

1 Scope and purpose



Issued Date: October 2022

Revision number: 1.22.0

TABLE OF CONTENTS

1	SCOPE AND PURPOSE	1-1
1.1	Operator Details	1-1
1.2	Title Details	1-2
1.3	Location.....	1-3
1.4	Background	1-7
1.5	Purpose of this MCP	1-7
1.5.1	Implications of Ranger project reforecast process	1-8
1.5.2	Ranger Authorisation and <i>Mining Management Act</i>	1-9
1.5.3	Section 41 Authority and ERs.....	1-9
1.5.4	Government agreement.....	1-10
1.6	Scope of this MCP	1-10
1.7	Review and updates	1-11
1.8	Content and structure of this MCP.....	1-14
	REFERENCES	1-16

FIGURES

Figure 1-1	Regional location of Ranger Project Area.....	1-4
Figure 1-2	Ranger Mine Project Area.....	1-5
Figure 1-3	Proximity of Ranger Mine to natural topographic features	1-6
Figure 1-4:	Oblique view of Ranger Mine 2019.....	1-7

Cover photograph: Freshwater runoff

TABLES

Table 1-1 Ranger Mine operator details.....	1-2
Table 1-2 Ranger Mine title holder details.....	1-2
Table 1-3 Timelines of the operations and closure phases of the Ranger Mine.....	1-11
Table 1-4 Future Commonwealth applications to be submitted	1-13
Table 1-5 Structure and content of this MCP	1-14

APPENDICES

Appendix 1.1: Ranger 2022 Mine Closure Plan stakeholder feedback form

GLOSSARY

Below are key terms that are used in this section.

Key term	Definition
Environmental Requirements	The Ranger Environmental Requirements are attached to the s.41 Authority and set out Primary and Secondary Environmental Objectives, which establish the principles by which the Ranger operation is to be conducted, closed and rehabilitated and the standards that are to be achieved.

ABBREVIATIONS & ACRONYMS

Below are abbreviations and acronyms that are used in this section.

Abbreviation/ Acronym	Description
APR	Annual Plan of Rehabilitation
ASX	Australian Securities Exchange
ER	Environmental Requirements
ERA	Energy Resources of Australia Ltd
GAC	Gundjeihmi Aboriginal Corporation
MCP	Mine Closure Plan
MMP	Mining Management Plan
MTC	Minesite Technical Committee
NLC	Northern Land Council
NT	Northern Territory
RPA	Ranger Project Area
RWD	Ranger Water Dam formerly referred to as the Tailings Storage Facility (TSF)

1 SCOPE AND PURPOSE

This Mine Closure Plan (MCP) is prepared by Energy Resources of Australia Limited (ERA) to describe the plan for the Ranger Mine closure as at 30 June 2022 and meet its regulatory obligations and conditions under Annex B.2 of the Ranger Authorisation 0108-18 (*Section 3 Closure Obligations and Commitments*). The MCP is submitted to both the Commonwealth Minister for Resources and for Northern Australia, and the Northern Territory Minister for Mining and Industry for approval.

This MCP also appropriately addresses the requirements of the annual Mining Management Plan (MMP) for the Ranger Mine, as defined in Section 40(2) and 41 of the *Mining Management Act 2001 (NT)*, and is submitted for the approval of the NT Minister for Mining and Industry under Section 35 of that Act.

1.1 Operator Details

Energy Resources of Australia Limited (ERA) is Australia's longest continually operating uranium producer. Rio Tinto owns 86.3 per cent of ERA shares with the balance of the shares publicly held and traded on the Australian Securities Exchange (ASX). Information about ERA and a business overview can be found at www.energyres.com.au.

Production at the Ranger Mine ceased, in accordance with the Ranger Authority, on 8 January 2021. This concluded the processing activity on the Ranger Project Area (RPA) after 40 years of operation. The current and future priority of ERA is now the successful rehabilitation and closure of the RPA.

Contact details for the General Manager Closure and the Health, Safety, Environment and Communities Manager are provided in Table 1-1.

Table 1-1 Ranger Mine operator details

Name of Operator	Energy Resources of Australia Limited
Name of Mining Site	Ranger Mine
Address	Locked Bag 1
	Jabiru NT 0886
ABN	71 008 550 865
ACN	008 550 865
Address for service documents	GPO Box 2394 Darwin NT
Principal Place of Business	Level 8, 24 Mitchell Street Darwin NT 0800
Phone	1800 778 056
Fax	08 8938 1622
General Manager Ranger Closure	Forrest Egerton
Manager HSE	Josh Curran
Commodity	Uranium
Product	Uranium Oxide (U ₃ O ₈)

The General Manager Ranger Closure has responsibility for maintaining the Ranger Mine Closure Plan.

1.2 Title Details

Table 1-2 summarises the holder details associated with the Ranger Mine.

Table 1-2 Ranger Mine title holder details

Name of mining site	Ranger Mine
Mineral Title	Ranger Project Area (RPA)
Mining interests	Uranium mining
Administration act	<i>Atomic Energy Act 1953 (Cth)</i>
Authorisation number	0108-18
Operator to whom Authorisation was granted	Energy Resources of Australia Ltd

1.3 Location

The Ranger Mine is located in the Alligator Rivers Region of the Northern Territory (NT), approximately 260 km east of Darwin (Figure 1-1). The RPA is surrounded by, but separate to, Kakadu National Park. It is bounded to the north and east by Magela Creek and its tributaries, to the west by Gulungul Creek and its tributaries, and to the south by Corridor Creek shown in Figure 1-3.

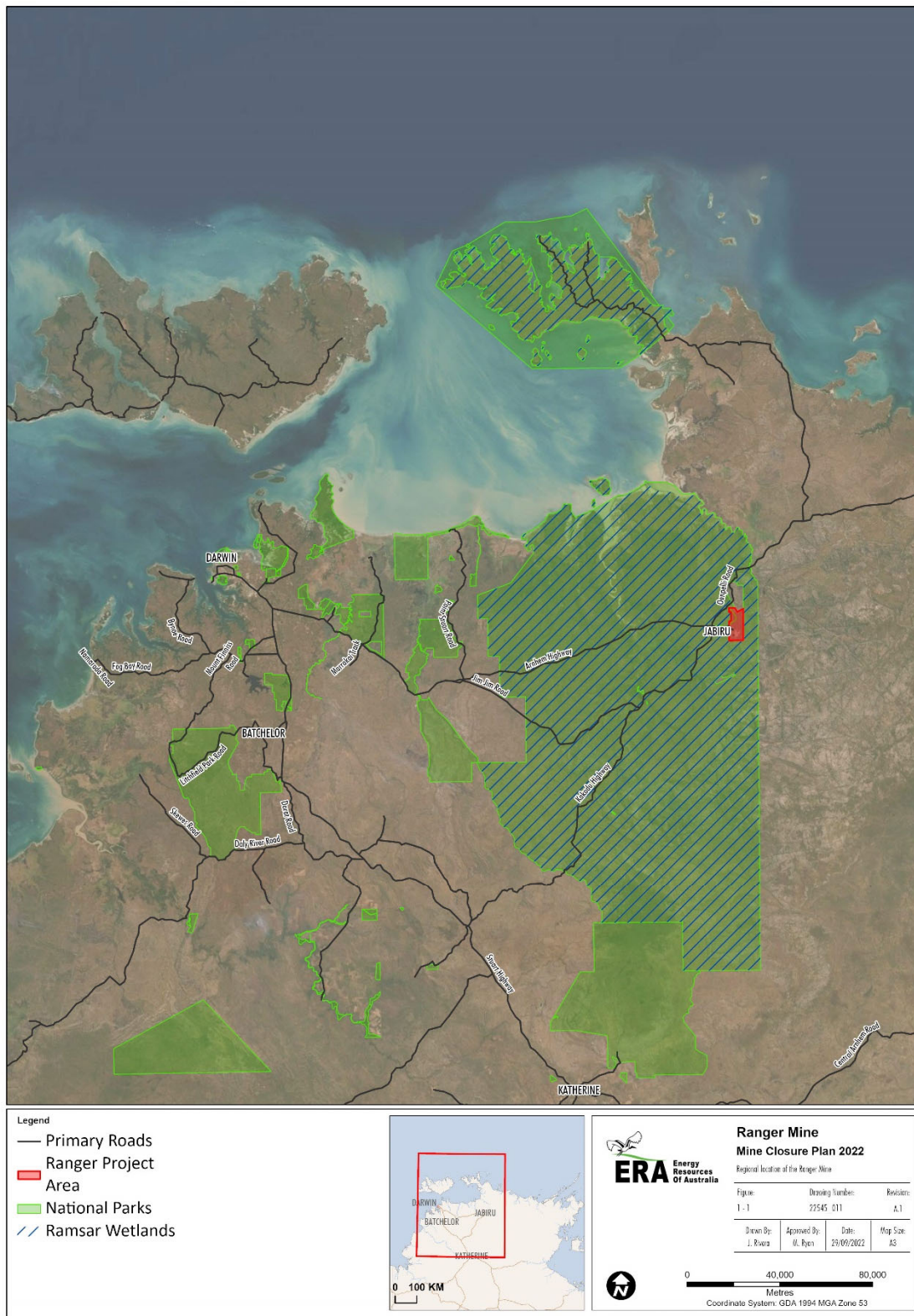


Figure 1-1 Regional location of Ranger Project Area

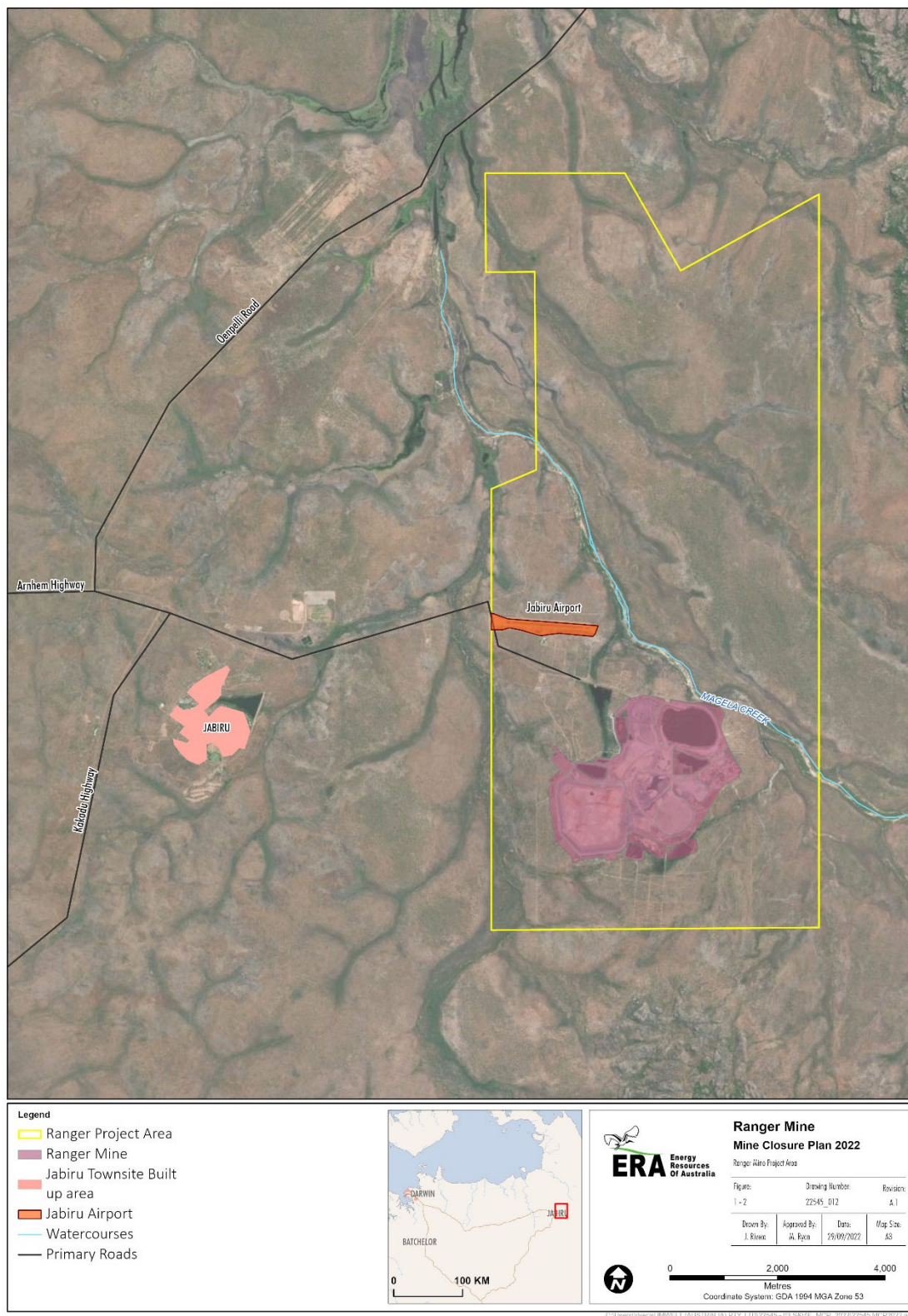


Figure 1-2 Ranger Mine Project Area

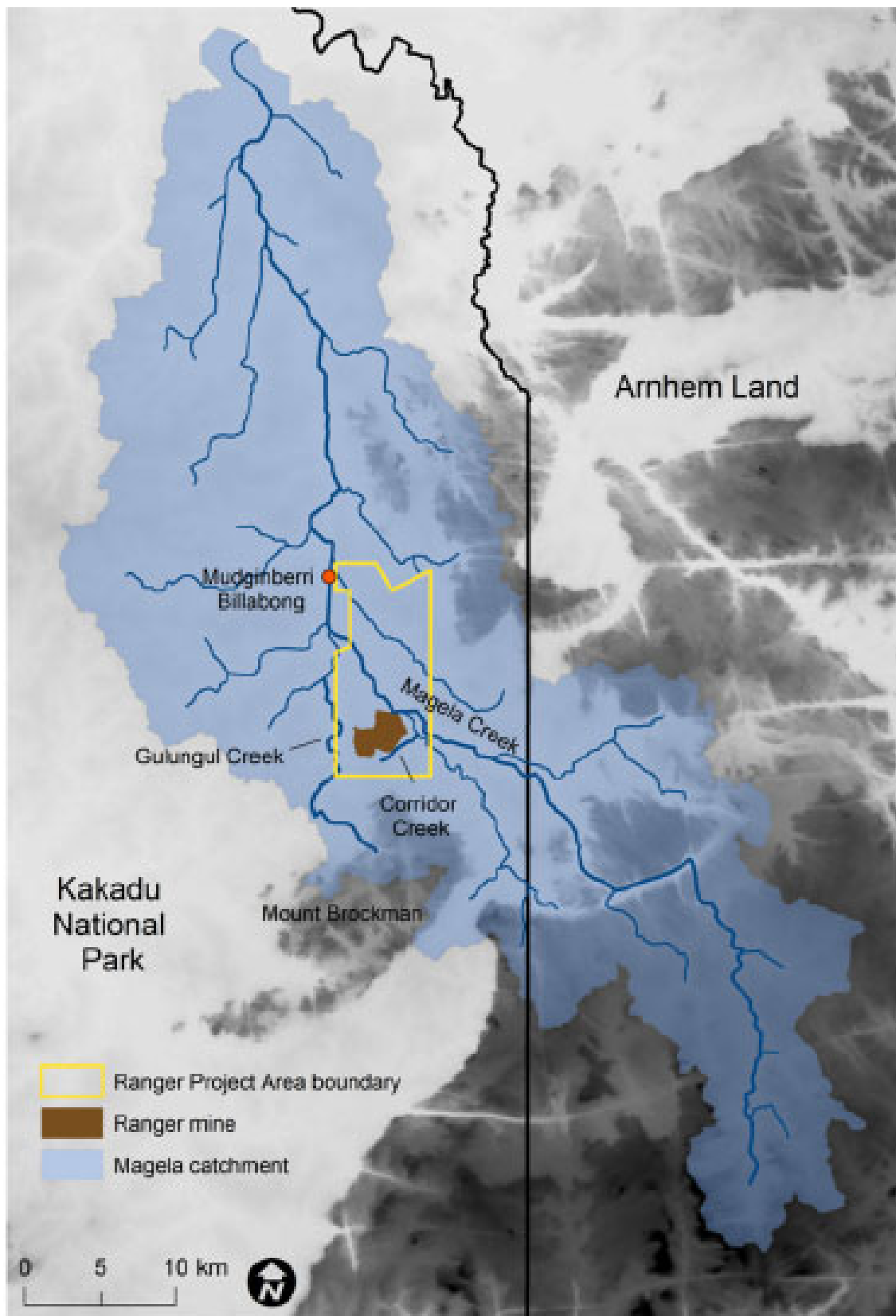


Figure 1-3 Proximity of Ranger Mine to natural topographic features

1.4 Background

ERA has operated the Ranger Mine since the commencement of operations in 1980. ERA has provided international customers with a reliable supply of uranium oxide (U_3O_8) in the 40 years since production began. The Ranger Mine has produced more than 132,000 tonnes of uranium (ERA, 2021) to meet the global uranium demand for fuelling nuclear power plants. ERA product is supplied to power utilities in Asia, Europe and North America in accordance with strict international and Australian safeguards.

Closure and rehabilitation of the Ranger Mine is governed by both Australian and Northern Territory legislation and regulations. The key instrument that governs operations at the Ranger Mine on a day-to-day basis is the Ranger Authorisation 0108-18 (the Authorisation) issued under the Northern Territory's *Mining Management Act 2018* (Mining Management Act). The main Commonwealth authority issued under Section 41 of the *Atomic Energy Act 1953 (Cth)* (Atomic Energy Act), provides the key tenure and land access approval required for the mine (S41 Authority).

The Ranger Environmental Requirements (ERs) are attached to the S41 Authority and set out environmental objectives which establish the principles by which the Ranger mining operation is to be conducted, closed, and rehabilitated and the standards that are to be achieved. The Mining Management Act also requires the Authorisation to incorporate, by reference, the ERs. A current view of the mine is shown in Figure 1-4.



Figure 1-4: Oblique view of Ranger Mine 2019

1.5 Purpose of this MCP

This MCP has been prepared as part of the ERA obligations under the Ranger Authorisation. It describes the ERA mine closure plan for the Ranger Mine as at 30 June 2022. ERA were exempt from providing a 2021 MCP. As such, the 2022 MCP includes updates from 1 July 2020 to 30 June 2022.

This MCP is the result of the past 40 plus years of extensive scientific research, engineering design and stakeholder consultation. It is an updated version of previous iterations presented to stakeholders (e.g. McGovern, 2006, Puhlovich & Pugh, 2007, ERA, 2019 and ERA, 2020). It is noted that further studies and works are ongoing, and that the outcomes of these studies will be presented in the annual updates of the MCP.

The MCP has been developed in line with the overall goal for the final land use, as specified in clause 2.1 of the ERs:

2.1 ... the company must rehabilitate the Ranger Project Area to establish an environment similar to the adjacent areas of Kakadu National Park such that, in the opinion of the Minister with the advice of the Supervising Scientist, the rehabilitated area could be incorporated into the Kakadu National Park.

1.5.1 Implications of Ranger project reforecast process

In July 2021, ERA commenced a major reforecast of cost and schedule after risks materialised post-completion of the 2019 Feasibility Study. The reforecast continued into early 2022, including an external evaluation by Bechtel of the preliminary findings. The preliminary findings by ERA from its reforecast exercise based on the Ranger rehabilitation project being completed in accordance with the methodology set out in the 2020 Mine Closure Plan indicates that:

- (i) the revised total cost of completing the Ranger Project Area rehabilitation, including incurred spend from 1 January 2019, is forecast to be approximately between \$1.6 billion and \$2.2 billion (undiscounted nominal terms). The previously announced closure estimate, which was based on the Ranger Project Area closure Feasibility Study finalised in 2019 ("Feasibility Study"), was \$973 million (undiscounted nominal terms); and
- (ii) the revised date for completing the Ranger Project Area rehabilitation is forecast to be between Quarter 4, 2027 and Quarter 4, 2028.

ERA notes that the above revised estimates, as to both cost and schedule, are based on the Ranger rehabilitation project being completed in accordance with the methodology set out in the 2020 Mine Closure Plan.

In May 2022, ERA commenced a feasibility study update in connection with a lower technical risk rehabilitation methodology (primarily relating to the subaerial capping of Pit 3) and to further refine the Ranger Project Area rehabilitation execution scope, risks, cost and schedule. Subaerial capping, previously adopted for Pit 1, is a more traditional method and it is currently ERA's preferred methodology. The 2022 Feasibility Study is expected to take approximately 12 months to complete.

This 2022 MCP update provides an indicative sequence of major closure activities and estimates of future milestones. A conservative approach to timing has been taken, with an indicative closure sequence out to Q4, 2028 provided.

1.5.2 Ranger Authorisation and *Mining Management Act*

A variation of the Authorisation was issued on 22 June 2018 and included Annex B, which details the process for submission and assessment of the MCP (also referred to as a 'rehabilitation plan') as agreed in accordance with S34 of the Mining Management Act. The MCP is required to be reviewed and updated annually, with submission to the Commonwealth Minister and the Northern Territory Minister on or before 1 October each year for approval. The MCP must demonstrate that closure activities will achieve the relevant ERs including:

- identification and management of closure issues, in particular, environmental and regulatory risks;
- key closure and monitoring activities with indicative timing; and
- a summary of closure works undertaken in the previous 12 months.

Once the MCP has been received by the Ministers, it is subject to review by the Supervising Scientist, Northern Land Council (NLC) and Gundjeihmi Aboriginal Corporation (GAC) with advice provided by these stakeholders to both Ministers.

1.5.3 Section 41 Authority and ERs

The ERs are appended to the S41 Authority. Clause 9.1 of the ERs requires ERA to prepare a 'rehabilitation plan' which 'provides for progressive rehabilitation' and achieves the overall goal of rehabilitation outlined in clause 2.1 and the 'major objectives of rehabilitation' outlined in clause 2.2.

2.1 Subject to subclauses 2.2 and 2.3, the company must rehabilitate the Ranger Project Area to establish an environment similar to the adjacent areas of Kakadu National Park such that, in the opinion of the Minister with the advice of the Supervising Scientist, the rehabilitated area could be incorporated into the Kakadu National Park.

2.2 The major objectives of rehabilitation are:

revegetation of the disturbed sites of the Ranger Project Area using local native plant species similar in density and abundance to those existing in adjacent areas of Kakadu National Park, to form an ecosystem the long-term viability of which would not require a maintenance regime significantly different from that appropriate to adjacent areas of the park;

stable radiological conditions on areas impacted by mining so that, the health risk to members of the public, including traditional owners, is as low as reasonably achievable; members of the public do not receive a radiation dose which exceeds applicable limits recommended by the most recently published and relevant Australian standards, codes of practice, and guidelines; and there is a minimum of restrictions on the use of the area;

erosion characteristics which, as far as can reasonably be achieved, do not vary significantly from those of comparable landforms in surrounding undisturbed areas.

The ERs also provide for infrastructure to remain on the RPA post closure if all stakeholders agree:

2.3 Where all the major stakeholders agree, a facility connected with Ranger may remain in the Ranger Project Area following the termination of the Authority, provided that adequate provision is made for eventual rehabilitation of the affected area consistent with principles for rehabilitation set out in subclauses 2.1, 2.2 and 3.1.

The requirements for the rehabilitation plan within the S41 Authority are more broadly based than those of the Authorisation (*Section 8 Post Closure Land Use, Closure Objectives and Closure Criteria*).

All progressive rehabilitation must also be approved by the Supervising Authority on the advice of the Supervising Scientist and is also subject to the NLC agreeing that the aim and objectives for rehabilitation have been met. The Supervising Authority is the person responsible under an applicable law (with relevance to *Atomic Energy Act 1953, Environment Protection (Alligator Rivers Region) Act 1978, Uranium Mining (Environment Control) Act 1979* etc.) or, where no law applies, the Supervising Scientist.

The parallel NT and Commonwealth legislative approvals processes that relate to mine closure activities at the Ranger Mine are complex. *Section 3 Closure obligations and commitments* and appendices provide further details on the complexities of the legislative framework.

1.5.4 Government agreement

Separate to this MCP, ERA is required to maintain the Ranger Rehabilitation Special Account (Trust Fund) with the Commonwealth Government. The Trust Fund is intended to provide security against the estimated costs of closing and rehabilitating the Ranger mine immediately. Each year, the Company is required to prepare and submit to the Commonwealth Government an Annual Plan of Rehabilitation (Annual Plan). Once accepted by the Commonwealth Government, the Annual Plan is then independently assessed and costed and the amount to be provided by the Company into the Trust Fund is then determined. *Section 11 Financial Provision for Closure* provides further details of this agreement.

1.6 Scope of this MCP

The MCP covers the RPA shown in Figure 1-2, specifically referring to the following areas and assets:

- Ranger Mine infrastructure, former mine pit voids, Ranger Water Dam (RWD) formerly known as the Tailings Storage Facility (TSF), the exploration decline and all associated utilities within the operational area of the Ranger Mine;
- Land application areas, wetland filters and other infrastructure associated with the Ranger Mine; and

- Jabiru Airport and associated infrastructure and utilities: noting that discussions are progressing between ERA, Traditional Owner representatives and relevant government agencies regarding the potential future use of the airport. These discussions will include rehabilitation obligations.

The following areas and assets are not considered in this MCP:

- The town of Jabiru.
- The infrastructure located on the RPA immediately south of the Jabiru Airport, identified as the Jabiru field station currently occupied by the Supervising Scientist Branch.

ERA has defined the closure and rehabilitation activities in the phases outlined in Table 1-3. Table 1-3 must be read subject to the qualifications in Section 11.

Table 1-3 Timelines of the operations and closure phases of the Ranger Mine

Phase	Timeline	Closure Related Activities
Operations	Period prior to 8 January 2021	Progressive rehabilitation and monitoring (operational and closure related research and monitoring activities).
Closure	Period between 8 January 2021 and the completion of final landform and rehabilitation (indicative estimate Q4, 2028 for the purpose of this MCP)	Decommissioning, bulk material movement to achieve final landform, rehabilitation and monitoring.
Monitoring and maintenance	Currently estimated to be 25 years after Closure Phase	Completion criteria monitoring (and maintenance rehabilitation works if required) [note – arrangements under which ERA has access to the RPA for this period are yet to be finalised].
Relinquishment	Issue of close-out-certificate(s), relinquishment of RPA	Progressive close-out certificates may be obtained for areas rather than a single area for the entire RPA.

1.7 Review and updates

To ensure its currency, and to incorporate lessons learnt from ongoing modelling and monitoring studies, the MCP is updated and submitted for approval annually. Having said that, the 2021 MCP was exempt from submission and therefore this 2022 MCP provides updates to closure activities from the period of 1 July 2020 to 30 June 2022.

Subsequent to the distribution of a draft of the MCP to stakeholders in December 2016, several aspects of rehabilitation/closure activities were identified for standalone assessment via the Minesite Technical Committee² (MTC) and the Commonwealth Minister³. These activities were identified during the stakeholder workshop held in May 2017. The remaining commonwealth applications for assessment and approval are listed Table 1-4. Other minor applications may be required to provide further clarification on technical aspects of closure activities or for minor changes. These will be submitted for MTC approval as required. Ideally, for ERA, such clarification would be provided and approved within the MCP rather than a separate minor approval application.

The 2020 MCP was subject to stakeholder review and detailed feedback was provided and has been considered in the preparation of this document (refer to Appendix A). Stakeholders are requested to utilise the form provided in Appendix 1.1 to provide feedback on this 2022 MCP.

² The functions of the MTC and other ERA key stakeholders are described in *Section 4 Stakeholder Engagement*.

³ Matters requiring Commonwealth ministerial consultation according to the update sent from the Department of Industry, Science and Resources & Department of Industry, Tourism and Trade (April 2017)

Table 1-4 Future Commonwealth applications to be submitted

APPLICATION TITLE	APPLICATION TYPE	PLANNED SUBMISSION DATE	SCHEDULED APPROVAL DATE	CONTENT
Pit 3 Capping, Bulk Backfill and Waste Disposal	Commonwealth Ministerial approval required	Draft April 2022 Q4 2022	Q1 2023	Details of Pit 3 capping and bulk backfill activities that include the co-disposal of site demolition and other waste.
TSF (RWD) Deconstruction and Final landform	Commonwealth Ministerial approval required	Q1 2024	Q3 2024	The detailed plan of deconstruction of TSF (RWD) and the final landform application will be combined and submitted as a stand-alone application.
Completed closure works report	Commonwealth Ministerial approval required	6 months after completion of rehabilitation works	N/A	Final report detailing all completed closure activities.

1.8 Content and structure of this MCP

Clause B6 of the Authorisation requires that the MCP must be prepared in accordance with mine closure guidelines accepted by the Commonwealth Minister as well as addressing the Mine Management Plan requirements. The currently adopted guidelines are the Western Australian mine closure guidelines. These guidelines were reviewed and updated in March 2020 (DMIRS, 2020) and have been used for reference in the preparation of this MCP. The guidelines provide for a preferred structure, which has been used as the basis for the MCP (with some minor adjustments to suit the unique circumstances of the Ranger Mine). The structure of this MCP, along with an overview of the content of each section, is provided in Table 1-5.

Table 1-5 Structure and content of this MCP

Section	Content
1. Scope and purpose	Introduction to the Ranger Mine, including its location and history, purpose of the document, overview of relevant regulatory requirements of the document and scope of this MCP. Includes details on future standalone closure applications.
2. Project overview	A historical overview of the Ranger Mine ore deposits and mine development, including a description of the historical mining operations and major mine components/infrastructure. Future closure related Land disturbances are provided in <i>Section 9: Closure Implementation</i> .
3. Closure obligations and commitments	Presents the legal obligations, commitments, standards and guidelines relevant to the Ranger Mine closure.
4. Stakeholder engagement	Description of the stakeholder engagement process and details of the stakeholder engagement for matters relating to rehabilitation and closure, with the stakeholder engagement register provided as an appendix to this section.
5. KKN Supporting Studies	Overview of the existing environment of the RPA in relation to the local and regional setting, including nearby sensitive receptors. Discussion of the Key Knowledge Needs relevant to ERAs key studies informing the overarching closure strategy, design and closure criteria. Summaries of the substantial knowledge base accumulated by ERA over 40 years of monitoring and research investigations of the site and surrounding environment.
6. Best practicable technology	Description of the process and identification of the best practicable technology for the Ranger Mine rehabilitation and closure. Includes details on best practicable technology assessments already undertaken on closure related works.
7. Risk assessment and management	Description and outcomes of the closure risk assessments.
8. Post Closure land use, closure objectives and closure criteria	Description of the agreed post-mining land use and closure objectives. Description of the closure criteria that will be used to measure rehabilitation success and demonstrate the closure objectives have been met. This section includes an overview of the current status of closure criteria at 30 June 2022.

Section	Content
9. Closure implementation	Description of the proposed closure strategy and is aligned with closure domains. Includes details on what has been completed and the proposed schedule for future works.
10. Closure monitoring and maintenance	Description of the monitoring programs currently being undertaken or proposed. Also describes what maintenance will be required.
11. Financial Provision for closure	Provides the rehabilitation provision based on estimates of costs and their timing to rehabilitate and restore disturbed land to agreed criteria.
12. Management of information and data	Description of management strategies, including systems and processes, for the retention of mine records relevant to mine closure.
Appendix A:	Responses to stakeholder comments on the 2020 MCP.

REFERENCES

- Department of Mines, Industry Regulation and Safety (DMIRS), 2020. Statutory Guidelines for Mine Closure Plans, Government of Western Australia, March 2020, p 14
<http://www.dmp.wa.gov.au/Documents/Environment/REC-EC-111D.pdf>
- Energy Resources of Australia Ltd (ERA), 2019. *Ranger mine closure plan*. Energy Resources of Australia Ltd, Darwin.
- Energy Resources of Australia Ltd (ERA), 2020. *Ranger mine closure plan*. Energy Resources of Australia Ltd, Darwin. Available from:
<http://www.energyres.com.au/sustainability/closureplan/>
- Energy Resources of Australia Ltd (ERA) 2021. *Ranger mine closure plan*. Unpublished.
- McGovern, E. 2006. *Energy Resources of Australia Ltd Ranger Mine Closure Model- First Pass. (Prepared June 2005 & revised March 2006)*. EWL Sciences Pty Ltd. March 2006, p 220.
- Puhlovich, A & Pugh, L. 2007. *ERA Ranger Closure Model 2007*. Report by Energy Resources of Australia Ltd, Commercial in Confidence. November 2007, p 137.

**APPENDIX 1.1 RANGER 2022 MINE CLOSURE PLAN
STAKEHOLDER FEEDBACK FORM**

2022 Ranger Mine Closure Plan Stakeholder Feedback

STAKEHOLDER: *Insert stakeholder details e.g. Supervising Scientist Branch*

[illegible]