Assyrian Schools Limited
C/- PMDL

Remedial Action Plan:

Lots 2320 and 2321 DP 1223137, 17 and 19 Kosovich Place, Cecil Park, NSW

P1705798JR06V03
August 2018

martens consulting engineers

ENVIRONMENTAL

WATER

WASTEWATER

GEOTECHNICAL

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PROJECT MANAGEMENT

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All enquiries regarding this project are to be directed to the Project Manager.

Contents

1 Introduction

1.1 Overview

This Remedial Action Plan (RAP) has been prepared by Martens and Associates Pty Ltd (MA) for the purpose of addressing observed soil contamination at the subject site, in accordance with Detailed Site Investigation (DSI) recommendations (MA, 2018a and SESL, 2015). The subject site includes Lots 2320 and 2321 DP 1223137, being 17 and 19 Kosovich Place, Cecil Park, NSW.

This RAP presents the objectives and scope of remediation and requirements for validation work to render the site suitable for primary school land use.

Preparation of this RAP is in general accordance with NSW OEH (2011), NSW EPA (2017), and ASC NEPM (1999, amended 2013).

1.2 Previous Studies

Previous assessment of site contamination undertaken by MA includes:

- Martens and Associates (2018a) *Detailed Site Investigation: Lots 2320 and 2321 in DP 1223137, 17 and 19 Kosovich Place, Cecil Park, NSW* (ref P1705798JR01V02).
- Martens and Associates (2018b) *Preliminary Geotechnical and Salinity Assessment: Lots 2320 and 2321 in DP 1223137, Part of 153 – 189 Wallgrove Road, Cecil Park, NSW* (ref P1705798JR02V03).
- SESL Australia (2015) *Detailed Site Investigation – 153-189 Wallgrove Road, Cecil Park, NSW (Lot 2315 DP 1133688)*.

1.3 Objectives and Scope of the RAP

Objectives of the RAP are:

- Provide context and scope for data gap closure investigations required to verify extent of contamination previously identified onsite.
- Set remediation goals and criteria.
- Review available remedial options.

- Select the preferred remedial option.
- Provide details of preferred remedial option.
- Outline procedures and activities for implementation of the preferred remediation option.
- Outline requirements for contractors to prepare environmental and occupational health and safety plans for the remediation.
- Outline requirements for contingency planning.
- Outline the regulatory compliance requirements.
- Provide details of contacts for the period of remediation works.
- Provide a framework for environmental management for the site during remediation.

The format of this RAP is as follows:

- Summary of previous study, contamination status and data gaps (Section 3).
- Data gap closure investigation (Section 4)
- Remediation options and criteria (Section 5).
- Remediation plan and validation requirements (Section 6).
- A guide for site control during remediation and site specific health and safety for remediation and validation (Section 7).
- Regulatory compliance requirements (Section 8).
- Remediation contacts (Section 9).
- Contingency plan (Section 10).

1.4 Proposed Development

Development plans for the school indicate that the land in the area requiring remediation is expected to remain as 'open space', not to be formally used by the primary school.

1.5 Abbreviations

ACM – Asbestos containing material

AEC – Area of environmental concern

AF – Asbestos fines

AMP - Asbestos management plan

ASC NEPM – *National Environmental Protection (Assessment of site contamination) Measure*

BTEX – Benzene, toluene, ethyl benzene, xylene

CAA – Controlled Activity Approval

COPC – Contaminants of potential concern

CSM – Conceptual site model

DA – Development application

DEC – NSW Department of Environment and Conservation

DECC – Department of Energy and Climate Change

DP – Deposited plan

DPI – Department of Primary Industries

DQO – Data quality objectives

DSI – Detailed site investigation

EAC – Ecological assessment criteria

EIL – Ecological investigation levels

ENM – Excavated natural material

EMP –Environmental Management Plan

EPA – NSW Environmental Protection Authority

ESA – Environmental site assessment

ESL – Ecological screening levels

FA – Friable asbestos

FCC – Fairfield City Council

HIL – Health investigation levels

HHRA – Human health risk assessment

LOR – Limit of reporting

LGA – Local government area

MA – Martens and Associates Pty Ltd

mbgl – Metres below ground level

NATA – National Association of Testing Authorities

OCP – Organochloride pesticides

OEH – NSW Office of Environment and Heritage

OPP – Organophosphate pesticides

PACM – Potential asbestos containing material

PAH – Polycyclic aromatic hydrocarbons

PCB – Polychlorinated biphenyl

PPE – Personal protective equipment

PSI – Preliminary site investigation

RAC - Remediation acceptance criteria

RAP – Remedial action plan

SAC – Site acceptance criteria

SEPP – State Environmental Planning Policy

SOP – Standard operating procedure

VENM – Virgin excavated natural material

WHSP – Worker health and safety plan

2 Site Identification

2.1 Location and Setting

Site information is summarised in Table 1. Site location and general surrounds are provided in Figure 1, Attachment A.

Table 1: General site information.

Item	Description / Detail
Lot/DP and site address	17 and 19 Kosovich Place, Cecil Park, NSW (Lots 2320 and 2321 DP 1223137)
Investigation Area	Approximately 3 ha
Local Government Area (LGA)	Fairfield City Council (FCC)
Current land use	The site is currently used for rural purposes and is predominantly open grasslands and paddocks. The site is zoned RU4 – Primary Production Small Lots. The extreme north west corner of the site, presently covered by the site dam, is zoned as E2-Environmental Conservation. Site elevation is approximately 89 m near the site's north western boundary, to 102 m near the eastern boundary.
Proposed land use	Primary school
Surrounding land uses	Primarily rural, rural residential, and church located to the north. Westlink M7 motorway located approximately 350 m east.
Expected geology and soil landscape	The Penrith 1:100,000 Geological Sheet 9030 (NSW Dept. of Mineral Resources, 1991) identifies the site is underlain by Bringelly Shale which comprises shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone and rare coal/tuff. The NSW Environment and Heritage eSPADE website identifies the site as having soils of the Luddenham soil landscapes consisting of undulating to rolling low hills on Wianamatta Group shales, often associated with Minchinbury Sandstone. Soils are generally shallow to deep podzolic soils or earthy clays.
Drainage	Site drainage generally occurs via overland flow to an onsite dam and unnamed tributary of Ropes Creek near the western boundary.
Environmental receptors	Unnamed, mapped, offsite tributary of Ropes Creek and dam located adjacent to western boundary. Ropes Creek, approximately 50 to 100 m north. Current and future site flora and fauna.
Human receptors	Future students, staff, and visitors. Site workers during future construction works. Surrounding residents, and visitors to nearby church.

2.2 Hydrogeology

Review of NSW Department of Primary Industries Water's database indicated one groundwater bore within 500 m of the site (Table 2).

Table 2: Available hydrogeological information.

The	Direction and Distance	Depth To Groundwater (mbgl)	Intended Use	Water Bearing Zone Substrate
GW108121	North east (260m)	34.0	Test bore	Shale

Notes

[1] ND – No data available.

From review of the information in Table 2, the groundwater well in the vicinity is used as a test bore and groundwater is typically greater than 34.0 m below ground level (mbgl). SESL (2015) report is unclear with regards to groundwater, it notes in one place "Groundwater was encountered when observing a deep soil profile immediately adjacent to the creek" (page 2), and at another place that "Groundwater was not encountered during the sampling process" (page 33). MA onsite investigations to 4.0 mbgl did not encounter water, and it is not considered likely that a significant groundwater system underlies the site. Additional works would be required for further understanding of site groundwater conditions and permanent groundwater levels, should it be required.

3 Summary of Previous Investigations

3.1 Overview

Martens and Associates (2018a) and SESL (2015) detailed site investigations for the subject site should be read in conjunction with this RAP. A brief summary of the site history, results, conclusions and recommendations of the previous investigations is provided in the following sections.

3.2 Detailed Site Investigation (DSI) Summary

Detailed site investigations (DSIs)) were completed for the site by SESL (2015) and MA (2018a). Findings are summarised in Tables 3 and 4 below.

Table 3: Summary of previous site investigations (SESL, 2015).

Investigation Details	Investigation Task and Finding
Scope of works	o Research and review of available site information. o Site walkover inspection of 153 – 189 Wallgrove Road. o Intrusive soil sampling based on site inspection and history; groundwater was not sampled as part of investigations. o Laboratory analysis, and review of field and analytical results. o Preparation of a DSI in general accordance with ASC NEPM (1999, amended 2013).
Current and historical site records key findings	o Available Council records show no development applications applicable to the investigation area. A dwelling and sheds are located on the eastern portion of 153 – 189 Wallgrove Road (not included within the investigation area of this RAP). o A review of historic aerial photography showed rural land use, with the site historically used for agricultural and pastoral purposes. The site was used for crop production from at least the 1970's until recently, when the site has returned to pastoral use. o A title search revealed the land has been predominantly owned by farmers since at least 1904. o The site soils are identified as Class 4 acid sulfate soils (ASS), although due to elevation and geological land unit of the area, ASS are not expected to be present onsite. o Section 149 certificates did not identify the land as a heritage item, conservation area, or critical habitat by Council, nor is the site considered bush fire prone[1] or contaminated land. o No records were identified on the list of NSW contaminated sites notified to the EPA, or listed under the Contaminated Land Management Act (1997) and the Environmentally Hazardous Chemicals Act (1985) within 500 m of the site. o A Dangerous Goods License search reported no chemicals being stored at the site.

Investigation Details	Investigation Task and Finding
Site walkover key findings	A site walkover inspection (28 April 2015) provided the following observations: o At the time of inspection, the site was used for rural residential purposes and grazing. o Possible lead-based paints used on dwelling and sheds (not located within investigation area). o No electrical transformers (PCBs) were observed onsite. o No hazardous materials were observed to be stored onsite. o Fill material was observed near the western site boundary, up to a depth of 1 m. o Asbestos containing materials (ACM) were observed on the soil surface in some sections of the site. ACM was observed within the current investigation area.

Notes

[1] Under current FCC / Rural Fire Service mapping, the site is identified as bush fire prone land.

Table 4: Summary of MA (2018a) detailed site investigations.

Investigation Details	Investigation Task and Findings
Scope of works	o Review of past DSI (SESL, 2015). o Intrusive soil investigation and soil sampling program, targeting AECs not adequately assessed in SESL (2015). o Laboratory analyses of selected samples for identified contaminants of potential concern (COPC) and assessment against site acceptance criteria (SAC). o Preparation of a report in general accordance with the relevant sections of ASC NEPM (1999, amended 2013), NSW OEH (2011), DEC (1995), and DEC (2006).
SESL data gaps identified by MA	Following review of SESL (2015) DSI report findings, a number of data gaps were identified by Martens, as follows: o Inadequate number of testing locations within the investigation area, based on previous agricultural land use (review of historical aerials indicate former market gardens within the majority of the investigation area). In accordance with NSW EPA (1995), 30 sampling locations are required for a 3 ha site, but only 16 locations were assessed in SESL (2015). Additional sampling locations were identified in accordance with NSW EPA (1995), and further testing of soil samples was completed for heavy metals and pesticides. o Although PACM material was observed in one borehole during DSI (SESL, 2015) investigations, and a fill area extent, including ACM, was noted in the western portion of the site, no material samples were tested for asbestos. No explanation for the filling of the near level floodplain area was provided.
MA DSI investigations	Results of MA DSI investigations are summarised as: o An eroded open channel visible in 1955 aerial extends south into the northern portion of Lot 2321 from Ropes Creek, which is located to the north of the site. The extent of the eroded channel increases across the north western portion of Lot 2321 from 1965 until at least 1994. The eroded channel is no longer visible in the 2007 and 2017 images, and the land is used for agricultural purposes. MA infers the eroded channel was filled, and which explains SESL's (2015) observation of sill in this area.

Investigation Details	Investigation Task and Findings
	o Subsurface investigations and sampling was undertaken for fill material in the western portion of the investigation site, and identified former market garden areas across the site. o ACM fragments were observed within fill material in the western portion of the site.
MA key findings	o All results for tested analytes in soil samples taken within previously identified market garden, or filled areas, were less than the adopted SAC for HILs, HSLs, EILs and Management Limits for heavy metals, pesticides, PAH, BTEX and TRH. o Asbestos (chrysotile and amosite) was detected in material sample ASB101, a fibre cement sheeting fragment, which was collected from the soil surface from areas associated with observed fill material to the south east of the dam.
Conclusion	The DSI concluded that the site has contamination in the form of asbestos, in excess of the SAC and asbestos limits set by ASC NEPM. It was concluded that the site can be made suitable for intended primary school land use through the implementation of a remediation action plan (RAP) to address observed asbestos. The RAP is to consider waste management requirements, identify additional investigations required and provide protocols for management of unexpected finds.

3.3 Asbestos Identified Contamination Hotspots

Asbestos in material (ASB101) was positively identified in fill material in the western portion of the site, in the form of a fibre cement sheeting fragment.

Refer to plan PS02-AZ09 (Attachment B) for locations of previous testing and test areas that exceeded guideline levels.

3.4 Remaining Data Gaps

The potential fill area in the western portion of the site (refer to PS02-AZ09, Attachment B) requires further investigation as part of the RAP, to:

- Determine the lateral and vertical extent of fill material; and
- Test inclusion impacted fill areas, to determine if soils exceed the ASC NEPM (1999, amended 2013) weight for weight (w/w) criteria for asbestos.

Section 4 discusses the requirements for a data gap closure investigation to be completed as part of this RAP.

4 Data Gap Closure Investigation

4.1 Overview

Data gaps identified as part of DSI investigations and discussed in Section 3.4 shall be addressed, as far as practical, in order to ensure that remediation works are based on appropriate site data and the full extent of required remediation is addressed.

A data gap closure investigation is proposed as the first stage of remediation, and includes:

- Test pitting across the potential fill area as identified on PS02-AZ09 (Attachment B) to confirm the lateral and vertical extent of fill material; and
- Where further intrusive investigations clearly identify inclusion impacted fill areas, or PACM fragments are observed within surface soils, testing of impacted soils to determine if soils exceed the NEPM weight for weight (w/w) criteria for asbestos.

4.2 Sampling Plan

Within potential fill areas in the western portion of the site, test pitting shall be undertaken to determine the lateral extent and depth of fill, and allow testing of degree of asbestos impact in fill. Table 5 outlines the sampling program.

Table 5: Data gap closure investigation summary.

Site Areas	Required Testing
Within identified fill areas	Adequate shallow test pits are to be excavated across the potential fill area, to satisfactorily determine the lateral extent of fill material. In areas where fill is identified, additional test pits shall be undertaken to characterise the depth of fill. Where anthropogenic inclusions are observed within fill material, soil sampling in accordance with WA Health (2009) shall be undertaken to permit further testing to assess asbestos content. A visual assessment of the top 0.1 m of soil, and soil samples from within test pits shall be completed to assess for the presence of potential ACM (PACM) bonded fragments. Should PACM be identified within these areas, additional w/w soil assessment in accordance with WA Health (2009) for asbestos in soil shall be undertaken.

Site soils shall be assessed against ASC NEPM (1999, amended 2013) heath screening levels for asbestos in soil (see Section 6.6.2). If soil samples are found to be contaminated, or bonded PACM fragments have been confirmed through laboratory testing, additional deeper testing within selected areas may be required to determine extent of asbestos contamination, including hotspots. The results of the data closure investigation shall be added as an addendum to the MA DSI (2017a) and any additional remediation requirements shall be addressed in an updated version of this document. Refer to Attachment B for data gap locations (I.e. approximate filled areas).

4.3 NSW Department of Industries - Water Approval

A Controlled Activity Approval (CAA), to be assessed by Department of Industries - Water (formerly NSW DPI Water), will be required for any works within 40 m of the highest bank of the watercourse, including remedial contamination works (refer to PS02-AZ09, Attachment B).

5 Remediation Programme

5.1 Remediation Goals

The remediation goal is to remediate identified site contamination to enable proposed primary school land use, and mitigate the potential risk to sensitive receptors.

5.2 Extent of Remediation Required

Remediation requirements are developed based on identified contamination, and Client advice regarding site development scenario. It is understood the site shall be developed as a primary school. The land in the areas likely to require remediation is not proposed to be formally used as part of the primary school, and is expected to remain vacant, except for formal and informal play areas. Depending on final extent of fill, some areas may be used for wastewater engineering works, including sub-surface irrigation.

Notwithstanding, remediation of site areas impacted by asbestos containing material is required prior to proposed primary school development on the site. Due to data gaps outlined in Section 3.4, the precise extent of remediation works shall be refined through the data gap closure investigation (Section 4).

5.3 Assessment of Remediation Options

5.3.1 Overview

The following section outlines the process for selecting appropriate remedial strategies, and is completed in general accordance with the guidance outlined in NSW OEH (2011) and NSW EPA (2017).

5.3.2 Assessment of Remedial Options for Soil Remediation

A review of soil remedial technologies has been undertaken to establish which technology or combination of technologies is most suitable to meet the site remediation objectives. NSW EPA (2017) provides a preferred hierarchy of options for site clean-up and/or management, outlined as follows:

- On-site treatment of the contamination so that it is destroyed and the associated risk is reduced to an acceptable level.

- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which the soil is returned to the site.

- Removal of contaminated material to an approved facility, followed, where necessary, by replacement with appropriate material.

- Cap and contain material onsite with an appropriately designed barrier.

Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy would be required.

Review of available soil remediation strategies and technologies is considered on the basis of:

- Effectiveness at achieving remediation objectives.

- Suitability in light of the proposed development.

- Anticipated costs.

- Ongoing environmental and public health adequacy.

Based on the above, the following strategies may be applicable to the remediation of contaminated material:

- Onsite treatment of asbestos contaminated soil through soil sorting and hand picking of bonded fibre cement fragments.

- Excavation, waste classification, and offsite disposal of contaminated soil to landfill.

- Entombment of ACM and capping to remove direct exposure pathways between contaminated soil and future users of the site.

A review of treatment options is presented in Table 6.

Table 6: Summary of proposed soil remediation option.

Remediation Options	Advantages	Disadvantages	Comments
Capping and containment	o Likely to be a low cost option.	o Will not remove contamination. o Human health risk is mitigated by burying but contamination remains onsite. o Remaining future liability, with a long term EMP required to manage remaining contamination. o Note on title indicating presence of onsite contamination. o Requires excavation, and possible disposal, of some fill or clean material to allow sufficient capping barrier. o Final land surface will need to be unchanged as the site is located on a floodplain. o No structures which may present a public health or environmental risk may be constructed on the capped or contained area, which may limit potential development options for the remediated area.	Capping and containment may be a suitable remediation method for portions of fill areas where there is likely to be a large volume fill with confirmed AF/FA contamination, or the extent of asbestos contamination within fill material is unclear. This remediation option allows for material which is expected to contain trace anthropogenic material and potential ACM to remain on site and to be capped with uncontaminated material. This will manage the associated risk of possible ACM content thus providing an appropriate balance between risk and cost of mitigation. However, it places future land use restrictions on the site with the requirement of an EMP and note on title, as well as costs associated with entombment and ongoing management and maintenance of the cap.
Offsite disposal	o Provides the shortest timeframe for remediation. o Removes human health risks and long term management requirements from the site.	o High cost for material transport and disposal charges. o Additional cost associated with classifying wastes prior to offsite disposal.	This proven and reliable technique for managing onsite contamination is suitable as it removes identified contamination and associated risk to human health as well as long term site management responsibilities. Although this remediation technique will meet development objectives, the extent of asbestos impacted soil has not yet been fully determined, and it may be impractical due to cost to remove significant volumes of material from the site. Where removal of all ACM is not proposed, some material is likely to be required to permit construction of an adequate layer without impacting site flood behaviour. Offsite disposal may be used to remediate any identified contamination hotspots.

Remediation Options	Advantages	Disadvantages	Comments
Hand picking of bonded ACM fibre cement bonded fragments	o Likely to be a 'mid' cost option. o Will remove majority of ACM contamination. o Significantly mitigates human health risks and long term management requirements. o Meets redevelopment objectives for removal of asbestos materials. o Offsite removal of large volumes of soils not required thereby limiting landfill use.	o Additional costs for material transport and disposal charges. o Sorting and picking site soils will increase the time frame and cost of site remediation. o Remediated material still has some residual risk of ACM contamination. o Does not address AF/FA impacts (none found on site to date).	This technique is useful to manage surficial onsite asbestos material contamination and may be used to remediate large volumes of bonded ACM impacted soils. Validation testing and inspections by a qualified engineer/contractor is required to ensure site soils meet adopted SAC following completion of hand picking process (refer to Section 6.6.2). Hand picking of asbestos impacted soils may be considered in select areas of the site depending on observed ACM content. It is an unsuitable remediation technique for areas impacted by AF/FA contamination. The costs and time associated with this remediation option may not fit with the proposed development schedule. Additional treatment will still be required to remediate other affected contaminated soil areas.

5.4 Preferred Remediation Strategy

In light of the proposed primary school land use, and as yet unconfirmed extent of asbestos contamination, remediation strategies for the fill area are likely to be a combination of all three options in Table 6, depending upon fill material observations. Preferred remediation strategies may be revised following the findings of the data gap closure investigation, which may uncover higher volumes and/or different types of contaminated soils than expected, requiring a more specialised remediation strategy.

5.4.1 Areas with FA/AF Detected

Where FA/AF contamination is confirmed material is to be either disposed of off-site or to be entombed with a minimum 500 mm cap including geotextile marker layer. Final position of material is to be recorded by survey and a site EMP to be developed to manage maintenance of cap.

5.4.2 Areas with Bonded ACM > RAC

Where no AF/FA contamination but bonded ACM contamination greater than RAC is observed, material may be either removed from site, or remediated by picking to remove ACM to levels below NEPM (see below for further details of treatment of remediated material) or be buried and capped onsite as for FA/AF with EMP.

5.4.3 Areas with Bonded ACM < RAC

Where ACM content is verified by testing to be less than RAC limits (either *in-situ* or following picking) material is to be placed with minimum 300 mm uncontaminated cover. Material position is to be identified by survey, however, as burial is precautionary only no EMP is required.

6 Remediation Plan

6.1 Remediation Plan

6.1.1 Overview

The following sections outline works required to remediate identified contaminated soils such that the site is fit for proposed primary school use.

The remediation process shall be completed in 5 stages as outlined in the following sections. The remediation plan is subject to review based on the findings of the data gap closure investigation (Section 4).

Unless otherwise identified, activities discussed below will be the responsibility of the contractor or its representative.

6.2 Stage 1 – Regulatory Approvals / Notification

The following regulatory approval and notifications will be required:

- Notification to Fairfield City Council is required in accordance with SEPP 55 - Remediation of Land (1998, draft 2018) where other development consents do not cover the works. At the conclusion of remediation works, Council shall also be notified outlining completion of remediation.

- Notification to WorkCover NSW will be required due to presence of asbestos contamination.

6.3 Stage 2 – Appointment of Remediation Contractor / Environmental Consultant

For remediation works to be successfully completed, the appointment of a suitability qualified environmental / earthworks contractor is required. If AF/FA is detected onsite as part of data gap investigations, the selected contractor is to have, or be supervised by, the holder of a NSW WorkCover Class A (friable) licence as outlined in the NSW Work Health and Safety Regulation (2011); if no AF/FA is detected onsite, a NSW WorkCover Class B (non-friable) licence will satisfy requirements. An asbestos management plan (AMP) is to be prepared by the nominated contractor prior to the commencement of onsite works.

An environmental consultant is to be engaged to oversee and document all stages of the remediation works, perform validation testing and prepare a validation report. The consultant will also be responsible for any required asbestos monitoring, clearance inspections and site supervision during remediation works.

6.4 Stage 3 – Site Establishment

Initial activities on the site shall involve the establishment of site plant and equipment necessary for remediation works including:

- Establishment of site offices, work sheds and amenities for site workers.
- Appropriate decontamination facilities for personnel and plant / equipment.
- Installation of appropriate air monitoring equipment for friable asbestos removal (if required).
- Appropriate physical barriers and site signage is to be erected surrounding site areas requiring remediation. Physical barriers are to be designed with consideration to potential health and safety risks which may arise from the handling of asbestos contaminated soil.
- Establishment of site holding areas for asbestos impacted soil. Site areas nominated to store material (both contaminated and remediated) are to have appropriate environmental controls in place including storm water diversion, erosion and sedimentation controls and dust suppression.

6.5 Stage 4 – Remediation Work

The proposed sequence for remediation is detailed for each remediation approach as follows:

6.5.1 All Remediation Areas

Sequence of works is as follows:

1. Complete land survey of areas to be remediation. Survey to be adequate to validate finished land surface is at or below existing surface levels. These works are required as the remediation area is within a floodplain and any increase in land surface has potential to impact on flood flows across the site.

2. Mark out by pegging or similar methods the areas to be remediated by each of the techniques detailed below.

6.5.2 Off-site Disposal

Sequence of works is as follows:

1. Material to be waste classified (either *in-situ* or in stockpiles formed in the contaminated material storage area) in accordance with NSW EPA (2014) waste classification guidelines.

2. Waste to be excavated and removed from site to landfill licensed to accept material.

3. Validation to confirm removal of all target material.

4. Backfill void.

6.5.3 Onsite Remediation by Picking ACM

Sequence of works is as follows:

1. Fill with bonded ACM in excess of RAC is to be excavated and stockpiled in the holding areas established at Stage 3 above.

2. Fill batches of 10 – 15 m^3 are to be spread to 50 - 100 mm thickness in the designated sorting area.

3. Each batch is to be numbered and a batch data sheet prepared (Attachment D). Data sheets are to record:

    - Batch ID (unique number).
    - Date of material excavation and source.
    - Date and time of treatment.
    - Date of validation sample collection.
    - Date of approval for material's use.
    - Sheets are to be signed by supervising environmental consultant on sampling of the batch and on approval of the batch for use.

4. During the spreading of the material for picking, anthropogenic inclusions > 100 mm are to be removed and separately managed for recycling or offsite disposal.

5. Following placement of the soil batch into the designated sorting area, the soil is to be handpicked and sifted through with steel rake by suitably qualified, WorkCover licensed asbestos removalists. Material is to be traversed in 1 m wide transections with subsequent transects perpendicular to the previous one.

   Each batch is to be picked and then reraked / respread and repicked until no fragments are collected for a minimum of 3 passes. Results of each pass are to be recorded on the batch data sheet.

   Collected ACM material is to be appropriately bagged, weighed and disposed of to a facility licenced to accept asbestos waste.

6. At the completion of picking and three passes with no additional fragments located the batch is to be placed in a pile for validation inspection and validation. The pile is to be clearly identified with a survey peg showing the batch number.

7. The batch stockpile is to be validated by the site environmental consultant through the collection of soil samples and visual validation criteria (i.e. no visible ACM and no anthropogenic inclusions > 2%). The validation process is discussed further in Stage 5 – Site Validation (Section 6.6).

8. Once the soil batch has been successfully validated and the batch sheet has been reviewed and signed by the environmental consultant, the material is to be placed in the designated holding area for remediated material.

9. The picking process will be an ongoing process that continues to excavate, sort and pick, validate and store / use the ACM impacted fill until all ACM identified fill material has been treated.

6.5.4 Onsite Entombment of Material with ACM < RAC

The following sequence of works applies to any material to be entombed on site which has either been validated as remediated by picking (Section 6.5.33) or material confirmed by testing as containing ACM but at concentrations below RAC criteria:

1. Material to be placed or graded with upper surface not higher than 300 mm below natural surface.

2. Extent of material to be recorded by land survey and upper surface levels documented by registered surveyor.

3. Uncontaminated fill to be placed over entombed material with a minimum thickness of 300 mm.

4. Validate cap thickness by comparison of pre and post cap survey levels.

6.5.5 Onsite Entombment of Material with ACM > RAC

The following sequence of works applies to any material to be entombed on site which has bonded ACM inclusions at concentrations in excess of RAC or any detected AF/FA:

1. Material to be placed or graded with upper surface not higher than 500 mm below natural surface.

2. Layer of geotextile (BIDIM A19 or comparable) to be placed over entombed material as a marker layer.

3. Extent of material to be recorded by land survey and upper surface levels documented by registered surveyor.

4. Uncontaminated fill to be placed over entombed material with a minimum thickness of 500 mm.

5. Validate cap thickness by comparison of pre and post cap survey levels.

6.6 Stage 5 – Site Validation

Prior to the site being declared fit for primary school land use, a validation report documenting the completed remediation works and results of onsite validation testing must be prepared by the appointed site environmental consultant. The following sections outline the site validation requirement.

6.6.1 Data Quality Objectives

A data quality objective (DQO) process is required to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of the site. Table 7 outlines DQO which have been prepared in general accordance with NSW EPA (2017) and ASC NEPM (1999, amended 2013) guidelines.

Table 7: Data quality objectives for the assessment of soil investigations.

Step 1 **Stating the Problem**	Site investigations have identified asbestos contamination which requires appropriate remediation before the site can be deemed suitable for the intended primary school land use.
Step 2 **Identifying the Decision(s)**	To assess the suitability of the site for future primary school use, decisions are to be made based on the following questions: o Has the completed remediation works removed or otherwise mitigated the identified risk to future site users? o Is the current soil quality suitable for the intended primary school land use? o Are there any aesthetic impacts remaining in the remediated areas? o Is any future management of site soils required?
Step 3 **Identification of Inputs to the Decision**	The inputs to the assessment of site soil quality will include: o Existing site environmental data. o Observations during remediation activities. o Soil sampling results from site areas undergoing remediation works. o Assessment of analytical results against site suitable human health and ecological risk criteria.
Step 4 **Study Boundary Definitions**	Study boundaries are as follows: o Lateral – Lateral boundary of the assessment is defined by the site boundary as indicated in Figure 1 (Attachment A), subject to modification by the data gap closure study. o Vertical – Vertical boundary will be governed by the maximum depth reached during remediation works, up to the maximum depth to underlying natural soils. o Temporal – The dates of site inspection and validation sampling.
Step 5 **Development of Decision Rules**	The decision rules for this investigation area are as follows: o If the concentration of asbestos in the soil data collected from a remediation area do not exceed the validation criteria, then the area or soil portion can be confirmed as validated. o If the concentration of asbestos in the soil data collected from a remediation area exceeds the validation criteria then have remediation capping works in accordance with the RAP been completed? o Has all material nominated for offsite disposal been classified in accordance with NSW EPA (2014) Waste Classification Guidelines, and disposed to appropriately licensed landfill?
Step 6 **Specification of Limits on Decision Errors**	Guidance found in ASC NEPM (1999 amended 2013) Schedule B2 regarding 95% upper confidence limit (UCL) states that the 95% UCL of the arithmetic mean provides a 95% confidence level that the true population mean will be less than or equal to this value. Therefore, a decision can be made based on a probability that 95% of the data collected will satisfy the site acceptance criteria. A limit on decision error will be 5% that a conclusive statement may be incorrect.
Step 7 **Optimisation of Sampling Design**	The validation testing program will aim to ensure that all the necessary data is collected to confirm the site suitability for the intended primary school use.

6.6.2 *Validation Criteria*

To ensure that site remediation works have rendered the site fit for the proposed primary school use, asbestos health screening levels for Residential A land use (which includes primary school land use) shall be adopted as site validation criteria for uncapped material, in accordance with ASC NEPM (1999, amended 2013). A summary of adopted remediation acceptance criteria (RAC) is presented in Table 8.

Table 8: Adopted asbestos RAC.

Form of Asbestos	Adopted Health Screening Level (w/w)
Bonded ACM	0.01%
FA and AF	0.001%
All forms of asbestos	No visible asbestos for surface soils

Where material is capped, the revalidation criteria are:

- 300mm cap for any remediated fill (Section 6.5.3) or for any material with ACM detected but below RAC.
- 500mm cap with geotextile for any AF/FA or ACM impacted fill exceeding RAC.

6.6.3 *Validation Sampling Program*

Table 9 outlines the proposed soil validation sampling frequency and analytical program. Sampling frequency has been set to satisfy the requirements of NSW EPA (1995) *Sampling Design Guidelines*. Remediation strategies may be used singularly, or in conjunction with other remediation techniques.

Table 9: Proposed validation sampling program.

Remediation Area	Remediation Process	Required Testing
Identified ACM impacted areas	ACM impacted material removed and no capping proposed	o Visual inspection of area to confirm no surface ACM and no evidence of residual fill. o If visually assessed residual 'natural material', excavate test pits to not less than 1 m to confirm absence of fill, 1 pit / 20m^2. o Visual validation of remediation acceptable if material is very clearly natural material. o Where exposed material is not very clearly natural material samples are to be taken to verify the material's character. Samples are to be taken at a rate of 1 / 20 m^2 (base) and 1 per 10 linear metres (walls). Validation bulk (10L) soil samples shall be taken then sieved using a 7 mm sieve to confirm the

		absence of bonded ACM within the soils. Testing is to be completed following methodology outlined in ASC NEPM (1999, amended 2013). Following sieve analysis, replicate samples are to be taken from sieved soils and sent for laboratory testing for AF/FA.
Identified ACM impacted fill to be entombed on site	Cap to be placed	o No soil testing of material to be entombed is required. o Survey to validate cap thickness and final finished level as no higher than site levels prior to remediation. o Cap material to be certified VENM from approved offsite source or to be site won from area identified as free of contamination and anthropogenic fill impacts.
	Site picking of ACM	o Visual inspection of each soil batch for ACM. o A minimum of 1 bulk sample collected from each soil batch is to be collected and tested in accordance with ASC NEPM (1999, amended 2013) methodology for asbestos in soil (10L samples sieved, sub-sampled and tested as for validation detailed above). o Sampling is to be completed at a frequency of no less than 1 per batch. This rate may be reduced with composite bulk samples assessed if earlier batches (not less than 10) consistently pass validation. A composite from not more than 3 batches is acceptable regardless of past remediation performance.
Treatment and storage areas – on completion of treatment works	Following completion of works	o Following the completion of remediation, visual validation of areas used for treatment and storage of asbestos impacted material will be required. Visual validation is to confirm that no residual fill material nor asbestos contamination is present. o Validation samples are to be collected at a rate of 1 per 20 m^2 on a grid and tested for AF/FA (asbestos in soil).

6.6.4 Validation Test Failure

The following steps shall be taken should any remediation validation fail:

- Visual assessment fail – If ACM is identified during a visual assessment of a remediation area, the area is to be re-scraped (minimum 100 mm) with scraped material placed in the contaminated material holding area and waste classified for offsite disposal or treatment onsite. This process shall repeat until a successful visual validation of the area is complete or until sufficient depth for capping is achieved.

- Batch fail visual / sieve – If any remediated batch fails the RAC w/w assessment the batch is to be pre-processed, resampled and revalidated. If a single batch fails more than once it is to be entombed as >RAC waste or removed from site.

- Batch fail for AF/FA – if a batch fails laboratory analysis and RAC for AF/FA, material is to be entombed as > RAC waste or removed from site.

- Laboratory assessment fail – If laboratory results find the concentration of asbestos exceeds the adopted RAC outlined in Table 8 for any validation sample (other than batch validation discussed above), the tested excavation surface is to be further excavated and spoil entombed as > RAC material or removed from site subject to waste classification procedures. This process shall repeat until soil sample results are below RAC.

6.6.5 Imported Material Protocol

Where soil, rock, aggregate, mulch or similar material is imported to site, material is to be documented and verified as being uncontaminated prior to acceptance / placement. The process for the validation of material shall depend on the source of the material as follows:

1. VENM: virgin natural material (soil or rock) imported to site is to be certified as VENM by an appropriately qualified consultant or be supplied from a natural rock quarry and VENM certification to be reviewed and approved by the Environmental Consultant.

2. ENM and other waste exempt materials and landscaping products – any material covered by a NSW EPA waste exemption is to be provided with certification detailing the testing and quality control measures used to confirm the material as exempt material, certification to be reviewed and approved by the Environmental Consultant.

On receipt of material at site, confirmation testing is to be undertaken. Testing rates are to be determined by the environmental consultant with consideration of the material's source, other available documentation, past testing of material and the variability of the material's character.

Typically, verification samples are to be collected at a rate of 1 / 100 m^3 of imported material. The typical testing regime for material is to include HM, TRH, BTEX, PAH, OCP/OPP and asbestos. Sampling rate and COPC testing may be varied depending on the nature of the material imported, its source and accompanying documentation.

Any recycled aggregate 'exempt material' imported to site is to be tested at the above rates with testing completed for both AF/FA and also sieve analysis in accordance with ASC NEPM (1999, amended 2013) as detailed in Section 6.6.3. Furthermore, stockpiles of recycled aggregate imported to site are to be inspected by the environmental consultant and raked thoroughly to confirm the absence of ACM inclusions. No recycled aggregate material is to be used prior to inspection, sampling, receipt of laboratory results and written certification of suitability of material by the environmental consultant.

6.6.6 *Quality Control/Quality Assurance*

The following field QA/QC measures will be completed and reported for all material sampled:

- Collection of intra-laboratory duplicate samples at a rate of 1 per 10 primary samples (minimum 1 per day of sampling) to assess sampling analytical process and laboratory replication of results. No duplicates are required for 10L sieve samples.

All samples will be analysed by a NATA accredited testing laboratory. The analytical laboratory will be required to perform internal quality control procedures specific to analytical methods and guidance documents. These may include, but are not limited to:

- Laboratory blanks - Analysed with each set of samples to assess analytical accuracy (not typically used for AF/FA testing).

- Duplicate - Complete duplicate analysis of a sample from the process batch to assess reproducibility of results.

- Matrix Spike – Used to monitor the performance of the analytical method adopted and to determine whether matrix interferences exist (not typically used for AF/FA testing).

- Surrogate Spike – Assessment of matrix effects and sample preparation losses (not typically used for AF/FA testing).

6.6.7 Data Assessment

Laboratory data will be reviewed by the appointed environmental consultant and assessed by applying data validation guidelines. The data will be compared to the adopted validation or waste classification criteria. Statistical interpretation of validation data may be required to establish that the remediation goals have been met. Based on comparison, areas that have undergone satisfactory remediation will be identified and will be designated as "No Further Action Required." Where the validation criteria have not been met, further remediation works and validation sampling will be required.

6.6.8 Validation Reporting

A site validation report will be prepared by the appointed environmental consultant at the completion of remediation works. This report shall document the remediation and validation sequence, detail all validation sampling and results of assessment, provide material tracking data for material taken from site and document any imported material and testing of it.

The document shall also include details of any remaining site contamination and identify residual risks posed by remaining contaminants.

6.7 Waste Classification of Excavated Material

Prior to offsite disposal of any excavation soils, fill or other material, formal waste classification in accordance with NSW EPA (2014) Waste Classification Guidelines is required.

Samples are to be collected from excavated soil stockpiles at a rate determined by the supervising engineer to adequately assess the material, and in accordance with NSW EPA (2014). Typical rates are 1:25 m^3 (with a minimum of 3 per stockpile). Samples are to be analysed for TPH, BTEX, OCP/OPP, PAH, heavy metals, and asbestos. Results are to be documented for the purpose of offsite disposal.

Total volumes of contaminated soil requiring offsite disposal will not be fully known until the data gap closure investigation has been completed.

Material being disposed offsite will require tracking. This shall entail recording of vehicle registration numbers, number of truck movements approximate volume of materials transported. Material tracking documentation is to be supplied to the appointed environmental consultant upon completion of remediation works, along with tipping documents supplied by the accepting landfill.

Waste classification documentation and waste dockets from the receiving landfill are to be provided in the validation report.

7 Site Management Plan for Remediation

7.1 Overview

A site specific Environmental Management Plan (EMP) and Worker Health and Safety Plan (WHSP) are to be prepared by the contractor prior to the commencement of remediation works. The following sections are intended as a guide to the information that should be included in these plans.

7.2 Environmental Management Plan

A site specific EMP shall be prepared to ensure works do not negatively impact on potential receptors (humans and environment) and comply with applicable environmental legislation.

Based on the site condition and proposed remediation method, primary environmental hazards requiring management during remedial works may include:

- Stormwater and soil management.
- Noise controls.
- Odour control.
- Air quality / dust control.

Additional onsite management issues that may be included in the Construction Environmental Management Plan (CEMP) include:

- Site access and security.
- Signage and contact information.
- Traffic control.
- Hours of operation.

Suggested requirements for these management points are discussed in the following sections.

7.2.1 Soil and Stockpile Management

The following points should be addressed regarding soil and stockpile management:

- Detailed records of stockpile material, location and volume are to be prepared and kept onsite. Stockpile records are to be maintained and updated with any changes (i.e. offsite disposal).
- No placement of soil or other material on Council properties (footpaths / nature strips) unless prior approval is sought.
- All contaminated stockpiles are to be covered by appropriate weighted plastic liners to reduce the potential for air pollution.
- All stockpiles containing soil or material identified as contaminated shall be stored in clearly marked areas with appropriate signage.

7.2.2 Noise Control

To mitigate noise impacts which may arise as a result of remedial works, the contractor will undertake works in accordance with state and local noise regulations. The contractor's machinery, including machinery hired by the contractor, should be in good working order so that abnormal machine noise is avoided.

All works are to be undertaken within the Fairfield City Council designated working hours (Section 7.2.8).

7.2.3 Odour Control

Based on the identified site contaminants (asbestos), odour is not considered to be of major environmental concern. Should odours be encountered, contingency measures including the covering of stockpiles and the use of odour suppressant spays should be implemented.

7.2.4 Air Quality / Dust Control

If required during excavation of identified ACM material, air quality monitoring may be undertaken. Monitoring points should be positioned around the site boundary and monitoring for asbestos fibres or other potential airborne fibres, to be determined by a suitably qualified environmental consultant licensed to undertake asbestos assessments.

Dust control procedures are to include:

- Erection of dust screens around the site perimeter.
- Cover of all soil loads entering or exiting the site.
- Use of water sprays across the site.
- Covering of all soil stockpiles.

7.2.5 Site Access and Security

Prior to works commencing, barricades shall be erected to control access to the designated work area, along the proposed remediation area boundary. Signage should be erected, identifying the area as asbestos contaminated and no unauthorised access is permitted. Site security and access controls must remain in place during all onsite construction works.

7.2.6 Signage and Contact Information

Security fencing and appropriate signage around all open excavations must be installed and maintained by the contractor.

A sign displaying the contact details of the contractor (including the onsite foreman or manager) shall be displayed for the duration of onsite works.

7.2.7 Traffic Control

Prior to exiting the site, vehicles shall be required to pass through a stabilised exit point to remove potentially contaminated soil that may have accumulated while onsite. Prior to leaving the site, during the decontamination phase, earthworks machinery are required to decontaminate upon plastic sheeting laid beneath vehicles, with all accumulated, potentially contaminated, soil removed. Plastic sheeting and contaminated soils collected should be disposed of with classified waste for subsequent offsite disposal.

7.2.8 Hours of Operation

Onsite works are only permitted during the following hours as outlined in the Fairfield City Council code of practice:

- Monday – Friday: 7 am – 5 pm
- Saturday: 8 am – 1 pm

- Sunday and public holidays: No work permitted.

These hours may be modified by site development consent or by approval of Fairfield City Council.

7.2.9 Monitoring Requirements

During excavation and movement of identified contaminated materials onsite, it is recommended that a suitably qualified environmental consultant is present on site during this process to observe and record the condition of the material. This is additional to project contingency plan arrangements (Section 10). Such recorded observations will be included in a validation report, to be completed at the conclusion of remediation.

Where contaminated soils and ACM are removed from site, they are to be disposed of to a suitably licensed landfill facility, with material volume and tracking documentation supplied to the appointed environmental consultant upon completion of remediation works.

7.3 Worker Health and Safety Plan

Worker health and safety of all onsite workers or visitors is the responsibility of the contractor. The purpose of a WHSP is to provide relevant health and safety information for all personnel undertaking work or visiting the site.

All onsite personnel and visitors must read the WHSP and acknowledge the requirements prior to entering the site.

The WHSP should include (but not necessarily be limited to):

- Legislation requirements.
- Hazardous materials identification (including fuel and chemical management).
- Induction requirements.
- Worker facilities.
- Designation, delineation and control of access to various work zones.
- Community notification.
- Contingency management.

- Roles and responsibilities.
- Training and competency.
- Hazard identification and risk assessment.
- Control measures including personal protective equipment (PPE).
- Incident and emergency response.
- Safe work method statement.
- Audits.

7.3.1 WHSP Legislation and Standards

All onsite works should comply with current legislation, regulation and standards. As a minimum all work is to comply:

- Workplace Health and Safety Act (2011).
- Workplace Health and Safety Regulation (2011).
- Work Safe Australia – How to Safely Remove Asbestos: Code of Practice (2011).

Additional codes of practices and standards that should be followed include:

- AS 1940 (2004) – The Storage and Handling of Flammable and Combustible Liquids
- AS 2436 (2010) – Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites;
- Hazardous Manual Tasks Code of Practice (December 2011)
- Managing the Work Environment and Facilities Code of Practice (December 2011);
- Managing Noise and Preventing Hearing Loss at Work Code of Practice (December 2011);
- Work Health and Safety Consultation, Co-operation and Co-ordination Code of Practice (December 2011).

7.3.2 Hazard Assessment

An Occupational Health & Safety (OH&S) health and safety hazards assessment is to be completed by the contractor and incorporated into the WHSP. Key hazards may include:

- Asbestos containing material and asbestos fibres in air.
- Onsite chemical hazards (storage of fuels, contaminated soils.
- Heat exposure for workers.
- Potential flooding.
- Buried services.
- Potential fast-moving grass fires.
- Noise.
- Red-bellied black snake bite.
- Dust.
- Contact with overhead electricity lines at site entrance.
- Operation of heavy equipment.
- Earth collapse during excavation work, especially during and after heavy rainfall.
- Operation of electrical equipment.

7.3.3 Asbestos Management Plan

Prior to the commencement of remediation works onsite, an Asbestos Management Plan (AMP) is to be produced outlining but not limited to:

- Occupational health and safety requirements.
- Personnel responsibilities.
- Purpose of the remediation.
- Description of works.
- Decontamination processes.

- Waste disposal.
- Contingency plans.

All works relating to the removal of asbestos waste in soil is to be completed by a contractor appropriately licensed by WorkCover NSW. The contractor shall prepare an AMP and, if required, engage a NATA accredited air monitoring consultant (occupational hygienist) to conduct asbestos air monitoring to determine and report on airborne asbestos fibre generated during normal operations and activities, as per Enhealth (2005) guidelines.

7.3.4 Worker Facilities

Facilities for workers at the site must be supplied in accordance with the Work Health and Safety Regulation (2011) including the relevant Codes of Practice.

Lunch rooms and toilet/washing facilities shall be separate from the designated work areas.

7.3.5 Site Inductions

Prior to starting works, site workers involved in the project shall attend a site-specific safety induction.

Documented evidence of the safety induction/s must be readily available on site and will be recorded on forms. The contractor should supply site workers including visitors to the site with appropriate PPE as outlined in Section 7.3.6.

7.3.6 Personal Protective Equipment

To reduce short and long term health risks associated with the potential exposure to the contaminants of concern, the minimum level of PPE required for people, depending on the site activity, are listed below (Table 11).

Table 10: Personal protective equipment.

Type	Description	Required Activity
Head protection	Hard hat	All site activities
Eye protection	Safety glasses	All site activities
Hand protection	Disposable nitrile gloves	Soil sampling activities
	Cut resistant gloves	Manual handling activities

Type	Description	Required Activity
Respiratory protection	Minimum P2 rated	During asbestos remediation works
Body protection	Disposable overalls	During friable asbestos remediation works
	High visibility clothing	All site activities
	Sunhat, sun screen	All site activities
Foot protection	Steel toed boots	All site activities
Hearing protection	Ear plugs or ear muffs	Site activities likely to generate potentially harmful noise levels.

Site personnel should be aware that personal protection equipment required to be worn may limit manual dexterity, hearing, visibility and may increase the difficulty of performing tasks. PPE places an additional strain on the user when performing work that requires physical activity.

Eating, drinking, chewing gum or tobacco, smoking or any practice that involves hand to mouth transfer increases the probability of ingestion of foreign matter into the body. Hands must be thoroughly washed before eating, drinking or smoking. Clothing which becomes dirty from onsite work should be washed separately from other clothing.

7.3.7 Personal Decontamination

Personal decontamination must be undertaken each time a person leaves a designated asbestos contaminated area. Personal decontamination procedures are to include the following:

- The removal of all visible asbestos dust/residue from PPE.
- Disposable overalls, outer gloves and respiration equipment, must not be transported outside the designated asbestos work area except for disposal or following decontamination.

8 Identification of Regulatory Compliance Requirements

8.1 State Environmental Planning Policies

In accordance with SEPP 55 - Remediation of Land (1998; draft 2018), it is considered proposed remediation works would likely classify as Category 1 as they may be located within a floodway, and therefore would require development consent.

Only a small portion of the dam is zoned as Environmental Protection. If remediation in Environmental Protection zoned land was required, it would also be considered Category 1 remediation and would require Council consent.

8.2 Waste Disposal Requirements

All soil is to be waste classified in accordance with NSW EPA (2014) Waste Classification Guidelines prior to offsite disposal. Should soils be transported to a landfill, it is a requirement that the receiving landfill be licenced to accept the category of waste leaving the site.

Waste classification documentation and waste dockets from the receiving landfill are to be kept for site validation purposes.

8.3 Asbestos Licences

All asbestos removal shall be undertaken in accordance with relevant work health and safety regulation including but not limited to:

- WorkCover Asbestos – Guidelines for Licensed Asbestos Removal Contractors (2008).
- Work Safe Australia – How to Safely Remove Asbestos: Code of Practice (2011).

9 Remediation Contacts

Names and phone numbers of appropriate personnel for contact during the remediation will be provided prior to commencement of remediation work.

10 Contingency Plan for Remediation and Redevelopment

10.1 Overview

It is considered possible that unexpected situations may occur during remediation and site redevelopment works including the possibility to uncover unidentified contamination. A site contingency plan for managing unexpected situations should be prepared by the contractor. Unexpected situations that may arise include:

- Inability to fully remediate the site.
- Uncovering types of contamination that are not presently identified.
- Uncovering of any additional and/or different type of asbestos waste.
- Generation of unacceptable asbestos fibres.
- Generation of unacceptable dust.
- Generation of unacceptable noise.
- Excessive rainfall and/or flooding of the site.
- Collection of water in excavations.

The following sections shall outline procedures to be adopted should any of the above listed events occur.

A flow chart outlining unexpected finds protocol is presented in Attachment C.

10.1.1 Incomplete Remediation

All soil to be retained onsite must conform to site specific health and ecological investigation levels. In the event that this requirement cannot be achieved, the following actions will be required to ensure site suitability for primary school and open play space land use.

- Preparation of a site specific human health risk assessment (HHRA).
- Development of an environmental management plan (EMP).

The EMP will be required to describe the nature and location of contamination remaining onsite, required management procedures and any ongoing monitoring and auditing requirements if required.

10.1.2 Unknown Materials

If during remedial/construction work, material is encountered which appears to be potentially contaminated, and appears to be different from the soils encountered during previous site DSIs (MA 2017a and SESL, 2015), or point sources of contamination, i.e. buried drums, which were not expected to be present are encountered, the following procedures are to be applied:

1. Suspicious material/soil which has been excavated should be stockpiled on bunded, strong, impermeable plastic sheeting, protected from erosion, with seepage retained.

2. Excavation works at that part of the site where the suspicious material (soil, fill or other) was encountered should cease until observed by an experience environmental consultant.

3. Based on visual inspection, the environmental consultant will provide interim advice on construction health and safety, soil storage and soil disposal to allow construction to proceed if practicable.

4. Based on sampling and analysis of the material, the environmental consultant will provide final advice, based on comparison of laboratory test results to suitable criteria relating to human health, potential environmental impacts and waste disposal.

In the context of the above, some examples of "suspicious" material would include oily or odorous material, drums or metal or plastic chemical containers.

10.1.3 Control of Dust

Contingency measures are to be prepared and implemented if dust levels exceed acceptable levels (based on onsite observation, measurements by dedicated dust monitoring equipment or community complaints). Possible measures shall include:

- Increased use of water sprays.

- Sheeting utilised to cover exposed areas.

- Changing work protocols i.e. avoid work on windy days.

10.1.4 Control of Noise

Should excessive noise be generated during remediation works, contingency measures shall be implemented which include:

- Identification and isolation of the source.
- Modification of the action of the source.
- Erection of temporary noise barriers.

10.1.5 Excessive Rainfall or Flood Event

Contingency measures to be undertaken in the event of excessive rainfall or flooding of the site include:

- Ensure that sediment and surface water controls are operating correctly.
- Diversion of surface water away from excavations, soil stockpiles and active work areas.
- Appropriate cover over stockpiles.

11 References

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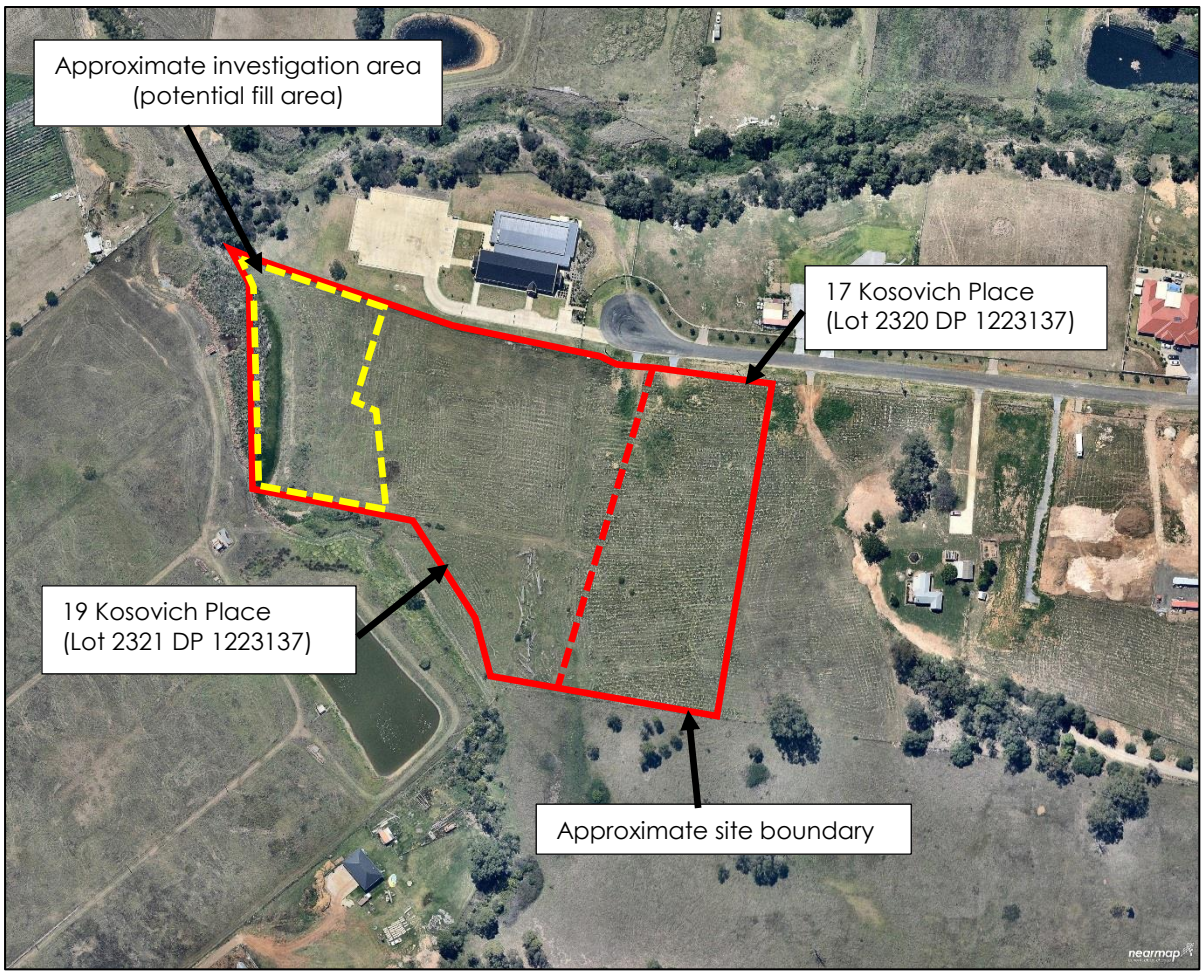
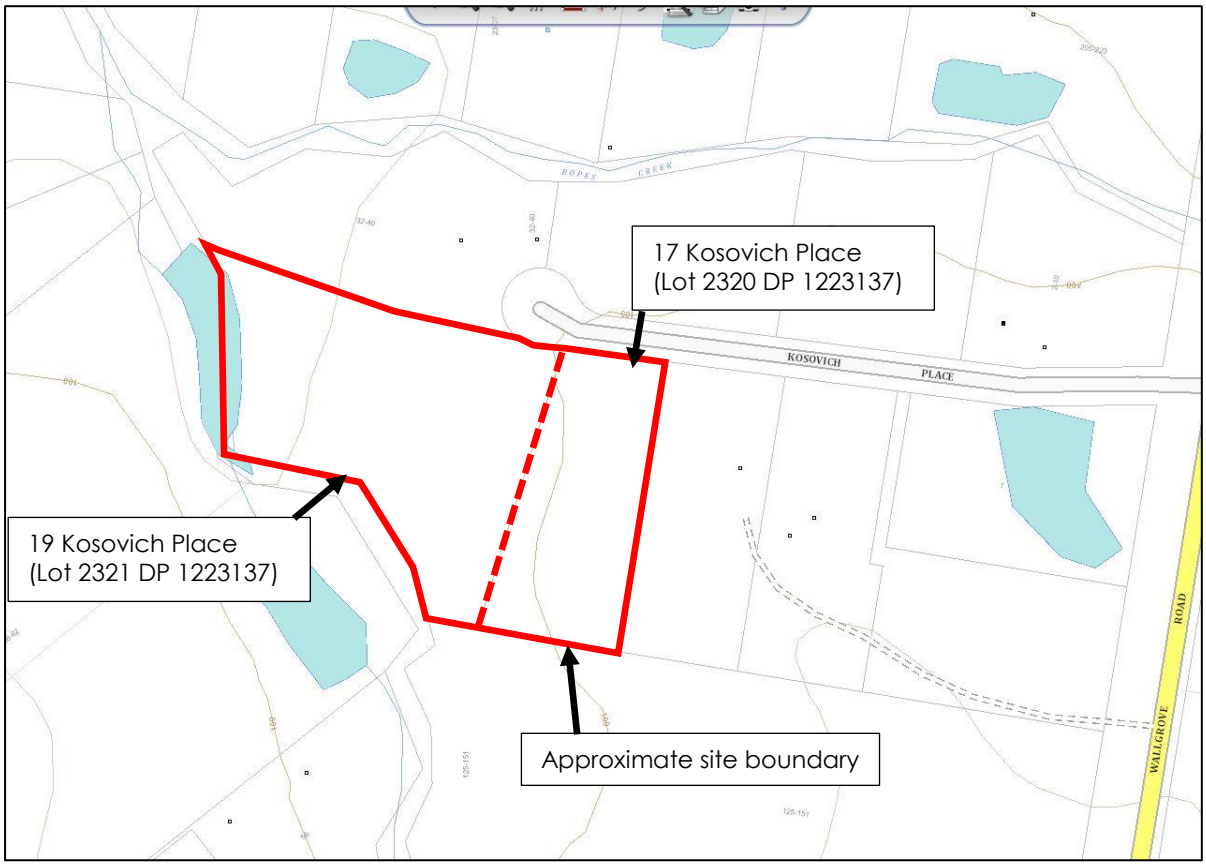
12 Attachment A – Figure





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Martens & Associates Pty Ltd ABN 85 070 240 890		**Environment | Water | Wastewater | Geotechnical | Civil | Management**	
Drawn:	CS	**Site Location** **17 and 19 Kosovich Place, Cecil Park, NSW** **Source: Nearmap, Feb 2017 (top), and** **NSW SIX Viewer, 2017 (bottom)**	Drawing No: FIGURE 1
Approved:	AN		
Date:	July 2018		
Scale:	Not to Scale		Job No: P1705798

13 Attachment B – Areas Requiring Further Investigation, Remediation, and Previous Sampling Points

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
C	**AMENDED TEXT LEADER**	**31/07/2018**	**LZ**	**CS**	**TH**	**TH**
B	CHECKED AND APPROVED	25/07/2018	LZ	CS	TH	TH
A	INITIAL RELEASE	08/03/2018	KH	CS		

SCALE
0 7.5 15.0 22.5 30.0 37.5 45.0 52.5 60.0 67.5 75.0 METRES
A1 (A3) 1:750 (1:1,500)

GRID	DATUM	PROJECT MANAGER
---	---	TH

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All measurements in millimetres unless otherwise specified.
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PROJECT NAME/PLANSET TITLE
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17 & 19 KOSOVICH PLACE, CECIL PARK, NSW

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DRAWING TITLE
BOREHOLES AND SURFACE SAMPLE LOCATIONS SOURCE NEARMAP 2017

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1705798	PS02	R03	PS02-AZ09	C

DRAWING ID: P1705798-PS02-R03-AZ09

PRINTED: --- --- (USER: LZW)
A1 / A3 LANDSCAPE (A1LC_v02.0.01)

14 Attachment C – Unexpected Finds Protocol

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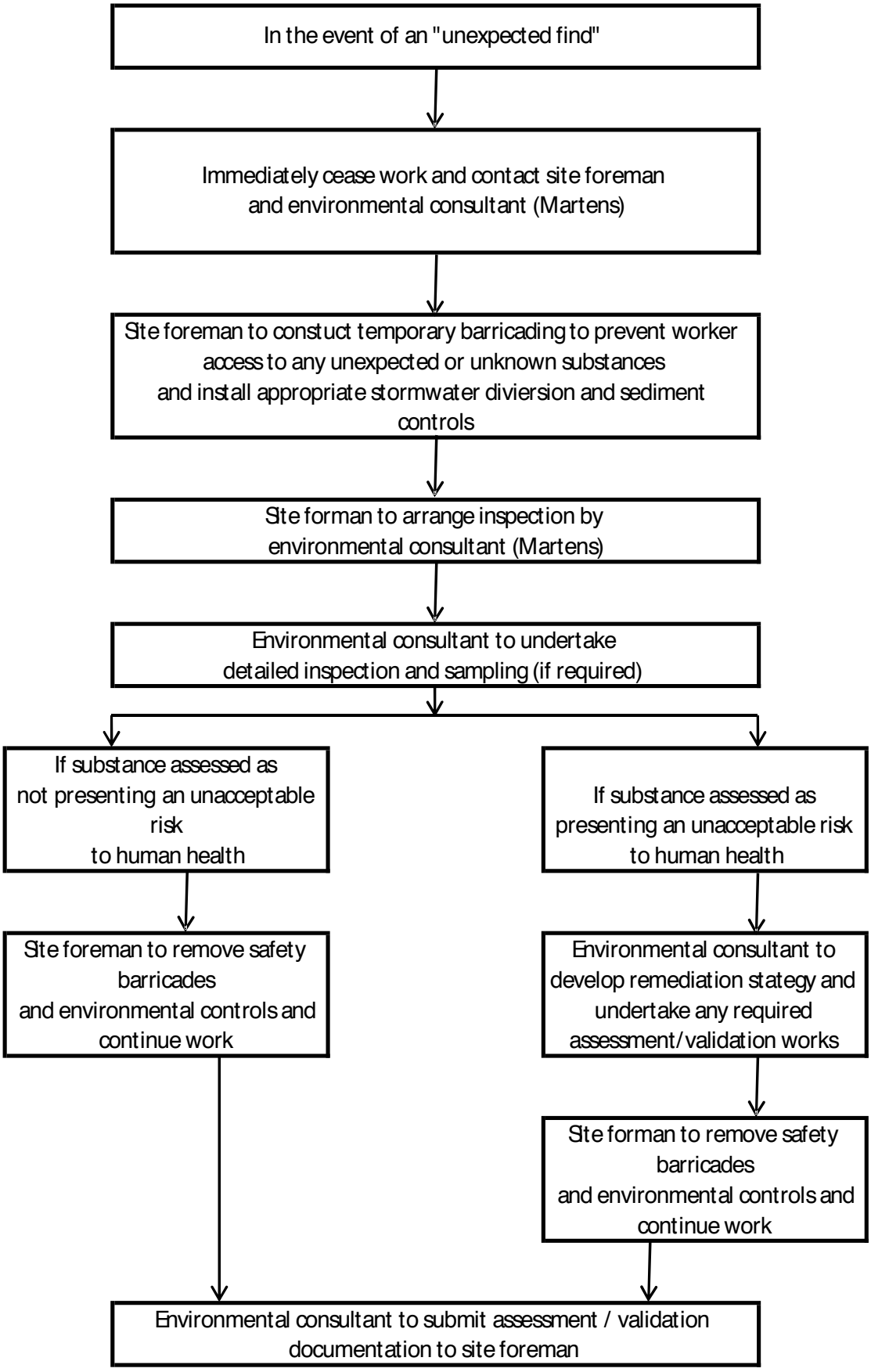
Unexpected Finds Protocol



15 Attachment D – Batch Data Sheet

BATCH DATA SHEET

Batch ID		Batch volume (m^3)	
Excavation Date		Excavation Source	
Treatment Date		Treatment Time	
Validation Sampling Date			
Approval for Use Date			

Pass Number	Number of fragments	Pass Number	Number of fragments
		Initial	**Date**
Batch confirmed as free of visual ACM			
Batch confirmed as fit for use and retention on site YES / NO			

Batch Sampling

Name Signed Date

Batch Approval for Use

Name Signed Date