

# **Meadowbank Education and Employment Precinct Schools Project Supplementary Asbestos Assessment**



**SSD 18\_9343**

**Prepared by Alliance Geotechnical  
For School Infrastructure NSW  
11 October 2019**



## DOCUMENT CONTROL

Revision	Date	Author	Reviewer
Rev 0	30 September 2019	Sam Scully	Aidan Rooney
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## EXECUTIVE SUMMARY

Alliance Geotechnical Pty Ltd (AG) was engaged by Woods Bagot Pty Ltd, to undertake a Supplementary Asbestos Assessment (SAA) for the Meadowbank Education and Employment Precinct Schools Project, at 2 Rhodes Street, Meadowbank NSW (refer **Figure 1** with the 'site' boundaries outlined in **Figure 2**). Previous contamination assessments have been undertaken by AG at this site since 2018.

This report has been prepared by AG on behalf of the NSW Department of Education (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18\_9343) for the Meadowbank Education and Employment Precinct Schools Project (hereafter referred to as MEEPSP) at 2 Rhodes Street, Meadowbank (the site).

MEEPSP will cater for 1,000 primary school students and 1,620 high school students. The proposal seeks consent for:

- A multi-level, multi-purpose, integrated school building with a primary school wing and high school wing. The school building is connected by a centralised library that is embedded into the landscape. The school building contains:
  - Collaborative general and specialist learning hubs, with a combination of enclosed and open spaces;
  - Adaptable classroom home bases;
  - Four level central library, with primary school library located on ground floor and high school library on levels 1 to 3.
  - Laboratories and workshops;
  - Staff workplaces;
  - Canteens;
  - Indoor gymnasium;
  - Multipurpose communal hall;
  - Outdoor learning, play and recreational areas (both covered and uncovered).
- Associated site landscaping and public domain improvements;
- An on-site car park for 60 parking spaces; and
- Construction of ancillary infrastructure and utilities as required.

The objectives of this investigation were to:

- Assess data gaps and delineate the identified contamination presented in the Stage 2 Detailed Site Investigation (DSI) completed in 2018 (AG, 2018b), the Supplementary Contamination Assessment completed in 2019 (AG, 2019a) and finalise the site Remedial Action Plan (RAP) ahead of the development application;
- Assess the potential nature and extent of identified contaminants of potential concern on the site, with reference to the areas of environmental concern reported by AG in (AG, 2018b & AG, 2019a);
- Provide advice on whether the site would be suitable (in the context of land contamination) for the proposed land use setting;
- Provide recommendations for further investigation, management and/or remediation (if warranted).

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

- A desktop review of relevant information relating to the site;
- A site walkover to understand current site conditions;
- Conduct an intrusive site investigation using both excavator and utility-mounted drill rig to assess subsurface ground conditions and to facilitate the collection of representative soil samples;
- Laboratory analysis to compliment the in-situ testing completed during the field investigation; and
- Data assessment and report preparation.

### **Conclusions and Recommendations**

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

#### **Asbestos Delineation Assessment**

- The detection of ACM in analysed fragments FCS01 and FCS-02 may present an unacceptable human health exposure risk. Widespread presumed ACM fragments have also been observed on surface soils in areas of the site and as such AG have altered the site impacted areas.

Based on these conclusions, AG make the following recommendations:

- A final site RAP be updated to include the overall identified contamination risks onsite and outline the appropriate remedial measures to adequately remove the contamination pathway and associated human health exposure risks. It is recommended that any update to the RAP be undertaken by an appropriately experienced environmental consultant.

This report, including its conclusions and recommendations, must be read in conjunction with the limitations presented in **Section 12**.

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## LIST OF ABBREVIATIONS

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

ACM	Asbestos Containing Material
AF/FA	Asbestos Fines / Fibrous Asbestos
AEC	Area of Environmental Concern
AG	Alliance Geotechnical Pty Ltd
AHD	Australian Height Datum
B(a)P TEQ	Benzo(a)pyrene Toxic Equivalence Quotient
BTEX	Benzene, toluene, ethyl benzene and xylenes
COPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
DSI	Detailed Site Investigation
DP	Deposited Plan
EPA	NSW Environment Protection Authority
m	metres
m <sup>2</sup>	square metres
m bgs	metres below ground surface
mg/kg	milligrams per kilogram
OCP	Organochlorine pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PSI	Preliminary Site Investigation
RAP	Remedial Action Plan
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit

## 1. INTRODUCTION

### 1.1. Background

Alliance Geotechnical Pty Ltd (AG) was engaged by Woods Bagot Pty Ltd, to undertake a supplementary asbestos assessment (SAA) for Meadowbank Education and Employment Precinct Schools Project, at 2 Rhodes Street, Meadowbank, NSW (refer **Figure 1** with the 'site' boundaries outlined in **Figure 2**). AG had undertaken an initial supplementary contamination assessment in July 2019 (AG, 2019a) and a further assessment was required to determine the final extent of previously identified asbestos contamination risks.

This report has been prepared by AG on behalf of the NSW Department of Education (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18\_9343) for the Meadowbank Education and Employment Precinct Schools Project (hereafter referred to as MEEPSP) at 2 Rhodes Street, Meadowbank (the site).

MEEPSP will cater for 1,000 primary school students and 1,620 high school students. The proposal seeks consent for:

- A multi-level, multi-purpose, integrated school building with a primary school wing and high school wing. The school building is connected by a centralised library that is embedded into the landscape. The school building contains:
  - Collaborative general and specialist learning hubs, with a combination of enclosed and open spaces;
  - Adaptable classroom home bases;
  - Four level central library, with primary school library located on ground floor and high school library on levels 1 to 3.
  - Laboratories and workshops;
  - Staff workplaces;
  - Canteens;
  - Indoor gymnasium;
  - Multipurpose communal hall;
  - Outdoor learning, play and recreational areas (both covered and uncovered).
- Associated site landscaping and public domain improvements;
- An on-site car park for 60 parking spaces; and
- Construction of ancillary infrastructure and utilities as required.

### 1.2. Objectives

The objectives of this project were to:

- Assess data gaps and delineate the identified contamination presented in the Stage 2 Detailed Site Investigation (DSI) completed in 2018 (AG, 2018b), the Supplementary Contamination Assessment completed in 2019 (AG, 2019a) and finalise the site Remedial Action Plan (RAP) ahead of the development application;
- Assess the potential nature and extent of identified contaminants of potential concern on the site, with reference to the areas of environmental concern reported by AG in (AG, 2018b & AG, 2019a);



- Provide advice on whether the site would be suitable (in the context of land contamination) for the proposed land use setting;
- Provide recommendations for further investigation, management and/or remediation (if warranted).

### 1.3. Scope of Work

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

- A desktop review of the previous investigation reports and other relevant information relating to the site;
- A site walkover to understand current site conditions;
- An intrusive site investigation using both excavators to assess subsurface ground conditions and to facilitate the collection of representative soil samples;
- Laboratory analysis to compliment the in-situ testing completed during the field investigation; and
- Data assessment and report preparation.

A **Supplementary Asbestos Assessment** is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 18\_9343. This table identifies the SEARs and relevant reference within this report.

**Table 1.1** – SEARs and Relevant Reference

SEARs Item	Report Reference
<u>13 Contamination</u> Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55.	Whole Report

## 2. SITE IDENTIFICATION

The site is registered with NSW Land and Property Information as a portion of Portion of Lot 1 in DP837179 (Lot 10 in DP1232584).

A registered Lot survey plan of acquisition drawing provided by the client indicates the site is Lot 10 in DP1232584 being part of Lot 1 in DP837179.

The Section 10.7 (formally Section 149) planning certificate for the site (refer Alliance Geotechnical (2019a)) refers to the site as being Lot 10 in DP1232584, with a street address of 2 Rhodes Street, Meadowbank, NSW.

For the purpose of this investigation, the site will be defined as Lot 10 in DP1232584 being part of Lot 1 in DP837179.

The approximate geographic coordinates of the middle of the site, inferred from Google Earth were 33°48'46" S and 151°05'27" E.

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

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

The site covers an area of 3.329 hectares (by Lot survey plan).

A copy of a detail and level survey and the Lot plan survey is presented in **Appendix A**.

### 3. SITE CONDITIONS AND SURROUNDING ENVIRONMENT

#### 3.1. Geology

A review of the Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1) 1983, indicated that the site is underlain by Middle Triassic Hawkesbury Sandstone, which is comprised of medium to coarse grained quartz sandstone, very minor shale and laminite lenses. A portion of the eastern boundary of the site is in close proximity to Ashfield Shale, which is comprised of black to dark grey shale and laminite.

#### 3.2. Acid Sulfate Soils

A review of the Prospect Parramatta Acid Sulfate Soil Risk Map (1:25,000 scale) indicates that the site is in a map class description of ***"No Known Occurrence"***. Land management activities are not likely to be affected by acid sulfate soil materials.

#### 3.3. Topography

The site topography was generally undulating, with overall slopes generally towards the south and south west, and some localised slopes in the northern portion, towards the east. All school buildings on the site have been demolished to allow for redevelopment.

The detail and level survey presented in **Appendix A** provides further information on surface contours and elevations.

#### 3.4. Hydrogeology

Surface water courses proximal to the site included:

- Parramatta River located approximately 400m to the south of the site.

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 south.

A review of the NSW Office of Water groundwater database (<https://realtime.data.watersnsw.com.au/water.stm>) indicated there are three (3) registered groundwater features located within a 500m radius of the site (GW1048997, GW1048998, and GW1048999):

- GW1048997 with an authorised purpose for "monitoring bore". The water bearing zone for the feature was at 2.4m and the standing water level in that bore was measured at 2.32m.
- GW1048998 with an authorised purpose for "monitoring bore". The water bearing zone for the feature was at 2.1m and the standing water level in that bore was measured at 2.5m.
- GW1048999 with an authorised purpose for "monitoring bore". The water bearing zone for the feature was at 2.4m and the standing water level in that bore was measured at 2.32m.

Each of the three features were located to the west of the site, considered to be in an inferred down or cross gradient location, relative to the site.

## 4. PREVIOUS CONTAMINATION ASSESSMENTS

The following reports were considered during the undertaking of this project:

- AG 2018a, *'Stage 1 Preliminary Site Investigation, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW'*, dated June 2019, ref: 6179-ER-1-1 REV5;
- AG 2018b, *'Stage 2 Detailed Site Investigation, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW'*, dated June 2019, ref: 6179-ER-1-2 REV6;
- AG 2019a, *'Supplementary Contamination Assessment, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW'*, dated 12 July 2019, ref: 9280-ER-1-1 REV1.

A summary of these reports is presented in **Section 4.1 to 4.3**.

### 4.1. Alliance Geotechnical (2018a)

Alliance Geotechnical Pty Ltd (AG) was engaged by Woods Bagot in 2017, to conduct a Stage 1 – Preliminary Site Investigation (PSI) for a portion of the Meadowbank Education and Employment Precinct Schools Project site at 2 Rhodes Street, Meadowbank, NSW (the site).

For this investigation, AG had the following project appreciation:

- TAFE and NSW Department of Education were in negotiations for the sale/purchase of the site;
- the site was being considered for redevelopment, comprising a primary school and secondary school; and
- contamination assessment works were required to inform the property transaction process and master planning process.

The objectives of this investigation were to:

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

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

- a desktop review;
- a site walkover; and
- data assessment and reporting.

Alliance Geotechnical (2018a) reported that the predominant historical land title holdings for the site included the Metropolitan Water Sewerage and Drainage Board, and the Meadowbank Manufacturing Company.

The site history data collected and site walkover observations made were assessed within the objectives of the investigation and in the context of the proposed development works. That assessment identified areas of environmental concern (AEC) and contaminants of potential concern (COPC) which have the potential to be present onsite.

Based on AG's assessment of the desktop review and site walkover data, in the context of the proposed development scenario, AG concluded that:

- there is a moderate potential for land contamination to be present on the site, as a result of past and current land use activities; and
- further investigation would be required to make an assessment of the suitability of the site, for a primary school and secondary school land use setting.

Based on these conclusions, AG made the following recommendations:

- A Stage 2 – Detailed Site Investigation (DSI) should be undertaken for the site. AG notes that, if a Stage 2 – DSI is undertaken while the site remains operational and/or while existing buildings and infrastructure remain on the site, there will likely be constraints limiting further assessment of some areas of the site, which may increase uncertainty around the contamination status of the site; and
- The Stage 2 – DSI should be undertaken by a suitably experienced environmental consultant.

#### **4.2. Alliance Geotechnical (2018b)**

Alliance Geotechnical Pty Ltd (AG) was engaged again by Woods Bagot to conduct a Stage 2 – Detailed Site Investigation (DSI) for a portion of the Meadowbank Education and Employment Precinct Schools Project site at 2 Rhodes Street, Meadowbank, NSW (the site).

For this investigation, AG had the following project appreciation:

- TAFE and NSW Department of Education were in negotiations for the sale/purchase of the site;
- The site was being considered for redevelopment, comprising a primary school and secondary school; and
- Supplementary Contamination Assessment works are required to inform the property transaction process and master planning process.

The objectives of this investigation were to:

- assess the nature and likely extent of identified contaminants of potential concern (COPC) in the identified areas of environmental concern;
- provide advice on whether the identified COPC present an unacceptable human health exposure risk (in the context of land contamination) for the proposed land use setting; and
- provide recommendations for further investigation, management and/or remediation (if warranted).

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

- a desktop review;
- intrusive drilling and soil sampling fieldwork;

- laboratory analysis; and
- data assessment and reporting.

The site history data collected and site walkover observations made were 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 (COPCs) which have the potential to be present on site. The identified AECs and associated COPCs are presented in **Table 4.2**.

**Table 4.2 AEC and COPC**

ID	AEC	Land Use Activity	Contaminants of Potential Concern
AEC01	Embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC02	Block Y1	Boat building and chemical storage / handling	Hydrocarbons and metals
AEC03	Block Y6	Boat building and chemical storage / handling	Hydrocarbons and metals
AEC04	Former dwelling	Uncontrolled demolition	Metals and asbestos
AEC05	Former dwelling	Uncontrolled demolition	Metals and asbestos
AEC06	Open space	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC07	Embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC08	Former building	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC09	Former dwelling	Uncontrolled demolition	Metals and asbestos
AEC10	Former greenhouse	Pesticide storage / handling	Pesticides and metals
AEC11	Multipurpose courts	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos

ID	AEC	Land Use Activity	Contaminants of Potential Concern
AEC12	Embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC13	Embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC14	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos.
AEC15	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC16	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC17	Carpark and grassed area	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC18	Small embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC19	Embankment next to path	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
-	General site footprint	Potential uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos

Soil sampling was undertaken by AG on 13 and 14 January 2018. A total of 44 sampling points (BH01 to BH41 and SS01 to SS03) were established on site. Sampling points BH01 to BH41 were excavated using a track mounted drilling rig fitted with push tube and solid flight augers, or a hand auger where access was limited. Soil samples at SS01 to SS03 were collected as grab samples from the surface.

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

- the concentrations of identified contaminants of potential concern in the soils assessed are considered unlikely to present an unacceptable direct contact human health exposure risk, with the exception of:

- lead in soil at BH02 (560mg/kg), lead in soil at BH22 (490mg/kg) and lead in soil at BH24 (610mg/kg);
  - benzo(a)pyrene (TEQ) in soil at BH04 (8.5mg/kg), BH16 (18mg/kg), and BH23 (8.4mg/kg); and
  - asbestos in soils in the vicinity of sampling points BH07, SS02, SS03, BH30, BH40 and BH41;
- the concentrations of identified contaminants of potential concern in the soils assessed are considered unlikely to present an unacceptable inhalation / vapour intrusion human health exposure risk;
- the concentrations of identified contaminants of potential concern in the soils assessed are considered unlikely to present a petroleum hydrocarbon management limit risk;
- the asbestos detected in the soils assessed, may present an unacceptable human health exposure risk and unacceptable aesthetics risk;
- the site could be made suitable for the proposed land use setting, subject to the further assessment, management and/or remediation of potential unacceptable contamination risks and those areas unable to be assessed.

Based on these conclusions, AG made the following recommendations:

- A Supplementary Contamination Assessment should be undertaken by a suitably experienced environmental consultant to:
  - further characterise the nature and extent of the elevated concentrations of lead in soil risks and benzo(a)pyrene (TEQ) in soil risks;
  - further characterise the nature and extent of asbestos in soil risks, and provide a quantitative assessment of those risks;
  - address data gaps associated with AEC13, the southern portion of AEC10, and the central portions of AEC02, AEC03, AEC09, AEC12, AEC14, AEC15, AEC16 (constrained due to the presence of existing structures and/or accessibility constraints);
- consideration should be given to removal of existing structure and accessibility constraints, prior to undertaking the supplementary contamination assessment. Removal of access constraints would likely also require provision for significant surface and pavement disturbance across the site to facilitate quantitative asbestos in soil risk assessment;
- pending the findings of the supplementary contamination assessment, a Remedial Action Plan should be prepared to address unacceptable soil contamination related human health exposure risks. The RAP should be prepared by a suitably experience consultant with reference to NSW OEH (2011) and include (but not be limited to) the following:
  - a remedial goal for the site;
  - an assessment of remedial options available to address the identified asbestos risks. These options may include removal offsite, in-situ containment, ex-situ containment, or a combination of these:
    - Offsite removal would likely involve excavation and disposal of impacted materials. Subject to successful removal of all impacted material, it is unlikely that a long term operational environmental management plan (EMP) would be required for the proposed development site;
    - In-situ containment could include application of a capping layer across the site. Typically, concrete and/or asphalt pavements are adequate for non-exposed soils, while a minimum 0.5m thickness of clean fill (excluding planting media) would be



required in unsealed areas (e.g. playgrounds, soft landscaping etc). Depending on design levels for the development, a portion of the impacted soils may require removal offsite to allow for capping layer thicknesses. This remedial strategy would likely require a long-term environmental management plan (EMP) for the proposed development site, and notification on the Section 10.7 (formally Section 149) planning certificate and/or title for the site;

- Ex-situ containment could include excavation and relocation of a portion of the impacted material elsewhere on the site, and application of a capping layer (similar to that discussed for in-situ containment). This remedial strategy would likely require a long term operational environmental management plan (EMP) for the proposed development site, and notification on the Section 10.7 (formally Section 149) planning certificate and/or title for the site;
- the proposed testing to validate the site after remediation;
- the proposed testing to validate the site after remediation;
- a contingency plan to address unexpected finds or if the selected remedial strategy fails; and
- a site management plan (for the remediation works).

#### **4.3. Alliance Geotechnical (2019a)**

In June 2019, AG were engaged by the site demolition contractor (Ward Civil) on behalf of Woods Bagot Pty Ltd, to prepare a Supplementary Contamination Assessment for the site.

At the time of this investigation, AG had the following project appreciation:

- The NSW Department of Education had purchased the site;
- The site was being considered for redevelopment, comprising a primary school and secondary school;
- All previous school buildings had been demolished and the site was being cleared; and
- A supplementary contamination investigation was required to address the data gaps identified as a result of inaccessible areas in previous assessments undertaken by AG, and to delineate the extent of known onsite contamination.

The objectives of this project were to prepare a remedial action plan to address:

- Assess data gaps and delineate the identified contamination presented in the Stage 2 Detailed Site Investigation (DSI) completed by AG in 2018 (AG, 2018b);
- Assess the potential nature and extent of identified contaminants of potential concern on the site, with reference to the areas of environmental concern reported by AG in (AG, 2018b);
- Provide advice on whether the site would be suitable (in the context of land contamination) for the proposed land use setting;
- Provide recommendations for further investigation, management and/or remediation (if warranted).

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

- A desktop review;

- Intrusive excavation works and soil sampling fieldwork; and
- Reporting.

The site history data collected was assessed within the objectives of this project and in the context of the proposed development works. The assessment identified the following areas of environmental concern (AEC) and contaminants of potential concern (COPC) which either require assessment, further assessment, and/or remediation. The AEC identified and associated COPC are presented in the table below.

ID	Area of Environmental Concern	Land Use Activity	Contaminants of Potential Concern
AEC01	Previous sampling point BH02	Uncontrolled filling	Lead
AEC02 (central portion)	Block Y1	Boat building and chemical storage / handling	Hydrocarbons and metals
AEC02	Previous sampling point BH04	Boat building and chemical storage / handling	Benzo(a)pyrene (TEQ)
AEC03 (central portion)	Block Y6	Boat building and chemical storage / handling	Hydrocarbons and metals
AEC05	Previous sampling point BH07	Uncontrolled demolition	Asbestos
AEC09 (central portion)	Former dwelling	Uncontrolled demolition	Metals and asbestos
AEC10 (southern portion)	Former greenhouse	Pesticide storage / handling	Pesticides and metals
AEC11	Previous sampling point BH16	Manufacturing and demolition	Benzo(a)pyrene (TEQ)
AEC12 (central portion)	Embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC13	Embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC14 (central portion)	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos.

ID	Area of Environmental Concern	Land Use Activity	Contaminants of Potential Concern
AEC14 (BH22)	Previous sampling point BH22	Manufacturing and demolition	Lead
AEC15 (central portion)	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC15	Previous sampling point BH23	Manufacturing and demolition	Benzo(a)pyrene (TEQ)
AEC15	Previous sampling point BH24	Manufacturing and demolition	Lead
AEC16 (central portion)	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC18	Previous sampling point SS03	Uncontrolled filling	Asbestos
AEC19	Previous sampling point BH30	Uncontrolled filling	Asbestos
-	Previous sampling point SS02	Potential uncontrolled filling	Asbestos
-	Previous sampling point BH40	Potential uncontrolled filling	Asbestos
-	Previous sampling point BH41	Potential uncontrolled filling	Asbestos

Soil sampling was undertaken by AG on 18, 19 and 20 June 2019. A total of 61 sampling points were established onsite. Sampling points were established to address data gaps or to delineate contamination identified within previous contamination reports (AG, 2018b). Sampling points (BH02A to BH02D, BH40A to BH40B and BH41A to BH41D) were advanced using a ute mounted drill rig fitted with solid flight augers, or a hand-held mechanically operated push tube where access was limited. The remaining sampling points (test pits) were excavated using an excavator.

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

#### **Data Gap Assessment (previously inaccessible areas)**

- the detected concentrations of identified contaminants of potential concern in the soils assessed are considered unlikely to present an unacceptable direct contact human health exposure risk;

- fibrous asbestos and asbestos fines detected in the soils assessed, may present an unacceptable human health exposure risk, at sampling points **TP53** and **TP57**;
- the detected concentrations of identified contaminants of potential concern in the soils assessed are considered unlikely to present an unacceptable inhalation / vapour intrusion human health exposure risk; and
- the detected concentrations of identified contaminants of potential concern in the soils assessed are considered unlikely to present a petroleum hydrocarbon management limit risk.

#### **Chemical Delineation Assessment**

- the extent of previously identified lead contamination at sampling points **BH02**, **BH22** and **BH24**, is considered to have been adequately delineated; and
- the extent of previously identified benzo(a)pyrene contamination at sampling points **BH04**, **BH16** and **BH23**, is considered to have been adequately delineated.

#### **Asbestos Delineation Assessment**

- the extent of previously identified asbestos contamination at sampling points **SS02**, **SS03**, **BH30**, **BH40**, **BH41** and **TP53** is considered to have been adequately delineated;
- the extent of previously identified asbestos contamination at sampling point **BH07**, has not been adequately delineated; and
- Non-friable ACM identified at sampling point **TP04B** may present an unacceptable human health exposure risk and has not been adequately delineated.

#### **Indicative Waste Classification**

- General Solid Waste (Special Waste).

Based on these conclusions, AG made the following recommendations:

- further supplementary contamination assessments could be undertaken to further understand and delineate the nature and extent of asbestos contamination identified at sampling points **TP04B**, **TP07A** and **TP57**; or
- alternatively, AG (2019c) could be updated to include the recently identified contamination risks onsite and outline the appropriate remedial measures to adequately remove the contamination pathway and associated human health exposure risks. It is recommended that any update to AG (2019c) be undertaken by an appropriately experienced environmental consultant.

## 5. CONCEPTUAL SITE MODEL

The site history data collected was assessed within the objectives of this project and in the context of the proposed development works. That assessment identified the following areas of environmental concern (AEC) and contaminants of potential concern (COPC) which either require assessment, further assessment, and/or remediation. The AECs identified are presented in attached **Figure 3** and associated COPC are presented in **Table 5.1**.

**Table 5.1: AEC and COPC**

ID	Area of Environmental Concern	Land Use Activity	Contaminants of Potential Concern
AEC01	Previous sampling point BH02	Uncontrolled filling	Lead
AEC02 (central portion)	Block Y1	Boat building and chemical storage / handling	Hydrocarbons and metals
AEC02	Previous sampling point BH04	Boat building and chemical storage / handling	Benzo(a)pyrene (TEQ)
AEC03 (central portion)	Block Y6	Boat building and chemical storage / handling	Hydrocarbons and metals
AEC05	Previous sampling point BH07	Uncontrolled demolition	Asbestos
AEC09 (central portion)	Former dwelling	Uncontrolled demolition	Metals and asbestos
AEC10 (southern portion)	Former greenhouse	Pesticide storage / handling	Pesticides and metals
AEC11	Previous sampling point BH16	Manufacturing and demolition	Benzo(a)pyrene (TEQ)
AEC12 (central portion)	Embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC13	Embankment	Uncontrolled filling	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos

ID	Area of Environmental Concern	Land Use Activity	Contaminants of Potential Concern
AEC14 (central portion)	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos.
AEC14 (BH22)	Previous sampling point BH22	Manufacturing and demolition	Lead
AEC15 (central portion)	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC15	Previous sampling point BH23	Manufacturing and demolition	Benzo(a)pyrene (TEQ)
AEC15	Previous sampling point BH24	Manufacturing and demolition	Lead
AEC16 (central portion)	Former industrial building	Manufacturing and demolition	Hydrocarbons, pesticides, polychlorinated biphenyl, metals, asbestos
AEC18	Previous sampling point SS03	Uncontrolled filling	Asbestos
AEC19	Previous sampling point BH30	Uncontrolled filling	Asbestos
-	Previous sampling point SS02	Potential uncontrolled filling	Asbestos
-	Previous sampling point BH40	Potential uncontrolled filling	Asbestos
-	Previous sampling point BH41	Potential uncontrolled filling	Asbestos

## 5.1. Land Use Setting

AG understands that the proposed development works includes the demolition of historical site structures and construction of a combined primary-high school and associated infrastructure.

Based on the proposed development works and guidance provided in Section 2.2 of NEPC (1999a), AG considers it reasonable to adopt the 'HIL A – residential' land use setting for the south eastern portion of the site, and 'HIL C – public open space' land use setting for the north western and southern portions of the site, for the purpose of assessing land contamination exposure risks.

### 5.1.1. Identification, Storage and Handling of Samples

Sample identifiers will be used for each sample collected, based on the sampling point number and the depth/interval the sample was collected from, e.g. a sample collected from test pit TP03 at a depth of 0.2m to 0.4m below ground level, would be identified as TP03/0.2-0.4.

Project samples will be stored in laboratory prepared glass jars (chemical) and zip lock bags (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:

- AG 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)

### 5.2. Direct Contact – Human Health

Portions of the site will be covered with building footprints and hardstand areas; however, some exposed soil areas will likely remain, in the form of playground areas, sporting fields, and general softscape. It is considered that a complete direct contact exposure pathway for may exist in these areas.

### 5.3. 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) is required.

The historical evidence reviewed did not indicate a potential for a primary source to be present on the site.

The same historical evidence indicated a potential land use activity to be uncontrolled filling. The excavation, transport, placement and spreading of imported (uncontrolled) fill material involves significant disturbance of soils which typically results in volatilisation of vapour producing contaminants.

A groundwater source of vapours was not identified for the site.

The potential for vapours to be present in soils on site at concentrations which might present an unacceptable exposure risk, is considered to be low to negligible, however, further assessment is considered warranted, given the sensitive nature of the proposed land use setting.

#### **5.4. Management Limits for Petroleum Hydrocarbon Compounds**

NEPC (1999a) 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).

NEPC (1999a) 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. NEPC (1999a) 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.

Given the nature of the identified contaminants of potential concern at the site, further assessment against these management limits is considered warranted.

#### **5.5. Aesthetics – Human Health**

Section 3.6.3 of NEPC (1999a) 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.

Portions of the site will be covered with building footprints and hardstand areas, however, some exposed soil areas will likely remain, in the form of playground areas, sporting fields, and general softscape. It is considered that a complete aesthetics exposure pathway for may exist in these areas.

#### **5.6. Terrestrial Ecosystems**

NEPC (1999) requires a pragmatic risk-based approach should be taken in applying ecological investigation and screening levels in residential and commercial / industrial land use settings.

It is noted that vegetation on site and on adjacent properties did not display evidence of significant or widespread phytotoxic impact (i.e. plant stress or dieback).

Further assessment of unacceptable risk to terrestrial ecosystems is considered not warranted.



## 6. DATA QUALITY OBJECTIVES

Appendix B of NEPC (1999b) 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 6.1 to 6.7** of this report.

### 6.1. 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 key objectives of this project are to assess the data gaps and delineate the identified contamination presented in (AG, 2019b & AG, 2019c) and provide recommendations for further investigation, management and/or remediation (if warranted) in accordance with 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 exposure risk in the context of the proposed land use setting.

The project team identified for this project includes Alliance Geotechnical Pty Ltd, the developer and the planning consent authority.

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

### 6.2. 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?
- Have the data gaps presented in (AG, 2019b) been addressed;
- Has the contamination identified in (AG2019b & AG, 2019c) been delineated;
- Do the concentrations of identified contaminants of potential concern (COPC) present an unacceptable exposure risk to identified receptors, for the proposed land use setting?
- Is the site suitable or can the site be deemed suitable for the proposed land use setting, in the context of land contamination?

### 6.3. 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 6.2** for this investigation, will include:

- data obtained during searches of the site's history;
- the nature and extent of sampling at the site, including both density and distribution;
- samples of relevant site media;
- the NATA accredited analysis of physical and/or chemical parameters of the relevant site media samples; 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** Error! Reference source not found. of this project, the 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 NEPC (1999a) and HSLs in Table B4 of Friebe, E & Nadebaum, P (2011);
- Human health inhalation/vapour intrusion – HSLs in Table 1 (A) in NEPC (1999a);
- Human health (asbestos) – HSLs in Table 7 of NEPC (1999a);
- Petroleum hydrocarbon compounds (management limits) – Table 1 B(7) of NEPC (1999a); 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).

#### 6.4. 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 presented in the AG proposal 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 AG 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).

The vertical extent that contamination is expected to be distributed across, based on the conceptual site model and the project scope, is limited to base of fill material.

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.

## **6.5. 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.

### **6.5.1. 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 one of the analytes the sample/s collected that day are being scheduled for analysis for (with the exception of asbestos).

### **6.5.2. 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<sub>6</sub>-C<sub>10</sub>).

### **6.5.3. Field Duplicates and Field Triplicates**

Field duplicate and Field triplicates will be collected at a rate of one per twenty (5%) site samples collected. The duplicates and triplicates 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/triplicate will be calculated.

### **6.5.4. 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.

### **6.5.5. If/Then Decision Rules**

AG 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 6.3**), 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 AG 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 6.3**), AG 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.

## 6.6. 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.

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

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

Completeness			
Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Critical locations sampled	Refer <b>Section 6.7</b>	Critical samples analysed according to DQO	Refer <b>Section 6.7</b>
Critical samples collected	Refer <b>Section 6.7</b>	Analytes analysed according to DQO	Refer <b>Section 6.7</b>
SOPs appropriate and complied with	100%	Appropriate laboratory analytical methods and LORs	Refer <b>Section 6.7</b>
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 extraction and holding times complied with	Refer <b>Section 6.7</b>
Comparability			
Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion

Same SOPs used on each occasion	100%	Same analytical methods used by primary laboratory	Refer <b>Section 6.7</b>
Climatic conditions	Samples stored in insulated containers with ice, immediately after collection	Same LORs at primary laboratory	Refer <b>Section 6.7</b>
Same types of samples collected, and handled/preserved in same manner	All soil samples same size, all stored in insulated containers with ice	Same laboratory for primary sample analysis	All primary samples to SGS Environmental
		Same analytical measurement units	Refer <b>Section 6.7</b>
<b>Representativeness</b>			
<b>Field Considerations</b>	<b>Assessment Criterion</b>	<b>Laboratory Considerations</b>	<b>Assessment Criterion</b>
Appropriate media sampled according to SAQP	Refer Section 6.4	Samples analysed according to SAQP	Refer <b>Section 6.7</b>
Media identified in SAQP sampled	Refer Section 6.4		
<b>Precision</b>			
<b>Field Considerations</b>	<b>Assessment Criterion</b>	<b>Laboratory Considerations</b>	<b>Assessment Criterion</b>
Field duplicate / triplicate RPD	<p>Minimum 5% duplicates and triplicates</p> <p>No limit for analytical results &lt;10 times LOR</p> <p>50% for analytical results 10-20 times LOR</p> <p>30% for analytical results &gt;20 times LOR</p>	Laboratory duplicates	No exceedances of laboratory acceptance criteria
SOPs appropriate and complied with	100%		
<b>Accuracy (bias)</b>			
<b>Field Considerations</b>	<b>Assessment Criterion</b>	<b>Laboratory Considerations</b>	<b>Assessment Criterion</b>
Rinsate blanks	Less than laboratory limit of reporting	Laboratory method blank	No exceedances of laboratory acceptance criteria

Field trip spikes	Recoveries between 60% and 140%	Matrix spike recovery	No exceedances of laboratory acceptance criteria
Field trip blanks	Analyte concentration <LOR	Surrogate spike recovery	No exceedances of laboratory acceptance criteria
		Laboratory control sample recovery	No exceedances of laboratory acceptance criteria

## 6.7. 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.

### 6.7.1. Sampling Point Layout Plan

Table A in NSW EPA (1995) provides guidance on minimum sampling point densities required for site characterisation, based on detecting circular hot spots by 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 NEPC (1999b) states that the number and location of 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.

As this investigation 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, where necessary, for each AEC.

The proposed sampling point layout arrangement for this project is presented in **Table 6.7.1**. The locations of the proposed sampling points are set out in **Figure 4**.

**Table 6.7.1 Validation Sampling**

Area of Concern	Environmental Sampling Point ID	Validation Sampling
AEC02	TP04B-01 -TP04B-04	Four step out test-pits to a target depth of 1.5m, or 0.3m into inferred natural material, or practical refusal, whichever occurs first.

Area of Concern	Environmental Sampling Point ID	Validation Sampling
AEC05	TP07E – TP07F	Four step out test-pits to a target depth of 0.6m, or 0.3m into inferred natural material, or practical refusal, whichever occurs first.
AEC16 (central portion)	TP57-A – TP57-F	One test-pit to a target depth of 1.0, or 0.3m into inferred natural material, or practical refusal, whichever occurs first.
-	SS02E-SS02G	Four step out test-pits to a target depth of 1.0m, or 0.3m into inferred natural material, or practical refusal, whichever occurs first.

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

The location of each sampling point will be marked on a site plan.

#### 6.7.2. Headspace Screening

Where the contaminants of potential concern include volatiles (e.g. TRH, BTEX), 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 sampling point log.

#### 6.7.3. Decontamination

In the 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.

#### 6.7.4. Laboratory Selection

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

#### 6.7.5. 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);
- The contaminants of potential concern (COPC) identified for the area of environmental concern that the sample was collected from.

Based on site history and completed contamination assessments (AG, 2019b), AG has adopted the laboratory analytical schedule presented in **Table 6.7.6** for this project.

**Table 6.7.6 Laboratory Analytical Schedule**

AEC	Sampling Point ID	Analytical Schedule
AEC02	TP04B-01 -TP04B-04	NEPM Asbestos 0.001%
AEC05	TP07E – TP07F	NEPM Asbestos 0.001%
AEC16 (central portion)	TP57-A – TP57-F	NEPM Asbestos 0.001%
-	SS02E-SS02G	NEPM Asbestos 0.001%

#### 6.7.6. 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 6.7.7**.

**Table 6.7.6 Laboratory Holding Times, Analytical Methods and Limits of Reporting**

Analyte	Holding Time	Analytical Method	Limit of Reporting (mg/kg)
BTEX and TRH C <sub>6</sub> -C <sub>10</sub>	14 days	USEPA 5030, 8260B and 8020	0.2-0.5
TRH >C <sub>10</sub> -C <sub>40</sub>	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
Asbestos	No limit	AS4964:2004	Absence / presence
Asbestos	No limit	Inhouse Method	0.001% w/w



## 7. FIELDWORK

### 7.1. Soil Sampling – Additional Asbestos Assessment

Soil sampling was undertaken by AG on 18 September 2019.

A total of 15 additional asbestos delineation sampling points were established onsite. Sampling points were established to further delineate asbestos contamination identified during the initial delineation assessment outlined in **Section 7.1**. Sampling points (SS02-E to SS02-G, TP04B-01 to TP04B-04, TP07E & TP07F and TP57A to TP57F) were advanced using a hydraulic excavator and operator supplied by the client.

On 18 September 2019, visual evidence of potential asbestos containing materials (ACM) was observed on the surface of the site. The potential ACM was observed by AG as being scattered widespread across the recently exposed surface soils located beneath previous hardstand areas (refer to **Figure 7**).

The mobilisation to site on 18 September 2019, was carried out after and during significant rainfall events across Sydney. AG hypothesizes that the rainfall events caused substantial erosion of the loose topsoil across these portions of the site and exposed subsurface demolition waste containing potential ACM. The evidence was in the form fibre cement sheet fragments. Two samples of these fragments (FCS-01 and FCS-02) were collected and submitted for analysis at a NATA accredited laboratory.

The locations of the sampling points established onsite are presented in **Figure 6b**.

**Image 7.1.1 View of sampling point TP07E**



Samples were collected at each sampling point and placed in laboratory supplied 500ml zip-lock asbestos sample bags (where required). The jars and bags were labelled with the project number, sample identifier and date the samples were collected on.

Each sampling point was backfilled and track rolled at the completion of the sampling task.

Each sampling point established was marked on a site plan. The locations of these sampling points are presented in **Figure 4**.

## **7.2. Site Geology**

Observations were made of soils encountered during sampling work.

Anthropogenic materials observed in some of the fill material encountered included asphalt, metal, wood, glass, brick and potential ACM (in the form of fibrous cement sheeting fragments).

## **7.3. Potential Asbestos Containing Materials**

Visual evidence of potential asbestos containing materials (ACM) was observed at several sampling points, including both on the surface and within the fill soil profile (TP04B, TP07A, TP30B, TP30C, TP40C and TP42). The evidence was in the form fibrous cement sheeting fragments. Samples of these fragments were collected when observed and submitted for analysis at a NATA accredited laboratory.

## **7.4. Odours – Additional Asbestos Delineation Assessment**

Olfactory evidence of odours in the soil samples collected, was not detected.

## **7.5. Staining – Additional Asbestos Delineation Assessment**

Visual evidence of staining in the soil samples collected, was not detected.

**Image7.3.1 View of potential ACMs onsite**



**Image7.3.1 View of potential ACMs onsite**



## **8. LABORATORY ANALYSIS**

The samples collected were transported to the analytical laboratory, using chain of custody (COC) protocols. A selection of these samples was scheduled for analysis, with reference to the relevant COPC identified for the AEC that the samples were collected from.

A copy of the analytical laboratory certificates of analysis, is presented in **Appendix B**.

The sample analytical results were tabulated and presented in the attached **Table 1**.

## 9. DATA QUALITY INDICATOR ASSESSMENT

### 9.1. Completeness

An assessment of the completeness of data collected was undertaken, and the results presented in **Table 9.1**.

**Table 9.1 Completeness DQI**

Field Considerations	Target	Actual	Comment
Critical locations sampled	61	61	Performance against indicator considered acceptable.
Critical samples collected	Refer <b>Section 6.7</b>	Refer <b>Section 6.7</b>	Performance against indicator considered acceptable.
SOPs appropriate and complied with	100%	100%	Performance against indicator considered acceptable.
Field documentation complete	All sampling point logs, calibration logs and chain of custody forms	All sampling point logs, calibration logs and chain of custody forms	Performance against indicator considered acceptable.
Laboratory Considerations	Target	Actual	Comment
Critical samples analysed according to DQO	Refer <b>Section 6.7</b>	Refer <b>Section 6.7</b>	Performance against indicator considered acceptable.
Analytes analysed according to DQO	Refer <b>Section 6.7</b>	Refer <b>Section 6.7</b>	Performance against indicator considered acceptable.
Appropriate laboratory analytical methods and LORs	Refer <b>Section 6.7</b>	Refer <b>Section 6.7</b>	Performance against indicator considered acceptable.
Sample documentation complete	All sample receipt advices, all certificates of analysis	100%	Performance against indicator considered acceptable.
Sample extraction and holding times complied with	Refer <b>Section 6.7</b>	100%	Performance against indicator considered acceptable.

The data collected is considered to be adequately complete within the objectives and constraints of the project.

## 9.2. Comparability

An assessment of the comparability of data collected was undertaken, and the results presented in **Table 9.2**.

**Table 9.2 Comparability DQI**

Field Considerations	Target	Actual	Comment
Same SOPs used on each occasion	100%	100%	Performance against indicator considered acceptable.
Climatic conditions	Samples stored in insulated containers with ice, immediately after collection	100%	Performance against indicator considered acceptable.
Same types of samples collected, and handled/preserved in same manner	All soil samples same size, all stored in insulated containers with ice	100%	Performance against indicator considered acceptable.
Laboratory Considerations	Target	Actual	Comment
Same analytical methods used by primary laboratory	Refer <b>Section 6.7</b>	100%	Performance against indicator considered acceptable.
Same LORs at primary laboratory	Refer <b>Section 6.7</b>	100%	Performance against indicator considered acceptable.
Same laboratory for primary sample analysis	All primary samples to Eurofins MGT	100%	Performance against indicator considered acceptable.
Same analytical measurement units	Refer <b>Section 6.7</b>	100%	Performance against indicator considered acceptable.

The data collected is considered to be adequately comparable.

## 9.3. Representativeness

An assessment of the representativeness of data collected was undertaken, and the results presented in **Table 9.3**.

**Table 9.3 Representativeness DQI**

Field Considerations	Target	Actual	Comment
Appropriate media sampled according to DQO	Refer <b>Section 6.7</b>	100%	Performance against indicator considered acceptable.



Media identified in DQO sampled	Refer <b>Section 6.7</b>	100%	Performance against indicator considered acceptable.
Laboratory Considerations	Target	Actual	Comment
Samples analysed according to DQO	Refer <b>Section 6.7</b>	Refer comments	Performance against indicator considered acceptable.

The data collected is considered to be adequately complete within the objectives and constraints of the project.

#### **9.4. Precision**

An assessment of the precision of data collected was undertaken, and the results presented in **Table 9.4**.

**Table 9.4 Precision DQI**

Field Considerations	Target	Actual	Comment
Field duplicate / triplicate RPD	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	-	
SOPs appropriate and complied with	100%	100%	Performance against indicator considered acceptable.
Laboratory Considerations	Target	Actual	Comment
Laboratory duplicates	No exceedances of laboratory acceptance criteria	No exceedances of laboratory acceptance criteria	Performance against indicator considered acceptable.

The data collected is considered to be adequately precise.

## 9.5. Accuracy

An assessment of the precision of data collected was undertaken, and the results presented in **Table 9.5**.

**Table 9.5 Accuracy DQI**

Field Considerations	Target	Actual	Comment
Rinsate blanks	Less than laboratory limit of reporting	Not applicable	Not applicable
Field trip spikes	Recoveries between 60% and 140%	Recoveries were between 60% and 140%	Performance against indicator considered acceptable.
Field trip blanks	Analyte concentration <LOR	Analyte concentrations were <LOR	Performance against indicator considered acceptable.



Laboratory Considerations	Target	Actual	Comment
Laboratory method blank	No exceedances of laboratory acceptance criteria	No exceedances of laboratory acceptance criteria	Performance against indicator considered acceptable.
Matrix spike recovery	No exceedances of laboratory acceptance criteria	No exceedances of laboratory acceptance criteria	Performance against indicator considered acceptable.
Surrogate spike recovery	No exceedances of laboratory acceptance criteria	No exceedances of laboratory acceptance criteria	Performance against indicator considered acceptable.
Laboratory control sample recovery	No exceedances of laboratory acceptance criteria	No exceedances of laboratory acceptance criteria	Performance against indicator considered acceptable.

The data collected is considered to be adequately accurate.

## 10. ASBESTOS DELINEATION ASSESSMENT

A summary of the laboratory analytical results for the asbestos delineation assessment completed at the site is presented in **Table 3** and sampling points are shown in **Figures 6a** and **6b**.

### 10.1. Asbestos in Soil – Fibrous Asbestos (FA)/ Asbestos Fines (AF)

Fibrous asbestos and asbestos fines (FA and AF) were not detected in the relevant soil samples analysed, with the exception of asbestos concentrations at sampling points:

- **SS02D-0.0-0.3** (FA): chrysotile asbestos detected in the form of weathered fibre cement fragments in the previous investigation. Total estimated asbestos concentration in FA asbestos was 0.0011% w/w;
  - Additional delineation soil samples SS02-E, SS02-F and SS02-G returned laboratory results that did not detect asbestos at the laboratory limit of 0.001% w/w successfully delineating the asbestos identified at soil sample SS02D-0.0-0.3.
- **TP30A-1.7-1.9** (AF): chrysotile and crocidolite asbestos detected in the form of loose fibre bundles in the previous investigation. No asbestos detected at the reporting limit of 0.001% w/w; and
- **BH40D-0.9-1.1** (AF): chrysotile asbestos detected in the form of loose fibre bundles in the previous investigation. No asbestos detected at the reporting limit of 0.001% w/w.

### 10.2. Non-friable Asbestos Containing Material (ACM)

Non-friable ACM was not detected in the delineation samples analysed, with the exception of:

- **TP04B**: chrysotile and amosite asbestos detected in the previous investigation;
  - Additional delineation soil samples TP04B-01 to TP04B-04 returned laboratory results that did not detect asbestos at the laboratory limit of 0.001% w/w successfully delineating the asbestos identified at soil sample TP04B.
- **TP07A**: chrysotile asbestos detected in the previous investigation;
  - Additional delineation soil samples TP07E & TP07F returned laboratory results that did not detect asbestos at the laboratory limit of 0.001% w/w successfully delineating the asbestos identified at soil sample TP07A.
- **TP30B**: chrysotile asbestos detected in the previous investigation;
- **TP30C**: chrysotile asbestos detected in the previous investigation; and
- **FCS-01** and **FCS-02**: chrysotile asbestos detected in surface fragments.

## 11. CONCLUSIONS AND RECOMMENDATIONS

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

### **Additional Asbestos Delineation Assessment**

- the detection of ACM in analysed fragments FCS01 and FCS-02 may present an unacceptable human health exposure risk. Due to the abundance of potential ACMs evident on the surface of the site, AG are unable to delineate the ACM fragments observed across the unpaved areas.

Based on these conclusions, AG makes the following recommendations:

- The RAP be updated to include the recently identified contamination risks onsite and outline the appropriate remedial measures to adequately remove the contamination pathway and associated human health exposure risks. It is recommended that any update to the RAP be undertaken by an appropriately experienced environmental consultant.

This report, including its conclusions and recommendations, must be read in conjunction with the limitations presented 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 Alliance Geotechnical Pty Ltd. Should information become available regarding conditions at the site including previously unknown sources of contamination, AG 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 AG's engagement. The report must not be used for any purpose other than the purpose specified at the time AG was engaged to prepare the report.

Logs, figures, and drawings are generated for this report based on individual AG 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, AG reserves the right to review and amend this report.

### 13. REFERENCES

AG 2018a, *'Stage 1 Preliminary Site Investigation, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW'*, dated June 2019, ref: 6179-ER-1-1 REV5;

AG 2018b, *'Stage 2 Detailed Site Investigation, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW'*, dated June 2019, ref: 6179-ER-1-2 REV6;

AG 2019a, *'Supplementary Contamination Assessment, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584), Meadowbank Education and Employment Precinct Schools Project, 2 Rhodes Street, Meadowbank, NSW'*, dated 12 July 2019, ref: 9280-ER-1-1 REV1.

AG 2019a, *'Supplementary Contamination Assessment, Portion of Lot 1 in DP837179 (Lot 10 in DP1232584 See Street, Meadowbank, NSW'*, dated July 2019, ref: 9280-ER-1-1;

National Environment Protection Council (NEPC) 1999a, *'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) 1999b, *'Schedule B (2) Guideline on Site Characterisation, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013'*.

NSW DEC 2006, *'Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition)'*.

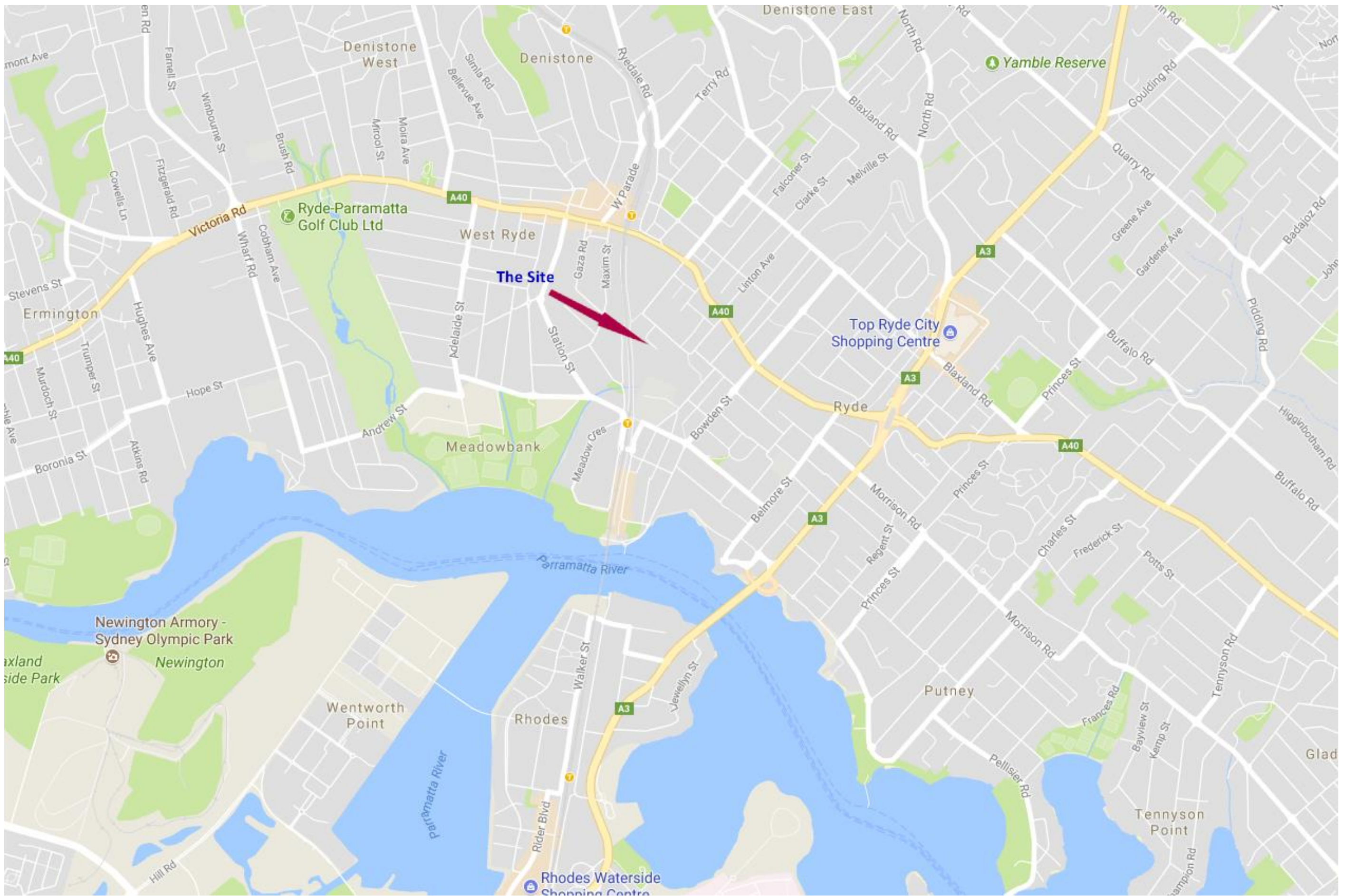
NSW EPA 1995, *'Contaminated Sites: Sampling Design Guidelines'*.

NSW OEH 2011, *'Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites'*.

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

## **SITE FIGURES**










0m 25 50 75 100 125








#### Legend

 Delineated Extent of Asbestos Contamination.

 Unknown Extent of Asbestos Contamination.







**DATA SUMMARY TABLE**

Table 1  
Tafe - See Street, Meadowbank, NSW  
Asbestos Delineation Results & Adopted Site Criteria  
9692-ER-1-1

Table 1 Tafe - See Street, Meadowbank, NSW Asbestos Delineation Results & Adopted Site Criteria 9692-ER-1-1					<table><tr><th>Sample ID</th><th>19-Jn21939</th><th>S19-Se28126</th><th>S19-Se28127</th><th>S19-Se28128</th><th>S19-Se28129</th><th></th><th>SE174488.007</th><th>SE174689.007</th><th>S19-Jn21912</th><th>S19-Jn21913</th><th>S19-Jn21914</th><th>S19-Jn21915</th></tr><tr><th>Reference</th><td>FCS-TP04B</td><td>TP04B-01</td><td>TP04B-02</td><td>TP04B-03</td><td>TP04B-04</td><td></td><td>BH07-0.0-0.2</td><td>BH07-0.3-0.5</td><td>TP07A-0.1-0.4</td><td>TP07B-0.1-0.4</td><td>TP07C-0.1-0.4</td><td>TP07D-0.1-0.4</td></tr><tr><th>Date Sampled</th><td>19/06/2019</td><td>18/09/2019</td><td>18/09/2019</td><td>18/09/2019</td><td>18/09/2019</td><td></td><td>13/1/2018</td><td>13/1/2018</td><td>19/6/2019</td><td>19/6/2019</td><td>19/6/2019</td><td>19/6/2019</td></tr><tr><th>Sample Matrix</th><td>Fragment</td><td>Soil</td><td>Soil</td><td>Soil</td><td>Soil</td><td></td><td>Soil</td><td>Soil</td><td>Soil</td><td>Soil</td><td>Soil</td><td>Soil</td></tr></table>														Sample ID	19-Jn21939	S19-Se28126	S19-Se28127	S19-Se28128	S19-Se28129		SE174488.007	SE174689.007	S19-Jn21912	S19-Jn21913	S19-Jn21914	S19-Jn21915	Reference	FCS-TP04B	TP04B-01	TP04B-02	TP04B-03	TP04B-04		BH07-0.0-0.2	BH07-0.3-0.5	TP07A-0.1-0.4	TP07B-0.1-0.4	TP07C-0.1-0.4	TP07D-0.1-0.4	Date Sampled	19/06/2019	18/09/2019	18/09/2019	18/09/2019	18/09/2019		13/1/2018	13/1/2018	19/6/2019	19/6/2019	19/6/2019	19/6/2019	Sample Matrix	Fragment	Soil	Soil	Soil	Soil		Soil	Soil	Soil	Soil	Soil	Soil
Sample ID	19-Jn21939	S19-Se28126	S19-Se28127	S19-Se28128	S19-Se28129		SE174488.007	SE174689.007	S19-Jn21912	S19-Jn21913	S19-Jn21914	S19-Jn21915																																																										
Reference	FCS-TP04B	TP04B-01	TP04B-02	TP04B-03	TP04B-04		BH07-0.0-0.2	BH07-0.3-0.5	TP07A-0.1-0.4	TP07B-0.1-0.4	TP07C-0.1-0.4	TP07D-0.1-0.4																																																										
Date Sampled	19/06/2019	18/09/2019	18/09/2019	18/09/2019	18/09/2019		13/1/2018	13/1/2018	19/6/2019	19/6/2019	19/6/2019	19/6/2019																																																										
Sample Matrix	Fragment	Soil	Soil	Soil	Soil		Soil	Soil	Soil	Soil	Soil	Soil																																																										
Group	Analyte	Units	PQL	Asbestos Health Screening Level (w/w) - NEPC 2013																																																																		
				Residential A	Data Set Minimum	Data Set Maximum																																																																
Asbestos	Asbestos Detected Insoil	No Unit	Detection	Detected	0	0	N.A.	Not Detected	Not Detected	Not Detected	Not Detected		Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected																																																				
	Estimated Fibres	% w/w	0.001	0.001	0	0	N.A.	<0.01	<0.01	<0.01	<0.01		<0.01	N.A.	<0.001	<0.001	<0.001	<0.001																																																				
	Non-friable ACM	No Unit	Type	Detected			Chrysotile and Amosite Asbestos Detected	N.A.	N.A.	N.A.	N.A.		N.A.	N.A.	Chrysotile Asbestos Detected	N.A.	N.A.	N.A.																																																				

Highlighted concentration exceeds the adopted site criteria - Asbestos Health Screening Level (w/w) - NEPC 2013

-

No published criteria or sample not analysed

N.A.

Not Applicable or Not Analysed

Table 1  
Tafe - See Street, Meadowbank, NSW  
Asbestos Delineation Results & Adopted Site Criteria  
9692-ER-1-1

					Sample ID	S19-Se28133	S19-Se28134		SE174488.038	SE174689.037	SE174689.038	SE174488.039	S19-Jn20044	S19-Jn20045	S19-Jn20046	S19-Jn20047	S19-Jn20048	
					Reference	TP07E-0.1-0.4	TP07F-0.1-0.4		BH30-0.0-0.2	BH30-0.5-0.6	BH30-0.9-1.0	BH30-1.4-1.5	TP30A_1.7-1.9	TP30B_0.0-0.2	TP30B_0.9-1.1	TP30C_0.9-1.1	TP30C_1.7-1.9	
					Date Sampled	18/09/2019	18/09/2019		13/1/2018	13/1/2018	13/1/2018	13/1/2018	18/6/2019	18/6/2019	18/6/2019	18/6/2019	18/6/2019	
					Sample Matrix	Soil	Soil		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
Group	Analyte	Units	PQL	Asbestos Health Screening Level (w/w) - NEPC 2013														
				Residential A	Data Set Minimum													
Asbestos	Asbestos Detected Insoil	No Unit	Detection	Detected	0	Not Detected	Not Detected		Detected	Not Detected	Not Detected	N.A.	Detected	Not Detected	Not Detected	Not Detected	Not Detected	
	Estimated Fibres	% w/w	0.001	0.001	0	<0.001	<0.001		<0.01	N.A.	N.A.	N.A.	<0.001	<0.001	<0.001	<0.001	<0.001	
	Non-friable ACM	No Unit	Type	Detected		N.A.	N.A.		N.A.	N.A.	N.A.	N.A.	N.A.	Chrysotile Asbestos Detected	Chrysotile Asbestos Detected	Chrysotile Asbestos Detected	Chrysotile Asbestos Detected	

Highlighted concentration exceeds the adopted site criteria - Asbestos Health Screening Level (w/w) - NEPC 2013

-

No published criteria or sample not analysed

N.A.

Not Applicable or Not Analysed

Table 1  
Tafe - See Street, Meadowbank, NSW  
Asbestos Delineation Results & Adopted Site Criteria  
9692-ER-1-1

					Sample ID	SE174488.053	SE174689.049	SE174488.054	S19-Jn24200	S19-Jn24201	S19-Jn24202	S19-Jn24203	S19-Jn20049	S19-Jn20050	S19-Jn20051	S19-Jn20052		SE174488.055
					Reference	BH40-0.05-0.2	BH40-0.5-0.6	BH40-0.9-1.0	BH40A-0.1-0.3	BH40A-0.8-1.0	BH40B-0.1-0.3	BH40B-0.8-1.0	BH40C_0.1-0.3	BH40C_1.7-1.9	BH40D_0.0-0.2	BH40D_0.9-1.1		BH41-0.05-0.2
					Date Sampled	13/1/2018	13/1/2018	13/1/2018	20/6/2019	20/6/2019	20/6/2019	20/6/2019	18/6/2019	18/6/2019	18/6/2019	18/6/2019		13/1/2018
					Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		Soil
Group	Analyte	Units	PQL	Asbestos Health Screening Level (w/w) - NEPC 2013														
				Residential A	Data Set Minimum													
Asbestos	Asbestos Detected Insoil	No Unit	Detection	Detected	0	Detected	Not Detected	N.A.	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Detected		Detected
	Estimated Fibres	% w/w	0.001	0.001	0	<0.01	N.A.	N.A.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		>0.01
	Non-friable ACM	No Unit	Type	Detected		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.		N.A.

Highlighted concentration exceeds the adopted site criteria - Asbestos Health Screening Level (w/w) - NEPC 2013

-

No published criteria or sample not analysed

N.A.

Not Applicable or Not Analysed

Table 1  
Tafe - See Street, Meadowbank, NSW  
Asbestos Delineation Results & Adopted Site Criteria  
9692-ER-1-1

					Sample ID	SE174689.050	SE174689.051	S19-Jn24204	S19-Jn24205	S19-Jn24206	S19-Jn24207	S19-Jn24208	S19-Jn24209	S19-Jn24210	S19-Jn24211	S19-Jn24212	S19-Jn24213	S19-Jn24214
					Reference	BH41-0.5-0.6	BH41-0.9-1.0	BH41A-0.1-0.3	BH41A-0.9-1.1	BH41B-0.0-0.2	BH41B-0.8-1.0	BH41C-0.1-0.3	BH41C-0.9-1.1	BH41D-0.0-0.2	BH41D-0.9-1.1	BH40A-1.2-1.4	BH40B-1.4-1.6	BH41A-1.8-2.0
					Date Sampled	13/1/2018	13/1/2018	20/6/2019	20/6/2019	20/6/2019	20/6/2019	20/6/2019	20/6/2019	20/6/2019	20/6/2019	20/6/2019	20/6/2019	20/6/2019
					Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Group	Analyte	Units	PQL	Asbestos Health Screening Level (w/w) - NEPC 2013														
				Residential A	Data Set Minimum													
Asbestos	Asbestos Detected Insoil	No Unit	Detection	Detected	0	Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
	Estimated Fibres	% w/w	0.001	0.001	0	N.A.	N.A.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Non-friable ACM	No Unit	Type	Detected		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Highlighted concentration exceeds the adopted site criteria - Asbestos Health Screening Level (w/w) - NEPC 2013

-

No published criteria or sample not analysed

N.A.

Not Applicable or Not Analysed

Table 1  
Tafe - See Street, Meadowbank, NSW  
Asbestos Delineation Results & Adopted Site Criteria  
9692-ER-1-1

					Sample ID	S19-Jn24215	S19-Jn24216	S19-Jn24217		SE174689.053	S19-Jn21900	S19-Jn21901	S19-Jn21902	S19-Jn21903	S19-Se28130	S19-Se28131	S19-Se28132	
					Reference	BH41B-1.4-1.6	BH41C-1.8-2.0	BH41D-1.8-2.0		SS02	SS02A-0.0-0.3	SS02B-0.0-0.3	SS02C-0.0-0.3	SS02D-0.0-0.3	SS02-E	SS02-F	SS02-G	
					Date Sampled	20/6/2019	20/6/2019	20/6/2019		14/1/2018	19/6/2019	19/6/2019	19/6/2019	19/6/2019	18/9/2019	18/9/2019	18/9/2019	
					Sample Matrix	Soil	Soil	Soil		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
Group	Analyte	Units	PQL	Asbestos Health Screening Level (w/w) - NEPC 2013														
				Residential A	Data Set Minimum													
Asbestos	Asbestos Detected Insoil	No Unit	Detection	Detected	0	Not Detected	Not Detected	Not Detected		Not Detected	Not Detected	Not Detected	Not Detected	Detected	Not Detected	Not Detected	Not Detected	
	Estimated Fibres	% w/w	0.001	0.001	0	<0.001	<0.001	<0.001		N.A.	<0.001	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	
	Non-friable ACM	No Unit	Type	Detected		N.A.	N.A.	N.A.		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	

Highlighted concentration exceeds the adopted site criteria - Asbestos Health Screening Level (w/w) - NEPC 2013

-

No published criteria or sample not analysed

N.A.

Not Applicable or Not Analysed



Table 1  
Tafe - See Street, Meadowbank, NSW  
Asbestos Delineation Results & Adopted Site Criteria  
9692-ER-1-1

					Sample ID	SE174689.054	S19-Jn20075	S19-Jn20076	S19-Jn20077		TP57_0.0-0.2	TP57-A	TP57-B	TP57-C	TP57-D	TP57-E	TP57-F
					Reference	SS03	SS03A_0.5-0.7	SS03B_0.8-1.0	SS03C_0.0-0.2		S19-Jn20064	S19-Se28135	S19-Se28136	S19-Se28137	S19-Se28138	S19-Se28139	S19-Se28148
					Date Sampled	14/1/2018	18/6/2019	18/6/2019	18/6/2019		18/6/2019	18/9/2019	18/9/2019	18/9/2019	18/9/2019	18/9/2019	18/9/2019
					Sample Matrix	Soil	Soil	Soil	Soil		Soil	Soil	Soil	Soil	Soil	Soil	Soil
Group	Analyte	Units	PQL	Asbestos Health Screening Level (w/w) - NEPC 2013													
				Residential A	Data Set Minimum												
Asbestos	Asbestos Detected Insoil	No Unit	Detection	Detected	0	Not Detected	Not Detected	Not Detected	Not Detected		Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
	Estimated Fibres	% w/w	0.001	0.001	0	N.A.	<0.001	<0.001	<0.001		Chrysotile Asbestos Detected	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Non-friable ACM	No Unit	Type	Detected		N.A.	N.A.	N.A.	N.A.		0.0013	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Highlighted concentration exceeds the adopted site criteria - Asbestos Health Screening Level (w/w) - NEPC 2013

-

No published criteria or sample not analysed

N.A.

Not Applicable or Not Analysed

Table 1  
Tafe - See Street, Meadowbank, NSW  
Asbestos Delineation Results & Adopted Site Criteria  
9692-ER-1-1

Sample ID  
Reference  
Date Sampled  
Sample Matrix

Group	Analyte	Units	PQL	Asbestos Health Screening Level (w/w) - NEPC 2013	
				Residential A	Data Set Minimum
Asbestos	Asbestos Detected Insoil	No Unit	Detection	Detected	0
	Estimated Fibres	% w/w	0.001	0.001	0
	Non-friable ACM	No Unit	Type	Detected	

Highlighted concentration exceeds the adopted site criteria - Asbestos Health Screening Level (w/w) - NEPC 2013

-

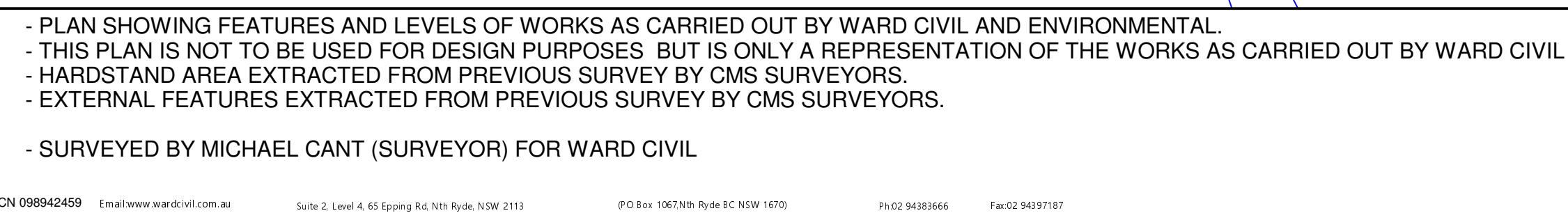
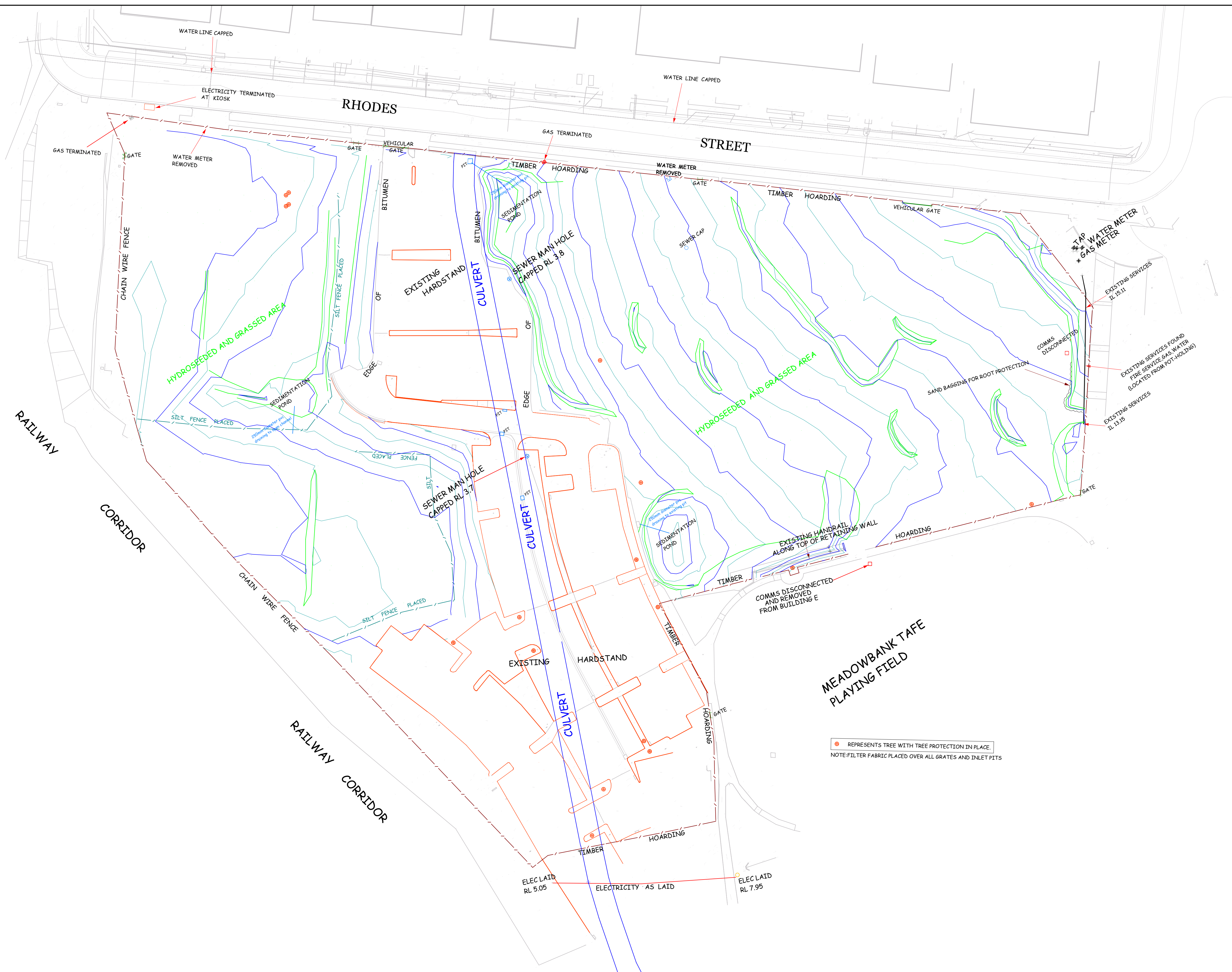
No published criteria or sample not analysed

N.A.

Not Applicable or Not Analysed

## **APPENDIX A**

### **SITE SURVEY**



Project <b>MEADOWBANK EDUCATIONAL PRECINCT</b>			Drawing Title <b>WORK AS EXECUTED FEATURES, LEVELS AND CONTOURS</b>		
Datum <b>AHD</b>	Date <b>19/8/19</b>	Scale <b>1:500</b> @A1	Dwg No. <b>695004</b>	Rev <b>C</b>	

## **APPENDIX B**

### **NATA ACCREDITED LABORATORY DOCUMENTATION**



## CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ Sydney Laboratory

Unit F3 Bld.F 16 Mars Road Lane Cove West NSW 2066  
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory

Unit 1 21 Smallwood Place Murarrie QLD 4172  
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory

Unit 2 91 Leach Highway Kewdale WA 6105  
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory

6 Monterey Road Dandenong South VIC 3175  
03 8564 5000 [EnviroSampleVic@eurofins.com](mailto:EnviroSampleVic@eurofins.com)

Company		Alliance Geo		Project No		9692		Project Manager		Aden Rooney		Sampler(s)		Sam Scully							
Address		10 welder Rd		Project Name		MEADOWBANK		EDD Format				Handed over by									
Contact Name		Sam Scully		Analyses Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.		Asbestos I.D		Asbestos Ascoric						Email for Invoice							
Phone No		Email for Results																			
Special Directions		Containers Change container type & size if necessary.												Required Turnaround Time (TAT) Default will be 5 days if not ticked.							
		<div><div>500mL Plastic</div><div>250mL Plastic</div><div>125mL Plastic</div><div>200mL Amber Glass</div><div>40mL VOA vial</div><div>500mL PFAS Bottle</div><div>Jar (Glass or HDPE)</div><div>Other (Asbestos AS4984, WA Guidelines)</div></div> <div><input checked="" type="checkbox"/> Overnight (reporting by 9am) ♦ <input type="checkbox"/> Same day ♦    <input type="checkbox"/> 1 day ♦ <input type="checkbox"/> 2 days ♦    <input type="checkbox"/> 3 days ♦ <input type="checkbox"/> 5 days (Standard) <input type="checkbox"/> Other(</div>																			
Purchase Order														Sample Comments / Dangerous Goods Hazard Warning							
Quote ID No																					
No	Client Sample ID	Sampled Date/Time dd/mm/yyyy hh:mm	Matrix Solid (S) Water (W)																		
1	FCS-01	18-9-19	Frag	X																	
2	FCS-02		Frag	X																	
3	TP04B-01		Soil		X																
4	TP04B-02				X																
5	TP04B-03				X																
6	TP04B-04				X																
7	SS02-E				X																
8	SS02-F				X																
9	SS02-G				X																
10	TP07E-01-04				X																
Total Counts																					
Method of Shipment		<input type="checkbox"/> Courier (# ) <input checked="" type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal		Name		Sam Scully		Signature				Date		18-9-19							
Laboratory Use Only		Received By		Grace Threlwell		(SYD   BNE   MEL   PER   ADL   NTL   DRW)		Signature				Date		18/9							
		Received By				(SYD   BNE   MEL   PER   ADL   NTL   DRW)		Signature				Date		10:58							
												Temperature									
												Report No		677689							



## CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ Sydney Laboratory

Unit F3 Bld.F 16 Mars Road Lane Cove West NSW 2066  
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory

Unit 1 21 Smallwood Place Murarrie QLD 4172  
07 3902 4600 [EnviroSampleQLD@eurofins.com](mailto:EnviroSampleQLD@eurofins.com)

☐ Perth Laboratory

Unit 2 91 Leach Highway Kewdale WA 6105  
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory

6 Monterey Road Dandenong South VIC 3175  
03 8564 5000 [EnviroSampleVic@eurofins.com](mailto:EnviroSampleVic@eurofins.com)

[illegible]

**Company Name:** Alliance Geotechnical  
**Address:** 10 Welder Road  
Seven Hills  
NSW 2147  
**Project Name:** MEADOWBANK  
**Project ID:** 9692

**Order No.:**  
**Report #:** 677689  
**Phone:** 1800 288 188  
**Fax:** 02 9675 1888

**Received:** Sep 18, 2019 10:58 AM  
**Due:** Sep 19, 2019  
**Priority:** Overnight  
**Contact Name:** Aidan Rooney

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Asbestos - WA guidelines	Asbestos Absence / Presence
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	FCS-01	Sep 18, 2019		Building Materials	S19-Se28124		X
2	FCS-02	Sep 18, 2019		Building Materials	S19-Se28125		X
3	TP04B-01	Sep 18, 2019		Soil	S19-Se28126	X	
4	TP04B-02	Sep 18, 2019		Soil	S19-Se28127	X	
5	TP04B-03	Sep 18, 2019		Soil	S19-Se28128	X	
6	TP04B-04	Sep 18, 2019		Soil	S19-Se28129	X	
7	SS02-E	Sep 18, 2019		Soil	S19-Se28130	X	
8	SS02-F	Sep 18, 2019		Soil	S19-Se28131	X	



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Sample Detail						Asbestos - WA guidelines	Asbestos Absence / Presence
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
9	SS02-G	Sep 18, 2019		Soil	S19-Se28132	X	
10	TP07E-0.1-0.4	Sep 18, 2019		Soil	S19-Se28133	X	
11	TP07F-0.1-0.4	Sep 18, 2019		Soil	S19-Se28134	X	
12	TP57-A	Sep 18, 2019		Soil	S19-Se28135	X	
13	TP57-B	Sep 18, 2019		Soil	S19-Se28136	X	
14	TP57-C	Sep 18, 2019		Soil	S19-Se28137	X	
15	TP57-D	Sep 18, 2019		Soil	S19-Se28138	X	
16	TP57-E	Sep 18, 2019		Soil	S19-Se28139	X	
17	TP57-F	Sep 18, 2019		Soil	S19-Se28148	X	
Test Counts						15	2

**Alliance Geotechnical**  
**10 Welder Road**  
**Seven Hills**  
**NSW 2147**



**NATA Accredited**  
**Accreditation Number 1261**  
**Site Number 18217**

Accredited for compliance with ISO/IEC 17025-Testing  
 The results of the tests, calibrations and/or  
 measurements included in this document are traceable  
 to Australian/national standards.

**Attention:** Aidan Rooney  
**Report** 677689-AID  
**Project Name** MEADOWBANK  
**Project ID** 9692  
**Received Date** Sep 18, 2019  
**Date Reported** Sep 19, 2019

### Methodology:

Asbestos Fibre  
 Identification

Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.

*NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*

Unknown Mineral  
 Fibres

Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.

*NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*

Subsampling Soil  
 Samples

The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.

*NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*

Bonded asbestos-  
 containing material  
 (ACM)

The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.

*NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*

Limit of Reporting

The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w).

The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk).

*NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

**Project Name** MEADOWBANK  
**Project ID** 9692  
**Date Sampled** Sep 18, 2019  
**Report** 677689-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
FCS-01	19-Se28124	Sep 18, 2019	Approximate Sample 64g / 100x40x10mm Sample consisted of: Gray fibrous cement material fragments	Chrysotile and amosite asbestos detected.
FCS-02	19-Se28125	Sep 18, 2019	Approximate Sample 33g / 80x30x10mm Sample consisted of: Gray fibrous cement material fragment	Chrysotile and amosite asbestos detected.
TP04B-01	19-Se28126	Sep 18, 2019	Approximate Sample 500g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP04B-02	19-Se28127	Sep 18, 2019	Approximate Sample 505g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP04B-03	19-Se28128	Sep 18, 2019	Approximate Sample 544g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP04B-04	19-Se28129	Sep 18, 2019	Approximate Sample 582g Sample consisted of: Light-brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SS02-E	19-Se28130	Sep 18, 2019	Approximate Sample 726g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
SS02-F	19-Se28131	Sep 18, 2019	Approximate Sample 658g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
SS02-G	19-Se28132	Sep 18, 2019	Approximate Sample 676g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP07E-0.1-0.4	19-Se28133	Sep 18, 2019	Approximate Sample 407g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP07F-0.1-0.4	19-Se28134	Sep 18, 2019	Approximate Sample 576g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP57-A	19-Se28135	Sep 18, 2019	Approximate Sample 537g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP57-B	19-Se28136	Sep 18, 2019	Approximate Sample 509g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP57-C	19-Se28137	Sep 18, 2019	Approximate Sample 719g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP57-D	19-Se28138	Sep 18, 2019	Approximate Sample 640g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP57-E	19-Se28139	Sep 18, 2019	Approximate Sample 652g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP57-F	19-Se28148	Sep 18, 2019	Approximate Sample 656g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.

**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Sep 18, 2019	Indefinite
Asbestos - LTM-ASB-8020	Sydney	Sep 18, 2019	Indefinite

**Company Name:** Alliance Geotechnical  
**Address:** 10 Welder Road  
 Seven Hills  
 NSW 2147  
**Project Name:** MEADOWBANK  
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**Order No.:**  
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**Phone:** 1800 288 188  
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**Received:** Sep 18, 2019 10:58 AM  
**Due:** Sep 19, 2019  
**Priority:** Overnight  
**Contact Name:** Aidan Rooney

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Asbestos - WA guidelines	Asbestos Absence / Presence
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	FCS-01	Sep 18, 2019		Building Materials	S19-Se28124		X
2	FCS-02	Sep 18, 2019		Building Materials	S19-Se28125		X
3	TP04B-01	Sep 18, 2019		Soil	S19-Se28126	X	
4	TP04B-02	Sep 18, 2019		Soil	S19-Se28127	X	
5	TP04B-03	Sep 18, 2019		Soil	S19-Se28128	X	
6	TP04B-04	Sep 18, 2019		Soil	S19-Se28129	X	
7	SS02-E	Sep 18, 2019		Soil	S19-Se28130	X	
8	SS02-F	Sep 18, 2019		Soil	S19-Se28131	X	

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Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
9	SS02-G	Sep 18, 2019		Soil	S19-Se28132	X	
10	TP07E-0.1-0.4	Sep 18, 2019		Soil	S19-Se28133	X	
11	TP07F-0.1-0.4	Sep 18, 2019		Soil	S19-Se28134	X	
12	TP57-A	Sep 18, 2019		Soil	S19-Se28135	X	
13	TP57-B	Sep 18, 2019		Soil	S19-Se28136	X	
14	TP57-C	Sep 18, 2019		Soil	S19-Se28137	X	
15	TP57-D	Sep 18, 2019		Soil	S19-Se28138	X	
16	TP57-E	Sep 18, 2019		Soil	S19-Se28139	X	
17	TP57-F	Sep 18, 2019		Soil	S19-Se28148	X	
Test Counts						15	2

## Internal Quality Control Review and Glossary

### General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
5. This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

### Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

### Terms

<b>Dry</b>	Sample is dried by heating prior to analysis
<b>LOR</b>	Limit of Reporting
<b>COC</b>	Chain of Custody
<b>SRA</b>	Sample Receipt Advice
<b>ISO</b>	International Standards Organisation
<b>AS</b>	Australian Standards
<b>WA DOH</b>	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
<b>NEPM</b>	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
<b>ACM</b>	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
<b>AF</b>	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to "non-bonded / friable".
<b>FA</b>	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
<b>Friable</b>	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
<b>Trace Analysis</b>	Analytical procedure used to detect the presence of respirable fibres in the matrix.



## Comments

S19-Se218133: Sample received was less than the nominal 500mL as recommended in Section 4.10 of the NEPM Schedule B1 - Guideline on Investigation Levels for Soil and Groundwater.

## Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

## Qualifier Codes/Comments

Code	Description
N/A	Not applicable

## Asbestos Counter/Identifier:

Chamath JHM Annakkage Senior Analyst-Asbestos (NSW)

## Authorised by:

Sayeed Abu Senior Analyst-Asbestos (NSW)



**Glenn Jackson**  
**General Manager**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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