

8 August 2018

CES Document Reference:
CES180708-REN-AB

Regional Enviroscience
Unit 2 No 7 Energy Place, PO Box 1645
Dubbo, NSW, 2830

**RE: Mudgee Hospital, Meares Street, Mudgee NSW:
Review of Remediation Action Plan and Waste Management**

For the Attention of Wayne Sibley

Dear Sirs,

1 INTRODUCTION

Regional Enviroscience Pty Ltd (Enviroscience) was engaged by Central West Project Management (CWPM) to prepare a Remediation Action Plan and Waste Management Plan for the Mudgee Hospital site, located at Cnr Lewis and Meares Streets, Mudgee, NSW, 2850.

Consulting Earth Scientists Pty Ltd (CES) was commissioned by Enviroscience, to carry out a review of the Remediation Action Plan and Waste Management Plan by a Certified Environmental Practitioner: Site Contamination Specialist (CEnvP:SC) in order to provide an independent assessment of the report. As a result, Mark Challoner – Principal Environmental Scientist, CEnvP: SC (No. SC40106), has reviewed the Remedial Action Plan and Waste Management Plan (RAP) Report No. RAP18981R01, prepared by Enviroscience (dated 6 August 2018).

The objective of the RAP is to provide a plan for the remedial works required for the Mudgee Hospital Redevelopment on Cnr Lewis and Meares Streets, Mudgee NSW 2850. The RAP has been based on a detailed site investigation (undertaken by Douglas Partners) and partial delineation works (undertaken by Enviroscience).

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Upon my review of the RAP, and following e-mail correspondence and a site visit, dated 24 July 2018, I am satisfied with the remediation action plan and that it has been prepared in general accordance with the relevant standards, legislation and guidelines, namely:

- NSW EPA, *Contaminated Sites Guidelines for Consultants Reporting on Contaminated Sites* (2011);
- *State Environmental Planning Policy 55 – Remediation of Land (SEPP 55)* NSW EPA (2014); and
- *National Environment Protection (Assessment of Site Contamination) Measure* (NEPM), (2013).

The review and associated work have been undertaken in accordance with the CES proposal (CES180708-REN-AA), dated 13 July 2018.

2 CLOSURE

Should you require further information or clarification of any details, please do not hesitate to contact the undersigned on 02 4940 7230.

For and on behalf of Consulting Earth Scientists Pty Ltd.



Chartered Environmental Practitioner: Site Contamination Specialist
Principal Environmental Scientist





REMEDIATION ACTION PLAN & WASTE MANAGEMENT PLAN

Mudgee Hospital Redevelopment,
Cnr - Lewis and Mears Streets,
Mudgee NSW 2850

Report Ref: RAP18981R01

REMEDIAL ACTION PLAN AND WASTE MANAGEMENT PLAN

Mudgee Hospital Redevelopment

Prepared For: Mr. Iain Lynch

Central West Project Management

(On Behalf of Health Infrastructure)

Suite 1, Level 1, 2a Piper Street,

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Status	Date	Prepared	Reviewed	Approved
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1 EXECUTIVE SUMMARY

This report describes the details of the proposed remediation program for the identified hazardous materials present on the subject site, to a condition where the land is considered suitable, for the proposed uses and delineates the extent of contamination as required by New South Wales (NSW) Environment Protection Authority (EPA). The intended use for the site is a Hospital. The Remediation and Action Plan and Waste Management Plan, from now on referred to as the Plan, also addresses potential gaps in the information and investigations undertaken in the following reports.

Environmental Investigation Services (EIS) undertook a Hazardous Building Materials Assessment, of existing buildings and structures, Report Ref: E30775Krpt-HAZ, in September 2017, Douglas Partners undertook a Preliminary Site Investigation, report Ref: 86091.00.R.001.DftA, in September 2017 and a Detailed Site Investigation (Contamination), Report Ref: 86091.01.R.001.Rev0.Mudgee DSI, issued May 2018. Mudgee DSI and Geotechnical Investigation, Report Ref: 86091.00.R.002.Rev0. Mudgee Geotech, in April 2018 for the proposed Mudgee District Hospital Redevelopment located on the corner of Lewis and Meares Streets, Mudgee, NSW, 2850. Mudgee Health Services undertook an Asbestos Survey and compiled an Asbestos Register, for Mudgee Hospital Assets and Facilities, in December 2011.

Regional Enviroscience have undertaken a partial Asbestos Site Assessment (Asbestos in Soil) investigation, Ref; 18743, in June 2018, as part of the recommendations provided in the DSI report from Douglas Partners.

The scope of work for the above Investigations included the following:

- review of site information including background information;
- review of previous site investigation data;
- preparation of a Conceptual Site Model (CSM);
- design and implementation of a sampling, analysis and quality plan (SAQP);
- interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment;
- preparation of a Tier 1 Risk Assessment and review of CSM; and
- preparation of a reports presenting the results of the assessment.

Environmental Investigation Services (EIS) identified hazardous materials in the form of asbestos, both Friable and Non-friable, and lead based paints. Fluorescent lighting has been identified as potentially containing Polychlorinated Biphenyls (PCB's), however the majority, of the lights have not been dismantled to confirm this recommendation.

It is recommended that the site is remediated to Residential Health Investigation Level (HIL) 'A' criterion, which conforms to the Mid-Western Regional Local Environmental Plan 2012 – Zoning R1 - General Residential. The National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) 1999, as published by National Environment Protection Council (NEPC), was adopted as site assessment standard for the proposed development. The land development has been confirmed as solely for the purposes and use of *Mudgee Hospital* and associated infrastructure. The HIL Levels have been formulated to protect most people who could be potentially exposed under four broad land uses. With the classification for a hospital, consideration additionally needs to deliberate not only that children will be occupying the site but that immunosuppressed and sensitive people with illnesses will be occupying the site as well.

Based on the sampling methodology and in consultation with the relevant legislative and other guidance instruments a *Remediation & Waste Management Plan* has been developed for Health Infrastructure and presented in this report to *Health Infrastructure NSW* management and relevant contractors for guidance during the site remediation, therefore it is recommended that the land will be remediated to a level that satisfies *Residential 'A' criterion*.

The goal of this remediation is to ensure that hazardous materials are removed without impacting hospital or construction personnel and public accessing the area, and if remaining on site, are effectively managed to allow for the construction of the new Hospital and associated facilities.

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2 INTRODUCTION

Regional EnviroScience Pty Ltd (RES) was engaged by Central West Project Management on behalf of Health Infrastructure, to develop a Remedial Action Plan (RAP) and Waste Management Plan (WMP), for the proposed Mudgee Hospital Redevelopment. Identified in the reports detailed previously, were hazardous materials within the buildings and structures, including asbestos contaminated soils, for the properties Lot 11: DP758721, Lots 1, 2 & 5: DP 845336 and Lot 2: DP1140724.

The current Mudgee hospital site has been in use since the 1850's, with various buildings added and demolished over time. The current Mudgee campus consists of six buildings of various ages and condition. The construction of the new Mudgee Hospital will require a staged demolition of many of these buildings and the construction of a new facilities. The Mudgee District Hospital has been proposed for the site located on the corner of Lewis and Meares Streets, Mudgee, NSW, 2850.

The Detailed Site Investigation undertaken by Douglas Partners in April 2018 identified Asbestos Contaminating Materials (ACM), present in two (2) of the bore hole excavations. Other sources of potential contamination have been identified on the campus including the workshop (oils, greases, degreasers, diesel fuel storage, battery storage), the electrical substation (PCBs, oils, greases), the demolition of building over time, repairs and renovations on the buildings over time (asbestos- both bonded and friable, lead paint and lead pipework) and imported fill. The bore hole investigations indicated that the depth of the fill material varied across the site. No underground storage tanks have been identified on site through the history or the site investigations undertaken.

The subsequent soil investigations undertaken by Regional Enviroscience, has also identified asbestos materials on the surface and within ash materials, at various locations. It is proposed that the ash materials uncovered during excavations, are presumably from the on-site incinerator, and may harbour asbestos materials. The trench investigations indicated that the depth of the ash material varied across the site surveyed.

The Hazardous Building Materials Assessment undertaken by Environmental Investigation Services (EIS) identified the locations of asbestos materials, lead paint, synthetic mineral fibre and potential PCB's throughout the existing Mudgee Hospital assets.

The Asbestos Survey conducted by Mudgee Health Services, identified asbestos materials within the hospital assets.

The Detailed Site Investigation ascertained that asbestos was the only contamination identified in the soil at the site. No elevated levels of chemical contaminants were identified in the fifty (50) samples, obtained by Douglas Partners. The levels for all, of the specific contaminants tested by Douglas partners were below their recommended Health Investigation Levels (HILs), for the category which includes commercial and industrial purposes.

Regional EnviroScience will provide advice and assistance in assuring the health and safety of workers and the public and that there are negligible impacts to the environment.

The proposed works to be undertaken are to be staged. The stages and inclusions are outlined below;

Stage 1. Relocation of staff and facilities, demolition of the wellness centre and community health

Stage 2. Excavations and construction of the new hospital

Stage 3. Demolition of current hospital

Stage 4. Construction of the car park.

The objectives of the Plan would have been deemed to be achieved when a Validation Report has been completed which shows that the site has been effectively remediated to the requirements of this document.

This report has been prepared in accordance with the appropriate NSW Environment Protection Authority (EPA), guidance and endorsements under the provisions of the Contaminated Land Management Act, 1997. Guidance has been provided by the *National Environment Protection (Assessment of Site Contamination) Measure, NEPC 2013*, the EPA publication *Guidelines for Consultants Reporting on Contaminated Sites (1997)* and in particular, the publication by the West Australian government *WA DoH (2009), 'Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in WA'*.

3 SCOPE OF WORKS

The scope of the Plan has been established on the basis, of findings obtained from previous investigations, with the Plan aimed at providing:

- an appropriate remediation strategy, which comprises localized actions to render the site suitable for the proposed Mudgee Hospital use;
- Reviewing the existing reports and information of the site identifying any information gaps;
- Based on the existing reports, develop a remediation plan for the contamination on site;
- Develop a removal and management plan for the hazardous materials identified on the site;
- Identify appropriate requirements for the validation and verification of the successful implementation of the remediation strategy and the remediation acceptance criteria to be adopted;
- appropriate requirements for the validation and verification of the successful implementation of the remediation strategy and the remediation acceptance criteria to be adopted;
- appropriate environmental safeguards required to conduct the remediation works in an environmentally acceptable manner;
- Work Health & Safety procedures required to conduct the remediation works in a manner that will not pose a threat to the health of site workers, neighbours or people accessing the Hospital facilities.

It should be noted that this Plan, may need to be amended if further or other contaminants are identified on-site during the course, of the planned works and through laboratory analysis results.



Figure Two: Proposed Area for the Site Redevelopment

A summary of the site history undertaken by Douglas Partners and reported in the Detailed Site Investigation (Contamination), Mudgee Hospital Redevelopment, findings is included below:

- The Mudgee hospital site has been in use as a hospital since the late 1850's.
- The current hospital building was constructed in 1955, with the previous hospital, near the current helipad, demolished soon after.
- The current community health building was constructed around 1955 and was previously used as nurses' quarters prior to conversion to the current use.
- The southern section of the wellness building was constructed in 1934 and was previously a nurses' residence prior to the community health building being constructed.
- The Northern portion of the wellness building was constructed between 1979 and 1990.
- Demolition of several smaller buildings around the current disused training centre to the east of the site, occurred between 1967 and 1979
- The section 149 Certificates did not provide any indication of known contamination being present on the site.
- The land is not identified as being significantly contaminated under the Contaminated Lands Management Act 1997 as of 29 March 2018 and
- Verbal information from hospital maintenance staff confirmed that hospital waste and incinerator ash was not dumped on site but was historically disposed of to landfill. Staff are also not aware of any underground storage tanks located on the site.

A Hazardous Building Material survey conducted by EIS report reference E30775Krpt-Haz, dated 6th September 2017, found both friable and bonded asbestos to the interior and exterior of the Community Health Centre, Wellness Centre, Boiler Room and Workshop, Main Hospital Building and the Store/Training Building. Of note, friable pipe lagging in the ceiling and subfloor spaces to the Workshop, Community Health Centre, Training Centre and the Main Hospital Building. Bonded asbestos containing materials were identified within the interior and the exterior of the existing building and structures on-site, at the time of the inspection.

Lead paints were identified internally and externally to metal and timber surfaces in the Workshop, Wellness Centre, Main Hospital Buildings and the Community Health Centre. At the time of the survey

conducted by EIS, the samples were analysed in accordance with the Australian Standard AS4361.2, 2017 “Guide to Hazardous Paint Management, Part 2: Lead Paint in Residential, Public and Commercial Buildings, a lead in paint concentration greater than 1.0% w/w is considered to be lead based paint. However, this concentration has since been amended, December 2017, to 0.1% w/w, which will change the classification of some of the results in the EIS E30775Krpt-Haz report. External paint to the Workshop was identified as being in a poor, flaking condition. Fluorescent light fittings potentially housing PCB containing capacitors were identified throughout the site.

‘EIS notes, that not all areas were able to be accessed at the time of the survey and as a result the subfloors and some ceiling cavities must be assessed prior to any demolition processes’

Regional EnviroScience undertook further soils investigations, which included excavating test pits across open spaces. These investigations confirmed that there is non-friable cement sheeting debris, present in the soil materials on-site. Ash material was detected in several grid locations, with one (1) trench returning ‘friable’ asbestos containing ash material. The ash material is believed to be from the on-site incinerator, which evidenced by a chimney in a photo. This would suggest the contamination within the soils is presumably from incinerator, building and construction products only.

Note: Regional EnviroScience was unable to complete the soils survey due to the number and extent of undefined services uncovered during the trenching works. As a result, recommendations for those areas not investigated, are based on the findings and observations to date.

Note: It is also recommended that a microbial inspection of buildings prior to demolition occur to ensure that mould including parthenogenic species are not present, both airborne, swab and biotope samples will be required and analysis to include species identification, as immunosuppressed persons will be on-site during the demolition works. If identified a scope of works will need to be prepared, including a biocide treatment and contamination controls prior to demolition works.

The area’s geology and current research would not support any Naturally Occurring Asbestos (NOA) deposits within this area.

Figure 2 below, details the soil excavation sample locations (samples 1 to 16) and a sample of bonded board SS01 was taken from the surface of the site. The asbestos locations are highlighted below.

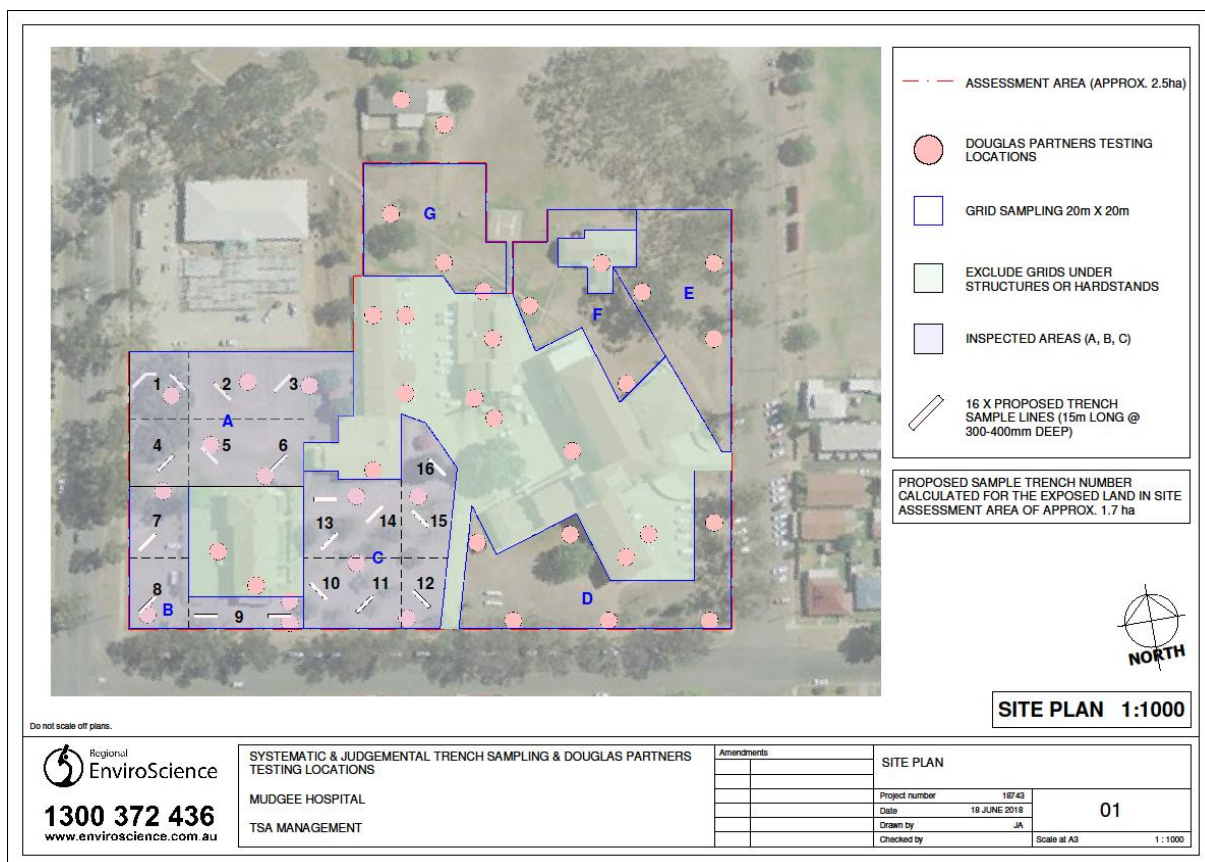


Figure Three: Proposed Site & Approximate Asbestos Contamination Locations

Ash was exposed during excavations in Grids 1, 2, 3, 9, 13 & 15. Asbestos in ash was found in Grid 9.

1. SITE CONDITION AND SURROUNDING ENVIRONMENT

The site is currently in use as a district hospital with allied health services located throughout the existing buildings on site. The site has one disused building on site, the building in the centre of eastern boundary. The site consists of a workshop and various appointment rooms and wards in the hospital.

The site is bound by local roads on three sides with the fourth side being a disused railway and railway station. Beyond the roads, the site is surrounded by residential dwellings to the east, south and west with a playing field and associated club rooms and facilities to the east. A campus of Mudgee Community Preschool is directly opposite the site along Church Street. Mudgee Medical Centre is located to the northwestern corner of the site.

The site has a slight rise in the centre of the southern boundary, with a slight slope to the west, east and north. The site is unfenced, and soils appear to be in generally good condition with no visible patches of contamination evident. Vegetation is generally good with exposed areas in walkways between buildings. No surface water was found on site.

The buildings are in generally good condition, but aged. The nearest sensitive receiver is South Mudgee Preschool. Redbank Creek is approximately 695m to the east of the site.

2. SITE GEOLOGY AND HYDROGEOLOGY

Douglas Partners reports that the site is underlain by the Queen Pinch group (sandstone, mudstone, conglomerate and limestone), but is very close to the boundary with Quaternary alluvium to the north (gravel, silt, sand and clay). The area's geology and current research would not support any Naturally Occurring Asbestos (NOA) deposits within this area.

The borelogs in the same report show the site soils are predominately silty clay to clayey silt, with top soil and fill to a maximum depth of 0.5m.

Groundwater is expected to flow in a northerly direction towards the Cudgegong River.

The site is part of the Cumnock Hydrogeological Landscape group. Aquifers in this group tend to be unconfined to semi-confined with vertical flow occurring through fractured and faulted bedrock. Typical depths for groundwater in this landscape are 6m with a range from 4-8m.

The four groundwater bores installed in the Douglas Partners report were found to be dry after construction at the maximum depth of 5.95m.

Regional EnviroScience's work uncovered patches of ash like material in several sections of the site. Ash was exposed during excavations in Grids 1, 2, 3, 9, 13 & 15. Asbestos in ash was found in Grid 9. A review of the borelogs provided by Douglas Partners identified several other locations where ash or building debris may be found. The borelogs suggest that the ash and building debris occurs to a maximum depth of 0.35m. The locations with possible ash material are shown in Figure 2, above.

3. ASSESSMENT CRITERIA

Douglas Partners report uses a setting of commercial/industrial for the site. Health Infrastructure have indicated that a HIL 'A' classification be implemented, due to the sensitive nature of the hospital site with vulnerable patients and visitors. A site specific, risk assessment may also be required prior to the commencement of works, to assist the remediation assessment.

Assessment criteria was selected from the ASC NEPM with further guidance from WA department of health guidelines for asbestos.

Where material is to be removed from site, the material will be assessed in accordance with the NSW EPA Waste Classification Guidelines: Part 1 Classifying waste.

4. RESULTS

The results for the laboratory analysis of the soils sampled, were reviewed by Regional EnviroScience and no exceedances of investigation levels were found. A summary of the analysis results reviewed can be found in the table below compared to the Residential D criteria which was adopted in previous reports. Due to the sensitive nature of the hospital site with vulnerable patients and visitors, Regional EnviroScience would recommend adopting the setting of standard Residential A for the remediation assessment. Analysis results seen in table 1 are also below the Health Investigation Levels for Residential A criteria.

Contaminant	Maximum Laboratory Analysis Result (mg/kg)	Health Screening Levels (mg/kg for Silty Soil)	Health based investigation levels (mg/kg)	Ecological investigation levels (mg/kg)	Ecological Screening Levels (mg/kg dry soil, Fine)
	PAHs				
Carcinogenic PAHs (as BaP TEQ)	<0.5		3		
Total Positive PAHs	3.8		300		
	PCBs				
PCBs	<0.1		1		

	Metals				
Arsenic	11		100	100	
Cadmium	0.5		20		
Chromium	22		100		
Copper	83		6000		
Lead	210		300		
Mercury	0.2		40		
Nickel	21		400		
Zinc	220		7400		
	Organochlorine Pesticides				
Aldrin and dieldrin	<0.1		6		
Chlordane	<0.1		50		
Endosulfan	<0.1		270		
Endrin	<0.1		10		
Heptachlor	<0.1		6		
HCB	<0.1		300		
Methoxychlor	<0.1		300		
	Organics				
Benzene	<0.2	0.7			65
Toluene	<0.5	390			105
Ethylbenzene	<1	NL			125
Xylenes	<2	95			45
Napthalene	<1	4		170	N/A
Benzo (a) pyrene	0.2	N/A			0.7
TRHC6-C10	<25				180
TRH>C10-C16	<50				120
TRHC16-C34	<100				300
TRHC34-C40	<100				2800

Table 1: Contaminants tested compared against the Health Screening Levels, Health Investigation Levels, Ecological Investigation Levels & Ecological Screening Levels (NEPM 2013) in accordance with Residential A Criteria.

The results reported in the Douglas Partners report are all below the threshold for a residential setting-
A. Asbestos was found in two locations during this sampling.

Regional EnviroScience report found asbestos in locations across the site. Friable asbestos was found on the site near the community health driveway adjacent the southern boundary. The friable asbestos was a small fragment of bonded board, which is classed as asbestos fines (friable) due to the substantial degree of damage. The asbestos on the surface of the soil is visible and is not compliant with the health screening levels for asbestos. The proportion of bonded asbestos in soils was below the 0.01% level for residential settings. The asbestos materials are likely to be only minor in volume, however, are likely to have been mixed in and spread through the soil fill materials. For this reason, it is realistic to assume that asbestos contamination is present throughout the soil fill materials on the site.

4.1 SITE CHARACTERISATION AND CONCEPTUAL SITE MODEL

The site is characterised as having asbestos contamination, in and on the soils across the site to a depth of approximately 300mm, predominately in the form of bonded board. The presence of ash remains a hazard due to the potential for asbestos to have been burnt on the site, presumably from the furnace over time.

Specific remediation strategies will need to be implemented prior to and during demolition works, due to the presence of 'Friable' and 'Non-friable' asbestos materials, Lead (pb) Based Paints and PCB containing fluorescent lighting, being identified within the structures and assets on-site.

A conceptual site model for the area is included below in figure 3. The conceptual site model identified the exposure of site personnel and potential inhalation of contaminants during demolition, excavation and construction activities, damaging the lead and asbestos materials. While asbestos in soil remains undisturbed, the buried material would not be a risk to human health.

During remediation works and including vehicular movements within the site, background and site-specific air monitoring is required to be undertaken by an independent licensed asbestos assessor or Occupational Hygienist when asbestos is removed from the Work Area or by a competent person.

The conceptual site model below details the potential health and environmental exposure pathways for the Meares Street site. Although asbestos is a chemical, the assessment, remediation and control measures will be undertaken based upon the physical properties of the material. The relationship between the fibre properties and the toxicity include the respirability of fibre, based on its potential to become airborne i.e. the air concentration, and the physical properties including the fibre diameter ($<3\mu$) and durability when considering carcinogenic potency (Australian Institute of Occupational Hygienists {AIOH} Asbestos Position Paper, and Stanton et al, 1981).

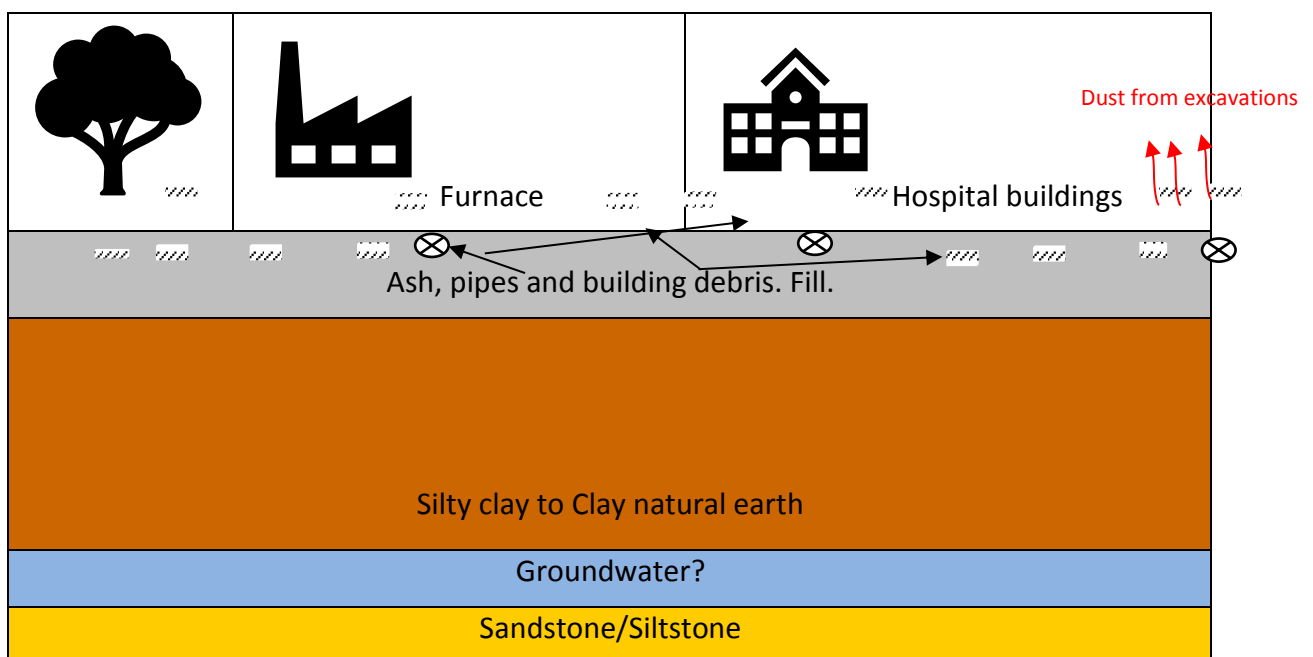


Image 3: Conceptual Site Model, Potential Environmental & Health Exposure Pathways for Asbestos in Soils.

As all asbestos types are known carcinogens, and it is when the asbestos fibres are released and become airborne that they pose a potentially deadly occupational health hazard. The main route of entry into the body is through inhalation, and they deposit directly into various sections of the respiratory tract depending on their fibre size. The three main diseases associated with asbestos exposure are asbestosis, lung cancer and mesothelioma.

During demolition exposure to lead dust will need to be considered. Health Hazards from Lead Exposure include;

- Lead interferes with many body processes and is poisonous to most organs and tissues, including the bones, intestines, kidneys, nervous system, and reproductive organs.
- Acute lead poisoning (high exposure over a short period of time) can cause fatigue, anaemia, constipation, and damage to the nervous system.
- Chronic lead poisoning (exposure over a longer period of time) can cause fatigue, joint pain, and weakness.
- Lead poisoning can damage the foetus in pregnant female workers and impair fertility in male workers.
- Workers are exposed to lead when they inhale lead-containing dust or ingest lead residue from their hands (for example, when eating, chewing gum, or smoking).
- Lead is a suspected human carcinogen and has been shown to cause cancer in laboratory animals.

REMEDIATION ACTION PLAN

Five options for remediation have been considered for the site.

- Leave the site in the current condition;
- Control treatment of the hazardous materials;
- Cap and manage the asbestos contaminated soils on site;
- Remove the asbestos contaminated soils off site;
- A combination of on-site or off-site treatment.

NOTE: For the areas which will remain in existing condition, and not be disturbed during the redevelopment works, management and access will need to be referred to previous investigations which have been identified in the reports listed earlier.

Health Infrastructure have indicated the project will be delivered in three (3) Stages. The Stages may over-lap, however the requirement to open and operate the new hospital is critical to allow the final stage of the project to proceed. The proposed stages are identified within the drawings located in Appendix 1.

Stage 1A, B, C & D. Decanting & Enabling Works:

- Construction of temporary buildings on site to allow for decanting of existing services from buildings to be demolished;
- Refurbishment of level 2 of the existing hospital to accommodate personnel relocated from existing buildings to be demolished;
- Demolition of the CHS and Wellness Centre buildings;
- Excavations for new services; and
- Establish a Contractors site compound.

Stage2. Build New Hospital:

- Site excavation and construction of the New Mudgee Hospital; and
- Decanting of the existing services into the new hospital.

Stage 3A & B. Project Finalisation:

- Demolition of remaining old buildings and temporary buildings; and
- Completion of new roads, remainder of public and staff parking and landscaping.

As there are both earth works and demolition operating individually and concurrently within the various stages, a combination of approaches to the remediation process and appropriate controls will need to be implemented.

The following table provides a summary of the variations and considerations that may be encountered during the above stages.

Remediation Approach	Considerations	Appropriateness for the intended site usage
Leave in-situ Involves the isolation of the asbestos material so it is not easily disturbed.	Least expensive Contaminant remains, asbestos is a known carcinogen and bio accumulates. Exposure pathway is through inhalation. Asbestos management plan required as not readily degradable. Poor public perception	May not be appropriate with potential interaction of potentially contaminated soils. Contamination remaining in-situ, will need to be covered/capped/ i.e. hard-stand, Geotech Fabric, signposted and included in an Environmental Management Plan (EMP).
Control Treatment	No known organisms, chemicals or suitable heat or UV process to break down asbestos to become inert	Not Applicable

Leave in-situ or excavate and re-bury on-site and encapsulate with Virgin Excavated Natural Material (VENM)	Reduces cost of disposal. Contaminant remains, asbestos is a known carcinogen and bio accumulates Exposure pathway is through inhalation. Asbestos management plan required as not readily degradable. Poor public perception	May be appropriate with limited interaction of potentially contaminated soils. Contamination remaining in-situ, will need to be covered/capped/ i.e. hard-stand, Geotech Fabric, signposted and included in an Environmental Management Plan (EMP).
Excavate all materials deemed as contaminated and dispose off-site, dispose off-site and validate and refill with VENM (depending on site levels)	Potentially expensive. Contaminant is removed WA DoH (2009) and NEPC (2013) least favored management option. No asbestos management plan and good public perception.	May Not be appropriate due to high cost.
On-site or off-site treatment Remove asbestos in soil, dispose of excavated waste as 'Special Waste'	Contaminant is removed and disposed off-site. The following guidelines may help in minimizing removed waste; 1. Remove only the excavated materials, i.e. trenches for foundations/footings. 2. At the completion of excavations, install a Geotech membrane over adjoining and exposed soils. 3. Place ENM capping over the Geotech membrane. 4. Document the in-situ soils to identify the potential contaminated areas, in the event, that future works may involve interacting with these soils.	May be appropriate due to large size of site and the unknown location of contamination. Any Contamination remaining in-situ, will need to be covered/capped/ i.e. hard-stand, Geotech Fabric, signposted and included in an Environmental Management Plan (EMP).

Table One: Mudgee Hospital Redevelopment- Consideration of Remediation Treatments

The scope of The Plan has been established, on the basis, of findings obtained from previous and current investigations, local knowledge and information with The Plan aimed at providing:

The hazardous materials removal scope of works and the Plan, has three (3) discrete phases.

Phase 1- Pre-Work & Site Set Up. The Pre-Work stage of this phase is designed to ensure all documentation and relevant licence and notification requirements are addressed. The Site Setup

stage begins the physical activities of establishing the boundaries for the overall removal work areas including communications to affected persons.

Phase 2 – Demolition and Removal. The demolition and removal phase guidance, is intended to provide sufficient detail for the removal contractor to understand the nature of the contamination and associated areas. It is not the intent to direct the method of remediation and achieving a clean area however, minimum requirements are included to assist the contractor.

Phase 3 – Clearance / Validation Work. The Clearance / Validation phase commences when hazardous building materials removal or encapsulation has been completed and the contractor requests a validation that the area is clean. Validation should be provided by a qualified Licenced Asbestos Assessor / Occupational Hygienist, which includes a visual inspection, airborne clearance monitoring and soil validation analysis where necessary, prior to providing a clearance certificate.

Regional EnviroScience expects a successful outcome if all parties follow the recommended guidance set out in The Plan.

4.2 Site Remediation Process Phase 1

As the stages listed earlier, involve both potential interaction with contaminated soils during earth works and hazardous materials during early works and demolition, consideration needs to be given to establishing a sufficient distance between the construction area, perimeter barricades, and the personnel/pedestrian accesses surrounding them.

Note: For areas identified as ‘Early Works’, Regional EnviroScience recommends contractors ensure that reports provided by EIS and Mudgee Health Services, are consulted prior, to commencing or accessing any existing structure or asset, as there are areas within some of the assets that have not been scoped or surveyed for hazardous materials.

4.2.1 Pre-Work Requirements

Prior to any removal works commencing certain responsibilities are placed on designated entities.

The following information is provided as part of a detailed Scope of Works for the asbestos in soil and hazardous building materials removal/demolition works planned for the Community Health Centre,

southern portion of the Wellness Centre and the Store/Training Building and the grounds surrounding these buildings.

The information given is based on the Safe Work Australia publication *How to Safely Remove Asbestos* Code of Practice, for lead based paint AS4361.2:2017 Guide to Hazardous Paint Management and Part 2: Lead paint in residential, public and commercial buildings, Environmentally Hazardous Chemicals Act 1985 No 14, for the removal and disposal of PCB's, and supported by local knowledge and information which should satisfy NSW legislative requirements and ensure a safe and efficient removal and demolition.

Regional EnviroScience recommends that Health Infrastructure consider obtaining documentation from the asbestos removal & other contractors that should include as a minimum the following;

- Current Workers Compensation Insurance;
- Current Public Liability / Indemnity Insurance;
- Current 'Class A' Asbestos Removal Licence;
- Proof of Current Licenced Supervisor;
- Proof of Removal Workers Training;
- Proof of Asbestos Removal & Other Contractors Workers Construction Induction Details;
- Removal Works Risk Assessment & Hazardous Building Material Removal Control Plan for Review & Comment;
- Notification to SafeWork NSW of Intent to Remove Asbestos at Least 5 Days Prior to Commencement of Removal;
- Site Specific Induction to Hazardous Building Materials Removal Workers;
- Provide Hazardous Building Material Removalist/s with Applicable Hazardous Building Materials Register & This Scope of Works; and
- Other Specific Documentation Identified for Health Infrastructure Systems.

Prior to Hazardous Building Materials Removal Works Commencing Health Infrastructure Should Provide the Following;

- Two (2) Days 'Notice of Disruption' to Hospital Management for Affected Workers / Occupants in Locations Immediate & Proximate to Removal and Work Area;

- Communicate Information Regarding Location of Daily Background Airborne Monitoring Sites and Where Results Will Be Posted;
- Traffic Management Plan for Plant / Equipment & People Movements
- Identification of Designated Area for Removal Contractor Plant / Equipment and Decontamination Facilities;

Asbestos in Soil:

Regional EnviroScience recommends that all excavated soils be treated as potentially containing 'friable' asbestos materials, and works should be undertaken by the holder of a certified "Friable" Class A asbestos licensed holder, approved by Safe Work NSW. All staff will need to be appropriately trained, (R.460-461) and a licensed asbestos removal supervisor will need to be on-site or readily available, (R.459).

NOTE: Asbestos materials in soil are the only contaminant to remain on-site, post remediation.

Demolition and Removal of Assets:

Details for the removal of hazardous materials are identified in the relevant codes of practice and guidelines which detail the controls measures to be implemented and satisfactory methodologies for separation within the development area.

4.2.2 Work Area Setup

Secure perimeter fencing surrounding the area where earth works are indicated. A facility to ensure decontamination of vehicles and implements exiting a contaminated area.

For personnel working in or adjacent excavations of contaminated materials, a decontamination area will need to be installed, adjacent to the removal area.

THE FOLLOWING SHOULD BE IMPLEMENTED AND IDENTIFIED PRIOR TO REMOVAL STARTING.

THE REMOVAL AREA IS THE AREA DEFINED BY THE ENCLOSURE AND DECONTAMINATION UNIT AND THE WORK AREA IS THE AREA OUTSIDE THE REMOVAL AREA THAT PROVIDES PEDESTRIAN AND LIMITED PLANT & EQUIPMENT ACCESSSES.

For each asset a designated Work Area must be established around the full perimeter of the Community Health Centre and the Southern Portion of the Wellness Centre and around the full perimeter of the Store/Training Building, to maintain permanent separation from other affected areas of the operating hospital and public thoroughfares. The Work Area, must safely and securely provide for pedestrian and vehicular movements with facility for designated removal waste storage location and clean area for workers to enter and exit the site, including a location for clean amenities that includes a lunch room. The Work Area must be a secure arrangement that ensures no unauthorised access is gained to the removal site, at all times.

Below are minimum requirements that the removal contractor should consider during the setup of the Work Area;

- Install physical barriers / tape to indicate Work Area perimeter;
- Block and or lock any access from the northern portion of the Wellness Centre from the Southern portion.
- Close and seal all doors and windows to buildings proximate Southern Portion of the Wellness Centre and the Store/Training Building for duration of removal and demolition works.

The lead painted guttering, downpipes and window arrangements must be taken into consideration when setting up the removal area to ensure paint particulate cannot migrate from the site. If remediation of lead painted surfaces is to be undertaken, the following remediation protocols are recommended, in conjunction with recommendations set out in the *EIS Hazardous Building Assessment Report (E30775Krpt-HAZ)*;

- Encapsulation is the preferred method and may be incorporated into the asbestos removal encapsulation ensuring ground level drop sheets are installed to a width that reduces the risk of soil contamination below gutter drip lines and potential particle fall areas. The drop sheet should be secured to the guttering and the ground sheet typically constructed 2 metres out from the building base with allowance for an extra 1 metre for each storey rise in the building and the edges should be turned up greater than 100mm and appropriately secured to the ground.
- Lead based paints removed during remediation must be disposed of as hazardous waste.

In the event, that demolition of structures containing lead-based paints is undertaken, perimeter monitoring as described previously, is recommended however, the lead based painted materials may be disposed of as

General Solid Waste based on the following from the POEO Act, 1997;

- “General solid waste (non-putrescible) means waste (other than special waste, hazardous waste, restricted solid waste, general solid waste (putrescible) or liquid waste) that includes any of the following;
 - waste contaminated with lead (including lead paint waste) from residential premises or educational or child care institutions”.

Fluorescent light fittings have been identified as potentially containing PCB’s. It should be considered by Health Infrastructure and the removal contractor/s to provide a controlled area (lockable container) where PCBs for the whole of Mudgee District Hospital Upgrade can be stored until the completion of the project one waste transport transaction to the appropriate facility would be safer and the most cost-effective solution for the overall project.

Friable Asbestos has been detected within the buildings of interest. Below are minimum requirements that the removal contractor should consider during the setup of the Friable Asbestos Removal Area;

- Identify live electrical and other energised critical services;
- Deactivate live electrical and other energised services;
- Provide physical barriers to other live services, i.e. natural gas;
- Install water bunding adjacent either end of the remediation area;
- Provide a methodology to evacuate water collected within the bunded area, and removed via the Decontamination Unit collection system;
- Determine suitable location and orientation of Decontamination Unit;
- Construct appropriate removal area enclosure (PVC / Shrink Wrap);
- Negative Air System must have sufficient capacity to maintain a constant air flow through the Decontamination Unit;
- Install additional Negative Air System as backup facility;
- Locate and setup water and sewerage facilities for the Decontamination Unit;

- Enclosure should be constructed with an area for washing down waste material prior to bag out;
- Provide secure waste area outside the enclosure in the barricaded Work Area; and
- Occupational Hygienist / Licenced Asbestos Assessor to 'smoke test' enclosure/s for integrity and ensure adequacy of negative air system prior to occupancy for removal works.

At the completion of the site establishment and prior to remediation works being undertaken, a checklist of the above recommendations should be compiled. This will ensure that all recommendations have been installed and are satisfactory to undertake the works.

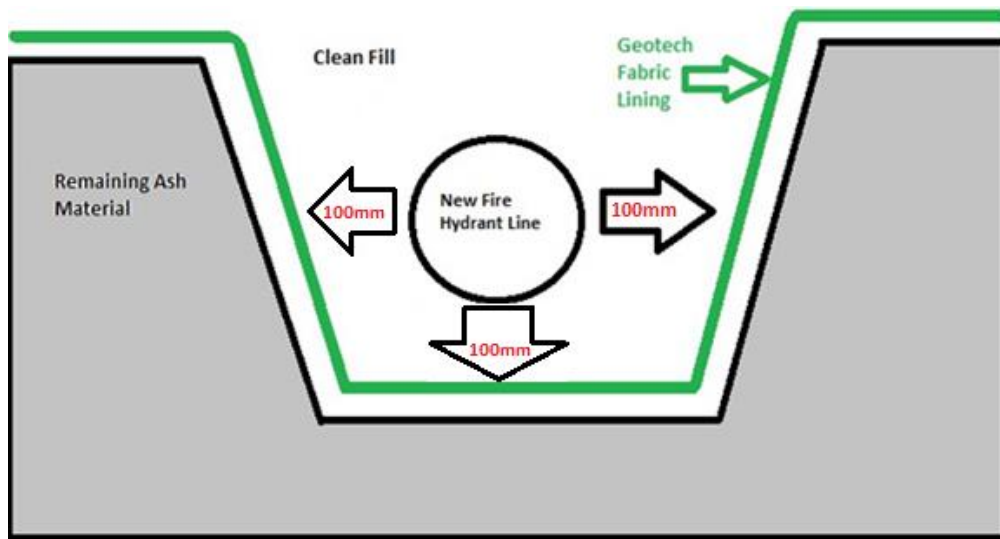
4.2.3 Demolition and Removal Works Including Soils

During remediation of contaminated soils and demolition works, airborne asbestos air monitoring will be undertaken around the perimeter of the site, including excavator cabins, and other high-risk areas deemed appropriate during the course, of the works on-site.

The asbestos and lead air monitoring during the removal and demolition, will be undertaken in accordance with the National Occupational Health and Safety Commission's "Asbestos: Code of Practice and Guidance Notes - Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust" [NOHSC:3003 (2005)] and AS4361.2:2017 Guide to Hazardous Paint Management, Part 2: Lead paint in residential, public and commercial buildings.

Excavation and Relocation of Soils

During the excavation/construction works where new service pipe-work or footings are proposed to be installed, and the material will need to be excavated and removed as potentially, contaminated waste. Regional EnviroScience recommends, excavations or trenches be installed as per the diagram below.



This procedure enables personnel to work without adopting PPE and procedures. The Geotech layer may also be of assistance across the surfaces which are not destined for excavation, however will have machinery or equipment likely to disturb the surface and expose the potential asbestos materials below. Hazard warning tape also needs to line the Geotech material to provide a physical warning layer.

For soils remaining in-situ, or relocated to areas within the development site, the following recommendations are provided;

- Ensure an adequate water suppression system is installed, available and implemented whenever the asbestos contaminated layer of soil is excavated;
- If contaminated soils are temporarily stored, they are wetted down and covered;
- At the completion and or relocation of contaminated soils, a Geotech membrane cover be installed and a minimum of 100mm for areas where a hard-stand cover is indicated and 300mm for open space areas, and ENM soils be overlaid;
- For areas where contaminated soils have been removed, as a minimum, a visual inspection is undertaken to ensure that no visible asbestos containing materials, i.e. ash, are observed;
- A clearance certificate is issued for each remediated area; and
- An Environmental Management Plan (EMP), be implemented which details the location and extent for the encapsulated soils remaining onsite.

NOTE: The collection and stockpiling of potentially contaminated soils and subsequent re-use on-site, may require ratification from NSW EPA.

During the soils survey, asbestos pipe was uncovered when excavating the trenches. As the pipe was not identified on any hospital documents or Dial Before You Dig correspondence, it is reasonable to assume that similar asbestos containing pipe, potentially exists across the site. As a result, Regional Enviroscience recommends employing an '*Unexpected Finds Protocol*', during excavations anywhere within the development area, to assist with the management and removal of these materials. Please refer to Appendix 2 for a copy of the unexpected finds protocol.

Assets Removal and Demolition Works

It is recommended that the removal of the hazardous building materials from each of the Community Health Centre, Southern Portion of the Wellness Centre and the Store/Training Building are completed prior to demolition and presented below are considerations to be reviewed by the removal contractor/s.

- Review hazardous building material risk assessment and action plan (should be part of pre-works and this is the implementation phase);
- All restricted access areas which did not get accessed in the EIS' Hazardous Building Materials Assessment must be accessed and assessed prior to the start of removal;
- Make safe ceiling cavity and subfloor areas prior to the friable asbestos removal – PVA or other type of fixing medium applied to underside of ceiling due to some degradation of the pipe lagging;
- Remove pipe lagging from ceiling cavity and subfloor areas;
- Remove bonded ceiling, walls, eaves linings and sub-floor debris;
- Remove Phenol light switches and light roses / globe holders;
- Remove guttering, downpipes and window arrangements;
- Remove PCB containing capacitor/s;
- Double bag hazardous building material waste - wash / wet wipe bagged in allocated area ready for removal from enclosure; and
- Air monitoring will need to be undertaken surrounding the removal area.

Restrictions/Considerations for tools used during the hazardous building materials removal include;

- As per recognised codes of practice and industry guidance, equipment and tools used should minimize dust creation, and must be suitable for use in a wet removal process. All tools and equipment that are used within the enclosure will need to be decontaminated and bagged prior to removal.
- The areas of environmental and health concern to date are the known hazardous building material locations identified from the Hazardous Building Materials Assessment (EIS report E30775Krpt-Haz) undertaken between 15th and the 17th August 2017.

4.2.4 Visual Assessment and Validation Sampling Prior to Demolition

The remediation goal and main objective of the remediation action plan will be to remove all hazardous building materials prior to demolition, as described above, throughout the Community Health Centre, Southern Portion of the Wellness Centre and the Store/Training Buildings. A visual inspection will provide the initial satisfactory remediation assessment.

A Clearance Certificate will need to be obtained for the remediation of the asbestos containing materials and lead paint, prior to the demolition of the enclosure.

A clearance certificate will also need to be obtained at the completion of the dismantling of the enclosure and decontamination unit. A 'Visual Clearance Certificate' can be issued on-site at the completion of works prior to providing a formal clearance report, post the analysis of the clearances air monitoring results.

During remediation works airborne asbestos and lead air monitoring will be undertaken around the perimeter of the site, and other high-risk areas deemed appropriate during the course, of the works on-site.

The asbestos and lead air monitoring will be undertaken in accordance with the National Occupational Health and Safety Commission's "Asbestos: Code of Practice and Guidance Notes - Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust" [NOHSC:3003 (2005)] and AS4361.2:2017 Guide to Hazardous Paint Management, Part 2: Lead paint in residential,

public and commercial buildings;

At the completion of remediation works airborne asbestos air monitoring samples will be undertaken within the works area, to confirm that background levels are below the detection limit of 0.01 fibres/ml for the membrane filter test.

4.2.5 Excavations Following Demolitions

As discussed previously, and due to the random nature of asbestos debris which currently exists in the undeveloped open space areas, remediation and excavations undertaken within these areas may require a number, of options to facilitate continuity for the proposed works, as follows;

- Excavate and remove all ash materials as contaminated waste;
- Excavate to expose natural soils and stockpile contaminated soils with the view to assessing the stockpiles for asbestos materials and waste classification;
- Relocation onsite to be encapsulated below hard-stands or covered open spaces;
- Employ an unexpected find protocol where ash materials are not evident;
- Excavate only those areas required and install a separation layer as indicated above, or
- A combination of the above.

At the completion of the demolition of the infrastructure/assets, Regional EnviroScience recommends employing an unexpected finds protocol across all, of the soils below and surrounding any of the infrastructure/assets.

The remediation for the Remaining Wellness Centre and the Boiler House and Workshop areas should follow the same or similar program as described previously.

As highlighted in EIS' Hazardous Building Materials Report, not all sub-floor and ceiling spaces could be accessed and assessed during the survey. These areas must where reasonably possible, be assessed prior to the start of the removal process.

4.3 Validation Sampling

In the event, validation sampling is required, the following methodology is provided as guidance for the assessment and collections of soils samples for analysis.

Sampling method recommendations for evaluating asbestos and lead contamination in soils, are provided in Table 7 of Schedule B2 of the NEPM. It must be noted the NEPM recommends that all sampling methods are generally preceded by hand-picking (Emu Bob) to remove visible asbestos from the site surface and the collected material should be included in any contamination calculations.

Both the NEPM and the Western Australian (WA) Department of Health (DOH) “Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009)” (which has been adopted by the NEPM) recommend ‘judgmental sampling’ to target particular, areas of a site based on known or likely contamination.

4.4 Sampling Frequency

At the completion of excavations or demolition works and validation sampling is required, the area under survey needs to be configured into grids with a composite sample obtained from each grid location.

Validation Sampling			
10L Composite Sample - Sample location (grid) is divided into 6 sections and approximately 1600 ml are collected from each subsection.			
500gm Composite Sample – Sample location (-7mm stockpile). The stockpile is mixed with a shovel before it is divided into 6 sections and approximately 80gms is collected from each subsection. The sampling mixing process is undertaken this way to decrease the risk of respirable asbestos fibres, as the contaminant material within the soil is bonded asbestos board which should be removed through the +7mm sieving process			
Sample Locations	+ 7mm Fraction	- 7mm fraction	Comments
Grid Number (1- XXX) Surface	XXX samples for analysis (EnviroScience)	XXX – 500 gm samples for analysis (Envirolab)	10L sample collected and spread onto tarpaulin for visual inspection, and then passed through 7mm sieve on-site for collection of the two samples from each 10L collection

Judgemental Sampling Estimate only, surface only	XXX samples for analysis (EnviroScience)	XXX - 500 gm samples for analysis (Envirolab)	Extra samples from stockpiles and excavated materials as decided on-site
TOTAL	XXX	XXX	XXX Samples in total

Table Two: Validation Sampling Design

4.5 Sample Analysis

A 10L sample of soil will be removed from each grid location and sieved using a 7mm x 7mm grid sieve. The greater than 7mm fraction of sieved material is to be visually inspected for potential Asbestos Containing Material (ACM). Any identified potential ACM will be collected for analysis at Regional EnviroScience's NATA accredited facility.

Following a visual inspection of the spoil, a sub-sample will be collected of the less than 7mm fraction of sieved soil with a minimum sample volume of 500ml collected from each grid location, for laboratory analysis.

The identified ACM will be weighed to calculate asbestos soil concentration for individual samples as per Section 4.1.7 of the Western Australian Guidelines and Schedule B1 of the NEPM (detailed below).

In accordance with the NEPM, assessment of bonded ACM is the recommended measure for total asbestos contamination where Fibrous Asbestos (FA) and Asbestos Fines (AF) (derived from bonded ACM only) are not likely to be significant (i.e. where FA and AF are likely to make up less than 10% of the total amount of asbestos present). If FA and AF are not identified as part of the proposed assessment the weight of identified bonded ACM should be used in the assessment.

The +7mm fraction will be NATA (EnviroScience) endorsed for identification of asbestos materials as per AS4964, the percentage calculation is a calculation separate to the laboratory identification, as detailed below to determine the quantity of asbestos in soil.

The asbestos ID in soils (500gm) sample as per AS4964 will be NATA (Envirolab) endorsed to a limit of 0.1g/kg. If friable asbestos is identified in the -7mm fraction soil sample, it will be reported but is

outside the parameters for NATA endorsement under the limitations of the testing methods of AS4964.

Important considerations in determining asbestos concentrations in soil that will be adopted on this site will be:

- averaging asbestos concentrations across all soils at a site is not appropriate (due to potential dilution or hot-spot factors);
- the calculation will be carried out per sample (i.e. not averaged)

The asbestos concentration calculation is based on the amount of asbestos equivalent (i.e. asbestos in asbestos-containing-materials) in a measured/estimated amount of soil, expressed as a % weight for weight.

The quantity of asbestos in soil is estimated as follows:

- $\%w/w \text{ asbestos in soil} = \% \text{ asbestos content} \times \text{bonded ACM (kg)} / \text{soil volume (L)} \times \text{soil density (kg/L)}$.

In calculating asbestos concentrations, the following assumptions can be made (however, situation specific information is recommended):

- % asbestos content (within bonded ACM) = 15%, and
- Soil density for sandy soils = 1.65 kg/L and for clay soils = 1.80 kg/L

The following definitions as per the NEPM apply in relation to asbestos in soil:

4.5.1 Bonded Asbestos Containing Material (Bonded ACM)

Bonded ACM comprises asbestos-containing-material which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin (e.g. asbestos fencing and vinyl tiles). This term is restricted to material that cannot pass a 7mm x 7 mm sieve. This sieve size is selected because it approximates the thickness of common asbestos cement

sheeting and for fragments to be smaller than this would imply a high degree of damage and hence potential for fibre release.

4.5.2 *Fibrous Asbestos (FA)*

FA comprises friable asbestos material and includes severely weathered, (chemical or mechanical) or burnt cement sheet, insulation products and woven asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure and has the potential to release airborne asbestos fibres. This material is typically unbounded or was previously bonded and is now significantly degraded (crumbling).

4.5.3 *Asbestos Fines (AF)*

AF includes free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7-mm x 7 mm sieve. (Note: that for bonded ACM fragments to pass through a 7-mm x 7 mm sieve implies a substantial degree of damage which increases the potential for fibre release.)

From a human health risk perspective, FA and AF are considered to be equivalent to 'friable' asbestos, which is defined as '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'.

SCREENING LEVEL RISK ASSESSMENT

Based on the proposed site development requiring the area be remediated to a level fit for use as a Hospital, the HSLs for the land use setting Residential A (Table 1) should be adopted for this proposed assessment.

NOTE: Asbestos materials are the only contaminant likely to remain on-site, post remediation/relocation of soils.

The rationale for the application of the HIL A, is twofold. The area is Zoned R1, residential and conforms to the following criteria. In accordance with NEPM, Recreational A includes residential use, day care centres, preschools, etc. and is applicable to a site used frequently by more sensitive groups such as children (within childcare centres, hospitals and hotels) and the elderly (within hospitals, aged care facilities and hospices).

The HILs for each land use scenario have been developed to be protective of the majority, of human populations that are sensitive to potential health risks from soil contamination. The level of exposure of a given human population to health risks within a particular land use scenario is related to physiological factors and the frequency, extent and duration of exposure.

The calculated asbestos content in the collected samples expressed in a %w/w basis can then be compared to the recommended NEPM Residential a Health Screening Level to determine subsequent site management and remediation actions. This type of risk assessment is, considered to be a Tier 1 or screening-level assessment.

Due to client requirements it is mandatory that the site is remediated to the HIL residential A criterion. Therefore, the HIL residential A (HIL – A) asbestos in soil (% w/w) NEPC (2013) has been adopted as site assessment criteria for the proposed development.

The site will be remediated to the HIL-A criteria as detailed in the table below;

- Bonded ACM = 0.01%
- FA and AF = 0.001%
- No visible asbestos (all forms) within surface soils (0.0 to 0.1 meters below ground surface).

	Health Investigation Level (w/w)			
Form of asbestos	Residential A1	Residential B2	Recreational C3	Commercial/ Industrial D4
Bonded ACM	0.01%	0.04%	0.02%	0.05%
FA and AF (friable asbestos)	0.001%			
All forms of asbestos	No visible asbestos for surface soil			
Residential A with garden/accessible soil also includes children’s day care centres, preschools and primary schools.				
Residential B with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.				
Recreational C includes public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and unpaved footpaths.				
Commercial/Industrial D includes premises such as shops, offices, factories and industrial sites				

Table 3: NEPC (2013) Health Screening Levels for Asbestos in Soil

5 LABORATORY QUALITY ASSURANCE & QUALITY CONTROL

Objectives of the Regional EnviroScience NATA accredited Asbestos Laboratory is to maintain programs to monitor new tests and improved techniques to comply with Australian Standard 4964-2004, the Guidance Note on the Membrane Filter Method for Estimating Asbestos Fibres, NOHSC:3003(2005) and NATA ISO 17025.

All Quality Control and Proficiency Testing is reviewed as part of the Management Review Meeting annually as per 4.14.15 of the NATA Standard Application Document for Accreditation of Testing and Calibration Facilities (2003).

5.1 Laboratory Analysis-NATA Asbestos in Soils

Australian Standard AS 4964:2004 Method for the qualitative identification of asbestos in bulk samples requires the reporting of presence or absence of asbestos at a reporting limit of 0.1 g/Kg. This method does not produce a quantifiable result of asbestos content and therefore, quantitative results cannot be reported.

Determining the concentration of asbestos in soil continues to provide challenges for those involved in soil remediation and site validation work. As discussed in Issue 151 of NATA News (March 2014), there is no accepted valid method in Australia for this estimation. Consequently, NATA does not offer accreditation for this activity and has advised facilities that results for this work must be issued with a comment clearly indicating that the results are not covered by the scope of accreditation and the result should also be issued on a non-NATA endorsed report.

NATA has reminded facilities that inclusion of such a comment does not remove the need to ensure that the customer is aware of the limitations of the analysis undertaken and what is being reported. This must be established during the contract review stage or when the customer first approaches the facility to request the examination of soil for asbestos in line with Clause 4.4 of ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories.

For customers of facilities who use the National Environment Protection (Assessment of Site Contamination) Measure 1999 - updated in 2013 - (NEPM) for site assessment work, determination of the concentration of asbestos-containing material (ACM) in soil is required. This can be achieved by carrying out site based gravimetric work. Section 4.10 of the NEPM document for site-based field observations provides details of the procedure for estimating the amount of visible ACM present in a volume of soil. It should be noted that results of any field or site-based work is not covered by any NATA accreditation.

It is important to remember that the procedures outlined in the NEPM only cover visible ACM. They do not cover free (or respirable) asbestos fibres which may be distributed throughout the soil. Only laboratory analysis using AS 4964 can determine the presence or absence of free asbestos fibres via the trace analytical technique outlined in the Standard.

NATA is aware that some NATA accredited laboratories are confusing the NEPM gravimetric field observation with the NEPM prescribed analytical method (AS 4964). Laboratories should be aware that the gravimetric procedures in the NEPM are not analytical methods and are therefore inappropriate for discrete samples provided to laboratories for analysis.

Additionally, the size of soil samples examined in the laboratory may not be representative of the field site and can result in an under estimation of any free asbestos present. Analysis of soil samples using AS 4964 will require the test report to include a description of the visible ACM such as fibrous asbestos (e.g. asbestos cement) and asbestos fines (e.g. small fibrous bundles) using stereo and polarised light microscopy. Only when examination is carried out using the trace analytical technique, can the presence or absence of free (i.e. respirable) asbestos fibres be determined at the *Reporting Limit of 0.1 g/Kg or 0.01% by weight* (note: that is a requirement that trace analysis always be performed as part of the AS 4964 analysis process for non-homogeneous samples such as soil).

Analysis of samples collected will be analysed in accordance with AS 4964 as described above and will include an assessment of Asbestos Fines (AF) and Fibrous Asbestos (FA) as outlined in the NEPM guidelines.

Laboratories are cautioned against reporting detection limits for asbestos down to 0.001% as it is possible that free respirable asbestos fibre contamination exist in the sample at concentrations up to an order of magnitude greater than the reported detection limit.

Where results are reported for positive ACM (e.g. fibrous asbestos cement, asbestos bundles etc.) and/or positive free asbestos, it is important that the findings are clear and unambiguous.

In summary the following points are made:

- The gravimetric procedure described in the NEPM is designed for field evaluations for visible ACM only. It is not appropriate for examining soil samples provided to a laboratory.
- There is no accepted valid analytical method in Australia for estimating the concentration of asbestos in soil.
- NATA does not accredit facilities for the estimation of the concentration of ACM or free asbestos fibres in soil.

- Stereo microscopic analysis which only examines visible ACM without conducting further trace analysis techniques cannot be used to establish whether the soil is asbestos free.
- Examination for the presence of free asbestos fibres in soils can only be undertaken using AS 4964 trace analysis techniques which detects fibres where they exist in concentrations greater than 0.01% (i.e. 0.1 g/Kg).
- Free asbestos fibres in soil when analysed using AS 4964 can only be reported as being present, if above the Reporting Limit of 0.1 g/Kg (i.e. 0.01%), or not present.
- If asbestos in soil estimation is performed in accordance with NEPM 2013, any quantitative results reported must be clearly and appropriately annotated on test reports to indicate that they are not covered by the scope of NATA accreditation and have not been analysed in accordance with a valid method.
- When reporting such results, a comment advising that such results cannot be used in place of field evaluations must be included on the report.

5.2 Achievement of Data Quality Indicators

- Precision- All staff and contractors are provided with all necessary information concerning their duties, obligations and responsibilities, hours of work, laboratory policies, proficiency programs, training and laboratory audits and all other information required for the efficient functioning of the company and project work and to aim for continual improvement.
- Accuracy- All Internal Quality Control and External Proficiency Testing will be performed in accordance with the current NATA guidelines. All reports shall be signed off and maintained by the Laboratory Manager. The use of laboratory blanks also helps to improve the accuracy during air monitoring procedures.
- Comparability- The same sampling technique will be followed for each sample obtained and a qualified and competent person will be used to obtain all samples. With regards to the Part: A programs each approved counter and identifier will order a program on rotation in their name for each cycle. To maintain expertise and the educational value all counters and identifiers will analyse the samples and compare their results upon receipt of the results from Part: A.

5.3 Equipment

All equipment should be uniquely identified where practicable.

- All equipment should be assessed for risk;
- All equipment used shall be capable of achieving the accuracy required for testing and or calibration;
- All necessary instructions of operation and troubleshooting shall be available to the operators;
- Routine daily, monthly and external services should be performed in accordance with manufacturer's specification and the relevant Australian Standard and ISO 17025 requirements;
- All equipment will be decontaminated in a selected decontamination area at the end of the day and between sampling locations when required using spray down, wash down and wet wiping techniques;
- All equipment must be clearly labeled with the date of the last service or calibration. Routine maintenance must be recorded on a chart and initialed;
- All computers and automated testing equipment should be adequately protected to prevent alteration or destruction by casual or unauthorized users; and
- The Company Information System shall be maintained under contract.

5.4 Field Site Sampling QA Requirements

Site Work sheets are produced from the request form to include:

- Unique identification of the client;
- Type of job site and primary sample required;
- Testing requested;
- Site information such as climatic and other conditions which may affect the sample;
- Date and time of sample collection with name of collector;
- Date and time of reception into the laboratory.

Additionally, Regional EnviroScience has a Sample Collection Manual which provides information on how to collect, label, correctly fill our chain of custody, store and transport samples for testing. This manual will include a list of all available laboratory examinations offered by Regional EnviroScience and the type and amount of sample required.

The manual gives instruction as to the recognition and recording of environmental conditions during sampling which may affect the test result. The manual gives instructions as to the correct labeling and numbering of samples for positive identification upon arrival in the laboratory.

Regional EnviroScience has documentation for acceptance or rejection of primary samples (e.g. unsuitable or inadequate).

Under Regional EnviroScience's sampling procedure and NATA accreditation that during collection of air monitoring samples a Laboratory Blank canister is analysed from the same batch as the canister prepared batch and is then analysed to ensure there has been no cross contamination of the batch of canisters used. Regional EnviroScience's internal policy is for every 20 canisters analysed, or a new batch or site location at least one Laboratory Blank is analysed.

Bulk Samples collected from the site will undergo analysis by Regional EnviroScience, a NATA accredited laboratory. The +7mm fraction will undergo analysis on-site, whilst the -7mm fraction will undergo analysis at Regional EnviroScience laboratory.

Due to the heterogeneous nature of the contaminant and the morphological and physical structure of asbestos contamination, even though asbestos is a chemical, rinsate samples are not required, and double/blind sampling of soil would not be comparing like samples to like samples.

Transport instructions shall indicate an optimal time by which samples are received into the laboratory. They will also have instruction as to the manner of transport that ensures safety for carriers and general public in compliance with appropriate legislation.

The Sample Collection Manual will be available to staff who travel to job sites.

6 SITE MANAGEMENT PLAN DURING REMEDIATION

The remediation works have the potential to cause environmental or human health issues during demolition, excavation and potential stockpiling of contaminated soils. This section of the RAP discusses measures to lower these risks.

The Plan will address:

- Site Access;
- Hours of Operation;
- Stormwater and Soil Management;
- Noise Control;
- Dust Control and Monitoring;
- Odour Control;
- Work Health and Safety;
- Remediation Schedule; and
- Waste Management.
- Contingency and Unexpected Finds Plan

Each of the issues to be addressed in the site management plan is briefly discussed below.

6.1 Site Access

It is the remediation contractor's responsibility to securely fence the site to prevent unauthorised and, in particular the remediation areas during the excavation works. Adequate fences or barriers will be placed around the excavations and potential stockpiles to prevent access of unauthorised personnel to areas where contaminated material is exposed and, also to prevent the public from the hazards of excavations. Adequate warning signs will also be placed around the area.

For all personnel entering the site, the following approach is suggested;

1. Undertake on-site asbestos awareness training and toolbox talk prior to works commencing to educate contractors about the potential for asbestos material to be

encountered including an 'Unexpected Finds Protocol', dust suppression techniques and the health effects of asbestos.

2. 'Danger Asbestos Hazard' signs will be erected on the exterior fencing of the site.
3. Signage with the site Representative's contact details will also be erected on the site, so that if there are any issues they may be contacted.
4. Care needs to be undertaken in defoliating and excavation activities to ensure that existing services underground are not disturbed. "Dial Before You Dig" must be undertaken.
5. Excavator cabins are to have windows wound up and air conditioning set to recirculation. The known asbestos contaminated zone, is isolated by fencing to avoid accidental disturbance.
6. Perimeter and Personal asbestos air monitoring will be undertaken in accordance with NOHSC: 3003 (2005) Guidance Note on the Membrane Filter Method for estimating airborne asbestos fibres during the remediation works and in case of unexpected finds.
7. Dust mitigation and suitable water suppression methods will be implemented prior to works commencing including the use of a hose and shadow watering during works and the availability of a water cart during works.
8. Decontamination area established to ensure personnel; vehicle and implement movements mitigate the potential migration of asbestos contaminants from the site.
9. All works on site will be documented by Regional EnviroScience and this will form part of the final Validation report.

6.2 Hours of Operation

Remediation hours of operation will be limited to the hours of general site works as stipulated in the DA consent.

6.3 Stormwater & Soil Management

Adequate stormwater runoff, run-on and sediment control measures will be put in place for the remedial works. Stockpiling if required should be managed in a way to prevent harm to the environment and general the general the public from potentially contaminated soils within the stockpiles. The following recommendations provide guidance on managing stockpiled material:

- Access to the stockpiles of potentially contaminated material should be limited by keeping stockpiles within site perimeter fences;
- Stockpiles should be placed on level ground. If this is not possible stockpiles should not be placed on slopes greater than five degrees;
- Material should be placed on strong impermeable plastic sheeting to prevent the contamination of the underlying soils. Material should not be stockpiled more than 2m high;
- If the stockpiles are to remain in-situ overnight or for an extended period of time, the stockpiles should be covered by weighted polythene sheets or tarpaulins to prevent erosion of stockpiled materials. Heavy objects not containing sharp edges should be placed on the sheets to prevent them from being disturbed or uncovered by wind;
- Adequate straw bales and/or silt fences should be placed around the perimeter of the stockpile area to filter runoff from the stockpiles and prevent overland storm water flow from affecting the base of the stockpile, these should be installed prior to works beginning on site;
- A diversion trench should be excavated, or tightly packed sand bags placed prior to commencement of sampling, up-gradient of the stockpile to prevent storm water running into the stockpile.
- The following guidelines will be used for soil and water management during remediation; Managing Urban Stormwater: *Soils and Construction*. Landcom, (4th Edition) March 2004 (reprinted 2006) (the “Blue Book”). Volume 1 and Volume 2.

6.4 Noise

To mitigate noise impacts which may arise as a result of remedial works, the civil contractor will undertake the works in accordance with state and local noise regulations applicable to the site.

6.5 Dust Control

Dust control is required to prevent airborne dust and microbes being inhaled by human receptors. Airborne dust may be generated by wind action from loose earth left on the ground. This could cause migration of contaminated dust, as well as cause a nuisance for the surrounding area and must be controlled.

Therefore, the following dust control measures are proposed:

- Dust levels will be monitored visually during site work;
- Soil will be kept adequately moist to reduce the generation of dust using a hose to ensure that the material is kept damp, and shadow watering techniques are used on site and when required a water cart will be used for dust suppression.
- If any excess dust is visually sighted extra dust suppression will be implemented such as a full-time water cart or Fogging system.
- It is recommended that excavation and fill movement (earthworks) does not occur on windy/dry days, unless dust suppression measures can be rigorously implemented. That is to say, given the ubiquitous presence of AF and FA in soil – and the neighbouring residential uses – the likelihood of generating asbestos fibres during earthworks taking place on dry/windy days, which may impact the adjacent residential properties, is likely to be high.
- It is recommended that a road-sweeper is used to control/remove any tracked dust/dirt on the affected parts of the neighbouring road network (Church Street, Lewis Street, Meares Street).
- Air monitoring for airborne fibres will be undertaken during remediation and validation of asbestos impacted areas on site, air monitoring will also be undertaken on the site boundaries in accordance with NOHSC: 3003 (2005) Guidance Note on the Membrane Filter Method for estimating airborne asbestos fibres.
- Ensure a suitable decontamination/dust suppression system is employed for vehicle and implement movements, off-site.

6.6 Odour

The remediation works are not expected to generate any significant odours.

6.7 Work Health & Safety

A Health, Safety, Security and Environmental (HSSE) Plan should be prepared by the remediation contractor, in accordance with relevant NSW legislation. The HSSE Plan should include, but not be limited to, the following.

- Hazard Identification and Control;
- Dust and odour monitoring during excavation and stockpiling works;
- Chemical Hazard Control;
- Handling Procedures;
- Personal Protective Equipment;
- Work Zones;
- Decontamination procedures;
- Contingency Plans; and
- Incident Reporting.

The HSSE Plan should be periodically reviewed and updated prior to various project tasks being conducted. The contractor, supporting sub-contractors and third-party observers to the site will be required to work strictly to this plan. During site activities, only approved personnel should be allowed access to the remediation work area. The HSSE Plan will identify hazards, assess the risks posed by the hazards and recommend measures to control the hazards.

6.8 Summary of Contaminants and Exposure Pathways

Although lead paint samples have been identified on some internal and external surfaces, Regional Enviroscience recommends that all painted surfaces be treated as containing lead-based paints. PCB's

were identified as potentially onsite, however, during the removal of fluorescent light assemblies, it is recommended that metal capacitors be removed as if containing PCB's or have the capacitor cross-checked against the 'Identification of PCB-Containing Capacitors' reference guide. Exposure of site users and off-site users to asbestos and identified hazardous contaminants could occur through;

- Inhalation of airborne respirable fibres;
- Dermal contact with contaminated soil;
- Transfer contamination from taking contaminated clothing, boots and subsequent secondary exposures.
- Ingestion of contaminated soil from poor hygiene practices and hand to mouth actions.

The following section presents some control measures that should be adopted to manage health and safety hazards posed by potential contamination during the remediation. These control measures include;

- Personal Protective Equipment;
- Safe Work Practices.

It is important to note that this section only covers contamination issues associated with contaminated soil. It is also important to note that these procedures will need to be evaluated for effectiveness and where necessary revised and/or improved during site work.

To minimise short and long-term health contaminants, the minimum level of PPE required for persons undertaking the excavations include;

- Hard hats;
- High visibility clothing;
- Long sleeve shirts and trousers;
- Steel capped workers boots;
- Safety glasses;
- Chemical resistant rubber gloves for persons coming in contact with the soil; and
- Dust resistant disposable overalls and P2 (minimum) dust masks when handling potentially asbestos contaminated soils.

Safe work practices during excavations and sampling of contaminated soils include;

- The use of Chemical resistant gloves should be changed after handling each sample and disposed of appropriately.
- The contractor should ensure that adequate signage is present across the remediation area to warn unauthorised persons from entering the area.
- Eating, drinking, chewing gum, smoking or practices that involve hand to mouth transfer increases the probability of ingestion of contaminated soil or dust into the body.
- With respect to remediation activities, hands must be thoroughly washed after coming into contact with soil or groundwater on the site before eating, drinking or smoking.

6.9 Contingency/Unexpected Finds Plan

6.9.1 Hazardous Materials

If unexpected hazardous materials are discovered during the remediation activities in a 'clean' area (area believed to be free of hazardous materials) the following procedures should be followed;

- Cease work and evacuate the area of work immediately
- Erect barricades to isolate the area and ensure no one accesses the area without permission from the Environmental Consultant (Regional EnviroScience).
- Immediately notify the Site Project Manager who is to notify the Client (NSW Health Infrastructure) of the potential contaminated area
- Sampling of the suspected material is to be carried out by the Environmental Consultant to undergo laboratory testing
- The Environmental Consultant will develop a management plan for the discovered material dependent on the laboratory analysis results.
- Remedial works will need to be undertaken in the area
- Once the area has remediated only then may the barricades be removed, and work activities resumed under direction of the Environmental Consultant.

6.9.2 Other Unexpected Finds

- Heritage – Stop work immediately if you uncover anything that might be an Aboriginal tool or carving or if European heritage items are encountered and contact the Environmental Consultant

6.9.3 COMPLAINTS

- If any complaints from on-site workers or the public regarding excessive noise, odour or dust is noticed the work creating the source of the nuisance should be identified and work temporarily stopped until a solution to suppress the issue can be found. Physical measurements maybe undertaken by the Environmental Consultant to investigate the complaint and to ensure that health exposure levels and environmental levels are adhered to.
- The Project Manager & Environmental Consultant should immediately be notified of the complaints
- Any immediate solutions should be put into effect e.g. dust suppression using a water cart and testing of the source of complaint should be undertaken to ensure excess noise, dust or odour is not being produced on the work site.
- Following testing of the issue the Environmental Consultant will prepare a management report to eliminate the issue so work can continue as normal.

6.10 Community Consultation Plan

Health Infrastructure and Central West Project Management will be required to issue, a letter to all adjoining landowners and stakeholders. The letter's content may include the details below:

Recipient Name
 Address
 City & Postcode

Dear Sir/ Madam,

**HAZARDOUS BUILDING MATERIALS REMEDIATION WORKS TO BE UNDERTAKEN FROM THE
 INTERIOR AND EXTERIOR OF THE BUILDINGS AT MUDGEE DISTRICT HOSPITAL.**

YOUR REF:



Mudgée District Hospital is the owner of the Lots DP 758721 and DP 845336 Church Street and
 Meares Street, Mudgée, NSW, 2850.

Preliminary Site investigations discovered hazardous building materials present in the form of
 asbestos, PCB's and lead in paint with each building and the grounds at the Mudgée District Hospital.

This letter is to personnel to inform them that qualified contractors will be undertaking remediation
 works on site within a period to be confirmed. The remediation works will be strictly supervised and
 will be undertaken in accordance within the required work practices for hazardous building materials
 to ensure the site is remediated safely.

Yours faithfully,

6.11 EMERGENCY NUMBERS and PROJECT CONTACTS

Emergency Numbers and Project Contacts			
Police – Fire – R F S – Ambulance		000 (Mobile 112)	
Health Infrastructure		02 9276 1400	
Poisons information	131 126	Dial Before You Dig	1100
EPA	131 555	Worksafe	6962 8900
Heritage Council	02 9873 8500	NSW DPI Water	6841 7900
Site Owner Representative Health Infrastructure	Iain Lynch	0439 702 978	iain.lynch@cwpm.com.au
EPA Site Auditor TBA			
Project Manager TBC			
Environmental Consultant Regional EnviroScience	Juliet Duffy	0407 120 325	juliet@enviroscience.com.au
Environmental Site Consultant Regional EnviroScience	Wayne Sibley	0417 238 571	wayne@enviroscience.com.au
Remediation Contractor TBA			
Remediation Site Supervisor TBA			

Table Four: Emergency and Site Contact Details

6.12 Asbestos Licensing Requirements and Notification Requirements

Under the NSW Work Health and Safety Regulations the following needs to be complied with;

The works need to be undertaken by either a licensed friable asbestos removalist (AS1) or Non-friable (AS2) contractor approved by SafeWork NSW. It is also a requirement of SafeWork NSW that the removalist provides a written work plan of the proposed removal control plan, (R.464-465), to SafeWork NSW, with their SafeWork NSW notification five (5) business days prior to the asbestos removal project being undertaken (R.466).

Notification of asbestos remediation works needs to be communicated to surrounding workplaces and residences prior to works commencing, this is the responsibility of the Asbestos Removalist under (R462 and R.467-468). However, for this project the Health Infrastructure will be undertaking this communication, please see the community consultation plan section of this report.

It is recommended that the licensed contractor prepare a safe method of work statement including wet suppression techniques and removal methods for the asbestos remediation works, utilising at least Type P2 half face particulate respirators, appropriate personnel and equipment decontamination procedures and appropriate disposal methods, refer to the following legislative codes of practice and standards for guidance, (R.471);

1. *Code of Practice for the Safe Removal of Asbestos* 2nd Edition [NOHSC:2002(2005)]
2. Australia/New Zealand Standard 1716-2003 *Respiratory Protective Device*
3. Australian/New Zealand Standard 1715-2009 *Selection, Use and Maintenance of Respiratory Protective Devices*
4. AS/NZS 60335.2.69:2003, Household and Similar Electrical Appliances - Safety - - Vacuum Cleaners
5. Australian/New Zealand Standard 3544 *Industrial vacuum cleaners for particulates hazardous to health*
6. *Code of Practice How to Safely Remove Asbestos* 1st Edition SafeWork NSW
7. Work Health and Safety Regulation 2017
8. Code of Practice: How to Safely Remove Asbestos 2016
9. Code of Practice: How to Manage and Control Asbestos in the Workplace 2016

Following the asbestos remediation, a visual inspection and asbestos air monitoring will need to be undertaken by a NATA registered laboratory and Licensed Asbestos Assessors, (R.473-474).

Waste needs to be labelled according to the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals and removed from site by an approved/licensed carrier for disposal.

The Classification and Labelling of Asbestos under the GHS is detailed below:

Chemical	CAS No	UN
Crocidolite Asbestos	12001 – 28 - 4	2212
Chrysotile Asbestos	12001 – 29 - 5	2590
Amosite Asbestos	12172 – 73 - 5	2212

6.13 State Environment Planning Policy No 55 – REMEDIATION OF LAND

The current version of the State Environmental Planning Policy (SEPP) No 55 was consulted under category 1, remediation work needing consent and was assessed as per the framework detailed in the Table below;

State Environmental Planning Policy No 55 – Remediation of Land		
For the Purpose of this policy; a category 1 remediation work (not being a work to which clause 14(b) applies that is:		
Item	Response	Comments
Designated Development	No	
Carried out or to be carried out on land declared to be a critical habitat	No	
Likely to have a significant effect on a critical habitat or a threatened species, population or ecological community,	No	
Development for which another State environmental planning policy or a regional environmental plan requires development consent,	No	
Carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument...		
Item	Response	Comments

Coastal protection	No	
Conservation or heritage conservation	No	
Habitat area, habitat protection area, habitat or wildlife corridor	No	
Environment protection	No	
Escarpment, escarpment protection or escarpment preservation	No	
Floodway	No	
Littoral rainforest	No	
Nature reserve	No	
Scenic area or scenic protection	No	
Wetland	No	
Is to be carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands Commissioner)	No	

Table Five: DP 758721 and DP 845336, SEPP 55 Consideration, Remediation of Land

Given the assessment in the table above in relation to the type of classification pursuant to SEPP 55. We consider the works to be permissible without consent or Category 2 as it does not trigger matters considered under Category 1.

6.14 Long Term Environmental Management Plan

After the remediation works have been completed, it is expected that hazardous materials (asbestos in soil), will remain on-site, however are encapsulated below Geotech fabric and ENM soils for open spaces or below hardstands. The site will require an ongoing Environmental Management Plan.

If one is required for the site, the Environmental Consultant will prepare the Environmental Management Plan to ensure the continued ongoing safety and environmental compliance for the site now and in the future.

The responsibility for the ownership and implementation of the plan will be the owner of the site.

7 Remediation Schedule

The remediation will follow the stages as indicated in appendix 2. No specific timeline has been provided.

8 WASTE MANAGEMENT PLAN

8.1 Legislative and Policy Framework

The regulatory requirements in NSW for waste management are provided within the Waste Avoidance and Resource Recovery Act 2001 (WARR Act), Protection of the Environment Operations Act 1997 (PoEO Act), Protection of the Environment Operations (Waste) Regulation 2014 (PoEO (Waste) Regulation) and the environmental policies and guidelines for waste produced or adopted by the EPA.

All waste will be traceable and will need to be classified by Regional EnviroScience prior to disposal, please refer to the attached Waste Management Chain of Custody, these will be compared to the tonnage/cubic meters with the supplied tip receipts.

8.1.1 Waste Avoidance and Resource Recovery Act 2001

The WARR Act establishes the waste hierarchy to ensure management options are considered for the effective management of resources against the following criteria:

- avoidance of unnecessary resource consumption;
- resource recovery including reuse, reprocessing, recycling and energy recovery; and
- disposal - to assess how waste will be effectively disposed to minimise any adverse impacts on the environment.

The NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (NSW EPA, 2014) outlines significant areas and actions for waste avoidance and resource recovery. The six key target areas outlined in the strategy include:

1. Avoid and reduce waste generation;
2. Increase recycling;
3. Divert more waste from landfill;
4. Manage [household] problem wastes better;
5. Reduce litter; and
6. Reduce illegal dumping.

Furthermore, the strategy sets a recycling target of 80% for construction and demolition waste and is applicable to the proposed remedial works.

8.1.2 Protection of the Environment Operations Act 1997

All material to be treated, excavated and removed from the Work Area, including the classification of waste materials, is to be undertaken in accordance with the requirements of the PoEO Act. Key guiding requirements include:

- ensuring waste is classified appropriately and in accordance with relevant guidelines;
- waste materials are disposed of at appropriately licenced facilities; and
- waste materials are removed and transported to appropriately licenced facilities lawfully.

8.1.3 Protection of the Environment Operation (Waste) Regulation 2014)

The PoEO (Waste) Regulation provides the framework for the transportation, storage and disposal of waste material. In addition, the licencing requirements of waste activities are also provided. Key requirements applicable to remedial works are summarised as follows:

- waste must be transported to one of the two nearest lawful disposal facilities or to a facility within 150 km of the place of generation;
- waste substances listed in Schedule 1 will be required to be tracked during transport. With the exception of asbestos and tyre waste, it is anticipated that waste from the Work Area will

be classified as 'General Solid Waste', and will therefore be exempt from being tracked during transport;

- prior to transporting asbestos and tyre waste above threshold values, it is a requirement to notify the EPA and track these waste streams;
- asbestos waste must be secured during transportation; and
- the re-use or recycling of asbestos waste is prohibited.

Guidance for transporting, reporting and disposing of waste in line with the Regulation are presented in Sections 14.10.

8.1.4 NSW Environment Protection Authority Waste Classification Guidelines

The Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, 2014) provides the framework for classifying waste for the purpose of storing, transporting and disposing of waste in NSW. This is discussed in the next Section.

8.2 Waste Type & Classification

Waste will be classified in accordance with Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, 2014). Under the NSW EPA Waste Classification Guidelines, waste streams are classified into groups, which pose similar risks to the environment and human health and therefore require similar management and disposal procedures.

The six waste categories are outlined in Table 7. It is suspected that the proposed remediation works will generate Special Waste category including asbestos and General Solid Waste (non-putrescible). The six waste categories are outlined in the table below.

Table 7: Source Waste Classification Guidelines, Park 1 Classifying Waste (NSW EPA, 2014)

Waste Category	Description
Special Waste	Waste including clinical and related waste (e.g. pharmaceuticals and sharps), asbestos, waste tyres and anything classified as special waste under a NSW EPA gazettal notice.
Liquid Waste	Waste that is generally not capable of being picked up by spade or shovel or is classified as liquid waste under a NSW EPA gazettal notice.
Hazardous Waste	Pre-classified hazardous waste includes: - containers having previously contained a substance of Class 1, 3, 4, 5 or 8 or substances to which Division 6.1 of the Transport of Dangerous Goods Code applies; - coal or coal tar pitch waste; - lead acid or nickel cadmium batteries; and lead paint waste.
Restricted Waste	At the time of preparation of this report, no wastes have been pre-classified by the NSW EPA. Restricted waste is classified by chemical assessment, with the results being compared to trigger values for various contaminants to determine its waste classification.
General Solid Waste (putrescible)	Pre-classified General Solid Waste (putrescible) generally includes: - household waste that contains putrescible organics; - waste from litter bins collected by or on behalf of local councils; - manure and night soil; - food waste; and - animal waste.
General Solid Waste Pre-Classified General Solid Waste (non-putrescible)	generally (non-putrescible), includes: - glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal; - paper or cardboard; - garden and wood waste - building and demolition waste; - waste contaminated with lead (including lead paint waste) from residential premises or educational or child care institutions - synthetic fibre waste (from materials such as fibreglass) but excluding asbestos waste.



8.3 Waste Minimisation-Application of the Waste Hierarchy

To minimise waste generated during site establishment, remediation and decommissioning/demobilisation, the anticipated waste materials outlined in Table 4 will be managed under the waste hierarchy criteria established under the WARR Act. As outlined in Section 2.1.1, the waste hierarchy consists of:

- avoidance of unnecessary resource consumption;
- resource recovery, including reuse, reprocessing, recycling and energy recovery; and
- disposal - to assess how waste will be effectively disposed to minimise any adverse impacts on the environment.

8.3.1 Asbestos

8.3.1.1 Avoidance

Not applicable. Contaminated fill materials (specifically containing ACM) and Friable and Non-Friable ACM building materials is the subject of the remediation to which this Waste Management Plan applies.

8.3.1.2 Resource Recovery

The PoEO (Waste) Regulation stipulates that ACM is not permitted to be recycled or re-used.

8.3.1.3 Disposal

Removal of waste containing ACM, enclosure materials, soils containing ACM, and any PPE potentially contaminated with asbestos fibres will be classified as 'Special Waste Containing Asbestos' in accordance with the requirements set out in the Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, 2014) and disposed of at a suitably licenced facility.

8.3.2 Soils

8.3.2.1 Avoidance

Not applicable. ACM impacted soil is the subject of the remediation to which this WMP applies, however the asbestos materials identified are predominately bonded. Asbestos fines have been identified in ash materials with no free fibres identified due to the nature of the material, within the samples analysed by RES.

It is the intention of the operation to leave the, majority of excavated and sieved soils in-situ, and any soil removed from site with asbestos materials will be included in the asbestos waste.

8.3.2.2 Resource Recovery

Soils impacted by ACM are not permitted to be reused or recycled, however will be encapsulated below a soil cover or hard-stand. Soils impacted by other contaminants are likely to be limited and on-site treatment/reuse is the preferred treatment.

8.3.2.3 Disposal

In the event, that soils removed are from site the soils will be classified and disposed of in accordance with the requirements set out in the Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, 2014) and disposed of at a suitably licenced facility.

8.3.3 Handling and Exposure to Asbestos Waste

Asbestos waste may present health risks during remedial works. The Code of Practice: How to Safely Remove Asbestos (Safe Work Australia, April 2016) and Code of Practice: How to Manage and Control Asbestos in the Workplace (Safe Work Australia, February 2016) Managing Asbestos in or on Soil (EPA, March 2014) and New minimum standards for managing construction and demolition waste in NSW (EPA, October 2016) provides detailed guidance on the appropriate work methods and controls during asbestos removal works.

Exposure to asbestos waste should be managed by:

- notifying SafeWork NSW ('the Regulator') about the work before works commence;

- informing workers and neighbours who may be affected by asbestos during remedial works;
- addressing asbestos risks and management for workers and Work Area visitors through a toolbox talk;
- displaying signs and labels 10m from the boundary of the asbestos work area;
- restricting access to those authorised to enter the removal area;
- adopting appropriate PPE during when inspecting, handling or sampling potential ACM or soils impacted by asbestos – P2 dust mask, nitrile gloves and Tyvek coveralls;
- adopting wet dust suppression when dust may be generated as asbestos impacted stockpiles are moved, and when soils are raked and sieved during validation works; and
- undertaking air monitoring. Air monitoring is required to be undertaken by an independent licensed asbestos assessor or Occupational Hygienist when asbestos is removed from the Work Area or by a competent person when more than 10m² of non-friable asbestos is removed. Friable asbestos and significant volumes of ACM are anticipated during remedial works however, air monitoring is recommended in line with best practice, and the site location. Air monitoring will be undertaken in accordance with NOHSC: 3003 (2005) Guidance Note on the Membrane Filter Method for estimating airborne asbestos fibres.

Air monitoring action levels outlined in Code of Practice: How to Safely Remove Asbestos (Safe Work Australia, April 2016) will be adopted and are presented in the table below (Table 8).

Action level	Control	Action
Less than 0.01 fibres/ml	No new control measures are necessary	Continue with control measures
At 0.01 fibres/ml or more than 0.01 fibres/ml but less than or equal to 0.02 fibres/ml	1. Review	Review control measures
	2. Investigate	Investigate the cause

Action level	Control	Action
	3. Implement	Implement controls to eliminate or minimise exposure and prevent further release
More than 0.02 fibres/ml	1. Stop removal work	Stop removal work
	2. Notify regulator	Notify the relevant regulator by phone followed by fax or written statement that work has ceased and the results of the air monitoring
	3. Investigate the cause	Conduct a thorough visual inspection of the enclosure (if used) and associated equipment in consultation with all workers involved with the removal work
	4. Implement controls to eliminate or minimise exposure and prevent further release	Extend the isolated/barricaded area around the removal area/enclosure as far as reasonably practicable (until fibre levels are at or below 0.01 fibres/ml, wet wipe and vacuum the surrounding area, seal any identified leaks (e.g. with expandable foam or tape) and smoke test the enclosure until it is satisfactorily sealed.
	5. Do not recommence removal work until further air monitoring is conducted	Do not recommence until fibre levels are at or below 0.01 fibres/ml

Table Eight: Indications of the required control levels & required actions

9 CONCLUDING REMARKS

Based on the remediation site works and validation sampling and coupled with an independent review by Mr Mark Challoner, a NSW EPA Chartered Environmental Practitioner, Contamination Specialist with Consulting Earth Scientists Pty Ltd, and in consultation with the relevant legislative and other guidance and planning instruments a Remediation & Waste Management Plan has been developed, the proposed intention and result is to successfully remediate the land to a level that satisfies Residential A land use, and the proposed Mudgee Redevelopment maybe issued with a construction certificate to commence construction activities.

"The site can therefore be made suitable for the proposed development if all management procedures contained within the plan are implemented."

LIMITATIONS

The proposed works were limited to areas indicated above that are outlined in this report. Where these areas require major remediation and reconstruction works Regional EnviroScience will provide the design and layout for the soil testing, remediation scope of works and validation of the remediation, assumptions and recommendations have been formulated based upon other consultants, reports, and it has been assumed that these have been undertaken with the same due diligence as Regional EnviroScience Pty Ltd.

1. To the extent permitted by law, Regional EnviroScience Pty Ltd will not be responsible in tort, contract or otherwise for any loss or damage, including for any personal injuries or death, or any consequential loss, loss of markets and pure economic loss, suffered by the Customer, whether or not the loss or damage occurs in the course of performance by Regional EnviroScience of this contract or in events which are in the contemplation of Regional EnviroScience and/or the Customer or in events which are foreseeable by Regional EnviroScience and/or the Customer.
2. To the extent that liability has not been effectively excluded by the proceeding clause, then Regional EnviroScience limits its liability to: -
 - (a) The supply of services again; or
 - (b) The payment of the cost of supplying the services again, at the election of Regional EnviroScience Pty Ltd.
3. Regional EnviroScience has provided advice and recommendations on, the basis of current Acts, Regulations, Codes of Practice and Guidelines, which may require modification and or amendment in the event, the relevant authorities make changes to their respective documents.

10 REFERENCES

Australia/New Zealand Standard 1716-2012 *Respiratory Protective Device*

Australian Standard – AS 4964-2004

Australian Standard 1319: *Safety Signs for the Occupational Environment*

Australian/New Zealand Standard 1715-2009 *Selection, Use and Maintenance of Respiratory Protective Devices*

Chemical Testing ISO/IEC 17025 Application Document - NATA, Nov 2014.

Chemical Testing ISO/IEC 17025 Application Document, Annex A: Asbestos fibre counting - NATA, May 2014.

Chemical Testing ISO/IEC Application Document, Annex B: Asbestos identification in bulk samples - NATA May 2014.

Chemical Testing ISO/IEC Application Document, Annex K: Workplace pump calibration checks – NATA July 2013.

Code of Practice; How to Manage and Control Asbestos in the Workplace [Safe Work Australia: 2016]

Code of Practice; How to Safely Remove Asbestos [SafeWork NSW: 2016].

Contaminated Land Management Act, 1997 (CLM Act).

Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres - NOHSC:3003(2005)

Guidelines for Consultants Reporting on Contaminated Sites (1997) Reprinted Aug 2011

ISO/IEC 17025 Standard Application Document for Accreditation of Testing and Calibration Laboratories - NATA, March 2015.

Stage 2 Environmental Site Assessment-Proposed Site for Rural Ambulance Infrastructure Reconfiguration Program, 2016, Environmental Investigation Services

Laboratory Assessment Worksheet – NATA October 2013.

National Occupational Health and Safety Commission (NOHSC) – *Exposure Standards for Atmospheric Contaminants in the Occupational Environment*.

National Code of Practice for the Safe Use of Synthetic Mineral Fibres – NOHSC: 3006(1989)

National Environment Protection (Assessment of Site Contamination) Measure, NEPC 2013

NSW EPA, Contaminated Sites, Sampling Design Guidelines

NSW Work Health and Safety Act and Regulation 2017

Protection of the Environment Operations Act, 1997 (POEO Act).

Safe Work Australia, *Workplace Exposure Standards for Airborne Contaminants*; Date of Effect 18 April 2013

Stanton, MF, Layard, M, Tegeris, A, Miller, E, May, M, Morgan, E & Smith A, “*Relation of Particle Dimension to Carcinogenicity in Amphibole Asbestos and Other Fibrous Minerals*”, Journal of the National Cancer Institute 67(5):965-75, December 1981

State Environmental Planning Policy No- 55 2014 (SEPP 55).

The National Standard for Synthetic Mineral Fibres – NOHSC: 1004(1990)

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Waste Classification Guidelines – Part 1 – Classifying Waste (November 2014) – NSW Environment Protection Authority (EPA)

Western Australia Department of Health, ‘Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in WA’

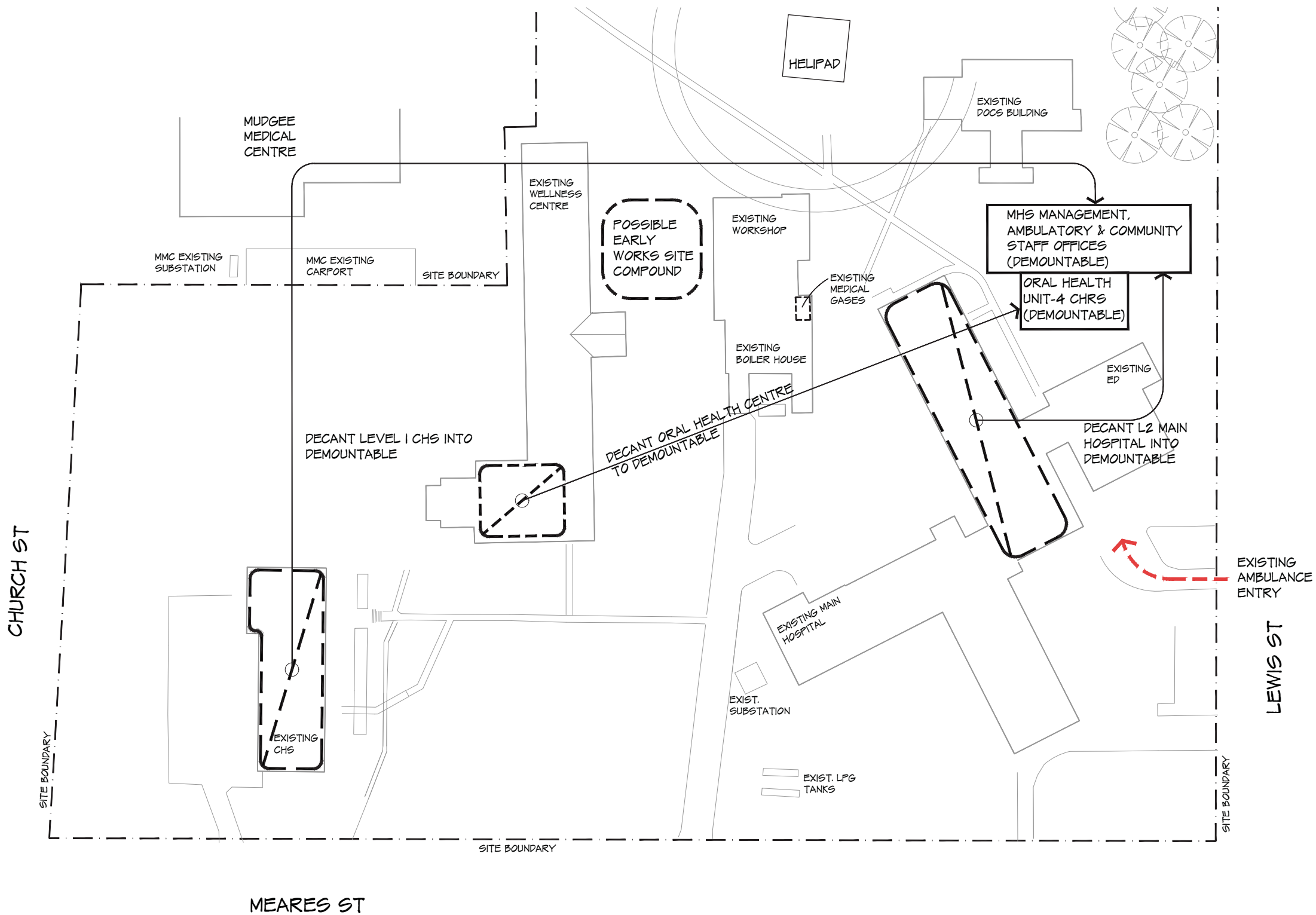
SafeWork NSW, *Managing asbestos in or on soil*, March 2014

Managing Urban Stormwater: *Soils and Construction*. Landcom, (4th Edition) March 2004 (reprinted 2006) (the “Blue Book”). Volume 1 and Volume 2.

6. DEVELOPMENT PROPOSAL

STAGING & DECANTING WORKS
ENABLING WORKS
STAGE 1A

- BUILD AND RELOCATE
- Demountable established on site and fitted out for LHD and MHS staff and Ambulatory & Community staff.
 - Demountable established on site and fitted out for Oral Health Unit (4 chairs).
 - Decanting of Oral Health Unit into demountable.
 - Decanting of MHS management and Ambulatory and Community staff into demountable.
 - Decanting of LHD staff from Main Hospital into rented office space offsite.
 - Establishment of early works site compund, with potential to utilise services from workshops.

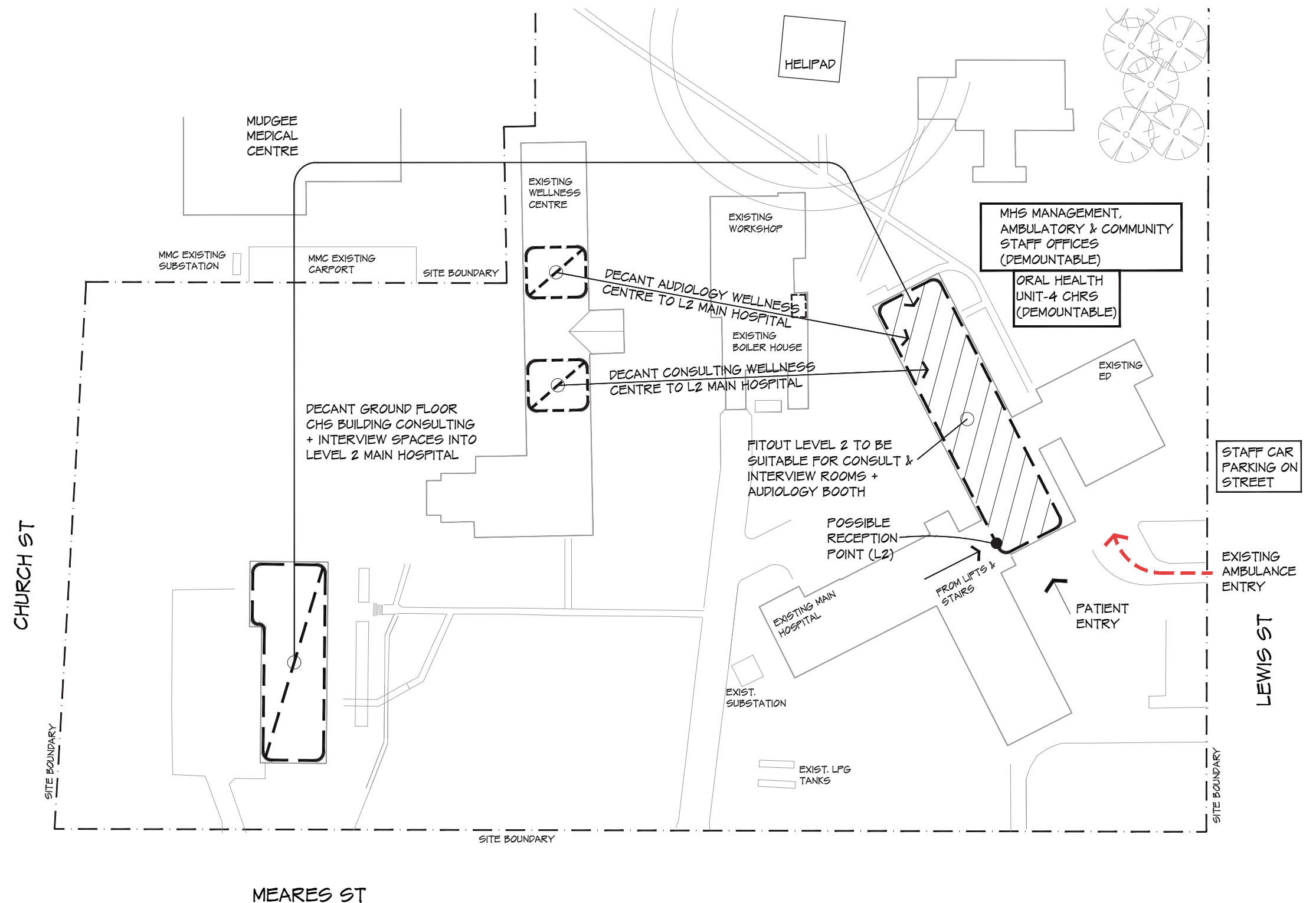


6. DEVELOPMENT PROPOSAL

STAGING & DECANTING WORKS ENABLING WORKS STAGE 1B

REFURBISH AND RELOCATE

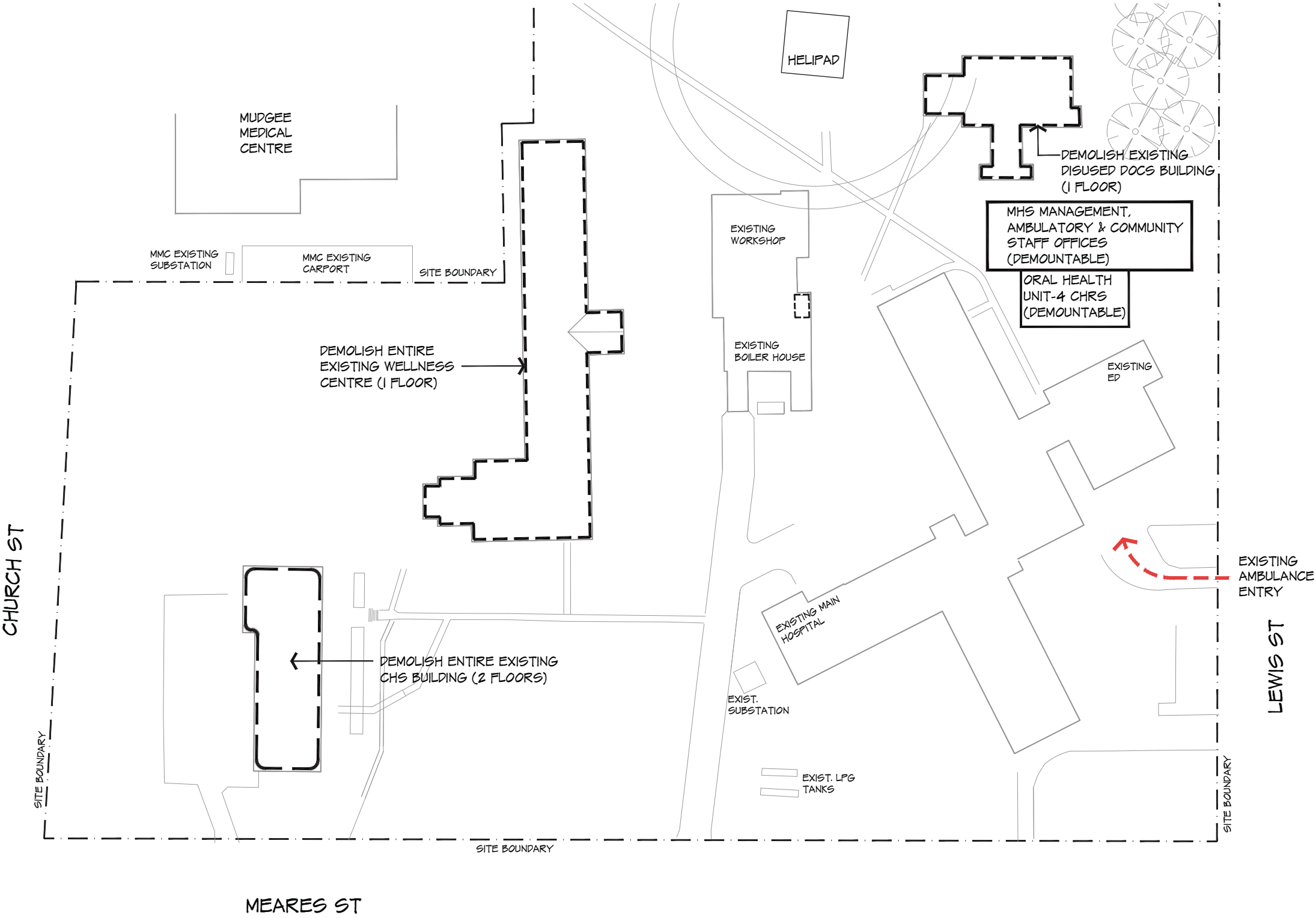
- Fit out of Level 2 of Main Hospital to accommodate Ambulatory & Community consult functions.
- Decanting of Ambulatory & Community staff to Level 2, Main Hospital.



6. DEVELOPMENT PROPOSAL

STAGING & DECANTING WORKS
ENABLING WORKS
STAGE 1C

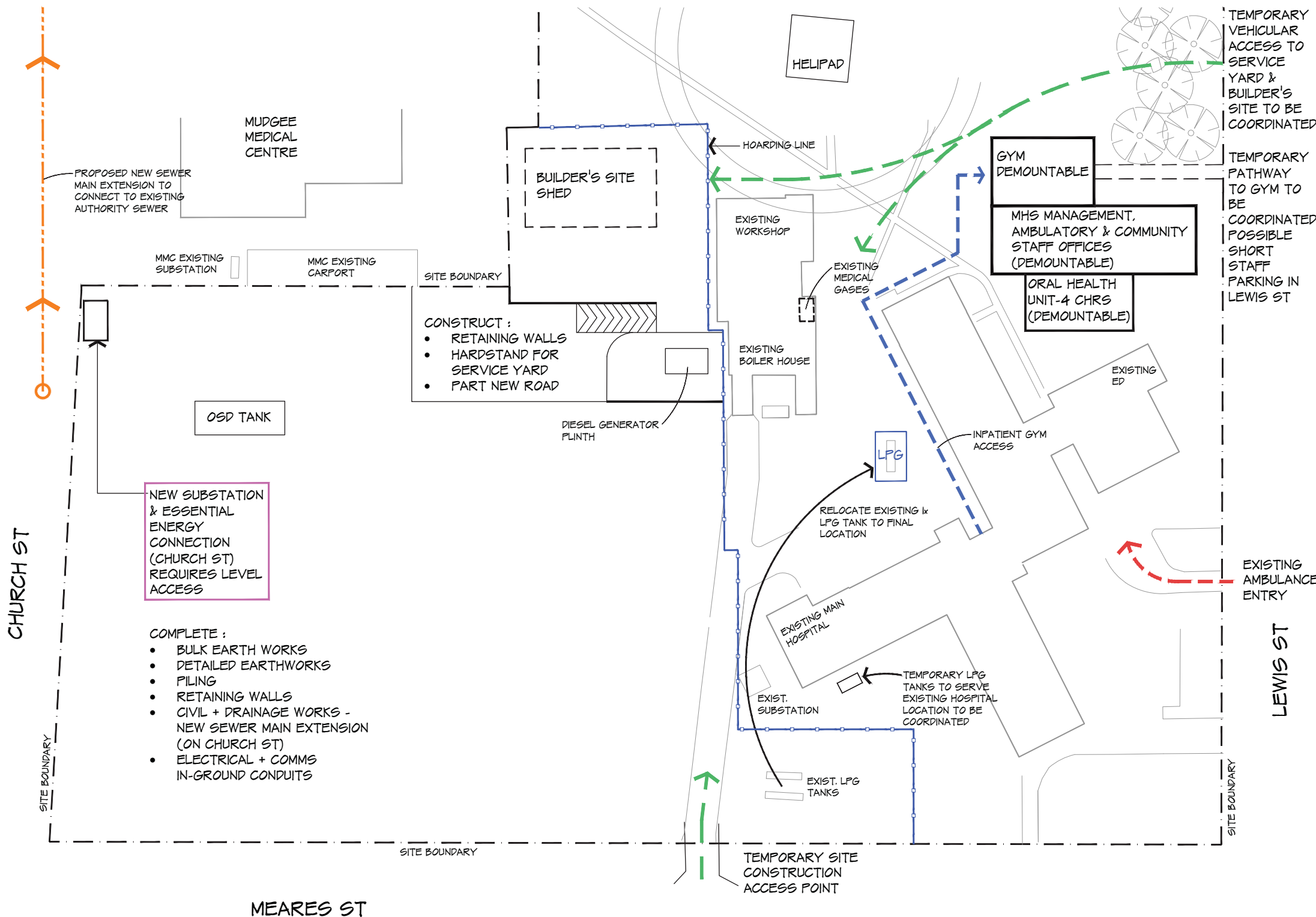
- DEMOLISH
- Demolition of the Community Health Centre, Wellness Centre and DOCS building.
 - Site Remediation (pending, subject to Phase 2 investigations)



6. DEVELOPMENT PROPOSAL

STAGING & DECANTING WORKS
ENABLING WORKS
STAGE 1D

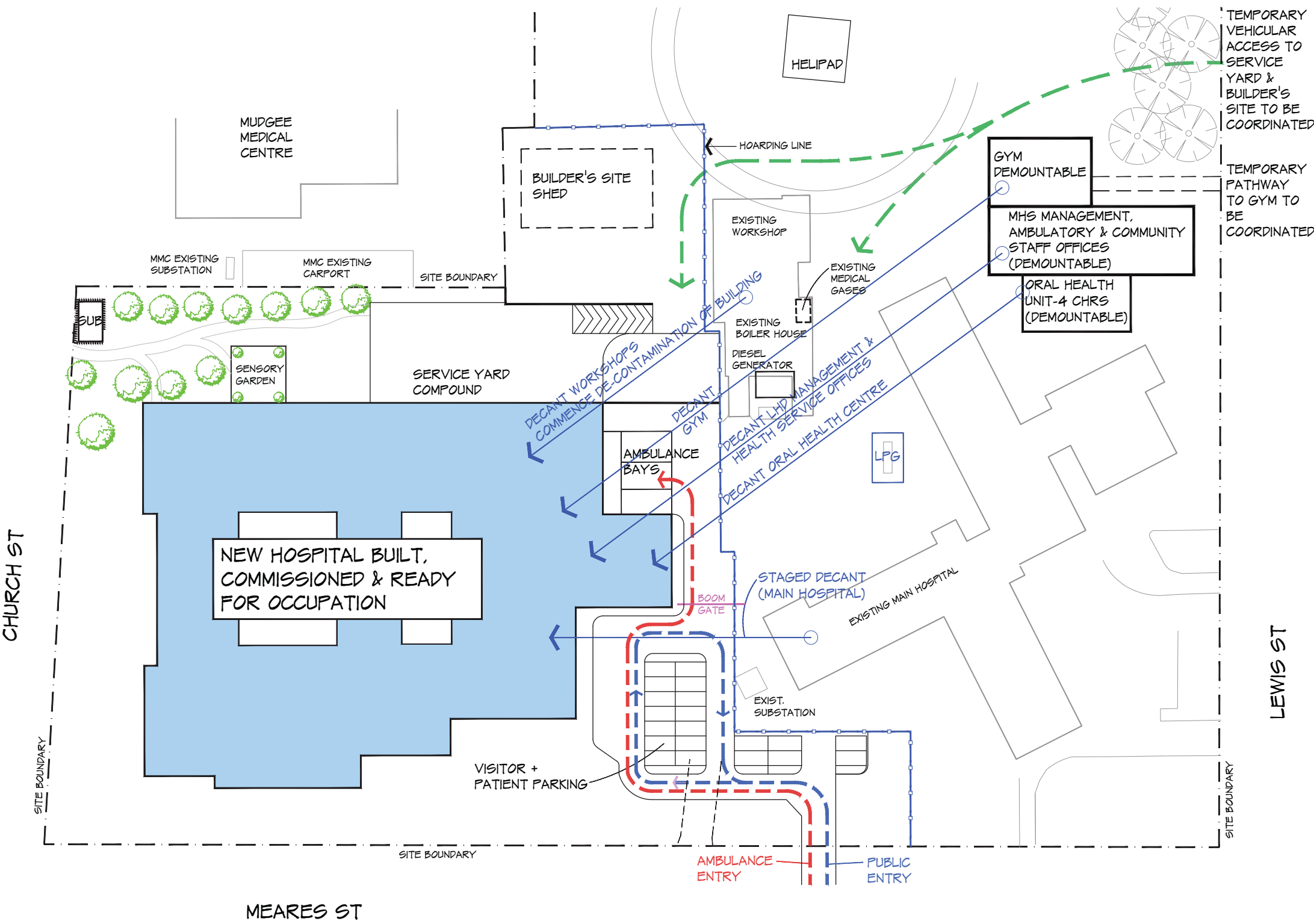
- BUILD
- Site service infrastructure upgrade –hydrant ring main, electrical, sewer.
 - Fencing and benching of the new Hospital building site.



6. DEVELOPMENT PROPOSAL

STAGING & DECANTING WORKS
MAIN WORKS
STAGE 2

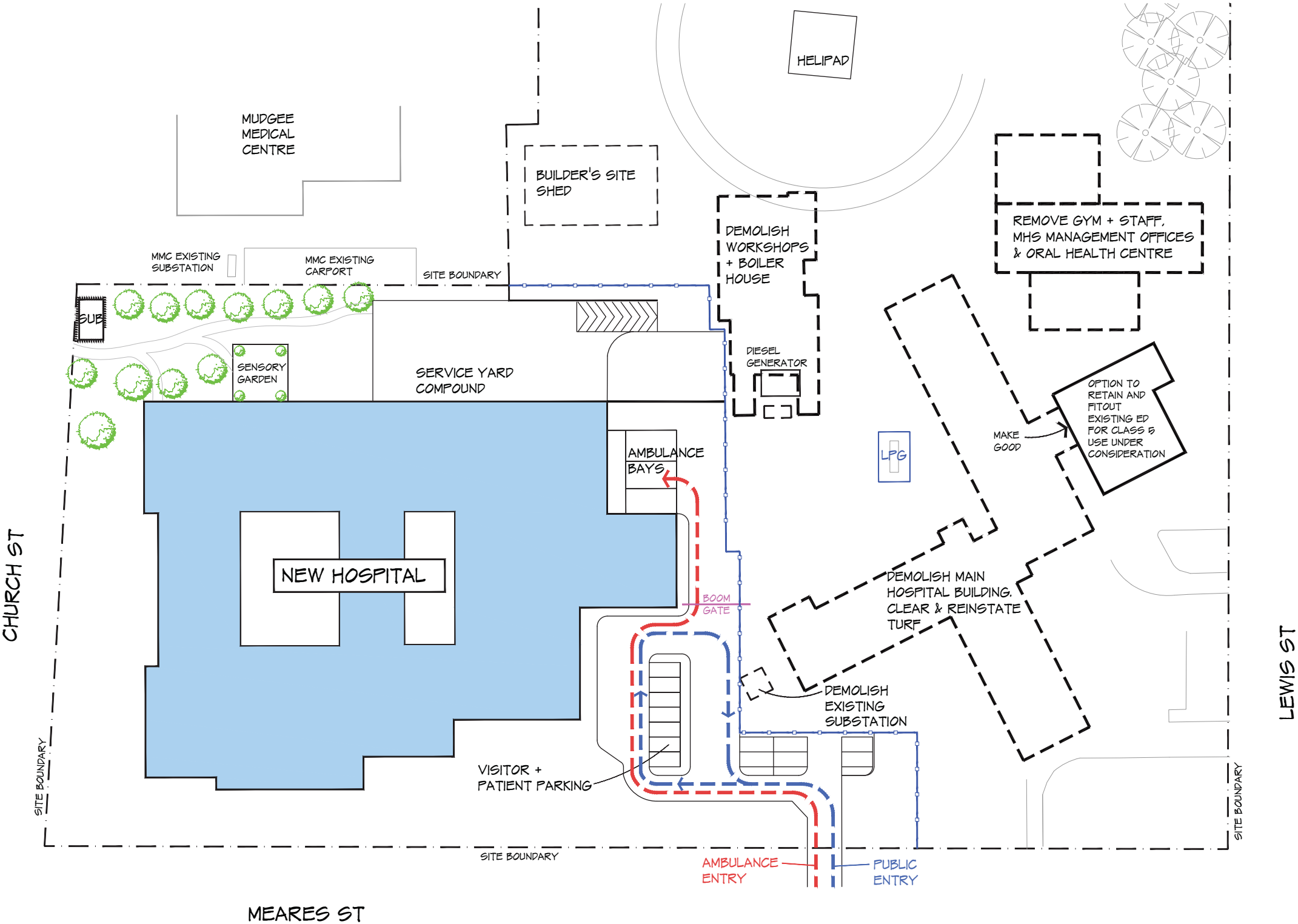
- BUILD AND RELOCATE
- Build new Main Hospital.
 - Decanting of Main Hospital, Workshops, Demountable into new Main Hospital.



6. DEVELOPMENT PROPOSAL

STAGING & DECANTING WORKS
FINAL WORKS
STAGE 3A

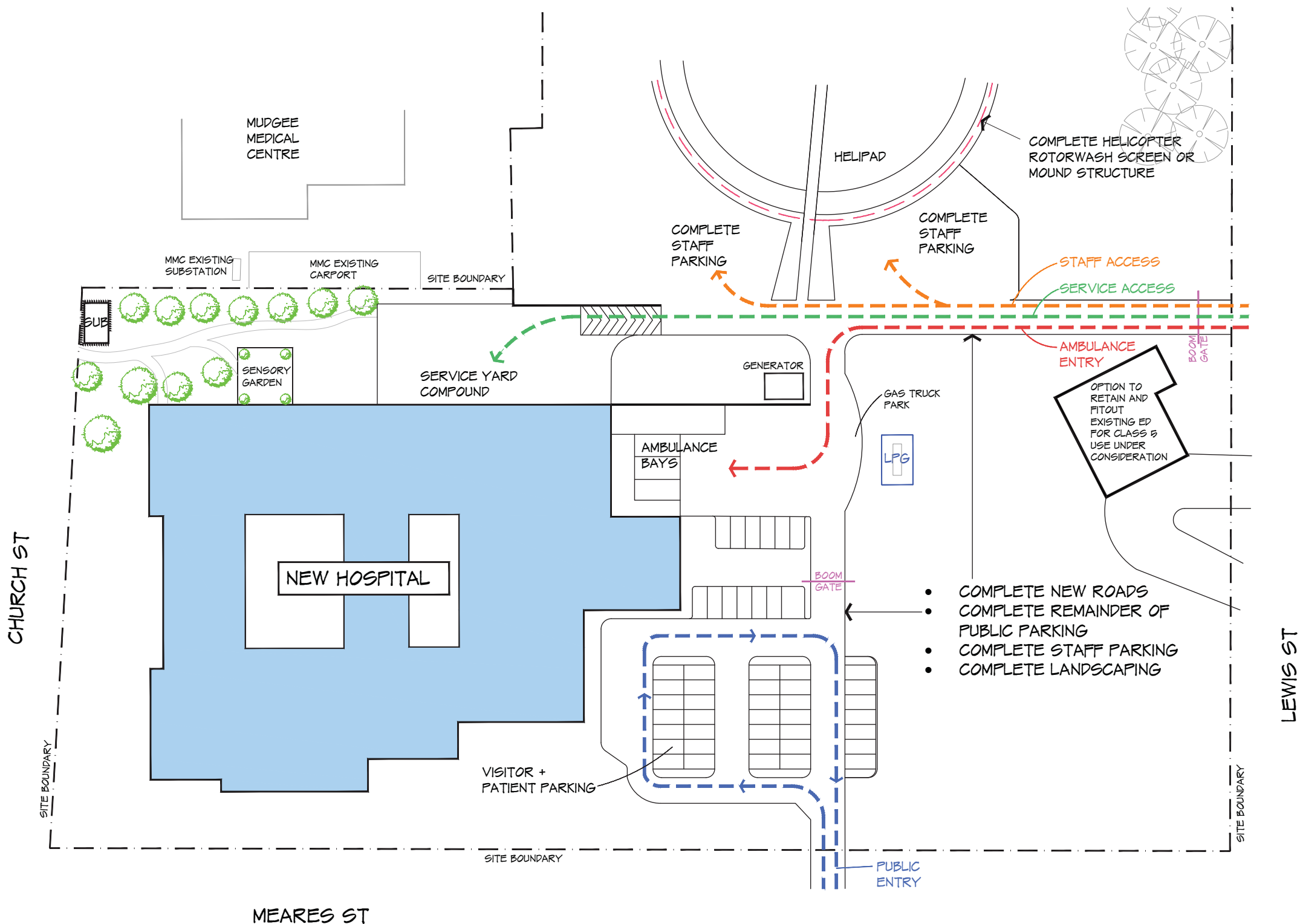
- DEMOLISH
- Demolish Old Boiler House and Workshops, Main Hospital building and Demountables.



6. DEVELOPMENT PROPOSAL

STAGING & DECANTING WORKS
FINAL WORKS
STAGE 3B

- BUILD
- Complete new roads, remainder of public and staff car parking and landscaping.



REGIONAL ENVIROSCIENCE

**At Enviroscience,
we safeguard health through science.**

Our licensed asbestos assessors identify, monitor and manage contaminants that can be a part of everyday life and harmful to health. We test for and manage the situation to make sure that levels are in a safe range, legislative requirements are met and staff, the community and the environment are safe.

Identification and management of Asbestos - including Naturally Occurring Asbestos (NOA) is supported by our in-house NATA Laboratory based in regional NSW, providing fast, confidential results.

Enviroscience also offers a full range of science-based environmental services, including risk assessment and innovative strategies to meet regulatory and legislative requirements at all stages of a project.

Available 24/7, and regionally based - we live and work in the communities with strong local partnerships to ensure smooth running projects.

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DUBBO | ORANGE | MAITLAND | TAMWORTH | WAGGA WAGGA | MAROOCHYDORE

**ASBESTOS
AT WORK KIT**



ASBESTOS AT WORK – YOUR RESPONSIBILITIES

Asbestos was once used in Australia in more than 3000 different products, and breathing in asbestos fibres can cause asbestosis, lung cancer and mesothelioma.

If asbestos fibres are in a stable material, such as fibro, they pose little health risk. However, when the fibro is damaged or disturbed in some way, fibres can become loose and airborne, and pose a risk to someone's health. There are specific laws about working with asbestos. Here is a summary provided by Safework:

WORKING WITH ASBESTOS

Don't allow workers to work with asbestos, except under prescribed circumstances or until they are properly trained. Also, make sure the exposure standard for asbestos is not exceeded.

More information, visit asbestosawareness.com.au or call 1800 Asbestos (1800 272 378).

FIND ASBESTOS IN THE WORKPLACE

Get a licensed asbestos assessor, to inspect your workplace for asbestos. If unsure whether it is present, assume it is. If necessary, have a sample checked by a NATA-accredited laboratory. Once identified, make sure all asbestos is clearly labelled

KEEPING AN ASBESTOS REGISTER

If your workplace was built before 31 December 2003, you must keep a register that outlines when and where asbestos has been located, what type it is, and what condition it's in. The register should be available to anyone involved in work at the workplace.

PREPARE AN ASBESTOS MANAGEMENT PLAN

If asbestos has been identified at your workplace, you must prepare and maintain an asbestos management plan, which is reviewed at least every five years or when requested by a health and safety representative or if the asbestos is removed, disturbed, sealed or enclosed. The plan must be available to anyone involved in work at the workplace.

MONITOR WORKERS' HEALTH

You must provide and pay for health monitoring for all those working with, or exposed to, asbestos.

TRAIN WORKERS

Your workers must be trained in identifying and handling asbestos safely, and understanding suitable control measures.

WHAT NOT TO DO

When you're working on or near asbestos, you must not use high-pressure water sprays or compressed air – and you must control the use of power tools, brooms or anything else that might release asbestos into the air.

ASBESTOS UNEXPECTED FIND PROTOCOL

Many asbestos exposures in the workplace happen when workers unintentionally disturb asbestos. In the event of a significant disturbance or unexpected find of suspected asbestos, the following steps should be undertaken:

01



STOP WORK, VACATE & ALERT

Stop work, vacate the immediate area and alert others.

02



ISOLATE & RESTRICT ACCESS

Isolate the area and restrict access, ideally with a 10m exclusion zone.

03



SIGNPOST

Signpost the exclusion zone with asbestos warning signs or similar.

04



CONTACT REGIONAL ENVIROSCIENCE

Contact Regional Enviroscience 1300 372 436 to assess the area, test the material and provide clear management recommendations.

05



AIR MONITORING

Air monitoring with testing conducted by a NATA accredited laboratory is the only way to answer the question "Have I been exposed to asbestos fibres?"

06



REMOVAL

Removal of the material by a licensed removal contractor working in accordance with Regional Enviroscience recommendations.

07



CLEARANCE INSPECTION

Clearance inspection after the clean-up and before reoccupation to ensure the area is asbestos free and safe to reoccupy.

DO NOT REMOVE IT
DO NOT WET IT DOWN
DO NOT WALK THE MATERIAL AROUND
ON BOOTS



Regional

EnviroScience

ASBESTOS | HYDROCARBONS | DUST | CHEMICAL | MOULD & FUNGI | BACTERIA | METH LAB | AIR QUALITY
WATER TESTING | NATA LAB SERVICES | TRAINING | ENVIRONMENTAL MANAGEMENT | PHONE 1300 372 436