill materials characterised by TP202 (KPMG 2021b)	Approximately ≈ 5 m x 5 m bgs. Total Area: ≈ 25 m^2
AEC03	Fill Material Stockpiles in the vicinity of TP202 (KPMG 2021b)	Total Area: ≈ 2536 m^2
AEC04	Building Footprints	Total Area: ≈ 833 m^2
AEC05	Building Demolition Waste	Approximately ≈ 5 m x 5 m bgs. Total Area: ≈ 25 m^2
AEC06	Surficial Asbestos Fragments	Total Area: ≈ 210 m^2
AEC07	Surficial Horticultural Wastes	Total Area: ≈ 5000 m^2

Refer to **Figure 3**, which indicate the areas which will be subject to remediation and the remedial strategy for each area to mitigate the risks to human health and the wider environment.

It is noted that the lateral extent of remediation may be altered, during remedial works based on site observations and validation soil sample analytical laboratory results.

7.3. Sequence of Works for Remediation

7.3.1 Remediation Schedule

Remediation works could likely be completed within one month following the commencement of works. It is expected that remediation timeframes will be further refined following the supplementary contamination assessment, appointment of the remediation contractor, and the staging of the remediation tasks in the contractor's works program.

7.3.2 Notifications and Approvals

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. SE note that all works within the Hawkesbury-Nepean conservation area sub-catchment require development consent under Section 6.13 of State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) and as such, the remediation works would be class as Category 1 under the SEPP (Resilience and Hazards).

The following information will also be provided to the planning consent authority, 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 (where applicable). The removal works will be undertaken by a suitably licensed contractor.

It should be noted that:

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

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

7.4. Demolition

Above ground structures and hardstand pavements will be demolished by a suitably licensed contractor, and associated wastes removed from site for recycling and/or disposal. The remediation contractor will retain transport and disposal records for all demolition wastes removed off site.

7.5. Remedial Works

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 proposed remediation works outlined in **Table 7.5.1** , are based on data available at the time of preparing this RAP.

The validation strategy for each identified AEC is outlined in **Section 8**.

Table 7.5.1 Proposed Remedial Works

Contamination Risk	Proposed Remedial Strategy
Surficial Non-friable (bonded) ACM	Asbestos containing material fragments will be handpicked from the surface of the soil materials. Soil materials will then be subjected to raking (where practical) to a depth of 100mm below the surface, using a rake with teeth spaced ≤7mm apart and >100mm 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. Non-friable ACM fragments will be removed from site, for offsite disposal to a licensed receiving facility.

Contamination Risk	Proposed Remedial Strategy
Non-friable (Bonded) ACM in fill or stockpiles	Fill soils will be excavated, spread out to a maximum thickness of 100mm 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 subjected to raking (where practical) to a depth of 100mm below the surface, using a rake with teeth spaced ≤7mm apart and >100mm 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. Non-friable ACM fragments will be removed from site, for offsite disposal to a licensed receiving facility, in accordance with the relevant waste classification. SE notes that remediation of non-friable asbestos contaminated soils for re-use may not be suitable due to the high clay content observed within the fill materials. All reasonable attempts will be made to remediate the soils; however, if deemed unfeasible by the supervising environmental consultant with consideration to adequacy of remediation methodology and timing, consultation with the client will be made to discuss the requirement for off-site disposal. OR Excavation vertically to base of fill and laterally to the edge of fill or to the site boundary (whichever occurs first). Disposal off-site to a licensed waste receiving facility as per NSW EPA Waste Classification Guidelines. The remediation contractor will retain transport and disposal records for all wastes removed off site.
Direct Contact Risks (Metals, PAHs, TRH, BTEX, PCBs, OCPs, E. Coli, F. Coliforms) ***exceeding ecological criteria***	Excavation vertically to base of fill (0.1 into natural) and laterally to edge of fill (or site boundary) and burial at depth beneath proposed roadways.
Hazardous Building Materials	Removal of identified hazardous building materials and separately prior to main demolition works. Subsequent off-site disposal of identified hazardous building materials (if identified) to a licensed waste receiving facility. The remediation contractor will retain transport and disposal records for all wastes removed off site to a licensed waste receiving facility as per NSW EPA Waste Classification Guidelines (2014).
Aesthetic Impacts	The remediation contractor will retain transport and disposal records for all wastes removed off-site to a licensed waste receiving facility as per NSW EPA Waste Classification Guidelines (2014).

7.6. Backfilling

Should remedial excavations require backfilling, then backfill soils will be limited to:

- Virgin excavated natural material (VENM);
- Excavated natural material (ENM); or
- 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).

Consideration will be given to geotechnical engineering requirements associated with backfilling; however, those requirements will be specified by others elsewhere.

7.7. Unexpected Finds Protocol

The contamination assessments to date have not indicated the presence of significant soil and groundwater contamination that is unacceptable for the proposed land use beyond the area of remediation described in this RAP. However, it is possible that unexpected finds may be present within the fill material. To this end, an

Unexpected Finds Protocol has been compiled, and is summarised herein. Unexpected finds could include, but are not limited to:

- 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

8. VALIDATION DATA QUALITY OBJECTIVES

Appendix B of NEPM ASC 2013 provides guidance on the development of data quality objectives (DQO) using a seven-step process.

The DQO for this project are set out in **Sections 8** to **8.7** of this report.

8.1. Step 1: State the problem

The first step involves summarising the contamination problem that will require new data and identifying the resources available to resolve the problem.

The objective of this project is to assess whether the remedial goal has been achieved, and whether the site presents an unacceptable human health exposure risk, for the proposed land use setting.

This project is being undertaken because:

- The site is the subject of redevelopment works; and
- Historically identified areas of environmental concern on the site, have the potential to present an unacceptable human health and ecological exposure risk in the context of the proposed land use setting.

The project team identified for this project includes Sydney Environmental Group Pty Ltd, the client and the planning consent authority.

The regulatory authorities identified for this investigation include NSW EPA and the Local Council.

8.2. Step 2: Identify the decision/goal of the study

The second step involves identifying decisions that need to be made about the contamination problem and the new environmental data required to make them.

The decisions that need to be made during this investigation include:

- Is the environmental data collected for the project, suitable for assessing relevant land contamination exposure risks?
- Do concentrations of identified contaminants of potential concern (COPC) present an unacceptable exposure risk to identified receptors, for the proposed land use setting?
- Have the contaminated soils been effectively isolate by the remedial strategy?
- Is the site suitable for the proposed land use setting, in the context of land contamination as a result of the chosen remedial strategy?

8.3. 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 **Section 8.2** for this investigation, will include:

- Data obtained in previous contamination assessments by KPMG (2021a & 2021b) and SE (2021);
- The nature and extent of sampling at the site, including both density and distribution;
- Samples of relevant site media;
- The measured physical and/or chemical parameters of the site media samples (including field screening and laboratory analysis, where relevant); and
- Assessment criteria adopted for each of the media sampled.

Taking into consideration the objectives of this project, and the conceptual site model and land use setting presented in **Section 5** of this project, the following assessment criteria relevant to the proposed land use setting have been adopted for this investigation:

- Human health direct contact – HILs in Table 1A (1) in NEPM ASC 2013 and HSLs in Table B4 of Friebel, E & Nadebaum, P (2011);
- Human health inhalation/vapour intrusion – HSLs in Table 1 (A) in NEPM ASC 2013;
- Human health (asbestos) – HSLs in Table 7 of NEPM ASC 2013;
- Petroleum hydrocarbon compounds (management limits) – Table 1 B(7) of NEPM ASC 2013; and
- Aesthetics – no highly malodorous site media (e.g. strong residual petroleum hydrocarbon odours, hydrogen sulphide in site media, organosulfur compounds), no hydrocarbon sheen on surface water, no discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature, no large monolithic deposits of otherwise low risk material (e.g. gypsum as powder or plasterboard, cement kiln dust), no presence of putrescible refuse including material that may generate hazardous levels of methane such as a deep-fill profile of green waste or large quantities of timber waste, and no soils containing residue from animal burial (e.g. former abattoir sites).

8.4. Step 4: Define the boundaries of the study

The fourth step involves specifying the spatial and temporal aspects of the environmental media that the data must represent to support decisions.

The spatial extent of the project will be limited to the site as defined by its boundaries.

The temporal boundaries of the project include:

- The project timeframes by SE for this project, and subsequent remediation contractor works program;
- Unacceptable weather conditions at the time of undertaking fieldwork, including rainfall, cold and/or heat;
- Access availability of the site (to be defined by the site owner/representative); and
- Availability of SE field staff (typically normal daylight working hours, Monday to Friday).

The lateral extent that contamination is expected to be distributed across, based on the conceptual site model, is defined by the inferred boundaries of the areas of environmental concern (AEC) and may be altered based on the data collected during the supplementary contamination assessment.

The vertical extent that contamination is expected to be distributed across, based on the conceptual site model, is defined by the inferred boundaries of the previously identified areas of environmental concern (AEC) and may be altered based on the data collected during the supplementary contamination assessment.

The scale of the decisions required will be based on the entire site.

Constraints which may affect the carrying out of this investigation may include access limitations, presence of above and below ground infrastructure, and hazards creating health and safety risks.

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

The fifth step involves defining the parameter of interest, specifying the action level, and integrating information from Steps 1 to 4 into a single statement that gives a logical basis for choosing between alternative actions.

8.3.1 Rinsate Blanks

One rinsate blank will be collected and scheduled for analysis, for each day of sampling undertaken. If non-disposable sampling equipment was used on that day. The rinsate blank will be analysed for at least two of the analytes the sample/s collected that day are being scheduled for analysis for (with the exception of asbestos).

Rinsate blanks will not be required for waste classification assessment.

8.3.2 Trip Spikes and Trip Blank Samples

One trip spike and trip blank sample will be used and scheduled for analysis, for each day of sampling undertaken, if site samples being collected that day are being analysed for volatile contaminants of concern (typically BTEX and/or TRH C_6-C_{10}).

Trip spikes and trip blanks will not be required for waste classification assessment.

8.3.3 Intra-Laboratory and Inter-Laboratory Duplicates

Intra-laboratory and inter-laboratory field duplicates will be collected at a rate of one per twenty (5%) site samples collected. The duplicates collected will be analysed for at least one of the analytes that the parent sample of the duplicate/triplicate is being scheduled for analysis for (with the exception of asbestos).

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

Intra- and inter-laboratory duplicates will not be required for waste classification assessment.

8.3.4 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.

8.3.5 If/Then Decision Rules

SE has adopted the following 'if/then' decision rules for this investigation:

- If the result of the assessment of field data and laboratory analytical data is considered acceptable, then that field data and laboratory analytical data is suitable for interpretation within the scope of this investigation; and
- If the field data and laboratory analytical data is within the constraints of the assessment criteria adopted for this investigation (refer **Section 8.3**), then the contamination exposure risks to identified receptors, are considered acceptable.

In the event the assessment of field data and/or laboratory analytical data results in the data being not suitable for interpretation, then SE will determine if additional data is required to allow interpretation to be undertaken.

In the event that field data and/or laboratory analytical data exceeds the assessment criteria adopted for this investigation (refer **Section 8.2**), SE will undertake an assessment of the exceedance in the context of the project objectives to determine if additional data is required and whether management and/or remediation is required.

8.6. Step 6: Specify the performance or acceptance criteria

The sixth step involves specifying the decision maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data. When assessing contaminated land, there are generally two types of errors in decision making:

- Contamination exposure risks for a specific land use setting are acceptable, when they are not; and
- Contamination exposure risks for a specific land use setting are not acceptable, when they are.

SE will mitigate the risk of decision error by:

- Calculation of the 95% upper confidence limit (UCL) statistic to assess the mean concentration of relevant contaminants of potential concern (excluding asbestos);

- Assignment of fieldwork tasks to suitably experienced SE consulting staff, and suitably experienced contractors;
- Assignment of laboratory analytical tasks to reputable NATA accredited laboratories; and
- Assignment of data interpretation tasks to suitably experienced SE consulting staff, and outsourcing to technical experts where required.

SE will also adopt a range of data quality indicators (DQI) to facilitate assessment of the completeness, comparability, representativeness, precision and accuracy (bias).

Table 8.6.1 Performance and Acceptance Criteria Summary

Completeness			
Field Considerations	**Assessment Criterion**	**Laboratory Considerations**	**Assessment Criterion**
Critical locations sampled	Refer **Section 8.4**	Critical samples analysed according to DQO	Refer **Section 8.14**
Critical samples collected	Refer **Section 8.4**	Analytes analysed according to DQO	Refer **Section 8.14**
SOPs appropriate and complied with	100%	Appropriate laboratory analytical methods and LORs	Refer **Section 8.14**
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 **Section 8.14**
Comparability			
Field Considerations	**Assessment Criterion**	**Laboratory Considerations**	**Assessment Criterion**
Same SOPs used on each occasion	100%	Same analytical methods used by primary laboratory	Refer **Section 8.14**
Climatic conditions	Samples stored in 500ml zip-lock bags	Same LORs at primary laboratory	Refer **Section 8.14**
Same types of samples collected, and handled/preserved in same manner	All soil samples same size, all stored in 500ml zip-lock bags	Same laboratory for primary sample analysis	All primary samples to Eurofins | Environmental Testing
Analytical measurement units consistent	All measurement units the same between same analytes	Same analytical measurement units	Refer **Section 8.14**
Representativeness			
Field Considerations	**Assessment Criterion**	**Laboratory Considerations**	**Assessment Criterion**
Appropriate media sampled according to SAQP	Refer **Section 8.4**	Samples analysed according to SAQP	Refer **Section 8.14**
Media identified in SAQP sampled	Refer **Section 8.4**	Nil	Nil
Precision			
Field Considerations	**Assessment Criterion**	**Laboratory Considerations**	**Assessment Criterion**
Intra- / Inter-Laboratory Duplicates RPD (Metals & PAH only)	Minimum 5% duplicates and triplicates No limit for analytical results <10 times LOR 50% for analytical results 10-20 times LOR 30% for analytical 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	Less than laboratory limit of reporting. None collected for asbestos.	Laboratory method blank	No exceedances of laboratory acceptance criteria.
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

8.7. Step 7: Develop the plan for obtaining data

The seventh step involves identifying the most resource effective sampling and analysis design for generating the data that is required to satisfy the DQOs.

8.3.1 Supplementary Contamination Assessment Sampling and Methodology

Table A in NSW EPA (1995) provides guidance on minimum sampling point densities required for site characterisation, based on detecting circular hot spots of defined diameter using a systematic sampling pattern. This guidance assumes the investigator has little knowledge about the probable locations of the contamination, the distribution of the contamination is expected to be random (e.g. land fill sites) or the distribution of the contamination is expected to be fairly homogenous (e.g. agricultural lands).

However, Section 3.1 of NSW EPA (1995) states that a judgemental sampling pattern can be used where there is enough information on the probable locations of contamination. Further to this, Section 6.2.1 of NEPM ASC 2013 states that the number and location or sampling points is based on knowledge of the site and professional judgement. Sampling should be localised to known or potentially contaminated areas identified from knowledge of the site either from site history or an earlier phase of site investigation. Judgemental sampling can be used to investigate sub-surface contamination issues in site assessment.

Table 4 in the *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, July 2021,* Western Australia Department of Health (DOH (2021)) indicates that where the 'likelihood of asbestos' is assessed as "possible" or "suspect", the investigation regimen should include a sampling density that is either judgemental or the same as that set out in Table A of NSW EPA (1995) for assessing asbestos.

As this project has included gathering data which provides a reasonable understanding of site history (in the context of potential areas of environmental concern on the site) and taking into consideration Table 1 in WA DOH (2009), it is considered reasonable to adopt a judgemental sampling pattern.

The location of actual sampling points will be recorded by hand on a site plan.

The supplementary contamination assessment and hazardous building material survey sampling arrangements for this project are presented in **Table 8.7.1** below.

Table 8.7.1 Supplementary Contamination Assessment Methodology

AEC	Contamination Risk	Supplementary Assessment Methodology
AEC03	Fill Material Stockpiles in the vicinity of TP202 (KPMG 2021b)	Test Pits to 0.3m bgl within stockpiled soil materials
AEC04	Building Footprints	Test Pits to 1.0m bgl, practical refusal or 0.3m into inferred natural material, whichever occurs first.

8.8. Validation Sampling

Validation should focus on collecting clear evidence to assess whether the key objectives have been met. Validation sampling programs should identify and delineate the lateral and vertical extent of contamination (if any) and arrive at a scientifically defensible and statistically valid data set which characterises the chemical concentrations and human health risk present at the site.

An appropriately experienced environmental consultant should be present onsite at all stages of the remediation works, to assess the extent of remediation required to render the site suitable for the proposed development. Site observations and field screening equipment can be used to assist in decision-making in relation to:

- The location and extent of any excavations to trace contamination or whether to remove additional soil;
- Create a more focused sample collection (number and location) and laboratory analysis; and

- The need to consider (or implement) any specific health and safety measures.

A judgemental validation sampling pattern will be carried out, with one soil sample collected from the floor (per 25m^2) and one soil sample collected from each wall (per 5 linear meters) of the remedial excavation footprints.

The validation sampling arrangements for this project are presented in **Table 8.7.2.**

Table 8.7.2 Validation Methodology

Contamination Risk	Validation Methodology
Surficial Non-friable (Bonded) ACM	Visual inspection of the surficial soil materials following removal of the asbestos containing material fragments to confirm removal of ACM. Following removal: 1 x 500mL sample per 25m^2 of excavation footprint. Photographic record of former ACM footprint.
Non-friable (Bonded) ACM in fill	Visual inspection of at least one pass of treated material, using a rake with teeth spaced ≤7mm apart and >100mm long. 1 x 10L sample per 30 m^3 of treated material, screened for fragments of ACM >7mm and a subsequent 500mL sample for quantitative asbestos analysis. Visual inspection of excavation footprint to confirm removal of fill. Following removal: 1 x 500mL soil sample per 5 linear metres of excavation wall, with a minimum of 1 per wall and one 500mL soil sample per 25m^2 of excavation footprint Photographic record of treated soils. Photographic record of excavation. SE notes that all reasonable attempts will be made to remediate the soils; however, if deemed unfeasible by the supervising environmental consultant with consideration to adequacy of remediation methodology and timing, consultation with the client will be made to discuss the requirement for off-site disposal.
Direct Contact Risks in Fill	Visual inspection of excavation footprint to confirm removal of fill. One 250mL soil jar sample per 25 m^2 of excavation footprint. 1 x 250mL jar sample per 10 lineal metres of excavation wall (if present), with a minimum of 1 per wall. Photographic record of excavation.
Hazardous Building Materials / Site Structures	Visual inspection of residual soil surface following demolition by a suitably qualified environmental consultant / NSW SafeWork Licensed Asbestos Assessor to confirm the absence of hazardous building materials.
Aesthetic Impacts	Visual inspection of residual soil surface following demolition by a suitably qualified environmental consultant to confirm absence of aesthetic impacts. Photographic record of excavation.
Imported Fill (VENM)	1 soil sample per 100 m^3 or 3 samples per stockpile / site.
Imported Fill (ENM)	Quantity dependent – refer to the NSW EPA 2014 *'Excavated Natural Material (ENM) exemption/order'* for further detail.

The quantity and movement of all waste materials excavated and removed offsite with be tracked by the remedial contractor. All waste disposal dockets issued by the suitably licensed waste receiving facility will 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.

If visual or olfactory observations indicated a potential for soil contamination to be present, then collection of additional validation samples will be considered.

8.9. Sampling Methodology

Grab soil samples will be collected at each required sampling point directly from the base and walls of the excavation. Wall samples will be taken from the middle of the wall. Depending on the depth of the excavation footprint, an excavator may be required to obtain samples. In these instances, samples will be collected from soils in the centre of the excavator bucket, to avoid cross contamination from the excavator bucket.

Sampling will be guided by a combination of visual evidence (e.g. visible ACM, staining, etc), olfactory evidence (hydrocarbon odours) and field analytical instrumentation (e.g. portable PID soil headspace screening) where applicable.

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

8.10. Identification, Storage and Handling of Samples

Sample identifiers will be used for each sample collected, based on the AEC, the number of samples collected and the depth/interval the sample was collected from, e.g. a sample collected from AEC01 from the excavation footprint base, would be identified as AEC01-VAL-Base##.

Project samples will be stored in laboratory prepared glass jars or zip-lock bags (if collected for asbestos).

Soil samples in glass jars will be placed in insulated container/s with ice.

Samples will be transported to the relevant analytical laboratory, with chain of custody (COC) documentation that includes the following information:

- SE project identification number
- Each sample identifier
- Date each sample was collected
- Sample type (e.g. soil or water)
- Container type/s for each sample collected
- Preservation method used for each sample (e.g. ice)
- Analytical requirements for each sample and turnaround times
- Date and time of dispatch and receipt of samples (including signatures)

8.11. Headspace Screening

Where the contaminants of potential concern include volatiles, project soil samples will be subjected to field screening for ionisable volatile organic compounds (VOC), using a photo-ionisation detector (PID). The results of field screening will be recorded on a field sampling point log and presented in test-pit logs.

8.12. Decontamination

In the unlikely event that non-disposable sampling equipment is used, that 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.

8.13. Laboratory Selection

The analytical laboratories used for this project will be NATA accredited for the analysis undertaken.

8.14. Laboratory Analytical Schedule

Project samples will be scheduled for NATA accredited laboratory analysis, using a combination of:

- Observations made in the field of the media sampled;
- Headspace screening results (where available); and
- The contaminants of potential concern (COPC) identified for the area of environmental concern that the sample was collected from.

Based on the site history, SE has adopted the laboratory analytical schedule for the supplementary contamination assessment and the validation sampling. Project specific information is presented in **Table 8.7.3** and **Table 8.7.4**.

Table 8.7.3 Laboratory Analytical Schedule (Supplementary Contamination Assessment)

AEC	Analytical Schedule	No. of samples
AEC03	Asbestos (0.001%)	36 x soil samples (3 x soil samples per stockpile)
AEC04	Heavy Metals, PAH, TRH, BTEX, OCP, PCB, Asbestos (0.01%)	6 x soil samples

Table 8.7.4 Laboratory Analytical Schedule (Validation Sampling)

AEC	Analytical Schedule	No. of samples
AEC01	Heavy Metals	As per **Section 8.8**
AEC02	PAH	As per **Section 8.8**
AEC05	Visual Clearance	N/A
Imported Fill – VENM	TRH, BTEX, PAH, 8 metals, OCP and asbestos.	As per **Section 8.8**
Imported Fill – ENM	TRH, BTEX, PAH, 8 metals, EC, pH, foreign materials and asbestos.	As per **Section 8.8**

8.15. 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 **Table 8.7.5**.

Table 8.7.5 Laboratory Holding Times, Analytical Methods, and Limits of Reporting (Soil).

Analyte	Holding Time	Analytical Method	Limit of Reporting (mg/kg)
BTEX and TRH C_6-C_{10}	14 days	USEPA 5030, 8260B and 8020	0.2-0.5
TRH >C_{10}-C_{40}	14 days	USEPA 8015B & C	20-100
PAH	14 days	USEPA 8270	0.1-0.5
VOC	14 days	USEPA 8260	0.1-0.5
Metals	14 days	USEPA 8015B & C	0.05 – 2
E. Coli	1 Day	AS 4276.7:2007	10 (cfu/g)
Faecal Coliforms	1 Day	AS 4276.5:2007	10 (cfu/g)
Asbestos	No limit	AS4964:2004	Absence / presence
Asbestos	No limit	In-house Method	0.001% w/w

9. REPORTING

9.1. 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 site validation report must include:

- An executive summary;
- The scope of reporting work undertaken;
- Site identification details;
- A summary of site history;
- A summary of site condition and the surrounding environment;
- A summary of geology and hydrogeology;
- Information on the remediation works undertaken;
- The results of field and laboratory work;
- An assessment of field and laboratory quality assurance / quality control data;
- A discussion on site validation;
- Information on ongoing site monitoring requirements (if any); and
- Conclusions and recommendations.

10. SITE MANAGEMENT PLAN

The following site management plan will apply during undertaking of the remediation tasks.

10.1. Soil and Stormwater Management

10.1.1. 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 / swept up and combined with the soil being disposed offsite.

Soil and sediment will be broomed or washed off vehicle/plant tyres and tracks, prior to vehicles/plant leaving the remediation works zone. This soil and sediment will be scraped / swept up and managed onsite or disposed of, 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).

10.1.2. 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.

10.1.3. 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 in ANZECC (2000), excavation water may be discharged to stormwater.

Should analytical results exceed ANZWQG (2019) 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.

10.1.4. 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.

10.1.5. Waste Management

Removal of materials from site for recycling and/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 is 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 is required (as a minimum):

- Source location;
- Estimated volume (based on excavation size;
- Actual volume of disposal;
- Waste classification;
- Transporter;
- Final destination, POEO license;
- 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/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 / 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 / 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.

10.1.6. Groundwater Management

Should dewatering of the site 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 will be required.

10.1.7. 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/activities.

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).

10.1.8. 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/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 (2019) *Code of Practice – How to Safely Remove Asbestos*. SE recommend 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 1.5m above the ground surrounding the work/removal area. 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 10.1.1 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.

10.1.9. 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/materials; and
- Adequate maintenance of equipment and machinery to minimise exhaust emissions.

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

10.1.10. 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 in **Section 10.2.6**;
- 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.

10.1.11. 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.

10.1.12. 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 concentrations of potential contaminants in VENM and ENM proposed to be imported to site, will be less than the human health assessment criteria adopted for the site.

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/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/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.

10.2. Work Health and Safety

10.2.1. 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.

10.2.2. 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;
- Gloves; and
- Eye protection (e.g. safety glasses).

Additional PPE may be required in accordance with task specific control measures in SWMS (refer **Section 10.2.1**) for asbestos handling and removal works.

The following minimum personal protective equipment (PPE) are 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.

10.2.3. 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).

10.2.4. 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 contamination/remediation works (in progress).

10.2.5. 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.

10.2.6. Site Hours of Operation

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

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

10.2.7. 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 and/or complaints to the Project Manager. The Project Manager will arrange for the communication/complaint to be assessed, a response prepared, corrective/preventative actions implemented (if necessary).

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

10.2.8. 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 in **Section 10.2.9**.

10.2.9. Register of Contacts

A register of contacts for the project is presented in **Table 10.2.1** below.

Table 10.2.9 Register of Contacts

Project Role	Person	Organisation	Contact
Emergency Services	-	Fire / Police / Ambulance	000
Development Manager	Tom Falcon	GPT Group	0423 363 242
Planning Consent Authority	-	Penrith City Council	(02) 4732 7777
WHS Regulatory Authority	-	SafeWork NSW	131 050
Environmental Regulatory Authority	-	NSW EPA	131 500
Remediation Contractor	TBC	TBC	TBC
Environmental Consultant	Steven Wallace	Sydney Environmental Group Pty Ltd	434 998

10.3. 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.

11. CONCLUSION

Based on the information presented in the historical contamination assessment reports, SE 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 supplementary assessment works, an addendum to this RAP may be required. The addendum should be prepared 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 should be prepared by a suitably experienced environmental consultant; and
- Future remedial works should be monitored and validated by a suitably experienced environmental consultant.

This report must be read in conjunction with the limitations set out in **Section 12.**

12. STATEMENT OF LIMITATIONS

The findings presented in this report are based on specific searches of relevant, government historical databases and anecdotal information that were made available during the course of this investigation. To the best of our knowledge, these observations represent a reasonable interpretation of the general condition of the site at the time of report completion.

This report has been prepared solely for the use of the client to whom it is addressed and no other party is entitled to rely on its findings.

No warranties are made as to the information provided in this report. All conclusions and recommendations made in this report are of the professional opinions of personnel involved with the project and while normal checking of the accuracy of data has been conducted, any circumstances outside the scope of this report or which are not made known to personnel and which may impact on those opinions is not the responsibility of Sydney Environmental Group Pty Ltd. Should information become available regarding conditions at the site including previously unknown sources of contamination, SE reserves the right to review the report in the context of the additional information.

This report must be reviewed in its entirety and in conjunction with the objectives, scope and terms applicable to SE's engagement. The report must not be used for any purpose other than the purpose specified at the time SE was engaged to prepare the report.

Logs, figures, and drawings are generated for this report based on individual SE consultant interpretations of nominated data, as well as observations made at the time site walkover/s were completed.

Data and/or information presented in this report must not be redrawn for its inclusion in other reports, plans or documents, nor should that data and/or information be separated from this report in any way.

Should additional information that may impact on the findings of this report be encountered or site conditions change, SE reserves the right to review and amend this report.

13. REFERENCES

KPMG (2021a), 'Environmental Assessment – 771-781 & 783-797 Mamre Road, Kemps Creek, NSW – EA', dated 19 July, Ref: 397835 – 771-781 & 783-797 Mamre Road, Kemps Creek, NSW – EA.

KPMG (2021b), 'Preliminary Site Investigation, 771-781 & 783-797 Mamre Road, Kemps Creek, NSW', dated 25 October, Ref: 397835 – 771-781 & 783-797 Mamre Road, Kemps Creek, NSW – Preliminary Site Investigation – KPMG Final 25-10-21.

SE (2022), 'Hazardous Building Materials Survey, 771-781 & 783-797 Mamre Road, Kemps Creek NSW', dated 23 February, Ref: 1495-HBMS-01-230222.v1f.

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'*;

NSW EPA 1995, '*Contaminated Sites: Sampling Design Guidelines'*;

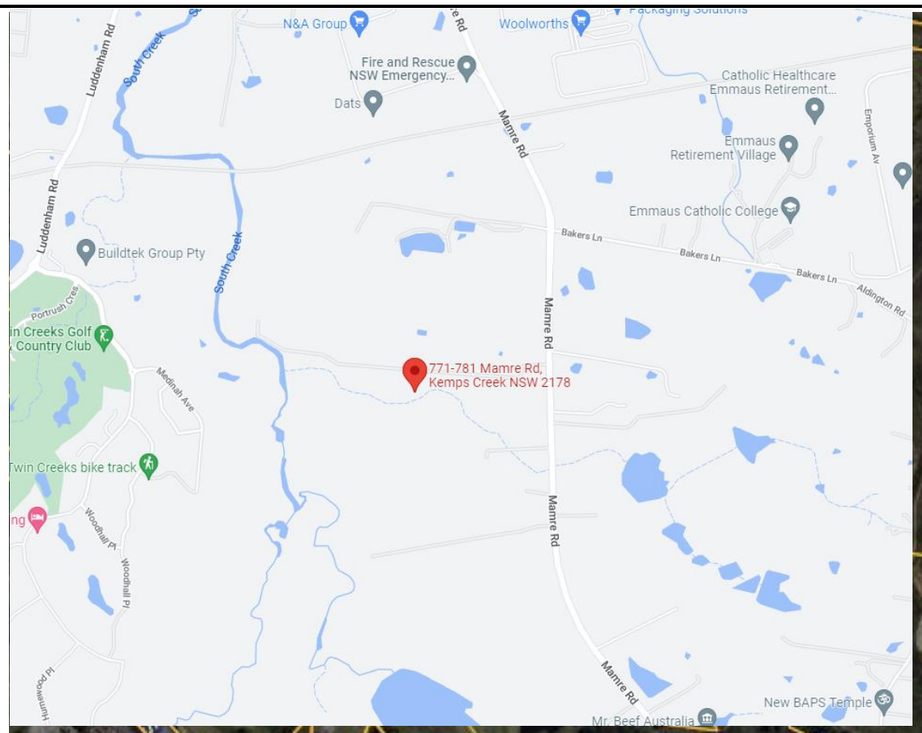
NSW EPA 2017, '*Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd edition)*';

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

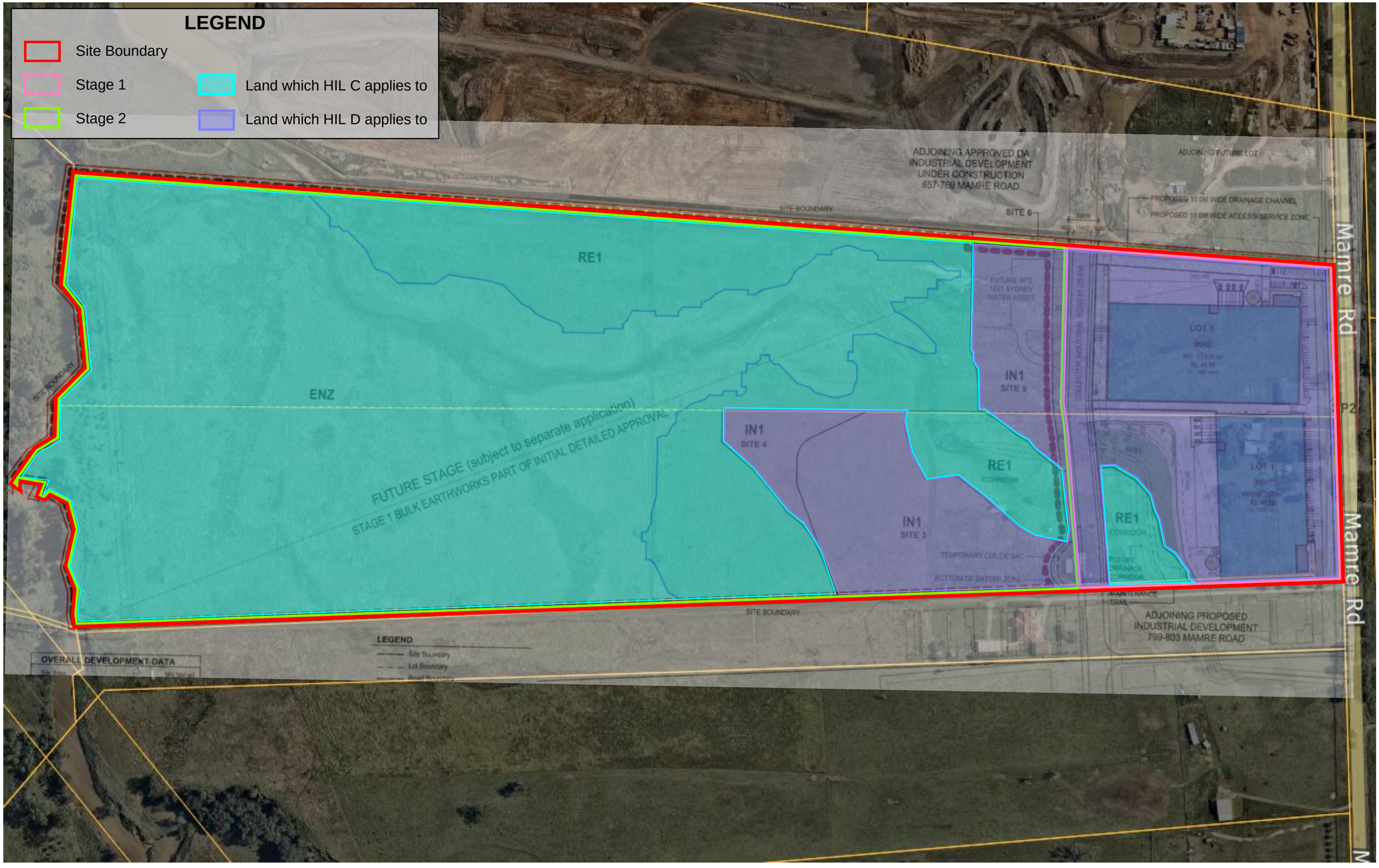
VIC EPA 2009, '*Industrial Waste Resource Guidelines 702'*; and

WA DOH 2009, *'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia'* dated May 2009.

FIGURES

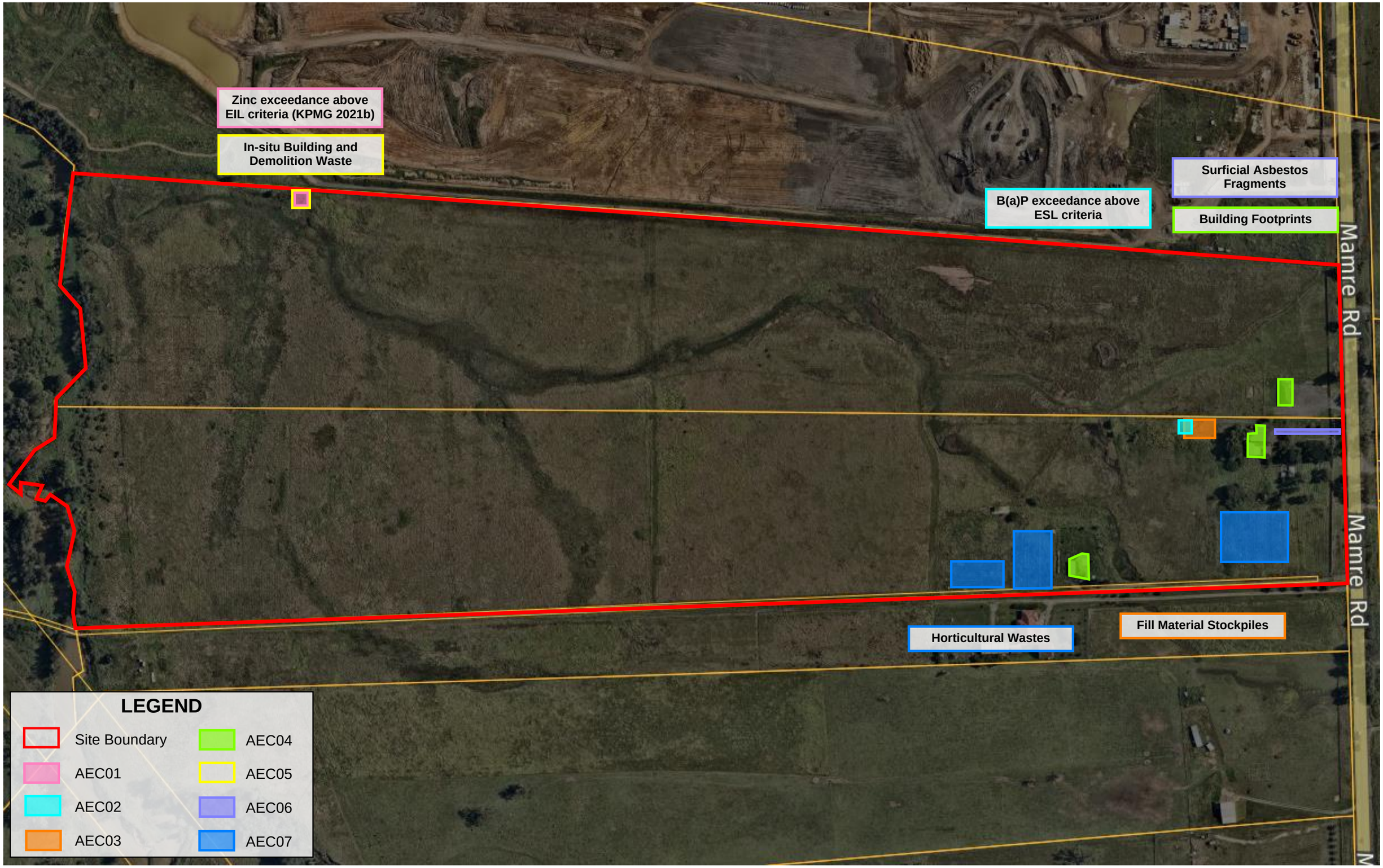


Sydney Environmental Group	Scale: 200 m	Site Locality		
	Client Name:	GPT Group	N	Figure Number: 1
	Project Name:	Remedial Action Plan		Figure Date: 23 March 2022
	Project Location:	771-781 & 783-797 Mamre Road, Kemps Creek NSW		Report Number: 1495-RAP-01-230322.v2f



Scale:	100 m	Site Locality		
Client Name:	GPT Group	N	Figure Number:	2
Project Name:	Remedial Action Plan		Figure Date:	3 July 2023
Project Location:	771-781 & 783-797 Mamre Road, Kemps Creek NSW		Report Number:	1495-RAP-01-230322.v2f

Sydney Environmental Group



Sydney Environmental Group

Scale:	100 m	Site Layout and Areas of Environmental Concern	
Client Name:	GPT Group	Figure Number:	3
Project Name:	Remedial Action Plan	Figure Date:	23 March 2022
Project Location:	771-781 & 783-797 Mamre Road, Kemps Creek NSW	Report Number:	1495-RAP-01-230322.v2f

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