

# Liddell Power Station Battery Energy Storage System Waste Management Sub Plan

Environmental Management Strategy

16-Jun-2023

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## Environmental Management Strategy

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16-Jun-2023

Job No.: 60698503

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## Quality Information

Document Liddell Power Station Battery Energy Storage System Waste Management Sub Plan  
 Ref 60698503  
 Date 16-Jun-2023  
 Originator H. Mylan and A. Mitchell  
 Checker/s Neil Standen  
 Verifier/s S. Walton

### Revision History

| Rev | Revision Date | Details                        | Approved                        |   |
|-----|---------------|--------------------------------|---------------------------------|---|
|     |               |                                | Name/Position                   | Signature   |
| 0   | 24-Feb-2023   | Draft for client review        | Neil Standen<br>Project Manager |   |
| 1   | 28-Mar-2023   | Second draft for client review | Neil Standen<br>Project Manager |   |
| 2   | 12-May-2023   | Final draft for DPE review     | Neil Standen<br>Project Manager |   |
| 3   | 16-Jun-2023   | Final                          | Neil Standen<br>Project Manager |  |

## Table of Contents

|                    |   |                                   |   |    |
|--------------------|---|-----------------------------------|---|----|
| Glossary and terms |   | i                                 |   |    |
| 1.0                | Introduction                                | 1                                 |   |    |
|                    | 1.1   | Background                        | 1   |    |
|                    | 1.2   | Site details                      | 1   |    |
|                    | 1.3   | Project description               | 2   |    |
|                    | 1.4   | Construction activities           | 6   |    |
|                    | 1.5   | Relevant approvals and conditions | 6   |    |
|                    |   | 1.5.1                             | Project approvals   | 6  |
|                    |   | 1.5.2                             | Development consent conditions  | 6  |
|                    | 1.6   | Scope, purpose and objectives     | 7   |    |
|                    | 1.7   | Related reports and plans         | 7   |    |
| 2.0                | Legislation and guidelines                  | 8                                 |   |    |
|                    | 2.1   | Legislation                       | 8   |    |
|                    |   | 2.1.1                             | POEO Act  | 8  |
|                    |   | 2.1.2                             | Protection of the Environment Operations (Waste) Regulation 2014  | 8  |
|                    |   | 2.1.3                             | Waste Avoidance and Resource Recovery Act 2001  | 8  |
|                    |   | 2.1.4                             | Hazardous Waste (Regulation of Exports and Imports) Act 1989  | 8  |
|                    |   | 2.1.5                             | National Environment Protection Measure (NEPM) (Movement of Controlled Waste between States and Territories) 1998 | 9  |
|                    |   | 2.1.6                             | Dangerous Goods (Roads and Transport) Act 2008  | 9  |
|                    |   | 2.1.7                             | Dangerous Goods (Road and Transport) Regulation 2014  | 9  |
|                    | 2.2   | Standards and guidelines          | 9   |    |
|                    |   | 2.2.1                             | NSW Waste Avoidance and Resource Recovery Strategy 2014-21  | 9  |
|                    |   | 2.2.2                             | NSW Government Resource Efficiency Policy   | 9  |
|                    |   | 2.2.3                             | Waste Classification Guidelines   | 9  |
|                    |   | 2.2.4                             | Australian Code for the Transport of Dangerous Goods by Road or Rail (ADG)  | 10 |
|                    | 2.3   | Environmental impact assessment   | 10  |    |
| 3.0                | Roles and responsibilities                  | 10                                |   |    |
| 4.0                | Environmental setting and potential impacts | 10                                |   |    |
|                    | 4.1   | Waste streams                     | 10  |    |
| 5.0                | Environmental management measures           | 12                                |   |    |
|                    | 5.1   | Waste hierarchy                   | 12  |    |
|                    | 5.2   | Management of waste streams       | 12  |    |
|                    | 5.3   | Environmental management measures | 13  |    |
|                    | 5.4   | Asbestos waste management         | 15  |    |
|                    |   | 5.4.1                             | Management of asbestos waste  | 15 |
|                    |   | 5.4.2                             | Transportation of asbestos waste  | 15 |
| 6.0                | Compliance and reporting                    | 16                                |   |    |
|                    | 6.1   | Monitoring and reporting          | 16  |    |
|                    | 6.2   | Incidents and complaints          | 16  |    |
|                    | 6.3   | Documentation review and updates  | 16  |    |

## Glossary and terms

| Term               | Description  |
|--------------------|--|
| ACM                | Asbestos-containing material   |
| AECOM              | AECOM Australia Pty Ltd  |
| AGLM               | AGL Macquarie Pty Ltd  |
| BAW                | Bayswater Ancillary Works  |
| BESS               | Battery Energy Storage System  |
| BESS Project (the) | Stage 2 of the Liddell Battery and Bayswater Ancillary Works Project consisting of the construction of a BESS with the storage capacity to facilitate a maximum discharge of up to 500 MW for a four-hour period, or up to 2 GWh   |
| CCTV               | Closed-circuit television  |
| DPE                | Department of Planning and Environment   |
| EIS                | Environmental Impact Statement   |
| EMS                | Environmental Management Strategy  |
| EPA                | Environment Protection Authority   |
| EP&A Act           | <i>Environmental Planning and Assessment Act 1979</i> (NSW)  |
| EPL                | Environment Protection Licence   |
| GWh                | Gigawatt hours   |
| ha                 | hectares   |
| IA                 | Improvement Action   |
| km                 | kilometre  |
| kV                 | Kilovolt   |
| LBBAWP             | Liddell Battery and Bayswater Ancillary Works Project, consisting of a battery energy storage system at Liddell, decoupling works, and works associated with the ongoing operation of Bayswater  |
| LAA                | Licensed Asbestos Assessor   |
| LAR                | Licensed Asbestos Removalist   |
| MW                 | Megawatt   |
| NEM                | National Energy Market   |
| POEO Act           | <i>Protection of the Environment Operations Act 1997</i> (NSW)   |
| RTS                | Response to Submissions  |
| SEARs              | Secretary's Environmental Assessment Requirements  |
| SSD                | State Significant Development  |
| V                  | Volt   |
| WMP                | Waste Management Plan  |
| WOAOW              | Bayswater Water and Other Associated Operational Works, which involves improvements to the management of ancillary processes at Bayswater power station and to facilitate an improved outcome for the ash disposal area. These works may occur at the same time as the LBBAWP. |

## 1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by AGL Macquarie Pty Limited (AGLM) to prepare a Waste Management Plan (WMP) for a Battery Energy Storage System (BESS) to be constructed as part of the Liddell Battery and Bayswater Ancillary Works Project (LBBAWP), NSW.

The LBBAWP is a State Significant Development (SSD) under the *State Environmental Planning Policy (State and Regional Development) 2011*<sup>1</sup>, and is subject to Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

An Environmental Impact Statement (EIS) was prepared in March 2021 in accordance with the Secretary's Environmental Assessment Requirements (SEARs). Development consent (SSD-8889679) was issued by the Department of Planning and Environment (DPE) on 8 March 2022.

### 1.1 Background

AGLM is progressing with plans to facilitate the efficient, safe and reliable continuation of electricity-generating works from the Bayswater and Liddell sites. The LBBAWP will be carried out in the following stages:

- Stage 1 - Decoupling Works: Alternative network connection arrangements for the Liddell 33 Kilovolt (kV) switching station that provides electricity to the infrastructure required for the ongoing operation of Bayswater power station, to associated ancillary infrastructure and to potential third-party industrial energy users
- Stage 2 - BESS: Replacement of a portion of Liddell's dispatchable electricity supply is required for the National Energy Market (NEM), including the construction of a grid-connected utility-scale BESS with a capacity of up to 500 megawatts (MW) and 2 gigawatt hours (GWh)
- Stage 3 - Bayswater Ancillary Works (BAW): Works associated with Bayswater power station, which may include upgrades to ancillary infrastructure, such as pumps, pipelines, conveyor systems, roads and assets, to enable maintenance, repairs, replacement or expansion
- Consolidated consents: Surrender and consolidation of various existing development approvals required for the ongoing operation of AGLM assets.

This management plan has been developed for Stage 2 only (i.e. the BESS), which is hereinafter referred to as 'the BESS Project'.

### 1.2 Site details

The AGLM landholding is located approximately 15 kilometres (km) southeast of Muswellbrook, 25 km northwest of Singleton, and approximately 165 km west northwest of Sydney in NSW. The total area of the AGLM landholding is approximately 10,000 ha, including the Bayswater and Liddell power station operational areas, the Ravensworth rehabilitation area, Lake Liddell and surrounding buffer lands.

Surrounding the AGLM landholding is predominantly land uses heavily influenced by industrial activity. The local area is dominated by large-scale infrastructure associated with Bayswater and Liddell power stations and open-cut mining activities. Agricultural clearing for the purposes of grazing is also present within and surrounding the AGLM landholding.

Elevations within approximately 10 kilometres of the AGLM landholding range from around 100 to 500 metres above sea level.

The majority of the AGLM landholding has been previously disturbed during the construction and operation of Liddell and Bayswater power stations and historic agricultural activity. The BESS will be located within the location of the existing solar array area (the site), shown as 'Area 2' in Figure 1. This location was selected as it is in close proximity to Liddell Power Station and is on previously disturbed operational lands no longer required for Liddell operations.

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<sup>1</sup> Now State Environmental Planning Policy (Planning Systems) 2021

The solar array area consists of approximately 5 ha of solar thermal equipment. This consists predominantly of steel pipes used for heat absorption and water and steam transfer, mirror reflectors, and steel mounting structures as shown in Figure 2.

### 1.3 Project description

The BESS Project involves the construction, operation and decommissioning of a BESS with the storage capacity to facilitate a maximum discharge of up to 500 MW for up to a four-hour period or up to 2 GWh. The BESS will be located within 'Area 2' the existing solar array area, and will be connected to the existing TransGrid 330kV substation via a new 330kV high-voltage power line (refer to Figure 1).

The BESS Project will involve the demolition of the existing solar array area. The disturbance area for the BESS is expected to be around eight hectares (ha). The BESS will be mounted on slab footings and will be containerised or otherwise enclosed in a formalised layout.

The approximate component requirements to achieve the maximum storage capacity for the BESS (based on indicative information provided by potential technology providers) are as follows:

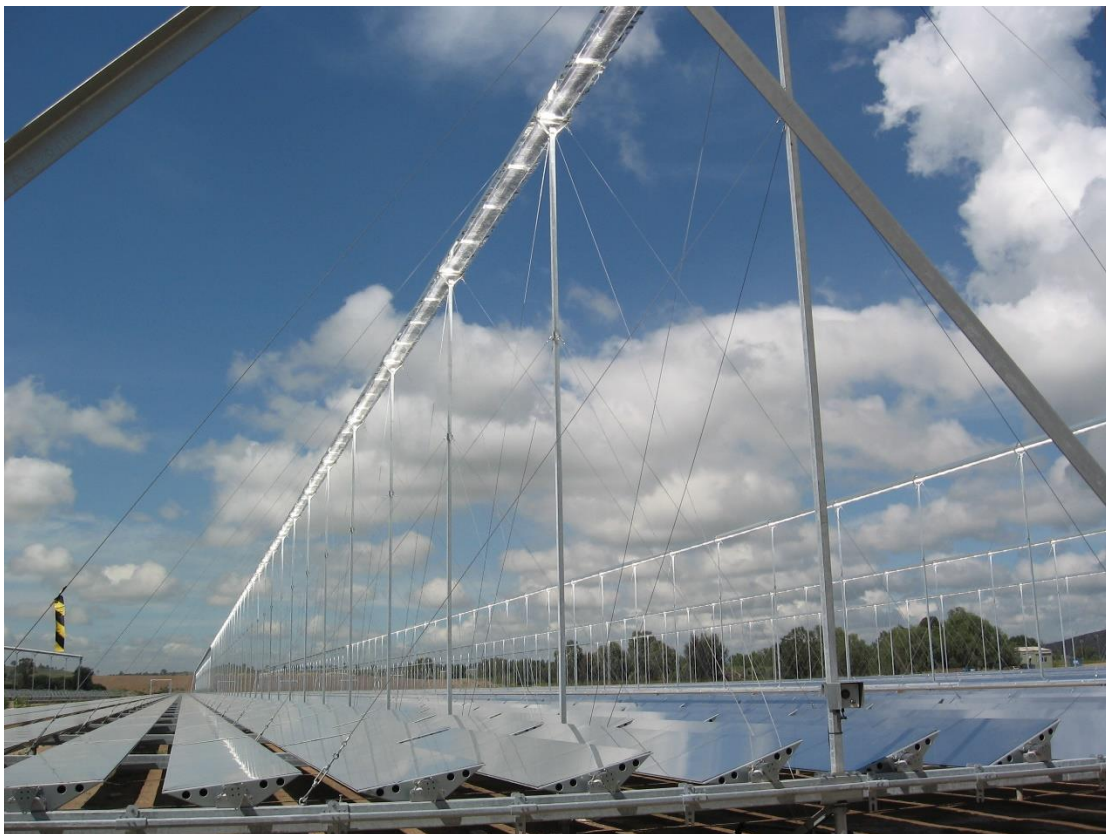
- Approximately 900 pre-assembled battery enclosures containing lithium-ion type batteries, internal cooling and fire suppression systems
- Approximately 148 medium voltage skid (inverter and transformers)
- Approximately 148 of 630 Volt (V) to 33 kV step-up transformers
- One control room, two electrical rooms, one social facility room and four storage rooms
- 33kV reticulation system and collector switchrooms
- Overhead, underground, or a combination of both, subject to detailed design, 330 kV line to connect to TransGrid 330 kV substation
- Two 33 kV / 33kV / 330 kV three-winding transformers and 330 kV connection equipment
- Ancillary infrastructure, including water tanks for bushfire protection purposes, lightning protection, security fencing and closed-circuit television (CCTV).

An indicative layout of the BESS is shown in Figure 3.

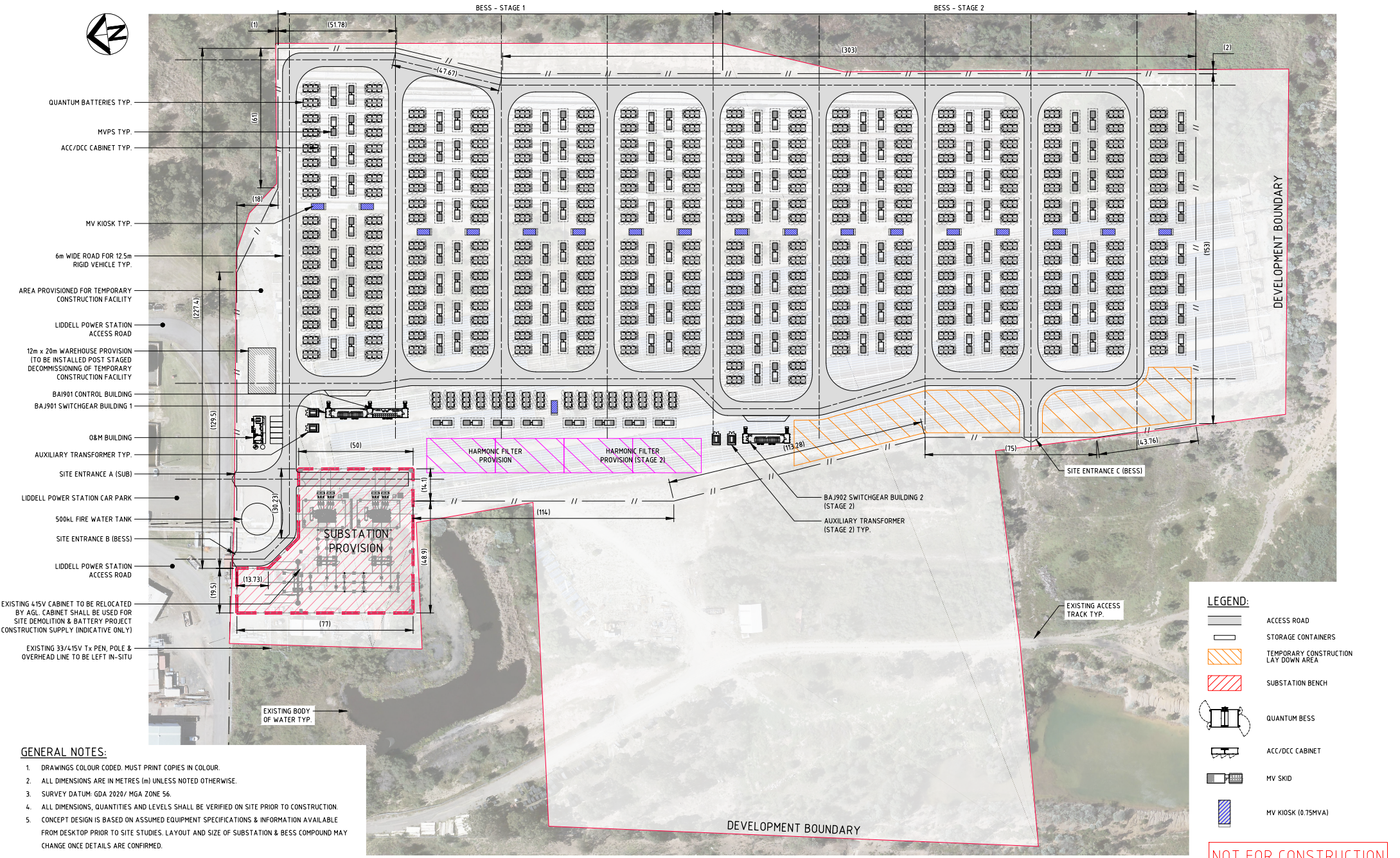


Figure 1 Overview of Stage 1 and 2 of the LBBAWP (source: Jacobs 2021)





**Figure 2 Existing solar array area**



- QUANTUM BATTERIES TYP.
- MVPS TYP.
- ACC/DCC CABINET TYP.
- MV KIOSK TYP.
- 6m WIDE ROAD FOR 12.5m RIGID VEHICLE TYP.
- AREA PROVISIONED FOR TEMPORARY CONSTRUCTION FACILITY
- LIDDELL POWER STATION ACCESS ROAD
- 12m x 20m WAREHOUSE PROVISION (TO BE INSTALLED POST STAGED DECOMMISSIONING OF TEMPORARY CONSTRUCTION FACILITY)
- BAI901 CONTROL BUILDING
- BAI901 SWITCHGEAR BUILDING 1
- O&M BUILDING
- AUXILIARY TRANSFORMER TYP.
- SITE ENTRANCE A (SUB)
- LIDDELL POWER STATION CAR PARK
- 500ℓ FIRE WATER TANK
- SITE ENTRANCE B (BESS)
- LIDDELL POWER STATION ACCESS ROAD
- EXISTING 4.15V CABINET TO BE RELOCATED BY AGL. CABINET SHALL BE USED FOR SITE DEMOLITION & BATTERY PROJECT CONSTRUCTION SUPPLY (INDICATIVE ONLY)
- EXISTING 33/4.15V Tx PEN, POLE & OVERHEAD LINE TO BE LEFT IN-SITU

- LEGEND:**
- ACCESS ROAD
  - STORAGE CONTAINERS
  - TEMPORARY CONSTRUCTION LAY DOWN AREA
  - SUBSTATION BENCH
  - QUANTUM BESS
  - ACC/DCC CABINET
  - MV SKID
  - MV KIOSK (0.75MVA)

- GENERAL NOTES:**
1. DRAWINGS COLOUR CODED. MUST PRINT COPIES IN COLOUR.
  2. ALL DIMENSIONS ARE IN METRES (m) UNLESS NOTED OTHERWISE.
  3. SURVEY DATUM: GDA 2020/ MGA ZONE 56.
  4. ALL DIMENSIONS, QUANTITIES AND LEVELS SHALL BE VERIFIED ON SITE PRIOR TO CONSTRUCTION.
  5. CONCEPT DESIGN IS BASED ON ASSUMED EQUIPMENT SPECIFICATIONS & INFORMATION AVAILABLE FROM DESKTOP PRIOR TO SITE STUDIES. LAYOUT AND SIZE OF SUBSTATION & BESS COMPOUND MAY CHANGE ONCE DETAILS ARE CONFIRMED.

| ITEM                        | STAGE 1<br>(250MW/500MWh) | STAGE 2<br>(250MW/500MWh) | TOTAL<br>(500MW/1000MWh) |
|-----------------------------|---------------------------|---------------------------|--------------------------|
| AUX TRANSFORMER             | 2                         | 2                         | 4                        |
| MV KIOSK                    | 8                         | 8                         | 16                       |
| MV SKID (INVERTER + TRANS.) | 74                        | 74                        | 148                      |
| GRIDSOLY QUANTUM            | 444                       | 444                       | 888                      |
| ACC/DCC CABINET             | 148                       | 148                       | 296                      |

**SITE PLAN**  
SCALE 1:500

| REV | DATE       | REVISION DESCRIPTION       | DES  | RVD  | APP  | AUTH | CLIENT |
|-----|------------|----------------------------|------|------|------|------|--------|
| 0.2 | 17.02.2023 | EQUIPMENT & LAYOUT REVISED | L.M. | K.M. | J.L. | A.M. |        |
| 0.1 | 10.02.2023 | ISSUED FOR INFORMATION     | L.M. | K.M. | J.L. | A.M. |        |



ENERVEN PROJECT No: 699

**ENERVEN™**

| NAME                  | DATE       |
|-----------------------|------------|
| DESIGNED L. MUNIZ     | 10.02.2023 |
| REVIEWED K. MACKAY    | 10.02.2023 |
| APPROVED J. LOMBARD   | 10.02.2023 |
| AUTHORISED A. MALCOLM | 10.02.2023 |

**LIDDELL BESS  
CONCEPT SITE LAYOUT  
SITE PLAN - SATELLITE OVERVIEW**

| SIZE | DRAWING NUMBER     | REVISION |
|------|--------------------|----------|
| A1   | 699.EEI.GN.DWG.003 | 0.2      |

**NOT FOR CONSTRUCTION**  
17.02.2023 11:40 AM

**Figure 3 Preliminary site layout (indicative only)**

## 1.4 Construction activities

Construction works associated with the BESS project would be likely to involve:

- Installation and maintenance of environmental controls, including temporary and permanent water management infrastructure
- Establishment of access from the Liddell access road
- Demolition or deconstruction of existing infrastructure as required, including the existing solar array area
- Establishment of a hardstand pad and construction laydown areas
- Cut and fill to battery compound, transformer compounds, footings and construction laydown area
- Trenching of 33kV reticulation system
- Trenching and/or overhead line installation to TransGrid to 330 kV substation
- Structural works to support enclosures, inverters, transformers, buildings and transformer compounds
- Delivery, installation and electrical fit-out
- Testing and commissioning activities
- Removal of construction equipment and reinstatement of construction areas.

## 1.5 Relevant approvals and conditions

### 1.5.1 Project approvals

Liddell power station was commissioned in 1971 and forms part of AGLM's integrated power generation complex. This complex also incorporates Bayswater power station (commissioned in 1985) and a range of supporting water management, coal supply, power supply and control system infrastructure.

Bayswater and Liddell power stations are regulated under several planning approvals. Most development at the site pre-dates current planning requirements enforced through the EP&A Act. However, alterations and additions after 1 September 1980 were subject to the provisions of the Act.

Development consent (SSD-8889679) was granted for the LBBAWP on 8 March 2022, which includes the voluntary surrender and consolidation of various existing development approvals into SSD-8889679.

In accordance with Section 55 of the *Protection of the Environment Operations Act 1997* (POEO Act), Liddell and Bayswater power stations are operated under Environment Protection Licences (EPL) EPL 2122 and EPL 779, respectively.

### 1.5.2 Development consent conditions

In accordance with SSD-8889679 development consent condition C1, an Environmental Management Strategy (EMS) has been prepared for the BESS project to provide a strategic framework for the environmental management of the development. A range of subplans has been developed to support the EMS and address development consent condition C1(e)(i).

This WMP has been developed to manage the potential waste impacts arising from the BESS project. The relevant conditions are outlined below in Table 1.

**Table 1 Development consent conditions - Waste management**

| Condition | Requirement   | Reference            |
|-----------|---|----------------------|
| C1        | Prior to commencing construction, the Applicant must prepare an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:<br>(e) include: | This management plan |

| Condition | Requirement   | Reference  |
|-----------|---|--|
|           | (i) the following subplans: <ul style="list-style-type: none"> <li>• soil, stormwater, water quality, flood and spoil management;</li> <li>• construction and decommissioning noise, including an out-of-hours works protocol;</li> <li>• air quality management;</li> <li>• contamination, including an unexpected finds protocol</li> <li>• <b>waste management</b>; and</li> <li>• traffic.</li> </ul>   |  |
| B27       | The Applicant must: <ul style="list-style-type: none"> <li>(a) Take all reasonable steps to minimise the waste generated by the development,</li> <li>(b) Classify all waste in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014)</li> <li>(c) Dispose of all waste at appropriately licenced waste facilities, if required, or as expressly permitted in an applicable EPL; and</li> <li>(d) Manage any asbestos or asbestos-contaminated materials identified during the construction and operation of the development in accordance with the requirements under the <i>Protection of the Environment Operations (Waste) Regulation 2014</i>.</li> </ul> | Section 5.0<br><br>Management Measures W3, W4, W5 and W9 |

## 1.6 Scope, purpose and objectives

This WMP has been developed in accordance with SSD-8889679 development consent condition C1 and to address relevant requirements associated with:

- SSD-8889679 development consent conditions
- EIS management measures, which were amended in the Response to Submissions (RTS) (Jacobs 2021)
- Bayswater Water and Other Associated Operational Works (WOAOW) management measures
- AGL plans and procedures.

The purpose of this WMP is to:

- Summarise potential waste impacts of the BESS project as assessed in the EIS (Jacobs 2021)
- Identify environmental management measures to be implemented to minimise waste impacts.

The objective of this WMP is to mitigate and manage potential waste impacts as a result of the BESS project and to maintain compliance with SDD-8889679.

All works undertaken by the Project Contractor must comply with the environmental management measures outlined in Section 5.0 of this plan.

## 1.7 Related reports and plans

There are environmental assessments, management plans and monitoring programs for existing and proposed operations within the AGLM landholdings. The following documents are considered related and may need to be read in conjunction with this WMP:

- Waste Standard (AGL-HSE-STD-009.7) (AGLM, 2022)
- Waste Management Plan (AGLM-HSE-PLN-009.07) (AGLM, 2022)
- Liddell Decoupling Works Waste Management Plan (Jacobs, 2022).

## 2.0 Legislation and guidelines

### 2.1 Legislation

This WMP has been prepared in accordance with the relevant legislation and regulatory requirements within the EMS. Key legislation relating to this WMP:

- POEO Act (NSW)
- *Protection of the Environment Operations (Waste) Regulation 2014* (NSW)
- *Waste Avoidance and Resource Recovery Act 2001* (NSW)
- *Hazardous Waste (Regulation of Exports and Imports) Act 1989*
- National Environment Protection Measure (NEPM) (Movement of Controlled Waste between States and Territories) 1998
- *Dangerous Goods (Roads and Transport) Act 2008*
- *Dangerous Goods (Road and Transport) Regulation 2014*

#### 2.1.1 POEO Act

The aim of the POEO Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment and reduce potential risks to human health and the environment. The POEO Act is the primary piece of legislation for the regulation of potential pollution impacts associated with scheduled operations or activities in NSW. Scheduled activities are those defined in Schedule 1 of the Act.

Liddell Power Station is operated under EPL 2122, which specifies the environmental performance requirements for operations, including emission limits of certain pollutants. The BESS Project does not constitute a scheduled activity and is therefore not subject to the requirements of the EPL.

#### 2.1.2 Protection of the Environment Operations (Waste) Regulation 2014

The Protection of the Environment Operations (Waste) Regulation 2014 improves the NSW Environment Protection Authority's (EPA) ability to protect human health and the environment, and paves the way for a modern and fair waste industry in NSW. It includes strict thresholds for EPLs and outlines the waste levy system.

#### 2.1.3 Waste Avoidance and Resource Recovery Act 2001

The aim of the *Waste Avoidance and Resource Recovery Act 2001* is to encourage the most efficient use of resources and to ensure resource management options are considered against the following waste hierarchy:

- Avoidance and reduction of waste
- Reuse of waste
- Recycling, processing or reprocessing waste
- Recovery of energy
- Disposal.

#### 2.1.4 Hazardous Waste (Regulation of Exports and Imports) Act 1989

The federal *Hazardous Waste (Regulation of Exports and Imports) Act 1989* implements the international "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal" in Australia. The Department of Climate Change, Energy, the Environment and Water administers and implements the Act.

### 2.1.5 National Environment Protection Measure (NEPM) (Movement of Controlled Waste between States and Territories) 1998

The NEPM requires the transport around Australia of Controlled waste to be thoroughly documented. Controlled wastes appear as List 1 of Schedule A to the NEPM, together with the relevant waste codes. The codes are a shorthand way of identifying controlled wastes and are used in applications and authorisations for the national tracking system under the NEPM.

### 2.1.6 Dangerous Goods (Roads and Transport) Act 2008

The Dangerous Goods (Road and Rail Transport) Act covers requirements for the transportation of dangerous goods on road and rail within NSW. The Act is supported by subordinate regulation and refers to the Australian Dangerous Goods Code.

### 2.1.7 Dangerous Goods (Road and Transport) Regulation 2014

The Dangerous Goods (Road and Transport) Regulation 2014 provides detailed controls around the management of dangerous goods. The controls include requirements around the signage, segregation, packaging, consignment and emergency plans related to transporting dangerous goods.

## 2.2 Standards and guidelines

The main standards and guidelines relevant to this WMP include:

- *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021* (EPA, 2014)
- *NSW Government Resource Efficiency Policy* (Office of Environment and Heritage 2019)
- *Waste Classification Guidelines* (EPA, 2014)
- Australian Code for the Transport of Dangerous Goods by Road or Rail (ADG).

### 2.2.1 NSW Waste Avoidance and Resource Recovery Strategy 2014-21

The *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021* outlines the impact of waste on the environment and provides a framework for classifying waste, efficient resource use and waste management.

### 2.2.2 NSW Government Resource Efficiency Policy

The *NSW Government Resource Efficiency Policy* provides a framework for reporting on waste streams produced by agencies and encourages the improvement of waste efficiency through suggested practices.

### 2.2.3 Waste Classification Guidelines

The Waste Classification Guidelines provide a framework for the classification of waste streams that pose similar risks to the environment or human health. The classes of waste are defined in Schedule 1 of the POEO Act and inform the classification process within the Waste Classification Guidelines.

The waste classifications are summarised in Table 2.

**Table 2 Waste classification descriptions**

| Waste classification | Definition  |
|----------------------|---|
| Special waste        | Waste that has unique regulatory requirements, for example, asbestos waste, waste tyres, anything classified as special waste under an EPA gazettal notice.   |
| Liquid waste         | Waste (other than special waste) that 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, or is classified as being a liquid under an EPA gazettal notice. |

| Waste classification                  | Definition   |
|---------------------------------------|--|
| Hazardous waste                       | Waste (other than special or liquid waste) that has been pre-classified by the EPA as 'hazardous waste', including dangerous goods classed under the Transport of Dangerous Goods Code (Class 1 to Class 8). For example, coal tar, lead-acid or nickel-cadmium batteries and lead paint waste.  |
| General solid waste (putrescible)     | Waste (other than special, liquid or hazardous waste) that has been pre-classified by the EPA as 'general solid waste (putrescible)'. This waste includes household waste, waste from litter bins collected by council, manure, animal waste, grit or screenings from sewerage treatment systems that have been dewatered, or a mixture of these.  |
| General solid waste (non-putrescible) | Waste (other than special, liquid, hazardous or general solid waste (putrescible) waste) that has been pre-classified by the EPA as 'general solid waste (non-putrescible)'. This includes, for example, glass, plastic, rubber, plasterboard, ceramics, bricks, concrete, metal, paper, cardboard, household recyclable waste that does not include food waste, garden waste, wood waste, virgin excavated material, building or demolition waste, asphalt waste, cured concrete. |

#### 2.2.4 Australian Code for the Transport of Dangerous Goods by Road or Rail (ADG)

The Australian Code for the Transport of Dangerous Goods by Road or Rail (ADG) provides specific requirements and recommendations for transporting dangerous goods in Australia by road and rail.

### 2.3 Environmental impact assessment

Potential waste impacts were assessed as part of the EIS in accordance with the SEARs issued for the LBBAWP. The key purpose of the assessment was to understand potential waste streams that would be produced and present and discuss predicted potential impacts. The identification of likely waste streams involved consultation with the Project development team, including the battery supplier, to understand the construction methodology.

The assessment identified potential impacts associated with waste and recommended suitable mitigation and management measures included in this WMP in Section 5.0, where relevant to the BESS.

The EIS was placed on public exhibition for a period of 28 days, between 15 April 2021 to 12 May 2021. Following this, an RTS report (Jacobs 2021) was prepared to consider and respond to any submissions received during the exhibition period, resulting in changes to some of the management measures from the EIS. Therefore, the management measures in the RTS report supersede those in the EIS, where changes have been made.

## 3.0 Roles and responsibilities

Section 4.3 of the EMS outlines key roles and responsibilities for both AGLM and the Project Contractor working on the BESS Project.

## 4.0 Environmental setting and potential impacts

### 4.1 Waste streams

The BESS Project will likely generate waste streams from operation, demolition, and construction, as identified in Table 3. The following waste streams were assessed in the EIS. Waste streams and quantities may change throughout further development of the BESS project.

**Table 3** Likely construction waste streams

| Waste identification               | Waste description  | Likely classification | Estimated quantity   |
|------------------------------------|--|-----------------------|--|
| Sewage                             | Portable facilities  | Liquid                | Up to 20,000 Litres per week at peak construction  |
| Fuels, lubricants and chemicals    | Used oil and containers that previously contained Class 1 to Class 8 substances used for construction plant  | Hazardous             | Unknown volume, waste associated with minor maintenance of vehicles only                             |
| Hydrocarbon contaminated soils     | Spills from construction plant and refuelling  | Hazardous             | Minimal  |
| Excavated natural materials        | Earthworks spoil   | General               | Subject to detailed design but able to be balanced on site   |
| Green waste                        | Clearing of vegetation   | General               | Subject to detailed design   |
| Operation waste                    | Defective or end-of-life lithium-ion batteries, battery cores, inverters, transformers, enclosures   | Hazardous/<br>general | 500 MW battery, subject to detailed design   |
| Demolition waste                   | Solar array components including concrete, mirrors, steel pipes and frames, wiring pumps and motors. Road materials.   | General               | Subject to detailed design   |
| Construction waste                 | Timber, packaging, metal, asphalt, concrete, glass, plastic, rubber, plasterboard, ceramics, bricks from the installation of foundations and underground services and above-ground civil, mechanical and electrical plant and equipment. | General               | Unknown. Limited packaging waste is required as Battery components would be delivered pre-assembled. |
| Grit, sediment in erosion controls | Collected in, and removed from, stormwater treatment devices and/or stormwater management systems.   | General               | As generated   |
| Site office waste                  | Paper/ cardboard   | General               | As generated   |
| Food waste                         | Generated from worker's lunches  | Putrescible           | Approximately 100 kg per day   |



## 5.0 Environmental management measures

### 5.1 Waste hierarchy

Mitigation measures and requirements to address waste and resource consumption during construction are outlined in this section. The measures outlined within this section are categorised within the framework of waste management hierarchy, as shown in Figure 4.

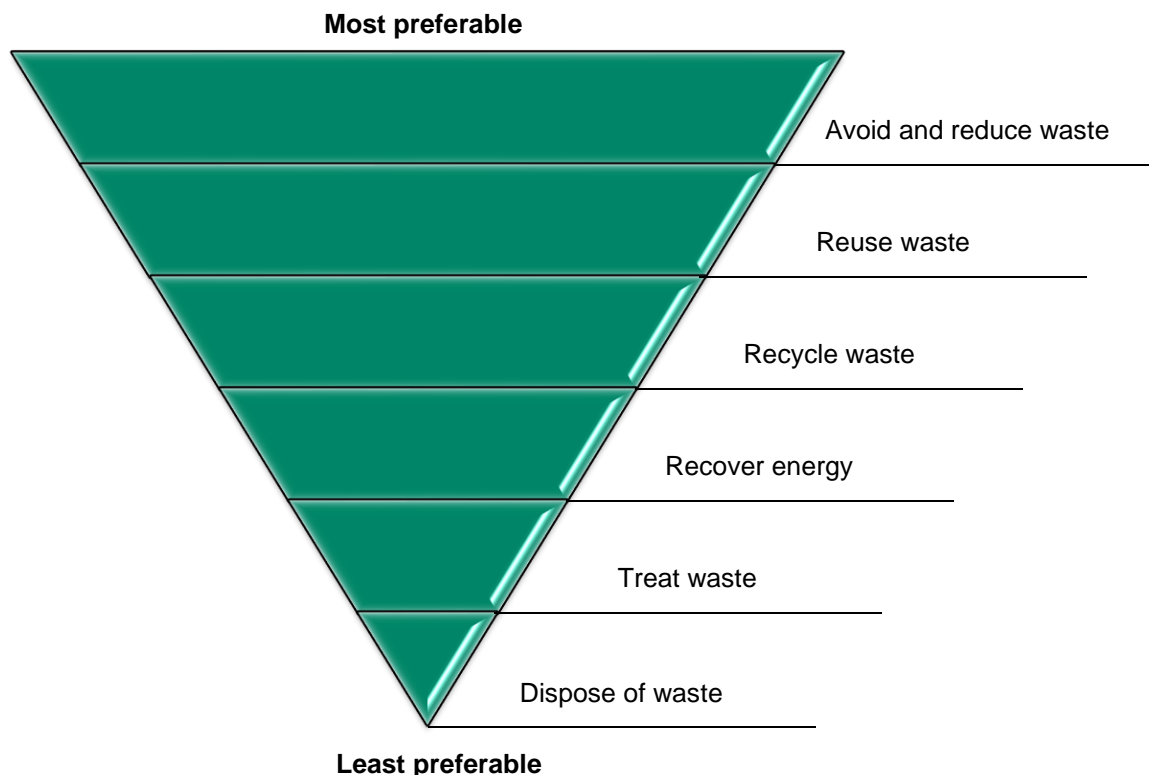


Figure 4 Waste hierarchy

### 5.2 Management of waste streams

Waste streams likely to be generated by the construction of the Project were identified (refer to Section 4.1), and are associated with the construction of Battery components, operational waste, demolition waste and standard construction waste.

The recommended management measures for each waste stream are summarised in Table 4.

Table 4 Construction waste stream management

| Waste type                      | Proposed management   | Waste management hierarchy |
|---------------------------------|---|----------------------------|
| Sewage                          | Managed through current Liddell systems   | Disposal                   |
| Fuels, lubricants and chemicals | Fuels and oils drained from plant for maintenance would be decanted for reuse. Where unsuitable, there would be taken offsite for recycling | Reuse or recycle           |
| Hydrocarbon contaminated soils  | Spill clean-up material would be placed in a dedicated covered skip bin for collection for offsite disposal                                 | Reuse or disposal          |
| Excavated materials             | Retain soils on site.   | Reuse                      |

| Waste type                         | Proposed management   | Waste management hierarchy |
|------------------------------------|---|----------------------------|
|                                    | Any chance finds of unsuitable or contaminated material would be tested to confirm waste classification prior to management in accordance with the Unexpected Finds Protocol outlined in section 5.1 of the Contamination Management Plan.<br>Appropriately separate and store waste types on site prior to classifying |                            |
| Green waste                        | Reuse in recontouring on site unless identified as weed-infested, in which case disposal at a green waste facility  | Recycle or disposal        |
| Operation waste                    | End-of-life or defective lithium-ion batteries are expected to be returned to the supplier for repurposing or appropriate disposal<br>Steel components will be recycled.  | Recycle or disposal        |
| Demolition waste                   | Re-usable content would be segregated for offsite recycling.<br>Waste materials not able to be reused would be classified for lawful disposal.  | Reuse or disposal          |
| Construction waste                 | Materials would be segregated for recycling to the extent practical in accordance with current site practices.<br>Material unable to be recycled or reused would be classified for lawful disposal.   | Recycle or disposal        |
| Grit, sediment in erosion controls | Clean sediment would be incorporated into site recontouring   | Reuse                      |
| Site office waste                  | Recycled as per current site practices  | Recycle                    |
| Food waste                         | Offsite disposal as per current practices   | Dispose                    |

### 5.3 Environmental management measures

The management measures provided in Table 5 and Table 6 will be implemented to minimise potential waste impacts from the BESS Project.

**Table 5 Environmental management measures – waste (EIS / RTS / development consent)**

| Reference | Environment management measure   | Responsibility     | Timing                          |
|-----------|--|--------------------|---------------------------------|
| W1        | <p>A Waste Management Plan will be developed for the Project with the following criteria:</p> <ul style="list-style-type: none"> <li>• A hierarchical waste management approach will be used, from the most preferable (reduce, reuse or recycle wastes) to the least preferable (disposal) to prioritise waste management strategies to avoid waste generation</li> <li>• The plans will promote the use of materials with minimal packaging requirements, removal of packaging offsite by suppliers and fabrication of parts offsite</li> <li>• Where waste cannot be avoided, waste materials will be segregated by type for collection and removal (for processing or</li> </ul> | Project Contractor | Construction<br>Decommissioning |

| Reference | Environment management measure   | Responsibility     | Timing                                       |
|-----------|--|--------------------|--|
|           | <p>other management) by licensed contractors</p> <ul style="list-style-type: none"> <li>All waste types will be separated at source for recycling</li> <li>A licensed service provider will be appointed to collect waste during construction and operation</li> <li>Each waste type will be classified for transport to ensure correct handling.</li> <li>Any waste that cannot be recovered or recycled will be managed at a suitably authorised or licensed treatment or disposal facility, if required, where it will be treated and managed according to its classification.</li> </ul> |                    |  |
| W2        | Cleared vegetation will be either mulched for onsite reuse or used to create habitat piles, noting that any weeds and pathogens will be managed according to requirements under the <i>Biosecurity Act 2015</i> (NSW).   | Project Contractor | Construction<br>Decommissioning              |
| W3        | All reasonable steps will be undertaken to minimise waste generated on site  | Project Contractor | Construction<br>Decommissioning              |
| W4        | All waste will be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014) prior to transport to ensure correct handling   | Project Contractor | Construction<br>Decommissioning<br>Operation |
| W5        | Any waste that cannot be recovered or recycled will be disposed of at a suitably authorised or licensed treatment or disposal facility, if required, where it will be treated and disposed of according to its classification or as expressly permitted in EPL 2122  | Project Contractor | Construction<br>Decommissioning              |

**Table 6 Environmental management measures – waste (other)**

| Reference | Environment management measure  | Responsibility     | Timing                                       |
|-----------|---|--------------------|--|
| W6        | Materials with minimal packaging requirements will be used with the removal of packaging and fabrication of parts carried out offsite by suppliers, where practicable                               | Project Contractor | Construction<br>Decommissioning              |
| W7        | Where waste cannot be avoided, waste materials will be segregated by type for collection and removal (for processing or disposal) by licensed contractors   | Project Contractor | Construction<br>Decommissioning              |
| W8        | All waste types will be separated at source for recycling, where practicable and a licensed service provider will be appointed to collect waste during construction, operation and decommissioning. | Project Contractor | Construction<br>Decommissioning<br>Operation |
| W9        | Any asbestos or asbestos-contaminated materials identified will be managed in accordance with the requirements under the <i>Protection of the Environment Operations (Waste) Regulation 2014</i> .  | Project Contractor | Construction<br>Operation<br>Decommissioning |

## 5.4 Asbestos waste management

This section outlines the requirements for the proper management of all asbestos waste.

Asbestos Containing Material (ACM) is classified in the *Protection of the Environment Operations (Waste) Regulation 2014* as either:

- Bonded asbestos material: any material other than friable asbestos material that contains asbestos
- Friable asbestos material: any material that contains asbestos and is in the form of a powder or can be crumbled, pulverised or reduced to powder by hand pressure when dry.

### 5.4.1 Management of asbestos waste

If ACM is identified (or assumed to be identified) during the course of the construction of the BESS, all works in the immediate vicinity will cease and the area isolated using barricades and signage, as outlined in Section 5.1 of the *Liddell Power Station Battery Energy Storage System Contamination Management Sub Plan* (see Appendix E of the EMS).

A Licenced Asbestos Assessor (LAA) will be required onsite to confirm the presence of ACM, and where necessary, a sample of the suspected ACM may be sent for laboratory analysis at a NATA-accredited testing laboratory for further confirmation. Once confirmed, the LAA should confirm appropriate steps to manage the contaminated land/material. All Personal Protective Equipment used in asbestos-related work is to be treated as contaminated and disposed of accordingly.

ACM wastes are to be classified in accordance with the NSW EPA *Waste Classification Guidelines* 2014. The Project Manager is to engage a Licenced Asbestos Removalist (LAR) to safely remove and manage the asbestos waste in accordance with legal requirements. Before the LAR begins, the ACM is to be kept covered, barricaded and signed to prevent unauthorised entry and subsequent contamination incidents.

An Asbestos Register detailing the location, magnitude and environment Improvement Action (IA) undertaken must be prepared, maintained, reviewed and readily accessible at the workplace.

### 5.4.2 Transportation of asbestos waste

The LAR responsible for the transportation of asbestos waste are required to ensure that:

- Any part of the vehicle in which ACM is being transported is coved and leak-proof for the duration of its transportation
- All bonded ACM is securely packed during its transportation
- All friable ACM is in a sealed container during its transportation
- Any ACM other than bonded ACM that is securely packaged or friable ACM in a sealed container is wetted down during transportation.

Prior to any required transportation of ACM (in a single load over 100 kilograms or 10 square metres in volume), the LAR is required to provide information to the EPA, including but not limited to:

- The address of the site at which the ACM has been generated
- The name, address and contact details of the premises from which the load is to be transported
- The proposed date of the intended transportation
- The name, address and contact details of the proposed receiving premises
- The approximate weight of each class of ACM in the load.

Following approval from the EPA, a unique consignment code will be issued. Additionally, to the requirements set above, interstate transportation of ACM is required to be tracked.

## 6.0 Compliance and reporting

### 6.1 Monitoring and reporting

A recommended monitoring and inspection plan for construction and decommissioning of the BESS project is provided in Table 7. Key findings and results of all monitoring and inspections listed in Table 7 should be communicated to the site teams during pre-start meetings. There will be no operational monitoring associated with the BESS project.

**Table 7 Waste and resource management monitoring plan**

| Type of monitoring   | Frequency                 | Responsibility     | Records                                  |
|--|---------------------------|--------------------|--|
| Environmental inspection <ul style="list-style-type: none"> <li>• Implementation of waste management activities</li> <li>• Site is neat, tidy and free of litter</li> <li>• Stockpiled and segregated waste collection points are clearly signposted</li> <li>• Quantities of stored materials are appropriate based on construction scheduling/procurement constraints</li> </ul> | Weekly                    | Project Contractor | Inspection checklist                     |
| Inspection of contaminated materials   | Twice daily when required | Project Contractor | Asbestos register<br>Improvement actions |

The Project Contractor will establish and maintain a system of records that provides full documentation of all inspections.

### 6.2 Incidents and complaints

Incident management will be managed in accordance with the protocol outlined in 4.5 of the EMS.

Complaints and enquiries will be managed in accordance with the protocol outlined in 5.3 of the EMS.

### 6.3 Documentation review and updates

As part of the EMS requirements, all associated plans, studies and strategies are to be reviewed and updated within three months of the following events:

- The submission of an Environmental Immediate Notification Report
- The submission of an audit report
- The approval of any modification to the conditions of the development consent
- A direction of the Secretary DPE.