EnergyAustralia
LIGHT THE WAY

Mt Piper Ash Placement Project – Lamberts North Ash Repository Modification 1

Modification Report

14 May 2021

Project No.: 0581248

The business of sustainability

ERM

Document details	
Document title	Mt Piper Ash Placement Project – Lamberts North Ash Repository Modification 1
Document subtitle	Modification Report
Project No.	0581248
Date	14 May 2021
Version	1.0
Author	Amanda Antcliff, Gavin Powell, Catherine Timbrell
Client Name	EnergyAustralia NSW Pty Ltd

Document history

				ERM approval to issue		
Version	Revision	Author	Reviewed by	Name	Date	Comments
Draft	00	AA, GP, CT	Amanda Antcliff Gavin Powell Murray Curtis	Murray Curtis	1/4/2021	Draft for Client review
Draft	01	AA	Amanda Antcliff Gavin Powell Murray Curtis	Murray Curtis	15/4/2021	Updated draft for Client review
Draft	02	AA	Murray Curtis	Murray Curtis	23/4/2021	Updated draft for Client review
Draft	03	AA	Murray Curtis	Murray Curtis	27/4/2021	Final draft for client approval
Draft	04	AA	Murray Curtis	Murray Curtis	29/4/2021	Updated draft for client approval
Draft	05	AA	Murray Curtis	Murray Curtis	30/4/2021	Updated final draft for client approval
Final	00	AA	Murray Curtis	Murray Curtis	30/4/2021	Final
Final	01	AA	Murray Curtis	Murray Curtis	14/05/21	Updated final to incorporate Biodiversity Assessment Report

Signature Page

14 May 2021

Mt Piper Ash Placement Project – Lamberts North Ash Repository Modification 1

Modification Report

Gavin Powell
Senior Consultant

Amanda Antcliff
Project Manager

Murray Curtis
Partner

Environmental Resources Management Australia Pty Ltd
Level 15 309 Kent Street
SYDNEY NSW 2000

CONTENTS

List of Tables

List of Figures

Acronyms and Abbreviations

AEMR	Annual Environment Management Report
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AQIA	Air Quality Impact Assessment
AQMMP	Air Quality Management and Monitoring Plan
BC Act	Biodiversity Conservation Act 2016
BCA	Brine conditioned ash
CCC	Community Consultation Committee
CoA	Condition of Approval
DEE	Department of Environment and Energy
DPIE	Department of Planning, Industry and Environment
EnergyAustralia	EnergyAustralia NSW Pty Ltd
EPA	NSW Environment Protection Authority
EP&A Act	Environmental Planning & Assessment Act 1979
EP&A Act	Environmental Planning & Assessment Regulation 2000
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
EPL	Environmental Protection License
ERP	Mt Piper Energy Recovery Project
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically sustainable development
ERM	Environmental Resources Australia Pty Ltd

GL	Geo-synthetic liner
HDPE	high-density polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
Heritage Act	Heritage Act 1977
km	kilometre
LCC	Lithgow City Council
LEP 2014	Lithgow Local Environmental Plan 2014
LGA	Local Government Area
LLDPE	low density polyethylene
LNAR	Lamberts North Ash Repository
LRRP	Landscape Rehabilitation and Revegetation Plan
LSAR	Lamberts South Ash Repository
m	metres
M	million
MNES	Matters of National Environmental Significance
MPAR	Mt Piper Ash Repository
MPPS	Mt Piper Power Station
MW	Megawatt
NorBE	Neutral or beneficial effect
NPW Act	National Parks and Wildlife Act 1974
NSW	State of New South Wales
NRAR	Natural Resources Access Regulator
NVIA	Noise and Vibration Impact Assessment
OEMP	Operational Environmental Management Plan
ONMMP	Operation Noise Management and Monitoring Plan
PA	Project Approval
PIRMP	Pollution Incident Response Management Plan
PMST	Protected Matters Search Tool
POEO Act	Protection of the Environment Operations Act 1997
QA	Quality Assurance
QLD	State of Queensland
RL	Relative Level
SAII	Serious and irreversible impacts

SEPP	State Environmental Planning Policy
SHG1	Huons Gully Sediment Pond
SKM	Sinclair Knight Merz Pty Ltd
SSD	State Significant Development
SSWMP	Soil and Surface Water Management Plan
SWTP	Springvale Water Treatment Project
TDS	Total dissolved solids
TECs	Threatened ecological communities
TfNSW	Transport for NSW
TTPP	Transport Planning Partnership
WCA	Water conditioned ash
WM Act	Water Management Act 2000
WMS	Water Management System

EXECUTIVE SUMMARY

EnergyAustralia NSW Pty Ltd (EnergyAustralia) owns and operates the Mt Piper Power Station (MPPS), located approximately 18 km north-west of Lithgow NSW. MPPS comprises two 700 MW coal-fired steam turbine generators which have the capacity to meet the energy needs of approximately 1.18 million homes in New South Wales every year.

Ash is produced at MPPS as a result of coal combustion by the transformation of the non-combustible matter present in the coal. The ash constituents comprise bottom furnace ash (wet) and fly ash (dry). Ash produced by MPPS can either be reused (sold on the open market) or placed in purpose-built ash placement repositories.

Before the fly ash can be emplaced within ash repository areas, it requires conditioning to increase its moisture level. As is currently approved, the fly ash is conditioned with water or brine. The brine is a by-product from the treatment of cooling water at MPPS and from the desalination process of the nearby Springvale Water Treatment Project (SWTP). Solid Mixed Salts are an additional by product from the SWTP that are mixed with the brine conditioned ash (BCA).

EnergyAustralia has two approved and operating ash placement repositories including the Mt Piper Ash Repository (MPAR), approved under the MPPS development consent (80-10060), as modified and the Mt Piper Ash Placement Project which consists of two ash repository areas, Lamberts North Ash Repository (LNAR) and Lamberts South Ash Repository (LSAR), approved under PA 09_0186 in 2012. This Modification Report assesses the impacts from planned changes to ash management practices at the LNAR.

Within the LNAR, BCA is currently approved to be emplaced on top of water conditioned ash (WCA) above a Relative Level (RL) of 946 m Australia Height Datum (AHD) and must be encapsulated within compacted WCA. The purpose of the WCA encapsulation is to minimise leachates escaping from the BCA. EnergyAustralia is proposing to strengthen the controls around leachate interception, capture and treatment to minimise the potential for its escape into the surrounding environment through the installation of a leachate barrier system within the LNAR. This Modification is seeking approval to install a leachate barrier system (using very low permeability liners) within LNAR below RL 946 AHD to capture and subsequently treat leachate moving through the ash placed above the liner. The installation of a liner, associated water management systems and capping liner seeks to limit the risk of vertical and lateral movement of leachate from BCA migrating into the surrounding environment, providing for improved environmental outcomes from that currently approved for LNAR under Project Approval 09_0186 (PA 09_0186) (herein referred to as 'the Modification').

The Modification involves:

- *staged installation of a liner within the currently approved LNAR;*
- *placement of BCA and Solid Mixed Salts and other authorised wastes, from the surface of the liner (below 946 m AHD) up to the existing maximum approved height of LNAR;*
- *replacement of the currently approved LNAR perimeter layer of WCA with a suitable capping liner;*
- *staged installation of lined multipurpose storage ponds to manage leachate from LNAR;*
- *transfer to MPPS or reuse (as dust suppression) of collected leachate; and*
- *minor amendments to the approved LNAR footprint, including excising the Western Coal Services washery infrastructure.*

The primary benefits resulting from the Modification include:

- *capture and management of leachate will result in improved environmental outcomes, minimising the risk of impact to the Wangcol Creek catchment, located within the Sydney Drinking Water Catchment;*

- *maximising the longevity of LNAR through increased opportunities for reuse of WCA through;*
  - *careful placement and separation of the placed materials to allow for the future recovery of WCA;*
  - *availability of fly ash to be used in cementitious products;*
  - *the removal of both the need for the 1 m WCA perimeter and the need to build the LNAR to RL 946 m AHD with WCA will enable the WCA to be available for other uses.*
- *leachate management will provide a localised source of water suitable for irrigation of the BCA placement areas within the LNAR, reducing the demand on the fresh water supply from the MPPS; and*
- *transfer of the leachate to MPPS for treatment (if of a suitable quality) may provide an alternative source of water for inclusion to the MPPS water management system, further reducing the demand from off-site water sources.*

The Modification will be carried out on land in the vicinity of the MPPS and is limited to the (as modified) LNAR footprint, which is in general accordance with the existing Project Approval Area for LNAR as documented in the original Environmental Assessment for the Mt Piper Ash Placement Project (SKM, 2010)*, and as augmented in the Consistency Report* (SKM, 2012)*.*

EnergyAustralia is seeking to modify PA 09_0186 as it relates to the LNAR, under the provisions of Section 4.55 (1A) of the Environmental Planning & Assessment Act 1979 (EP&A Act). Environmental Resources Australia Pty Ltd (ERM) has been engaged by EnergyAustralia to prepare this Modification Report.

The Modification Report is supported by a Water Assessment. The Water Assessment addresses relevant matters pertaining to water management for the Modification, including a water balance, pond construction, capacity and operational management, management of the liner installation, assessment of potential groundwater and surface water impacts, long-term environmental management of the LNAR, including performance monitoring and reporting commitments (during operation and post-closure). The Water Assessment also includes a Neutral or Beneficial Effects (NorBE) Assessment.

The Water Assessment concluded:

- *The presence of the liner, leachate management system and capping layer, which will be designed and implemented consistent with the requirements of NSW Environmental Guidelines for Solid Waste Landfills (EPA 2016), will mitigate the potential impacts of leachate escaping into the surrounding groundwater and surface water systems in the vicinity of the LNAR.*
- *The existing approved stormwater management practices and controls implemented at the LNAR are considered suitable to mitigate the potential surface water impacts from the Modification.*
- *Only minor updates to the approved Lamberts North Operational Environmental Management Plan (OEMP) will be required to account for relevant aspects of the NSW EPA (2016) guidance.*
- *The Modification will have a neutral or beneficial effect on water quality by providing the ability to capture, store and treat leachate from lined and capped BCA placement areas, limiting the migration of leachate from Lamberts North Ash Repository into the surrounding environment.*

Further consideration of impacts to air quality, noise, traffic, visual, contamination, biodiversity, Aboriginal heritage, and historic heritage are included in this Modification Report (see Section 7). In summary the Project will have negligible impact to these environmental matters with ongoing implementation of the OEMP.

1. INTRODUCTION

1.1 Introduction

Environmental Resources Australia Pty Ltd (ERM) was engaged by EnergyAustralia NSW Pty Ltd (EnergyAustralia) to prepare a Modification Report and associated technical assessments to support a modification application to the Mt Piper Ash Placement Project (Project Approval (PA) 09_0186).

The Mt Piper Ash Placement Project was approved on 16 February 2012, permitting the construction and operation of the Lamberts North Ash Repository (LNAR) and Lamberts South Ash Repository (LSAR) at the Mt Piper Power Station (MPPS). EnergyAustralia is seeking to modify PA 09_0186 as it relates to the LNAR, hereafter referred to as 'the 'Modification'.

This Modification is seeking approval to install a leachate barrier system[1] (using very low permeability liners) within LNAR to capture and subsequently reuse/treat leachate that has moved through the ash placed above the liner. The installation of a liner, associated water management systems and capping liner seeks to limit the risk of vertical and lateral movement of leachate migrating into the surrounding environment, providing for improved environmental outcomes from that currently approved for LNAR under Project Approval 09_0186 (PA 09_0186). The Modification also seeks to reduce the LNAR footprint to avoid interaction with the existing Western Coal Services infrastructure area.

This Modification Report does not seek to reassess environmental impacts associated with the approved Mt Piper Ash Placement Project (PA 09_0186) where no changes are proposed.

1.2 Background

EnergyAustralia owns and operates the MPPS. The MPPS was built between 1984 and 1993 and comprises two 700 megawatt (MW) coal-fired steam turbine generators. The MPPS is located within the Lithgow Local Government Area (LGA), approximately 110 kilometres (km) west of Sydney, 18 km northwest of Lithgow and five km east of Portland. A locality plan is provided in Figure 1-1.

MPPS is fuelled using black coal currently sourced from the local area. Ash is produced as a result of coal combustion. Ash produced by MPPS can either be reused (sold on the open market) or placed in purpose-built ash placement repositories.

EnergyAustralia has two approved and operating ash placement repositories:

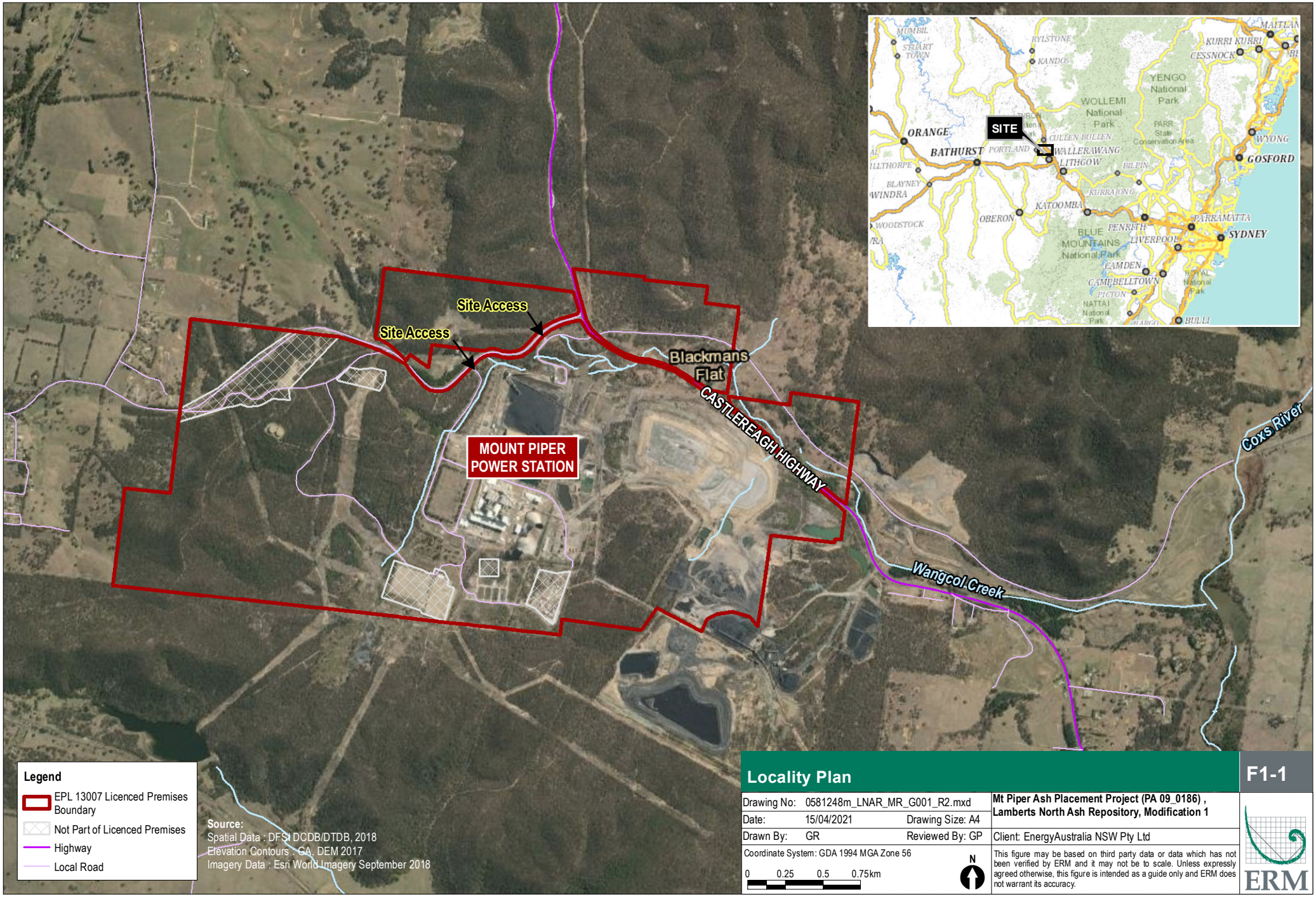
- Mt Piper Ash Repository (MPAR), approved under the MPPS development consent (80-10060), as modified. The majority of the ash produced at MPPS has been and is currently placed within the MPAR in accordance with the conditions of development consent (80-10060); and
- Mt Piper Ash Placement Project (the subject of this Modification Report), consisting of two ash placement repository areas, LNAR and LSAR, approved in February 2012 under PA 09_0186. Ash placement is currently occurring within the northern portion of the LNAR. Ash placement within the southern portion of LNAR is anticipated to commence in October 2021. LSAR is currently not available as it is being used by Springvale Coal Pty Ltd (Centennial) for approved coal mining and processing activities and does not form part of this Modification.

The MPAR and the LNAR are collectively referred to as the 'Ash Repositories'.

[1] "Leachate barrier system" and the term "liner" are used interchangeably throughout the Modification Report

Ash placed in the Ash Repositories comprises bottom furnace ash (typically coarse and wet) and fly ash (dry). The dry fly ash requires conditioning prior to its placement within the Ash Repositories. Conditioning is carried out using either water, as water conditioned ash (WCA) or brine, as brine conditioned ash (BCA). The brine is a by-product from the treatment of cooling water and a by-product from the desalination process associated with the Springvale Water Treatment Project (SWTP), State Significant Development (SSD) 7592. Solid Mixed Salts are also a by-product from the SWTP and are mixed in (co-placed) with the BCA. Conditioning the fly ash with brine and incorporating the Solid Mixed Salts with the BCA is the only approved method of disposal for both by-products.

Figure 1-2 presents the location of the Ash Repositories, along with other relevant site features.



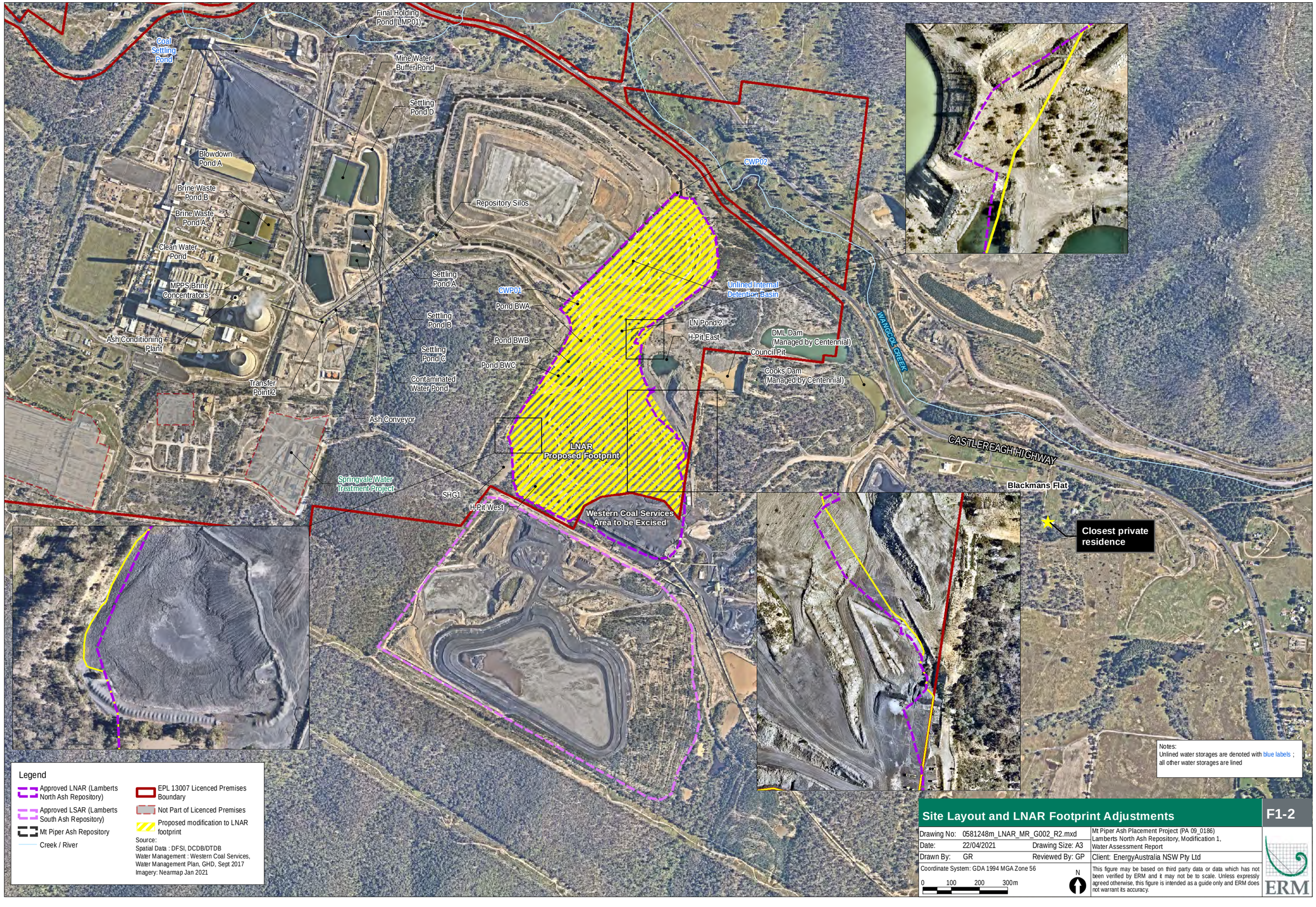
Locality Plan

F1-1

Drawing No:	0581248m_LNAR_MR_G001_R2.mxd		Mt Piper Ash Placement Project (PA 09_0186) , Lamberts North Ash Repository, Modification 1
Date:	15/04/2021	Drawing Size: A4	
Drawn By:	GR	Reviewed By: GP	Client: EnergyAustralia NSW Pty Ltd

Coordinate System: GDA 1994 MGA Zone 56

ERM



Site Layout and LNAR Footprint Adjustments

F1-2

Drawing No:	0581248m_LNAR_MR_G002_R2.mxd		Mt Piper Ash Placement Project (PA 09_0186) Lamberts North Ash Repository, Modification 1, Water Assessment Report
Date:	22/04/2021	Drawing Size: A3	
Drawn By:	GR	Reviewed By: GP	Client: EnergyAustralia NSW Pty Ltd

Coordinate System: GDA 1994 MGA Zone 56

0 100 200 300m

N

ERM

1.3 Modification Overview

EnergyAustralia has been investigating groundwater and surface water conditions in the vicinity of the Ash Repositories. The investigations indicate that the current practice at MPAR of encapsulating BCA and Solid Mixed Salts within an outer perimeter of WCA may not be successful in terms of restricting the escape of leachate from BCA placement into the surrounding environment. The approved Mt Piper Ash Placement Project, incorporating LNAR and LSAR authorises the same encapsulation process whereby BCA is encapsulated within a WCA perimeter. Furthermore, placement of BCA within the LNAR can only occur on top of WCA when the operational face reaches Relative Level (RL) 946 m Australian Height Datum (AHD).

EnergyAustralia recognise that the placement of BCA in accordance with approved practices as set out above may not result in the environmental performance intended for the LNAR. The implementation of the Modification, which includes establishing a leachate barrier system (using very low permeability liners), will strengthen the environmental controls in place to better capture, contain and manage leachate from BCA placement activities (which includes the incorporation of Solid Mixed Salts). For this reason, EnergyAustralia is proposing the following changes to LNAR:

- staged installation of a liner within the currently approved LNAR;
- placement of BCA and Solid Mixed Salts and other authorised wastes from the surface of the liner (below RL 946 m AHD) up to the existing maximum approved height of LNAR;
- replacement of the currently approved LNAR WCA perimeter layer with a suitable capping liner;
- staged installation of lined multipurpose storage ponds to manage the intercepted leachate from LNAR; and
- minor amendments to the approved LNAR footprint, including excising the Western Coal Services washery infrastructure.

Further details associated with the Modification including, justification and benefits are provided in Section 3.

1.4 Modification Objectives

The intention of the Modification is to strengthen the environmental controls to avoid the potential escape of leachate from BCA placement activities into the surrounding environment so that the LNAR achieves its approved environmental objectives. Therefore, EnergyAustralia is seeking to improve the design and operation of the LNAR to achieve the following objectives:

- to minimise and manage the potential environmental or social impacts which may result from the ongoing use of the LNAR;
- to limit the risk of leachate from BCA migrating into the surrounding environment through the installation of a liner with very low permeability for BCA placement within LNAR;
- to update the capping strategy associated with LNAR to limit the vertical and lateral movement of BCA leachate through the ash to the surrounding environment;
- to maximise opportunities for reuse of WCA through improved placement strategies within the LNAR; and
- to update the LNAR footprint in the context of the existing and proposed surrounding activities and interactions.

1.5 The Modification Area

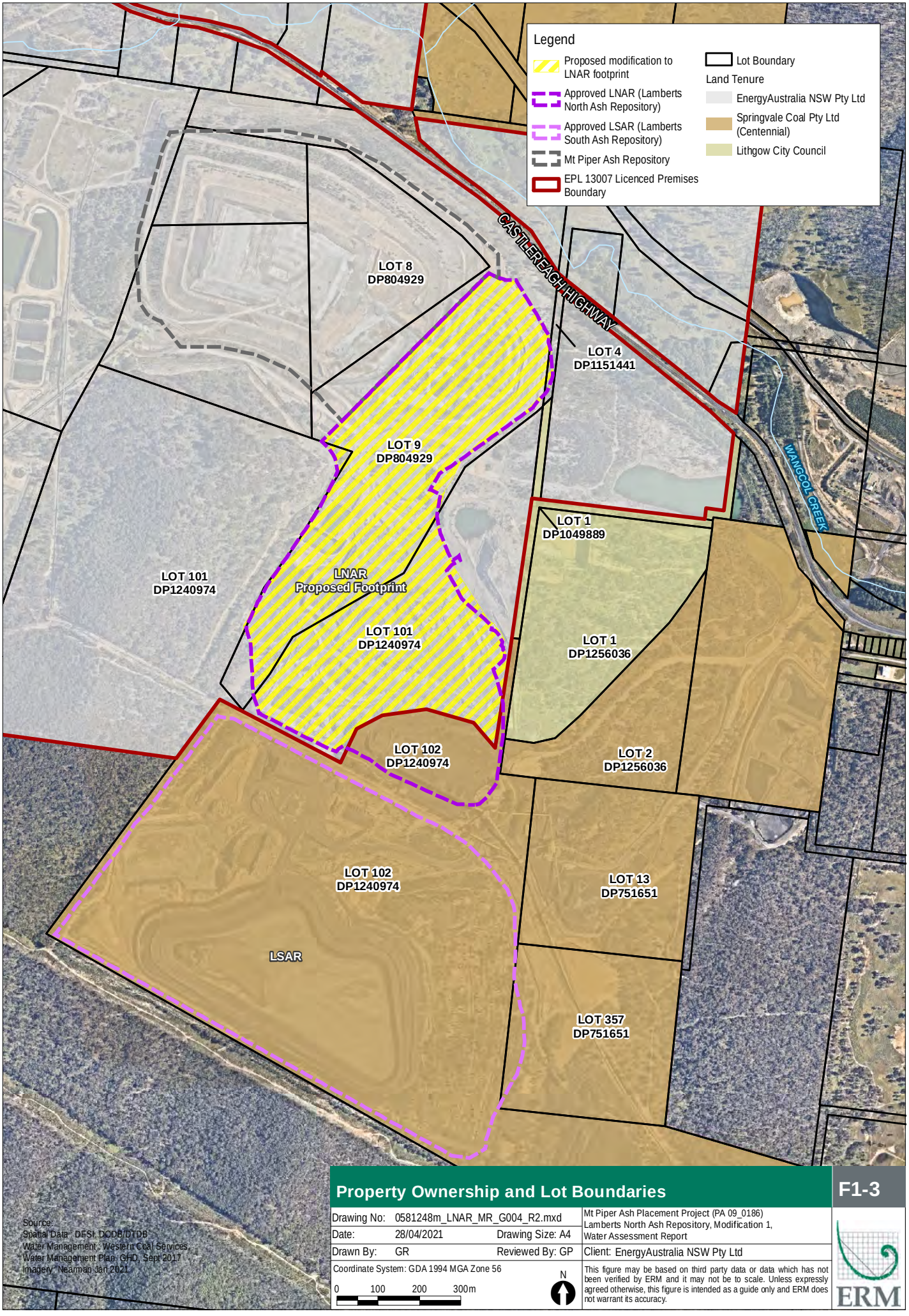
The Modification Area is in general accordance with the Project Approval Area for LNAR as documented in the original Environmental Assessment for the Mt Piper Ash Placement Project (SKM, 2010) and as augmented in the Consistency Report (SKM, 2012).

Figure 1-2 presents the location of the MPPS and the Ash Repositories, including the approved LNAR boundary, the minor modifications to the LNAR footprint and existing water management features.

The Modification relates to the following allotments: Lot 9 DP 804929, Lot 101 1240974, Lot 4 DP 1151441 and Lot 102 DP 1240974. A small portion of Lot 102 DP 1240974 will be excised only from the LNAR footprint. There are no changes to the LSAR boundary which includes Lot 102 DP1240974 and Lot 357 DP 751651. Property and lot boundaries are presented in Figure 1-3.

1.6 The Proponent

EnergyAustralia is the proponent for the Modification and will be responsible for its implementation.



Source:
Spatial Data: DFSI, DODB/DTDB
Water Management: Western Coal Services, Water Management Plan, GHD, Sept 2017
Imagery: Nearmap Jan 2021

Property Ownership and Lot Boundaries

F1-3

Drawing No:	0581248m_LNAR_MR_G004_R2.mxd		Mt Piper Ash Placement Project (PA 09_0186) Lamberts North Ash Repository, Modification 1, Water Assessment Report
Date:	28/04/2021	Drawing Size: A4	
Drawn By:	GR	Reviewed By: GP	Client: EnergyAustralia NSW Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56			This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

0 100 200 300m

N

ERM

2. EXISTING OPERATIONS

2.1 Site History and Land Use

The MPPS has been operational since 1994 and is set within a historically cleared landscape that has been subject to extensive open cut and underground mining activity from at least 1940. Historic open cut mining operations removed the Bunnyong Sandstone (part of the Illawarra Coal Measures) (SKM, 2010) with mining activities targeting the Lidsdale and Lithgow Coal Seams. Underground mining in the vicinity of the LNAR began in 1942 and continued until the 1990s; however, details regarding the timing and progression of underground mining in this area are not clear (RPS, 2014).

An overview of the historical mining disturbance in the vicinity of the LNAR is presented in Figure 2-1. Figure 2-2 presents a historical aerial photograph from 2008, which indicates the level of ground disturbance present at that time prior to the construction of the LNAR in 2012-2013. The majority of the LNAR has been subject to open cut mining activities and subsequent backfill. There is a small area near the western boundary of the LNAR that retains some remnant pillars from historic underground mining activities (Figure 2-1).

The predominant land use in the immediate proximity of the LNAR is the MPPS, adjacent coal washery facility, coal mines, and related infrastructure. The majority of this area is zoned SP2 Infrastructure, a standard land use zone used to provide for infrastructure and related uses, and to protect infrastructure from development that is not compatible with or may detract from the provision of infrastructure. The Ben Bullen State Forest, zoned RU3 Forestry, lies to the north and east of the LNAR on the surrounding hills. Other relevant areas including the eastern portion of the LNAR and areas further east and to the south are zoned RU1 Primary Production. Land use zoning is further discussed in Section 5.

The nearest sensitive receptors to the LNAR are the remaining privately owned rural dwellings located at Blackmans Flat to the south-east, approximately one (1) km from the LNAR (refer to Figure 1-2).

2.2 Environmental Setting

The LNAR is located on an outcrop of the Illawarra Coal Measures, which hosted the now largely removed coal seams that were previously extracted. Consistent with the historical mining activities, the LNAR and its immediate surrounds is mapped as disturbed terrain (DPIE, 2020).

The LNAR is located at elevations of between 900 and 1000 m AHD within the Huons Gully catchment. Huons Gully is a part of the Wangcol Creek catchment, which is part of the upper Coxs River Catchment. The natural state of the Huons Gully has been removed by historic coal mining and subsequent ash placement activities. Originally, the downstream portion of Huons Gully flowed directly to Wangcol Creek. However, Huons Gully Sediment Pond (SHG1) to the south-west of the LNAR is the termination point of the former Huons Gully surface water flow.

2.3 Ash Management

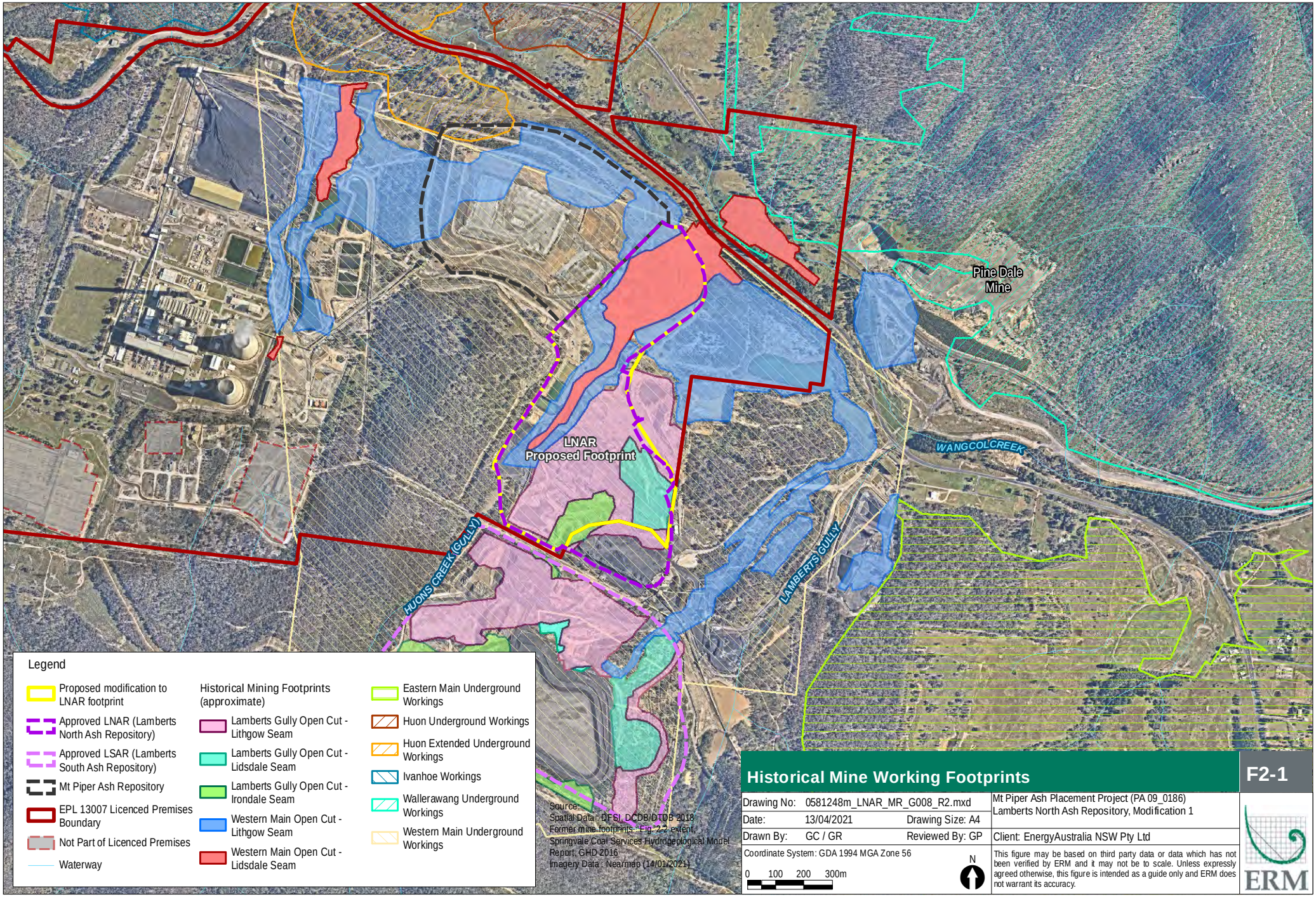
MPPS is fuelled using black coal currently sourced from the local area. Ash produced at MPPS is a result of coal combustion by the transformation of the non-combustible matter present in coal. The ash constituents comprise:

- Bottom furnace ash, which typically makes up 10% of the total ash product and is typically coarse and wet.
- Fly ash, typically 90% of the total ash product is finer with a moisture content of 0%.

Together, bottom furnace ash and fly ash is referred to as ‘ash.’

The wet bottom furnace ash is placed directly onto the Ash Repositories, either temporarily (i.e. recovered and reused) or permanently.

Prior to the placement of fly ash within the Ash Repositories, it is conditioned to increase its moisture content. This is undertaken to achieve required compaction rates and to maintain geotechnical stability of the Ash Repositories. It also assists in dust suppression.

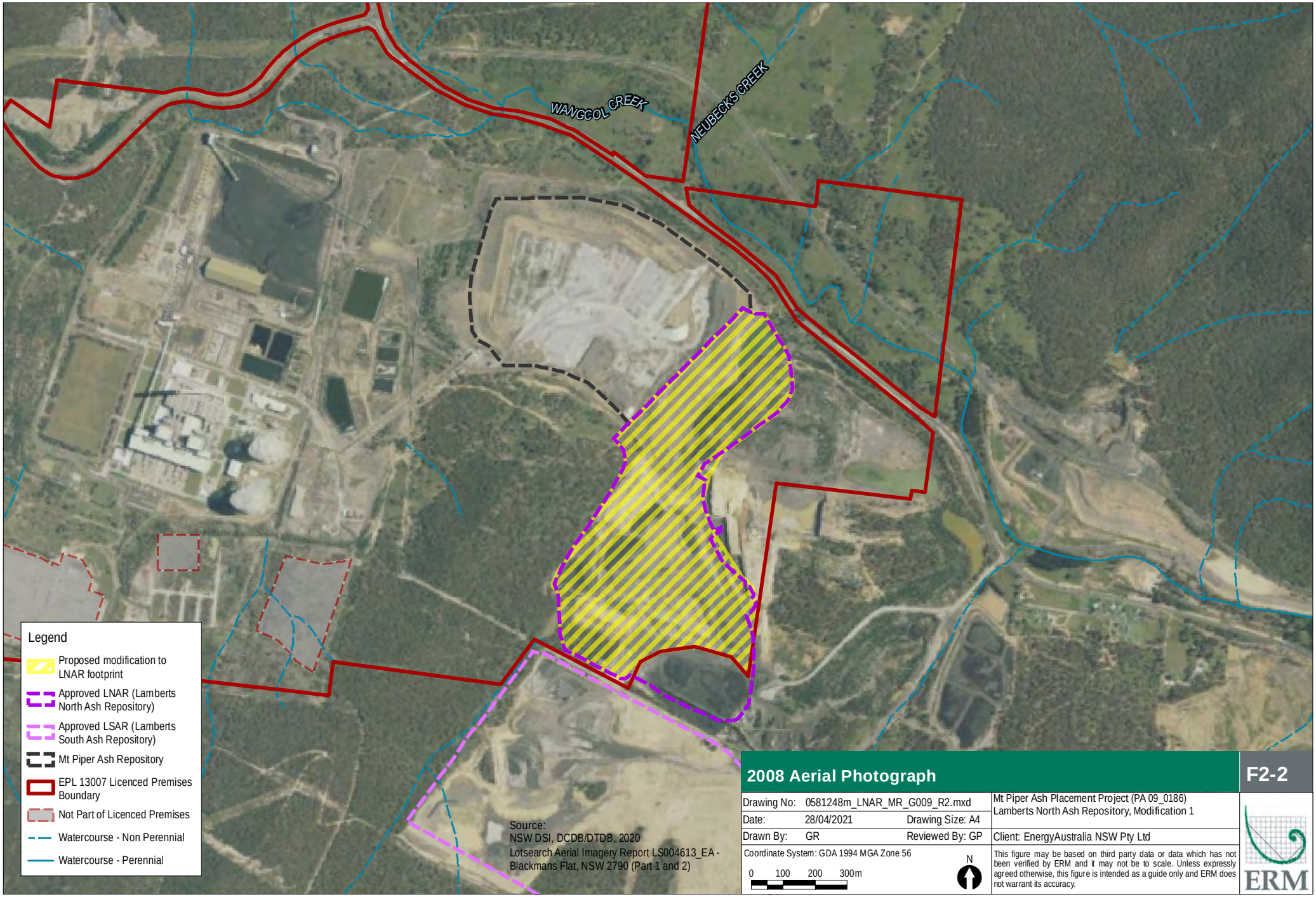


Historical Mine Working Footprints

F2-1

Drawing No:	0581248m_LNAR_MR_G008_R2.mxd		Mt Piper Ash Placement Project (PA 09_0186) Lamberts North Ash Repository, Modification 1
Date:	13/04/2021	Drawing Size: A4	
Drawn By:	GC / GR	Reviewed By: GP	Client: EnergyAustralia NSW Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56			

ERM


WANGCOL CREEK
NEUBECKS CREEK
Legend
Proposed modification to LNAR footprint
Approved LNAR (Lamberts North Ash Repository)
Approved LSAR (Lamberts South Ash Repository)
Mt Piper Ash Repository
EPL 13007 Licenced Premises Boundary
Not Part of Licenced Premises
Watercourse - Non Perennial
Watercourse - Perennial
Source:
NSW DSI, DCDB/DTDB, 2020
Lotsearch Aerial Imagery Report LS004613_EA - Blackmans Flat, NSW 2790 (Part 1 and 2)
2008 Aerial Photograph
F2-2
Drawing No: 0581248m_LNAR_MR_G009_R2.mxd
Date: 28/04/2021
Drawing Size: A4
Drawn By: GR
Reviewed By: GP
Coordinate System: GDA 1994 MGA Zone 56
0 100 200 300m
N
Mt Piper Ash Placement Project (PA 09_0186)
Lamberts North Ash Repository, Modification 1
Client: EnergyAustralia NSW Pty Ltd
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM

Fly ash is conditioned by the addition of either:

- Water sourced in accordance with MPPS existing water licences and allocations including recycled process water and fresh (non potable) water; or
- Brine a by-product from:
  - the treatment of evaporative cooling water from the cooling towers of MPPS to remove salts and impurities. Treatment occurs at the MPPS Brine Concentrators under MPPS development consent 80-10060; and
  - the desalination process of the nearby SWTP, under SSD 7592.

The SWTP produces both liquid and solid waste brine streams. As noted above, the liquid brine stream is disposed of through the conditioning of fly ash as BCA. A proportion of the liquid brine stream is further refined to solid crystal form through the brine crystallisers, this is referred to as Mixed Salts. The other solid brine by-product from the desalination process is Lime Salts. Together, the Mixed Salts and Lime Salts are referred to as Solid Mixed Salts. The Solid Mixed Salts are co-placed with BCA and are restricted to areas that are approved to receive BCA.

The SWTP authorises the placement of these Solid Mixed Salts within the Ash Repositories in accordance with existing approved BCA placement practices. The MPPS Environment Protection Licence (EPL13007) and the SWTP Brine and Residual Waste Management Plan (with attached Management Plans for the Ash Repositories) (GHD, 2019) describe and authorise the existing practices.

The conditioning of fly ash as WCA or BCA occurs at the Ash Conditioning Plant within the power block of the MPPS, away from the Ash Repositories. The BCA or the WCA is then transported separately (via conveyor) to the repository silos located at the MPAR. The conditioned fly ash is wetted again in the silos with water. This additional wetting allows for final conditioning so that the ash contains the correct moisture content. From the silos, the conditioned ash is loaded into trucks and transported to approved placement areas. The Solid Mixed Salts produced at the SWTP are trickle fed onto the same overland conveyor at Transfer Point 2 when BCA is produced. From time to time, the Solid Mixed Salts are delivered directly to the MPAR when the conveyor feed at Transfer Point 2 is out of service. Figure 1-2 presents the location of the ash conditioning and transfer infrastructure.

The LNAR has not yet reached RL 946 m AHD and has only received WCA to date. The BCA delivery and placement activities as described above are approved for both MPAR and LNAR.

2.4 Environmental Management

The Lamberts North Operational Environment Management Plan (the OEMP) (EnergyAustralia, 2019) outlines the existing approved environmental management requirements for the LNAR. The OEMP includes sub-plans that specify the monitoring and reporting requirements related to the management of noise, groundwater, soil and surface water, air quality, landscape revegetation and rehabilitation, and waste.

The OEMP will be revised to account for the Modification, and water quality outcomes will be refined with respect to the specific context of the Modification objectives and operations. The revised OEMP will document groundwater and surface water management and monitoring requirements associated with the Modification, as outlined in Section 5.4 of the Water Assessment.

The Mt Piper Ash Placement Project Lamberts North Annual Environmental Management Report (AEMR) 2019-2020 (EA, 2020) presents a summary of environmental compliance in relation to the OEMP and the conditions required by the PA 09_0186 and EPL13007 as relevant to the LNAR. As presented in the 2019-2020 AEMR, the environmental management and reporting for the LNAR generally complies with the relevant conditions of approval, EPL13007 and OEMP requirements.

3. JUSTIFICATION AND BENEFITS

3.1 Justification

3.1.1 Leachate Control

EnergyAustralia is seeking to modify approved practices at the LNAR to strengthen the environmental controls around intercepting, capturing and treating leachate from BCA placement activities. To this end, EnergyAustralia is seeking to install a leachate barrier system (using very low permeability liners) within LNAR to capture and subsequently treat leachate moving through the ash placed above the liner. The installation of a liner, associated water management systems and capping liner seeks to limit the risk of vertical and lateral movement of BCA leachate migrating into the surrounding environment, providing for improved environmental outcomes from that currently approved for LNAR PA 09_0186.

3.1.2 Beneficial Reuse of WCA and Increased Longevity of LNAR

PA 09_0186 currently limits the placement of BCA to RL 946 m AHD and above. The current level of the northern portion of the LNAR varies between RL 941 – 944 m AHD and the commencing ash placement level within the southern portion of the LNAR varies between approximately 930 – 945 m AHD. Therefore, as is currently approved, WCA placement would need to occur, to achieve the RL 946 m AHD height above which the co placement of BCA and Solid Mixed Salts would occur. This would result in placing WCA to achieve an operational face of RL 946 m AHD before BCA placement could occur.

The Modification seeks approval for the co placement of BCA and Solid Mixed Salts below RL 946 m AHD, but above the liner, removing the need to achieve the currently approved height restriction above which BCA placement could occur. This would likely provide increased future opportunity for reuse of WCA, maximising the longevity of LNAR through enabling the WCA to be available for other uses.

The Modification also seeks to remove the 1 m thick WCA perimeter encapsulating the BCA and replace it with a liner. This will free up the WCA for beneficial reuse and provide more capacity to store BCA. This is also likely to provide increased future opportunity for maximising the longevity of LNAR.

3.1.3 Reduced Water Demand

The Modification provides opportunities to reduce water demand at MPPS and the Ash Repositories through a leachate management system consisting of:

- leachate collection and management that will provide a localised source of water suitable for irrigation of the BCA placement areas within the LNAR, thereby reducing the demand on the fresh water supply from the MPPS; and
- transferring the leachate to MPPS for treatment (if of a suitable quality) may provide an alternative source of water for inclusion in the MPPS water management system, further reducing the demand from off-site water sources.

3.1.4 BCA Placement Continuity

The maximum height approved for the MPAR is RL 980 m AHD. Taking into account requirements for encapsulating the MPAR with 1 m of WCA and approximately 1 m of clean soil cover to provide for a vegetation growing media, the maximum final height of BCA emplacement prior to its closure at MPAR is therefore approximately RL 978 m AHD.

A December 2020 survey of the MPAR indicated that there was approximately eight (8) months of BCA capacity remaining at the MPAR. As a result, the MPAR will reach its approved final landform height for ash placement in accordance with the MPPS development consent (80-10060) in the second half of 2021. EnergyAustralia therefore requires an alternate area to place BCA and Solid Mixed Salts for co-placement continuity.

The LNAR has received only WCA to date as PA 09_0186 restricts BCA placement to heights above RL 946 m AHD. The LNAR operational face is yet to achieve this height. The Modification seeks to permit the co-placement of BCA and Solid Mixed Salts (and other authorised wastes) above the liner, below RL 946 m AHD. This will provide for greater flexibility in BCA management and will facilitate BCA placement continuity as MPAR reaches its approved capacity, enabling ongoing power generation and ongoing operation of the SWTP.

3.1.5 Brine Management

Both the MPPS Brine Concentrators and the SWTP generate brine. The brine is temporarily stored in purpose built double high-density polyethylene (HDPE) lined dams prior to its disposal through conditioning of ash (as BCA).

As MPPS is generally a zero-liquid discharge (with the exception of the Coal Settling Pond discharge point), the current arrangements prioritise the disposal of brine to condition fly ash to limit the potential for an uncontrolled brine release. The BCA is then placed within the MPAR.

The MPPS Brine Concentrators produce approximately 0.06 mega-litres (ML) of brine per day, requiring approximately 100,000 tonnes per year of ash to manage the brine through the conditioning process (i.e. BCA).

Approximately 0.2 ML of brine is produced per day by the SWTP, requiring approximately 425,000 tonnes per year of ash to manage the brine through the BCA placement process. The SWTP has some capacity (albeit limited) to crystallise brine (as a component of Solid Mixed Salts) to reduce the volume of brine produced.

Without the BCA placement process, brine would have to be progressively stored in ponds and the Solid Mixed Salts would have to be stockpiled until an alternative use or disposal method was identified. The disposal of brine to condition the fly ash and its co-placement with Solid Mixed Salts is currently the only approved method available to manage brine (both solid and liquid) at the MPPS. This approach will continue as part of ongoing operations at the MPPS hence the importance of BCA placement continuity.

3.2 Modification Benefits

In summary, the following matters are considered to be benefits that may result from the implementation of the Modification:

- capture and management of leachate resulting from BCA placement areas will result in improved environmental outcomes, specifically related to groundwater and surface water quality of the Wangcol Creek catchment, located within the Sydney Drinking Water Catchment;
- maximising the longevity of LNAR through increased opportunities for reuse of WCA through;
  - careful placement and separation of the placed materials may allow for the future recovery of WCA;
  - the removal of the need for the 1 m WCA perimeter and the need to build the LNAR to RL 946 m AHD with WCA will enable the WCA to be available for other uses; and
  - availability of fly ash to be used in cementitious products; and
- leachate management will provide a localised source of water suitable for irrigation of the BCA placement areas within the LNAR, reducing the demand on the fresh water supply from the MPPS; and

- transfer and treatment of leachate (if of a suitable quality) may provide an alternative source of water for inclusion to the MPPS water management system, further reducing the demand from off-site water sources.

3.3 Consequence of Not Proceeding

The consequences of not proceeding with the Modification include:

- the environmental performance intended for the LNAR may not be realised, as the potential for lateral and vertical movement of leachate from BCA to the surrounding environment would still exist;
- as MPAR reaches its operational life in the second half of 2021, there is a risk to the continuity of BCA placement from the MPAR to the LNAR. Without an authorised BCA placement area, brine would have to be progressively stored in ponds until an alternative disposal method was identified. The disposal of brine to condition the fly ash is currently the only approved method available to manage brine at the MPPS;
- limited ability to realise the beneficial reuse potential of WCA, as WCA will be required to achieve the RL 946 m AHD height and provide for the 1 m perimeter encapsulation of BCA for LNAR prior to BCA placement being able to occur;
- WCA would likely be sterilised (not readily available for alternate uses) if it had to be placed only to allow BCA to be placed on top of it (as is currently approved); and
- lost opportunity to reduce water demand at MPPS through the beneficial reuse of collected leachate.

4. PROJECT DESCRIPTION

4.1 Proposed LNAR Modification Elements

To deliver improved environmental outcomes for the LNAR, EnergyAustralia wishes to modify the LNAR PA 09_0186 as detailed in Table 4-1.

Figure 1-2 presents the location of the MPPS and the Ash Repositories, including the minor adjustments to the LNAR boundary and existing water management features.

Table 4-1 Modifications to LNAR PA 09_0186

Modification Elements	Description
Liner Installation (leachate barrier system)	Staged installation of a single HDPE liner, geo-composite or equivalent (liner) to predominantly encapsulate the BCA, Solid Mixed Salts and other authorised wastes (as per EPL 13007) within the currently approved LNAR. This will include: ■ preparation of geotechnically suitable areas for liner installation utilising mine spoil that is currently available within the LNAR, including leachate barrier support systems in areas of mine subsidence risk as required; ■ placement of a geotechnical base layer using WCA (WCA is already approved for placement in LNAR). The Concept Design (GHD, 2021) indicates that WCA will be utilised as a geotechnical base layer due to its favourable physical properties. The liner will be placed directly on top of this base layer; ■ staged installation of the liner (leachate barrier system) to suitable design specifications based on NSW Environment Protection Authority (EPA) Solid Waste Landfill Guidelines (2016). The material properties and specification for the barrier system will be determined during detailed design, and will include a base liner, sidewall liner and capping liner; and ■ leachate collection system, including placement of drainage aggregate (sourced from mine spoil if available within the LNAR or imported from a local supplier or bottom furnace ash, where suitable), drainage pipework (as required) followed by geotextile or other equivalent material(s) for leachate management, and leachate sump and riser. Concept design drawings are provided in Appendix A.
Placement of BCA and Solid Mixed Salts	■ Placement of BCA, Solid Mixed Salts and other authorised wastes (as per EPL 13007) from the surface of the liner up to the maximum approved LNAR height of RL 966-980 m AHD, including a capping liner. ■ It is important to note that the placement of BCA and Solid Mixed Salts are an existing approved activity at RL 946 m AHD and above. The modification seeks approval for the co-placement of BCA and Solid Mixed Salts below RL 946 m AHD, but above the liner. As and when required, WCA will also be placed within lined areas, noting that the volumes are likely to be limited. The BCA and Solid Mixed Salts will also be placed in defined lined areas.

Modification Elements	Description
LNAR Capping	■ Replacement of the currently approved 1 m thick WCA perimeter layer with a suitable capping liner to encapsulate the BCA and Solid Mixed Salts. ■ The liner will comprise of a linear low density polyethylene (LLDPE) liner underlain by a geo-synthetic liner (GL) or similar arrangement. The LLDPE (or equivalent) will be welded to the sidewall geo-membrane liner to produce a seal around the lined ash placement area. ■ No other changes to the capping of LNAR is proposed, with exposed ash areas to be progressively capped as areas reach their design elevations, in accordance with the existing approval (PA 09_0186).
Leachate Storage Ponds and Leachate Management (leachate management system)	■ Staged installation of double HDPE lined multipurpose storage ponds to manage leachate from BCA placement as well as water intercepted from other areas of the LNAR. These new ponds will be adequately sized and constructed so as to provide suitable storage volume for leachate derived from the BCA and Solid Mixed Salts lined areas. Where possible, leachate will be recycled for dust suppression within the lined areas or transferred to MPPS for treatment (if of a suitable quality) and used in electricity generation.
LNAR Approved Footprint Adjustments	■ Minor amendments to the approved LNAR boundary in the context of the existing and proposed surrounding activities and interactions, including excising the Western Coal Services washery infrastructure. Overall, the modified footprint of the LNAR is not anticipated to materially influence the operational lifespan of the LNAR.

4.2 Installation and Operations

4.2.1 Staging

The Concept Design (GHD, 2021) for the Modification outlines that the installation of the liner would be progressive throughout the life of the LNAR, which is estimated to be approximately 7.5 years as a minimum. This time period assumes minimal reuse of ash generated with all conditioned fly ash being placed in the LNAR. The initial installation of liners and leachate management controls would be limited to that required for the first stage of development and be progressively augmented at appropriate intervals in line with future development stages, subject to detailed design and site operational requirements.

The Concept Plan including conceptual staging is provided in Appendix A. The size and configuration of the concept staging will be refined during detailed design and operational requirements.

4.2.2 Plant and Equipment

Existing plant and equipment, including trucks, dozers, drum rollers and water carts approved under PA 09_0186 for ash placement will be utilised to install the geotechnical base layer, liner, drainage aggregate and associated water management systems and capping.

Small specialised equipment will be required for the liner installation (ie. Liner welding, etc). Otherwise, no additional plant and equipment to that already approved and in use under PA 09_0186 will be required.

4.2.3 Ash Conveyance and Haul Roads

The approved transfer of ash from the MPPS to the Ash Repositories is via conveyor and truck. There are no changes proposed to the currently approved ash conveyance and haul roads across the LNAR as approved under PA 09_0186.

Haul roads would be established progressively to the operational areas, in accordance with the existing approval (PA 09_0186).

4.2.4 Ash Placement and Management

There are no proposed changes to existing ash placement methods that involve the delivery of ash to the working face via conveyor, truck, spreading and shaping of the ash via dozer and compaction via dozer / roller compactor. The intensity and duration of ash placement will be consistent with that approved under PA 09_0186.

Existing management practices will continue with no change, including controlling the moisture condition during placement and use of artificial dust suppressors, sprinklers and water carts to minimise the generation of dust of prepared and working areas, haul roads, stockpiles and working surfaces. These are existing approved activities under PA 09_0186.

There are no changes to the monitoring and testing of ash placement including moisture content, groundwater levels, dust, compaction, water quality and volume, ash placement levels and engineering and geotechnical considerations.

As described in Section 2.4, the placement of the ash is undertaken in accordance with the OEMP.

4.2.5 Traffic

It is anticipated that during liner installation, on average, around three to four (3 – 4) truck deliveries could occur per day, associated with the delivery of liner materials and drainage aggregate from local suppliers. Installation periods will vary depending on the size of each stage but would generally be around three to four (3 – 4) months (not including weather delays).

A worst case estimate of the LNAR life is 7.5 years, noting that this timeframe assumes no beneficial reuse of the ash material (ie. all ash produced is emplaced within the repository). Over the (worst case) life of the repository, it is estimated that average material deliveries required to construct the repository liner would equate to around two (2) trucks per week.

The estimated number of trucking movements is within the range of that previously assessed and approved under PA 09_0186. Considering the opportunities around beneficial reuse, the separation of WCA and BCA, enabling recovery / sale of WCA could double the life of the repository. This would reduce the average number of trucks over the life of the repository to around one (1) truck per week.

An assessment of traffic impacts associated with the modification is detailed in Section 7.5.

4.2.6 Operational Hours and Workforce

The Modification does not seek to amend the approved operational hours.

In general, the existing workforce approved under PA 09_0186 for ash placement will be utilised to install the liner and associated water management systems and capping. No additional permanent workforce will be required.

4.2.7 Final Landform and Rehabilitation

No changes are proposed to the revegetation and rehabilitation of LNAR to that approved under PA 09_0186. Revegetation will occur progressively throughout the life of the placement area once capping is complete.

The final landform of LNAR will be generally consistent with what is currently approved. It will have a 1(v) in 4(h) batter slope (or less) with approximately 10 m wide benches at 10 m height intervals (or less). The final landform would be constructed to a height of approximately RL 980 m AHD in accordance with the approved LNAR landform.

Rehabilitation and decommissioning of LNAR is addressed in the OEMP. As discussed in Section 9, the OEMP will be updated to incorporate relevant aspects of the Modification, including ongoing leachate management and monitoring requirements.

4.3 Interactions with MPPS Approvals and Other Projects

LNAR's interaction with existing and proposed activities at MPPS, are outlined in Table 4-2. With regard to environmental impacts, relevant cumulative assessments have been undertaken and the findings presented in Section 8.

Table 4-2 Interactions with MPPS Approvals and Other Projects

Development / Project	Stage	Proximity	Interactions
MPPS	Approved	At MPPS	The Modification will support the electricity generation of MPPS by facilitating continuity in ash, brine and Solid Mixed Salts management at MPPS.
MPPS Turbine Upgrade	Existing approval	At MPPS	The Turbine upgrade includes works to Unit 1 and Unit 2 to increase to MPPS's capacity by 60 MW without burning more coal. Unit 1 was upgraded in 2020 and Unit 2 will be upgraded during a planned outage in September/October 2021. As these works will occur at Unit 2, there is no interaction with ash placement activities.
Proposed MPPS Groundwater Interception Project	Not yet approved.	At MPPS and adjacent to Wangcol Creek.	The proposed Groundwater Interception Project seeks to intercept groundwater and surface water at Wangcol Creek containing elevated Total Dissolved Solids (TDS) resulting from BCA placement in the MPAR to provide environmental protection. EnergyAustralia is currently preparing a Review of Environmental Factors under Part 5 of the Environmental Planning and Assessment Act 1979 and liaising with relevant government regulators. Detailed design of the works is also ongoing. Relevant to LNAR, the proposed Groundwater Interception Project proposes to install a pipeline to transfer extracted water to the MPPS for treatment or to two new HDPE lined storage ponds within the footprint of the LNAR if required. The siting of the pipework and ponds is currently in detailed design stage and will be sited with relevant consideration to the approved LNAR to ensure operational activities and water management within the LNAR and the Modification is not impacted.
Proposed Mt Piper Energy Recovery Project (ERP)	Not approved. SSD application, currently being assessed by DPIE prior to Independent Planning Commission assessment and determination	At MPPS	The proposed Ash Placement Facility for the ERP is proposed to be located within a portion of the approved LNAR footprint. Should the proposed ERP be approved and constructed, EnergyAustralia intends to submit a future modification application to Project Approval 09_0186 seeking to amend the approval to account for the proposed ERP use of that portion, effectively excising that portion of land from the LNAR. As such the proposed ERP ash placement facility and the LNAR will effectively operate under two separate planning approvals.
Pipers Flat Rail Coal Unloader	Approved	Approximately 2.5 km, south	MPPS received approval for the construction and operation of the Pipers Flat Rail Coal Unloader to secure coal supply to MPPS. The yet to be constructed coal unloader is located to the south of MPPS and LNAR and will not impact the operations of LNAR.

Development / Project	Stage	Proximity	Interactions
Western Coal Services	Approved	A portion of WCS is located within the approved LNAR footprint.	Western Coal Services (SSD 5579) is approved to receive, handle and process coal from Springvale Mine, Angus Place Colliery (currently under care and maintenance) and other Centennial Coal operations. The Modification seeks to reduce the LNAR footprint by excising the Western Coal Services lands to avoid interaction with the existing Western Coal Services infrastructure area.
Springvale Mine Extension Project	Approved (SSD 5594)	Over 3 km south east of MPPS.	Springvale Mine Extension Project (underground mine) permits the extraction of up to 5.5 million tonnes of run of mine coal per annum and includes the transfer of coal via conveyor to Centennial's Western Coal Services for further processing or to MPPS for use in power generation. The Modification will have no interaction with the Springvale Mine.
Springvale Water Treatment Project (SWTP)	Approved, as modified	At MPPS, south of the existing cooling water system	The SWTP involves the transfer of water from existing dewatering facilities on the Newnes Plateau to a water treatment plant located at MPPS, for reuse in MPPS cooling water system. The SWTP authorises the placement of brine and Solid Mixed Salts within the Ash Repositories in accordance with existing approved BCA placement practices. The Modification provides for continuity in the management/disposal of brine from the SWTP and MPPS as conditioning the fly ash along with its co-placement with Solid Mixed Salts is currently the only approved method available to manage brine (both solid and liquid) at the MPPS.
Angus Place Coal Project (PA 06_0021) and SWTP (SSD 7592) MOD 6	Approved	SWTP (as above); Angus Place 5km to the east of the LNAR	Transfer of mine water from Angus Place Mine directly to the MPPS, establishment of a water softening plant at the Angus Place pit top to pre-treat water enabling it to be transferred to the SWTP and the treatment and reuse of mine water within the existing MPPS cooling water management system. The transfer and treatment of mine water from Angus Place Colliery will generate a brine stream additional to that already produced that will require disposal through ash conditioning.

5. STATUTORY PLANNING

5.1 Commonwealth Legislation

5.1.1 Environment Protection and Biodiversity Conservation Act 1999

The Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) is the primary Commonwealth legislation relating to the environment, heritage protection and biodiversity conservation.

The Commonwealth Department of Environment and Energy (DEE), through the implementation of the EPBC Act, is the responsible authority for determining whether development activities are likely to have a significant impact on Matters of National Environmental Significance (MNES). Under the EPBC Act, any action (defined as a project, development, undertaking, activity (or series of activities), or alteration to any of these) that has, or is likely to have, significant impact on a MNES requires referral to the Commonwealth Minister for the Environment.

A search of the EPBC Protected Matters Search Tool (PMST) was undertaken on 22 March 2021 for the Modification and provided in the Biodiversity Assessment Report in **Appendix C** of this Modification Report. The results of the search are summarised in **Table 5-1**.

Table 5-1 Assessment of potential impacts to MNES

Matters of National Environmental Significance	Application to the LNAR Modification	Relevant Sections of Mod Report
World heritage properties	Not identified within the Modified LNAR area	Not applicable
National heritage places	Not identified within the Modified LNAR area	Not applicable
Ramsar wetlands of international importance	Not identified within the Modified LNAR area. The closest Ramsar wetland is over 300 km away.	Not applicable
Listed threatened species and communities	Threatened species and threatened ecological communities have been recorded within the locality.	Section 7.7
Internationally protected migratory species	Migratory species identified as potentially occurring within the locality.	Section 7.7
Commonwealth marine areas	Not identified within the Modified LNAR area	Not applicable
The Great Barrier Reef Marine Park	Not identified within the Modified LNAR area	Not applicable
Nuclear actions	Not applicable	Not applicable
A water resource, in relation to coal seam gas development and large coal mining development	Not applicable	Not applicable

5.2 NSW Legislation

5.2.1 Environmental Planning and Assessment Act 1979 and Regulation 2000

5.2.1.1 Overview

The principle NSW planning legislation is the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the accompanying Environmental Planning and Assessment Regulation 2000 (EP&A Regulation).

The EP&A Act provides a system of environmental planning and assessment administered by the NSW Department of Planning, Industry and Environment (DPIE). The EP&A Act establishes when and how a development or activity is to be assessed and who is the relevant approval or determining authority.

5.2.1.2 Objects of the EP&A Act

Section 1.3 of the EP&A Act defines the objects of the Act, being:

(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,

(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,

(c) to promote the orderly and economic use and development of land,

(d) to promote the delivery and maintenance of affordable housing,

(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,

(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),

(g) to promote good design and amenity of the built environment,

(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,

(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,

(j) to provide increased opportunity for community participation in environmental planning and assessment.

The Modification is consistent with the relevant objects outlined in the EP&A Act by:

- promoting the orderly and economic use of the land through the provision of a use and development that is compatible with existing industrial activities of MPPS and nearby mining operations, and through maximising the longevity of LNAR;
- improving the environmental outcomes for the groundwater and surface water quality of the Wangcol Creek catchment, part of the Sydney Drinking water Catchment Area, through improved management of leachate at LNAR;
- actively engaging with the community and other stakeholders (refer Section 6), with ongoing commitments for continual communications and engagement;
- maximising the available capacity of the LNAR through providing greater opportunity for beneficial reuse of WCA; and

- promoting ecologically sustainable development (ESD) through potential beneficial reuse of WCA and beneficial reuse of leachate in the MPPS water management system, whilst maintaining electricity generation for approximately 1.18 M homes in NSW every year.

5.2.1.3 Approval Pathway

Section 4.55 of the EP&A Act provides pathways for the modification of development consents.

Section 4.55 (1A) Modification

The Modification is considered to be of minimal environmental impact as detailed in Table 5-2. Accordingly, the modification is sought under the provisions of Section 4.55 (1A) of the EP&A Act.

Table 5-2 Environmental Impacts associated with the Modification

Project Element	Description	Environmental impact resulting from the modification
Importation of materials for staged installation of the liner	Geotechnical construction materials and drainage aggregates for the liner and water management ponds will be sourced from the MPPS by utilising on-site mine spoil where suitable material exists, or bottom furnace ash, if suitable, or through the local procurement (by road) of materials as necessary. Liner materials will also be imported.	Staging the installation of the liner will result in negligible net change to trucking movements (and associated road traffic noise) that already occur in line with existing approvals and practices at the MPPS. Trucking movements will be, associated with the importation of liner materials and importation of aggregate materials from local providers, where the material cannot be sourced from on-site (ie. mine spoil and/or bottom furnace ash). This is discussed further in Section 7.5.
Liner installation (leachate barrier system)	The bulk earthworks associated with the construction and operation of the LNAR are an approved activity under PA 09_0186. An additional activity associated with the Modification is the staged installation of the liner (leachate barrier system). The installation of the liner will require some specialised plant (ie liner welding, etc), but will largely utilise existing on-site plant and equipment and will utilise the existing workforce. There is no change to the approved intensity of the ash placement activity.	The Mt Piper Ash Placement Project EIS (SKM 2010) incorporated an Air Quality Impact Assessment (AQIA) and a Noise and Vibration Impact Assessment (NVIA). The AQIA and NVIA considered the construction and operational phases of LNAR (and LSAR), including bulk earthworks. As the Modification will not increase on-site plant and equipment nor the intensity of ash placement, and as the installation of the liner is consistent with approved activities (i.e. bulk earthwork) there is likely to be a negligible change to predicted offsite air quality and noise impacts associated with the liner installation. No change to the workforce traffic will occur as the existing workforce is to be utilised. In terms of dust and noise generation, ongoing management will continue in accordance with the requirements specified in the OEMP with only minor modifications required to the OEMP to account for liner installation.

Project Element	Description	Environmental impact resulting from the modification
Landform height	LNAR approved maximum landform height is RL 980 m AHD for LNAR. The Modification is consistent with existing approved final landform height, thus not altering the existing approved final visual form.	Nil environmental impact
Footprint	Minor amendments to the approved LNAR boundary in the context of the existing and proposed surrounding activities and interactions, including excising the Western Coal Services washery infrastructure.	Reduction in the total footprint of the LNAR resulting in a minor reduction to the above ground profile of the LNAR.
Leachate management	Materials required for the leachate barrier system will be sourced from the MPPS by utilising on-site mine spoil where available or bottom furnace ash, if suitable. Some materials may need to be imported (by road) from local providers. Liner materials will also be imported. Construction activities associated with the leachate ponds will require some specialised plant (ie liner welding, etc), but will largely utilise existing plant and equipment on site and the existing workforce. The leachate barrier system will result in improved environmental controls through leachate collection and leachate management. Collected leachate will be recycled and reused for dust suppression or transferred to the MPPS for treatment and then reused in the electricity generation process.	Similar to the staged installation of the liner, the construction of the leachate ponds will not increase on-site plant and equipment nor the intensity of ash placement, and as the construction of the ponds are consistent with approved activities (i.e. bulk earthwork) there is likely to be a negligible change to predicted off site air quality and noise impacts associated with pond construction. The Water Assessment (Appendix B) concluded that: ■ the presence of the liner, leachate management system and capping layer, will mitigate the potential impacts of leachate escaping into the surrounding groundwater and surface water; and ■ the Modification will have a neutral or beneficial effect on water quality by providing the ability to capture, store and treat leachate from lined and capped BCA placement areas, limiting the migration of leachate into the surrounding environment. The existing approved stormwater management practices and controls implemented at the LNAR are considered suitable to mitigate the potential surface water impacts from the Modification, with only minor updates to the approved OEMP required to account for the Modification. The reuse of leachate will likely reduce MPPS's demand for fresh water.

Project Element	Description	Environmental impact resulting from the modification
Ash Management	Increased potential for reuse of WCA. There will be no need to build the LNAR to RL 946 m AHD using WCA, nor a requirement to encapsulate the LNAR with a 1 m thick perimeter WCA cap.	An increased opportunity for future beneficial reuse of WCA that would have otherwise been used to encapsulate and construct the LNAR to RL 946 m AHD, which would have likely sterilised the WCA for beneficial reuse. Careful placement of WCA within LNAR will allow for its recovery providing a positive environmental outcome.

Substantially the Same Development

The Modification is considered to be 'substantially the same development' as that originally approved under PA 09_0186 as:

- it is for the same purpose, being the placement of ash as is currently approved within the LNAR;
- it will occur largely within the same approved footprint of LNAR, with only minor amendments to the approved footprint, with an overall net reduction in total footprint through the excising of the Western Coal Services lands;
- it is consistent with the approved grades, landform and maximum height of RL 980 m AHD for LNAR;
- it will involve minimal operational changes to the already approved management and placement of ash within LNAR, with the changes largely relating to liner installation and leachate management;
- it will provide improved environmental controls through leachate collection, leachate management and recycling;
- it will enable a more efficient placement and ash co-placement strategy providing for greater opportunities to reuse WCA; and
- no changes are proposed to LSAR.

In terms of existing approved practices at the LNAR, the only changes relate to:

- The staged installation of a leachate barrier system (liner) to encapsulate the BCA and Solid Mixed Salts and the importation of liner materials (i.e. HDPE, LLDPE, geo-composite, geotextile and drainage materials). The staged liner installation and the importation of the necessary materials is considered likely to result in a negligible net change to trucking movements that already occur at the MPPS (see Section 7.5).
- The placement of BCA and Solid Mixed Salts below RL 946m AHD, but above the liner.
- A leachate management system to capture, manage and beneficially reuse leachate, which is to be addressed in an updated OEMP.

A qualitative and quantitative comparison of the Modification to the Mt Piper Ash Placement Project (PA 09_0186) is summarised in Table 5-3 to support the "substantially the same" test as set out in Section 4.55(1A) of the EP&A Act.

Table 5-3 Substantially the Same Comparison to Project Approval PA 09_0186

Key Project Element	LNAR (PA 09_0186)	The Modification
LNAR Boundary	Approved boundary as defined in Figure 1-2.	■ Minor amendments to the approved LNAR boundary in the context of the existing and proposed surrounding activities and interactions, including excising the Western Coal Services washery infrastructure ■ The proposed amendments are detailed in Figure 1-2
Final Ash Repository Landform Height	■ RL 980 m AHD LNAR ■ RL 1,000 m AHD LSAR	■ No change to the maximum heights
Final Landform	■ Outer batters typically 1(V):4(H) side slopes, with approximately 10 m wide benches constructed for each 10 m vertical height	■ No change to maximum grades, benches or lifts
Disturbance footprint (approximate)	■ 50 ha LNAR ■ 61 ha LSAR	■ Reduction in the modified footprint of LNAR by approximately 5 ha to excise Western Coal Services infrastructure ■ No change to LSAR
Total Approved Volumes (approximately)	■ LNAR: 8.25 M m^3 ■ LSAR: 15 M m^3	■ No change
Operational hours	■ Monday to Friday: 6am – 8pm ■ Saturday to Sunday: 6am – 5pm	■ No change
Ash type permitted for placement	■ Bottom furnace ash ■ WCA ■ BCA	■ No change
Ash Placement Requirements	■ WCA and BCA placed separately ■ BCA must be placed above RL 946 m AHD on top of WCA	■ Installation of a single HDPE liner (or equivalent) prior to the placement of BCA ■ Placement of BCA and Solid Mixed Salts from the surface of the liner up to the maximum approved LNAR height of RL 966-980 m AHD, including a capping liner

Key Project Element	LNAR (PA 09_0186)	The Modification
Water Management	■ Surface runoff from the internal surfaces is directed by a slope of around 1% to unlined internal detention basins ■ Surface runoff from the external batters is directed away from the Ash via drains into sedimentation ponds ■ Zero surface water discharge from LNAR premises	■ Installation of a leachate management system to collect leachate within the lined areas ■ Additional storage ponds to manage leachate collected from the lined areas ■ Reuse or transfer of leachate to MPPS for treatment and use in power generation ■ No other change
Rehabilitation and capping	■ Capping of 1 m WCA followed by 0.75 – 1 m thick revegetation growth media (ie. soil) ■ Final profile to promote surface water run off to reduce infiltration ■ Development of a Rehabilitation Plan	■ Placement of a very low permeability capping liner (to replace the 1 m WCA layer) followed by 0.75 – 1 m thick revegetation growth media (ie. soil) ■ No other change

5.2.2 Other Applicable Legislation

Table 5-4 below summarises other legislation considered relevant to the Modification.

Table 5-4 Relevant NSW Legislation

Statutory Requirements	Description	Relevance to the Modification	Location in Modification Report
Biodiversity Conservation Act 2016 (BC Act)	The NSW Biodiversity Conservation Act 2016 came into effect on 25 August 2017. The BC Act establishes mechanisms for: ■ The management and protection of listed threatened species of native flora and fauna (excluding fish and marine vegetation) and threatened ecological communities (TECs); ■ The listing of threatened species, TECs and key threatening processes; ■ The development and implementation of recovery and threat abatement plans; ■ The declaration of critical habitat. ■ The consideration and assessment of threatened species impacts in development assessment process; and ■ Biodiversity Offsets Scheme, including the Biodiversity Values Map and method to identify serious and irreversible impacts (SAII).	The area associated with the Modification is not currently mapped on the Biodiversity Values Map (DPIE, 2021). The LNAR (including the Modification Area) and its immediate surrounds has been previously cleared of native vegetation and remains unrehabilitated. The installation of the liner and associated leachate management infrastructure will occur within areas previously assessed and approved under PA 09_0186. Minor boundary adjustments are within areas fully disturbed by previous open cut coal mining activities, noting some sparse and patchy regrowth consisting of native and exotic species exists along the eastern boundary as detailed in Figure 1-2. Further, Figure 2-1 and Figure 2-2 demonstrate the previous land disturbance within the Modified LNAR Area due to previous mining operations. The Modification supports the existing Biodiversity Offset arrangements currently in place, therefore no further changes are required to the existing Offset package. Further discussion on biodiversity matters is provided in Section 7.7. Mitigation measures contained in the OEMP will minimise any indirect impacts to surrounding habitats. A Biodiversity Assessment Report has been completed and is provided in Appendix C.	Section 7.7 Figure 1-2 Figure 7-3 Appendix C

Statutory Requirements	Description	Relevance to the Modification	Location in Modification Report
Protection of the Environment Operations Act 1997 (POEO Act)	The POEO Act is the primary waste and pollution control legislation in NSW. Under the POEO Act, EPLs are required to authorise and regulate certain activities relating to air pollution, water pollution, noise pollution and waste management.	MPPS holds the existing EPL 13007 for two scheduled activities under the POEO Act: chemical storage and electricity generation. EPL 13007 authorises ash, amongst other wastes, generated at MPPS to be disposed of at MPPS as per condition L5.3: Brine water (solid and liquid) from the Springvale Mine Water Treatment Facility (also referred to as SWTP) is permitted to be received for storage, treatment, processing, reprocessing or disposal, as per condition L5.5. EA will liaise with the EPA should any variation to EPL 13007 be required to align with the outcomes of the water assessment and/or modification approval.	This table
Heritage Act 1977 (NSW) (Heritage Act)	The Heritage Act provides for the conservation of items of environmental heritage in NSW. It protects environmental heritage through: 1. listing on the State Heritage Register; 2. protection of certain non-Aboriginal relics; and 3. various kinds of orders.	A search of the State Heritage Register on 29 March 2021 showed that there are no listed places within proximity of the Modified LNAR. No historic heritage has ever been recorded within the area associated with this Modification. The Modification will occur on lands disturbed by previous mining activities and as approved under PA 09_0186. Minor LNAR boundary adjustments also occur on disturbed lands, as shown in Figure 1-2.	Section 7.7
National Parks and Wildlife Act 1974 (NPW Act)	Sections 86, 87 and 90 of the NPW Act provide that Aboriginal objects and places must not be harmed or desecrated except in accordance with an Aboriginal Heritage Impact Permit (AHIP). AHIPs are issued by Heritage NSW.	The LNAR (as modified) is not identified as an Aboriginal Place under the provisions of the NPW Act. An Aboriginal Heritage Information Management Systems (AHIMS) Extensive search was conducted on 29 March 2021 and listed a number of Aboriginal sites located within the search area. No AHIMS sites are recorded within the area associated with this Modification, being the LNAR footprint, including the boundary footprint adjustments as detailed in Figure 1-2. Furthermore, the area holds little potential for the existence of undetected Aboriginal sites due to the high levels of prior disturbance.	Section 7.7

Statutory Requirements	Description	Relevance to the Modification	Location in Modification Report
Water Management Act 2000 (WM Act)	Among other things, the WM Act contains licence/approval requirements for water use, water management works, drainage or flood works, controlled activities and aquifer interference.	SSD projects do not require a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the Water Management Act 2000, in accordance with Section 4.41 of the EP&A Act. The installation of the liner and associated leachate management infrastructure will not intercept groundwater and approvals relating to aquifer interference are not required. No changes to existing water licencing and allocations for MPPS are required.	Table 5-4

5.2.3 State Environmental Planning Policies

Table 5-5 below summarise other policies considered relevant to the Modification.

Table 5-5 Relevant State Environmental Planning Policies

Statutory Requirements	Description	Relevance to the Modification	Location in Mod Report
State Environmental Planning Policies (SEPP)			
State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011	The State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 replaced the Drinking Water Catchments Regional Environmental Plan No. 1 and specifically requires all proposed developments in the Sydney drinking water catchment to demonstrate a neutral or beneficial effect (NorBE). The aims of the SEPP are to: (a) to provide for healthy water catchments that will deliver high quality water while permitting development that is compatible with that goal; (b) to provide that a consent authority must not grant consent to a proposed development unless it is satisfied that the proposed development will have a neutral or beneficial effect on water quality, and (c) to support the maintenance or achievement of the water quality objectives for the Sydney drinking water catchment.	The Modification is located within the Sydney Drinking Water Catchment. Under clause 10 of the Sydney Drinking Water Catchment SEPP, "*a consent authority must not grant consent to the carrying out of development in the drinking water catchment unless it would have a "neutral or beneficial effect on water quality"* (the 'NorBE' test). The Water Assessment located in Appendix B concludes that the Modification: ■ incorporates Water NSW's current recommended practices and standards; and ■ will provide an improved environmental outcome for Wangcol Creek and thereby have a neutral or beneficial effect on water quality.	Section 7.2 Appendix B
State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala SEPP 2021)	The Koala SEPP 2021 was made and commenced on 17 March 2021. It reinstates the policy framework of SEPP Koala Habitat Protection 2019 to 83 local government areas (LGAs). For all RU1, RU2 and RU3 zoned land outside of the Sydney Metropolitan Area and the Central Coast, Koala SEPP 2020 continues to apply. Koala habitat is defined in Part 1 (4) of the Koala SEPP 2021 as: **core koala habitat** means—	The Lithgow LGA is listed in Schedule 1 of the Koala SEPP 2021. The Modification is located on land zoned SP2 and as such the provisions of Koala SEPP 2021 applies (ie it is not zoned RU1, RU2 and RU3 to which the Koala SEPP 2020 continues to apply for land outside the Sydney Metropolitan Area and the Central Coast). The areas of minor extension of the LNAR boundary contain no established vegetation, as detailed in Figure 1-2.	Section 7.7 Figure 1-2 Figure 5-1 Appendix C

Statutory Requirements	Description	Relevance to the Modification	Location in Mod Report
	(a) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or *(b) an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years.*	No Koala feed tree species listed in Schedule 2 of the Koala Habitat Protection SEPP 2020 have been recorded within the area associated with the Modification and the site does not constitute either Potential or Core Koala habitat.	
State Environmental Planning Policy (Koala Habitat Protection) 2020 (Koala SEPP 2020)	The Koala SEPP 2020 commenced on 30 November 2020 and replaced the Koala Habitat Protection SEPP 2019. The Koala SEPP 2020 replicates the objectives and provisions of the former SEPP 44 – Koala Habitat Protection (SEPP 44) which was in force from 1995 through to 2019. The Koala SEPP 2020 applies to all RU1, RU2 and RU3 zoned land outside of the Sydney Metropolitan Area and the Central Coast.	The Modification is located on land zoned SP2. As such, the Koala SEPP 2020 is not relevant to the Modification and the provisions of the Koala SEPP 2021 apply, as discussed above.	Section 7.7 Figure 1-2 Figure 5-1

5.3 Local Statutory Context

5.3.1 Lithgow Local Environmental Plan 2014

The Modification is situated within the Lithgow LGA and the provisions of the Lithgow Local Environmental Plan 2014 (LEP 2014) apply. The Modification is located within land zoned SP2 Infrastructure (Electricity Generating Works) under the Lithgow LEP (refer to Figure 5-1).

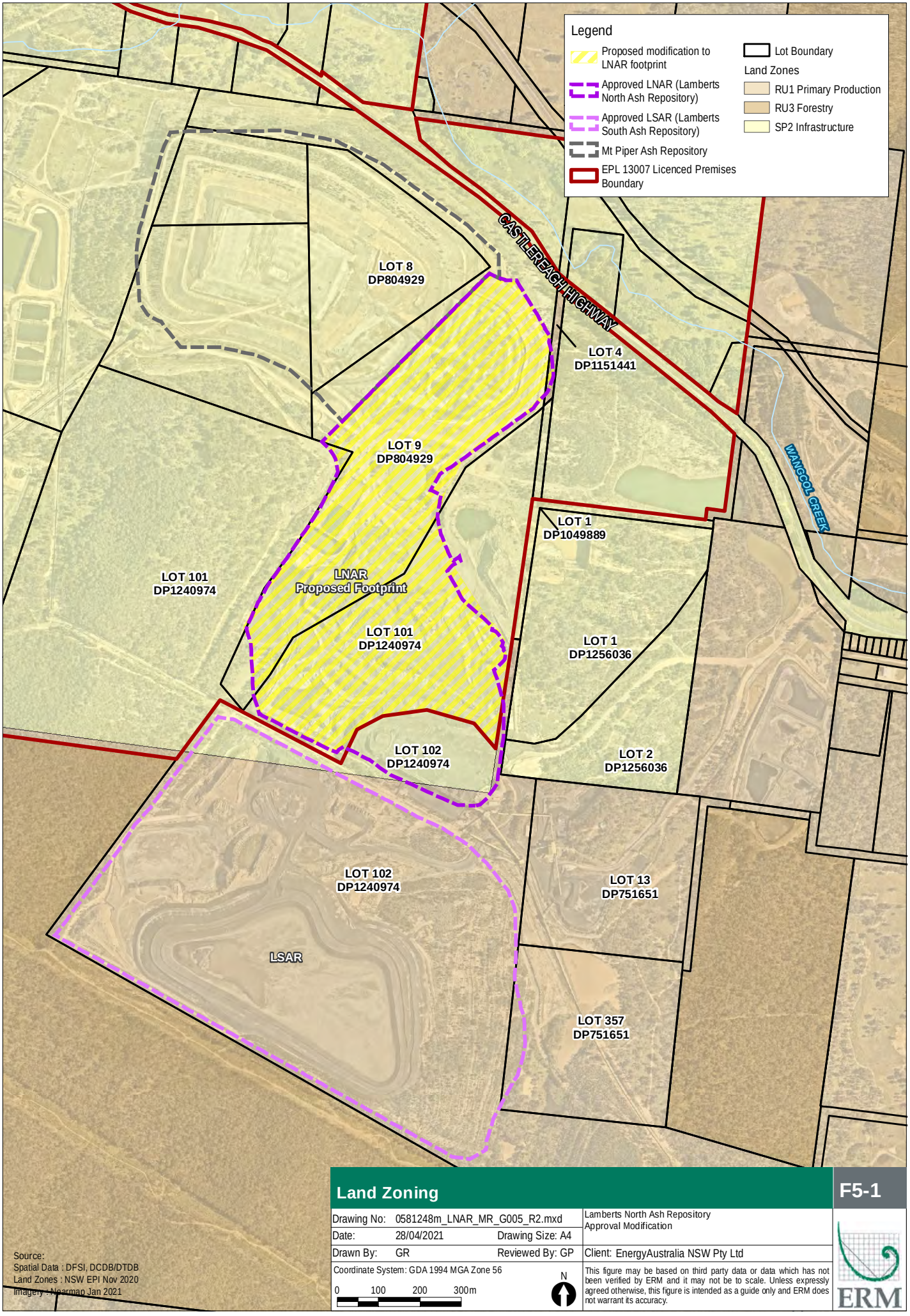
The objectives of the SP2 Infrastructure zone are:

- To provide for infrastructure and related uses;
- To prevent development that is not compatible with or that may detract from the provision of infrastructure; and
- To maintain or improve the water quality of receiving water catchments.

The Modification constitutes development that is compatible and will be ancillary to existing electricity generating activities of MPPS. The development will have a neutral effect on the drinking water catchment through design that is compliant with relevant regulatory guidelines, including the Landfill Design Guidelines for the Ash Placement Facility (refer Water Assessment in Appendix B).

5.3.2 Lithgow Development Control Plan

There are currently no development control plans applicable to the Lithgow LGA following the repeal of all development control plans on 20 January 2017, as detailed on Council's website (LCC, 2021).



Source:
Spatial Data : DFSI, DCDB/DTDB
Land Zones : NSW EPI Nov 2020
Imagery : Nearmap Jan 2021

Land Zoning

F5-1

Drawing No:	0581248m_LNAR_MR_G005_R2.mxd		Lamberts North Ash Repository Approval Modification
Date:	28/04/2021	Drawing Size: A4	
Drawn By:	GR	Reviewed By: GP	Client: EnergyAustralia NSW Pty Ltd

Coordinate System: GDA 1994 MGA Zone 56

0 100 200 300m

N

ERM

5.4 Policies, Guidelines and Strategies

5.4.1 Central West and Orana Regional Plan 2036

The Central West and Orana Regional Plan 2036 (Regional Plan) is the NSW Government's strategy for guiding land use planning decisions for the Central West and Orana region for the next 20 years. It applies to the Lithgow Local Government Area.

The Regional Plan sets out four goals for the Central West and Orana region:

- The most diverse regional economy in NSW;
- A stronger, healthier environment and diverse heritage;
- Quality freight, transport and infrastructure networks; and
- Dynamic, vibrant and healthy communities.

The Modification meets the Regional Plan through facilitating a stronger, healthier environment through, and facilitating quality infrastructure. As stated in the preceding sections, the Modification will strengthen environmental controls associated with capturing and managing the leachate from the co-placement of BCA and Solid Mixed Salts so that the LNAR achieves is approved environmental outcomes. This will improve environmental outcomes, through reducing the risk of leachate escape to the surrounding environment which forms part of the Sydney Drinking Water Catchment (refer Appendix B).

5.4.2 Landfill Design Guidelines

The NSW EPA Environmental Guidelines Solid Waste Landfills (2016) provide minimum standards for landfilling in NSW. The basis of the concept design is aimed at conforming with the Guidelines. The leachate barrier system (using very low permeability liner materials), storage and disposal/treatment arrangements and capping works have been designed in accordance with the minimum standards stipulated in EPA Guidelines for General Solid Waste, as discussed in Table 5-6 and detailed in Appendix A.

Table 5-6 Consideration of EPA Environmental Guidelines for Solid Waste Landfills

Requirement	Required Outcomes	Modification Compliance
Leachate Barrier System (liner)	■ The ash repository must have a leachate barrier system to contain leachate and prevent the contamination of surface water and groundwater over the life of the ash repository. ■ Pollutants with the potential to degrade the quality of groundwater must not migrate through the strata to any point beyond the boundary of the premises or beyond 150 metres from the ash repository footprint, whichever is smaller. If this occurs, additional engineered controls may be required to prevent further pollutant migration. It may also be necessary to remediate the existing pollution.	A leachate barrier system consistent with the requirements of the Guideline will be installed as discussed in Section 4.1. A schematic depicting the conceptual leachate barrier system is provided in Appendix A. The leachate barrier system including layer arrangement and layer types was selected to conform to the minimum standards outlined in the EPA Guidelines.
Leachate storage and disposal	■ Collected leachate must be stored in appropriately sized dams or tanks, treated and/or disposed of so as not to cause environmental harm. ■ There must be sufficient leachate disposal capacity to prevent the build-up of leachate and an increase in the risks of water pollution and offensive odours. ■ Untreated leachate must not be disposed of to off-site water or land, used for dust suppression, or used to supply the water needs of any process conducted at the ash repository, such as composting. (GHD notes that treated leachate and/or leachate that conforms to required contamination levels could be used for dust suppression on BCA placement areas only).	A leachate collection system, including placement of drainage aggregate (sourced from mine spoil if available within the LNAR or bottom furnace ash, if suitable or imported from a local supplier), followed by geotextile or other equivalent infrastructure material for leachate management, and leachate sump and riser is proposed. Leachate collected will be directed to specifically built lined leachate ponds, the location and capacity of which will be determined during detailed design. Leachate pond sizing will be dependent upon the size and life of the respective lined stages. The leachate will be either transferred to MPPS for treatment and then used in the existing water management system or will be used to irrigate BCA placement areas. The presence of the liner, leachate management system and capping layer, which will be designed and implemented consistent with the requirements of NSW EPA (2016), will mitigate the potential impacts of leachate migrating to

Requirement	Required Outcomes	Modification Compliance
		groundwater and the potential for subsequent impacts to the surface water or groundwater in the vicinity of the LNAR. The OEMP will be revised to account for relevant aspects of the NSW EPA (2016) guidance required by the Modification. However, the majority of existing water management, monitoring and reporting requirements are considered suitable and will remain unchanged. Concept design drawings are provided in Appendix A. Leachate management is further discussed in the technical Water Assessment in Appendix B.
Stormwater Management	■ Controls must be implemented to minimise erosion and reduce the sediment load (suspended solids) of stormwater discharged from the site.	The water quality outcomes presented in the OEMP will be revised to account for the Modification. The revised OEMP will document groundwater and surface water management and monitoring requirements associated with the Modification, including those set out in Section 7.2.3. Water management for the LNAR is discussed further in Section 7.2 and in the technical Water Assessment in Appendix B.
Amenity issues: odour, dust, noise, litter and fire control	■ The ash repository must not adversely affect amenity in the locality, in particular: – offensive odour impacts must not occur at offsite locations; – emission of nuisance dust and other particulate matter beyond the ash repository boundaries must be minimised; – excessive noise must not be generated by activities at the site; – local amenity must not be degraded by litter from the ash repository or by mud or litter attached to vehicles leaving the ash repository; and – the risk of fire at the site must be minimised and the site must be adequately prepared in the event of fire.	As discussed in Section 4, there are no proposed changes to existing ash placement methods, intensity or duration as a result of the Modification. No additional plant and equipment to that already approved and in use under PA 09_0186 will be required for the installation of the liner and associated leachate management infrastructure (noting that specialised equipment may be required for certain tasks such as liner welding, etc). Given the context of the existing approved LNAR operations and the minimal changes resulting from the Modification, it is highly unlikely that the Modification will contribute additional air quality, odour and noise impacts to that previously assessed and approved under PA 09_0186. The Modification will operate in accordance with the existing approved Air Quality Management and Monitoring Plan (AQMMP), Soil and Surface Water

Requirement	Required Outcomes	Modification Compliance
		Management Plan (SSWMP), and the LNAR Operation Noise Management and Monitoring Plan, all sub plans of the OEMP. The Modification will also operate in accordance with the existing Emergency Response Plan and Pollution Incident Response Management Plan (PIRMP) for MPPS to minimise the risk of fire at the site and to ensure emergency preparedness.
Waste acceptance and site security procedures	■ Only authorised wastes can be received at the site. ■ Any unauthorised wastes delivered to the site must be appropriately managed and disposed of lawfully. ■ Statutory record-keeping and reporting requirements must be complied with. ■ The premises must be secure, and unauthorised entry must be prevented.	EPL 13007 authorises ash, amongst other wastes, generated at MPPS to be disposed of at MPPS as per condition L5.3: Brine water (solid and liquid) from the SWTP is permitted to be received for storage, treatment, processing, reprocessing or disposal, as per condition L5.5. Unless authorised by EPL 13007, the Modification does not propose receipt of additional wastes.
Final capping and revegetation	■ The completed ash repository must be capped and revegetated as soon as practicable after the final delivery of waste. The final capping must: – reduce rainwater infiltration into the waste and thus minimise the generation of leachate (infiltration from the base of the final cap should be less than 5% of the annual rainfall); – stabilise the surface of the completed part of the ash repository; – reduce suspended sediment and contaminated runoff; – minimise the escape of untreated gas; – minimise odour emissions, dust, litter, the presence of scavengers and vermin, and the risk of fire; and	Capping and rehabilitation of completed stages shall be undertaken as soon as practicable. The capping will be revegetated in accordance with the OEMP. Environmental management for the Modification will continue to be undertaken in accordance with the OEMP. The final cover and cap system (from top to bottom) will likely consist of: ■ Vegetation growth medium. ■ Sub-surface drainage to drain excess infiltration. ■ A liner which will be welded to the sidewall geo-membrane liner to produce a seal around the lined ash emplacement. ■ A seal bearing layer.

Requirement	Required Outcomes	Modification Compliance
	– prepare the site for its future use; this includes protecting people, fauna and flora on or near the site from exposure to pollutants still contained in, or escaping from, the landfill. During the post-closure period, the occupier must monitor the integrity and performance of the final cap.	The final cap will be installed to reduce rainwater infiltration into the ash repository, targeting less than 5% of the annual rainfall.
Closure	■ The ash repository must continue to be non-polluting and not cause environmental harm after site closure. ■ The occupier must prepare a closure plan, setting out a program for making sure that the site does not cause environmental harm after closure. The occupier must implement the approved closure plan.	Closure of the LNAR will be in accordance with PA 09_0186, which requires the preparation of a Site Rehabilitation Management Plan (as part of the OEMP) and a Project Completion Management Plan to be prepared no later than one month prior to the decommissioning of LNAR. The Project Completion Management Plan is to include: ■ measures to reduce impacts on the environment and surrounding sensitive land uses; ■ groundwater assessment criteria, groundwater monitoring program and contingency plan; and ■ surface water criteria, monitoring program and contingency plan.

6. STAKEHOLDER ENGAGEMENT

EnergyAustralia has undertaken consultation with relevant government agencies and the community as detailed herein. EnergyAustralia is committed to ongoing engagement with regulators and the community regarding it activities at MPPS.

6.1 Agency Engagement

Engagement that has been undertaken with government agencies associated with the Modification is summarised in Table 6-1. The agencies were supportive of the intended outcomes of the Modification and improved environmental outcomes to be achieved through its implementation.

Table 6-1 Summary of Government Consultation

Government Agency	Consultation undertaken by EnergyAustralia
NSW Department of Planning, Industry and Environment (DPIE)	■ EnergyAustralia engaged with DPIE around the intention to lodge a future modification application for LNAR via email on 5 February 2021. ■ A briefing memo was prepared and submitted to DPIE on 19 February 2021 providing an overview of the proposed modification ■ The proposed Modification was subsequently presented to DPIE via a teleconference on 23 February 2021, including engagement around the planning and approval pathway and seeking input into the requirements for the Modification Report. ■ A formal Scoping Letter was submitted to DPIE on 17 March 2021. ■ Subsequent email correspondence with DPIE relating to the proposed modification. ■ Confirmation from the DPIE that the proposed changes to the LNAR would be assessed as a Modification under Section 4.55 of the EP&A Act.
Lithgow City Council (LCC)	■ EnergyAustralia actively engages with LCC every 1 – 2 months to discuss all relevant developments and activities relating to EnergyAustralia's broader operations. The proposed modification has been discussed with LCC during a meeting held 12 February 2021 and 29 April 2021. Ongoing liaison will occur at future regularly scheduled meetings.
DPIE - Water	■ EnergyAustralia engaged with DPIE- Water around the intention to lodge a future modification application for LNAR via email on 24 February 2021. DPIE – Water advised via email dated 15 March 2021 that the Natural Resources Access Regulator (NRAR) can advise on any regulatory issues associated with the Modification and that there was no need to brief DPIE Water any further.
NRAR	■ EnergyAustralia engaged with NRAR around the intention to lodge a future modification application for LNAR via email on 24 February 2021. ■ The proposed Modification was subsequently presented to NRAR via teleconference on 11 March 2021, including seeking input into the requirements for the Modification Report.

Government Agency	Consultation undertaken by EnergyAustralia
WaterNSW	■ EnergyAustralia engaged with Water NSW around the intention to lodge a future modification application for LNAR via email on 24 February 2021. ■ The proposed Modification was subsequently presented to Water NSW via a teleconference on 11 March 2021, including seeking input into the requirements for the Modification Report.
EPA	■ EnergyAustralia engaged with the EPA around the intention to lodge a future modification application for LNAR via email on 24 February 2021. ■ The proposed Modification was subsequently presented to the EPA via a teleconference on 11 March 2021, including seeking input into the requirements for the Modification Report.
DPIE – Environment Energy and Science Group (Biodiversity and Conservation)	■ EnergyAustralia engaged with DPIE – EES Group around the intention to lodge a future modification application for LNAR via email on 23 April 2021.
Transport for NSW (TfNSW)	■ EnergyAustralia engaged with TfNSW around the intention to lodge a future modification application for LNAR via email on 31 March 2021. ■ The proposed Modification was subsequently presented to TfNSW via a teleconference on 28 April 2021

6.2 Community Engagement

EnergyAustralia has a strong ongoing relationship with the local community and undertakes regular community consultation through the existing Mt Piper Community Consultation Committee (CCC) for operations associated with the MPPS and via community newsletters and website materials.

6.2.1 Mt Piper Community Consultative Committee.

The CCC has been consulted regarding the proposed Modification at the following CCC meetings:

- 1 March 2021; and
- 7 December 2020.

Meeting minutes and the presentations from the CCC meetings have been uploaded onto the EnergyAustralia website: Mt Piper Community Consultative Committee Meetings Notes.

6.2.2 Ongoing Engagement

Ongoing community consultation relating to the Modification will include:

- engagement with regulators, as relevant;
- consultation with MPPS CCC in future CCC meetings regarding the status of the Modification;
- newsletter / website updates; and
- engagement with other community members as requested.

7. ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Overview

The following sections provide a description of the existing environment and an assessment of the environmental impacts associated with the Modification, along with recommended safeguards and management measures to minimise impacts to the environment. The impact assessment is supported by a detailed technical Water Assessment, provided in Appendix B.

7.2 Water Assessment

7.2.1 Existing Environment

As set out in Section 2.1, the LNAR and adjacent lands are heavily disturbed and located in an area of long-term coal mining activity that has taken place since the 1940's. Much of the surrounding area, including the areas associated with the LNAR boundary adjustments, still require final rehabilitation to be undertaken. The historical mining, related activities and subsequent ash placement activities have resulted in significant variation to pre-existing natural hydrology, geology and hydrogeology within and around the LNAR. Despite this, the LNAR and its immediate surrounds lie within the Wangcol Creek catchment, which forms part of the upper Coxs River Catchment.

The boundary adjustments associated with the Modification are negligible in terms of potential impact to existing and approved topography and hydrology, remain within the Wangcol Creek catchment and are not specifically considered further in this assessment.

7.2.1.1 Surface Water

Surface water in Wangcol Creek, north of the LNAR, is characterised by elevated concentrations of sulfate, iron and manganese. This reflects the nature of the local geology, which includes out cropping coal seams, many of which have been mined.

Concentrations of other constituents, including chloride, boron and nickel, have been recorded in surface water at the Wangcol Creek and have been reported as elevated relative to background since approximately 2010 (ERM, 2019). The greater frequency of elevated concentrations of other constituents relative to background is associated with groundwater containing elevated levels of TDS migrating to the surface water of Wangcol Creek.

Wangcol Creek has been heavily modified by historic mining activities including diversions and the removal of coal from beneath it which has left deep ponds where the mining voids still exist. The Wangcol Creek is also the recipient of licenced surface water discharges from existing activities in the local area.

The LNAR is part of the Upper Nepean Upper Nepean and Upstream Warragamba Water Source, Wywandy Water Management Area. The Modification does not require access to additional surface water resources during operations and will not impact surface water available for use in the downstream catchment areas.

7.2.1.2 Groundwater

As a result of historical mining, ash placement and regional background conditions, groundwater in the vicinity of the LNAR is typically elevated in salts and metals, including sulfate, chloride, nickel, iron and manganese as well as some trace elements such as zinc and boron (ERM, 2020a).

There are no registered users of groundwater within a 2 km radius from the LNAR, and no nearby sensitive groundwater receptors, however groundwater is known to interact with the nearby surface water of Wangcol Creek. The Modification does not propose to access the groundwater resource during operation and will not impact groundwater water available for use in the local groundwater catchment.

7.2.2 Assessment of Impacts

Based on review of the key elements associated with the Modification, the environmental setting, water cycle management and the water balance, the following items represent a change in the existing approved processes or practices and will be assessed in the following subsections:

- placement of BCA and Solid Mixed Salts from the surface of the liner up to the maximum approved LNAR height, rather than placement of BCA and Solid Mixed Salts in unlined areas;
- capture, storage and reuse or transfer (to MPPS) of leachate from the lined BCA and Solid Mixed Salts placement areas; and
- the installation of leachate holding ponds.

7.2.2.1 Placement of BCA and Solid Mixed Salts

The placement of BCA and Solid Mixed Salts from the surface of the liner up to the maximum approved LNAR height represents a change in the existing approved practices for the LNAR. In accordance with the Concept Design, the proposed change in placement method will be designed and implemented in accordance with the minimum standards presented by NSW EPA (2016).

There are no changes proposed to the existing management of stormwater run-off from the internal or external areas of the LNAR, and no changes to the existing approved ash placement volumes. Accordingly, stormwater run-off will continue to be managed by the existing SSWMP which is a sub-plan of the OEMP. The SSWMP includes a concept Erosion and Sediment Control Plan (ESCP) which was developed as part of the Water Management System (WMS) of the SSWMP.

Implementation of the change in BCA and Solid Mixed Salts placement method in accordance with the minimum standards presented by NSW EPA (2016) will mitigate the potential for leachate escape to the surface water or groundwater.

7.2.2.2 Leachate Management

A leachate management system will be developed as part of the Modification detailed design and this represents a change in the existing approved practices for the LNAR. The Concept Design provides an assessment of potential leachate volumes using the Hydrologic Evaluation of Landfill Performance (HELP) Model software package, noting that this will be refined during the detailed design of the lined ash placement stages. The leachate management system will capture, store and reuse or transfer leachate generated from the lined BCA and Solid Mixed Salts placement areas. The Water Balance presented in the Water Assessment (Appendix B) indicates that leachate generation will be readily utilised via irrigation or conditioning of ash at the LNAR, or may be transferred to the MPPS water management system for treatment prior to use in electricity generation as needed.

Implementation of the leachate management system will include installation of leachate holding ponds, transfer pipelines and pumping infrastructure (as required) which represents a change in the existing approved practices for the LNAR. The leachate management system will be implemented in accordance with existing approved practices and NSW EPA (2016).

The design and implementation of the leachate barrier system will be in accordance with the minimum standards presented by NSW EPA (2016). Whilst the majority of the area underneath and around the LNAR has been mined using open cut methods, there are small areas near the western boundary of the LNAR where remnant pillars remain. To minimise the consequence of potential mine subsidence associated with these remnant pillars, the Concept Design includes a conceptual leachate barrier support system consisting of additional liner layers installed beneath the leachate barrier system in

areas of potential mine subsidence risk. It may be possible to avoid these areas and this will be assessed during the detailed design phase of the LNAR liner components.

Implementation of the leachate barrier system in accordance with the minimum standards presented by NSW EPA (2016) and with the leachate barrier support system will mitigate the potential for adverse impacts to the surface water or groundwater resulting from the Modification.

7.2.2.3 Neutral or Beneficial Effect Assessment

Sydney Drinking Water SEPP requires an assessment of how the Modification would have a neutral or beneficial effect (NorBE) on water quality during its installation and operation. A NorBE assessment has been completed as part of the Water Assessment in Appendix B.

Implementation of the Modification in accordance with NSW EPA (2016) will mitigate the potential for leachate to migrate into the surrounding groundwater and surface water systems. Appropriately sized and lined leachate holding ponds and the operation of transfer pipelines will also mitigate the risk of leachate escaping to the surrounding environment. In addition, the existing approved storm water management practices and controls are considered suitable to mitigate the potential surface water impacts from the Modification. Overall, the Modification will have a neutral or beneficial effect on water quality by providing the ability to capture, store and reuse or treat leachate from the BCA placement areas, limiting the migration of leachate from the LNAR (as modified).

7.2.3 Mitigation and Management Measures

The water quality outcomes presented in the OEMP (EnergyAustralia, 2019), outline that the quality of water in Wangcol Creek, or groundwater underlying the site is not impacted by the Lambert's North Ash Placement operations. These water quality outcomes are assessed via a long-term monitoring program designed to measure long-term variation in water quality from historical baseline values that are attributable to ash placement operations at Lamberts North.

The OEMP will be revised to account for the Modification, and water quality outcomes will be developed with respect to the specific context of the Modification objectives and operations. The revised OEMP will document groundwater and surface water management and monitoring requirements associated with the Modification, including (but not limited to) the following items:

- frequency and schedule of inspections and maintenance, including visual inspections of the Project infrastructure (pumps, pipe work, ponds) for leaks etc.;
- roles and responsibilities;
- leachate management control:
  - limiting the area of exposed ash above lined areas;
  - control of rainfall runoff away from lined ash placement areas;
  - adequate compaction of placed materials to limit the rate of infiltration; and
  - capping and progressive rehabilitation of capped areas as soon as practicable.
- surface water run-off controls:
  - staged use of temporary and permanent cover as needed based on LNAR operations;
  - diversion of run-off from upslope / upper catchment areas;
  - internal run-off to internal holding basins; and
  - external run-off around external batters to storm water holding ponds.
- emergency procedures – to respond to potential infrastructure failures and leaks, as well as environmental events (bushfire, flood, etc.);
- monitoring requirements– monitoring of leachate, groundwater and surface water levels and water quality in the LNAR Area, including;

- monitoring network (i.e. for groundwater and surface water);
- leachate generation, quality and storage volumes;
- leak detection bores (i.e. for leachate storage infrastructure);
- frequency and schedule of monitoring;
- monitoring methodologies i.e. field methods, decontamination procedures, quality control / quality assurance procedures; and
- monitoring parameters (i.e. water levels, flow rates, physical and chemical properties);

- assessment criteria including Environmental Goals;
- reporting in line with the existing reporting requirements; and
- contingency measures.

7.3 Air Quality

7.3.1 Existing Environment

The area surrounding the LNAR is dominated by MPPS, Western Coal Services, mining operations and the traffic use along the Castlereagh Highway. Air quality in the LNAR locality is influenced by these existing operations and uses. MPPS undertakes regular air quality monitoring as required by EPL 13007.

EnergyAustralia operate and maintain two air quality monitoring stations at Blackmans Flat and Wallerawang which include monitoring of particulates (PM_{10} and $PM_{2.5}$), among other air pollutants. EnergyAustralia publishes monthly Environmental Monitoring Data Reports on their website, which provides a summary of the air quality monitored at their two monitoring stations. In addition there are five dust deposition gauges which also monitor particulates in the vicinity of MPPS.

The AEMR (EA, 2020) reported that the annual average PM_{10} result for the reporting period was 23 $\mu g/m^3$ which is below the annual average criteria of 30$\mu g/m^3$. The report includes analysis of continuous air quality (PM_{10}) monitoring data from the Blackmans Flat, Wallerawang and Lamberts North air quality stations undertaken for the reporting period. The analysis indicates that all high-level events may be attributed to sources other than the LNAR. Refer: (https://www.energyaustralia.com.au/sites/default/files/2020-12/AEMR Lamberts North 2019-2020.pdf

The AEMR concluded that air quality management controls as set out in the OEMP have been effective and will continue to be implemented for the LNAR (as modified).

7.3.2 Assessment of Impacts

There are no proposed changes to approved ash placement methods, intensity or duration as a result of the Modification. These activities are approved under PA 09_0186 and have been previously quantitatively assessed in the Mt Piper Ash Placement Project EIS (SKM, 2010) with monitoring in place to demonstrate general compliance with performance criteria. Apart from specialised equipment (such as that required to weld the liner components), no additional plant and equipment to that already approved and in use under PA 09_0186 will be required for the installation of the liner and associated leachate management infrastructure.

Therefore, given the context of the existing approved LNAR operations and the nature of the Modification, it is unlikely that the Modification would contribute additional air quality impacts to that previously assessed and approved under PA 09_0186.

7.3.3 Mitigation and Management Measures

LNAR operates in accordance with an AQMMP, a sub plan of the OEMP which has been developed to address condition D3(d) of PA 09_0186 relating to air quality. An Air Quality Monitoring Program is provided in Section 6.6.6 of the AQMMP to address condition E18 of PA 09_0186, and is required for

the ongoing life of the LNAR, and during final rehabilitation and stabilisation of the site. Air quality monitoring is also required by EPL 13007.

The AQMMP provides a framework for EnergyAustralia, its contractors and vendors to manage air quality and to minimise the potential for adverse impacts to sensitive receivers during the operation of LNAR.

The following management measures will continue to be implemented to minimise dust generation and the risk of off-site dust emissions during liner and water management infrastructure installation as well as the ongoing operation of LNAR,:

- dust suppression / watering or covering exposed areas;
- dust generating works will be limited where possible during strong winds;
- vehicles transporting waste or other materials that may produce dust will be covered during transportation; and
- stockpiles or areas that may generate dust will be managed to minimise dust emissions.

7.4 Noise

7.4.1 Existing Environment

The existing noise environment in the broader vicinity of the LNAR is best described as ‘rural’, despite the surrounding industrial premises and land uses near the LNAR (e.g. MPPS). This definition is in accordance with the Noise Policy for Industry (EPA, 2017) as it is an area with an acoustical environment that is predominately a rural setting, and generally characterised by low background noise levels. This area often has evening ambient noise levels defined by the natural environment and human activity.

The immediate vicinity of the LNAR includes the Ben Bullen State Forest which predominately surrounds the LNAR, and other mining and associated activities located to the north, east and south. Noise sources at Springvale Colliery which lies to the south east of LNAR have been assessed as contributing to the ambient noise measured for sensitive receivers of the LNAR through activities such as transportation of coal via conveyors and operations of mobile and stationary plan (Aurecon, 2019a).

Periodic noise monitoring is conducted at the closest residence (sensitive receivers) to the LNAR. The two sensitive receivers are located at Blackmans Flat approximately 1 km to the east of LNAR and at Wallerawang approximately 2.5 km south east of LNAR (Aurecon, 2019b) and are described in Table 7-1.

Table 7-1 Sensitive receivers nearest to LNAR

Location ID	Description	Map Coordinates	Noise monitoring location	Approximate Distance from LNAR
Location 1	Blackmans Flat	33.36468ºS 150.05904ºE	Located at the western end of Noon Street on the southern side of the road. Positioned at the boundary of the residential property 90 m from the Castlereagh Highway.	1 km east
Location 2	Wallerawang	33.374001ºS 150.065370ºE	Situated on a rural property southeast of Lamberts North, and approximately 650 m from Castlereagh Highway.	2.5 km south east

The MPPS and adjoining roads and mining activities generate a level of existing noise in the vicinity of the LNAR. Sources of operational noise approved at the LNAR and MPAR involves the transportation, distribution and compaction of the ash within placement areas using dumpers, dozers, drum rollers and water carts (SKM, 2010). Operational activities associated with the LNAR are permitted from 6.00 am to 8.00 pm Monday to Friday and 6.00am to 5.00pm Saturday and Sunday excluding emergency events defined in Condition E1 and E2 of PA 09_0186.

The cumulative operational noise criteria for the LNAR and ash haulage activities is defined in condition E7 of PA 09_0186, and is identified in Table 7-2:

Table 7-2 Operational Noise Criterion (LAeq(15 minutes) dB(A))

Location ID	Location	L_{Aeq} (15 minute) dB(A)		
		Day (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
1	All private sensitive receivers within the township of Blackmans Flat	42	38	35
2	All other sensitive receivers	42	38	35

Note: These criteria do not apply where the Proponent and an affected landowner have reached a negotiated agreement in regard to noise, and a copy of that agreement has been forwarded to the Director-General and the NSW EPA.

The noise criteria set out above applies under all meteorological conditions except for any of the following:

a) wind speed greater than 3 metres/second at 10 metres above ground level;

b) stability category F temperature inversion conditions and wind speed greater than 2 metres/second at 10 metres above ground level; and

c) stability category G temperature inversion conditions.

The AEMR reported that noise from LNAR was inaudible at sensitive receivers during the reporting period (EnergyAustralia, 2020), refer: (https://www.energyaustralia.com.au/sites/default/files/2020-12/AEMR Lamberts North 2019-2020.pdf

This conclusion was based on compliance monitoring conducted in October 2019 and May 2020 in accordance with the LNAR Operation Noise Management and Monitoring Plan (ONMMP). Based on the worst–case noise modelling predictions undertaken, the noise resulting from the operation of equipment and mobile plant at the LNAR were below the LAeq(15min) 42dBA criterion in PA 09_0186 and were therefore deemed to comply with the OEMP at the representative residential receivers (EnergyAustralia, 2020).

Worst–case noise modelling predictions were also included in the AEMR, which reported that in this scenario, the noise resulting from the operation of equipment and mobile plant at the LNAR would still be below the LAeq(15min) 42dBA Conditions of Approval (CoA) criterion and therefore would comply with the OEMP at the sensitive receivers (EnergyAustralia, 2020).

The ONMMP is a sub plan of the OEMP which was prepared to meet the requirements of conditions D3(a) and E7 to E14 of PA 09_0186. In accordance with condition E12 of PA 09_0186, an Operational Noise Monitoring Program has been implemented to assess compliance against the operational noise criteria stipulated in condition E7 of PA 09_0186. The Operational Noise Monitoring Program is provided in Section 6.3.5 of the ONMMP.

7.4.2 Assessment of Impacts

There are no proposed changes to approved ash placement methods, intensity or operational times as a result of the Modification. Apart from specialised equipment (such as that required to weld the liner components) no additional plant and equipment to that already approved and in use under PA 09_0186 will be required for the installation of the liner and associated water management infrastructure.

Therefore, given the context of the existing approved LNAR operations and the nature of the Modification, it is unlikely that the Modification would contribute additional noise impacts to that previously assessed and approved under PA 09_0186.

As discussed in the above section, the closet sensitive receivers are located at Blackmans Flat approximately 1 km to the east of LNAR and at Wallerawang approximately 2.5 km south east of LNAR. Given the context of the existing MPPS operations and surrounds, the Modification is unlikely to contribute additional noise impacts to these sensitive receivers.

In terms of traffic noise, as discussed in Section 7.5, the estimated number of trucking movements associated with the importation of liner and associated drainage aggregate is within the range of that previously assessed and approved as part of PA 09_0186 and development consent 80-10060.

7.4.3 Mitigation and Management Measures

The ONMMP addresses the specific requirements of PA 09_0186 for LNAR relating to noise and vibration during operation. The following management measures will continue to be implemented to minimise noise generation:

- 6.00 am to 8.00 pm Monday to Friday and 6.00am to 5.00pm Saturday and Sunday excluding emergency events;
- unnecessary noise will be avoided by minimising idling diesel engines and using lower engine speeds where practicable;
- all machines used for the Modification will be in good condition, and particular focus will be placed on exhaust silencers, covers on engines and transmissions and squeaking or rattling components. Excessively noisy machines will be repaired or removed from the LNAR where practicable;
- all plant, equipment and vehicles will incorporate non-tonal or quacker alarms where feasible and reasonable; and
- if any validated noise complaints are received, operator attended noise measurements will be undertaken to measure and compare the noise level contributions to background noise levels. If the measured noise levels are above calculated noise management levels, further mitigation and/or management measures will be considered.

7.5 Traffic

7.5.1 Existing Environment

The Great Western Highway is a State highway running in a north westerly direction from Sydney to western NSW. The Castlereagh Highway is a State highway that starts north of the Great Western Highway in Marrangaroo (north of Lithgow) and extends beyond the NSW-Queensland (QLD) border (near Lightning Ridge). Between the Great Western Highway and Boulder Road, the Castlereagh Highway has a general sign-posted speed limit of 100 km/h. It is a two-lane, two-way road (one lane in each direction) with additional overtaking lanes and intersection turning lanes at various locations.

Boulder Road is a collector road under the control and management of LCC. It is a two-way divided road with an east-west alignment.

7.5.2 Assessment of Impacts

7.5.2.1 Traffic Generation

As stated in Section 4.2.5, it is anticipated that during liner installation, on average, around three to four (3 - 4) truck deliveries could occur per day, associated with the delivery of drainage aggregate from local suppliers and liner materials. Liner installation periods will vary depending on the size of each stage but would generally be around three to four (3 - 4) months (not including delays due to weather).

A worst case estimate of the LNAR life is 7.5 years, noting that this timeframe assumes no beneficial reuse of the ash material (ie. all ash produced is emplaced within the repository). Over the life of the repository, it is estimated that average material deliveries required to install the repository liner would equate to around two (2) trucks per week.

The estimated number of trucking movements is well within the range of that previously assessed and approved as part of both the Mt Piper Ash Placement Project (LNAR and LSAR) PA 09_0186 and MPPS development consent 80-10060. Considering the opportunities around beneficial reuse, the separation of WCA and BCA, enabling recovery / sale of WCA could double the life of the repository. This would reduce the average number of trucks required for the liner installation over the life of LNAR to around one (1) truck per week on average.

In December 2017, The Transport Planning Partnership (TTPP, 2019) carried out a road survey of the Great Western Highway, Castlereagh Highway and Boulder Road including the entrance to MPPS. These surveys identified following daily traffic movements:

- Great Western Highway– 16,504 vehicles per day (3,136 being heavy vehicles);
- Castlereagh Highway – 3,332 vehicles per day (368 being heavy vehicles);
- Boulder Road – 950 vehicles per day (133 being heavy vehicles) and
- the MPPS Entrance - 537 vehicles per day (124 being heavy vehicles).

An increase in three to four (3 - 4) vehicles per day (worst case) will result in a negligible increase in heavy vehicle traffic along the Great Western Highway (approximately 0.1 – 0.2% increase), Castlereagh Highway (1 - 2% increase) and the Boulder Road (3 - 5% increase) noting that these additional vehicles will only be for a limited time over the life of the repository, restricted to such times as when the liner is being installed.

The MPPS development consent (80-10060) provides for coal truck deliveries to MPPS in the order of 100 trucks per day. Unless specifically approved, there are limited, if any, coal truck deliveries to MPPS as most of the coal is currently delivered via overland conveyor. The average three to four (3 - 4) truck deliveries per day to MPPS is well below the 100 trucks authorised and will not result in (cumulatively) an exceedance of the 100 trucks per day authorised.

No additional workforce is associated with the liner installation and associated works as the existing workforce under PA 09_0186 will be utilised for the liner installation. Therefore, the Modification will not result in any additional light vehicle traffic generation above that which currently occurs.

7.5.2.2 Transport Routes and Intersections

Where aggregates cannot be sourced onsite, they will be sourced from approved quarries operating in the locality. These include quarries operating along the Great Western Highway in Marrangaroo, Hartley and towards Bathurst. As such, the transport route for any aggregates required will be via existing approved heavy haulage routes, including the Great Western Highway and Castlereagh Highway. Haulage of materials will also be required to comply with existing approvals for the quarry operations.

Between the Castlereagh Highway and the MPPS access point, Boulder Road is a three-lane road providing one westbound travel lane and two eastbound travel lanes. Boulder Road intersects with the Castlereagh Highway at a priority controlled T-intersection with left and right turn channelisation. As such, left turn deceleration lanes and dedicated right turn bays are provided at the intersection for the turning movements from the Castlereagh Highway to Boulder Road.

The LNAR is accessible from MPPS internal road network. There are two access points to the MPPS, which are available to access the different areas of the LNAR. These access points intersect with Boulder Road at two intersections located approximately 250 m and 850 m to the west of the Castlereagh Highway and Boulder Road intersection, respectively.

This transport route and intersection use is consistent with existing heavy haulage transport routes (RMS-approved 19 m B-double route) and with the approved coal truck movements to MPPS under development approval 80-10060, which provides for the utilisation of the public road network, including the Castlereagh Highway and Boulder Road.

7.5.2.3 Transport Hours

Delivery of aggregates and materials for the liner installation and associated works will be limited to the approved operational hours for LNAR, which are between 6am-8pm Monday to Friday and 6am – 5pm Saturdays and Sundays. Furthermore, dispatch of aggregate materials from local suppliers will need to comply with their operational hours/restrictions as set out in their development consents.

7.5.2.4 Vehicle Types

The MPPS development consent (80-10060) provides for coal truck deliveries to MPPS in the order of 100 trucks per day. Coal trucks are typically sized to transport an average load of 32 tonnes.

Where aggregates cannot be sourced onsite they will be sourced from approved local quarries via bulk deliveries in truck and dog at up to 37 tonne, 6- and 8-wheelers to 16 tonne and smaller loads over 2 tonnes.

Liner materials will likely be delivered in rigid flatbed trucks and utilise the public road network, including the Great Western Highway and Castlereagh Highway onto Boulder Road.

The type of vehicles delivering materials to MPPS for the installation of the liner will be of typical dimensions and payloads to that which currently occur.

7.5.3 Mitigation and Management Measures

The potential traffic impacts from the Modification relate to the minor additional truck movements associated with the importation of the liner and drainage aggregate, anticipated to be worst case three to four (3 - 4) truck deliveries per day. This is negligible in the context of the existing approved truck volumes under MPPS development consent (80-10060). Delivery of the liner and drainage aggregate materials and associated mitigation and management measures will be undertaken in accordance with the updated OEMP.

7.6 Visual

7.6.1 Existing Environment

The LNAR is located at the top of a valley at the foothills of the Ben Bullen State Forest, forming part of the western edge of the Great Divide. It is characterised by sandstone plateaus, gullies and rocky outcrops with moderately undulating and gentle slopes surrounding the existing townships.

The general locality is characterised by heavily vegetated steep hills with a variety of native tableland vegetation communities. The more level and undulating areas are characterised by grasslands used for grazing with a variety of larger native species scattered throughout the landscape and along roads.

The locality has a long history of coal mining and land disturbance activities, much of which is still readily apparent from the Castlereagh Highway within the LNAR Area. Existing industrial operations in the area include the MPPS, Western Coal Services coal washery operations, Springvale Water Treatment Plant, MPAR and LNAR, and the Pine Dale Coal Mine, which is an exposed open cut feature currently under care and maintenance. In addition, further west along the Castlereagh Highway, approximately 2 km beyond Boulder Road is the former Invincible Colliery.

The nearest town, approximately 1 km from LNAR's eastern boundary is Blackmans Flat. Portland and Lidsdale are also located approximately 5 km west and 3 km south-east, respectively.

A requirement of PA 09_0186 for LNAR is that it will not exceed the final maximum RL of 966-980 m AHD.

A Landscape Rehabilitation and Revegetation Plan (LRRP) which is a sub-plan of the OEMP has been prepared to address condition D3(e) and (f) of PA 09_0186.

7.6.2 Assessment of Impacts

The Modification is consistent with the approved final landform for LNAR, thus not altering final elevations approved under PA 09_0186. Visual impacts associated with the final landform and revegetation has already been assessed. The Modification will not result in additional visual impacts to nearby sensitive receptors.

7.6.3 Mitigation and Management Measures

The LRRP includes measures that aim to develop and reconstruct the landscape to minimise the visual impacts of the LNAR by ensuring the long term stabilisation and compatibility with surrounding landscapes.

The final landform of LNAR will be consistent with the approved LNAR. It will have a (maximum) 1(v) in 4(h) batter slopes (or less) with 10 m wide benches at (maximum) 10 m height intervals. The final landform would be constructed to a height of approximately RL 980 m AHD in accordance with the approved LNAR landform.

Closure of the LNAR will be in accordance with PA 09_0186, which requires the preparation of a Site Rehabilitation Management Plan (presented as the LRRP within the approved OEMP) and a Project Completion Management Plan Management Plan to be prepared no later than one month prior to the decommissioning of LNAR (see also Table 5-6).

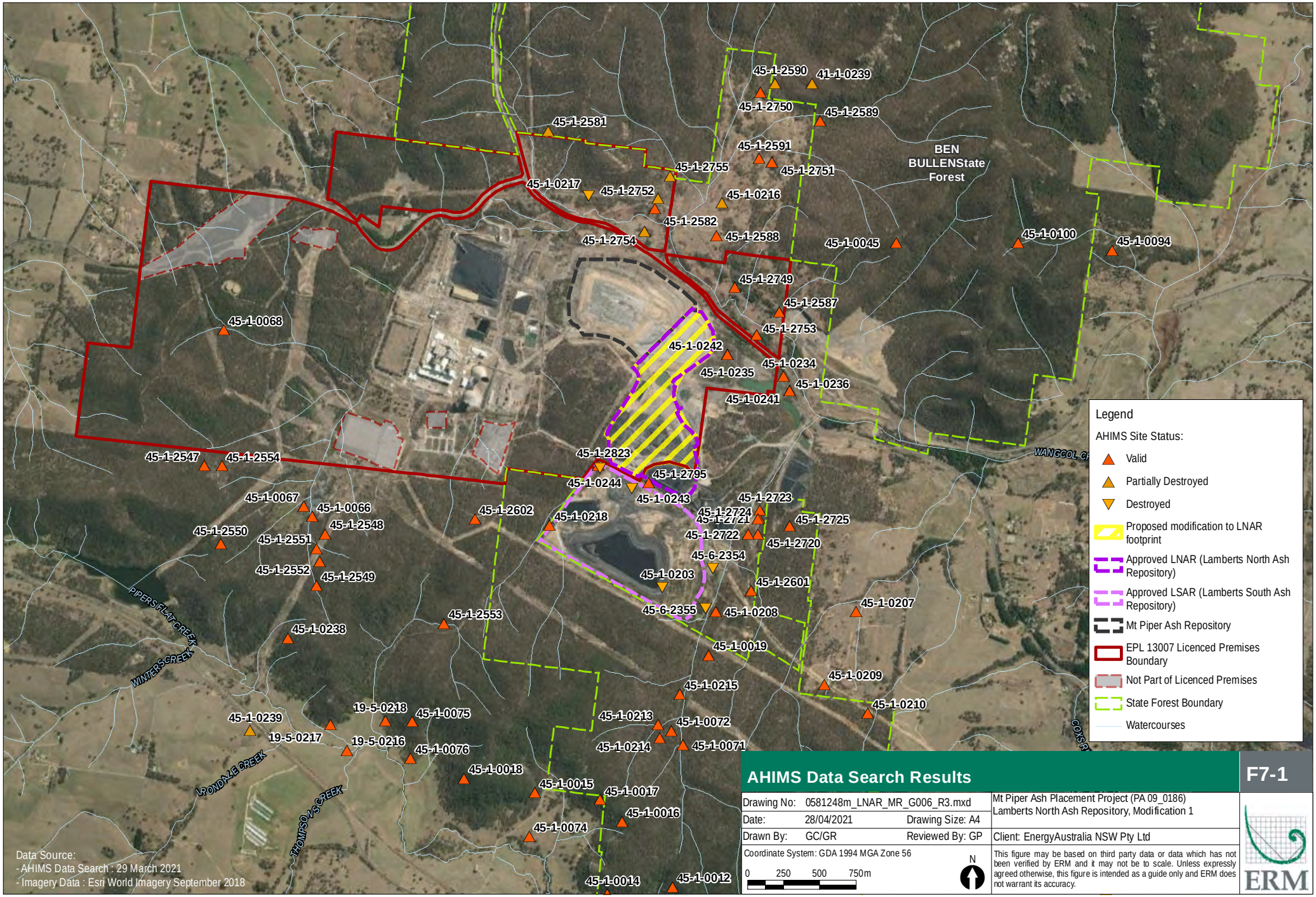
7.7 Other Environmental Impacts

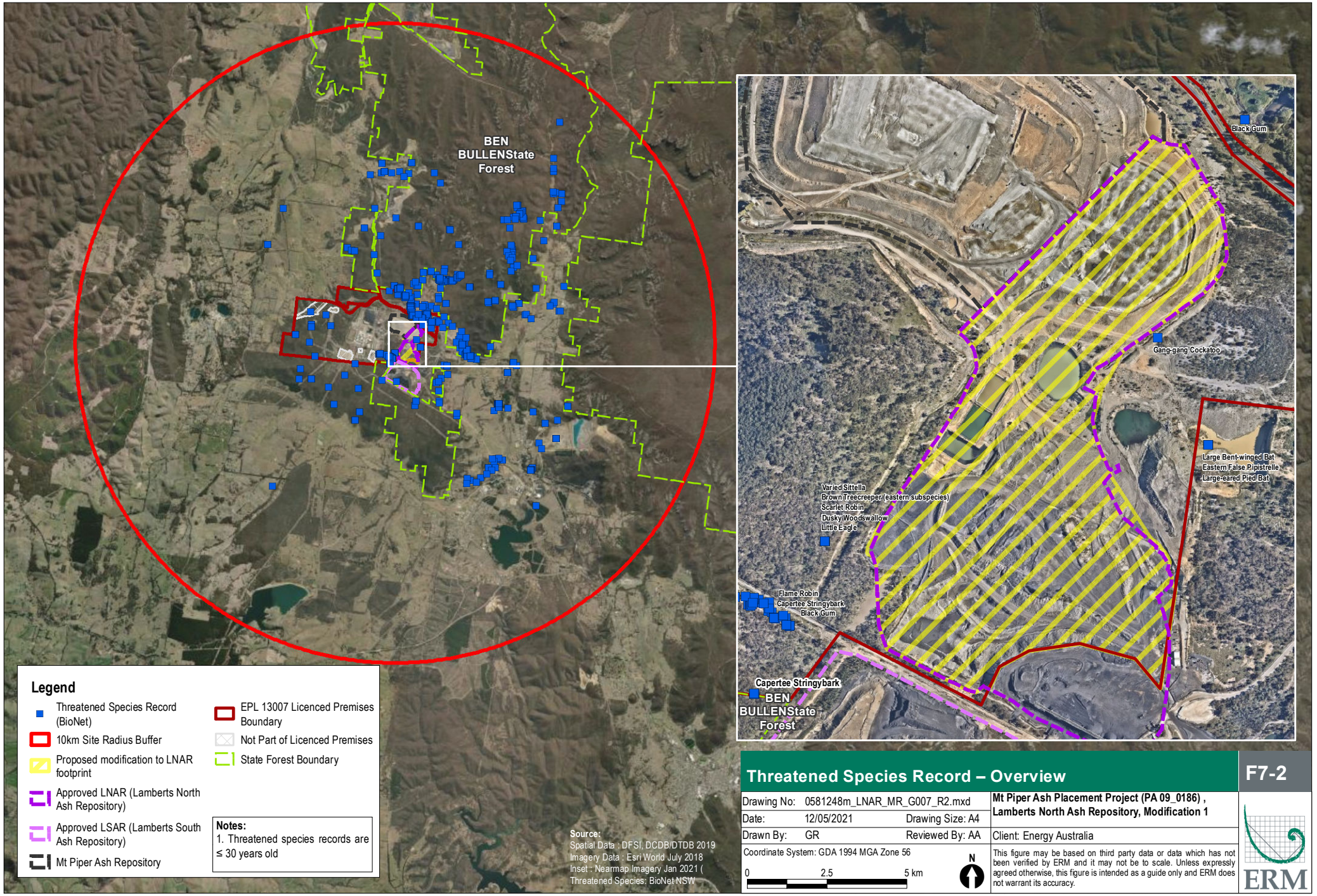
An overview of other environmental impacts is provided in Table 7-3. In summary, the Modification will have negligible impacts on the environmental aspects of contamination, biodiversity, Aboriginal heritage, and historic heritage.

Table 7-3 Overview of Other Environmental Impacts associated with the Modification

Environmental Aspect	Existing Environment	Assessment of Impacts and Mitigation
Contamination	The LNAR is positioned on land subject to former mining operations and subsequent backfilling. The LNAR is currently located within or adjacent to land currently utilised for mine water management, ash deposition and related water management infrastructure (ponds, pumps and pipelines). Potential leaks from the liner and water management infrastructure, represent potential sources of contamination for the Modification.	The Modification is limited to the installation of a liner and associated ash placement and leachate management within the approved LNAR footprint, with minor boundary adjustments and excising of the Western Coal Service area, thereby seeking to improve environmental outcomes. If encountered, contaminated materials will be managed in accordance with the existing approved OEMP, which outlines protocols for management of a contamination or pollution event to surface water or groundwater, including prompt clean up, monitoring and appropriate reporting requirements.
Aboriginal Heritage	The Modified LNAR Area is not identified as an Aboriginal Place under the provisions of the NPW Act. An AHIMS Extensive search was conducted on 29 March 2021 and listed a number of Aboriginal sites located within the search area. Nil AHIMS sites are recorded within the Modified LANR Area, being the LNAR footprint, as detailed in Figure 7-1. Nil Aboriginal places have been declared in or surrounding the search area.	The LNAR and its immediate surrounds (including those areas the subject of the minor boundary adjustments) have been previously cleared and subject to previous coal mining activities. The Modification area holds little potential for the existence of undetected Aboriginal sites due to the high levels of prior disturbance. The Modification is expected to have negligible impact on Aboriginal Places or Objects and an Aboriginal site.
Historic Heritage	A search of the State Heritage Register on 29 March 2021 showed that there are no listed places within proximity of the LNAR. No historic heritage has ever been recorded within the area associated with the Modification.	It is anticipated that the Modification will have no impact on historic heritage given none has ever been recorded within the area associated with the Modification. Mitigation and management measures contained in the OEMP will continue to be implemented to mitigate any potential risk to historical heritage. If a non-Aboriginal relic of State or local heritage significance is discovered, the Heritage Council will be notified and the relic will not be disturbed or excavated except in accordance with an excavation permit.

Environmental Aspect	Existing Environment	Assessment of Impacts and Mitigation
Biodiversity	A search of BioNet records on 25 March 2021 of threatened or migratory species within a 10 km radius of the LNAR identified that a total of 30 threatened species have been recorded within a 10 km radius. This includes 15 bird, eight mammal, five plant and one insect species. No threatened species records are recorded in the Modification Area. The PMST under the EPBC Act was conducted on 22 March 2021 to identify potential threatened and migratory species habitat within a 5 km radius of the LNAR. The predicted species included 41 threatened species of which there were ten bird, two fish, two amphibian, one insect, eight mammal, four reptile, and 14 plant species. A total of 12 migratory bird species were predicted to occur within a 5 km radius. In addition to this, three TECs were predicted to occur within the 5 km radius, which included the 'Natural Temperate Grassland of the South Eastern Highlands', 'Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion' and the 'White Box-Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland'. None of the species or TECs identified on the PMST have been recorded within the Modification Area. The Modification Area is not currently mapped on the Biodiversity Values Map. The outcomes of NSW BioNet search are presented in Figure 7-2.	A Biodiversity Assessment Report is provided in Appendix C. The Modification Area has been previously cleared of native vegetation and has not been rehabilitated. The installation of the liner and associated leachate management infrastructure will occur within areas previously assessed and approved under PA 09_0186. Minor boundary adjustments are within areas fully disturbed by previous open cut coal mining activities, noting some patchy regrowth consisting of native, non endemic and exotic species exists along the eastern boundary as detailed in Figure 1-2. Further, Figure 2-1 and Figure 2-2 demonstrate the previous land disturbance within the Modified LNAR Area due to previous mining operations. Images of the regrowth within the former (unrehabilitated) mining areas subject to the minor boundary adjustment are presented in Figure 7-3 and include *Acacia baileyana* (Cootamundra Wattle), *Acacia longifolia* (Sydney Golden Wattle), pine spp and *Cortaderia selloana* (Pampas Grass) and virtually devoid of any ground cover species. The regrowth vegetation is considered to be of very low biodiversity value. Mitigation and management measures contained as such in the OEMP will minimise any indirect impacts to surrounding habitats. The Modification will not increase the impact on biodiversity values of the LNAR as previously approved.


45-1-2590
41-1-0239
45-1-2750
45-1-2589
45-1-2581
45-1-2591
BEN BULLENState Forest
45-1-2755
45-1-2751
45-1-0217
45-1-2752
45-1-0216
45-1-2582
45-1-2754
45-1-2588
45-1-0045
45-1-0100
45-1-0094
45-1-2749
45-1-2587
45-1-0068
45-1-2753
45-1-0242
45-1-0234
45-1-0235
45-1-0236
45-1-0241
45-1-2547
45-1-2554
45-1-2823
45-1-2795
45-1-0244
45-1-0243
45-1-2723
45-1-0067
45-1-0066
45-1-2602
45-1-0218
45-1-2724
45-1-2721
45-1-2725
45-1-2550
45-1-2548
45-1-2722
45-1-2720
45-1-2551
45-6-2354
45-1-2552
45-1-2549
45-1-0203
45-1-2601
45-1-0207
45-6-2355
45-1-0208
45-1-2553
45-1-0238
45-1-0019
45-1-0209
45-1-0215
45-1-0210
19-5-0218
45-1-0075
45-1-0213
45-1-0072
45-1-0239
19-5-0217
19-5-0216
45-1-0214
45-1-0071
45-1-0076
45-1-0018
45-1-0015
45-1-0017
45-1-0016
45-1-0074
45-1-0014
45-1-0012
PIPERS FLAT CREEK
WINTERS CREEK
RONDALE CREEK
THOMPSONS CREEK
WANGCOOL CR
COXS R
Legend
AHIMS Site Status:
Valid
Partially Destroyed
Destroyed
Proposed modification to LNAR footprint
Approved LNAR (Lamberts North Ash Repository)
Approved LSAR (Lamberts South Ash Repository)
Mt Piper Ash Repository
EPL 13007 Licenced Premises Boundary
Not Part of Licenced Premises
State Forest Boundary
Watercourses
Data Source:
- AHIMS Data Search : 29 March 2021
- Imagery Data : Esri World Imagery September 2018
AHIMS Data Search Results
F7-1
Drawing No: 0581248m_LNAR_MR_G006_R3.mxd
Mt Piper Ash Placement Project (PA 09_0186)
Lamberts North Ash Repository, Modification 1
Date: 28/04/2021
Drawing Size: A4
Drawn By: GC/GR
Reviewed By: GP
Client: EnergyAustralia NSW Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56
0 250 500 750m
N
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM



Threatened Species Record – Overview

F7-2

Drawing No:	0581248m_LNAR_MR_G007_R2.mxd		Mt Piper Ash Placement Project (PA 09_0186) , Lamberts North Ash Repository, Modification 1
Date:	12/05/2021	Drawing Size: A4	
Drawn By:	GR	Reviewed By: AA	Client: Energy Australia

Coordinate System: GDA 1994 MGA Zone 56

ERM

1 2 3 4 5 6 7

Legend

- Photo Point
- Approved LNAR (Lamberts North Ash Repository)
- EPL 13007 Licenced Premises Boundary
- Proposed modification to LNAR footprint

Source:

Imagery: Nearmap Jan 2021

Amended LNAR Footprint and Regrowth Vegetation

F 7-3

Drawing No:	0581248m_LNAR_MR_G010_R2.mxd		
Date:	13/05/2021	Drawing Size: A3	
Drawn By:	GR	Reviewed By: GP	

Coordinate System: GDA 1994 MGA Zone 56

0 5 10 15m

N

Mt Piper Ash Placement Project (PA 09_0186)
Lamberts North Ash Repository, Modification 1,
Water Assessment Report

Client: EnergyAustralia NSW Pty Ltd

ERM

8. CUMULATIVE IMPACTS

The Modification is limited to the installation of a liner and associated ash placement and leachate management infrastructure, and minor adjustments to the LNAR footprint boundary within areas previously disturbed by past mining activities.

All other activities and operations associated with LNAR and its interactions with MPPS and adjacent nearby approved developments (at that time) were assessed and approved under PA 09_0186 and are being implemented in accordance with the approved OEMP.

As such:

- the intensity and operational hours of ash placement will be consistent with that approved under PA 09_0186;
- there are no proposed changes to existing approved ash placement methods;
- apart from specialised equipment (such as that required to weld the liner components), no additional plant and equipment to that already approved and in use under PA 09_0186 will be required;
- no additional workforce is required. The existing LNAR workforce will implement the Modification;
- there are no changes to the monitoring and testing of ash placement including moisture content, groundwater levels, dust, compaction, water quality and volume, ash placement levels and engineering and geotechnical considerations;
- there are no changes to the revegetation and rehabilitation of LNAR to that approved under PA 09_0186. Revegetation will occur progressively throughout the life of the placement area once capping is complete in accordance with approved practices;
- the Modification seeks approval for the co placement of BCA and Solid Mixed Salts below RL 946 m AHD, but above the liner. The placement of BCA and Solid Mixed Salts are an existing approved activity above RL 946 m AHD; and
- the estimated number of trucking movements is within the range of that previously assessed and approved as part of PA 09_0186.

Interactions with existing and proposed projects and activities at MPPS, as discussed in Section 4.3, is limited. The potential interactions between the Modification and other proposed and approved developments in the vicinity of the LNAR are likely to be minimal, as follows:

- SWTP will be operational, but interactions associated with brine management is approved under existing practices and approvals as discussed in Section 2.3. The Modification will enable management continuity of brine and Solids Mixed Salts from the SWTP;
- minimal interruption to electricity production from the MPPS as the modified LNAR will provide for continuity of ash placement activities;
- Springvale Mine is an underground mine approved for operation until 2028 and is the current supplier of coal to MPPS. The Springvale Mine has no direct interaction with the Modification;
- Angus Place Colliery (under care and maintenance) and Angus Place Extension Project SSD application (at Response to Submissions stage), if approved, is likely to replace Springvale Mine when it closes for the supply of coal to MPPS. The Angus Place Extension Project will have no direct interaction with the Modification;
- the transfer and treatment of mine water from Angus Place Colliery will generate a brine stream additional to that already produced that will require disposal through ash conditioning;
- Western Coal Services will continue operating, but hand back some land in the southern portion of the LNAR, likely Q4 2021; and
- interactions with the Mt Piper ERP, if approved and constructed, will be considered under a future modification application to LNAR PA 09_0186.

On this basis, there is minimal cumulative environmental impacts associated with the Modification.

9. ENVIRONMENTAL MANAGEMENT

9.1 Existing Framework

The OEMP (EnergyAustralia, 2019) outlines the existing approved environmental management requirements for the LNAR. The OEMP includes sub-plans that specify the monitoring and reporting requirements related to the management of noise, groundwater, soil and surface water, air quality, landscape revegetation and rehabilitation, and waste.

9.2 Mitigation and Management Measures

Should the Modification proceed, management measures presented in Section 7 will be incorporated into the detailed design and applied during the installation of the liner and associated infrastructure.

Environmental safeguards outlined in this Section would be incorporated into an updated OEMP, should the Modification proceed. These safeguards will minimise potential adverse impacts arising from the Modification on the surrounding environment. The safeguards and management measures are summarised Table 9-1 below.

All other environmental aspects will continue to be managed in accordance with the existing environmental management and mitigation measures within the OEMP.

Table 9-1 Summary of Environmental Safeguards and Mitigation Measures

Plan	Environmental Safeguards and Mitigation Measures
Lamberts North Operational Environmental Management Plan	■ general Updates ■ updates to the relevant mapping and plans in the OEMP to incorporate the Modification; ■ define the roles, responsibilities, authority and accountability of key personnel involved in environmental management for the LNAR; and ■ describe stakeholder and community engagement measures to be implemented to inform the local community and relevant stakeholders regarding the installation and operational performance of the LNAR. **Water Management Updates** Water quality outcomes will be developed with respect to the specific context of the Modification objectives and operations. The existing water quality outcomes presented in the OEMP (EnergyAustralia, 2019), will be revised to account for the Modification. Erosion and sediment controls are already contained within the OEMP. The Modification is unlikely to require changes to these approved controls. The revised OEMP will document groundwater and surface water management and monitoring requirements associated with the modified LNAR, including those set out in Section 7.2.3.
Detailed Design	■ Detailed design of the leachate barrier system (liner) for each LNAR stage will be prepared prior to the installation of liner materials. This will generally incorporate: – geotechnical assessment; – leachate pond sizing and location; – general water management logistics (ie. Pumping requirements and drainage logistics);

Plan	Environmental Safeguards and Mitigation Measures
	– liner material requirements; – liner staging including installation procedure and logistics; – liner installation quality assurance and quality control procedures. ■ NSW EPA (2016) requirements pertaining to stormwater management, leachate management, installation quality assurance (QA) requirements (including a QA Plan), aesthetics, capping and closure requirements will also be addressed by the detailed design for the LNAR (as modified). ■ As is currently outlined in the OEMP, the LNAR Principle Contractor will operate the LNAR, will update their Repository Management Plan to incorporate the necessary changes as a result of the detailed design.

10. EVALUATION AND CONCLUSION

This Modification Report assesses, to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Modification in accordance with section 4.55 (1A) of the EP&A Act. These environmental impacts are primarily assessed both in Section 7 and in the Water Assessment provided in Appendix B.

This Modification Report concludes that given mitigation and management measures are implemented, such as those contained in the existing OEMP, negligible environmental impacts are anticipated to the following matters:

- Water: The presence of the leachate barrier system (liner), leachate management system and capping layer, which will be designed and implemented consistent with the requirements of NSW Environmental Guidelines for Solid Waste Landfills (EPA 2016), will mitigate the potential escape of leachate to the surrounding groundwater and surface water systems in the vicinity of the modified LNAR.

  The existing approved stormwater management practices and controls are considered suitable to mitigate the potential surface water impacts from the modified LNAR.

  The OEMP will be revised to account for relevant aspects of the NSW EPA (2016) guidance required by the Modification and relevant aspects of the detailed design as necessary. However, the majority of existing water management, monitoring and reporting requirements will remain unchanged.
- Air quality and Noise: There are no proposed changes to existing ash placement methods, intensity or operational timeframes to that already approved and in use under PA 09_0186; nor additional plant and equipment to that already approved and in use under PA 09_0186 (noting the requirement for specialised equipment for the liner installation). Therefore, the Modification will not contribute additional air quality and noise impacts to that previously assessed and approved under PA 09_0186;
- Traffic: It is anticipated that during installation, on average, around three to four (3 - 4) truck deliveries could occur per day, associated with the delivery of liner materials and drainage aggregate from local suppliers. This estimated number of trucking movements is within the range of that previously assessed and approved as part of PA 09_0186 and in the context of MPPS development consent (80-10060) approved traffic volumes;
- Visual: There are no proposed changes to the approved final landform for LNAR, thus not altering final elevations approved under PA 09_0186. As such, the Modification will not result in additional visual impacts to nearby sensitive receptors; and
- Other environmental impacts: Nil impacts to contamination, biodiversity, Aboriginal heritage, and historic heritage are anticipated as a result of the Modification works, as described in Section 7.7.

Section 8 also provided a discussion of cumulative environmental impacts, concluding that there are minimal cumulative environmental impacts associated with the Modification.

The Modification will provide a range of environmental benefits, including:

- improved environmental outcomes, specifically related to groundwater and surface water quality of the Wangcol Creek catchment, located within the Sydney Drinking Water Catchment through improved management of leachate resulting from BCA placement areas;
- maximising the longevity of LNAR through increased opportunities for reuse of WCA;
- ash management and brine disposal continuity and therefore continuity to those activities producing brine (solid and liquid) as a by-product; and
- opportunities for reduced demand on the fresh water supply from MPPS through beneficial reuse of the leachate.

The Modification, with the implementation of environmental safeguards, is expected to result in overall improved environmental outcomes.

11. REFERENCES

Aurecon. (2014). *Mt Piper Power Station Ash Placement: Lamberts North – Operational Noise Assessment September 2014 (Rev 2).* Retrieved from https://www.energyaustralia.com.au/sites/default/files/2017-03/D.%20Noise%20Assessment%20-%20September.pdf

Aurecon. (2019a). *Lamberts North Operational Noise Assessment – June 2019 Rev 2.* Aurecon.

Aurecon. (2019b). *Mt Piper Power Station Ash Placement, Lamberts North Operational Noise Assessment June 2019 Rev 2.*

DPIE. (2020). *Soil Landscapes of Central and Eastern NSW - v2.1.* Sydney: NSW Office of Environment and Heritage.

DPIE (2021) Biodiversity Values Map and Threshold tool. Online resource accessed via https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap

EnergyAustralia. (2019). *Lamberts North Ash Placement Project - Operational Environment Management Plan.* NSW Australia: EnergyAustralia NSW.

EnergyAustralia. (2020). *Lamberts North Annual Environmental Management Report September 2019 – August 2020.* NSW Australia.: EnergyAustralia NSW.

EPA. (2014). *Waste Classification Guidelines Part 1: Classifying Waste* . Retrieved from NSW Environment Protection Authority: https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines

EPA. (2016). *Environmental Guidelines Solid Waste Landfills.* Retrieved from NSW Environment Protection Authority: https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/waste/solid-waste-landfill-guidelines-160259.pdf

EPA. (2017). *Noise Policy for Industry. NSW Environment Protection Authority.* Retrieved from https://www.epa.nsw.gov.au/publications/noise/17p0524-noise-policy-for-industry

ERM. (2019). *Mt Piper Energy Recovery Project: Biodiversity Assessment Report*. Retrieved from https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-8294%2120191210T080241.535%20GMT

ERM. (2020a). *Mt Piper Brine Conditioned Fly Ash Co-placement Project - Annual Environmental Monitoring Report 2019/20.* Sydney: EnergyAustralia.

ERM. (2020b). *The Mt Piper Power Station Brine Conditioned Flyash Co-Placement Extension Water Managment and Monitoring Plan.*

GHD. (2019). *Springvale Water Treatment Project, Brine and Residual Waste Disposal Plan, On behalf of Centennial Coal and EnergyAustralia, May 2019.*

GHD. (2021). *Ash Placement Cell Concept Design. On behalf of EnergyAustralia.*

LCC. (2021). *Development Control Plans. Lithgow City Council website.* Retrieved from http://council.lithgow.com/development-control-plans/, accessed 26 March 2021.

RPS. (2014). *Centennial Western Coal Services Project. Water Management Plan, 2014.*

SKM. (2010). *Mt Piper Power Station Environmental Assessment. Prepared for Delta Electricity.*

SKM. (2012). *Mt Piper Power Station Ash Placement Project Consistency report, Project Approval 09_0186. Prepared for Delta Electricity.*

TTPP. (2019). *Mt Piper Energy Recovery Project: Traffic Impact Assessment.* St Leonards, NSW: The Transport Planning Partnership.

APPENDIX A CONCEPT DESIGN

APPENDIX B WATER ASSESSMENT

APPENDIX C BIODIVERSITY ASSESSMENT REPORT

ERM has over 160 offices across the following countries and territories worldwide

Argentina
Australia
Belgium
Brazil
Canada
Chile
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
Myanmar
The Netherlands
New Zealand
Norway
Panama
Peru
Poland
Portugal
Puerto Rico
Romania
Russia
Senegal
Singapore
South Africa
South Korea
Spain
Sweden
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM's Newcastle Office
Level 1 45 Watt Street
NEWCASTLE NSW 2300

T: +61 2 49035500

www.erm.com

The business of sustainability

ERM