REPORT TO

MERIDEN SCHOOL

ON

REMEDIATION ACTION PLAN (RAP)

FOR

PROPOSED ADMINISTRATION AND STUDENT CENTRE OF MERIDEN SCHOOL

AT

16 MARGARET STREET, STRATHFIELD, NSW 2135

Date: 25 June 2019

Ref: E30910KGrpt-RAP

JKEnvironments

www.jkenvironments.com.au

EIS

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Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millivolts	**mV**
Millilitres	**ml or mL**
Milliequivalents	**meq**
micro Siemens per Centimetre	**µS/cm**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**

1 INTRODUCTION

Allen Jack + Cottier, acting on behalf of Meriden School ('the client') commissioned Environmental Investigation Services (EIS)[1] to prepare a Remediation Action Plan (RAP) for the proposed Administration and Student Centre of Meriden School at 16 Margaret Street, Strathfield NSW.

For the purpose of this report, the area applicable to the RAP has been referred to as 'the site', whilst the whole property at 16 Margaret Street, Strathfield has been referred to as 'the property'. The site location is shown on Figure 1 and the area applicable to this RAP was confined to the approximate site boundaries as shown on Figure 2 and approximate remediation boundaries as shown on Figure 3.

EIS have previously undertaken a *Soil Contamination Screening* (Screening 2019) at the site in 2019 (EIS Ref: E30910KGrpt2)[2]. In 2017 EIS have undertaken a preliminary Environmental Site Assessment (ESA 2017) at the wider property and a report (Ref: E30910KGrpt[3]) was issued on 3 November 2017. EIS understand that the site (which forms a part of the property) covers an area of approximately 500m^2. The findings of the screening and ESA reports are summarised in Section 2.

EIS are currently in a transitional phase of re-branding and will commence trading as JK Environments in 2019. JK Environments, like EIS, will function as the environmental division of Jeffery and Katauskas Pty Ltd and will continue to operate alongside JK Geotechnics.

1.1 Proposed Development Details

From the information provided by the client, EIS understand that the proposed development includes demolition of the existing building, removal of some of the trees within the site and construction of a new two storey building, designed for administration and student centre, with no basement.

1.2 Goals, Aims and Objectives

The aim of remediation is to address the risks posed by the contamination encountered at the site and to make the site suitable for the proposed development. The goal of this RAP is to provide technical recommendations for remediation works, validation works and unexpected finds protocols during the development works.

The objectives of the RAP are to:

- Provide a methodology to manage contamination, remediate and validate the site;
- Provide a contingency plan for the remediation works;
- Outline site management procedures to be implemented during remediation work; and
- Provide an unexpected finds protocol to be implemented during the development works.

[1] Environmental consulting division of Jeffery & Katauskas Pty Ltd (J&K)

[2] Titled *"Report to Meriden School on Soil Contamination Screening for Proposed Administration and Student Centre of Meriden School at 16 Margaret Street, Strathfield NSW 2135*", dated 30 May 2019, referred to as Screening Report.

[3] Preliminary Environmental Site Assessment Report, November 2017.

1.3 Scope of Work

The RAP was prepared in accordance with an EIS proposal (Ref: EP49475BG2-RAP) of 6 June 2019 and written acceptance from the client of 7 June 2019. The scope of work included:

- Review of relevant previous reports prepared by EIS; and
- Preparation of a RAP report.

The scope of work was undertaken with reference to the regulations and guidelines outlined in the table below. Individual guidelines are also referenced within the text of the report.

Table 1-1: Guidelines

Guidelines/Regulations/Documents
Contaminated Land Management Act (1997)[4]
State Environmental Planning Policy No.55 – Remediation of Land (1998)[5]
Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)[6]
Guidelines for Consultants Reporting on Contaminated Sites (2011)[7]
Guidelines for the NSW Site Auditor Scheme, 3rd Edition (2017)[8]
National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)[9]

[4] Contaminated Land Management Act 1997 (NSW). (referred to as CLM Act 1997)

[5] State Environmental Planning Policy No. 55 – Remediation of Land 1998 (NSW). (referred to as SEPP55)

[6] Department of Urban Affairs and Planning, and Environment Protection Authority, (1998). *Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land*. (SEPP55 Planning Guidelines)

[7] NSW Office of Environment and Heritage (OEH), (2011). *Guidelines for Consultants Reporting on Contaminated Sites.* (referred to as Reporting Guidelines 2011)

[8] NSW EPA, (2017). *Guidelines for the NSW Site Auditor Scheme, 3rd ed.* (referred to as Site Auditor Guidelines 2017)

[9] National Environment Protection Council, (2013). *National Environmental Protection (Assessment of Site Contamination) Amendment Measure 1999* (as amended 2013). (referred to as NEPM 2013)

2 SITE INFORMATION

2.1 Site Identification

Table 2-1: Site Identification

Site Address:	16 Margaret Street, Strathfield, NSW 2135
Lot & Deposited Plan:	Part of the Lot 1 in DP723946
Current Land Use:	School (landscaped area)
Proposed Land Use:	School (Administration and Student Centre)
Local Government Authority (LGA):	Strathfield council
Site Area (m^2):	Approximately 500m^2
RL (AHD in m) (approx.):	23
Geographical Location (decimal degrees) (approx.):	Latitude: -33. 784843 Longitude: 151. 091377
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2 (Sample Location Plan 2019)
Remediation Plan:	Figure 3

2.2 Site Location and Regional Setting

The site is located in a predominantly residential area of Strathfield. The site is located approximately 385m to the south of a stormwater channel that runs into Powells Creek and eventually into Homebush Bay.

2.3 Topography

The site is situated within gently undulating topography on a hillside that gently slopes down to the north-east at approximately 3° to 4°. The site has a northern frontage on Margaret Street.

2.4 EIS Site Inspection (2019)

At the time of the soil sampling on 16 May 2019 the site was occupied by a single storey brick/fibro building with tile roof at the southern section of the site. The building was used as an office (the business services centre for the school). A concrete paved access path to the building was located along the eastern boundary of the site. The eastern section of the site was generally grass covered with a few large trees along the eastern boundary. The western section of the site was undergoing some new landscaping activities. Apart from the eastern boundary the other boundaries of the site were not defined or fenced.

2.4.1 Boundary Conditions, Soil Stability and Erosion

Obvious soil erosion was not observed at the approximate site boundaries.

2.4.2 Visible or Olfactory Indicators of Contamination

Visible signs or olfactory indicators of contamination were not observed within the site.

2.4.3 Presence of Drums/Chemicals, Waste and Fill Material

Drums, chemicals, waste material or fill material were not observed within the site.

2.4.4 Drainage and Services

Surface water from the site is likely to flow into a low lying area at the north of the site and eventually flow into Cataract River.

2.4.5 Sensitive Environments

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds.

2.4.6 Landscaped Areas and Visible Signs of Plant Stress

The majority of the site was grassed. Large trees were located along the eastern section of the site. Obvious tree dieback or areas of stressed vegetation were not observed within the site.

2.5 Surrounding Land Use

During the site inspection, EIS observed the following land uses in the immediate surrounds:

- North – Margaret Street and Meriden Senior School beyond the street;
- South – Meriden Prep School and associated building;
- East – Residential properties; and
- West – Driveway and landscaped areas of the Meriden Prep School (under construction) and residential properties beyond that.

EIS did not observe any land uses in the immediate surrounds that were identified as potential contamination sources for the site.

2.6 Previous Investigations (ESA 2017 and Screening 2019)

2.6.1 ESA 2017

The ESA 2017 report was prepared for the wider property that covers an area of approximately 3,610m^2. The report identified elevated lead concentrations in samples obtained from fill-soil at the western section of the property (outside of the current investigation area/site). The report recommended additional works to be undertaken in order to make the property suitable for the proposed development. EIS are of the opinion that another environmental consultant has followed up the recommendations in the ESA 2017. EIS were not involved in this project after the preparation of the ESA 2017 report, until the recent screening in 2019.

2.6.2 Screening 2019

EIS have undertaken a *Soil Contamination Screening* (Screening 2019) at the site in 2019. The Screening 2019 report identified elevations of carcinogenic PAHs (Benzo(a)pyrene TEQ) above the human-health risk based site assessment criteria (SAC) in the fill material. Elevated concentrations of TRH (C_{10}-C_{16} and C_{16}-C_{34}) and zinc were encountered above the ecological based SAC. The elevations are shown on the attached figures.

Based on the Tier 1 risk assessment, the elevated concentrations of carcinogenic PAHs above the human-health based SAC were considered to pose a risk to the site users. Potential ecological related risks exist in relation to TRH and zinc within the fill soil.

Based on the findings of the assessment, EIS were of the opinion that the site can be made suitable for the proposed development, however a RAP will be required to outline the remediation necessary to make the site suitable for the proposed development. The RAP should outline the methodology for remediation of the contaminated fill soil and validation of the excavation on the completion of remedial works.

Due to the access restrictions for a drill-rig, the groundwater investigation had been excluded from the scope of work. This will be required during remediation works and has been identified as a data gap in this RAP.

2.7 Summary of Geology and Hydrogeology

2.7.1 Regional Geology

Regional geological information presented in the Lotsearch report (attached in the appendices) indicated that the site is underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite.

2.7.2 Subsurface Conditions

Boreholes drilled at the site for the ESA 2017 and Screening 2019 reports generally encountered fill-soil at the surface in the boreholes to a maximum depth of 0.7m Below Ground Level (BGL), underlain by natural silty clay to depths of between 0.2mBGL and 1.8mBGL. Shale bedrock was encountered in two deeper boreholes to the termination of these boreholes at depths ranging from 4.5mBGL to 6.0mBGL.

2.7.3 Acid Sulfate Soil Risk

Acid sulfate soil (ASS) information presented in the ESA 2017 report indicated that the site is located within a Class 5 area. Works in Class 5 areas that could pose an environmental risk in terms of ASS include works within 500m of adjacent Class 1,2,3,4 land which are likely to lower the water table below 1m AHD on the adjacent land. A review of the ASS risk map prepared by Department of Land and Water Conservation (1997[10]) indicated that the site is located in an area classed as having a 'low risk' of ASS occurrence therefore the risk of ASS at this site is considered negligible.

2.7.4 Hydrogeology

Hydrogeological information presented in the ESA 2017 report indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. The information reviewed for ESA 2017 indicated that the subsurface conditions at the property are expected to consist of alluvial soils overlying relatively deep bedrock. Abstraction and use of groundwater at the site or in the immediate surrounds may be viable under these conditions. Use of groundwater is not proposed as part of the development.

2.7.5 Receiving Water Bodies

The property location and regional topography indicates that excess surface water flows have the potential to enter the stormwater channel that runs into Powells Creek and eventually into Homebush Bay. This water body could be a potential receptor. Homebush Bay is generally not considered to be a pristine waterbody as a result of a number of former industries that were located around bay.

2.8 Summary of Site History

A summary of the historical land uses and activities from the ESA 2017 report is presented in the table below.

Table 2-2: Summary of Historical Land Uses

Year(s)	Potential Land Use / Activities	Supporting Evidence
1810	Part of original larger land grant	Heritage Report
1894 to 1944	landscaped garden	Heritage Report
1944 to present	School (landscaped garden)	Heritage Report, Aerial Photographs

[10] Department of Land and Water Conservation, (1997). *1:25,000 Acid Sulfate Soil Risk Map (Series 9130N3, Ed 2).*

3 SUMMARY OF CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. A summary of the CSM is presented in the following sub-sections and is based on the site information and the review of site history information undertaken for ESA 2017 and Screening 2019. Reference should also be made to the figures attached in the appendices.

3.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC identified in the previous investigation are presented in the following table:

Table 3-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – The site appears to have been historically filled to achieve the existing levels. The fill may have been imported from various sources and could be contaminated.	The 2019 screening encountered elevated concentrations of Carcinogenic PAHs, TRH and Zinc as discussed in Section 2.6. The source of these contaminants was identified as historical importation of contaminated fill material onto the site.
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site.	Other than zinc, the previous EIS investigations did not detect any of these CoPC in the site area.
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities. These materials may also be present in the existing buildings/ structures on site.	Asbestos, lead and PCBs may still be present in the site buildings.

3.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 3-2: CSM

Potential mechanism for contamination	Potential mechanisms for contamination include: • Fill material – importation of impacted material, 'top-down' impacts (e.g. placement of fill, leaching from surficial material etc.), or sub-surface release (e.g. impacts from buried material); and • Hazardous building materials – 'top-down' (e.g. demolition resulting in surficial impacts in unpaved areas).
Affected media	Soil has been identified as the primary affected media. Groundwater may be impacted by the CoPC and should be assessed.
Receptor identification	Human receptors include site occupants/users, construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users, and recreational water users within Homebush Bay.

	Ecological receptors include freshwater ecology in Homebush Bay.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and use of unpaved areas (i.e. the gardens). Potential exposure pathways for ecological receptors include primary contact and ingestion.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas.

3.3 Assessment of Data Gaps

The previous investigations identified the following data gaps which should be addressed as part of the remediation works:

- Assessment of groundwater contamination conditions was excluded; and
- The presence or otherwise of hazardous building materials in the existing building has not been assessed.

4 REMEDIATION EXTENT

A discussion of the anticipated extent of remediation based on the current data is provided below. Reference should also be made to the attached Figure 3.

4.1 Fill Material

The EIS 2019 investigation identified that the CoPC was confined to the fill material in the vicinity of BH201, BH202, BH203 and SS1 as shown on the attached Figure 3. The fill in the vicinity of boreholes BH1 and BH2 appeared not to be impacted. EIS has calculated the remediation extent by taking half the distance between the boreholes which were impacted and the ones which were not impacted by the CoPC. The remediation extent covers the majority of the site and extends to a depth of approximately 0.6m to 0.7mBGL as shown on the attached Figure 3.

EIS note that it may be prudent to undertake validation sampling along the walls and base of the remediation excavation in an attempt to better define the extent of the contamination especially beneath the existing buildings.

5 REMEDIATION OPTIONS

5.1 Soil Remediation

The NSW EPA follows the hierarchy set out in NEPM 2013. The preferred order for soil remediation and management is as follows:

1) On-site treatment of soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
2) Off-site treatment of excavated material so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site; or

if the above are not practicable:

3) Consolidation and isolation of the soil on-site by containment with a properly designed barrier;
4) Removal of contaminated material to an approved site or facility, followed where necessary by replacement with clean material; or
5) Where the assessment indicates that remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

The above hierarchy items (1 to 5 inclusive) have been referred to as Option 1, Option 2 etc. herein.

5.2 Consideration of Remediation Options

The tables below discusses a range of remediation options:

Table 5-1: Consideration of Remediation Options

Option	Discussion	Applicability
Option 1 On-site treatment of contaminated soil	Various on-site treatment technologies exist such as bio-remediation, air sparging and soil vapour extraction, and thermal desorption. With regards to any bonded asbestos containing material (ACM), the only relevant on-site treatment option would include the physical removal of bonded ACM via picking. This would include a systematic process whereby the impacted surface is inspected and ACM fragments are physically removed by hand.	Not applicable for this project considering the limited volumes of material to be remediated, the limitations associated with treatment technologies, the regulatory implications and the costs associated with on-site treatment.
Option 2 Off-site treatment of contaminated soil	Contaminated soils are excavated, transported to an approved/ licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site, transported to an alternative site or disposed to an approved landfill facility. This option provides for a relatively short program of on-site works, however there may be some delays if the material is to be returned to the site following treatment and regulatory requirements would need to be carefully considered. The cost per tonne for transport to and from the site and for treatment is considered to be relatively high. The material would also have to be assessed in terms of suitability for reuse as part of the proposed development works.	Not applicable for this project considering the limited volumes of material potentially to be remediated, the limitations associated with treatment technologies, and the regulatory implications.
Option 3 Capping and containment of contaminated soils	This would include the placement of a warning layer (such as geo-grid or geofabric) and pavement over the surface of the contaminated soil to isolate the material and thereby reduce the health risk to future site users.	Not the preferred option for this project, considering the site will be developed for a sensitive landuse (i.e. school). This option would require notation of the site on various planning and site identification documentation.

Option	Discussion	Applicability
	The capping and/or containment must be appropriate for the specific contaminants of concern. An ongoing Environmental Management Plan (EMP) would be required and site identification documentation, including the Section 10.7 Council planning certificate (or other appropriate notification mechanism), would be modified to note the presence of the contamination/EMP in the event that contamination remains at concentrations that exceed the Validation Assessment Criteria (VAC). This may impact upon development approval conditions, place restrictions on the use of the land and limit the future potential land value.	
Option 4 Removal of contaminated material to an appropriate facility and reinstatement with clean material where required	Contaminated soils would be classified in accordance with NSW EPA guidelines for waste disposal, excavated and disposed of off-site to an appropriately licensed facility. The material would have to meet the requirements for landfill disposal. Landfill gate fees (which may be significant) would apply in addition to transport costs.	This option is considered the most viable option for this project considering the use of the site (school) and limited timeframe available prior to the commencement of the construction works.

6 REMEDIATION DETAILS

6.1 Sequence of Works

Prior to commencement of any site preparation or remediation work, a suitably qualified contaminated land consultant[11] should be engaged as the validation consultant to validate the implementation of the RAP. The site management plan for remediation works (see Section 9) should be reviewed and implemented by the remediation contractor. Subsequently, remediation can occur within the remediation area.

Geotechnical advice should also be sought regarding the requirements of any backfill material used for the reinstatement (temporary or otherwise) of the remediation areas.

6.2 Remediation of the Impacted Fill

6.2.1 Rationale for Selection of Remedial Strategy

The most viable option for remediation of the impacted fill soil is removal and disposal off-site to an appropriate facility (Option 4).

6.2.2 Remediation Details

The specific remediation details for the impacted fill are described below:

Table 6-1: Remediation Details –Impacted Fill

Step	Procedure
1.	Remediation Area: Prior to commencement, the remediation area should be marked out by the validation consultant using appropriate methods (i.e. pegs/marking paint). At this stage, the extent of remediation is shown on the attached Figure 3. If additional sampling is undertaken prior to remediation, the extent should be defined as per the results of this additional sampling.
2.	Waste Classification: As waste classification report should be prepared for the soil to be removed in accordance with the NSW Waste Classification Guidelines, Part 1: Classifying Waste (2014)[12]. The excavated fill material should be disposed of to a landfill that is licensed by the NSW EPA to accept the waste stream outlined in the waste classification report. The landfill should be contacted to obtain the required approvals prior to commencement of excavation.

[11] EIS recommend that the consultancy engaged for the work be a member of the Australian Contaminated Land Consultants Associated (ACLCA), and/or the individual managing the works (and writing the validation report) be certified under one of the NSW EPA endorsed certified practitioner schemes

[12] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste*. (referred to as Waste Classification Guidelines 2014)

Step	Procedure
3.	Personal Protective Equipment (PPE) and Work Health and Safety (WHS): Check PPE and WHS requirements prior to commencement of remediation works. The minimum PPE required for the remediation includes the following: • Disposable gloves; • P2 dust mask; • Eye protection; and • Hard hat, covered clothing and steel toed boots.
4.	Removal of fill soil: Remediation of the fill soil will be undertaken as follows: • The area to be remediated is to be marked out using appropriate methods (pegs/marking paint); • Excavate the fill soil to the full extent of remediation under the guidance of the validation consultant; • Load the fill onto trucks and dispose to licensed facility in accordance with the assigned waste classification; • Validate the excavation in accordance with Section 7; and • Reinstate the area (if required) to an appropriate level using clean material. Reference should be made to Section 7 for materials importation requirements.

6.3 Remediation Documentation

The remediation contractor must retain all documentation associated with the remediation, including but not limited to:

- Waste classification and waste tracking documentation;
- Soil disposal dockets (and dockets for disposal of any asbestos containing materials where relevant);
- Imported materials information; and
- Photographs of remediation works.

Copies of the above documentation must be forwarded to the validation consultant on completion of the remediation for inclusion in the final validation report.

6.4 Waste Volume and Disposal Assessment

A soil volume analysis should be undertaken on completion of the works and reconciled with the quantities shown on the soil disposal dockets. A review of the disposal facility's licence issued under the Protection of the Environment Operations (POEO) Act (1997)[13] should also be undertaken to confirm whether or not each facility is appropriately licensed to receive the waste.

[13] NSW Government, (1997)). *Protection of Environment Operations Act.* (referred to as POEO Act 1997)

7 VALIDATION PLAN

Validation is necessary to demonstrate that remedial measures described in this RAP have been successful and that the site is suitable for the intended land use. The sampling program for the validation is outlined in Section 7.1. This is the minimum requirement based on the remedial strategies provided. Additional validation sampling may be required based on site observations made during remediation.

Site observations will also be used as a validation tool to assess the extent of site contamination. In particular visual and olfactory indicators such as petroleum odours and staining should be recorded.

7.1 Validation Sampling and Documentation

The table below outlines the validation requirements for the site.

Table 7-1: Validation Requirements

Aspect	Sampling	Analysis	Observations and Documentation
Remediation of PAH, TRH and Zinc Impacted Fill Area			
Impacted Fill Area – excavation base	One surficial soil sample per 25m^2 to be collected from the base of the excavation area.	TRH, PAHs and Zinc	Samples to be screened using PID Observations of staining and odour to be recorded Photographs to be taken
Impacted Fill Area – excavation walls	One sample per 5 lineal meter of the excavation wall and one sample per fill/soil profile along the vertical metre. Sampling to target obvious indicators of contamination and changes in soil profile.	TRH, PAHs and Zinc	Samples to be screened using PID Observations of staining and odour to be recorded Photographs to be taken
Imported Materials – relevant to all site works			
Imported VENM backfill	Minimum of three samples per source	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX PAHs, OCP/OPP, PCBs and asbestos. Additional analysis may be required depending on source site history.	VENM documentation/ report required (should include source site history to demonstrate analytes are appropriate) confirming material meets the definition for VENM. Material to be inspected upon importation to confirm it is free of visible/olfactory indicators of

			contamination and is consistent with documentation.
Imported engineering materials such as recycled aggregate, road base etc.	Minimum of three samples per source/material type.	Heavy metals (as above), TRHs, BTEX, PAHs, OCP/OPP, PCBs and asbestos.	Documentation required to confirm material has been classified with reference to a relevant exemption. Material to be inspected upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation. Dockets for imported material to be provided.
Imported engineering materials comprising only natural quarried products such as blue metal etc.	At the validation consultant's discretion based on supplier documentation.	At the validation consultant's discretion based on supplier documentation.	Documentation to be provided from the supplier confirming the material is a product comprising only VENM (i.e. quarried product). Review of quarry POEO licence. Material to be inspected upon importation to confirm it is free of anthropogenic materials, visible and olfactory indicators of contamination, and is consistent with documentation. Dockets for imported material to be provided.
Imported landscaping materials	Minimum of three samples per source/material type.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRHs, BTEX, PAHs, OCPs, OPPs, PCBs and asbestos.	Documentation required to confirm material has been produced under an appropriate standard. Material to be inspected upon importation to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation. Dockets for imported material to be provided.

7.2 Validation Assessment Criteria (VAC) and Data Assessment

The VAC to be adopted for the validation assessment are outlined in the table below:

Table 7-2: VAC

Validation Aspect	Criteria
Waste classification (soil disposal)	In accordance with the procedures and criteria outlined in Part 1 of the Waste Classification Guidelines 2014.
Remediation Area	• Health Investigation Levels (HILs) for a 'residential with accessible soils' exposure scenario (HIL-A). These guidelines are also considered appropriate for primary schools and day-care centres; • Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B). HSLs were calculated based on the soil type and the depth of the sample from the existing ground surface as the proposed building floor level is expected to be constructed approximately at the existing grade; • Where exceedances of the HSLs were reported for hydrocarbons (TRH/BTEX and naphthalene), the soil health screening levels for direct contact presented in the CRC Care Technical Report No. 10 – Heath screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[14] were considered; • Asbestos was assessed on the basis of presence/absence. Asbestos HSLs were not adopted as detailed asbestos quantification was not undertaken. • Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013); • ESLs were calculated based on the soil type. EILs for selected metals were calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[15]. This method is considered to be adequate for the Tier 1 screening; and • Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered (if required) following evaluation of human health and ecological risks, and risks to groundwater.
Imported materials	Heavy metal concentrations are to be less than the most conservative Added Contaminant Limit (ACL) concentrations for URPOS exposure setting presented in Schedule B1 of NPEM (2013). Organic compounds are to be less than the laboratory PQLs and asbestos to be

[14] Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document*

[15] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission.

Validation Aspect	Criteria
	absent. Results for VENM and other imported materials will need to be consistent with expectations for those materials. Aesthetics: soils to be free of staining and odours.

Data should initially be assessed as above or below the VAC. Statistical analysis may be applied if deemed appropriate by the consultant and undertaken in accordance with the NEPM (2013).

7.3 Validation Report

As part of the validation process, a site validation report should be prepared by the validation consultant. The report should outline the remediation work undertaken at the site and any deviations to the remediation strategy. The report should summarise the results of the validation assessment and should be prepared in accordance with the Reporting Guidelines 2011. The report should draw conclusions regarding the success of the remediation/validation and the suitability of the site for the proposed development (from a contamination viewpoint).

7.4 Data Quality

Appropriate QA/QC samples should be obtained during the validation and analysed for the contaminants of concern. As a minimum, QA/QC sampling should include duplicates (5% inter-laboratory and 5% intra-laboratory), trip spikes, trip blanks and rinsate samples (one spike, rinsate and blank per sampling event).

DQOs should be established and outlined in a Validation Sampling Analysis and Quality Plan prior to commencement. The DQOs are to be established with regards to the seven-step process outlined in NEPM (2013) which is based on the USEPA documents Data Quality Objectives Processes for Hazardous Waste Site Investigations (2000) and Guidance on Systematic Planning Using the Data Quality Objectives Process (2006). The seven steps include the following:

- State the problem;
- Identify the decisions/goal of the study;
- Identify information inputs;
- Define the study boundary;
- Develop the analytical approach/decision rule;
- Specify the performance/acceptance criteria; and
- Optimise the design for obtaining the data.

Data Quality Indicators (DQIs) are to be assessed based on field and laboratory considerations for precision, accuracy, representativeness, completeness and comparability.

8 CONTINGENCY PLAN

A review of the proposed remediation works has indicated that the greatest risk that may affect the success of the remediation is an unexpected find. A contingency plan for unexpected finds is outlined below, in conjunction with a selection of other contingencies that may apply to this project.

8.1 Unexpected Finds

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. At this site, these types of hazards may include asbestos in soil, and odorous or stained hydrocarbon impacted soils outside those identified.

The procedure to be followed in the event of an unexpected find is presented below:

- In the event of an unexpected find, all work in the immediate vicinity should cease and the client should be contacted immediately;
- Temporary barricades should be erected to isolate the area from access to the public and workers;
- In the event potential asbestos material is encountered, a qualified occupational hygienist and/or asbestos consultant should be contacted (preferably the validation consultant will have an in-house hygienist or asbestos assessor);
- The client should engage an environmental consultant to attend the site and assess the extent of remediation that may be required and/or adequately characterise the contamination in order to allow for cap and containment of the material;
- In the event that remediation is required, the procedures outlined within this report should be adopted where appropriate, alternatively an addendum to this RAP should be prepared;
- An additional sampling and analytical rationale should be established by the consultant and should be implemented with reference to the relevant guideline documents; and
- Appropriate validation sampling should be undertaken and the results should be included in the validation report.

8.2 Continual Soil Validation Failure

In the event of a soil validation failure, the excavation should be extended in the direction of the failure (in consultation with the validation consultant and the client/client's representative) and the area re-validated. Costs associated with additional excavation and disposal should be assessed progressively and in the context of the CSM for the nature extent of contamination. Continuous failures may warrant consideration of alternative remediation techniques such as capping. The validation consultant should prepare a separate remediation works plan (RWP) if capping is required.

An EMP would subsequently need to be prepared for the capped area and enforced using an appropriate mechanism.

8.3 Importation Failure for VENM or other Imported Materials

Where material to be imported onto the site does not meet the importation acceptance criteria detailed in Section 7, the only option is to not accept the material. Alternative material must be sourced that meets the importation requirements.

8.4 Disposal of Hazardous Waste

Material classed as 'Hazardous Waste' under the Waste Classification Guidelines 2014 may require further assessment and stabilisation prior to off-site disposal. Disposal approval may also be required from the NSW EPA and licensed landfill facility. The presence of Hazardous Waste may result in significant delays and additional cost to the project.

9 SITE MANAGEMENT PLAN FOR REMEDIATION WORKS

The information outlined in this section of the RAP is for the remediation work only. The client should contact the local consent authority (council or certifier) for specific site management requirements for the overall development of the site.

9.1 Interim Site Management

The site is secure and is currently sealed, therefore interim management is not considered to be required.

9.2 Project Contacts

Emergency procedures and contact telephone numbers should be displayed in a prominent position at the site entrance gate and within the main site working areas. The contact details of key project personnel are summarised below.

Table 9-1: Project Contacts

Task	Company	Contact Details
Site Owner	Meriden School	To be informed
Remediation Contractor	To be appointed	-
Environmental Consultant	EIS (at the time of the RAP preparation)	9888 5000
Certifier	To be appointed	-
NSW EPA	Pollution Line	131 555
Emergency Services	Ambulance, Police, Fire	000

9.3 Security

Prior to the commencement of site works, fencing should be installed as required to secure the remediation areas. Warning signs should be erected, which outline the PPE required for remediation work. All excavations should be clearly marked and secured to reduce the risk to site personnel from injury by falling into open excavations.

9.4 Timing and Sequencing of Remediation Works

In general, all remedial works should be completed prior to the commencement of construction works for the proposed development. In the event that remedial works are undertaken in conjunction with the development, all remediation areas should be clearly marked and covered with builder's plastic (or similar) in order to reduce the dust generation, surface water run-off and/or exposure to receptors.

In the event of unexpected delays, builder's plastic (or similar) should be used to cover the remediation areas in order to reduce the dust generation, surface water run-off and/or exposure to receptors.

9.5 Site Soil and Water Management Plan

The contractor should prepare a detailed soil and water management plan prior to the commencement of site works. Silt fences should be used to control the surface water runoff at all appropriate locations of the site. Reference should be made to the development consent conditions for further details.

All stockpiled materials should be placed within an erosion containment boundary with silt fences and sandbags employed to limit sediment movement. The containment area should be located away from drainage lines, gutters, stormwater pits and inlets and the site boundary. No liquid waste or runoff should be discharged to the stormwater or sewerage system without the approval of the appropriate authorities.

9.6 Noise and Vibration Control Plan

The guidelines for minimisation of noise on construction sites outlined in AS-2460 (2002)[16] should be adopted. Other measures specified in the consent conditions should also be complied with. Noise producing machinery and equipment should only be operated between the hours approved by Council (refer to consent documents).

All practicable measures should be taken to reduce the generation of noise and vibration to within acceptable limits. In the event that short-term noisy operations are necessary, and where these are likely to affect residences, notifications should be provided to the relevant authorities and the residents by the project manager, specifying the expected duration of the noisy works.

[16] Australian Standard, (2002). *AS2460: Acoustics - Measurement of the Reverberation Time in Rooms.*

9.7 Dust Control Plan

All practicable measures should be taken to reduce dust emanating from the site. Factors that contribute to dust production are:

- Wind over a cleared surface;
- Wind over stockpiled material; and
- Movement of machinery in unpaved areas.

Visible dust should not be present at the site boundary. Measures to minimise the potential for dust generation include:

- Use of water sprays on unsealed or exposed soil surfaces;
- Covering of stockpiled materials and excavation faces (particularly during periods of site inactivity and/or during windy conditions) or alternatively the erection of hessian fences around stockpiled soil or large exposed areas of soil;
- Establishment of dust screens consisting of a 2m high shade cloth or similar material secured to a chain wire fence;
- Maintenance of dust control measures to keep the facilities in good operating condition;
- Paved surfaces brushed or washed to remove dust;
- Stopping work during strong winds;
- Loading or unloading of dry soil as close as possible to stockpiles to prevent spreading of loose material around the site; and
- The expanse of cleared land should be kept to a minimum to achieve a clean and economical working environment.

If stockpiles are to remain on-site or an excavation remains open for a period of longer than several days, dust monitoring should be undertaken at the site. If excessive dust is generated all site activities should cease until either wind conditions are more acceptable or a revised method of excavation/remediation is developed.

Dust is also produced during the transfer of material to and from the site. All material should be covered during transport and should be properly disposed of on delivery. No material is to be left in an exposed, un-monitored condition.

All equipment and machinery should be brushed or washed down before leaving the site to limit dust and sediment movement off-site. In the event of prolonged rain and lack of paved areas all vehicles should be washed down prior to exit from the site, and any soil or dirt on the wheels of the vehicles removed. Water used to clean the vehicles should be collected and tested prior to appropriate disposal under the Waste Classification Guidelines.

9.8 Odour Control Plan

All activities undertaken at the site should be completed in a manner that minimises emissions of smoke, fumes and vapour into the atmosphere and any odours arising from the works or stockpiled material should be controlled. Control measures may include:

- Maintenance of construction equipment so that exhaust emissions comply with the Clean Air Regulations issued under the POEO Act;
- Demolition materials and other combustible waste should not be burnt on site;
- The spraying of a suitable proprietary product to suppress any odours that may be generated by excavated materials; and
- Use of protective covers (e.g. tarpaulins or builder's plastic).

All practicable measures should be taken to reduce fugitive emissions emanating from the site so that associated odours do not constitute a nuisance and that the ambient air quality is not adversely impacted.

Disturbance of hydrocarbon contaminated soils may result in odorous conditions. The following odour management plan should be implemented to limit the exposure of site personnel and surrounding residents to unpleasant odours:

- Excavation and stockpiling of material should be scheduled during periods with low winds if possible;
- A suitable proprietary product could be sprayed on material during excavation and following stockpiling to reduce odours;
- All complaints from workers and neighbours should be logged and a response provided. Work should be rescheduled as necessary to minimise odour problems;
- The site foreman should consider the following odour control measures:
  - Reduce the exposed surface of the odorous materials;
  - Time excavation activities to reduce off-site nuisance (particularly during strong winds); and
  - Cover exposed excavation faces overnight or during periods of low excavation activity.
- If continued complaints are received, alternative odour management strategies should be considered and implemented.

9.9 Health and Safety Plan

A site specific WHS plan should be prepared by the contractor for all work to be undertaken at the site. The WHS plan should meet all the requirements outlined in SafeWork NSW WHS regulations.

As a minimum requirement, personnel must wear appropriate protective clothing, including long sleeve shirts, long trousers and steel cap boots. Gloves and dust masks should be worn when working on remediation activities (additional asbestos-related PPE may also be required for asbestos remediation work). Washroom and lunchroom facilities should also be provided to allow workers to remove potential contamination from their hands and clothing prior to eating or drinking.

9.10 Waste Management

Prior to commencement of remedial works and excavation for the proposed development, the contractor should develop a waste management plan. A Waste Data File is also to be maintained to assist with addressing the requirements for assessing and tracking waste disposal under this RAP.

9.11 Incident Management Contingency

The validation consultant should be contacted if any unexpected conditions are encountered at the site. This should enable the scope of remedial/validation works to be adjusted as required. Similarly if any incident occurs on site, the environmental consultant should be advised to assess potential impacts on site contamination conditions and the remediation/validation timetable. Any new information that comes to light that has the potential to alter the prior conclusions regarding site contamination should be notified to Council.

9.12 Dewatering

Dewatering is unlikely to be required to facilitate the remediation. Reference should be made to the development consent for specific details regarding temporary construction dewatering.

9.13 Hours of Operation

Hours of operation should be between those approved by Council under the development approval process. Reference should also be made to any specific conditions imposed by other consent authority/regulatory bodies.

10 CONCLUSION

EIS are of the opinion that the site can be made suitable for the proposed development provided this RAP is implemented accordingly and the data gaps listed in the Section 3.3 are addressed as described in the following table:

Table 10-1: Data Gaps and Strategy to Address the Data Gaps

Data Gap	Strategy to Address the Data Gaps
Assessment of groundwater contamination conditions was excluded in the Screening 2019 due to the access restrictions for a drill rig.	One groundwater monitoring well, as a minimum, should be installed at downgradient of the site once the soil remediation and validation was completed. Groundwater from the well should be sampled and analysed for a range of targeted contaminants. The findings of the groundwater assessment should be included in the site validation report.
The presence or otherwise of hazardous building materials in the existing building has not been assessed.	Hazardous building materials such as asbestos, lead and PCBs may be present in the building located at the south section of the site. A Hazardous Building Material assessment should be undertaken of the building prior to the demolition. If the presence of this material is confirmed it should be removed as soon as possible and validate (i.e. issue a clearance certificate).

A site validation report should be prepared on completion of remediation activities and should be submitted to the consent authority.

10.1 Remediation Category

Site remediation can fall under the following two categories outlined in SEPP55:

Table 10-2: Remediation Category

Category	Details
Category 1	Category 1 remediation works are those undertaken in the following areas specified under Clause 9 of SEPP55: A designated development; • Carried out on land declared to be a critical habitat; • Development for which another SEPP or REP requires a development consent; or • Carried out in an area or zone classified as: ➢ Coastal Protection; ➢ Conservation or heritage conservation; ➢ Habitat protection, or habitat or wildlife corridor; ➢ Environmental protection; ➢ Escarpment, escarpment protection or preservation; ➢ Floodway or wetland; ➢ Nature reserve, scenic area or scenic protection; etc. • Work that is not carried out in accordance with the site management provisions contained in the consent authority Development Control Plan (DCP)/Local Environmental Plan (LEP) etc. Approval is required from the consent authority for Category 1 remediation work. The RAP needs to be assessed and determined either as part of the existing DA or as a new and separate DA. Category 1 remediation work is identified as advertised development work unless the remediation work is a designated development or a state significant development (Part 6 of EPAA Regulation 1994).
Category 2	Remediation works which do not fall under the above category are classed as Category 2. Development consent is not required for Category 2 remediation works, however the consent authority should be given 30 days' notice prior to commencement of works.

EIS understand that heritage items are located within the school grounds. It is not clear if the existing site buildings are heritage listed and this should be confirmed with the client's planning expert. In the event there are heritage items on the site, the remediation will fall into Category 1 remediation works. If not, the remediation will be Category 2 remediation works.

10.2 Regulatory Requirements

The regulatory requirements applicable for the site are outlined in the following table:

Table 10-3: Regulatory Requirement

Guideline	Applicability
Duty to Report Contamination (2015)[17]	At this stage, EIS consider that there is no requirement to notify the NSW EPA regarding site contamination. This requirement should be reassessed following review of the validation results.
POEO Act 1997	Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner. Appropriate waste tracking is required for all relevant waste that is disposed off-site. Asbestos waste must be tracked using WasteLocate.
WHS Code of Practice (2016)	Sites with asbestos become a 'workplace' when work is carried out there and require an asbestos management plan. Appropriate SafeWork NSW notification (if required) is to be undertaken prior to any asbestos removal works or handling. Contractors are also required to be appropriately licensed for the asbestos works undertaken (i.e. bonded or friable asbestos works).

[17] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under the Contamination Land Management Act 1997.* (referred to as Duty to Report Contamination 2015)

11 LIMITATIONS

The following limitation apply to this assessment:

- EIS accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the assessment; scope of work and limitation outlined in the EIS proposal; and terms of contract between EIS and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- The preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, EIS has not undertaken any verification process, except where specifically stated in the report;
- EIS has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- EIS accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- EIS have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. EIS should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Important Information About This Report

These notes have been prepared by EIS to assist with the assessment and interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors:
This report has been prepared in response to specific project requirements as stated in the EIS proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

EIS/J&K will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by EIS to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions:
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data:
Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Assessment Limitations:
Although information provided by a site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate

to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

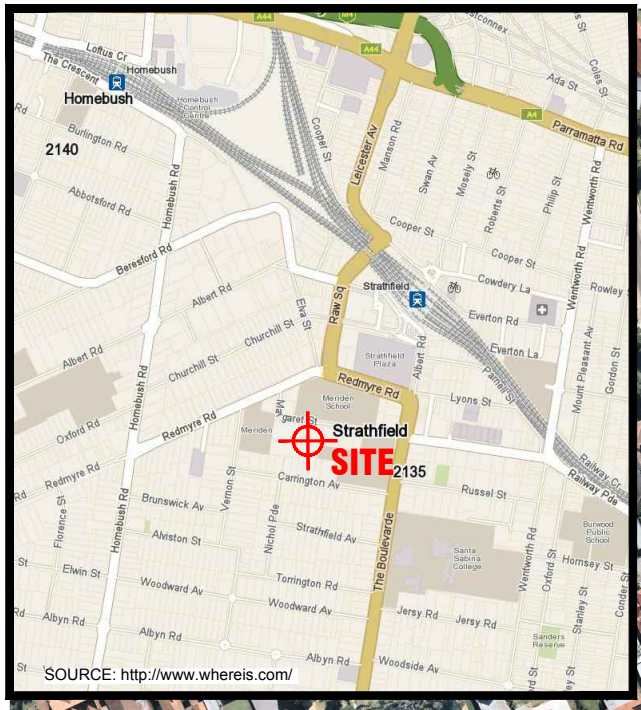
Misinterpretation of Site Assessments by Design Professionals:
Costly problems can occur when other design professionals develop plans based on misinterpretation of an assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Assessment Report:
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely:
Because an environmental site assessment is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: Report Figures



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM, 12 MAY 2019.

This plan should be read in conjunction with the Environmental report.

Title: **SITE LOCATION PLAN**

Location: 16 MARGARET STREET
STRATHFIELD, NSW

Report No: E30910KG

Figure No: 1

JKEnvironments

PLOT DATE: 30/05/2019 3:20:24 PM DWG FILE: S:\5 EIS\5C EIS JOBS\30000\SIE30910KG STRATHFIELD\CAD\E30910KG_ESA.DWG

BH203	0.2-0.3
B(a)P TEQ	5.6
TRH C_{16}-C_{34}	980

SS1	-
ZINC	330

BH202	0.1-0.2	0.4-0.2	0.6-0.7
B(a)P TEQ	6.4	6.9	
TRH C_{16}-C_{34}	410		
TRH C_{10}-C_{16}			130

BH201	0.0-0.2
B(a)P TEQ	30

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE SITE BOUNDARY
- BH (Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (2017)
- BH (Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (2019)
- SS — SURFACE SOIL SAMPLE

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

- SOIL CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK (mg/kg)
- SOIL CONTAMINATION ABOVE SAC FOR ENVIRONMENTAL RISK (mg/kg)

SCALE 1:300 @A3 METRES (0 3 6 9 12 15)

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN (2019)**

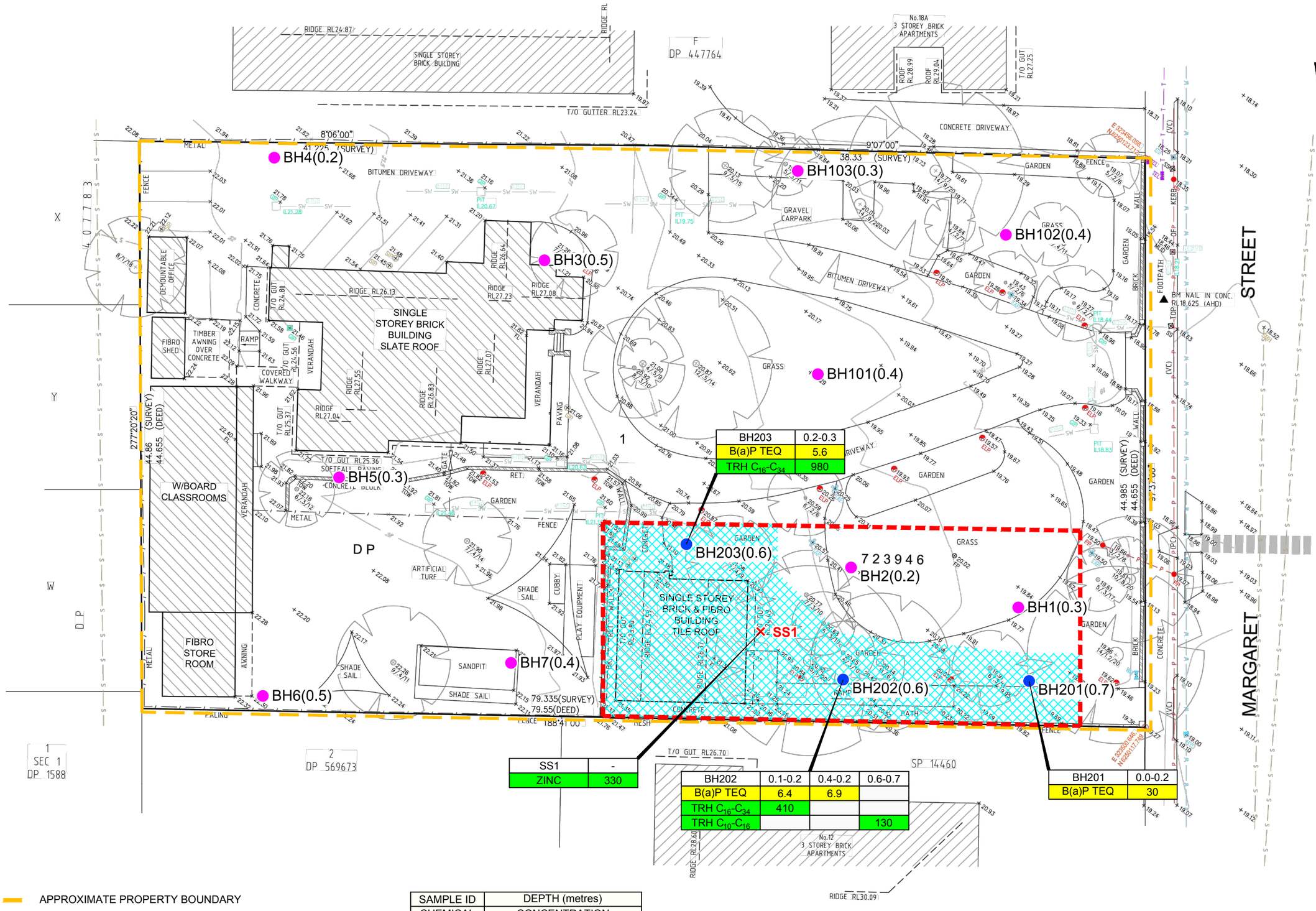
Location: 16 MARGARET STREET STRATHFIELD, NSW

Report No: E30910KG

Figure No: 2

JKEnvironments

PLOT DATE: 30/05/2019 3:20:09 PM DWG FILE: S:\S EIS\SC ES\JOBS\30000\SE30910KG STRATHFIELD\CAD\E30910KG_ESA.DWG



LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE SITE BOUNDARY
- BH (Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (2017)
- BH (Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (2019)
- SS — SURFACE SOIL SAMPLE

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

- SOIL CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK (mg/kg)
- SOIL CONTAMINATION ABOVE SAC FOR ENVIRONMENTAL RISK (mg/kg)
- EXTENDED REMEDIATION AREA

0 3 6 9 12 15
SCALE 1:300 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **REMEDIATION PLAN (2019)**

Location: 16 MARGARET STREET STRATHFIELD, NSW

Report No: E30910KG

Figure No: 3

JKEnvironments

PLOT DATE: 25/09/2019 11:43:08 AM DWG FILE: S:\5 EIS\5C EIS JOBS\30000'S\E30910KG STRATHFIELD\CAD\E30910KG_ESA.DWG