

CONTAMINATION MANAGEMENT PLAN


Moorebank Precinct East Stage 1, Package 2

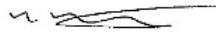
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SYDNEY INTERMODAL TERMINAL ALLIANCE

MOOREBANK PRECINCT EAST STAGE 1, PACKAGE 2

Contamination Management Plan (CMP)

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ACRONYMS AND DEFINITIONS

Terms	Explanation
ANZECC	Australia New Zealand Environment and Conservation Council
ACM	Asbestos Containing Material
AEC	Area of Environmental Concern
AMP	Asbestos Management Plan
As	Arsenic
ASS	Acid Sulfate Soil
CCOS	Council of City of Sydney
Cd	Cadmium
CEMP	Construction Environmental Management Plan
CMP	Contamination Management Plan
CoA	Conditions of Approval
CCoA	Commonwealth Conditions of Approvals
CMM	Commonwealth Mitigation Measures
COPC	Contaminant of Potential Concern
CPCoA	Concept Plan Conditions of Approval
Cr	Chromium
CSWMP	Construction Soil and Water Management Plan
Cu	Copper
Blue Book	Managing Urban Stormwater: Soils and Construction, published by
BTEXN	Benzene Toluene Ethylbenzene Xylenes and Naphthalene
DP&E	Department of Planning & Environment
DNSDC	Defence National Storage and Distribution Centre
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
EPL	Environment Protection Licence
ER	Environmental Representative
ERAP	Environmental Risk Action Plan
ERSED	Erosion & Sedimentation
FCMM	Final Compilation of Mitigation Measures
FERP	Flood Emergency Response Plan
HCB	Hexachlorobenzene
Hg	Mercury
IFD	Intensity Frequency Duration
IMT	Intermodal Terminal Facility
IMEX	<p>Import Export Terminal. Includes the following key components:</p> <ul style="list-style-type: none"> • Truck processing, holding and loading areas - entrance and exit from Moorebank Avenue • Rail loading and container storage areas – installation of four rail sidings with adjacent container storage area serviced by manual

Terms	Explanation
	<p>handling equipment initially and overhead gantry cranes progressively</p> <ul style="list-style-type: none"> Administration facility and associated car parking- light vehicle access from Moorebank Avenue.
IMT facility	<p>MPE Stage 1 Site including the construction of the following key components together comprising the intermodal terminal (IMT):</p> <ul style="list-style-type: none"> Truck processing and loading areas. Rail loading and container storage areas. Administration facility and associated car parking Rail Link.
JBS&G	JBS&G Australia Pty Ltd.
LNAPL	Light Non-Aqueous Phase Liquid
MC	Managing Contractor
MPE	Moorebank Precinct East
NEPM	National Environmental Protection Measure
Ni	Nickel
NSW EPA	New South Wales Environment Protection Authority
NTU	Nephelometric Turbidity Unit
OC/OP	Organochlorides/Organophosphates
OEH	Office of Environment and Heritage
PAC	Planning Assessment Commission
PAH	Polycyclic Aromatic Hydrocarbons
PASS	Potential Acid Sulfate Soil
Pb	Lead
PEM	Project Environmental Manager
PMF	Probable Maximum Flood
POEO Act	Protection of the Environment Operations Act 1997
QA/QC	Quality Analysis/Quality Control
RUSLE	Revised Universal Soil Loss Equation
RSoC	Revised Statement of Commitments
SAQP	Sampling Analysis Quality Plan
SIMTA	Sydney Intermodal Terminal Alliance
SSD	State Significant Development
TN	Total Nitrogen
TP	Total Phosphorus
TRH	Total Recoverable Hydrocarbons
TSS	Total Suspended Solids
UPSS	Underground Petroleum Storage System
UST	Underground Storage Tank
Zn	Zinc

COMPLIANCE MATRICES

Table 1 Final Compilation of Mitigation Measures (FCMM)

FCMM	Requirement	Document Reference
FCMM 7C	<p>A Contamination Management Plan (CMP) will be developed for the Proposal, and included in the CEMP, that will contain detailed procedures on:</p> <ul style="list-style-type: none"> • Handling, stockpiling and assessing potentially contaminated materials encountered during the development works. • A management tracking system for excavated contaminated materials to ensure the proper management of the material movements at the site, particularly during excavation and bioremediation works. • Assessment, classification and disposal of waste in accordance with relevant legislation. 	This Plan

Table 2 Conditions of Approval (CoA)

CoA	Requirement	Document Reference
C7	The approved works (including any excavation required for remediation) must not occur below 5 metres AHD and lower the watertable below 1m AHD on adjacent class 1, 2, 3, 4 land in accordance with the Liverpool Local Environmental Plan 2008.	Section 6
C33 (e)	(ii) measures for the handling, treatment and management of hazardous and contaminated materials (including asbestos);	Section 7 and Section 8

Table 3 Revised Statement of Conditions (RSoC)

RSoC	Requirement	Document Reference
1.71 c)	Developing a Contamination Management Plan with detailed procedures on: <ul style="list-style-type: none"> • Handling, stockpiling and assessing potentially contaminated materials encountered during the development works; • Assessment, classification and disposal of waste in accordance with relevant legislation; and • A contingency plan for unexpected contaminated materials, such as materials that is odorous, stained or containing anthropogenic materials, that may be encountered during site works. 	Section 4 and Section 5 Section 9 Section 10

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1 INTRODUCTION

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 1 of the Moorebank Precinct East (MPE) Project, comprising an Intermodal (IMT) Facility including a rail link (Package 1) and Import Export (IMEX) Terminal (Package 2) on 12 December 2016 (SSD 6766). This Contamination Management Plan (CMP) has been developed to manage impacts to Intermodal Terminal Facility during the construction of Package 2 of the MPE Stage 1 Project (the Project).

Within this plan, a strategy has been established to demonstrate the contractor's approach to the management of Intermodal Terminal Facility. The CMP also accounts for requirements of the MPE Stage 1 Project Environmental Impact Statement (EIS).

This CMP addresses the relevant requirements of the Project Approvals, including the EIS, Submissions Report and Minister's Conditions of Approval (CoA), and all applicable guidelines and standards specific to the management of Intermodal Terminal Facility during construction of the Project.

1.1 Background and Scope

The MPE Project site is located approximately 27 kilometres (km) south-west of the Sydney Central Business District (CBD) and approximately 26 km west of Port Botany and includes the former Defence National Storage and Distribution Centre (DNSDC) site.

The MPE Project involves the development of an intermodal facility, including warehouse and distribution facilities, rail link, freight village (ancillary site and operational services), stormwater, landscaping, servicing and associated works on the eastern side of Moorebank Avenue, Moorebank. It is to be developed in three key stages:

- Stage 1 - Construction of the IMT
- Stage 2 - Construction of warehouse and distribution facilities
- Stage 3 - Extension of the IMT and completion of warehouse and distribution facilities.

Stage 1 of the MPE Project comprises, and would be constructed across, two packages:

- Package 1: The Rail Link (not included within this CMP) includes a connection to the IMEX, and traverses across Moorebank Avenue, Anzac Creek and Georges River prior to connecting to the Southern Sydney Freight Line (SSFL).
- Package 2: The IMEX (subject of this CMP) includes the following key components:
 - Truck processing, holding and loading areas - entrance and exit from Moorebank Avenue
 - Rail loading and container storage areas – installation of four rail sidings with adjacent container storage area serviced by manual handling equipment initially and overhead gantry cranes progressively
 - Administration facility and associated car parking- light vehicle access from Moorebank Avenue.

The layout of the IMEX generally comprises operational areas, an administration area, rail sidings, utilities and drainage infrastructure, landscaping and signage. The operational areas of the IMEX consist of the primary and secondary container loading/unloading areas and container storage areas, and the truck holding area. Within these areas containers would be stacked up to five high.

1.1.1 Environmental Planning Approval

The MPE Stage 1 Project has been assessed by the Department of Planning and Environment (DP&E) under Part 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as State Significant Development (SSD). The Planning Assessment Commission (PAC) granted Approval for the MPE Stage 1 Project on 12 December 2016 and is subject to the Minister's Conditions of Approval (CoA, 18 December 2016 (ref SSD-6766)). The MPE Stage 1 Project, its impacts, consultation and mitigation were documented in the following suite of documents:

- State Significant Development Application SSD 6766
- SIMTA Intermodal Terminal Facility – Stage 1 – Environmental Impact Statement (Hyder Consulting Pty Ltd, May 2014)
- SIMTA Intermodal Terminal Facility – Stage 1 – Response to Submissions (Hyder Consulting Pty Ltd, September 2015)
- *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) Approval (No. 2011/6229) granted on March 2014.

1.2 Purpose and Application

Within the submission of planning approval for the MPE Stage 1, Arcadis (then Hyder Consulting) undertook an Intermodal Terminal Facility impact assessment. SIMTA have developed this CMP based on the initial Intermodal Terminal Facility impact assessment, and to address the final compilation of mitigation measures within the EIS and revised statement of commitments. This plan aims to demonstrate how contamination will be managed during construction of the Project.

This plan provides methods to measure and reduce the impact to Intermodal Terminal Facility by the contractor during the construction of the Project, including all contractor and consultant partners.

Specifically, the purpose of this CMP is to provide detailed procedures on:

- Handling, stockpiling and assessing potentially contaminated materials encountered during the development works;
- A management tracking system for excavated contaminated materials to ensure the proper management of the material movements at the site, particularly during excavation and bioremediation works; and
- Assessment, classification and disposal of waste in accordance with relevant legislation.

This CMP was developed in reference to the following document:

- JBS&G (11 May 2015) DRAFT *Contamination Management Plan (CMP) Moorebank Avenue, Moorebank, NSW*. Qube Property Management Services Pty Ltd c/o Tactical Group. Reference 50342/100501 (Rev A).

The JBS&G (11 May 2015) report was produced for the Stage 1 works; however, required more detail to comply with Condition 7C as detailed in Table 1. This CMP expands on the information provided in the JBS&G report. The JBS&G report should be read in relation to this plan to provide additional background information in relation to contamination. Information and wording presented in this CMP was primarily obtained from the JBS&G (11 May 2015) report.

1.3 Objectives and Targets

The objectives of this CMP are to provide procedures for the management of known or suspected contaminated materials during construction of the Project. The management of these materials will be in accordance with appropriate guidelines and regulations applicable to the Project.

The CMP has been developed to ensure a safe working environment for workers and to avoid unacceptable impact on the natural environment. Unexpected finds may occur in areas which, although searched extensively, contain remnant materials which were obscured by the local topography, the type of surface cover (e.g. building) or at a depth preventing detection. Furthermore, the CMP provides an appropriate framework for an Asbestos Management Plan (AMP) including procedures required for handling and disposing of any identified asbestos containing materials and asbestos impacted soils during the development of the site.

The successful implementation of the CMP requires the appropriate briefing and specific Occupational Health and Safety induction of site workers who may uncover potential chemical contamination (including potential asbestos containing materials). It is proposed this briefing will include the review of this CMP and the associated flow chart (Figure 1, Section 10).

This CMP describes reporting procedures and lines of responsibility (see Section 2). These experts should include those with detailed knowledge of the Project site and details on the location of, and access to, the supporting documents related to the assessment of the Project site.

1.4 Project Location Details

Table 4 below outlines details of the location of the Project to which this CMP relates:

Table 4 Project Location Details

Site Details	
Lot/ Deposited Plan (DP)	Lot 1 in DP 1048263
Address	Moorebank Avenue, Moorebank New South Wales
Local Government Authority (LGA)	Liverpool City Council
Coordinates (GDA94 – MGA56)	Easting: 308351.668 Northing: 6241097.683

The location of the Project will be herein known as the ‘site’.

2 ROLES AND RESPONSIBILITIES

The roles and responsibilities relevant to this CMP are detailed in Table 5 below.

Table 5 Roles and Responsibilities

Role	Responsibility
Principal Contractor	<p>Means the contractor in primary control of the Stage 1 Project.</p> <p>Responsible for notifying the client, appropriate consultant or contractor in relation to contamination or unexpected finds. Also responsible for quarantining Areas of Environmental Concern (AEC) with suitable barricades and informing other works of this/these location(s).</p>
Environmental Consultant	<p>As defined under Schedule B9 of the National Environmental Protection Measure (NEPM) 2009, as amended 2013, as the consultant responsible for the assessment of contaminated sites and preparation of assessment reports.</p> <p>The environmental consultant should be able to demonstrate relevant qualifications and experience to a level appropriate to the contamination issues relevant to the site under investigation.</p> <p>Responsible for notifying the client and Principal Contractor of any unexpected finds. Also responsible for undertaking the assessment, remediation and validation of any AEC in relation to chemical contamination.</p>
Licensed Asbestos Assessor	<p>Means a person who holds an asbestos assessor licence.</p> <p>Responsible for final clearances after asbestos removal works are undertaken.</p>
Licensed asbestos removalist (Asbestos Removal Contractor)	<p>Means a person conducting a business or undertaking who is licensed under the Work Health and Safety (WHS) regulation to carry out Class A or Class B asbestos removal work.</p> <p>Responsible for the safe removal of asbestos of any AEC in accordance with the relevant legislation and codes of practice.</p>
Asbestos Consultant/Competent Person	<p>A person who has acquired through training or experience the knowledge and skills of relevant asbestos removal industry practice and holds a certification in relation to the specified Vocational Education and Training (VET) course for asbestos assessor work or a tertiary qualification in occupational health and safety, occupational hygiene, science, building, construction or environmental health. For all other purposes, competent person means a person who has acquired through training, qualification or experience, the knowledge and skills to carry out the task.</p>
Worker	<p>Any worker on the Project, including any contractor or sub-contractor.</p> <p>Responsible for undertaking their tasks in a safe manner and notifying the Principal Contractor if they see any items/conditions which may constitute an unexpected find.</p>

3 HANDLING CONTAMINATED MATERIALS

Specific management procedures are documented below to firstly ensure the health and safety of workers, surrounding community and the environment and secondly to ensure that the Project objectives can be achieved.

The following management procedure are to be implemented as part of the Unexpected Finds Protocol (Section 10). Where unexpected finds occur that are not documented in the following sections, additional sampling, analysis and quality plans will be required to be documented by the Environmental Consultant.

In general, no suspected or actual contaminated material should be handled by workers or personnel who are not trained in such activities. The Principal Contractor and Environmental Consultant should direct and supervise such activities.

Any health and safety requirements and handling procedures listed in this document may be superseded by the CEMP and/or activity specific procedures or health and safety plans.

3.1 Health and Safety

The CEMP is understood to outline health and safety procedures associated with the Project. The information presented below is to be included, but not limited to the CEMP. The objectives of the health and safety plan are:

- To apply standard procedures that reduce risks resulting from the above works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner;
- To have procedures to protect other site workers and the general public. These objectives will be achieved by;
 - Assignment of responsibilities;
 - An evaluation of hazards;
 - Establishment of personal protection standards and mandatory safety practices and procedures; and
 - Provision for contingencies that may arise while operations are being conducted at the site.

This health and safety section does not provide safety information specific to construction and other excavation activities carried out by contractors, such as the safe operation, maintenance and inspection of plant, etc. Contractors will be required to prepare their own Safe Work Method Statements for their work activities. All parties working on the site shall comply with all applicable Health and Safety legislation, regulations, codes and guidelines.

3.2 Hazards

The known or potential hazards associated with the work activities are listed below:

- Contaminated materials notably Asbestos, petroleum hydrocarbons and Hexachlorobenzene. Refer to Sections 5.1, 5.2 and 5.3 respectively for information and procedures relating to these forms of contamination;
- Physical hazards, including:
 - Work in or near excavations;
 - Operating machinery;
 - Heat stress and UV exposure;
 - Underground or overhead services;
 - Manual handling; and
 - Noise.

In the event of the discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, or of any new hazard that could potentially cause serious harm to personnel or the environment, work will be suspended until the Principal Contractor and/or Environmental Consultant has been notified and appropriate instructions have been provided to workers.

3.2.1 Airborne Hazards

When working with potentially impacted materials in general, care must be taken to ensure that the contamination is not introduced to the worker via ingestion, inhalation or absorption. Appropriate Personal Protective Equipment (PPE) relevant to the task should be worn at all times.

3.2.2 Physical Hazards

3.2.2.1 Operating Machinery

Heavy plant and equipment operating in the vicinity of workers presents a risk of physical injury. Personnel should be cognisant of their position in relation to operating machinery at all times. Personnel must wear high visibility clothing when onsite.

Never walk behind or to the side of any operating equipment without the operator's knowledge. Do not assume that the operator knows your position. Personnel should stay at least 1 m from the operational area of heavy equipment and should not stand directly below any load or piece of equipment (e.g. backhoes, excavators, vehicles).

3.2.2.2 Work In or Near Excavations

No site personnel are to stand closer than 0.5m to the edge of an excavation. No site personnel are to enter excavation greater than 1 m deep. Additionally, at the end of each day excavations are to be barricaded to prevent access.

3.2.2.3 Cuts and Abrasions

The manual work associated with the remediation works gives rise to the risk of cuts and abrasions to personnel working in the area. As well as the direct consequences of any cut or abrasion, such injuries can lead to the possibility of exposure to contaminants through the wound as well as diseases such as tetanus. To minimise the risk of direct or indirect injury, personnel will wear the personal protective equipment described.

3.2.2.4 Heat Stress and UV Exposure

Site personnel may experience heat stress due to a combination of elevated ambient temperatures and the concurrent use of personal protection equipment; this depends in part on the type of work and the time of year.

In addition to heat stress, overexposure to UV radiation in sunlight can result in sunburn to exposed skin. The use of a high protection sunscreen (SPF30 or greater) on all exposed skin is recommended. Hats (including hard hats in specified areas) will also provide additional sun protection during the peak (i.e. 10:00 am to 3:00 pm) sun period. Sunglasses should be worn (where appropriate) to protect eyes from effects of UV exposure.

3.2.2.5 Underground Services

There is a high likelihood for underground services (electricity, natural gas lines, water, telephone, sewer, and stormwater) to be present beneath the work area. The civil contractor shall ensure that appropriate procedures will be taken to minimise the risk associated with excavation near services.

3.2.2.6 Aboveground Electrical Hazards

All electrical plant and equipment must comply with the requirements of Australian Standard AS 3000. Hand held Portable tools shall comply with AS/NZS 3160 "hand-held Portable electric tools" and shall be double insulated.

Cord connected Portable hand lamps shall comply with AS/NZS 3118. A Residual Current Device (RCD) shall protect plug-in Portable equipment, which is connected to a supply above Extra Low Voltage - 12-24volts (including equipment supplied from a generator or welding set). RCD protection shall be provided during maintenance of Portable electrical equipment at all times while the equipment is connected to a power supply above Extra Low Voltage, irrespective of whether power is switched ON or OFF. RCD's shall comply with AS 3190 and shall be type II units, rated to trip at or below 30 milliamps within 40 milliseconds.

3.2.2.7 Manual Handling

When lifting or handling heavy objects, use correct lifting techniques, bending the knees not the back. If the item to be lifted is too heavy or awkward for one person to lift, seek assistance from other company employees or use mechanical help.

3.2.2.8 Noise

Long-term exposure to high levels of noise is unlikely. However, operating machinery may cause significant noise exposures for short periods. Earplugs or earmuffs should be worn in any situation where noise levels make normal conversation difficult.

3.2.3 Personal Protective Equipment

All workers who may come into direct contact with potentially or actual contaminated material will wear the following personal protective equipment (at a minimum):

- Disposable hazmat suit;
- heavy duty outer gloves (e.g. leather) where there is a risk of cuts or abrasions, otherwise PVC outer gloves if in direct contact with contaminated soil;
- steel capped boots;
- safety glasses;
- high visibility vest or jacket;
- P2 disposable dust mask; and
- hard hat.

It is further noted that additional PPE may be required. If this occurs, then the above PPE requirements will be upgraded to reflect these requirements.

3.2.4 Decontamination Procedures

The decontamination procedures specified below will be followed whenever personnel, plant or equipment leave the site.

3.2.4.1 Personnel

The following steps should be taken to ensure personnel do not leave the site with potentially contaminated clothing:

- Wash boots in clean water;
- Remove outer gloves and store for reuse;
- Remove hazmat suit (if used) and store for reuse;
- Remove respirator and goggles (if used) and store clean for reuse or decontamination, as appropriate; and
- Thoroughly wash hands and face.

If any part of a worker's body comes into direct contact with any potentially contaminated material, the affected part(s) should be immediately washed with clean water.

3.2.4.2 Vehicle, Plant and Equipment

All equipment, including personal protective equipment, will be washed or otherwise cleaned to ensure that potentially contaminated material (i.e. soil, water or dust) is removed before it leaves the site. All plant and equipment will have their outer bodies thoroughly cleaned of soil and sediment before moving off the site.

3.2.5 Contamination Control Zone

A contamination control zone will be set-up onsite in the event of the contaminated material being identified or suspected. All personnel entering a contamination control zone must wear the appropriate PPE as discussed above and monitoring procedures must be in place.

The lunch shed and office will be located outside of the contamination control zone and will be designated clean zones. Any personal and plant leaving a contamination zone must undergo appropriate decontamination procedures, in a designated area (decontamination zone) as discussed above, prior to entering the site clean zones.

4 STOCKPILING CONTAMINATED MATERIALS

Excess soils requiring offsite disposal will require additional assessment and should be stockpiled onsite prior to sampling and any additional assessment by a suitably qualified Environmental Consultant. All wastes will be classified, managed and disposed in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (NSW EPA, 2014).

All excavated material removed from site will need to have appropriate Waste Tracking Certificates and **no material is permitted to leave site prior to receiving a waste classification letter.**

The following provides general advice for the management of stockpiles during the Project:

- Stockpiles should be clearly labelled with (at a minimum); stockpile identification name; date of formation, date of sampling; waste classification (if completed); approximate volume of material at the date of sampling; source of material; description of material. This information should also be recorded in a stockpile register. Refer to Section 8 for additional information;
- If a stockpile has been sampled for waste classification purposes, it should not be added to or changed until a waste classification certificate has been produced and the Environmental Consultant approves the movement and/or adding to the stockpile of waste with the same classification;
- No stockpiles or other materials shall be placed on footpaths or roadways and will be away from all stormwater infrastructure (including drainage lines, stormwater pits, gutters, etc.) where possible. Where this is not possible, sediment controls will be placed over stormwater grates to prevent ingress of sediment to stormwater drainage lines;
- Stockpiles should be placed at a safe distance away from excavations;
- Stockpiles shall be formed with sediment control structures placed immediately down slope to protect other lands and waters from sediment pollution;
- Placement of material on a sealed or plastic lined surface; and
- Covering of all excavated/stockpiled material.

Additional information relating to stockpile management is presented in Sections 7.1.4.4 to 7.1.4.7 for the specific stockpiling of asbestos materials. These procedures, such as dust suppression may be applicable to certain stockpiles, pending a review of the contamination present. The Environmental Consultant should specify the most appropriate stockpile handling procedures.

In the event that stockpiled material is not placed on sealed or plastic lined surface then additional sampling of the stockpile footprint, once the stockpile has been disposed, will be required to ascertain that no residual impacted soils are present onsite.

Additional precautions/procedures may be required dependent on the stockpiled material, and should be confirmed by the Environmental Consultant.

4.1 Bioremediation

Dissolved phase hydrocarbon and light non aqueous phase liquid (LNAPL) contamination was identified in the vicinity of the former refuelling facility located at the south western portion of the site. A Remedial Action Plan (RAP) (GHD 2015) was prepared for the former refuelling facility site to make the site suitable for commercial/industrial landuse. The RAP outlined a three-staged approach to remediation, including source removal (tanks and soils), development of a risk assessment and source removal (LNAPL).

The JBS&G (October 2016) document that soil remediation works has been completed. The risk assessment has reportedly also been completed, however, the LNAPL source removal is still ongoing.

Should additional hydrocarbon impacted soils in the former refuelling area, or elsewhere onsite, be disturbed, bioremediation of soils in accordance with well-developed industry standards for land farming including NSW EPA *Best Practice Note: Land farming* can be undertaken for reuse of soils on-site.

Ex-situ bioremediation stimulates the indigenous population of naturally occurring bacteria and fungi to break down hydrocarbon mixtures in soil. The process optimises a range of parameters (oxygen concentration, soil moisture content, soil structure, nutrient levels, pH and temperature) to enhance conditions favourable to bioremediation.

Applying additional nutrients is necessary to optimise the biodegradation process as the major nutrients limiting it are nitrogen and phosphorous. Fertiliser containing N and P is added during the initial mixing phase and may also be added later if required. The fertiliser is added at rates (based on mass) accordingly to C:N:P ratios, specifically 100:10:1. For bioremediation, slow release fertilisers are required, therefore granular Urea will be used for the Nitrogen source and granular Superphosphate will be used for the Phosphorous source.

Organic matter (comprising green waste, compost or other similar material imported onto site) may be added at a predetermined rate by the Contractor, but is not necessary if the indigenous bacteria count is high enough to enable effective bioremediation. In this case, levels of indigenous bacteria in the soil have been determined to be sufficiently high enough to eliminate the use of introduced organic matter.

Once sufficient impacted soil has been stockpiled in the designated area of the bio pad, the bioremediation process is initiated by the addition of nutrients, surfactants and aeration. The planned aeration frequency for bio-remediation is detailed as follows:

- Weeks 1 to 2 - The windrow stockpiles are thoroughly aerated every week using excavation (or similar) machinery. Nutrients are added during the initial mixing.
- Weeks 3 to 12 - The treated windrow stockpiles are thoroughly aerated every 14 days using excavation (or similar) machinery. During this period additional nutrients may be added if required, and as determined by analytical results.
- Weeks 12 – 16 - The treated windrow stockpiles are thoroughly aerated every 30 days using excavation (or similar) machinery.

The optimum height for windrows is between 1.0 - 1.5 meters (bio piles) or <0.5m for landfarming. The stockpile is regularly monitored and depending on how bioremediation is progressing, the stockpiles may be turned more frequently and more nutrients may be added as required.

Temperature is to be measured frequently. To promote biological activity, the temperature should ideally be kept within the range of 10-45 °C.

Moisture is to be measured weekly and additional water may be added via irrigation to ensure moisture levels are maintained between 12-30% by weight. Soils should be moist but not wet as too much moisture restricts the movement of air through them.

pH is to be monitored weekly and should ideally range between 6 and 8 to facilitate bacterial growth. pH has a large effect on the rate of abiotic transformation of organic waste constituents, soil structure and the availability of nutrients.

In addition to the above monitoring and measurement, the organic contaminant concentrations and nutrients levels are measured monthly to determine the progress of the bioremediation process.

Stockpile run off arising from rain may have dissolved organic matter and nutrients with occasional heavy end hydrocarbons. Polyaromatic hydrocarbons and aromatic hydrocarbons are readily adsorbed onto the solid organic matter in the soil and do not normally leach out significantly. All run off is required to be collected via a sump located in the low corner of the bio pad and either reused in the bioremediation process or passed through the water treatment system.

Bioremediation will continue until the concentration of total PAHs, benzo (a) pyrene and total petroleum hydrocarbons (TPH) are below the site re-use criteria.

5 ASSESSMENT OF CONTAMINATED MATERIALS

Assessment of contaminated material is the responsibility of the Environmental Consultant. The purpose of assessing contaminated material is:

- Determine the actual and/or potential risk to human health and/or the environment of contaminated material (including soil, water and dust);
- Determine the most appropriate action (i.e. remediation, non-disturbance etc.) for the contaminated material;
- Provide workers and the Principal Contractor with guidance on how to handle and/or work around the contamination; and
- Document the location, quantity and actions taken to handle the contamination.

Assessment of contaminated material should be completed in accordance with the NSW EPA endorsed guidelines.

Specific guidance for known contamination such as asbestos, petroleum hydrocarbons and hexachlorobenzene are provided in Section 5.1, 5.2 and 5.3 respectively.

In general, the assessment of contaminated materials would involve:

- Implementation of the Unexpected Finds Protocol (UFP) (Section 10) if appropriate;
- Work in the area should be immediately ceased, and the area cordoned off and signage erected to inform workers and the public (if applicable);
- The Principal Contractor and Environmental Consultant should be immediately contacted and informed of the contamination/suspected contamination;
- The Environmental Consultant will develop a strategy to determine the nature of the substance, that is, is it hazardous and, if so, does it exist at concentrations which pose an unacceptable risk to human health or the environment;
- The Environmental Consultant will develop and implement an assessment strategy which meets the requirements the listed in the NEPM ASC 2013, Australian Standard AS4482.1-2005, AS4482.2-1999 and NSW EPA Sampling Design Guidelines (1995);
- The material will be assessed against NSW EPA endorsed guidelines to determine the risk to human health and/or the environment;
- The Environmental Consultant will make recommendations to the handling of material, offsite disposal, and/or on site re-use of material; and
- The results of any investigation and subsequent works associated with the contamination should be documented in accordance with this CMP and NSW EPA endorsed guidelines.

5.1 Asbestos Containing Material

For the management of potential/suspected Asbestos Containing Material (ACM) impacted soils or following the identification and notification of ACM find, the Asbestos Management Plan (AMP) as presented in Section 6 should be implemented.

5.2 Petroleum Hydrocarbon Impacted Soils

Total Recoverable Hydrocarbons (TRH) impacted soils have been noted to be present in the south-western corner of the Stage 1 site in the vicinity of the Refuelling Area. These hydrocarbon impacted soils have since been remediated as documented in the JBS&G Site Audit Report (October 2016). Should additional hydrocarbon impacted soils in this area be disturbed the following actions should be undertaken:

- Implementation of the Unexpected Finds Protocol (UFP) (Section 10);

- Excavation and stockpiling of potentially impacted soils;
- Sampling and validation by the Environmental Consultant of stockpiled soils for potential reuse at a frequency as described in Schedule B2, Section 7.5.2 of the NEPM (NEPC, 2013) for the following contaminants of potential concern (COPC): TRH, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals and asbestos;
- Comparison of validation results to EPA endorsed criteria to assess the suitability of the material to remain onsite;
- Should the material be unsuitable for reuse onsite, classification of the material by the Environmental Consultant in accordance with the NSW EPA Waste Classification Guidelines (NSW EPA, 2014a);
- Validation of walls and floors of excavated areas by the Environmental Consultant using a sampling density of 1 validation sample per 25 m² for the COPCs as stated above;
- Comparison of validation results to NSW EPA endorsed criteria to confirm the validation of the excavation; and
- Preparation of validation/clearance and/or waste classification documentation.

5.3 Hexachlorobenzene Impacted Soils

Hexachlorobenzene (HCB) impacted soils have been noted to be present in the south-eastern corner of the Stage 1 site. Should soils in this area be disturbed the following actions should be undertaken:

- Implementation of the Unexpected Finds Protocol (UFP) (Section 10);
- Excavation and stockpiling of potentially impacted soils;
- Sampling and validation by the Environmental Consultant of stockpiled soils for potential reuse at a frequency as described in Schedule B2, Section 7.5.2 of the NEPM (NEPC, 2013) for the following contaminants of potential concern (COPC): TRH, VOCs, semi-volatile organic compounds (SVOCs), metals and asbestos;
- Comparison of validation results to EPA endorsed criteria to assess the suitability of the material to remain onsite;
- Should the material be unsuitable for reuse onsite, classification of the material by the Environmental Consultant in accordance with the NSW EPA Waste Classification Guidelines (NSW EPA, 2014a). The management of HCB impacted waste soils will be conducted in accordance with the NSW EPA's schedule of chemical wastes chemical control order 2004;
- Validation of walls and floors of excavated areas by the Environmental Consultant using a sampling density of 1 validation sample per 25 m² for the COPCs as stated above;
- Comparison of validation results to NSW EPA endorsed criteria to confirm the validation of the excavation; and
- Preparation of validation/clearance and/or waste classification documentation.

6 MANAGEMENT OF ACID SULFATE SOILS

Acid Sulphate soil is the common name given to a range of soil types containing iron sulphides and/or their oxidation products. When exposed to air, these sulphides oxides to produce sulphuric acid, hence the name acid sulphate soils.

According to the Liverpool City Council ePlanning Acid Sulfate Soil Risk Map, the site lies within an area of 'no known occurrence of acid sulfate soils' and land management activities are not likely to be affected by acid sulfate soil materials. The nearest acid sulfate soils of category 1 to 4 are located less than 500m from the site. Excavation works cannot extend below 5m AHD and/or lower the water table on adjacent class 1, 2, 3, 4 land, unless development consent is granted.

If acid sulfate soils are encountered on the site during remediation or development an acid sulfate soils management plan will need to be prepared. A summary of the management of potential acid sulfate soils (PASS) is as follows:

One option for managing PASS is reburial before oxidation. The Holt Land Rehabilitation Centre at Kurnell currently accepts PASS material for reburial subject to an approved excavation, storage, testing and transport methodology being adopted for the site. This would negate the need for treatment on site prior to disposal.

If reburial is not feasible then soils identified as being PASS will need to be managed in accordance with the following process:

- The PASS will need to be excavated and transported to a specified stockpile area on the site in preparation for treatment. The stockpile area should be located on an impervious surface (e.g. existing concrete hardstand, PVC sheeting etc.) with appropriate drainage and collection points to ensure leachate/runoff from the stockpile can be captured and treated prior to disposal;
- The stockpiled material will need to be mixed with lime to neutralise the acid-production potential. The dosing rates will depend on the concentration of potential acid produced. Refer to table 4.5 of the *NSW Acid Sulfate Soils Management Advisory Committee (August 1998) Acid Sulfate Soils Assessment Guidelines* which provides an indication of the rates likely to be required. The dosing rate may require amendment subject to verification testing on site;
- Validation testing of the treated stockpile will need to be undertaken in the field to ensure the pH of the treated materials is between 6 and 10. Field screening at a rate of 1 test per 25 m³ of treated spoil should be targeted;
- The pH of the collected leachate from the drainage system in the stockpile area will need to be measured and an appropriate buffer solution added to ensure the pH is between 6 and 10 prior to its disposal to stormwater or other approved location;
- The soil and water will need to be classified for disposal in accordance with Waste Classification Guidelines (NSW EPA, 2014) for soils and the relevant stormwater discharge criteria within the Moorebank local government area for water;
- The neutralised PASS will need to be transported from the site and disposed of at a facility that is properly licenced to receive such material. Treated acid-sulphate soils cannot be removed from the site as virgin excavated natural material (VENM) or excavated natural material (ENM) even if they are of natural origin and would otherwise be classified as VENM or ENM. The neutralised PASS will need to be classified but the lowest classification will be General Solid Waste (non-putrescible).

An environmental consultant will need to be engaged to monitor the PASS treatment and validation works.

7 ASBESTOS MANAGEMENT PLAN

An Asbestos Management Plan (AMP) is required to ensure that if ACM or asbestos impacted soils are encountered at the Proposal site during the Stage 1 works, it is appropriately managed to ensure protection of human health of site workers, future site workers and the neighbouring community. This AMP also outlines the requirements for managing any potentially asbestos impacted fill materials.

7.1.1 AMP Objectives

The purpose of this AMP is to outline the required procedures for handling and disposing of any identified ACM and asbestos impacted soils during the bulk earthworks at the Proposal site, to outline the measures required to protect the health and safety of workers who may encounter asbestos containing materials or asbestos impacted soils whilst completing the planned works and to prevent any adverse health effects on any future workers or neighbouring community in accordance with relevant National Codes of Practice and Work Health and Safety Legislation.

Specifically, the objectives are to:

- Outline, monitor and enforce safe working conditions for all workers;
- Outline, monitor and enforce safe environmental conditions for all persons outside of the AECs;
- Outline, monitor and enforce procedures to manage works within asbestos impacted soils/fill identified during the Project works;
- Outline measures for the safe onsite storage and, if required, offsite disposal of asbestos materials in accordance with all relevant legal and statutory requirements; and
- Outline ongoing management requirements to ensure the risk posed by any potential asbestos contamination is properly managed.

7.1.2 AMP Responsibilities

7.1.2.1 Appointment of Principal Contractor

In accordance with the provisions of the Work Health and Safety Regulation 2011 prepared under the Work Health and Safety Act 2011, the Principal Contractor must be appointed as the “person conducting a business or undertaking” (PCBU).

7.1.2.2 Responsibilities of the Principal Contractor

Responsibilities of the Principal Contractor include, but are not limited to the following. The Principal Contractor must:

- Be responsible for the proposed project work at all times until the work is completed;
- Ensure that all persons involved with proposed project work have undertaken occupational health and safety training if ACM is identified;
- Keep records of induction training for workers and any specific training;
- Ensure that any subcontractors provide safe work method statements for the activities for which they are engaged;
- Monitor any subcontractors to ensure that they are complying with the safe work method statements; and
- Maintain a hazardous substances register for all hazardous substances used or present.

The Principal Contractor is responsible for co-ordinating health and safety activities for the project. Other responsibilities of the Principal Contractor include:

- Compliance with occupational health and safety and environmental legislation, regulations, standards, codes and the SIMTA site specific rules relating to safety contained in this AMP;
- Ensuring that sufficient funds are available to procure the necessary health and safety equipment such as personal protective equipment (PPE);
- Managing accident and emergency procedures; and
- Managing workplace injury management and rehabilitation.

The Principal Contractor has the authority to provide for the auditing of compliance within the provisions of this AMP, suspension or modification of work practices, and administration of disciplinary actions for individuals whose conduct does not meet the requirements set forth herein.

7.1.2.3 Asbestos Consultant or Competent Person

An Asbestos Consultant or Competent person, shall be engaged to assess any suspected asbestos containing materials when encountered during the Project. The asbestos consultant or competent person shall also complete airborne asbestos monitoring and dust monitoring during any asbestos works. Where required, air monitoring will be conducted in accordance with Section 7.1.5.

The Asbestos Consultant shall:

- Provide onsite supervision of all potential asbestos works;
- Complete static asbestos air monitoring during any potential asbestos works and display daily results for the information of workers;
- Provide onsite advice, if required, in relation to suspected asbestos containing materials and the management of asbestos issues associated with the works; and
- Be available, if required, for consultation with regards to the conditions and requirements of this AMP.

Should asbestos be encountered during the planned excavation works, additional clearance inspections and clearance asbestos air monitoring may be required to confirm the suitability of the area prior to works recommencing.

7.1.2.4 Class A/B Licensed Asbestos Removal Contractor

A Class A (friable) licensed asbestos removal contractor shall be engaged if friable asbestos is identified. If more than 10 m² of non-friable asbestos is identified, a Class B (non-friable) licensed asbestos removal contractor shall be engaged. For smaller quantities of non-friable asbestos, a suitably trained and experience contractor is required to conduct the removal work.

The asbestos removal contractor will remove ACM or asbestos impacted soils from the Area and remediate or dispose of them to a suitably licensed waste facility or transfer the material to an onsite containment area (if available). The licensed asbestos removal contractor will be the primary person responsible and in charge for works on site involving ACM or asbestos impacted soils.

Their responsibilities include the following:

- Complete a site walkover and 'emu-pick' to remove any observed ACM on the ground surface prior to the demolition of existing buildings or any topsoil stripping works commencing;
- Completion of required WorkCover permits (friable asbestos removal) or notifications (non-friable asbestos removal);
- Prepare a site specific Asbestos Removal Control Plan (ARCP) prior to any asbestos removal works being completed;
- Ensuring compliance with relevant legislation and the conditions of this AMP;

- Removal and disposal of asbestos containing materials or asbestos impacted soils from the site in accordance with relevant legislation;
- Ensure appropriate environmental and safety controls outlined in this AMP are maintained for the duration of the works;
- Assisting all site subcontractors where required in complying with relevant legislation and the procedures outlined in this AMP; and
- Completion of a final site walkover and removal of all visible asbestos containing material from the ground surface across the Proposal site.

7.1.2.5 Summary of Contaminant Type

Friable asbestos is defined by Safe Work Australia in the Code of Practice – How to Safely Remove Asbestos (2011) as being “...material that is in a powder form or that can be crumbled, pulverised or reduced to a powder by hand pressure when dry, and contains asbestos”. This includes asbestos fibre impacted soils and asbestos fines as identified by laboratory analysis.

Non-friable asbestos material is defined by Safe Work Australia (2011) as being “...material containing asbestos that is not friable asbestos, including material containing asbestos fibres reinforced with a bonding compound.” This includes bonded asbestos fragments found in soils, subject to laboratory analysis for respirable fibres.

Mechanical disturbance of the fragments may result in the release of fibres and therefore, such activities should be managed to prevent any fibres becoming airborne. The health effects of asbestos are detailed in enHealth (2005) *Management of Asbestos in the Non-Occupational Environment*.

The primary issue associated with the asbestos contamination is inhalation of respirable fibres if the materials were to be disturbed and abraded.

A secondary issue with asbestos contamination is disposal of excess spoil that may be impacted with asbestos.

7.1.3 AMP Health and Safety Management

7.1.3.1 Safe Work Method Statements

Safe work method statements must be prepared by the Principal Contractor or by subcontractors completing significant intrusive works and also covering other aspects of the Project works not related to significant intrusive works, are to be prepared and approved by the Principal Contractor prior to those activities commencing.

Safe Work Method Statements must:

- Describe how work is to be carried out;
- Identify the safety risks;
- Describe the control measures that must be applied to the work;
- Describe the equipment used in the work;
- Describe any standards or codes applicable to the work; and
- Training and qualifications required of persons undertaking the work.

Safe work method statements for all workers must be reviewed and approved by the Principal Contractor.

7.1.3.2 Site Access Control

The Principal Contractor shall ensure if works are to occur in an area in which ACM has been identified that the ACM-impacted construction area is securely fenced and access is controlled.

Entrance to the asbestos area will be via a dedicated entry point which will contain the following features in addition to site security measures as required for a construction site as per relevant health and safety provisions:

- Readily identifiable and delineated site access/egress point. Where possible this location shall be visibly identifiable by site fencing/barricading;
- Decontamination unit for all workers to remove PPE and dispose of contaminated articles and will also include a hand wash and boot wash facility. The decontamination unit will be located in close proximity of the designated site access/egress point;
- Signage including “No Entry Without Required PPE” and a contact number for members of the public to direct any queries / complaints; and
- Emergency contact details.

The overall construction area boundary will be secured by fencing. It is anticipated if areas of ACM are identified then localised active construction site access points may be delineated within the overall site boundaries. Access to the construction area will be controlled and permitted by the Principal Contractor only after persons entering the site have been advised of the potential contamination hazards. This shall at least include notification of the potential presence of asbestos containing materials and asbestos impacted soils.

If ACM is identified then any authorised person accessing the site should do so in accordance with health and safety requirements as indicated in this AMP. The implementation of the health, safety and environmental requirements should be administered by the Principal Contractor.

Site access will not be allowed until the workers have been inducted, have signed in, and if entering the asbestos area must have donned the required PPE (Section 7.1.3.5). Upon exiting the site, personnel must remove and dispose of/clean the PPE in the provided decontamination area.

Asbestos removal boundaries (if required) shall be determined by the Principal Contractor in consultation with the asbestos consultant and will vary according to the location and size of the required daily activities. Any asbestos removal boundaries will be designed to allow other site works not involving significant intrusive works to continue without being required to adhere to this AMP.

It may be found that the asbestos removal boundaries require to be assigned to the site boundaries, in which case all site workers must adhere to the requirements of this AMP.

7.1.3.3 Training and Certification

The Principal Contractor must not allow any person to carry out project works unless he/she are satisfied that the person has undergone OHS induction training.

The OHS induction training required by the Regulation is as follows:

- General occupational health and safety training for construction work;
- Work activity based health and safety training (job specific training); and
- Site-specific health and safety induction training.

For each person carrying out project works, for a period of three years, the Principal Contractor must keep a record of the following:

- A copy of relevant statements of OHS induction training, or a statement indicating that the Principal Contractor is satisfied that the relevant OHS induction training has been undertaken; and
- A brief description of the site-specific training undertaken by the person.

7.1.3.4 Site Safety Induction

If ACM is identified, it is the responsibility of the Principal Contractor to ensure all persons carrying out works onsite are given site-specific occupational health and safety training. The induction shall be undertaken by the Principal Contractor. The induction shall be undertaken as per a standard presentation which will address the following topics as per the requirements of this AMP:

- Identification of any site-specific hazards and risk control measures in relation to the asbestos impacted nature of the site;
- Regulatory requirements or codes of practice relevant to identified site specific hazards as restricted to asbestos impact;
- Directions on what to do if suspected asbestos containing materials or asbestos impacted soils are encountered;
- Site orientation at least including location of asbestos decontamination areas at site access/egress points; and
- Site specific safety rules in relation to asbestos.

The Principal Contractor is responsible for establishing site specific safety rules. The rules must be displayed in an easily observable location (nominally in the site office) so as to ensure that all site workers, have ready access.

At the completion of the induction presentation, each worker shall be required to acknowledge that they have understood the requirements for the site works and health, safety and environmental obligations by completion of a Site Induction Form.

7.1.3.5 Personal Protective Equipment (PPE) Requirements

Prior to any asbestos containing materials or asbestos impacted soils being encountered, no additional PPE is required above the standard construction site PPE outlined by the Principal Contractor for the site.

Should suspected ACM be identified, then the supervising asbestos consultant should be contacted. The following additional items of PPE are required in addition to the standard construction site PPE outlined by the Principal Contractor for the site, and applies for any ground workers within the asbestos work area, as defined by the supervising asbestos consultant:

- Disposable 'tyvek' coverall suits must be worn;
- Disposable gloves – non disposable gloves must be cleaned within the decontamination unit in accordance with Safe Work Australia (2011);
- P2 class respirator or higher – non disposable respirators must be cleaned in the decontamination unit in accordance with Safe Work Australia (2011); and lace less steel capped rubber soled work shoes or gumboots.

Plant operators must close cabin doors and windows and set air conditioning to recirculate when operating within the asbestos work area.

7.1.3.6 Management of Subcontractors

If ACM is identified, then workers onsite will be required to adopt the provisions of this AMP and will be advised of potential safety and environmental issues on site during site-specific induction training. This induction will include the occupational health and safety responsibilities, requirements and controls for all workers on site.

All workers activities involved in asbestos works will be monitored by the Principal Contractor, the licensed asbestos removal contractor and the Asbestos Consultant to ensure compliance with the requirements of this AMP.

Workers whose work will be performed onsite, or who otherwise could be exposed to health and safety hazards, will be advised of known hazards through distribution of site information contained in this AMP.

They shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations. All workers are responsible for:

- Providing their own personal protective equipment as required by the Principal Contractor;
- Conditions set out in this AMP;
- Training their employees in accordance with applicable laws;
- Providing medical surveillance and obtaining medical approvals for their employees, as appropriate;
- Ensuring their employees are advised of and meet the minimum requirements of this AMP and any other additional measures required by their site activities; and
- Designating their own site safety officer.

Workers must sign an acceptance form prior to commencing work on site. Workers may only modify, and then only to improve, the conditions specified in this AMP with approval from the Principal Contractor, or their nominee.

7.1.4 AMP Environmental Management

7.1.4.1 Asbestos Works

In the event that significant asbestos contamination is identified and intrusive works are to be carried out in the asbestos work area then the following management measures will apply:

Prior to any intrusive work commencing:

- Review of the information available for the site;
- Approval for the works must be sought from the Principal Contractor who will assess whether the works are necessary or if there is an alternative that will not result in exposure of ACM impacted soils. The Principal Contractor's must review the job specific risk assessment (JSRA) and safe work method statements (SWMS) and ensure that workers who will undertake the works are inducted into the AMP;
- The asbestos consultant must complete supervision of the significant intrusive works and complete regular inspections for the presence of visible asbestos. Static airborne asbestos monitoring must also be completed by the asbestos consultant for the duration of significant intrusive works;
- The works area must be isolated from casual entry using temporary barriers and only personnel inducted in the requirements of the AMP will be permitted to enter the works area;
- Sufficient room must be provided within the works area to allow stockpiling of spoil from excavations, if required, in accordance with Section 7.1.4.5;
- A water supply must be provided to the works area for the purpose of maintaining exposed asbestos impacted fill or soil in the excavations and stockpiles in a moist state;
- Personnel entering the works area must wear appropriate PPE in accordance with Section 7.1.3.5;
- Stockpiles of excavated spoil must be managed in accordance with Section 7.1.4.5 and 7.1.4.6; and
- Air monitoring requirements must be met as outlined in Section 7.1.5.

Should visible asbestos be identified by the asbestos consultant or airborne asbestos monitoring results identify airborne asbestos fibres in the vicinity of the works area,

specific requirements for working with asbestos containing materials or asbestos impacted materials shall be enforced as outlined in Section 7.1.4.2.

7.1.4.2 Specific Requirements for Working with Asbestos Impacted Material

Asbestos may be present in non-friable or friable form. In the event that either friable or nonfriable asbestos is encountered, as determined by the asbestos consultant, the following procedures shall be implemented for the remaining significant earthworks to ensure workers safety and to mitigate any potential off site migration of contamination.

7.1.4.2.1 Friable and Non-Friable Asbestos

Prior to Excavation:

- Workers and visitors to the asbestos work area will be made aware of the encountered soil contamination and only authorised people shall enter the asbestos work area, which must contain a perimeter barrier separate to the site boundaries to restrict entry. Where the asbestos work area boundary is also the site perimeter boundary, an exclusion zone of at least 5 m shall be erected beyond the work area perimeter boundary (if practical/possible) to restrict access to the asbestos work area; and
- Asbestos removal caution signs shall be placed on the perimeter barrier (or exclusion zone barrier, whichever is furthest from the asbestos removal work area), as per AS 1319.

During Excavation/Transport/Disposal:

- A WorkCover permit for friable asbestos removal works or WorkCover notification for non-friable asbestos removal works shall be sought by the licensed asbestos removal contractor. Friable asbestos removal permits must be submitted at least 7 days prior to any friable asbestos being disposed off-site;
- All wastes will be classified, managed and disposed in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (NSW EPA, 2014);
- Personnel within the excavation work area shall wear a Tyvek suit, respirator (e.g. half faced P2 respirator), disposable gloves and lace less steel capped rubber soled work shoes or gumboots at all times when within the asbestos work area and until clearance certification is provided by the asbestos consultant;
- Any obvious pieces of asbestos containing materials shall be picked up and placed into a labelled asbestos waste bag and set aside in a designated waste storage area for either for offsite disposal or onsite containment;
- The excavation shall be kept damp by water spraying at all times during excavation works to reduce the possibility of dust generation;
- Personal protective equipment used during the works, such as disposable coverall suits and half faced respirators, shall be disposed of as asbestos waste;
- Airborne asbestos monitoring shall be conducted for the duration of the excavation works in accordance with Section 7.1.5;
- Any stockpiled excavated material shall be kept moist and covered if left for more than 24 hours;
- Appropriate leak proof transport vehicles must be used to transport materials;
- A transporter of Asbestos Waste must be registered as a transporter of Asbestos Waste on WasteLocate before any transport of Asbestos Waste is to occur. Refer to Section 7.1.4.7 for further details;
- Transport vehicles shall be covered prior to leaving site and any material removed from wheels to prevent tracking outside the site; and
- Backfill of any areas to required levels must only be completed with clean imported material classified as VENM as per Waste Classification Guidelines:

Part 1 Classifying Waste (NSW EPA, 2014) and can include mulch and landscaping materials.

Post Excavation:

- Any excavation floor and walls shall be inspected by the asbestos consultant who is trained and experienced in the identification of asbestos. Any visible ACM shall be removed by the licensed asbestos removal contractor;
- Where friable asbestos has been encountered, validation samples shall be collected from the excavation walls and base and analysed at a NATA Accredited testing laboratory for the presence of asbestos. Clearance airborne asbestos monitoring shall also be conducted following the completion of the excavation and reinstatement works to be included in clearance certification. Clearance monitoring is not required if only non-friable asbestos is encountered; and
- Upon receipt of both visual and laboratory data (where required) confirming the absence of asbestos, the asbestos work area shall be deemed suitable for use and a clearance letter shall be provided by the asbestos consultant.

7.1.4.3 Remediation of Asbestos Containing Materials in Soils/Fill

Fill material of soil that are found to contain ACM can be reused as backfill onsite subject to its appropriate remediation. This can be completed by the excavation of the ACM impacted soils and hand-picking of ACM fragments as per the procedure described below:

- Excavation of the impacted material to the extent indicated in the RAP and stockpiling prior to spreading within the pad sorting area;
- Spreading of the contaminated material to form a pad(s) of not more than 0.1 m thick, within the designated pad sorting area (more than one pad may be used);
- Collection of ACM fragments by raking and hand-picking of the spread material.

Subsequent to hand-picking, the pad will be inspected by the Environmental Consultant by walking two sets of 1 m spaced transects at right angles to observe the presence of remaining ACM fragment. Remaining fragments will be collected and weighed. If the visual inspection does not identify residual ACM fragments above the adopted criteria, then soil samples will be collected as stated below;

- Validation of remediated soils (in pads) by collecting 1 sample per 20 m³ for asbestos analysis (AS 4964-2004) and collection of one 10 litre sample per 100 m³ of soil for quantification. Should validation fail, the pad will be subject to an additional rake, walk/pick and re-validated until such time as validation is achieved;
- Validation of footprints of ACM stockpiles and pad by collecting 1 sample per 25 m² for asbestos analysis and inspection of surface for ACM;
- Excavations to be validated by collecting 1 sample per 25 m² on the excavation floor and 1 sample per 10 m from each distinct horizon / material type / 1 m vertical profile of excavation wall for asbestos analysis (AS 4964-2004). Collection of 1 10 litre sample per fill stratum/per metre/per location for quantification. Should validation fail, the failed wall/base of the excavation will be excavated a further 0.5 m in the direction of the failure and the validation process repeated until validation is achieved;
- Offsite disposal to an appropriately licensed waste facility or onsite containment of ACM fragments;
- Reinstatement of the validated pad materials into the validated excavations.

7.1.4.4 Disposal and Storage of Asbestos Containing Materials

Where asbestos fragments or other forms of asbestos are identified either during the construction works or on the ground surface, these materials should be removed

under the supervision of a licensed asbestos removal contractor and in accordance with Safe Work Australia (2011).

The asbestos materials should be placed into heavy-duty 200µm (minimum thickness) polythene bags that are no more than 1200 mm long and 900mm wide. The bags should be labelled as asbestos waste, sealed and placed in a designated waste area for offsite disposal or transport to the onsite containment area (if available).

7.1.4.5 Stockpile Management

Any stockpiles of excavated materials, including topsoil and grass cover, will be periodically sprayed with water to control dusts.

In the event that covers are required, they shall extend beyond the perimeter of the stockpiles and shall be secured to prevent being blown away by wind.

Stockpiles must be placed in a secure location onsite and covered if to remain for more than 24 hours.

7.1.4.6 Dust Management

Dust levels shall be managed by ensuring:

- All stockpiles will be either periodically wetted down or covered to control dusts;
- Water sprays will be used on the excavation areas, stockpiles and haulage pathways;
- Any haulage vehicles shall be covered and leave via the designated (stabilised) site access;
- All haulage vehicles and plant and equipment shall be washed down whenever they leave the Asbestos in Soil (ASBINS) work area;
- All access roads are sufficiently maintained to ensure no visible dust at the site boundary; and
- Dust suppressors will be fitted to equipment as required.

If dust is visible at the site boundary, then additional dust control measures shall be employed, which may include:

- Temporarily suspending activities until winds speeds reduce; and/or
- Additional use of water sprays.

7.1.4.7 Waste Management

There shall be no wastes brought onto the site for storage, treatment, processing, reprocessing or disposal unless permitted by a licence issued under the POEO Act.

All wastes will be classified, managed and disposed in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (NSW EPA, 2014).

All wastes disposed offsite will be controlled as per the NSW EPA's requirements for waste tracking and acceptance. These are as follows:

- Obtain a written consignment authorisation number from an EPA-licensed waste disposal or treatment facility before moving waste to the facility;
- Accurately complete a waste data form signed by the consignor before the waste is dispatched;
- The waste consignor, the waste transporter and the waste facility must each keep a copy of the waste data form for up to four years for auditing purposes;
- The waste consignor must give a completed copy of the waste data form to the transporter, who must check that it is completed and then sign it. The driver must carry the waste data form in the vehicle;

- The transporter must give a completed copy of the waste data form to the waste facility on arrival at the destination. The waste facility operator must check the load details on the form. The waste data form must be signed by a representative of the waste facility on receipt of the waste at the destination; and
- The waste consignor must receive from the waste facility, written confirmation of receipt of the waste within 21 days of dispatch. This must be kept for up to four years for auditing purposes.

If more than 100kg of asbestos waste or 10m² of asbestos sheeting is proposed to be removed from the Site, then information is to be provided to the NSW EPA, under the NSW EPA Asbestos and Waste Tyre Guidelines 2015. This guideline contains the legal requirements that consignors, transporters and occupiers of premises must meet in addition to the Waste Regulations.

The following requirements are noted:

A transporter of Asbestos Waste must be registered as a transporter of Asbestos Waste on WasteLocate before any transport of Asbestos Waste is to occur.

The transporter of Asbestos Waste must provide the following information to the NSW EPA upon registration on WasteLocate (<https://wastelocate.epa.nsw.gov.au>) no later than on delivery of its first load of Asbestos Waste to the receiving facility:

- Name and address of the transporter;
- Mobile telephone number of the transporter's registered driver;
- Email address of the transporter;
- Trading name or agency name of the transporter;
- Drivers licence number of the transporter's registered driver;
- Postal address of the transporter, if different from address;
- Primary telephone number of transporter;
- The Australian Business Number (ABN) for the transporting company (if the entity has an ABN); and
- WorkCover licence number of the transporter, if held.

The transporter of a load of Asbestos Waste must provide the following information to the NSW EPA by using WasteLocate before the transportation of any load of Asbestos Waste:

- The type of Asbestos Waste in the load;
- vehicle registration;
- number of the vehicle driven by the transporter's registered driver for the specific consignment.

A transporter of a load of Asbestos Waste to any premises must scan the EPA Fixed Plate at the premises through their mobile device for each load. Scanning of the EPA Fixed Plate by the transporter for a load enables the occupier to meet its obligations under clause 76(7) or 79(6) (as applicable) of the Waste Regulation for that load.

If the EPA Fixed Plate at an occupier's premises is not scanned by the transporter, the occupier must provide the EPA in writing the date and time of delivery of the load of Asbestos Waste, the vehicle registration number of the vehicle driven by or on behalf of the transporter for the specific consignment.

7.1.5 Monitoring Program

In the event that significant asbestos is found, a monitoring program may be needed to ensure that the control measures being implemented at the site are effective, the following monitoring procedures will be implemented:

- Daily static airborne asbestos fibre monitoring at site boundaries during significant asbestos works;
- Clearance monitoring (if friable asbestos is encountered only); and

- Site inspections.

7.1.5.1 Daily Static Airborne Asbestos Fibre Monitoring

During excavation works or any other works that may disturb significant asbestos in soil onsite, airborne asbestos fibre monitoring may be undertaken by the Asbestos Consultant using calibrated portable air sampling pumps. Monitoring will be conducted at 4 locations around the site boundaries each day over an approximate 4 to 6-hour period and targeting any neighbouring sensitive receptors and with consideration to the daily location of works.

At the end of each monitoring period the pump and attached filter will be collected and analysed at a NATA-accredited laboratory in accordance with NOHSC Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition (NOHSC:3003 [2005]).

The results of air monitoring will be available on a 24-hour turnaround time basis. Daily air monitoring reports shall be displayed in a common area outside of the asbestos work area (e.g. site office or lunch shed) or be able to be produced upon request.

The following action levels will be applied upon receipt of daily results, as outlined in the Safe Work Australia (2011):

- Reading of less than 0.01 fibres/mL – control measures in place are working effectively, site works to continue;
- Reading between 0.01 and 0.02 fibres / mL – a review of control measures shall be completed in the work area; and
- Reading greater than 0.02 fibres / mL – works shall cease until the cause of contamination is identified and rectified.

It is noted that these action levels adopted are more conservative than the exposure standard for airborne asbestos (0.1 fibres/mL (TWA)) as outlined in the Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC: 1003(1995)] for an 8-hour shift.

7.1.5.2 Clearance Monitoring

In the event that friable asbestos is encountered during the excavation works, clearance airborne asbestos monitoring shall be required following the friable asbestos removal. Following the completion of all earthworks and backfill of the excavated area, clearance air monitoring will take place in the vicinity of the work area to ensure that there is no residual contamination remaining at the site.

Ambient air conditions clearance will be gained by recording airborne asbestos concentration levels in all sampling locations below 0.01 fibres / mL.

7.1.5.3 Site Inspections

Following the completion of any asbestos removal works, a final site walkover will be completed by the asbestos consultant to inspect the site ground surface for the presence of ACM. Any ACM observed will be removed and placed in asbestos waste bags in accordance with Safe Work Australia (2011). Once a successful inspection has been completed and both the licensed asbestos removal contractor and the asbestos consultant are satisfied there is no visible residual asbestos impacts on the ground surface, the area shall be deemed suitable for re-occupation and a clearance report issued by the asbestos consultant. Should clearance for the removal of friable asbestos be required, the final inspection and clearance report should be completed by a licensed asbestos assessor.

8 TRACKING SYSTEM: EXCAVATED CONTAMINATED MATERIALS

The quantities, source location and stockpiled location of contaminated material which has been excavated during this Project should be recorded in a tracking register.

The purpose of a tracking register is to ensure all excavated contaminated material is appropriately handled, and correct waste disposal/ on site re-use in accordance with this document is achieved.

The following information should be recorded in a tracking register, and kept on site for review of by the Principal Contractor and Environmental Consultant:

- Location where contaminated material was excavated (including coordinates);
- Measurements of the resulting excavation (length, width and depth) to determine estimated volume of material removed.
- Rationale for excavation (unexpected find etc.);
- A description of the excavated material, including dimensions of stockpiles and estimated volumes;
- Location of where excavated material was stockpiled (including coordinates, placement on hardstand or similar material etc.);
- Details of any sampling of the resulting excavation and/or stockpile for validation/classification purposes including; number of samples collected; date of sampling; NATA accredited laboratory; waste classification etc.;
- If the material was disposed offsite, then details of the appropriately licenced landfill facility where the material was sent, including volume, truck movements, waste docket and dates of disposal etc.; and
- Details of material used to backfill the excavation (if applicable), including source of material and assessment of suitability to use on site (i.e. VENM certification).

Additional tracking maybe required dependent on the contamination present. The Environmental Consultant should determine if additional tracking is required.

9 WASTE MANAGEMENT

Information and wording presented in this section was primarily obtained from the JBS&G (11 May 2015) report.

9.1 Waste Avoidance Hierarchy

The following waste hierarchy has been established to ensure material suitable for beneficial reuse on or off-site is utilised by the contractor, avoiding unnecessary waste disposal costs:

1. Can the material be beneficially and cost effectively reused onsite (e.g. crushing of concrete, bitumen, bricks and other building rubble for reuse beneath roads etc.)?
2. Is the waste covered by NSW EPA general exemption (e.g. coal ash, Excavated Natural Material, etc.) allowing the waste to be beneficially reused at another site? A list of general exemptions currently in force are listed on the NSW EPA website. If the waste is anticipated to be covered by a NSW EPA general exemption the contractor will contact the Environmental Consultant who will undertake the required sampling and analysis.
3. If the waste is not covered by a NSW EPA general exemption, but opportunity exists for the waste to be reused in a manner that causes no harm to the environment or human health, an application to the EPA for a specific resource recovery exemption should be considered.
4. If the contractor is satisfied that all the options outlined in the above hierarchy are not applicable the material shall be characterised by the Environmental Consultant as per Section 9.3 and disposed offsite to a facility lawfully able to accept the waste.

Where material is surplus to the site requirements, the contractor shall ensure that the least valuable resources (e.g. recycled demolition material, fill etc.) is utilised onsite in preference to material that can be beneficially reused at another site (e.g. VENM, ENM etc.) in order to avoid unnecessary waste disposal costs.

9.2 Material Management Procedures for Unexpected Finds

Details of the unexpected finds protocol are outlined in Section 10. Specific management procedures for potentially contaminated material that may be encountered during the works are outlined in Section 6.

9.3 Material Characterisation Protocol

Upon identification of materials that require characterisation the contractor shall notify the client (or their nominated representative) and the Environmental Consultant of the details of the material requiring characterisation and the purpose of the characterisation (e.g. materials requiring to be disposed offsite, materials requiring to be imported to the site, or characterisation of potentially contaminated soils, etc.). The Environmental Consultant will be responsible for undertaking the required characterisation sampling based on NSW Environmental Protection Agency (NSW EPA) approved guidelines.

Upon receipt of the analytical results the Environmental Consultant is responsible for providing appropriate documentation (e.g. material characterisation report, waste classification etc.) to the contractor.

The proposed sampling frequency and analytical schedule is presented in Table 6 below.

Table 6 Waste Sampling Frequency

Area	Sampling Frequency	Analytes
Characterisation of material for beneficial reuse (suitable material granted an applicable EPA exemption under the Protection of the Environment Operations (Waste) Regulation 2005)	Sampling frequency dependent upon EPA exemption requirements, minimum of 3 samples per material type.	Analytes dependent upon EPA exemption or source site characteristic. As a minimum: <ul style="list-style-type: none"> • Heavy metals • Total recoverable hydrocarbons (TRH) • Benzene, toluene, ethylbenzene, xylenes (BTEX) • Polycyclic aromatic hydrocarbons (PAHs) • Organochlorine and Organophosphorus pesticides (OCP/OPPs) • Polychlorinated biphenyls (PCBs) • Asbestos
Contaminated material requiring disposal offsite (waste classification)	1 validation sample per 400 t ^{#1} with a minimum of 3 samples per material type.	TRH, BTEX, PAHs, heavy metals, OCP/OPPs, PCBs, asbestos and Toxicity Characteristic Leaching Potential (TCLP) (if required)
Imported fill material (Virgin Excavated Natural Material (VENM) or any other suitable material granted an applicable EPA exemption under the Protection of the Environment Operations (Waste) Regulation 2005)	VENM - 1 validation sample per 100m ³ . Sampling of imported excavated natural materials (ENM) will be undertaken in accordance with the requirements of the POEO (Waste) Regulation 2005 – General Exemption under Part 6, Clause 51 and 51A for Excavated Natural Material exemption (NSW EPA, 2014b) ^{#2} .	Analytes dependent upon EPA exemption or source site characteristic. As a minimum: Heavy metals, TRH, BTEX, PAHs, OCP/OPPs, PCBs and asbestos

#1. Noting the homogeneity of soils as reported in previous environmental assessments conducted on the site, and in lieu of any current published NSW EPA endorsed sampling frequency for on-site reuse of soils, it is proposed that the stockpiled soils be sampled at a rate of 1 per 400 tonnes consistent with the POEO (Waste) Regulation 2005 – General Exemption under Part 6, Clause 51 and 51A for Excavated Natural Material exemption (DECCW, NSW, 2009).

#2. NSW EPA (2014b), Resource Recovery Exemption Under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 – The Excavated Natural Material Exemption 2014.

9.4 Material for Importation

Where material is required to be imported onto the site, the imported fill material must comprise virgin excavated natural material (VENM) defined in accordance with Schedule 1 of the Protection of the Environment (POEO) Act (POEO 1997), excavated natural material (ENM) classified in accordance with the specific exemption (NSW EPA, 2014b); or material granted a specific exemption by NSW EPA.

Prior to importation of material onto the site, the contractor/supplier shall provide, at a minimum, the following information to the site for prior evaluation in order to obtain an approval on the potential acceptability of the material for use at the site:

- Details of the source site history, source site address, and characteristics of the material (such as colour, soil type, odours); and
- Details of any sampling performed for purposes of certification.

Prior to and during the importation of VENM or ENM, visual inspection must be undertaken to verify the appearance of the material is consistent with the source material description.

Mulch should be inspected for the presence of asbestos containing materials.

In addition, material that falls under the recycled materials exemptions may be imported to site if a letter is provided by the supplier which indicates the materials meet the requirements of the exemptions approved by the NSW EPA. The material must be accompanied by a summary report which includes laboratory report(s) from a National Association of Testing Authorities (NATA) accredited laboratory and chain of custody documentation, in addition to other Quality Analysis/ Quality Control (QA/QC) documentation to demonstrate the samples were obtained in accordance with the applicable recycled material exemption. The report must conclude the material meets the requirements of the applicable recycled materials exemption approved by the NSW EPA.

In addition to the above information from the supplier, following the importation of the material, a visual inspection is needed to confirm there are no visible asbestos, staining or odours and that the material delivered meets, in general, the description of the source material.

10 UNEXPECTED FINDS

Ground conditions between sampling points can vary, and further hazards may arise from unexpected sources once remediation commences. To manage the potential for unexpected occurrences of contamination, an unexpected finds protocol has been prepared.

The nature of any undiscovered hazards which may be present at the site are generally expected to be detectable through visual or olfactory means, for example:

- Additional hydrocarbon contaminated soils (staining/discolouration visible);
- Additional excessive VOC contaminated soils (odorous (sweet/chemical));
- Fragments of asbestos-containing materials (visible) or potential friable material;
- Significant ash and/or slag contaminated soils / fill materials (visible); and
- Underground storage tanks (USTs) or uncovering of an existing UST that have not been previously identified or location approximated precisely.

As a precautionary measure to ensure the protection of the workforce and surrounding environment, should any unexpected potentially hazardous substance be encountered the works should cease immediately before being assessed by a suitably qualified environmental consultant. In addition, relevant regulator(s) and/or stakeholders (i.e. WorkCover) should also be informed of any potential immediate risk to either human health or the environment (except for issues relating to Underground Petroleum Storage Systems (UPSS) or groundwater impacts where the NSW EPA should be informed).

The sampling strategy for each 'unexpected find event' and remediation works shall be designed by a suitably qualified environmental consultant. The strategy will, however, be aimed at determining the nature of the substance, that is, is it hazardous and, if so, does it exist at concentrations which pose an unacceptable risk to human health or the environment. The sampling frequency of the identified substance/materials meeting the minimum requirements the listed in the NEPM ASC 2013, Australian Standard AS4482.1-2005, AS4482.2-1999 and NSW EPA Sampling Design Guidelines (1995).

The Principal Contractor will ensure that in the event that an unexpected find is of cultural or historical nature, a nominated archaeologist would be available to attend the site, to ensure that there are no extended delays to the program. Should an unexpected relic, archaeological feature or deposit is exposed during works, where an archaeologist is not already on site, work should cease in that area and a suitably qualified archaeologist should be contacted for advice. Depending on the level of integrity and/or significance of the relic, the relic/feature would be assessed and recorded and, if relevant, excavated manually to ensure that important information is not lost, and monitor adjacent works. If the relic/feature is assessed as having state significance the archaeologist would consult with the Heritage Council to develop an appropriate strategy to manage the relic.

In the event of an unexpected Find, the protocol shown in Figure 1 (sourced from the JBS&G (11 May 2015) report) should be followed.

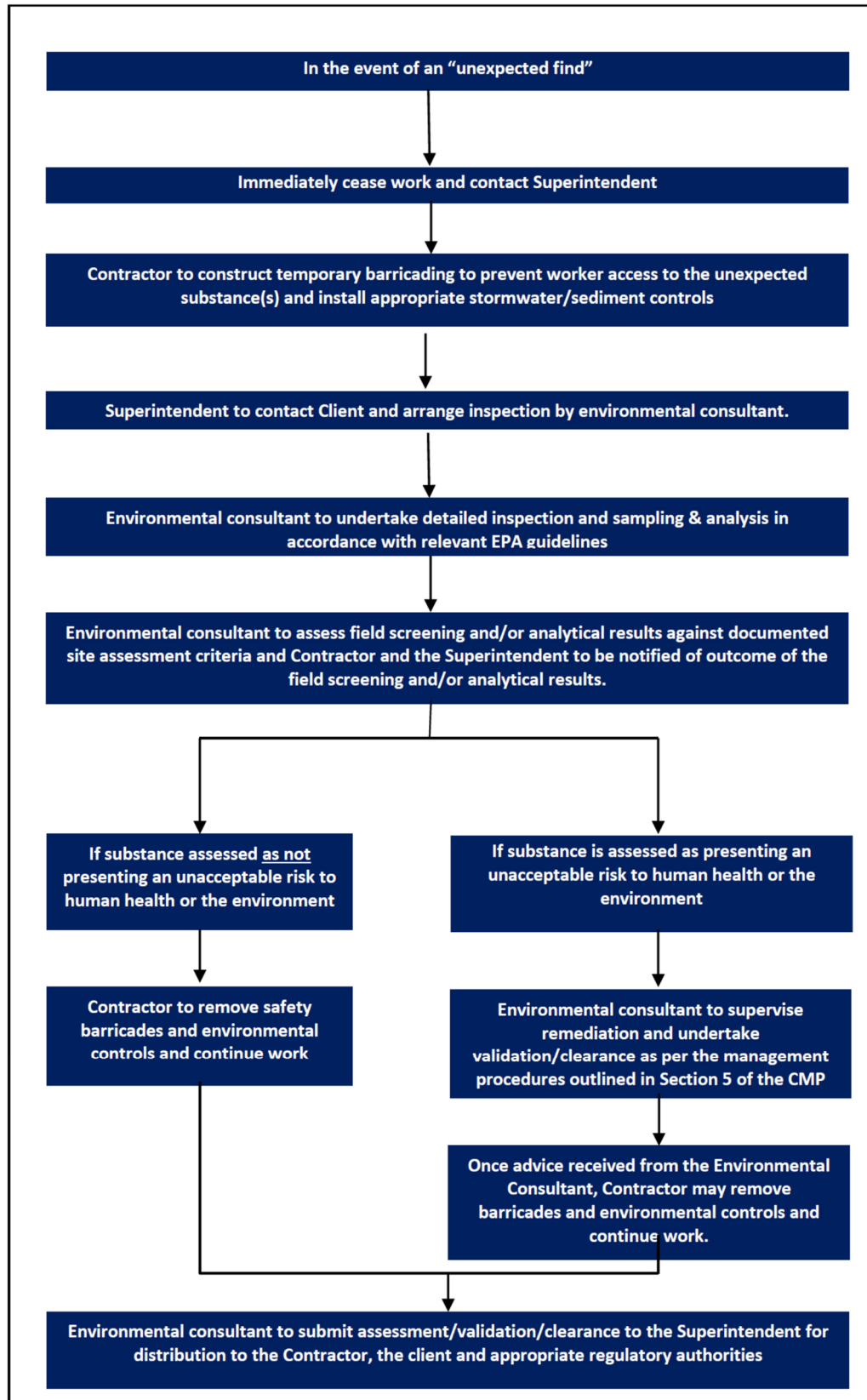


Figure 1: Unexpected Find Protocol Flowchart

