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# APPENDIX Y – Environmental Impact Statement

# Waste management assessment

Prepared for Lake Lyell Project Pty Ltd

# Lake Lyell Pumped Hydro Energy Storage

## Waste Management Assessment

Lake Lyell Project Pty Ltd

E221111 RP#26

November 2025

| Version | Date | Prepared by | Reviewed by | Comments |
|---|---|---|---|---|
| V1 | 08/10/2025 | Daniel Nugent | Kate Cox, Alex Frolich | Draft report |
| V2 | 04/11/2025 | Alex Frolich | Christopher Holloway | Revised draft |
| V3 | 19/11/2025 | Alex Frolich | Christopher Holloway | Final |

Approved by

**Christopher Holloway**
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28 November 2025

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# Executive Summary

EnergyAustralia Portfolio Holdings Pty Ltd (EnergyAustralia) in partnership with EDF power solutions Australia (EDFA), referred to as Lake Lyell Project Pty Ltd (LLP) as trustee, is developing the Lake Lyell Pumped Hydro Energy Storage (PHES) Project (the project), approximately 5 kilometres (km) west of Lithgow, New South Wales (NSW). The objectives of the project are to develop a long-term energy storage facility that will improve energy security, support renewable energy developments in the nearby Central-West Orana Renewable Energy Zone, and facilitate the decarbonisation of the NSW electricity grid.

This waste management assessment has identified waste streams to be generated from the project, its impact on the surrounding environment and mitigation measures to address any potential impact.

Waste generated from the project will include a mixture of general solid waste (non-putrescible and putrescible), general liquid waste, hazardous waste and special waste. The most significant contributor will be spoil generated from excavation of the upper reservoir, waterway tunnels, and powerhouse cavern, with an estimated 7.6 million cubic metres ($Mm^3$) of material. Approximately 97% of this spoil will be reused on-site, primarily for dam wall construction, site recontouring, and permanent road embankments, significantly reducing off-site disposal requirements.

Other key waste streams will result from vegetation clearing for temporary and permanent infrastructure construction, wastewater from concrete batching operations and tunnel construction, sewage and greywater from the temporary workforce accommodation facility (accommodation camp), and packaging and maintenance waste from construction and operation of the site. Smaller volumes of hazardous waste may arise from blasting residues (e.g. ammonium nitrate), fuel or chemical storage, and special waste such as lead-acid batteries and asbestos-containing material.

A Construction Waste Management Plan (CWMP) will be developed prior to works commencing, in accordance with the *NSW Protection of the Environment Operations Act 1997*, Protection of the Environment Operations (Waste) Regulation 2014, and *NSW Waste and Sustainable Materials Strategy 2041 Stage 1: 2021–2027*. The CWMP will prioritise waste avoidance, reuse, and recycling in line with the NSW waste hierarchy and circular economy principles.

# TABLE OF CONTENTS



## Tables

## Figures

# 1 Introduction

## 1.1 Background

EnergyAustralia Portfolio Holdings Pty Ltd (EnergyAustralia) in partnership with EDF power solutions Australia (EDFA), referred to as Lake Lyell Pty Ltd (LLP) as trustee, is developing the Lake Lyell Pumped Hydro Energy Storage (PHES) Project ('the project'), a project that is anticipated to store up to 3,080 megawatt hours (MWh) of energy and generate at 385 megawatts (MW) for 8 hours or generate up to around 440 MW for a shorter period. At a basic level, it will consist of upper and lower water reservoirs, a pipeline connecting them, and a hydro-electric power station connected to the national energy grid that is capable of generating or consuming electricity.

The project is located approximately 5 kilometres (km) west of Lithgow and 110 km west of the Sydney central business district, shown in Figure 1.1 and Figure 1.2. The project takes advantage of existing infrastructure (i.e. Lake Lyell) associated with Mt Piper power station which will be decommissioned in the coming decades and allows Lake Lyell to continue to serve a specific purpose in electricity generation (consistent with its existing use).

In June 2024, the Minister for Planning and Public Spaces declared the project to be Critical State Significant Infrastructure (CSSI). Accordingly, approval for the project is required under Part 5, Division 5.2 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). This requires the preparation of an environmental impact statement (EIS) for the project in accordance with Secretary's Environmental Assessment Requirements (SEARs) and the approval of the Minister. EMM Consulting Pty Limited (EMM) has been engaged by LLP to prepare the EIS.

This waste management assessment is an appendix to the project's EIS and should be read in conjunction with it. The assessment addresses the Secretary's environmental assessment requirements (SEARs) issued for the project.

## 1.2 Assessment guidelines and requirements

This waste management assessment has been prepared with reference to relevant guidelines, policies and industry requirements, and following consultation with stakeholders, including relevant government agencies and the community. Guidelines and policies are described in the following sections.

### 1.2.1 SEARs

This waste management assessment has been prepared in accordance with the requirements of the NSW Department of Planning, Housing and Infrastructure (DPHI) and relevant agencies, which are set out in the SEARs for the project, issued on 17 November 2025. The SEARs identify matters which must be addressed in the EIS. Individual requirements relevant to this waste management report and where they are addressed in this report are listed in Table 1.1.

**Table 1.1 Relevant matters raised in SEARS**

| Requirement | Section addressed |
|---|---|
| Waste:<br>• an assessment must 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 and an assessment of sewage (if required), taking into consideration capacity and availability of local landfills. | This report, including:<br>Section 4 and Section 5 |

### 1.2.2 Legislation and strategies

#### i NSW Protection of the Environment Operation Act 1997

The *NSW Protection of the Environment Operations Act 1997* (POEO Act) is the key piece of environmental legislation administered by the NSW Environment Protection Authority (EPA), under which the classification of waste is regulated.

Schedule 1, part 3, clause 49 of the POEO Act outlines the different types of waste classifications, including general solid waste (non-putrescible), general solid waste (putrescible), hazardous waste, liquid waste, restricted solid waste, and special waste. The different types of waste to be generated from the project have been classified as per the POEO Act (and the *Waste Classification Guidelines* (EPA, 2014)) and are further discussed in Chapter 6.

#### ii NSW Waste and Sustainable Materials Strategy 2041 Stage 1: 2021–2027

The *NSW Waste and Sustainable Materials Strategy 2041 Stage 1: 2021–2027* (EPA, 2021) focuses on the environmental benefits and economic opportunities in how waste is managed in NSW. The document sets out actions and targets for the strategy through to 2027. Key targets of the strategy are to:

- phase out problematic and unnecessary plastics by 2025
- reduce total waste generated by 10% per person by 2030
- have an 80% average recovery rate from all waste streams by 2030
- halve the amount of organic waste sent to landfill by 2030
- significantly increase the use of recycled content by governments and industry.

A key priority of the strategy is to support the development of the circular economy. A circular economy is an economic system aimed at minimising waste and promoting the continual reuse of resources. The circular economy is based on three key principles:

- design out waste and pollution
- keep products and materials in use
- regenerate natural systems.

The project approach to waste management will be consistent with principles of the circular economy and will incorporate management measures to ensure waste is appropriately reused, recycled or disposed. The primary aim of waste management for the project will be to prevent and avoid waste followed by using renewable and recycled materials. Waste management is further discussed in Chapter 5.

#### iii Waste Classification Guidelines

The *Waste Classification Guidelines* (EPA, 2014) outlines a step-by-step process for classifying waste. It is split into four parts, which cover classifying waste, immobilising waste, waste containing radioactive material, and acid sulfate soils.

Waste generated from the project will be classified in accordance with *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA, 2014) and as defined in schedule 1, part 3, clause 49 of the POEO Act.

#### iv Other relevant reports

This waste management assessment has been prepared with reference to the following technical reports which form part of the EIS:

- Surface Water Assessment (EMM, 2025a)
- Groundwater Impact Assessment (EMM, 2025b)
- Soil, Land use and Rehabilitation Assessment (MineSoils, 2025)
- Contamination Preliminary Site Investigation (PSI) (EMM, 2025c)
- Preferred Excavated Rock Management Strategy (ERMS) (EMM, 2025d)
- Geochemical Characterisation Report (EMM, 2025e)
- Biodiversity Development Assessment Report (BDAR) (EMM, 2025f).

### 1.2.3 Agency engagement

DPHI invited government agencies, including the EPA, to recommend matters to be addressed in the EIS. These matters were considered by the Secretary for DPHI when preparing the SEARs. Comments made by agencies relating to the assessment of waste management assessment and where they are addressed in this report are listed in Table 1.2.

**Table 1.2 Agency comments on SEARs**

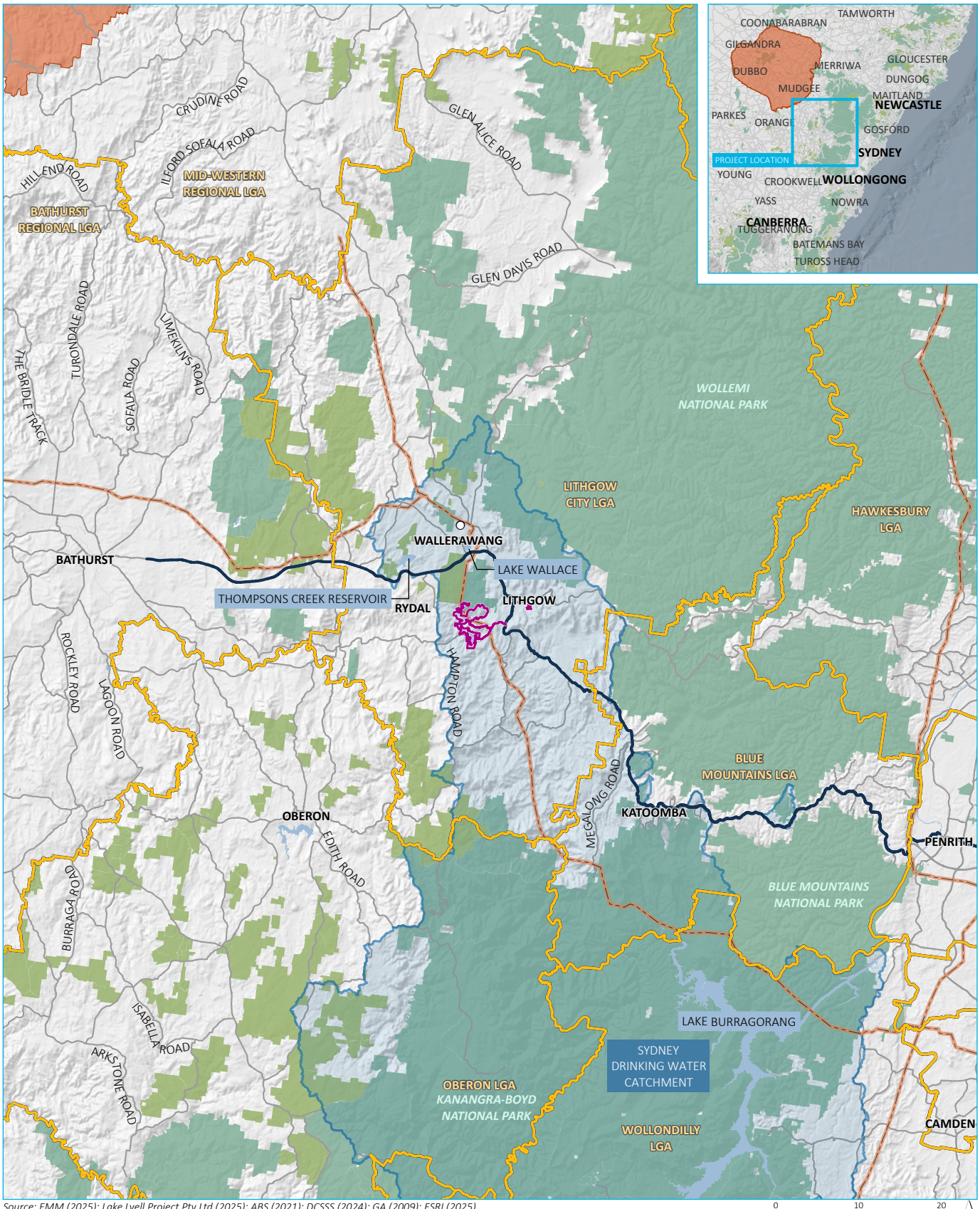
| Agency | Comments | Section addressed |
|---|---|---|
| EPA | Waste, including hazardous materials and radiation. Consideration needs to be given to disposal options for general waste, sanitary waste, hazardous materials, and radiation, where relevant. | This report |
| | The [EIS] must assess all aspects of waste generation, management and disposal associated with the proposed development. The [EIS] must demonstrate compliance with all regulatory requirements outlined in the POEO Act and associated waste regulations. The [EIS] must identify, characterise and classify the following in accordance with the EPA's Waste Classification Guidelines (2014) and associated addendums:<br>• all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste;<br>• all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for reuse or recycling. | Section 4 and 5 |

## 1.3 Limitations and assumptions

This waste management assessment is based on the concept design and available information at the time of reporting. While the assessment identifies likely waste streams and estimated volumes associated with the construction and operation of the project, several assumptions and limitations apply:

- Waste quantities are indicative only and based on concept-level inputs, such as preliminary engineering estimates and geotechnical data. Final volumes may vary as detailed design progresses

- The Construction Environmental Management Plan (CEMP) will include a detailed Construction Waste Management Plan (CWMP), which will quantify waste volumes for all streams more accurately, including construction waste types, segregation methods, and off-site disposal volumes
- Spoil reuse rates and waste handling strategies are based on current reuse intentions and existing classifications (e.g. virgin excavated natural material, excavated natural material). Final classification will depend on-site-specific testing prior to spoil placement or reuse
- End-of-life decommissioning is considered at a high level only.




*Source: EMM (2025); Lake Lyell Project Pty Ltd (2025); ABS (2021); DCSSS (2024); GA (2009); ESRI (2025)*

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## KEY

- Project area

Existing environment

- Mt Piper Power Station
- Major road
- Great Western Highway
- 330 kV transmission line
- Named waterbody
- NPWS reserve
- State forest
- Local government area
- Sydney Drinking Water Catchment
- Central West Orana Renewable Energy Zone

### INSET KEY

- Major road
- NPWS reserve
- State forest
- Central West Orana Renewable Energy Zone

Regional context

Lake Lyell PHES
Waste Management Assessment
Figure 1.1

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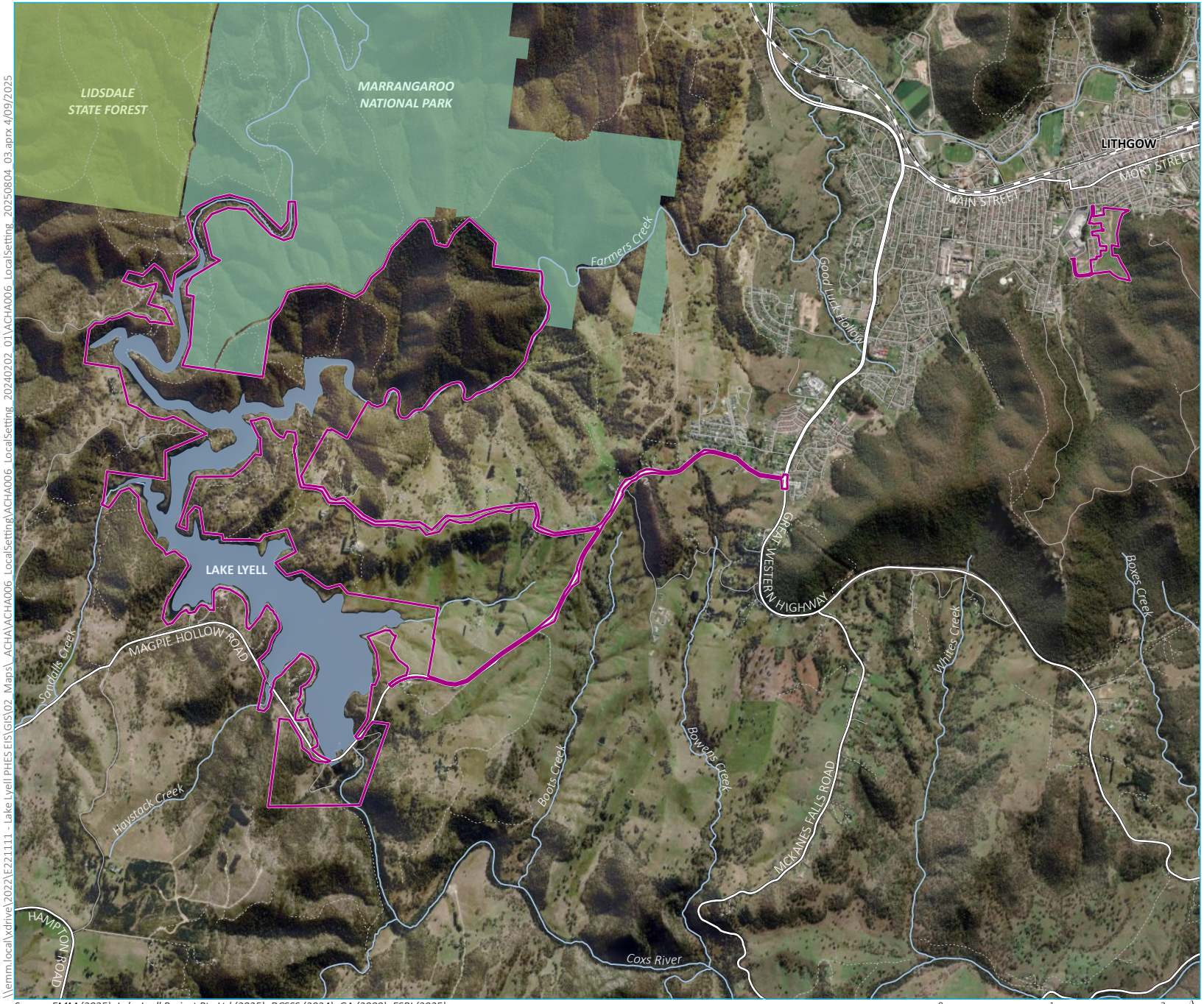


KEY

- Project area

Existing environment

- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

Source: EMM (2025); Lake Lyell Project Pty Ltd (2025); DCSSS (2024); GA (2009); ESRI (2025)

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# Local context

Lake Lyell PHES
Waste Management Assessment
Figure 1.2

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# 2 Description of the project

A detailed description of the project, including an overview of its design, construction and operation is provided in the EIS. The EIS (specifically Chapter 3 and Appendix B) should be read in conjunction with this report.

The project design, as shown in Figure 2.1, can be broadly categorised as:

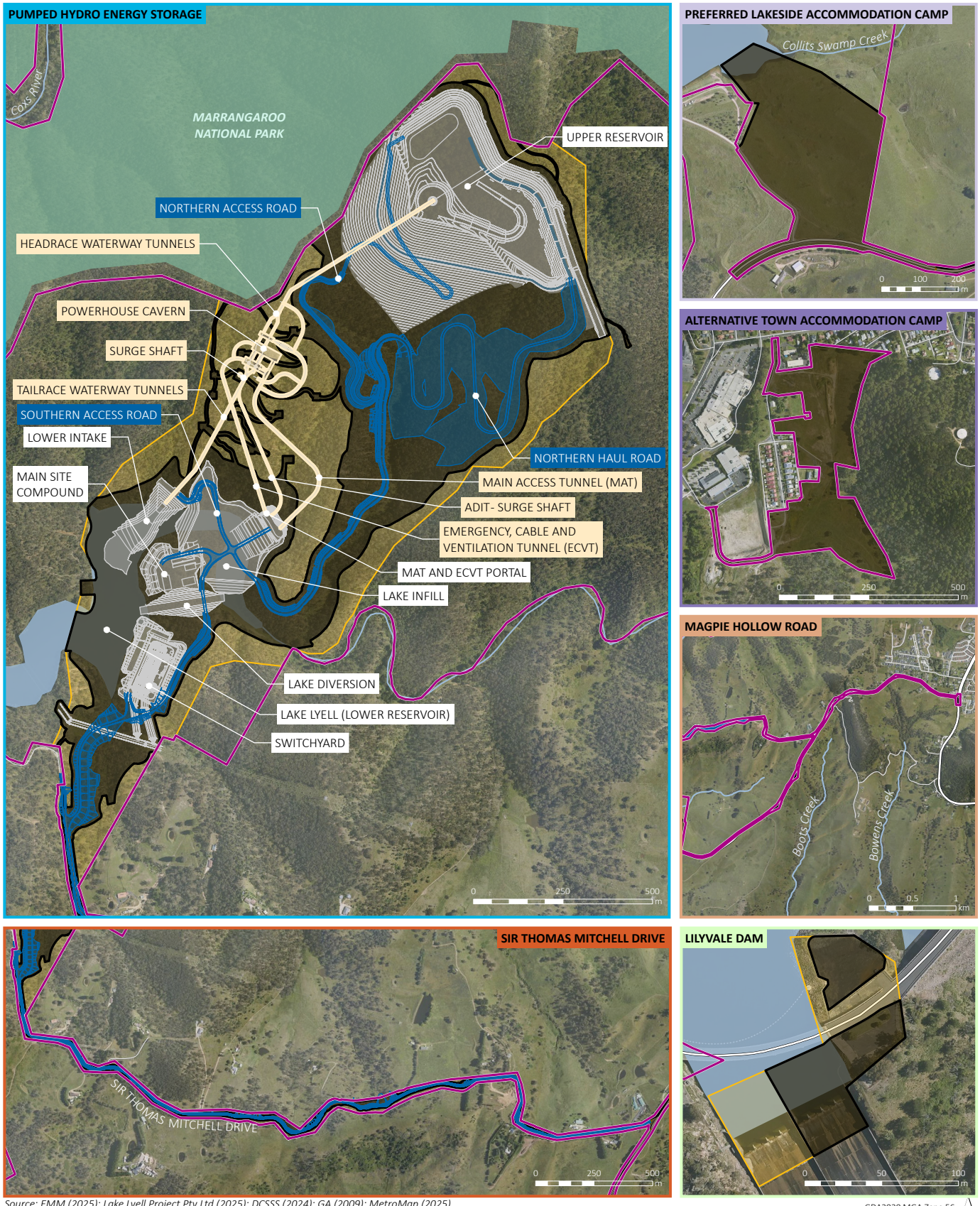
- **pumped hydro generation components** – including a 5.3 gigalitres (GL) upper reservoir to be constructed behind the southern ridge of Mount Walker, a 33.5 GL lower reservoir (existing Lake Lyell), inlet/outlet structures, and an underground powerhouse, surge shaft and waterway tunnels
- **transmission connection components** – including a new high voltage switchyard and connection to the existing 330 kilovolt (kV) transmission line that runs through the site
- **site access and ancillary facilities** – including upgrade of existing and construction of new access roads and bridges, a diversion and infill of a section of Lake Lyell, administration and utilities
- **other construction components or works** – including geotechnical investigations, temporary workforce accommodation facility (accommodation camp), site work pads, laydown areas and facilities, and spoil management.

Construction will be completed in stages, including:

- pre-construction / enabling works – consisting of initial access works (internal and external roads), geotechnical investigations, site establishment and preparation of the accommodation camp
- main works – consisting of all other construction activities needed to enable operation of the project.

During operation, the project will act as an electrical energy storage system through the conversion of electrical to kinetic energy to gravitational energy and back via water as it is transferred from the elevated upper reservoir to a lower reservoir. The project will provide services to the wholesale 'spot' market on the national electricity market (NEM), and support ancillary services used to manage the power system reliably.

After the 80–100-year design life of the project, the asset may remain viable for a plant refurbishment and extension of life as has been seen for other older assets globally. Following the plants final refurbishment or once it has reached the end of its serviceable life then the project would look to return the site to a more natural state and encourage community beneficial use.




*Source: EMM (2025); Lake Lyell Project Pty Ltd (2025); DCSSS (2024); GA (2009); MetroMap (2025)*

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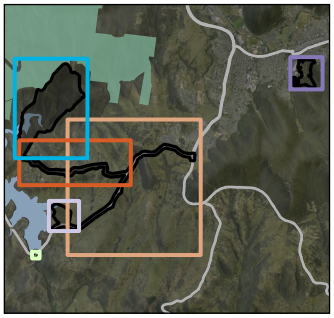

KEY

- Project area
- Permanent road
- Above ground design
- Underground design
- Construction envelope
- Disturbance footprint

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve

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# Project overview

Lake Lyell PHES
Waste Management Assessment
Figure 2.1

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# 3 Existing environment

There are several existing licensed waste management and waste transfer facilities in the broader region that accept a wide range of wastes, including construction and demolition waste, domestic waste and recyclables. The council operated facilities are listed in Table 3.1.

**Table 3.1 Nearby waste management and transfer facilities**

| Council | Facility name | Wastes accepted according to waste classification | Approximate distance to project (by road) |
|---|---|---|---|
| Lithgow City Council | Lithgow Solid Waste Facility | General solid waste (putrescible and non-putrescible)<br>Commercial waste (building and demolition)<br>Hazardous waste<br>Special waste (Asbestos)<br>Liquid waste (Oils) | 6 km |
| | Portland Garbage Depot | General solid waste (putrescible and non-putrescible) | 30 km |
| | Capertee Garbage Depot | General solid waste (putrescible and non-putrescible) | 48 km |
| Oberon Council | Oberon Waste Depot & Recycling Centre | General solid waste (putrescible and non-putrescible)<br>Hazardous waste<br>Liquid waste (Oils) | 46 km |
| Bathurst Regional Council | Bathurst Waste Management Centre | General solid waste (putrescible and non-putrescible)<br>Commercial waste (building and demolition)<br>Special waste (Asbestos)<br>Liquid waste (Oils) | 69 km |
| Blue Mountains City Council | Blaxland Resource Recovery & Waste Management Facility | General solid waste (putrescible and non-putrescible)<br>Commercial waste (building and demolition)<br>Hazardous waste<br>Special waste (Asbestos)<br>Liquid waste (Oils) | 74 km |

The project's surrounding local area is served by Lithgow City Council's municipal and commercial waste infrastructure. For residents, the Council provides general weekly kerbside waste collection (240 litre bins), fortnightly recycling collections, and green waste or organics programs. Commercial entities can access separate waste and recycling services through the Council or private contractors (Lithgow City Council, Waste and Recycling).

E-waste is managed via drop-off facilities at the Resource Recovery Centre, including secure handling and high recovery processing (Lithgow City Council, E-Waste). Bulky waste collections are available twice per year for residents (Lithgow City Council, Bulky Waste Cleanup).

# 4 Waste generation

## 4.1 Overview

This section provides an overview of the waste types expected to be generated during construction, operation, and future decommissioning of the project. It classifies these waste streams in accordance with the POEO Act and the *NSW EPA Waste Classification Guidelines – Part 1: Classifying Waste* (EPA, 2014). Waste streams have been identified based on the current project design and supporting technical assessments.

Waste volumes and management measures will be refined during detailed design and documented in the project's CEMP. The CEMP will include a dedicated CWMP outlining handling, reuse, treatment, and disposal methods, as well as mitigation measures to minimise off-site impacts.

The anticipated waste streams and their management during each phase of the project, are described in the following sections.

## 4.2 Construction

Key waste streams during construction include:

- general solid waste
    - non-putrescible, such as construction waste, packaging, spoil, vegetation and biomass waste from site clearing
    - putrescible, primarily from workforce food waste
- general liquid waste from greywater, sewage, water treatment systems and site runoff
- hazardous waste, including spoil containing ammonium nitrate residue or hydrocarbons, containers previously storing explosives and fuel spills
- special waste, such as asbestos-containing material and lead-acid batteries.

The waste generating activities and summary of construction waste streams is provided in Table 4.1 and is based on the project's concept design and contractor input. Multiple types of waste are expected to be generated across the various construction areas, including the 5.3 GL upper reservoir, associated tunnels and underground infrastructure, powerhouse cavern, switchyard, roads, accommodation camp, laydown areas, batch plant, and supporting infrastructure. A key waste stream will be spoil. Spoil reuse is maximised through an integrated management strategy, but a range of residual construction waste streams will require management.

Table 4.1 provides a summary of the construction waste types and sources, which are further described in the following sections.

### Table 4.1 Construction waste types and sources

| Construction activity | Waste type | Indicative quantity | Likely classification of waste stream |
|---|---|---|---|
| General earthworks and excavation activities | Spoil excavated from the upper reservoir, tunnels, powerhouse, road cuttings that is suitable for reuse | ~7.35 $Mm^3$ | General solid waste (non-putrescible), subject to testing and classification |
| | Spoil excavated from the portal pad and lake diversion works that is unsuitable for reuse | ~240,000 $m^3$ | General solid waste (non-putrescible) (potential for hazardous waste, subject to treatment) |
| | Polychlorinated biphenyls, metals hydrocarbons or pesticides | Unknown | Hazardous waste |
| | Asbestos-containing material, | Unknown | Special waste |
| Clearing and grubbing of the upper reservoir and surrounds, access roads | Vegetation (biochar) | ~32,000 t | General solid waste (non-putrescible) |
| | Vegetation (mulch) | ~8,000 t | General solid waste (non-putrescible) |
| | Weed-infested vegetation | To be confirmed in CWMP | General solid waste (non-putrescible) |
| Activities at construction support sites, including accommodation camp | General domestic waste, including food waste, paper, cardboard, plastic and glass | 300–600 kg per/day | General solid waste (putrescible and non-putrescible) |
| Construction of access roads | Asphalt, road base, concrete and gravel | 100t | General solid waste (non-putrescible) |
| Maintenance of construction plant, vehicles and equipment | Vehicle/plant maintenance materials, including:<br>• empty oil and other containers/drums<br>• lubricants, waste oils, fuels, coolant, radiator fluid, hydraulic fluid<br>• drained oil filters<br>• electrical waste, including batteries and cables<br>• tyres<br>• batteries. | 200t | General solid waste (non-putrescible), Hazardous waste, Liquid waste, Special waste |
| Dewatering, dust suppression, washdown of plant and equipment and staff amenities | Wastewater, including concrete washouts and sewage | More than 50 kilolitres per day (kL/day) | Liquid waste |
| Blasted cut material | Blasting residues | Unknown | Hazardous waste |

### 4.2.1 General solid waste (non-putrescible)

#### i Spoil and excavated materials

Construction of the project will generate approximately 7.6 million cubic metres ($Mm^3$) of spoil, predominately classified as virgin excavated natural material (VENM) or excavated natural material (ENM) in accordance with the *NSW EPA Waste Classification Guidelines* (EPA, 2014). Approximately 97% of the spoil will be categorised as type 1, being material excavated by drill and blast methods and considered to present higher environmental risk, while the remaining ~3% as type 2, comprising spoil produced from lower-risk methods such as raised bore or heavy ripping (EMM, 2025d).

Of this, the upper reservoir excavation contributes 5.2 $Mm^3$, which is proposed to be reused in the construction of the embankment dam wall and site fill. A further 883,000 $m^3$ from access roads is also expected to be reused entirely on-site.

Spoil will also be produced from tunnelling works, caverns, the portal pad, and the lake diversion channel. While the majority will be reused in road construction, laydown areas, or lake infill, approximately 240,000 $m^3$ is expected to require off-site disposal. Disposal will occur only where reuse or storage is not possible, with the Mount Piper Power Station identified as a potential receiving site or alternatively another licensed waste facility.

Spoil characterisation will occur prior to reuse or disposal, including testing for residual nitrate contamination from blasting activities. Approximately 97% of excavated rock will be produced by drill and blast (type 1) and 3% by ripping or raised bore methods (type 2). At peak activity, blasting may generate up to 50,000–100,000 $m^3$ of spoil per week. Drill and blast methods are known to leave residual nitrogen compounds (ammonium and nitrate) bound to rock fragments, which are highly soluble and may leach in the short to medium term following placement. Where monitoring identifies elevated concentrations, in accordance with EPA guidelines, spoil will be classified and managed as restricted solid waste or hazardous waste. A formal waste classification process will confirm the material type prior to off-site transport.

Temporary stockpiling of spoil will occur within the construction envelope, with the upper laydown area accommodating up to 1.2–1.8 $Mm^3$. Additional stockpiles of approximately 30,000 $m^3$ may be established near the switchyard and lower laydown areas. Six permanent spoil emplacements (PSEs) have been identified (EMM, 2025d) to accommodate surplus material, incorporating design features to minimise water cycle interactions and protect downstream water quality. The PSEs include the upper reservoir embankment, two in-reservoir emplacements and three land-based emplacements.

#### ii Vegetation and biomass waste

Vegetation clearance during construction is expected to generate approximately 40,000 t of biomass, primarily from the heavily vegetated upper reservoir and surrounding areas. Clearing is required to enable site establishment, access roads, spoil laydown areas, and associated infrastructure.

Of the total biomass:

- approximately 32,000 t will be processed into biochar using on-site pyrolysis equipment, supporting circular economy principles and reducing greenhouse gas emissions
- around 8,000 t will be mulched for erosion and sediment control and potentially used in site rehabilitation or dust suppression.

Vegetation will be cleared to ground level and stockpiled in designated north and south of Farmers Creek, with stockpile caps of 10,000 $m^3$ and 30,000 $m^3$, respectively. These limits are designed to manage fire risk and space constraints.

While weed-infested vegetation is not expected to be a significant waste stream, the project may involve the removal of approximately 16 ha of exotic and derived exotic grassland vegetation communities, as identified in the BDAR as impacts not requiring offsets. Weed biomass will be segregated and treated (e.g. via composting, mulching with curing, or herbicide use) prior to reuse or removal. All waste handling will align with the NSW EPA waste hierarchy (2021), with a clear focus on reuse, recycling, and minimal off-site disposal. Weed management will also align with the general biosecurity duty under the Biosecurity Act 2015, and will specifically address priority weeds recorded in the construction envelope (including Blackberry, Giant Parramatta Grass, Gorse, Fireweed, Serrated Tussock and St John's Wort) as outlined in Section 13.3 of the BDAR, including ensuring that priority weeds are not sold, exchanged or otherwise spread.

### iii Co-mingled construction

During construction, general waste will be generated from the establishment of hardstand areas, construction pads and drainage infrastructure. This may include, but is not limited to:

- packaging waste such as pallets
- excess construction material including brick, concrete, and rubble
- surplus material from drainage works.

A concrete batch plant will operate from 2026–2030, with production peaking in 2028 (144,600 t of concrete and 30,000 t of cement). Waste from the batch plant may include off-spec concrete, excess aggregates, and packaging materials such as cement bags and pallets.

Co-mingled construction and demolition waste would be stored in skips and segregated where possible for reuse, recycling or disposal at an appropriately licenced waste disposal facility in accordance with the waste hierarchy and managed in accordance with the measures outlined in Section 6.

### iv Recyclables

Recyclable waste will be generated across the construction site, including from office facilities, the accommodation camp, and daily construction activities. Likely recyclables include cardboard, paper, hard and soft plastics, glass, aluminium cans, and other general dry waste.

Designated office and administration facilities will be established at the main construction compound and accommodation camp, supporting a peak construction workforce of about 600 full-time equivalents.

Recycling procedures and infrastructure will be defined in the CWMP and will align with the NSW waste hierarchy (2021), with an emphasis on on-site source separation where practical to divert from landfill.

### v Asphalt waste

During construction, the majority of internal site access roads will remain unsealed, while other internal access roads are expected to be formed using compacted material such as dense graded base. However, following completion of earthworks, both the northern and southern access roads, including access to the switchyard, will be made permanent and either sealed or asphalted. The surface control building will also include a sealed carpark with kerb and gutter.

Where asphalt is used, waste may be generated from material overages, trimming, or off-spec batches. This material typically includes bitumen and aggregate, which may require management to avoid surface water contamination during storm events.

Where feasible, reclaimed asphalt may be reused for haul road remediation or stabilisation of other internal access routes. Under Part 9 of the POEO Act, the application of reclaimed asphalt to land for road construction or maintenance is exempt from several waste tracking and licensing requirements, provided conditions are met.

Any asphalt waste not suitable for reuse will be stockpiled at designated laydown areas and transported off-site by licensed contractors to an appropriately authorised waste facility. Storage, reuse, and disposal of asphalt will be managed through the CWMP.

### 4.2.2 General solid waste (putrescible)

Putrescible waste will arise from food preparation and occupation of the accommodation camp. Temporary facilities will support about 600 full time employees at peak construction, including a modular accommodation camp designed in 300-person increments. With peak occupancy of around 600 workers, putrescible waste generation is estimated at 300–600 kg/day. Waste will be segregated, including the segregation of food organics where practical, stored in bins, and removed regularly by licensed contractors.

### 4.2.3 General liquid waste

Liquid waste generated during construction will include sewage and greywater from workforce facilities, process water from tunnelling and concrete batching, and stormwater runoff from construction areas. Wastewater will be managed through a combination of on-site treatment systems, sedimentation basins, and controlled discharge in accordance with environmental requirements.

#### i Greywater and sewage

The accommodation camp, which will support about 600 workers at peak, will include a dedicated wastewater treatment plant with a design capacity of 50 kL/day. This system will separately manage greywater and sewage from the modular kitchen and living facilities.

Sewage will be treated on-site and the resulting effluent transported off-site for disposal at an approved facility. Greywater, generated from the showers, handwashing and laundry, will be collected through dedicated plumbing, treated within the camp system, and either reused (e.g. for irrigation or dust suppression where permitted) or disposed of in accordance with the environmental discharge criteria.

All liquid waste handling and disposal will be undertaken in line with EPA requirements and detailed further in CWMP.

#### ii Tunnel and construction water

Tunnel excavation will generate significant volumes of process water. Water from spoil dewatering or excavation activities will also be captured and treated where necessary prior to discharge or reuse. Management will include sedimentation basins, filtration, and treatment systems where contaminants such as nitrate or sediment are present. In addition, the ERMS (2025d) identifies that water seeping through or draining from PSEs during construction may interact with excavated rock and mobilise contaminants. Although geochemical testing (2025e) indicates that the majority of rock is non-acid forming (NAF) and overall risk of acid or metalliferous drainage is low, all runoff and seepage from PSEs will be captured in the contaminated water system and directed to treatment prior to reuse or controlled discharge, consistent with the Surface Water Assessment (EMM, 2025a).

#### iii Stormwater runoff

Stormwater runoff will occur from cleared areas, laydowns, and cofferdam works. A stormwater treatment plant with 10 L/s capacity will be used to treat runoff collected around the cofferdams and associated areas. Sediment and erosion control measures will be implemented in accordance with the Soil and Water Management Plan (SWMP) to prevent transport of sediments and pollutants to Lake Lyell or other sensitive receivers.

#### iv Concrete washout and process water

The concrete batch plant will generate washout water and process water from mixing, pouring, and equipment cleaning. These liquid waste streams will be captured and treated on-site, typically via sedimentation basins, prior to reuse or discharge. Disposal of any residual waste will be managed as per the CWMP.

### 4.2.4 Hazardous waste

Hazardous waste is identified through testing and classified when contaminant levels exceed thresholds set out in the *NSW EPA Waste Classification Guidelines* (2014). Hazardous waste generation during construction is expected to be limited. Potential sources include:

- residues of ammonium nitrate from blasting, including potential contamination of spoil with nitrates
- containers that previously held explosives, flammable liquids, gas cylinders, adhesives (National Transport Commission, 2024)
- localised spills or leaks during storage or handling
- spoil from excavation and earthworks that does not meet VENM or general solid waste criteria
- fill material, stockpiles or soils from identified medium-risk areas flagged in the PSI (EMM, 2025c).

Approximately 55,695 $m^3$ of spoil from the portal pad and lake diversion is expected to require off-site disposal in the peak year of construction. This material is currently anticipated to meet the VENM classification. However, testing will confirm its classification prior to disposal, and if it is found not to meet VENM or general solid waste criteria, it would be managed as hazardous waste (or restricted solid waste, depending on classification) in accordance with EPA requirements.

Drill and blast generated material can retain soluble nitrogen residues that may leach in the short to medium term (EMM, 2025d). Whole-rock nitrogen levels are very low and dominated by nitrate, and the parent material is unlikely to be a significant nitrogen source (EMM, 2025e). Nitrogen release may occur through multiple pathways during blasting, with leaching rates typically highest immediately after placement and declining over time. To address this, measures are proposed to minimise explosive release, capture nitrate-laden runoff and seepage during construction, and direct this water to treatment prior to reuse or controlled discharge, consistent with Surface Water Assessment (EMM, 2025a).

The PSI (2025c) also identified several localised, medium-risk areas (e.g. fill of unknown origin near Sir Thomas Mitchell Drive, historic fill emplacement in the town camp, stockpiles of mixed material, and residual pesticide use). These may contain contaminants such as polychlorinated biphenyls (a persistent organic pollutant historically used in electrical equipment), metals, hydrocarbons or pesticides. If such materials are encountered, they will be classified through testing and managed as hazardous waste in line with the project's unexpected finds protocol.

Hazardous waste will be temporarily stored and removed by licensed contractors in compliance with the *NSW Waste Classification Guidelines* (2014) and the Protection of the Environment Operations (Waste) Regulation 2014.

### 4.2.5 Special waste

Special waste includes materials such as asbestos waste, tyres, chemical containers and other specific categories requiring specialised handling and disposal (EPA, 2014). At this stage, it is expected that minimal special waste will be generated during construction.

Targeted testing of quartzite and hornfels samples undertaken as part of the Geochemical Characterisation Report (EMM, 2025e) did not detect any asbestos fibres, indicating a low likelihood of naturally occurring asbestos (NOA) in spoil materials. However, the PSI (EMM, 2025c) identified potential sources of asbestos-containing material, including service pits, culverts and pipelines adjacent to roadways, residual waste from historic Pottery Estate buildings, and fill material or stockpiles of unknown origin in parts of the construction envelope.

If asbestos-containing material is encountered, an unexpected finds protocol will be implemented and a site-specific asbestos management plan (AMP) prepared in accordance with Part 8.4 of the NSW Work Health and Safety Regulation 2017. This will set out requirements for separation, monitoring, validation and clearance of asbestos, and will be supported by safe work method statements.

All off-site disposals will be managed by licensed waste contractors and in accordance with the Protection of the Environment Operations (Waste) Regulation 2014.

## 4.3 Operation

Operational waste is expected to be minimal, with volumes generated through transmission easement vegetation management, routine maintenance and use of site infrastructure. No spoil or significant hazardous waste is anticipated during operation.

Operational waste streams, their indicative quantities, and likely waste classifications are summarised in Table 4.2. All operational waste would be transported offsite and disposed of at an appropriately licensed facility.

**Table 4.2 Operation waste types and sources**

| Operation activity | Waste type | Indicative quantity | Likely classification of waste stream |
|---|---|---|---|
| Workforce occupation and amenities (switchyard/control centre) | General domestic waste (food, packaging), Recyclables (aluminium cans, glass bottles, plastics, paper) | ~4–6 t/yr | General solid waste (putrescible and non-putrescible) |
| Routine transmission easement and site maintenance | Vegetation | ~15–23 $m^3$/year[1] | General solid waste (non-putrescible) |
| Plant and equipment maintenance | Oily rags, filters, drums (non-volatile), metals (damaged or faulty components), electrical components (damaged/faulty), retired batteries from appliances/equipment | ~2–3 t/yr | General solid waste (non-putrescible)<br>Commercial and industrial waste<br>Special waste |
| Workforce amenities (toilets, septic) | Sewage and greywater | 240 $m^3$/year | Liquid waste (sewage) |

[1] Assumes a moderate regrowth scenario with an average vegetation volume of ~35 $m^3$/ha per clearing (patchy shrubs and young trees). Calculated for 1.32 ha (60 m corridor × 220 m length), giving ~46 $m^3$ per clearing event. Averaged over a 2–3-year cycle for ongoing easement maintenance.

## 4.4 End-of-life decommissioning waste

While the project is expected to operate for a design life of approximately 80 to 100 years, consideration has been given to the future decommissioning and rehabilitation of the pumped hydro energy storage infrastructure. Decommissioning is expected to involve the dismantling, demolition, material re-use and large-scale site stabilisation.

The anticipated decommissioning activities and their associated waste streams are summarised in Table 4.3.

To avoid unnecessary off-site disposal, excess inert material would be placed in designated areas within the former project area (e.g. upper reservoir margins, decommissioned construction areas, or reshaped spoil zones). Reprofiling of these areas would follow geotechnical guidance, including compaction and slope stability targets and be subject to erosion control and vegetation establishment measures.

A detailed decommissioning and rehabilitation plan would be developed prior to asset retirement, and would:

- align with applicable future legislation and EPA policy requirements
- respond to regional land use planning priorities within the Lithgow LGA
- include mitigation for long-term impacts, including stability, runoff, and residual materials
- stakeholder consultation on legacy site use, including potential for recreational or community benefit (e.g. camping, boating, sightseeing, hiking).

The existing Lake Lyell dam and associated water supply infrastructure are outside the scope of this assessment and are expected to remain.

**Table 4.3 End-of-life waste types and sources**

| Decommissioning activity | Waste type | Indicative quantity | Likely classification of waste stream |
|---|---|---|---|
| Dismantling of upper reservoir dam wall | Demolition spoil/rockfill | Quantities would need to be confirmed following detailed design and as part of a decommissioning management plan | General solid waste (non-putrescible) |
| Removal of upper reservoir liner | PVC geomembrane | | General solid waste (non-putrescible) |
| Demolition of operations buildings and platforms | Concrete, metal, interior fit-out materials | | General solid waste (non-putrescible) |
| Removal of plant, transformers and electrical systems | Mechanical and electrical equipment | | General solid waste (non-putrescible)<br>hazardous waste |
| Removal of internal access roads | Reclaimed asphalt / road base | | General solid waste (non-putrescible) |
| Removal of ancillary infrastructure | Pipes, valves, fencing, cabling | | General solid waste (non-putrescible) |
| Site rehabilitation works | Green waste/topsoil from reshaped areas | | General solid waste (non-putrescible) |

# 5 Offsite disposal

Waste facilities in the region have been identified in Section 3.2 and the sources, quantities, and types of waste have been described in Section 4. Most of the project waste is anticipated to be excavated rock from construction of the upper reservoir and tunnelling activities. This material is expected to be suitable for reuse, reducing the need for offsite disposal. However, approximately 3% of the total excavated rock is expected to require offsite disposal. Other waste to be disposed offsite are of generally lower volumes.

A summary of all waste likely requiring offsite disposal is provided in Table 5.1. All waste transported offsite would be disposed of at an appropriately licensed facility. It is anticipated that Lithgow City Council's facilities have capacity to manage the anticipated project waste, however consultation with Council is ongoing. Preliminary consultation with businesses and operators within the Lithgow LGA has identified other suitable options for the receipt of excavated rock from the project. This will be re-confirmed during detailed design, including with specific facilities closer to the commencement of construction. Engagement with privately operated waste facilities will also be undertaken as required.

**Table 5.1 Waste requiring offsite disposal**

| Project phase | Waste stream | Waste type | Indicative quantity transported offsite |
|---|---|---|---|
| Construction | General solid waste (non-putrescible) (potential for hazardous waste, subject to treatment) | Spoil excavated from the portal pad and lake diversion works that is unsuitable for reuse | ~ 84 t |
| | General solid waste (non-putrescible) | Vegetation (biochar and mulch), asphalt, road base, concrete and gravel | ~40,000 t |
| | General solid waste (putrescible and non-putrescible) | General domestic waste, including food waste, paper, cardboard, plastic and glass | ~730 t |
| | Liquid waste | Wastewater, including concrete washouts and sewage, vehicle/plant maintenance materials | More than 50 kilolitres per day (kL/day) |
| | Hazardous waste | Polychlorinated biphenyls, metals hydrocarbons or pesticides, blasting residues, vehicle/plant maintenance materials | Unknown |
| | Special waste | Asbestos-containing material, | Unknown |
| Operation | General solid waste (non-putrescible) | General domestic waste, vegetation | ~12 t / year |
| | Commercial and industrial waste, special waste | Plant and equipment for maintenance | ~3 t / year |
| | Liquid waste | Sewage from office amenities | ~80 t /year |
| End of life | General solid waste (non-putrescible) | Demolition spoil/rockfill, concrete, metal, interior fit-out materials, pipes, valves, fencing, cabling | To be confirmed following detailed design and as part of a decommissioning management plan |
| | Hazardous waste | Mechanical and electrical equipment | |

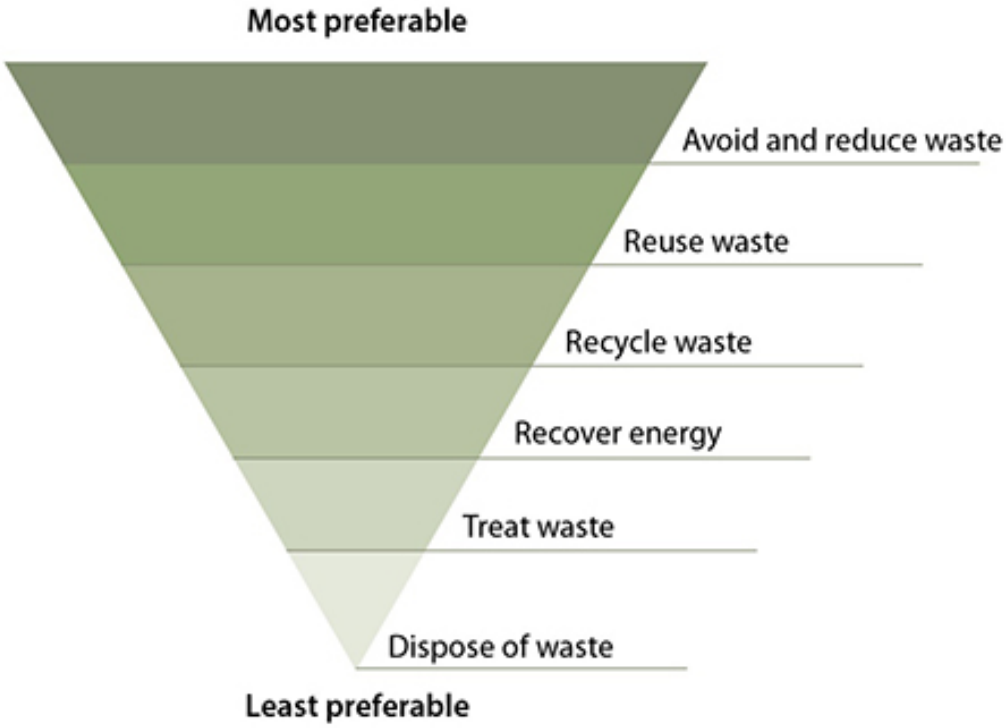
# 6 Waste mitigation and management

## 6.1 Waste avoidance and reuse

Waste management across the project will align with the waste hierarchy (2021) and the circular economy principles described in the *NSW Waste and Sustainable Materials Strategy 2041: Stage 1 (2021–2027)*. The focus will be on avoiding and minimising waste generation, followed by reuse, recycling and recovery, with disposal as a last resort. The waste hierarchy is shown in Figure 6.1.

All waste generated on-site will either be reused or be stored, collected and transported offsite appropriately. Waste will be handled by appropriately licensed contractors and disposed of at licensed facilities.

This approach supports the project's environmental performance objectives and contributes to NSW-wide resource recovery targets.




Source: (EPA, The waste hierarchy, 2021)

**Figure 6.1 The waste hierarchy**

The project has actively applied the waste hierarchy in the development of its design and construction strategy. The most significant waste stream (excavated spoil) will be reused on-site to the greatest extent practicable, with approximately 97% of the estimated 7.35 $Mm^3$ planned for reuse in permanent embankments, structural pads, and internal road formation.

At a broader scale, the project has avoided the need to construct a second reservoir by leveraging the existing Lake Lyell dam as the lower storage for the pumped hydro system. This design decision eliminates the need for a new dam wall, inlet/outlet works, and related spoil generation, preventing considerable resource use and associated waste and generation of spoil.

## 6.2 Waste management approach

On-site management measures specific to each waste classification and type are outlined in Table 6.1.

**Table 6.1 Summary of approach to waste management**

| Waste classification type | Management method |
|---|---|
| **General solid waste (non-putrescible)** | |
| Vegetation | Vegetation will be mulched or processed via biochar where feasible. Mulch will be transported directly to earthwork batters for bund formation or mixed with topsoil for revegetation, with surplus stockpiled on site. Biochar will be produced on site using pyrolysis, with reuse in topsoil, soil amelioration and revegetation. Stockpiling for reuse or off-site processing at green waste facilities will be used as needed. Procedures will be included in the CWMP. |
| Concrete and construction waste | Concrete overspill will be captured and crushed for reuse on-site or recycled. Waste from batch plant washout will be settled and treated prior to discharge or reuse. |
| Asphalt waste | Asphalt from road works will be reused where suitable or sent to a licensed facility for recycling or disposal. |
| Spoil (VENM / ENM) | Approximately 7.35 $Mm^3$ of spoil will be reused on-site. An estimated 240,000 $m^3$ of surplus VENM will be transported to an off-site location to be stored. Spoil handling procedures will be included in a Spoil Management Plan prepared for the project before construction. |
| Recyclables (wood, paper, plastics, metals) | Recyclable waste will be sorted at source and collected in covered receptacles. These will be removed by licensed contractors for recycling. |
| General mixed waste | Non-recyclable, non-hazardous waste will be collected and disposed of by licensed contractors. |
| **General solid waste (putrescible)** | |
| Food waste | Segregated food/organic waste from the accommodation camp will be stored in covered bins and regularly removed by a licensed contractor. Potential reuse options (e.g. composting) may be considered in the CWMP. |
| **General liquid waste** | |
| Grey water and sewerage | On-site wastewater treatment systems will treat grey water and sewage from accommodation camps. A dedicated treatment plant (50 kL/day) will treat sewage, with effluent transported off-site by licensed contractors for disposal at an approved facility. Greywater from showers, handwashing and laundry will be treated within the camp system and either reused (e.g. for irrigation or dust suppression where permitted) or otherwise disposed of in accordance with relevant guidelines. Portable toilets will be used in remote locations. The CWMP and SWMP will detail maintenance, monitoring, and removal of waste solids by licensed contractors. |
| Tunnel water / construction water | Water from tunnel excavation will be treated on-site via a construction water treatment system. Treatment will address pH, suspended solids, dissolved hydrocarbons, nutrients and metals. Treated water will be discharged to designated sediment basins and controlled release points, including Lake Lyell, in accordance with (ANZECC & ARMCANZ, 2000) fresh and marine water quality guidelines. Locations and monitoring requirements will be detailed in the CWMP and SWMP. |
| Stormwater runoff | Stormwater from work areas, including cofferdams (10 L/s), will be treated on-site prior to reuse or discharge. Measures will be detailed in the SWMP to prevent sediment and contaminant mobilisation. |
| Concrete batching wastewater | Wastewater and washout from batching operations will be collected in lined basins or tanks. Sediment will be allowed to settle before treated water is recycled or discharged in accordance with environmental guidelines. Management measures will be detailed in the CEMP and SWMP. |
| **Hazardous waste** | |

| Waste classification type | Management method |
|---|---|
| Oily rags, filters, chemical containers | Stored in sealed, bunded containers and removed by licensed hazardous waste contractors for treatment or disposal. Procedures will be documented in the CWMP. |
| Spoil containing ammonium nitrate residue, hydrocarbons, metals, polychlorinated biphenyls or pesticides | Spoil proposed for off-site disposal will be tested for nitrates, hydrocarbons, metals and other contaminants. If testing indicates levels above EPA thresholds, the material would be classified as hazardous waste and managed accordingly. Hazardous waste will be temporarily stored in bunded areas and removed by licensed contractors in compliance with EPA guidelines. Procedures will be documented in the CWMP. |
| **Special waste** | |
| Asbestos (if encountered) | No naturally occurring asbestos has been identified. However, the PSI (EMM, 2025) identified potential asbestos-containing material in service pits, culverts/pipelines, residual waste from historic buildings, and fill or stockpiles of unknown origin. If encountered, an unexpected finds protocol will apply, and a site-specific AMP will be implemented. All asbestos waste will be separated, monitored and disposed of by licensed contractors in accordance with EPA requirements and SafeWork NSW requirements. |
| Batteries (lead-acid and other) | Pre-classified as special waste under EPA guidelines. To be stored securely and removed by licensed contractors for disposal or recycling at licensed facilities. |

## 6.3 Waste management measures

A range of safeguards will be implemented during construction, operation and decommissioning of the project to ensure waste is managed in accordance with relevant legislation and best practice, as identified in Table 6.2. Potential management and mitigation measures to address spoil dewatering and ensure erosion and sedimentation does not pollute surface water run-off, are provided in the Surface Water Assessment (EMM, 2025a), Groundwater Assessment (EMM, 2025b) and Soil, Land Use and Rehabilitation Report (MineSoils, 2025) appended to the EIS.

A CWMP will be prepared by the principal construction contractor prior to commencement of works. The CWMP will be consistent with the POEO Act, Protection of the Environment Operations (General) Regulation 2009, and relevant EPA guidance including the *Waste Classification Guidelines* (EPA, 2014). It will also incorporate the mitigation and management measures outlined in Sections 6.1 and Section 6.2 of this report.

The CWMP will address the type, volume and classification of waste streams expected across different work areas, and describe appropriate handling, storage, and treatment measures. It will also set out:

- any applicable conditions of consent or licensing requirements
- collection schedules and approved waste contractors
- on-site waste storage and testing procedures
- locations and protocols for waste disposal
- haulage routes for waste transport
- roles and responsibilities of project personnel
- staff training and communication protocols
- auditing, tracking and reporting procedures.

Environmental management measures for waste management are provided in Table 6.2.

**Table 6.2 Summary of general management measures**

| Impact | Ref# | Mitigation measure | Timing |
|---|---|---|---|
| Construction waste | WS01 | A Construction Waste Management Plan (CWMP) will be prepared and implemented as part of the construction environmental management plan (CEMP). The CWMP will include but not be limited to:<br>• measures to avoid and minimise waste associated with the project<br>• classification of wastes and management options (re-use, recycle, stockpile, disposal)<br>• statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions<br>• procedures for storage, transport and disposal<br>• monitoring, record keeping and reporting. | Pre-construction<br>Construction<br>Post construction |
| Waste | WS02 | All waste will be managed in accordance with the requirements of the NSW *Protection of the Environment Operations Act 1997* and the NSW *Waste Avoidance and Resource Recovery Act 2001*. | Pre-construction<br>Construction<br>Post construction |
| Waste | WS03 | All wastes will be classified, stored and handled in accordance with the *Waste Classification Guidelines – Part 1: Classifying Waste* (EPA 2014), with appropriate segregation of waste streams to maximise reuse and recycling of suitable waste streams. | Pre-construction<br>Construction<br>Post construction |
| Waste | WS04 | Waste will be managed in accordance with the waste hierarchy, in order of preference:<br>• avoid/reduce waste production<br>• recover resources for reuse<br>• recycle or dispose of waste at licenced facilities. | Pre-construction<br>Construction<br>Post construction |
| Management of unexpected waste materials | WS05 | Contingency management of unexpected waste materials, including contaminated materials, would be identified as part of the Unexpected Contaminated Finds Protocol in the CEMP. | Detailed design<br>Pre-construction<br>construction |
| Decommissioning waste | WS06 | As part of decommissioning, LLP will maximise opportunities to recover/recycle decommissioned infrastructure and equipment. | Decommissioning |

# 7 Conclusion

This waste management assessment has identified the likely waste streams generated by the project, potential impacts on the site and surrounding environment, and appropriate management and mitigation measures to address these impacts. This report should be read in conjunction with the Surface Water Assessment (EMM, 2025a), Groundwater Assessment (EMM, 2025b), Soil, Land use and Rehabilitation Report (MineSoils, 2025), Contamination Preliminary Site Investigation (EMM, 2025c) and Excavated Rock Management Strategy (EMM, 2025d) which were prepared for the project and appended to the EIS. These documents further define mitigation measures relevant to the management of wastewater, sedimentation, and erosion.

Waste generated from the project is expected to include a mixture of general liquid waste, general solid waste (putrescible and non-putrescible), hazardous waste, and, during construction, may include materials classified as special waste. The key waste-generating activities include:

- excavation and handling of spoil from upper reservoir, tunnel construction and the powerhouse cavern, site establishment and road upgrades
- concrete and grout waste from batching and lining activities
- greywater and sewage from accommodation and ancillary facilities
- vegetation and topsoil removal across the disturbance footprint, including the upper reservoir, access roads, and transmission connection
- routine operation maintenance and use of site infrastructure
- decommissioning.

The management measures outlined in Chapter 5 will be implemented by the project to ensure that potential waste impacts are minimised and do not adversely affect the surrounding environment. A CWMP will be prepared to incorporate the measures detailed in this report and ensure compliance with the POEO Act, *Protection of the Environment Operations (Waste) Regulation 2014*, and the *NSW Waste and Sustainable Materials Strategy 2041 – Stage 1: 2021–2027* (EPA, 2021). The CWMP will apply the waste hierarchy to prioritise avoidance, reuse, recycling, and responsible disposal of waste generated by the project.

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