Johnstaff Projects Pty Ltd

Concord Hospital Redevelopment
Construction Waste Management Plan

1H Hospital Road
Concord, NSW

27 June 2018

54537 – 114,263 Rev 0

JBS&G

www.jbsg.com.au

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JBS&G

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1. Introduction

JBS&G Pty Ltd has been engaged by JohnStaff Pty Ltd (JohnStaff) on behalf of Health Infrastructure NSW to prepare a Construction Waste Management Plan (CWMP) for the proposed redevelopment of the Concord Hospital, located at Hospital Road, Concord, NSW (herein referred to as 'the site').

1.1 Scope

This CWMP has been developed to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning and Environment for application SSD 9036, dated 20 April 2018. The SEARs require the following waste management measures to be addressed as part of the Environmental Impact Statement (EIS):

'*Identify, quantify and classify the likely waste streams to be generated during construction and operation and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.'*

In accordance with the SEARs requirement listed above, the scope of this CWMP is to address the likely waste streams generated during the works, provide indicative estimations of waste quantities, and propose management, reuse, recycling and disposal procedures during the demolition, excavation and construction works of the Concord hospital redevelopment phases.

1.2 Objectives

The key objective of this CWMP is to support HI in the SSD application through identifying the types and quantities of potential waste streams and to establish management measures to prevent environmental harm, minimise waste and maximise resource preservation.

This CWMP specifically aims to:

- Address the SEARs requirements for waste as per SSD 9036;
- Promote waste minimisation through avoiding and reducing waste generation;
- Promote the recycling of demolition materials including concrete;
- Comply with legislative criteria and adhere to waste minimisation guidance and standards;
- Apply the waste management hierarchy (**Section 3.4**) throughout construction; and
- Specify safe and appropriate management of potentially contaminated wastes.

2. Project Description

Concord Repatriation General Hospital (Concord Hospital) forms part of the Sydney Local Health District which is responsible for providing and managing all public health care within the metropolitan areas of Sydney.

The Concord Hospital Master Plan forms a strategic development framework and has been prepared to guide the future development and utilisation of Concord Hospital to ensure it can respond to current and future needs of the population whilst providing appropriate clinical, care, education and associated support facilities.

2.1 Stage 1

This SSDA report seeks consent for the proposed redevelopment of Concord Repatriation General Hospital to improve and replace outmoded facilities to meet the substantial growth in clinical service demand across the hospital's catchment:

- Concept approval is sought for the redevelopment indicatively comprising 82,000sqm GFA, to be undertaken in two (2) stages including:
    - Clinical Services Building (CSB) and multi-storey carpark (Stage 1); and
    - Acute Services Building (ASB) and multi-storey carpark (Stage 2).
- Detailed approval is sought for the Stage 1 construction of the proposed CSB (44,000sqm GFA) and the construction of a multi-storey car park located to the north of Hospital Road.

Detailed development approval for the proposed Stage 2 works will be completed at a later date and does not form part of this SSDA. The Stage 1 Detailed works are estimated to be completed by end 2021.

The proposed Concept redevelopment is in accordance with the concept architectural package prepared by Jacobs Engineering Group (Jacobs).

The proposed Stage 1 detailed development (CSB and multistorey carpark) is in accordance with the architectural drawings prepared by Jacobs.

2.2 Location and Site Layout

Information relating to the site are provided in **Table 2.2** below. The site location is illustrated in **Figure 1.**

Table 2.2 – Site Details

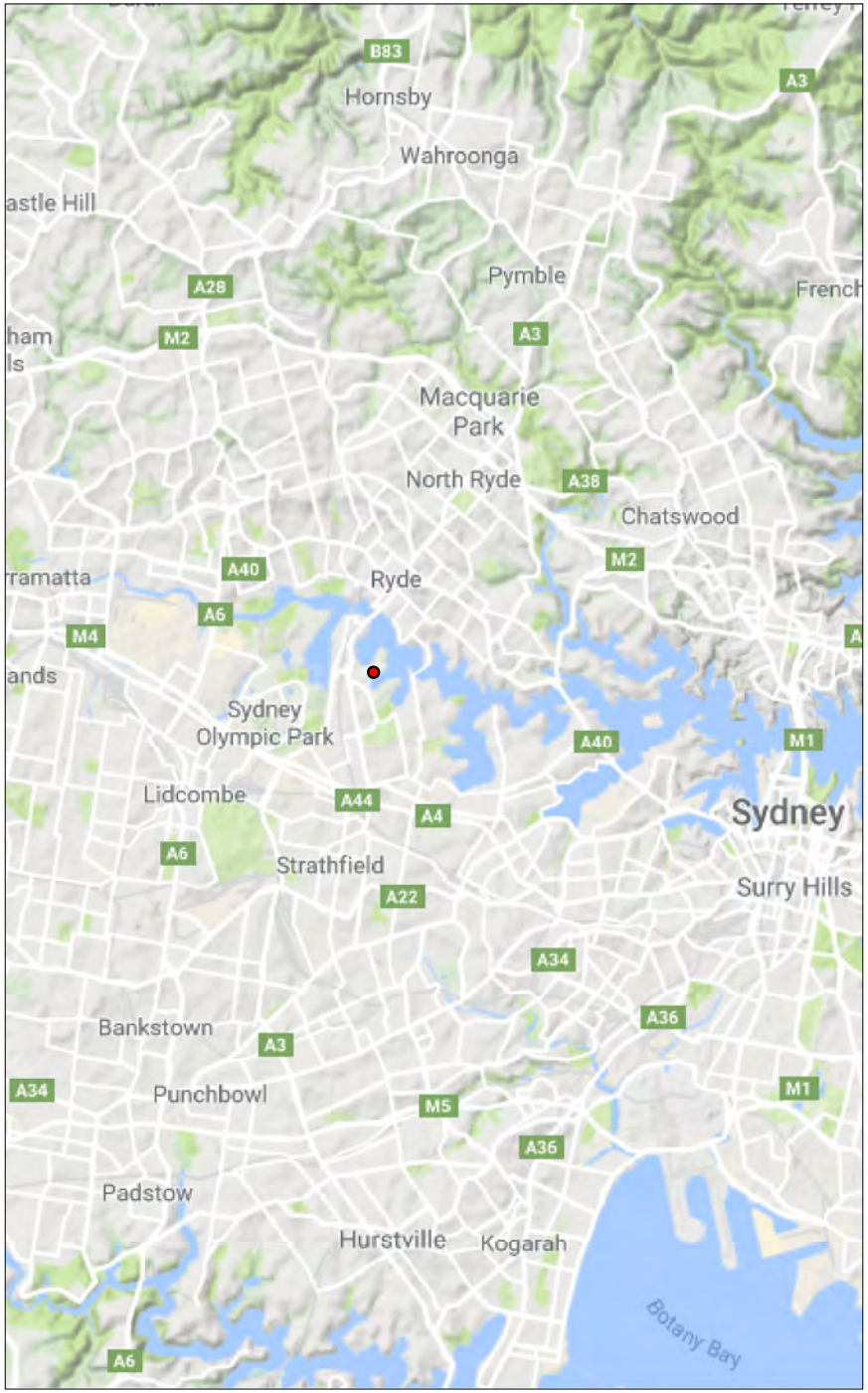
Site address	1H Hospital Road, Concord NSW 2139
Local Government	Canada Bay
Zoning	SP2 – Infrastructure (Hospital) LEP 2013 E2 – Environmental Conservation (part of the site) LEP 2013 W2 – Environmental Protection (part of the site) SREP 2005
Surrounding Land Use	North: Hospital Road with Rhodes Park and Parramatta River beyond. Rivendell School is located at the northernmost end of the peninsula, to the north east of the site East: Yaralla Bay, Parramatta River South: Yaralla Bay, Parramatta River West: Low-density residential dwellings

2.3 Construction & Demolition Activities

The project comprises Stage 1 of the Concord Hospital Redevelopment Master Plan by Jacobs (2018) which involves four (4) phases of work detailed in **Table 2.1** below.

A draft Master Plan by Jacobs (2018) outlining the preliminary concept design of Stage 1 of the project is provided in **Figure 2.**

Figure 1 – Site Location



Legend:

- Site Location
- Site Boundary

JBS&G

Job No: 54537	
Client: Health Infrastructure	
Version: DRAFT	Date: 03-May-2018
Drawn By: JC	Checked By: EH

Scale at A4 1:20,000

0 250 500

metres

Coor. Sys. GDA 1994 MGA Zone 56

1H Hospital Rd,
Concord, New South Wales

SITE LOCATION

FIGURE 1

Document Path: N:\Projects\Health Infrastructure\54537 Concord Hospital Waste Management Plan\8 - ArcGIS\Maps\Site Location 7 March 2018.mxd
Image Reference: www.nearmap.com© - Imagery Date: 18 January 2018 www.google.com.au© - 2018

Figure 2 – Stage 1 Master Plan

JACOBS

Concept Proposal

Stage 1 Concept Proposal

The development proposal is for a new eight storey Clinical Services Building to the south of the existing Multi Block building, to be completed as part of the Stage 1 works. The key features are:

New Clinical Services Building & Multistorey Carpark

- new Clinical Services Building re-houses and expands Aged Care and Veteran's Physical and Mental Health and Rehabilitation services
- Eight new inpatient units on the upper floors
- Integrated Cancer Care Centre
- new Hospital Street atrium located at the interface between the new Clinical Services Building and the existing Multi Block.
- Dedicated drop-off and entries
- Bridge links within the atrium for patient transfers between the new Clinical Services Building and Multi Block.
- New link below hospital street atrium for back of house goods and services transfers between the new Clinical Services Building and Multi Block
- New temporary on-grade carpark to accomodate approximately 300 cars.
- New multi-storey carpark with 550 spaces to accomodate the increased demand

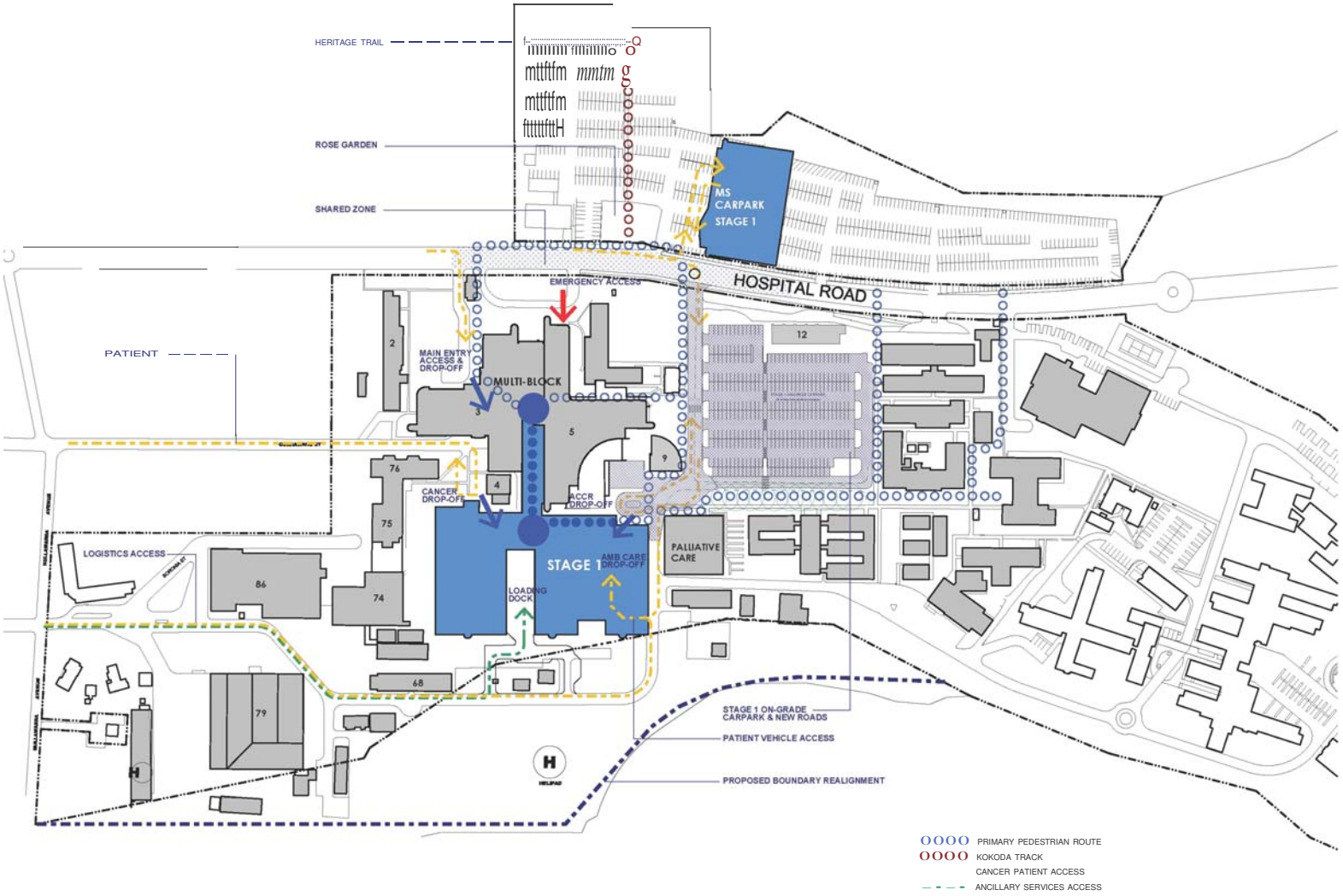


Figure 2. Stage 1 Concept Proposal Site Plan

Table 2.3 - Stage 1 Works

Type of Work	Description
Phase 1 (Immediate future)[1]	
Demolition (Early Works)	Demolition of eight(8) buildings: • Building 60 – Mail Centre • Building 61 – Contractors site office/amenities • Building 62 – Store/Medical Records • Building 63 – Medical Records • Building 64 – Drug Health Services/Aged and Extended Care • Building 65 – Drug Health Services/Geriatrics and AECD • Building 72 – Environmental Services/Drug and Health Care • Building 73 – Drug Health Services/Drug and Health Care Demolition of other structures: • Service Tunnel • Substations 1, 2, 4 and 5
Excavation (Early Works)	Excavation and site preparation works including remediation of contaminated materials within the Phase 1 Zone.
Phase 2 (2020/2021)	
Demolition	Demolition of eight (8) ramp ward buildings: • Building 10 – Coronary Care and Thoracic Ward • Building 11 – Coronary Care and Thoracic Ward • Building 14 – ICU • Building 15 – ICU • Building 16 – Renal, Cardiovascular and Cancer • Building 17 – Renal, Cardiovascular and Cancer Services • Building 18 – Neuroscience, Bone, Joint and Connective Tissues • Building 19 - Neuroscience, Bone, Joint and Connective Tissues
Construction	Construction of the new Clinical Services Building to be constructed adjacent to the Multi Block.
Phase 3 (timeframe still to be determined)	
Construction	Construction of a temporary on-grade carpark.
Excavation	Excavation works associated with the construction of the multi-storey carpark.
Phase 4 (timeframe still to be determined)	
Construction	Construction of a new five (5) multi storey carpark within the existing at grade carpark located north on Hospital Road. This will also include road works.

Photographs taken during a site walkover by JBS&G in February 2018 within the Phase 1 and 2 Zone are provided in **Appendix A**.

2.3.1 Timing

Phase 1 works, including the preparation of this CWMP does not form part of the SSDA process but instead is subject to a separate REF approvals process. This CWMP will be updated once a proposed start date has been confirmed.

2.4 Existing Environment

2.4.1 Topography

Based on previous geotechnical assessments undertaken at the site, the natural topography of the site slopes slightly from the north-east to the south-east. Surface levels vary from approximately RL 9.5 m based on the Australian Height Datum (AHD) in the western corner of the site to RL 3.5 m AHD in the south-east.

2.4.2 Buildings, Structures and Roads

The main entrance to Concord Hospital (including Emergency) is located on Hospital Road, Concord, which intersects with Concord Road approximately 500 m south west of the site. A visitor car park is located to the north of Hospital Road.

[1] Does not form part of the SSDA process but instead is subject to a REF approvals process.

The site is currently occupied by 88documented buildings of variable height and scale. All buildings are located to the south of Hospital Road with the exception of a small building located on the opposite side, to the south west corner of the carpark.

2.4.3 Presence of Chemical Storage, Hazardous and Fill Material

Fuel Underground Storage Tanks (USTs) exist within the loading dock which are proposed to be removed during redevelopment works.

Fill material onsite has been initially classified as non-putrescible soil, subject to waste classification post excavation works.

Asbestos containing material (ACM), lead based paint, lead containing dust and synthetic mineral fibres (SMF)has been identified at the site through a Hazardous Building Material Survey (HBMS) and is present in several of the buildings located within the Phase 1 zone (JBS&G, 2018).

2.4.4 Acid Sulfate Soils

The land is identified as being within Class 2 on the Acid Sulfate Soil Map under the Canada Bay Local Environmental Plan 2013 (LEP).

2.4.5 Vegetation and Sensitive Environments

Given the hospital is situated on a peninsula, vegetated areas exist along the coastal edges which are identified as Wetlands Protection Area under the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 and areas of terrestrial biodiversity under the LEP 2013. The protected vegetated areas are located approximately 20 metres to the south-east from current infrastructure within Phase 1.

There is vacant grassland comprising grass and some trees located to the south of Phase 1 which is proposed to be acquired by HI from RMS for infrastructure and support services. The vacant grassland is currently used as a helipad by Concord Hospital.

3. Legislative Requirements and Guidelines

3.1 Legislation

This CWMP has been prepared in accordance with the requirements of the *NSW Waste Avoidance and Resource Recovery Act 2001*, and the NSW *Protection of the Environment Operations Act 1997* and *Amendment Act 2011* (POEO Act). These and other key legislation relevant to waste management at the site are provided in **Table 3.1.**

Table 3.1 - NSW Waste Legislation Summary

Legislation	Purpose
Protection of the Environment Operations Act 1997 and Amendment Act 2011 *Protection of the Environment Operations (Waste) Regulation 2014* *Protection of the Environment Operations (General) Regulation 2009*	The Act is the key piece of environment protection legislation administered by the NSW Environment Protection Authority (EPA). The object of the Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment. The Act enables the Government to establish policy instruments for setting environmental standards, goals, protocols and guidelines.
Waste Avoidance and Resource Recovery Act 2001	The Act promotes waste avoidance and resource recovery and is administered by Resource NSW. The Act establishes a scheme to promote extended producer responsibility in place of industry waste reduction plans, and continues the Waste Fund for the purpose of funding relevant programs and Resource NSW. Objectives of the Act include: • To encourage the most efficient use of resources and to reduce environmental harm; • To ensure that resource management options are considered against a hierarchy (see **Section 3.4**); • Provide for the continual reduction in waste generation; • To minimise the consumption of natural resources and the final disposal of waste; • To ensure that industry shares with the community the responsibility for reducing and dealing with waste; and • To assist in the achievement of the objectives of the *POEO Act.*
Environmental Planning and Assessment Act 1979 *Environmental Planning and Assessment Regulation 2000*	The Act and the Regulation provide the overarching structure for planning in NSW. They provide for a number of other statutory documents to support the planning structure, including State Environmental Planning Policies and Local Environmental Plans. The objectives include: • The proper management, development and conservation of natural and artificial resources; and • To encourage ecologically sustainable development.
Environmentally Hazardous Chemicals Act 1985 (NSW)	The Act provides for control of the effect on the environment of chemicals and chemical wastes. The EPA is responsible for administering this legislation, in partnership with other state government agencies. It is the primary legislation for specifically regulating environmentally hazardous chemicals throughout their life cycle. The Act sets out requirements for: • Chemical Control Orders (CCOs) which are used to manage specified hazardous chemicals and chemical wastes; • Technology assessments, which ensure that premises treating or destroying chemicals are safe and appropriate for their purpose; and • Licensing of individuals or industries who manage chemicals that are subject to a CCO.
Contaminated Land Management Act, 1997 and *Amendment Act 2008*	The Act establishes a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation.

3.2 Guidelines

Guidance documents and policies considered in the preparation of this CWMP are included in **Table 3.2.**

Table 3.2 - NSW Guidance Summary

Guideline	Purpose
NSW Environment Protection Authority (EPA) Waste Classification Guidelines (Part 1) 2014	The Waste Classification Guidelines have been established by the NSW EPA to assist waste generators to classify wastes. Wastes are classified into groups that pose similar risks to environment and human health. Waste classifications are discussed further in **Section 4.1**.
Building Code of Australia (BCA)	The BCA contains technical provisions for the design and construction of buildings and other structures, covering such matters as structure, fire resistance, access and egress, services and equipment, and energy efficiency as well as certain aspects of health and amenity.
NSW EPA's Waste Avoidance and Resource Recovery (WARR) Strategy 2014-21	The WARR strategy provides a framework for waste management for the state until 2021. Key targets include: • Avoid and reduce waste generation; • Increase recycling; • Divert more waste from landfill; • Manage problem wastes better; • Reduce litter; and • Reduce illegal dumping.
NSW EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	The guide provides advice to assist architects, developers, council staff and building managers to incorporate better waste management practice into the design, establishment, operation and ongoing management of waste services in commercial and industrial developments.
NSW Government Resource Efficiency Policy 2014	The policy aims to reduce the operating costs of NSW Government agencies through resource efficiency, and ensure that they provide leadership in resource-productivity. The policy replaces the previous NSW Government Sustainability Policy and streamlines reporting under the Waste Reduction and Purchasing Policy (WRAPP). Local government, state-owned corporations, public trading enterprises and public financial enterprises are strongly encouraged to adopt this policy's approach.
Waste management Guidelines for health care facilities 1998 (NSW Health)	The guidelines provide a minimum standard for safe and efficient waste management for NSW Public Health Care Facilities. They represent the result of consultation with the Environmental Protection Authority (EPA), WorkCover, Waste Industry and health workers.
How to manage and control asbestos in the workplace, SafeWork NSW Code of Practice, 2016 (NSW Government)	The Code of Practice is an approved code of practice under section 274 of the *Work Health and Safety Act 2011*. The code provides guidance on how to manage risks associated with asbestos and asbestos containing material at the workplace and thereby minimise the incidence of asbestos-related diseases such as mesothelioma, asbestosis and lung cancer.
How to safely remove asbestos, SafeWork NSW Code of Practice, 2016 (NSW Government)	The Code of Practice is an approved code of practice under section 274 of the *Work Health and Safety Act 2011*. The code provides practical guidance on how to safely remove asbestos from all workplaces including structures, plant and equipment and should be read in conjunction with *How to manage and control asbestos in the work place* Code of Practice.
Australian Government Construction and Demolition Waste Guide, 2011	The aim of the guide is to help develop effective markets for materials diverted or derived from the construction and demolition waste stream.
Australian Government Sustainable Procurement Guide, 2013.	The guide aims to reduce the adverse environmental, social and economic impacts of purchased products and services throughout their life through considerations such as waste disposal and the cost of operation and maintenance over the life of the goods. The guide was developed to assist Australian Government purchasers to include sustainability considerations in all stages of the procurement process, from identifying the business need to disposal of goods.

3.3 NSW Health Waste Management Policy

This CWMP takes account of waste management associated with health care facilities and, in particular, hospital waste streams. The Clinical and Related Waste Management for Health Services

Policy 2017 provides a minimum standard for waste management that must be met by health services to ensure appropriate handling and containment of specific waste streams in line with NSW legislation, licensing and waste minimisation.

3.4 Waste Hierarchy

Waste management for the project will be undertaken in accordance with the waste hierarchy, which underpins the objectives of the *Waste Avoidance and Resource Recovery Act 2001* (NSW EPA,2014a). The waste hierarchy shown in **Figure 3** demonstrates preferred approaches to waste management to ensure sustainable development and use of resources.

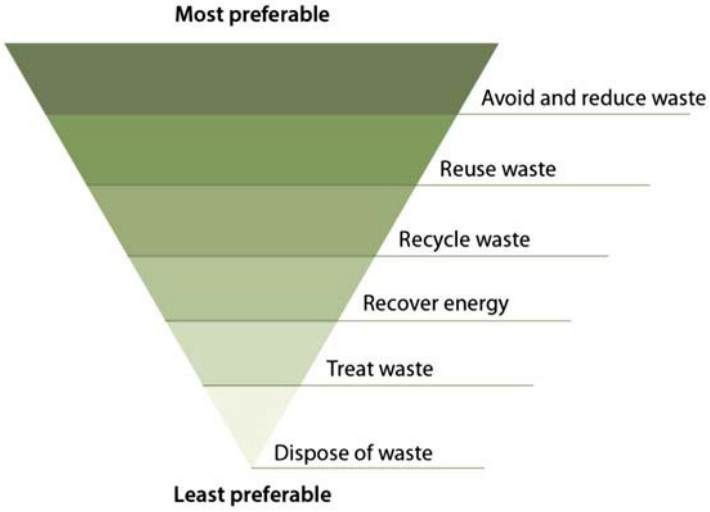


Figure 3 - Waste Hierarchy

The hierarchy also aims to maximise efficiency and avoid unnecessary consumption of resources. This CWMP seeks to implement the waste hierarchy to minimise waste disposal and promote waste reduction in order of preference:

- Reduce or avoid waste through selection of items and design;
- Reuse materials without further processing;
- Recycle and process waste for reuse as a new product;
- Recover energy through combustion of materials where acceptable and in accordance EPA Regulations;
- Treat waste to stabilise the waste product for disposal or reuse; and
- Dispose of waste when no other management options are appropriate.

4. Waste Streams and Classification

4.1 EPA Waste Classification

The NSW EPA Waste Classification Guidelines (Part 1) provides for the classification of wastes into groups that pose similar risks to the environment and human health (NSW EPA, 2014b), which are defined in the POEO Act. Classes of waste described in the guideline are described in **Table 4.1.**

Table 4.1 - Summary of NSW EPA Waste classifications

Waste Classification	Description
Special waste	Special wastes are wastes that pose specific regulatory requirements due to the risks of harm to the environment and human health. These wastes include clinical and related waste, asbestos waste, waste tyres, and anything classified as special waste under an EPA gazettal notice. Special wastes associated with the Concord reconfiguration project are described further in **Table** .
Liquid waste	Liquid waste is classified as any waste (other than special waste) that meets the following criteria: • Has an angle of repose of less than 5 degrees above horizontal; • Becomes free-flowing at or below 60 degrees Celsius or when it is transported; • Is generally not capable of being picked up by a spade or shovel; and/or • Is classified as liquid waste under an EPA gazettal notice.
Pre-classified waste: • Hazardous waste • Restricted solid waste • General solid waste (putrescible) • General solid waste (non-putrescible).	Where the waste is neither liquid nor special waste; the EPA has pre-classified other commonly generated waste types, as defined in Schedule 1 of the POEO Act. This includes hazardous waste, restricted solid waste, general solid (putrescible) and general solid (non-putrescible) waste. Putrescible waste is the component of the waste stream that is liable to become putrid, and usually refers to vegetative, food and animal products. A list of all currently gazetted waste classifications are provided on the EPA website at: www.epa.nsw.gov.au/waste/wastetypes.htm.

4.2 Waste Streams and Classification

A variety of waste types will be generated during the demolition and reconfiguration parts of the project. Potential waste types and corresponding EPA classifications for the Concord Hospital redevelopment are summarised in **Table .2**.

Table 4.2 - Potential Waste Types and Classifications

Waste Type	EPA Classification	Generated	Project Phase
Concrete and grouts	General solid waste (non-putrescible)	✓	Demolition, construction
Road materials (asphalt, rubble, crushed rock)	General solid waste (non-putrescible)	✓	Demolition, construction
Soils and sands	General solid waste (non-putrescible)	✓	Demolition, construction
Contaminated materials (including asbestos and contaminated soil)	Special waste	✓	Demolition, excavation
Rock and excavated stone	General solid waste (non-putrescible)	Potential	Demolition, Construction
Metals (steel, aluminium, stainless steel, and copper piping or wire)	General solid waste (non-putrescible)	✓	Demolition, Construction
Timber	General solid waste (non-putrescible)	Potential	Demolition, Construction
Plastic and foam packaging	General solid waste (non-putrescible)	✓	Construction
Plastics – durables (non-packaging)	General solid waste (non-putrescible)	✓	Demolition, Construction
Plasterboard	General solid waste (non-putrescible)	✓	Demolition, Construction
Glass	General solid waste (non-putrescible)	✓	Demolition
Electrical (HV and LV)	General solid waste (non-putrescible)	✓	Demolition
Optic fibre wiring	General solid waste (non-putrescible)	Potential	Demolition, Construction

Waste Type	EPA Classification	Generated	Project Phase
Light bulbs	Hazardous waste	✓	Demolition
Batteries	Hazardous waste	Potential	Demolition, Construction
Empty drums (e.g. oil, fuel, chemicals, paint, spill clean-up)	Hazardous waste if the containers previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and from which residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if containers cleaned by washing or vacuuming.	✓	Demolition Construction
General refuse	General solid waste (putrescible), and General solid waste (non-putrescible)	✓	Demolition, Construction
PVC pipes (stormwater, electrical, optic fibre, sewer)	General solid waste (non-putrescible)	✓	Demolition, Construction
Site runoff (waste water)	Liquid waste	X	n/a
Sewage	Liquid waste	X	n/a

4.2.1 Hazardous Waste

A HBMS was undertaken of all buildings within the Phase 1 zone in February 2018 (JBS&G, 2018) and comprised a detailed visual inspection and sample collection with the objective to locate and identify areas of suspected hazardous materials. The outcome of this investigation is shown in **Table 4.2.1.** Measures for dealing with hazardous waste are discussed further in **Table 5**.

Table 4.2.1 - Summary of hazardous materials

Locations	Asbestos	Lead Paint	Lead Containing Dust	SMF[1]	PCBs[2]
Building 60 – Mail Centre	✓	✓	-	✓*	✓*
Building 61 – Contractors site office/amenities	✓	✓	✓*	✓*	✓*
Building 62 – Store/Medical Records	✓	✓	✓	✓*	✓*
Building 63 – Medical Records	✓	-	-	✓*	✓*
Building 64 – Drug Health Services/Aged and Extended Care	✓	-	✓	✓*	✓*
Building 65 – Drug Health Services/Geriatrics and AECD	✓	✓	✓	✓*	✓*
Building 72 – Environmental Services/Drug and Health Care	✓	✓	✓*	✓*	✓*
Building 73 – Drug Health Services/Drug and Health Care	✓	✓	✓	✓*	✓*
Services Tunnel	✓	-	-	✓*	✓*
Substation 1	✓*	-	-	-	✓*
Substation 2	✓	✓	-	-	✓*
Substation 4	✓*	-	-	-	✓*
Substation 5	✓*	-	-	✓*	✓*

* Assumed/Suspected to exist

[1] Synthetic Mineral Fibres

[2] Polychlorinated Biphenyls

4.3 Waste Quantities

4.3.1 Demolition

In the absence of detailed dimensions for each of the demolition buildings, the quantity of waste generated have been estimated on the basis of approximate square meter coverage of the building footprint. An estimation of the quantity of hazardous waste generated during the demolition of buildings within the Phase 1 zone has been made based on the HMBS completed by JBS&G in February 2018. The estimated total and hazardous waste quantities for each building are provided in **Table 4.3.1.**

Table 4.3.1 – Estimated Demolition Waste Quantities

Building/Structure	Type of Waste	Approximate quantity (m^2)
Stage 1 Phase 1		
Building 60	Asbestos fibre cement sheeting	190
	Lead based paint – external walls and structures	450
	Synthetic Mineral Fibres	310
	Other[2]	400
Building 61	Asbestos fibre cement sheeting	265
	Lead based paint – external walls and structures	180
	Synthetic Mineral Fibres	TBC
	Other[1]	120
Building 62	ACM (including lagging residue, debris, gasket and fibre cement sheeting)	1,050
	Lead containing dust	150
	Lead based paint – external walls and structures	450
	Synthetic Mineral Fibres	40
	Other[1]	650
Building 63	Asbestos fibre cement sheeting and mastic	125
	Synthetic Mineral Fibres	1,000
	Other[1]	650
Building 64	Asbestos fibre cement sheeting and debris	2
	Lead Containing Dust	900
	Synthetic Mineral Fibres	1,460
	Other[1]	950
Building 65	Asbestos moulded fibre cement	6
	Lead Based Paint – internal timber windows	20
	Synthetic Mineral Fibres	810
	Other[1]	550
Building 72	ACM (including lagging, gasket, fibre cement sheeting, dust and electrical backing board)	370
	Lead Based Paint – internal and external structures	520

[2] Based on square meter coverage of building footprint, does not include floor levels

[2]Based on surface cover of asphalt in the at grade carpark

Building/Structure	Type of Waste	Approximate quantity (m^2)
	Synthetic Mineral Fibres	130
	Other[1]	550
Building 73	Asbestos fibre cement sheeting, debris and gasket	320
	Lead containing dust	100
	Lead Based Paint – internal and external structures	622
	Synthetic Mineral Fibres	690
	Other[1]	370
Service Tunnel	ACM (including dust and debris, gasket, lagging, insulation and cement fragment)	205
	Synthetic Mineral Fibres	150
	Other	TBC
Substation 1	ACM (membrane and internal components)	TBC
	Polychlorinated Biphenyls (insulation oils)	TBC
	Other	TBC
Substation 2	ACM (internal components and fibre cement sheeting and conduits)	46
	Lead based paint (external wall and structures)	12
	Polychlorinated Biphenyls (insulation oils)	TBC
	Other	TBC
Substation 4	ACM (Roof and HV/LV electrical plant)	TBC
	Polychlorinated Biphenyls (insulation oils)	TBC
	Other	TBC
Substation 5	Suspected friable asbestos in HV and LV electrical plant	TBC
	Polychlorinated Biphenyls (insulation oils)	TBC
	Synthetic Mineral Fibres	5
	Other	TBC
Roads	Asphalt[3]	3,700
Stage 1 Phase 2		
Building 10	Total[1]	1,200
Building 11	Total[1]	1,010
Building 14	Total[1]	615

[1]Based on square meter coverage of building footprint, does not include floor levels

[2]Based on surface cover of asphalt in the at grade carpark

Building/Structure	Type of Waste	Approximate quantity (m^2)
Building 15	Total[1]	975
Building 16	Total[1]	540
Building 17	Total[1]	800
Building 18	Total[1]	950
Building 19	Total[1]	500
Roads	Asphalt[2]	1,500
Stage 1 Phase 3		
At Grade Carpark	Asphalt[2]	17,500

It is noted the above waste quantities are estimations only and will be updated once more accurate plans and dimensions are available.

The demolition schedule will be developed to ensure appropriate temporary waste storage areas are available for storage of demolition waste. If required, waste will be periodically removed from the site (as per management measured outlined in **Table**) during the demolition works to ensure there is sufficient waste storage capacity available.

4.3.2 Construction

Indicative quantities of waste likely to be generated during construction (excluding excavation and other enabling works) will be determined when the detailed demolition schedule has been established. It is expected that actual waste quantities and composition will vary depending on outcomes of detailed design, materials specification and construction planning and methods.

Indicative waste volumes have been provided for context based on benchmark data developed by the UK Building Research Establishment (see **Table 4.3.2.1**), which is based on waste generation at various construction projects including healthcare, commercial, industrial and public buildings

A value of 20 m^3 per 100 m^2 has been adopted to estimate waste generation for the construction phase of this project, as an average between healthcare and public building waste. Indicative waste composition information shown in **Table 4.3.2.2** (derived from the Sustainability Victoria Waste Wise Tool Kit (2013)) provides an estimate of quantities for each waste stream.

Strategies that will be implemented to minimise waste generation and maximise reuse and recycling are outlined in **Section 5**.

Table 4.3.2.1 - Average Volumes of Waste Produced by Different Project Types

Project Type	Average volume (m^3) of waste per 100 m^2
Residential	18.1
Public buildings	20.9
Leisure	14.4
Industrial Buildings	13.0
Healthcare	19.1
Education	20.7
Commercial Other	17.4
Commercial Offices	19.8
Commercial Retail	20.9

Source: BRE (2012)

Table 4.3.2.2 - Guide to Waste Composition and Volumes – Construction

Material	*Estimated Waste %*	Conversion Factor (Density) (Tonne per m^3)
Hard material	32%	1.2
Timber	24%	0.3
Plastics	15%	0.13
Cement sheet	9%	0.5
Gypsum material	6%	0.2
Metals	6%	0.9
Paper / card	4%	0.1
Vegetation	3%	0.15
Soil	1%	1.6
Other	0.3%	0.3

Source: Sustainability Victoria Waste Wise Tool Kit (2013)

5. Waste Management

Site specific waste management measures have been developed in line with the waste hierarchy outlined in **Section 3.4** and in accordance with the relevant legislative requirements and guidelines. These measures are applicable to the demolition and construction phases of the project.

5.1 Avoidance and Reduction of Waste

The demolition and construction contractor will be required to avoid waste generation, and endeavour to reuse waste where possible.

During the construction phase, waste generation will be avoided through strategic selection of materials during design and purchasing, taking into account options to reduce waste generation for the project. This includes consideration of procurement of materials which are prefabricated, use minimal packaging, and are suitable for reuse across the site. Selection of construction materials will also consider the use of recycled items where practicable.

Opportunities to avoid wastes generated by construction include:

- Develop a procurement policy which considers waste avoidance measures such as:
  - Order site specific or prefabricated items where practicable to minimise surplus material;
  - Consider packaging material provided by suppliers during purchasing and reduce this requirement where possible, or consider returnable packaging;
  - Material selection to consider recycled items;
- Refine waste stream estimates to ensure adequate on-site storage and waste segregation; and
- Refine estimated volumes of materials for construction.

5.2 Reuse and Recycling

To maximise opportunities for reuse of waste materials onsite, measures to separate waste streams will be implemented. This includes segregating wastes into appropriate dedicated bins or areas for reclamation on site or transportation to a designated recycling facility.

Where practicable, uncontaminated spoil will be stockpiled for use during construction. Materials containing asbestos cannot be safely recycled, and direct treatment and/or disposal is the most appropriate option. The construction contractor will liaise with a licensed asbestos removalist and local council to determine a suitable disposal facility. Measures for dealing with hazardous waste are discussed further in **Table .**

Procedures to manage the reuse and recycling of waste materials during construction include:

- Incorporate waste management into development staging to promote reuse of materials across the site;
- Ensure areas for waste segregation are easily accessible and clearly defined;
- Ensure contractors are familiar with onsite waste storage areas for appropriate waste segregation;
- Determine suitability of materials generated during demolition for use in construction; and
- Consider opportunities for materials reuse in areas in proximity to the site or local construction activities where practicable.

5.3 Treatment and Disposal

Project wastes may require treatment to stabilise them for appropriate disposal to reduce the risk of harm to human health or the environment. These materials are not suitable for reuse or recycling and will be segregated and disposed of via a suitably qualified contractor.

Wastes will only be sent to landfill or disposal facilities where the prioritised management methods in the hierarchy cannot be implemented in a cost effective or practical manner. The demolition and construction contractor will liaise with the local council to determine appropriate disposal locations for potential waste streams.

Measures to manage the treatment and disposal of waste materials during construction include:

- Ensure wastes which cannot be reused or recycled and require disposal are clearly segregated from those which have the potential to be reused.
- Provide segregated bins for subcontractors to dispose of construction waste (i.e., metal, plastics and cardboard).
- Contractors and staff to be inducted into site waste management practices.
- Hazardous materials including asbestos to be disposed of in accordance with the handling and disposal requirements of SafeWork NSW and NSW EPA.
- General wastes to be disposed of in accordance with local council requirements.
- Toilet facilities must be regularly serviced and emptied by a licensed contractor.

5.4 Waste Stream Management Options

The waste management measures outlined in **Table** will be implemented for each waste stream generated as part of the project. Key waste streams identified for this project have been discussed in more detail in this section to ensure appropriate waste handling for each type of waste.

Each waste stream will be separated and stored appropriately to ensure each type of waste is handled in the most appropriate and efficient way. The numbers and size of waste storage bins, containers, stockpile areas and loading zones on site will be determined by the demolition and construction contractor.

Johnstaff will implement their own waste management systems in accordance with this plan to ensure the hospitals existing waste management systems are not impacted by the redevelopment.

5.4.1 Other Considerations

To ensure waste is not unintentionally tracked offsite, the vehicles or trailers used to transport waste or excavated spoil from the site will be covered before leaving the site, to prevent spillage or escape of dust, waste or spoil from the vehicle or trailer. Any mud, splatter, dust and other material that is likely to be released from the wheels, underside or body of vehicles, or plant leaving the site will also be removed through a shaker bay or wash down area prior to leaving the site.

Table 5 - Waste Stream Management

Waste Stream	Project Phase	Management
Concrete	Phase 1, 2, 3 & 4	Concrete is likely to be generated during the demolition of the buildings within Phase 1 & 2 and the excavation during Phase 3. It is possible concrete may be generated from kerbing and footpaths during Phase 2, 3 & 4. There is also a possibility that concrete waste may be generated from excess concrete poured during construction, although this will be minimised wherever possible using the methods outlined in **Section 5.1**. Concrete can be reprocessed and may, in some instances, be reused across site, however, the general practice is to crush the concrete and arrange for disposal to a recycling facility or disposal offsite. Options may include disposal of excess concrete to a HDPE lined pit on site, to allow for regular crushing and reprocessing or disposal to a recycling facility. Wet supply may be placed back into supply trucks to return to the manufacturer at the cost of an additional fee.
Asphalt	Demolition, Construction	Asphalt is likely to be generated during the demolition of Phase 1, 2 and 3 considering all areas have asphalt coverage on road and footpaths. Asphalt is potentially recyclable however reprocessing is not as readily undertaken as concrete (DSEWPaC, 2011). Opportunities for recycling asphalt will be investigated dependent on the volume generated. Alternatively, the contractor will organise disposal of the asphalt to a licensed waste facility
Soils and Sand	Demolition, Excavation and Construction	Soils and sand may be generated during excavation of foundations as part of the demolition of the buildings within Phase 1, 2 & 3 during excavation for footing and foundation construction. Soil is likely to be generated during the excavation of the Underground Storage Tanks located within Phase 1. Samples taken from the excavated soil will be analysed and classified in accordance with NSW EPA Waste Classification Guidelines to determine the suitability of the soil for reuse on site or the requirement for offsite disposal at a licensed facility. Following testing and classification, excavated soils and sands which are designated as clean fill (or those that are classified to meet site reuse criteria) may be redistributed across the site for filling, levelling or landscaping. All excavated material (to densities as per Australian Standard 4482) will be sampled prior to use as fill to ensure it meets criteria for reuse. A soil management plan (as part of the CEMP) will be developed to provide guidance for all soil testing, excavation, reuse and disposal works. It is anticipated all excavated material that meets the relevant site reuse criteria will be redistributed for use on the site during construction works. Based on the Preliminary Site Contamination Investigation undertaken in 2016, the fill material on site can be classified as General Solid Waste (non-putrescible), subject to further ex situ classification. It should be noted however that not all sub-slab areas were accessed. If excavation in sub-slab areas is to be undertaken, this material will need to be tested and classified. Following further testing and classification, surplus fill will be disposed of at a landfill that is licensed by the NSW EPA to receive this waste stream. In general, natural soil and bedrock at the site meets the definition of VENM for off-site disposal or re-use purposes. VENM is considered suitable for re-use on-site, or alternatively, may be suitable for beneficial reuse at another site as fill material (subject to further assessments). In accordance with Part 1 of the Waste Classification Guidelines, the VENM is pre-classified as general solid waste and can also be disposed of accordingly to a facility that is licensed to accept it. Where stockpiling is required prior to redistribution, control measures to avoid sediment and erosion will be implemented where appropriate. This may include establishing a bund or lining of the base with an impermeable HDPE plastic liner.

Waste Stream	Project Phase	Management
		Where excess soil cannot be redistributed or has been situated in proximity to asbestos containing materials, the sand and soils are required to be treated and/or disposed of, potentially as low level contaminated waste via a licensed removalist to a disposal facility.
Rock and excavated stone	Demolition, excavation Construction	Rock and excavated stone may be generated during excavation of foundations as part of demolition of the buildings within Phase 1, 2 & 3 during excavation for footing and foundation construction. Depending upon the quantities and properties of the materials generated, materials may be used as aggregate or sub-base for other works across the site as described in the **Soils and Sand** section above.
Metals	Demolition, Construction	Metal wastes may be generated during demolition of the buildings within the Phase 1 & 2 zones. There is also a possibility that metal waste may be generated from excess materials purchased for the site as part of building upgrades, although this will be minimised wherever possible using the methods outlined in **Section 5.1**. Johnstaff will investigate and determine appropriate storage and recycling of metals to reduce waste, including location and signage of skip bins onsite Where recycling of metal is not feasible, for example distribution to salvage yards for reuse, the contractor will organise disposal of the timber to a licensed waste facility.
Timber	Demolition, Construction	Timber wastes may be generated during demolition of the buildings within Phase 1 & 2 zones. There is also a possibility that timber waste may be generated from excess materials purchased as part of building upgrades, although this will be minimised wherever possible using the methods outlined in **Section 5.1**. Johnstaff will investigate and determine appropriate storage and recycling of timber to reduce waste, including location and signage of skip bins onsite Where timber framework is required for construction, items may be salvaged where safe and cost effective to do so. Reclaimed timber can be used for a variety of applications or distributed to salvage yards for reuse. Where reuse of timber is not feasible, the contractor will organise disposal of the timber to a licensed waste facility.
Plasterboard	Demolition, Construction	Plasterboard may be generated during demolition of the buildings within Phase 1 & 2 zones. There is also a possibility that plasterboard waste may be generated due to excess materials purchased as part of building upgrades, although this will be minimised wherever possible using the methods outlined in **Section 5.1**. Johnstaff will investigate and determine appropriate storage and recycling of plasterboard to reduce waste, including location and signage of skip bins onsite. Uncontaminated plasterboard (e.g. offcuts) or material with low levels of contamination such as nails and screws is completely recyclable and can be recycled for use in new plasterboard or the gypsum used in agricultural soil conditioners.
Plastics	Construction	Plastic wastes associated with packaging for construction materials can be recycled or in some cases returned to the supplier of the materials for reuse. Where possible, plastic (non-durable) wastes will be reduced using the methods outlined in **Section 5.1**.
General Waste	Demolition, Construction	Wastes such as food waste, organics and biodegradable material will be created as a result of worker activity on site. Non-putrescible wastes are generally inert, or solid, and are not able to be composted, recycled, reprocessed or reused. Johnstaff will ensure adequate bins are provided on site for putrescible waste. This is particularly important around worker congregation areas, site office areas and toilet facilities.

Waste Stream	Project Phase	Management
		It is likely that general waste will increase at times of internal and service fit out during construction, primarily associated with excess packaging materials and workers on site. Johnstaff will determine the location of skip bins and specify waste stream separation measures across the site. Where possible, co-mingled recycling bins will be provided in common areas at work sites for plastic and glass bottles, soft drink cans, aluminium and tin cans to avoid these items being disposed to landfill. Specialised bins for cigarette butts will also be provided in designated smoking areas.
Hazardous Waste – General	Demolition, construction	Small quantities of hazardous wastes may be generated during demolition and construction (e.g. light bulbs, batteries, used drums from oil, fuel, chemicals or paint). Separate containers for the safe storage of these wastes will be provided where applicable, prior to removal offsite by an appropriately licensed contractor for recycling or disposal at a licensed facility.
Hazardous Waste – Asbestos	Demolition	As discussed in **Section 4.2.1**, a hazardous materials survey identified asbestos in buildings and structures within the Phase 1 zone. Asbestos poses a risk to human health through exposure of loose fibres when damaged or disturbed. As such, asbestos is classified as special waste under the POEO Act, and the EPA Waste Classification Guidelines (Part 1) 2014. Special wastes pose unique regulatory requirements due to the management responsibilities to minimise risk of harm. Prior to the commencement of any asbestos removal works, a site and material specific asbestos removal control plan (ARCP) will be developed by a competent person or a licenced asbestos assessor or licensed asbestos removal contractor. The ARCP will be developed in accordance with the requirements of SafeWork NSW How to Safely Remove Asbestos, Code of Practice 2014. Controls may include: • Appropriate PPE including respiratory protective equipment • Air monitoring undertaken by an accredited expect • The asbestos work area and removal site will be clearly defined and restricted to unauthorised personnel All asbestos removal, transport and disposal must be performed in accordance with NSW legislative requirements including storing or wrapping in polythene bags. Any asbestos removed from site will be inspected by a competent person or licenced asbestos assessor prior to movement to the waste disposal facility.
Hazardous Waste – Lead Paint	Demolition	Lead based paint and or lead accumulated dust have been identified within buildings 60, 61, 62, 64, 65, 72, 73 and substation 2. Loose and flaking paint should be removed prior to demolition by an experienced hazardous materials removal contractor in accordance with AS4361.2-1998. Remaining paint well adhered to the building materials may be demolished if care is taken not to spread paint flakes to surrounding areas. Alternatively, remove all paint prior to demolition by an experienced hazardous materials removal contractor in accordance with AS4361.2-1998. Lead containing dust may be generated during the demolition of lead based painted walls and structures and has the potential to impact soil and the demolition workers. WH&S procedures will be put in place for the demolition works to protect the workers, surrounding residents and environment. Appropriate PPE will be worn by all personnel including face masks.

Waste Stream	Project Phase	Management
Hazardous Waste – Polychlorinated Biphenyls (PCBs)	Demolition	It will be assumed that old light fittings are PCB-containing. There will be managed in accordance with the ANZECC 1997 document "Identification of PCB Containing Capacitors - an Information Booklet for Electricians and Electrical Contractors". PCBs containing capacitors will be disposed of at a licenced disposal facility.
Hazardous Waste – Synthetic Mineral Fibres (SMF)	Demolition	Synthetic mineral fibers were encountered in building 60, 62, 63, 64, 64, 72, 73, the service tunnel and substation 5 during the HBMS and were generally contained and deemed to be low risk. The SMF materials will be removed with the building and demolition waste with care taken not to generate fibers. Appropriate PPE including the use of P2 respirator is to be used as a minimum requirement and appropriate removal methodology as outlined in NOHSC: 1004(1990) and NOHSC: 2006(1990).

6. Roles and Responsibilities

This CWMP forms the basis of waste management on site for Stage 1 of the Concord Hospital Redevelopment Master Plan.

It is expected that all demolition and construction personnel will commit to the CWMP and be responsible for their own actions in adhering the waste management objectives. Waste management criteria (such as those contained in this report) should be contractually binding for all contractors working on the site.

A Construction Site Manager will be the key person responsible for implementation of the CWMP and adherence to applicable legislation, guidelines, licensing and project conditions outlined herein.

Table 6 presents suggested responsibilities for waste management. Refer to the CEMP for the final responsibility matrix.

Table 6 - Roles and Responsibilities

Role	Responsibility
Environmental Management Representative	• Compliance with applicable environmental licences, legislation and project conditions. Ensure environmental management plan(s) across the site are adhered to and accurate to site conditions. • Undertake inspections to ensure compliance.
Construction Site Manager	• Ensuring workers and subcontractors are inducted into the CWMP along with other applicable management plans. • Responsible for undertaking procurement of construction materials in accordance with the waste management hierarchy. • Segregation of waste streams where required to ensure appropriate use, treatment and/or disposal.
Health and Safety Manager	• Safety inductions for all staff, workers and visitors. • Work with Construction Site Manager to determine safe handling of asbestos waste in compliance with regulatory requirements.
Site Workers	• Responsible for acting in accordance with the CWMP and site inductions. • Informing the Construction Site Manager of any waste management incidences and Health and Safety Manager of any safety issues associated with on-site activities.

6.1 Training and Awareness

Staff present on site during the construction stage of the project will be required to undertake induction and awareness training inclusive of the CWMP and site-specific waste management. This includes:

- Induction to the waste management hierarchy and use across the site; and
- Details of responsibilities for waste management and key personnel;
- Asbestos Awareness Training
- Site specific waste management practices relevant to the project stage such as:
    - Waste storage and stockpiling locations;
    - Waste disposal requirements;
    - Hazardous or special wastes;
    - Record of waste disposal details and receipts; and
- Knowledge of emergency response procedures and contacts.

Signage will be provided on site to ensure waste management measures are communicated across the site, particularly for contractors and visitors who are not regularly on site. Signage will highlight

correct procedures for separating wastes where required, locations of bins and waste storage areas, labelling of designated bins, potential hazards associated with the waste streams and handling, and contact details should any issues be encountered.

Signage will be prepared and located on site in accordance with the Australian Standard (AS 1319) for safety signs, and the NSW EPA and Australian Standard for recycling signage.

7. Monitoring and Reporting

The following activities will be undertaken to inform future onsite waste management and to determine the success of the CWMP:

- Ensure waste quantities generated are recorded, including tracking of receipts from waste recycling or disposal via the appointed waste contractor;
- Record waste classification and testing results;
- Review the CWMP in light of any changes to construction activities or further information which may alter waste management practices;
- Undertake auditing of waste management across the site as a component of broader environmental site audits;
- Undertake visual inspections daily to ensure waste management controls are implemented and maintained across site; and
- Undertake final review of the CWMP upon project completion to ensure information accurately reflects site activities, and to assist future waste management.

Outcomes of audits and waste tracking will be reported to Johnstaff, potentially through weekly or monthly reporting to ensure waste management objectives are adhered to.

7.1 Corrective Action

Where formal auditing, daily visual inspections or incident reporting identify incorrect storage or disposal procedures, or maintenance or waste management issues, observations will be promptly reported to the Construction Site Manager and recorded. The Construction Site Manager will determine appropriate measures to rectify the issues in a timely manner in consultation with the Environmental Management Representative and Health and Safety Manager where required.

8. Recommendations

This draft Construction Waste Management Plan will need to be updated once demolition and construction volumes have been finalised and temporary waste storage areas have identified.

This draft CWMP must be in accordance with the sites SEARs application which requires the following waste management measures to be addressed as part of the Environmental Impact Statement (EIS):

'*Identify, quantify and classify the likely waste streams to be generated during construction and operation and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.'*

The EIS must also address contamination and demonstrate that the site is suitable for the proposed use in accordance to *SEPP 55 Remediation of Land (DUAPP) – Managing Land Contamination: Planning Guidelines*.

Prior to commencement of construction, a Construction Environmental Management Plan (CEMP) will need to be developed. This CWMP will form a sub-plan of the CEMP for the Stage 1. The CEMP should also include a soil management plan and an asbestos removal control plan.

9. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

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Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

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Appendix A – Site Photos

Photo 1: Within Phase 1, central intersection facing east

Photo 2: Within Phase 1, central intersection facing south

Photo 3: Within Phase 1, south-east section facing north

Photo 4: Within Phase 1, south-east section facing north

Photo 5: Within Phase 2, south-west corner of ramp wards

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