Julia Creek Vanadium and Energy Project

Application Number: **02578** Commencement Date: **04/09/2024** Status: **Locked**

1. About the project

1.1 Project details

1.1.1 Project title *

Julia Creek Vanadium and Energy Project

1.1.2 Project industry type *

Mining

1.1.3 Project industry sub-type

Other

1.1.4 Estimated start date *

01/11/2027

1.1.4 Estimated end date *

01/11/2060

1.2 Proposed Action details

1.2.1 Provide an overview of the proposed action, including all proposed activities. *

QEM Limited (QEM) is proposing to develop the Julia Creek Vanadium and Energy Project (the Action) located in Queensland's North West Minerals Province. The Action proposes to produce two commodities: high-purity vanadium pentoxide (V2O5) and transport fuel (such as diesel and/or aviation fuel). The nature of the Action includes the development of an open-cut mining operation, with an estimated life of mine (LOM) of 30 years, with on-site processing facilities to produce V2O5 and transport fuel products. Mined ore has an average V2O5 feed grade of approximately 0.27 per cent (%), upon which it would be separated above ground into vanadium-bearing clays and kerogen-rich feeds. The vanadium-bearing feed is processed to produce high-purity V2O5 at an

estimated rate of 10,571 tonnes (t) per year (99.5%+ purity). The potential exists for the production of other valuable products such as high purity alumina, zinc, copper and molybdenum. The high-purity V2O5 is then transported via road to Townsville for future processing into Vanadium Flow Batteries (VFB) electrolyte.

Vanadium is identified as a critical mineral which are essential for the manufacturing of key technologies such as VFB that will help the world transition to net zero emissions. The Project is located in the Julia Creek and Richmond Critical Mineral Zone and strategically aligned with the critical mineral strategies of the Queensland and Australian Governments to support a strong pipeline of new critical minerals projects that will assist in the global economic and energy transition in response to climate change.

The mineral resource is globally significant and estimated to contain 2,870 million tonnes (Mt) of V2O5 at an average concentration of 0.31% with 461 Mt in the Indicated category and 2,406 Mt in the Australasian Joint Ore Reserves Committee inferred category. This makes the resource one of the single largest vanadium deposits in the world, with the added benefit of a contingent in-situ oil resource of 6.3 million barrels (MMBBls) of Oil equivalent in the 1C category, 94 MMBBls in the 2C category, and 654 MMBBls in the 3C category, contained within the same ore body.

Processing of the kerogen-rich feed would undergo a hydrogenation process that will utilise green hydrogen in the form of a hydrogen-donor solvent, and a hydrotreating process using direct hydrogen. This would allow the production of 5,960 barrels per day (bbl/day) of transport fuel. Approximately 7% of this transport fuel will be provided to the mining contractor for all the mining work. The remainder is sold at the mine gate to a distributor. Therefore, the average transport fuel sold is 5,500 bbl/day.

The Project area includes the Queensland exploration tenements including Exploration Permit for Minerals (EPM) 25662, EPM 25681, EPM 26429 and EPM 27057 which comprise approximately 24,986.97 hectares (ha). QEM is the proponent. The Project area is located approximately 16 kilometres (km) southeast of Julia Creek, Queensland and is shown in Attachment B – Project Location. The Disturbance Footprint is based on the outputs of a recently completed Scoping Study for the Action and will be subject to further change as engineering studies progress. The indicative Disturbance Footprint represents 2,912 ha and is shown in Attachment B – Project Location.

The proposed mining method is conventional open cut mining with pit optimisation results indicating that the open cut will be developed in a north-to-south direction, commencing in the northeast and with a strip ratio of 5:1. The pit shell is estimated at 3.2 km wide (west to east) and 3 km long (north to south) and will be divided into 100 metres (m) wide mining strips for mining and rehabilitation planning purposes. The pit floor is estimated to be a depth of approximately 50 m in the north and 65 m in the south. Ore will be drilled and blasted to fragment the material and mined using hydraulic excavators. Ore will be loaded into dump trucks and hauled to blending stockpiles, the run of mine (RoM) pad or directly fed to the RoM hopper.

The total life is 32 years, comprising a 24-month construction phase followed by a 30-year mining period and site rehabilitation the following year.

A processing flowsheet has been developed to produce vanadium as high-purity V2O5 along with transport fuel as marketable products from the Lower Coquina and Oil Shale ores. Processing has been divided into three stages: including Feed Preparation, Vanadium Refining and Oil Recovery.

Ore will initially be concentrated into two separate product streams, vanadium-bearing clays and kerogen-rich feed in the Feed Preparation Facility (FPF). The FPF would employ conventional mineral processing techniques widely used in the mining industry, such as crushing, milling, screening and flotation, for dedicated downstream treatment.

The vanadium-bearing clays would report to the Vanadium Refining Facility (VRF), where vanadium would be extracted with sulphuric acid and purified through precipitation and re-leaching stages before calcination to produce high-purity V2O5 in powder form. This product will be packaged and stored before transport via road to Townsville.

The kerogen-rich stream would be converted into hydrocarbons and treated in the Oil Recovery Facility (ORF) to produce transport fuel, employing hydrogenation and conventional oil refinery processes. It is in the ORF’s hydrogenation and hydrotreating steps that will use green hydrogen sourced from on-site hydrolyser plant.

Supporting infrastructure located within the Disturbance Footprint will include:

- RoM area with a RoM dump station, crushing and screening, equipment and conveyors
- Tailings storage facility
- Waste rock storage
- A new intersection on the Flinders Highway will be constructed, including turn-out lanes, acceleration and deceleration lanes, and waiting lanes
- Haul roads, access roads and car parking
- Construction lay down area
- Construction material borrow pits
- Topsoil stockpiles
- Magazine
- Surface water management structures
- Water storage and distribution network
- Sub-station and power distribution network
- Onsite diesel generators
- Administration buildings, gate house, parking, fencing, and access security
- Operational buildings, including change house, ablution, workshops, laboratory, emergency services, and warehousing
- Reagent storage and handling facilities
- Process control room, communication, closed circuit television, and security systems
- Mine service area including offices, ablutions, heavy vehicle workshop and vehicle wash bays, diesel storage and refuelling facilities
- Waste management facilities
- Waste water treatment plant and waste storage facilities
- Mobile radio tower or booster system
- Workers camp on lease (if required)
- Groundwater monitoring well network
- Environmental monitoring station (weather and air quality)

Total workforce number for construction and operation are estimated to include:

- Construction workforce of up to 600 personnel
- Operational workforce of up to 588 personnel, consisting of 309 mining, 106 processing, 133 infrastructure, and 40 admin personnel across a range of shift and roster patterns

Rehabilitation of mining operations will occur progressively and will be subject to a Progressive Rehabilitation and Closure Plan (PRCP) that will be developed during the EIS.

A description of the proposed Action is provided in Attachment A – Proposed Action Description.

The Project area and Disturbance Footprint is presented in Attachment B - Project Location.

1.2.2 Is the project action part of a staged development or related to other actions or proposals in the region?

No

1.2.6 What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant? *

The primary state approval pathway identified for the Project is an Environmental Impact Statement under the State Development and Public Works Organisation Act 1971 (SDPWO Act). QEM has applied for a Coordinated Project declaration requiring an Environmental Impact Statement (EIS) under the SDPWO Act. An initial advice statement was submitted to the Coordinator-General on 26 August 2024. If declared a Coordinated Project, the EIS will address the Terms of Reference to the satisfaction (TOR) of the Coordinator-General.

QEM has identified the Project has the potential to impact “listed threatened species and ecological communities” listed under the EPBC Act. The potential for the Project to impact Matters of National Environmental Significance (MNES) means that a referral has been made to the Commonwealth for a determination as to whether the proposed relevant action constitutes a “controlled action” under the EPBC Act. If deemed a controlled action, the Commonwealth will request a specific level of environmental impact assessment depending on the nature of the proposed activity.

The Commonwealth could determine that an EIS is required for the assessment of the controlled action. The Queensland Coordinator-General’s EIS process is an accredited assessment process for MNES and can be utilised to inform the Commonwealth Minister on whether to approve the controlled action. Under the bilateral agreement between the Commonwealth and the State of Queensland dated 2014, DCCEEW has input at the required times in the Coordinator-General’s EIS process and is responsible at the end of the process for issuing a separate conditioned approval for the action and for managing ongoing compliance.

Where there may be a significant residual impact on a protected matter, an offset will be required in accordance with the EPBC Act and the *EPBC Environmental Offsets Policy 2012*. Where this is the case, an Offset Strategy will be included in the EIS. Following assessment of the EIS, an Offset Management Plan may be required to be developed and approved by the Commonwealth.

A mining lease application will be lodged with the Queensland Department of Resources (DoR) for the exploration and mining of minerals during the EIS process. A Petroleum Facility Licence (PFL) for producing transport fuel products from the extracted oil shale will also be subsequently lodged with DoR during the EIS process.

A site-specific Environmental Authority application (SSEA) will be required for undertaking Environmentally Relevant Activity (ERA) 10 – mining metal ore and ERA 8 – a petroleum activity and other ancillary ERAs.

With regard to cultural heritage, a Cultural Heritage Management Plan (CHMP) will be in place and approved under the *Aboriginal Cultural Heritage Act 2003*. This is a pre-requisite to the grant of any lease, licence, permit, approval, or other authority required under any legislation for the Project. A CHMP will be developed for the project and will be registered with the Queensland Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts (DTATSIPCA).

Beyond these primary approvals additional, secondary approvals may be required. These approvals will be determined as part of the EIS process.

The Project will accelerate the development and production of vanadium within a designated Critical Mineral Zone, critical for sustainable supply chains to support the energy transition challenge. It will also produce transport fuel to address the demand in the NWMP and improve regional and domestic fuel security.

Vanadium Strategic Significance

In 2022, the Australian Government designated vanadium as a critical mineral essential for the manufacturing of key technologies that will help the world and Australia transition to net zero emissions. The Commonwealth’s *Australia’s Critical Minerals Strategy 2023-2030* identifies that Australia is well placed to seize the opportunity of the clean energy transition and sets out a vision to grow the critical minerals sector. The key objectives of the strategy are:

- Create diverse, resilient and sustainable supply chains through strong and secure international partnerships
- Build sovereign capability in critical minerals processing
- Use our critical minerals to help Australia become a renewable energy superpower
- Extract more value from our resources onshore, which creates jobs and economic opportunities including for regional and First Nations communities

The *Queensland Critical Minerals Strategy* released in 2023 by the Queensland Government also identify that critical minerals including vanadium underpin the technologies required to achieve a global economic and energy transition. A Critical Mineral Zone between Julia Creek and Richmond was established as a result of the strategy and represents the State’s commitment to developing a critical minerals industry. To capitalise on the generational opportunity and demand for critical minerals this strategy identifies that, Queensland must take quick and purposeful action to seize the opportunity through the following four key objectives:

- Move faster, smarter
- Maximise investment
- Build value chains
- Foster research and ESG excellence

The Queensland and Australian Governments have recognised the importance of vanadium as a critical mineral and have made a commitment to support a strong pipeline of new critical minerals discoveries and projects. QEM's value proposition to produce high-purity V205 to address the demand in battery electrolyte for VFBs is supported by State and Commonwealth policy and the presence of the Critical Minerals Zone.

In addition to Australia, The United States, Canada, European Union, United Kingdom, India, Japan, South Korea and China have identified vanadium as a critical mineral. Although Russia, Brazil, and South Africa have significant vanadium resources and production, there is no clear evidence that they have officially designated vanadium as a critical mineral. However, these countries are major exporters and play crucial roles in the global supply chain for vanadium.

Transport Fuel Strategic Significance

Australia almost entirely relies on refined product and crude imports to meet domestic consumption. Over the last decade, five Australian refineries have closed leaving only two Australian refineries in operation. In financial year (FY) 2021, 91% of all liquid fuel consumed in Australia was imported. This poses a significant fuel security risk due to the reliance on foreign countries, maritime transit and lack of sovereign supply. This was also identified in the Australian Government's National Defence Strategic Review in 2023, stating that fuel distribution in the north and northwest must be more effective and less vulnerable by introducing a more productive and predictable supply approach. The Project will also aim to resolve is the distance between the NWMP and the closest fuel import terminals located in Townsville (646 km), Cairns (852 km), and Mackay (973 km).

The Project's potential production of 313 ML of transport fuel would be an important contribution to Queensland's demand. The expected transport fuel production of approximately 313 ML per annum (at full capacity) represent a modest 4% of the annual demand in Queensland. QEM's value proposition is to domestically produce transport fuel (such as diesel and/or aviation fuel) in North West Queensland to address the demand and contribute towards Australia's fuel security is strongly aligned with Australian Government's strategic priorities.

1.2.7 Describe any public consultation that has been, is being or will be undertaken regarding the project area, including with Indigenous stakeholders. Attach any completed consultation documentations, if relevant. *

The Proponent has been undertaking exploration activities in the Project area since 2015. Engagement with key stakeholders has been ongoing and will continue to occur throughout the EIS process. No major concerns have been raised during public consultations to date. Additionally, QEM have actively engaged with the Julia Creek community to date and have published a set of newsletters and frequently asked questions flyers for the community and landholders which have been published on their website. The landholders and other stakeholders are also provided with a weekly project update that is distributed by email. In 2023, QEM opened an office in Julia Creek and have since been conducting monthly trips to Julia Creek to meet with landowners, council and project stakeholders. QEM also sponsor a range of community initiatives including the Julia Creek Saints junior rugby team and local events such as races, camp drafts and rodeos.

Key stakeholders identified for the Proposed Action include:

- Direct and adjoining landholders
- Local and regional communities, particularly Julia Creek
- Commonwealth, State, and Local Government agencies, including the office of the Coordinator-General, DCCEEW, Department of Agriculture and Fisheries (DAF), DoR, DESI, DRDMW, DSDI, DTATSIPCA, DTMR, MSC
- Indigenous stakeholders
- Business operators and representatives

- Other stakeholders, including Clean Energy Regulator, Private Certifiers, Workplace Health and Safety Queensland, AMEC, MITEZ, WISER, Queensland Critical Minerals Office

To support the environmental approvals process, a Community and Stakeholder Engagement Strategy will be developed, consistent with the requirements of the *Social Impact Assessment Guidelines* (2018) and the *Strong and Sustainable Resource Communities Act 2017*. This engagement strategy will be implemented throughout the EIS development process. The community and stakeholder engagement objectives for the project are to:

- Raise stakeholder awareness of the Project, including timelines and potential impacts
- Address stakeholder concerns and interests
- Initiate engagement as early as possible in the EIS process to ensure stakeholders have sufficient time to consider the project's potential impacts and provide input into mitigation strategies
- Ensure disadvantaged and hard to reach stakeholders and groups are identified and included in community engagement activities
- Identify opportunities to work together with stakeholders to develop strategies that maximise project benefits and minimise adverse impacts
- Initiate engagement with local businesses and vendors to identify local procurement opportunities

A range of engagement and communications tools will continue to be utilised throughout the environmental approvals process, including but not limited to:

- Face-to-face meetings
- Community roadshows and public information sessions
- Council and government department briefings (with DESI, DoR, DCCEEW, McKinlay Shire Council, and other relevant departments)
- Regular Project newsletter and factsheets for the Julia Creek community outlining project milestones and technical studies
- Weekly Project email to landholders outlining key actions and updates
- Media releases and ASX announcements
- Business briefings
- Regular updates to the QEM website
- Investor conferences and webinars

Key State and Commonwealth Agencies will continue to be engaged as the Action is progressed**.**

1.3.1 Identity: Referring party

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Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

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1.3.1.1 Is Referring party an organisation or business? *

Yes

Referring party organisation details	
ABN/ACN	54169579275
Organisation name	EPIC ENVIRONMENTAL PTY LTD
Organisation address	4000 QLD

Referring party details	
Name	Mark Longbottom
Job title	Principal Environmental Scientist
Phone	0409 690 874
Email	mlongbottom@epicenvironmental.com.au
Address	L17, 95 North Quay, Brisbane, QLD, 4000

1.3.2 Identity: Person proposing to take the action

1.3.2.1 Are the Person proposing to take the action details the same as the Referring party details? *

No

1.3.2.2 Is Person proposing to take the action an organisation or business? *

Yes

Person proposing to take the action organisation details

ABN/ACN	167966770
Organisation name	QEM LIMITED
Organisation address	4217 QLD

Person proposing to take the action details

Name	Gavin Loyden
Job title	Managing Director
Phone	0403 256 580
Email	gavin@qldem.com.au
Address	Level 6, 50 Appel Street, Surfers Paradise 4217

1.3.2.14 Are you proposing the action as part of a Joint Venture? *

No

1.3.2.15 Are you proposing the action as part of a Trust? *

No

1.3.2.17 Describe the Person proposing the action's history of responsible environmental management including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person proposing to take the action. *

QEM acknowledges that mining and metals are essential, from building sustainable economic growth and supporting local community in Julia Creek and throughout North Queensland, to enabling innovations needed to address climate change urgency – but they must be produced responsibly.

QEM believes that integrating positive environmental, social and governance (ESG) qualities with rigorous, financial diligence is crucial to delivering long-term risk-adjusted performance. Proactively seeking opportunities for positive change in ESG matters is fundamental to QEM's mission and fiduciary responsibility and QEM believe this approach will enhance shareholder value.

QEM is charting a course to help build resilience and enhance the social licence for the Action through a greater commitment to long-term, sustainable value creation that embraces the wider demands of people and the planet. The dual commodities of vanadium and transport fuel will help address Australia's growing energy storage and fuel security issues in the transition to a renewable energy-driven society.

QEM or its Directors have never been convicted of an environmental offence under Queensland or other Australian Government legislation. QEM or its Directors have not been subject to current or previous proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources.

QEM's mission is to operate in the safest and cleanest way possible while providing strong and sustained value to shareholders.

1.3.2.18 If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

The key ESG principles adopted by QEM are summarised below:

Environment

- Proposed use of renewable energy to produce Green Hydrogen and power mining operations
- Target products such as high purity V2O5 to support global emission reduction targets

Social

- Supports local community – engagement, Indigenous relations, long-term jobs, training, youth programs, women's and community sporting programmes
- Encourages employees to volunteer and fundraise (St Vinnies CEO Sleepout, St Vincent de Paul Society, Endeavour Foundation)
- Bronze Partner of WISER (Women in Sustainable Energy and Resources)

Governance

- Management aligned with shareholders
- Ethically sourced critical minerals – traceability and provenance
- Support for women in leadership roles and Women in Mining and Resources Queensland (WIMARQ) Gold Coast Sponsor
- Dedicated to corporate transparency
- Use of SocialSuite ESG Go reporting software

QEM's environmental policy is provided in Attachment E - QEM Environmental Policy.

1.3.3 Identity: Proposed designated proponent

1.3.3.1 Are the Proposed designated proponent details the same as the Person proposing to take the action? *

Yes

Proposed designated proponent organisation details

ABN/ACN	167966770
Organisation name	QEM LIMITED
Organisation address	4217 QLD

Proposed designated proponent details

Name	Gavin Loyden
Job title	Managing Director
Phone	0403 256 580
Email	gavin@qldem.com.au
Address	Level 6, 50 Appel Street, Surfers Paradise 4217

1.3.4 Identity: Summary of allocation

Confirmed Referring party's identity

The Referring party is the person preparing the information in this referral.

ABN/ACN	54169579275
Organisation name	EPIC ENVIRONMENTAL PTY LTD
Organisation address	4000 QLD
Representative's name	Mark Longbottom
Representative's job title	Principal Environmental Scientist
Phone	0409 690 874
Email	mlongbottom@epicenvironmental.com.au
Address	L17, 95 North Quay, Brisbane, QLD, 4000

Confirmed Person proposing to take the action's identity

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	167966770
Organisation name	QEM LIMITED
Organisation address	4217 QLD
Representative's name	Gavin Loyden
Representative's job title	Managing Director
Phone	0403 256 580
Email	gavin@qldem.com.au
Address	Level 6, 50 Appel Street, Surfers Paradise 4217

Confirmed Proposed designated proponent's identity

The Person proposing to take the action is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

1.4 Payment details: Payment exemption and fee waiver

1.4.1 Do you qualify for an exemption from fees under EPBC Regulation 5.23 (1) (a)?

Yes

1.4.2 Select reason for exemption

Small Business

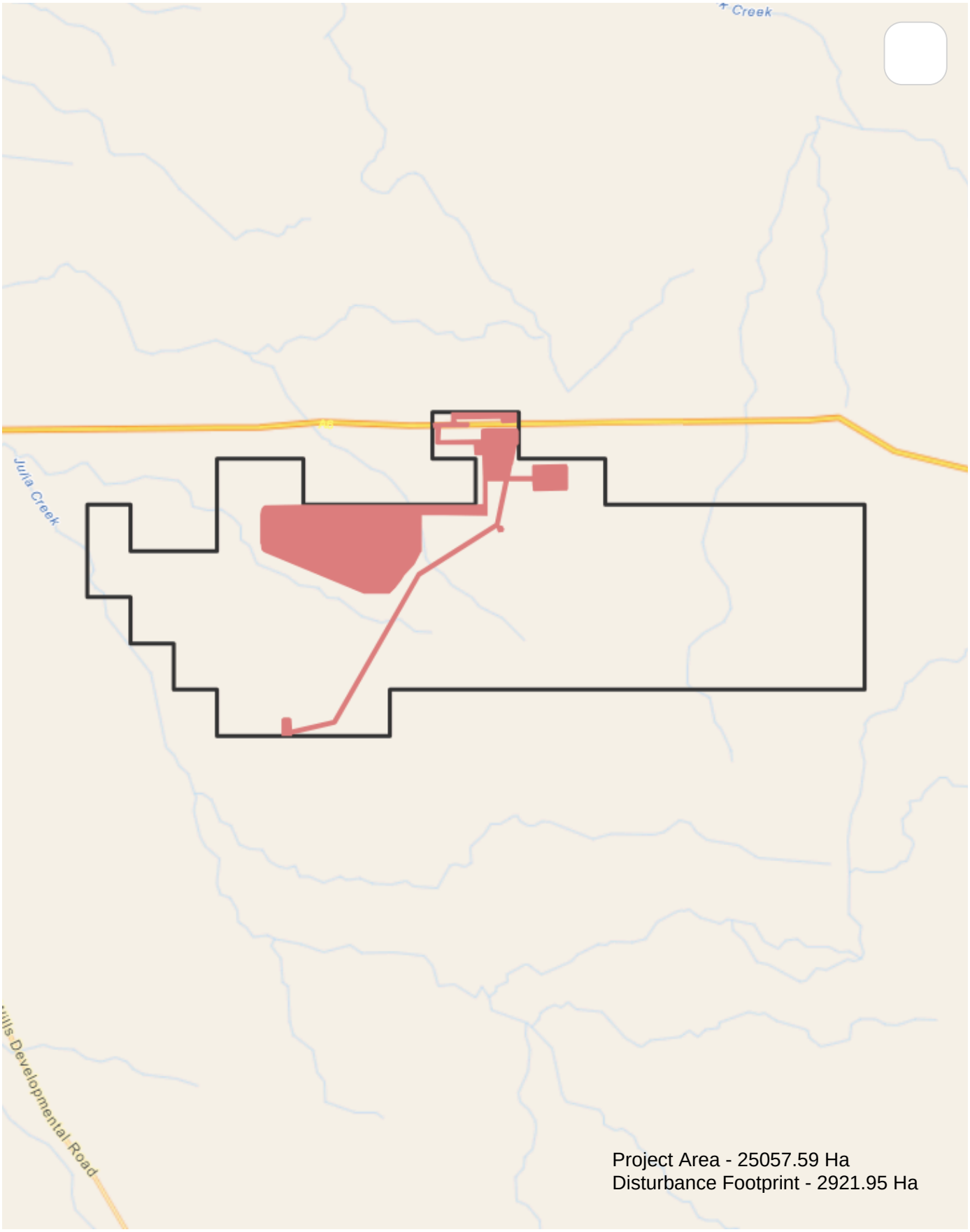
1.4 Payment details: Payment allocation

1.4.11 Who would you like to allocate as the entity responsible for payment?

Person proposing to take the action

2. Location

2.1 Project footprint



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2.2 Footprint details

2.2.1 What is the address of the proposed action? *

Flinders Highway, Julia Creek, Queensland. (Entrance Lot on Plan: 11 EN105).

2.2.2 Where is the primary jurisdiction of the proposed action? *

Queensland

2.2.3 Is there a secondary jurisdiction for this proposed action? *

No

2.2.5 What is the tenure of the action area relevant to the project area? *

The Project Area includes the Queensland exploration tenements including EPM 25662, EPM 25681, EPM 26429 and EPM 27057

The land on which the Project area is located is mostly State Land administered by the DoR under the Land Act 1994.

The Project area is bound to the north by the Flinders Highway and Mount Isa rail line, as well as several Mining Leases.

There is no native title or registered Traditional Owner parties over the Project area.

Land ownership associated with the Project Area includes:

Lot on Plan/Tenure

- 128 SP271042/Lands Lease- pastoral
- 4 SP135881/Lands Lease
- 1 EN3/Lands Lease
- 451 SP104935/Lands Lease
- 3 EN17/Lands Lease
- 3 EN 16/Lands Lease
- 3 EN 17/Lands Lease
- 6 EN 16/Reserve
- 11 EN 105/Freehold
- 10 EN16/Lands Lease
- 13 EN89/Freehold
- 3 EN147/Lands Lease (perpetual- grazing or agricultural)

- 9 EN147/Lands Lease

3. Existing environment

3.1 Physical description

3.1.1 Describe the current condition of the project area's environment.

The Project area has been historically used for cattle grazing on unimproved pastures of the Mitchell Grass Downs and is in a largely disturbed state, situated across several rural properties. Several fencing lines and vehicular tracks also occur across these properties.

Desktop mapping indicates that the Project area is largely comprised of remnant least concern regional ecosystems (REs), dominated by *Astrebla* tussock grassland. However, these REs are subject to significant grazing pressures.

Surrounding views are of the existing environment which comprises mostly degraded, cattle grazing country, and the Flinders Highway. From Flinders Highway, the Project Area is viewed as flat and mainly treeless plains subject to cattle grazing.

Three Category three restricted matter species of weeds were identified in the desktop assessment as potentially occurring within the Project area. Two of these species are listed as Weeds of National Significance. All potentially occurring weeds are listed below:

- Prickly Acacia (Vachellia nilotica) (WoNS)
- Parkinsonia (Parkinsonia aculeata) (WoNS)
- Chinese Apple (Ziziphus mauritiana)

Twelve species of feral animal were identified in the MSES report and PMST report, including the Dog/Dingo (Canis familiaris) and Pig (Sus scrofa) amongst others.

Further information is provided in Attachment C - Ecological Assessment Report (Section 3, Page 22-28).

3.1.2 Describe any existing or proposed uses for the project area.

The Project area has been historically used for cattle grazing with no additional proposed uses beyond those described in this referral.

3.1.3 Describe any outstanding natural features and/or any other important or unique values that applies to the project area.

No outstanding natural features and/or any other important or unique values relevant to the Project area have been identified.

3.1.4 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The Project area lies on flat lying black soil plains characteristic of the Mitchell Grass Downs Bioregion, with relief generally less than one metre high. The Project area contains sediments from the Eromanga Basin, a marine basin that formed between the Late Triassic to Early Late Cretaceous period. The geology within the area is benign and is comprised of relatively flat to gently undulating plains with an elevation range of 125-150 m Australian Height Datum (AHD). Subtle topographic highs are largely consistent with outcropping Toolebuc Formation instead of the primarily weathered and subdued Allaru Mudstone which is generally 200 m to 300 m thick and formed within a calm shallow to basinal marine setting.

The economic sequences are contained within the Toolebuc Formation, with vanadium in the whole formation and oil mainly within the oil shale (Arrolla Siltstone). The Toolebuc is anomalous in various elements, including vanadium, copper, zinc, nickel and molybdenum, derived from seawater by paleo-organisms. Several creeks and drainage lines occur within the Project area and generally flow to the northwest.

Further information is provided in Attachment C - Ecological Assessment Report (Section 3, Page 22-28).

3.2 Flora and fauna

3.2.1 Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.

Fauna

A fauna survey was undertaken by Epic Environmental in March 2022 which recorded 55 terrestrial fauna species, comprised of six mammals, 40 bird, seven reptile and two frog species in the Project area and immediate surroundings. The survey identified the occurrence of the Fork-tailed Swift (*Apus pacificus*) in the Project area, listed as Migratory under the EPBC Act.

Two of the mammal species are introduced and all the recorded bird and reptile species were expected for the habitats present in the Project area and within the bioregion. One recorded frog species is an introduced species. No recorded fauna is species considered threatened under either the EPBC Act or NC Act. One species is listed

as Migratory under the EPBC Act.

The Mitchell Grass grasslands have a relatively depauperate vertebrate fauna species assemblage. A lack of structural complexity limits the habitat's suitability for many species, though the grasslands do support a number of distinctive species, some of which are endemic to the bioregion and/or only found in the tussock grasslands (Wilson 1999). Nonetheless, the recorded species assemblage is an under representation of the species expected for the area but reflects the poor conditions on site during the survey and the mobility of many of the bird species. A full list of recorded fauna species is provided in Attachment C - Ecological Assessment Report (Appendix D - Fauna Data).

Flora

Two flora surveys undertaken by Epic Environmental in March 2022 and October to November 2022 identified a total of 121 flora species within the area. A total of 121 flora species were identified within the Project area, 109 during the autumn survey and an additional 12 species identified during the spring survey. Recorded species included 12 non-native species, of which two are listed as restricted matters under the Queensland Biosecurity Act. A full list of recorded flora species is provided in Attachment C - Ecological Assessment Report (Appendix C - Flora Species List).

Protected Matters Search Results

The DCCEEW EPBC Act Protected Matters report (PMR) was generated based on the Project area with a 10 km buffer. The PMR identified 15 threatened fauna species and 10 migratory species were identified as potentially occurring within the search area. No MNES threatened flora species were identified as potentially occurring within the search area. A desktop search for TECs showed that a single TEC – the community of native species dependent on natural discharge of ground water from the Great Artesian Basin –is likely to occur within the Project area. The Protected Matters Search results are provided in Attachment C - Ecological Assessment Report (Appendix A - Desktop Search Results).

Threatened Ecological Communities (TECs)

No active or inactive mound springs were observed within the Project area, and none are considered as potentially occurring.

3.2.2 Describe the vegetation (including the status of native vegetation and soil) within the project area.

The Project area is located in a modified landscape with large areas converted to agricultural purposes (predominately grazing) with some areas of remnant vegetation remaining. The Project area is dominated by Mitchell grass (*Astrebla* spp.) tussock grasslands on rolling plains (downs). The plains are interlaced by multiple drainage lines which support open grasslands, herblands or eucalypt woodlands and isolated remnant plateaus.

Desktop assessment indicates the presence of six mapped REs. This mapping shows large areas of the northern area as RE 4.3.15, while the southern area is largely comprised of 4.9.1c/4.9.12x8 and 4.3.15/4.3.4f. Regional ecosystems mapped at a desktop level within the Project area are presented in Attachment C – Ecological Assessment Report (Table 7, Page 25).

The region is dominated by Epicalcareous to Epihypersodic self-mulching brown vertosols under the Australian Soil Classification system. The area is mapped as MM5 which is described as gently undulating clay plains with a slight gilgai microrelief, containing substantial gypsum. Topography in some locations is strongly undulated, and dissected by deep wide valleys where the soil unit is exposed by stream erosion. Brown clays (Ug5.32) of moderate depth (76 – 91 cm) are dominant with similar grey clays (Ug5.26, Ug5.22) also commonly occur. In areas, particularly located adjacent to eroded lateritic mesa-like hills or lateritic scarps, red-brown clays (Ug5.37, Ug5.38) are locally dominant, with smaller areas of red loamy duplex soils (Dr3.22). In other small local areas, a veneer of silcrete (billy) gravel is prominent, with associated lower-level plains, or small stream flood-plains with deeper clay soils (Ug5.28, Ug5.29, Ug5.24, and Ug5.34). Acid sulphate soils are not expected to occur in the Project area due to its distance from the coast, topography (above 5 mAHD), and geomorphic and soil characteristics.

A total of 51 Secondary RE assessments and 56 Quaternary RE assessments were conducted during the autumn wet season survey. During the spring dry season survey an additional 23 Secondary RE assessments and 28 Quaternary RE assessments were conducted. Ground-truthing of current RE mapping of the Project area confirmed the presence of three vegetation communities analogous to three RE types and an area of non-remnant grassland impacted by cropping as describe in Attachment C - Ecological Assessment Report (Table 8, Page 30). The ground-truthed REs are illustrated in Attachment D - Ground-truthed Regional Ecosystems.

3.3 Heritage

3.3.1 Describe any Commonwealth heritage places overseas or other places recognised as having heritage values that apply to the project area.

A search of the Commonwealth heritage places list indicates that there are no listed heritage sites within the Project area.

3.3.2 Describe any Indigenous heritage values that apply to the project area.

The Mitakoondi & Mayi People are the closest registered Cultural Heritage Party to the Project area. A desktop search has found 24 cultural heritage artefact scatters within a 10 km buffer of the Project area; however, these are not located within the proposed Disturbance Footprint. There is also a mapped Aboriginal Intangible Place approximately 50 km northwest of the Project area.

3.4 Hydrology

3.4.1 Describe the hydrology characteristics that apply to the project area and attach any hydrological investigations or surveys if applicable. *

The Proposed Action is located within the Flinders River Catchment area of the Water Plan and is further separated into the Flinders River and Cloncurry River drainage subbasins. The Proposed Action is located within the of the Great Artesian Basin (GAB) area which occupies 1.7 million square metres and consists of a multi-layered confined aquifer system. The Project lies within the northern part of the Eromanga Basin which overlies the north-western Galilee Basin and connects the Euroka Arch to the Carpentaria Basin.

There are minimal notable topographic features and subtle topographic highs across the region. Under the Interim Biogeographic Regionalisation for Australia (IBRA), the area is classified as Central Downs subregion within the Mitchell Grass Downs biogeographic region. Several creeks and drainage lines occur within the Project area, including Julia Creek, Horse Creek and Spellary Creek. There are no Ramsar protected wetland sites, nationally important wetland sites, wetland protection areas, wetlands of High Ecological Significance (HES), or wetlands or watercourses in High Ecological Value (HEV) waters mapped within the Project area.

The western extent of the Project area intersects with rapid hazard assessment floodplain extent mapping. Catchment run off is generally from southeast to northwest towards the Cloncurry River and to a lesser extent the Flinders River. Multiple wetlands of low ecological significance located in the northern portion of the Project area. Freshwater bodies are limited across the Project area despite inundation filling some water storage areas on a seasonal basis.

The Bureau of Meteorology (BoM) Groundwater Dependant Ecosystem (GDE) Atlas identifies a potential aquatic GDE (low confidence) in the western portion of the Project area. The GDE connects to a larger system to the west and north of the Project area that are associated with the Flinders River.

4. Impacts and mitigation

4.1 Impact details

Potential Matters of National Environmental Significance (MNES) relevant to your proposed action area.

EPBC Act section	Controlling provision	Impacted	Reviewed
S12	World Heritage	No	Yes
S15B	National Heritage	No	Yes
S16	Ramsar Wetland	No	Yes
S18	Threatened Species and Ecological Communities	Yes	Yes
S20	Migratory Species	Yes	Yes
S21	Nuclear	No	Yes
S23	Commonwealth Marine Area	No	Yes

EPBC Act section	Controlling provision	Impacted	Reviewed
S24B	Great Barrier Reef	No	Yes
S24D	Water resource in relation to large coal mining development or coal seam gas	No	Yes
S26	Commonwealth Land	No	Yes
S27B	Commonwealth Heritage Places Overseas	No	Yes
S28	Commonwealth or Commonwealth Agency	No	Yes

4.1.1 World Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.1.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.1.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no World Heritage properties within the Project area, or within proximity to the Project area (confirmed via the EPBC Act Protected Matters Report). Therefore, the potential for a significant direct and/or indirect impact on the natural or cultural heritage values of World Heritage properties is unlikely.

4.1.2 National Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.2.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.2.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no National Heritage places within the Project area, or within proximity to the Project area (confirmed via the EPBC Act Protected Matters Report). Therefore, the potential for a significant direct and/or indirect impact on the natural or cultural heritage values of National Heritage places is unlikely.

4.1.3 Ramsar Wetland

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.3.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.3.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no Ramsar wetlands within the Project area, or within proximity to the Project area (confirmed via the EPBC Act Protected Matters Report). Therefore, the potential for a significant direct and/or indirect impact on Ramsar wetland is unlikely.

4.1.4 Threatened Species and Ecological Communities

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Threatened species

Direct impact	Indirect impact	Species	Common name
No	No	Acanthophis hawkei	Plains Death Adder
Yes	Yes	Calidris acuminata	Sharp-tailed Sandpiper
No	No	Calidris ferruginea	Curlew Sandpiper
No	No	Chloebia gouldiae	Gouldian Finch
No	No	Erythrotriorchis radiatus	Red Goshawk
Yes	Yes	Falco hypoleucos	Grey Falcon
No	No	Gallinago hardwickii	Latham's Snipe, Japanese Snipe
No	No	Grantiella picta	Painted Honeyeater
No	No	Macroderma gigas	Ghost Bat
No	No	Macrotis lagotis	Greater Bilby
No	No	Neochmia ruficauda ruficauda	Star Finch (eastern), Star Finch (southern)
No	No	Rostratula australis	Australian Painted Snipe
Yes	Yes	Sminthopsis douglasi	Julia Creek Dunnart
No	No	Varanus mertensi	Mertens' Water Monitor, Mertens's Water Monitor

Ecological communities

Direct impact	Indirect impact	Ecological community
No	No	The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin

4.1.4.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.4.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

The clearing of vegetation is the most significant and direct impact of the Project on the ecological values of the Project area. Land clearance is listed as a key threatening process under the EPBC Act. The removal of habitat reduces the size of local populations of flora and fauna dependent on that habitat. These impacts are immediate and potentially significant in the short term. Impacts may persist in the long term if the habitat created during mine rehabilitation does not closely resemble pre-mining ecosystems. In addition, if sufficient habitat refuges are not maintained locally prior to the maturation of rehabilitated land, local extinction of certain species may occur.

Vegetation will be removed to accommodate mining and other infrastructure associated with the Project. The Disturbance Footprint encompasses a total area of approximately 2,912.09 ha over the lifespan of the Project. It is noted the current Disturbance Footprint is likely to be revised and may change before the Project design is finalised. The extent of impact to field-verified vegetation communities within the Project area based on the current Disturbance Footprint is described in Attachment C - Ecological Assessment Report (Table 11, Page 42) and illustrated in Attachment D - Ground-truthed Regional Ecosystems.

Appendix C - Ecological Assessment Report provides a comprehensive description of the likelihood of occurrence of each threatened species identified as potentially present through a review of the findings of desktop and in-field assessments along with historic records of the species, and provides an assessment of the potential impacts arising from the Action by addressing the Significant Impact Criteria outlined in the *MNES significant impact guidelines 1.1* (MNES Guidelines).

There are no flora species listed as threatened under the EPBC Act predicted as potentially present in the Project area or surrounds.

Four threatened fauna species under the EPBC Act have some potential to occur in the Project area, including the Julia Creek Dunnart (*Sminthopsis douglasi*), Sharp-tailed Sandpiper (*Calidris acuminata*), Common Greenshank (*Tringa nebularia*) and Grey Falcon (*Falco hypoleucos*). These species were not observed during the surveys, but records do exist within the Project area or in the immediate surrounding area and, therefore, have the potential to occur.

Threatened species potentially occurring within the Project area are assessed in Attachment C - Ecological Assessment Report (Section 6, Page 48-58).

Threatened Ecological Community

The Protected Matters Search Tool identified the community of native species dependent on the natural discharge of groundwater from the Great Artesian Basin Threatened Ecological Community as potentially occurring within the Project area. No active or inactive mound springs were observed within the Project area, and none are considered as potentially occurring.

Julia Creek Dunnart (*Sminthopsis douglasi*)

Within the Project area and surrounds the species preferred habitat is the dominant grassland community present (RE 4.9.1c) and it may also occur on the alluvial grassland community (RE 4.3.15). Based on field verified vegetation mapping 2,912.09 ha of potentially grassland REs occur within the current Disturbance Footprint.

Sharp-tailed Sandpiper (Calidris acuminata) and Common Greenshank (*Tringa nebularia*)

There is a possibility for two migratory wetland-associated bird species to be present: Sharp-tailed Sandpiper and Common Greenshank. These species would only be occasional visitors (at best) to wetland habitats in the Project area. Both species are non-breeding visitors to Australia, most commonly in the south-east. They are widespread in both inland and coastal locations and in both freshwater and saline habitats. Sharp-tailed Sandpipers prefer muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. Common Greenshank prefers edges of shallow wetlands, mudflats and channels and may occur on a variety of freshwater, marine and modified habitats including sewage treatment ponds and reservoirs. The Project area does not contain good habitat for either species, but it could occur on habitats such as the bore drain and farm dams, especially in transit. Both species are more likely to occur in the region during migratory movements to the south and east of Australia.

The current Disturbance Footprint largely avoids existing waterbodies (farm dams) except for a single dam in the north of the Project area. Several minor waterways will be affected with some loss of catchment area. Nevertheless, the affected waterways are in the upper catchment, comprise shallow channels and are highly ephemeral. These areas would only retain water after sustained heavy rainfall events. There is abundant similar habitat in the region not affected by the Project. The only potential impact on these species is a minor loss of occasional habitat which is considered a very minor risk at worst and therefore no direct habitat reduction calculations have been undertaken.

Grey Falcon (*Falco hypoleucos*)

Grey Falcon may occasionally forage in the area but the only breeding habitat present (i.e. large trees on watercourses) for the species within the Project area may be along Julia Creek and associated anabranches along the western boundary of the Project area. The Project is not proposing to impact this habitat. The Project will result in the disturbance of 2,912.09 ha of potential habitat, all of which will be restricted to foraging habitat.

Should they be found to be present at the time of any vegetation disturbance, bird species such as Grey Falcon and Sharp-tailed Sandpiper would be expected to simply move away from the disturbance area to adjacent undisturbed habitat which is widespread.

Indirect Impacts

Indirect impacts are discussed in Attachment C - Ecological Assessment Report (Section 5, Page 42-45). Indirect impacts relating habitat fragmentation, direct mortality, dust, noise, vibration, altered flow regimes and water quality are anticipated to be marginal.

4.1.4.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

Yes

4.1.4.5 Describe why you consider this to be a Significant Impact. *

Attachment C - Ecological Assessment Report (Section 6, Page 48-58) provides a comprehensive description of the likelihood of occurrence of each threatened species identified as potentially present through a review of the findings of desktop and in-field assessments along with historic records of the species, and provides an assessment of the potential impacts arising from the Action by addressing the MNES Guidelines.

An assessment of the potential for significant impacts resulting from the Project activities was carried out only on those MNES considered as potentially subject to substantial impacts: Julia Creek Dunnart and Grey Falcon. The assessment concluded that a significant impact on Grey Falcon will not occur as the proposed impact area does not comprise any potential breeding habitat and would represent a very small portion of an individual's foraging habitat (should the species occur at all). The assessment for Julia Creek Dunnart concluded there is potential for a significant impact through a reduction in the area of occupancy of a population of the species.

4.1.4.7 Do you think your proposed action is a controlled action? *

Yes

4.1.4.8 Please elaborate why you think your proposed action is a controlled action. *

The proposed Action is considered to be a controlled action due to the potentially significant impacts to the Julia Creek Dunnart.

The Julia Creek Dunnart has not been identified as present during a single targeted Project survey in 2022. Nevertheless, there are known recent (2023 and 2024) database records within 5 km of the Project area, there is a suitable habitat present, and the species is considered likely to occur. If a population of the species occurs it could be interpreted as being part of an important population. The current Disturbance Footprint will result in the disturbance of 2,912.09 ha of habitat potentially suitable for the species. The linear elements of the Project are not considered to be of a nature to cause a barrier to the species movement in the landscape. It is noted the Disturbance Footprint and extent of impact may change as the Project progresses. There is over 21,400 ha of potentially suitable habitat for the species located within the remainder of the Project area that will not be disturbed. While the habitat within the Project area is a relatively minor proportion of the available habitat in the immediate surrounds the Project has the potential to reduce the area of occupancy of an important population of Julia Creek Dunnart (should the species be found to occur in the area).

Therefore, the Proposed action may cause a significant impact to the Julia Creek Dunnart through a reduction in the area of occupancy of a population of the species. Project location, design and mitigation and management measures will be considered in the Project's design phase to reduce the likelihood of impact, with progressive rehabilitation to occur in accordance with the PRCP.

4.1.4.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

The avoidance and minimisation of impacts on national and state significant environmental values have been a major consideration during the planning and design of the Project to date. The Disturbance Footprint will be further refined during the advancement of the engineering studies and through the Environmental Impact Assessment Process.

The Proponent will commit to a range of measures to minimise impacts to ecological values associated with the Project area. The final design process for the Project will aim to minimise the Disturbance Footprint to areas representing habitat for threatened species (i.e. Julia Creek Dunnart and Grey Falcon) as much as is feasible for the construction of the required infrastructure. Where avoidance is not possible, a range of mitigation strategies will be implemented under an overarching Construction Environmental Management Plan, Operation Environmental Management Plan and subplans.

A PRCP will be developed in accordance with requirements under the State's approval processes. Rehabilitation will be carried out in a progressive manner over the project's life. The PRCP will inform rehabilitation and management measures throughout the Project's life.

Attachment C - Ecological Assessment Report (Section 5.2, Page 42) provides a comprehensive list of mitigation measures designed to avoid or minimise potential environmental impacts and identifies relevant legislation.

4.1.4.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

The only MNES considered potentially subject to significant impacts from the Project is habitat for a threatened species: Julia Creek Dunnart (listed as Vulnerable under the EPBC Act). The assessment for significant residual impacts carried out under the MNES Guidelines indicates there is a potential for the Project to cause a significant impact on the species through impacts to 2,912.09 ha of suitable habitat.

Should the assessment deem the Project to be a 'controlled action' for a significant impact/s to Julia Creek Dunnart the proponent may be required to compensate for the impact through the development and implementation of a Project-specific environmental offsets program. An offsets program for the Project will be required to consider the guidance in the Commonwealth's Environmental Offsets Policy and use the EPBC Act offsets assessment guide to calculate the extent of the required offset based on the habitat values present.

4.1.5 Migratory Species

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Species	Common name
No	No	Actitis hypoleucos	Common Sandpiper
No	Yes	Apus pacificus	Fork-tailed Swift
No	Yes	Calidris acuminata	Sharp-tailed Sandpiper
No	No	Calidris ferruginea	Curlew Sandpiper
No	No	Calidris melanotos	Pectoral Sandpiper
Yes	No	Charadrius veredus	Oriental Plover, Oriental Dotterel
No	No	Gallinago hardwickii	Latham's Snipe, Japanese Snipe
Yes	No	Glareola maldivarum	Oriental Pratincole
No	No	Motacilla cinerea	Grey Wagtail
No	No	Motacilla flava	Yellow Wagtail
Yes	Yes	Tringa nebularia	Common Greenshank, Greenshank

4.1.5.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.5.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Attachment C - Ecological Assessment Report (Section 6, Page 48-58) provides a comprehensive description of the likelihood of occurrence of each Migratory species identified as potentially present through a review of the findings of desktop and in-field assessments along with historic records of the species and provides an assessment of the potential impacts arising from the Action by addressing the Significant Impact Criteria outlined in the *MNES significant impact guidelines 1.1* (MNES Guidelines).

One species listed as Migratory under the EPBC Act was observed during Project surveys (Fork-tailed Swift) and is therefore considered as known to occur. Four other Migratory species may also potentially occur based on the habitat values present within the Project area (Sharp-tailed Sandpiper, Common Greenshank, Oriental Plover and Oriental Pratincole).

Oriental Pratincole (*Glareola maldivarum*) and Oriental Plover (*Charadrius veredus*)

Oriental Pratincole and Oriental Plover are non-breeding summer visitor to Australia. Oriental Pratincole is present in Australia between December and February. Oriental Plover arrives in Queensland from the Northern Hemisphere in September, with numbers increasing into December.

Oriental Plovers occur mostly on open grasslands in arid and semi-arid areas. The species prefers flat inland plains, sparsely vegetated with short grass. It also occurs on claypans, sporting fields, lawns, around the margins of terrestrial wetlands and in woodland and heathland that have been recently burnt. The distribution and abundance of Oriental Plover in inland regions are poorly known, particularly given it feeds in or over grasslands and/or bare habitats. Oriental Plover has been recorded in close proximity to the Project area (Julia Creek township). It may occur in the Project area, though not necessarily on an annual basis. It is unlikely to occur during good conditions (i.e. following periods of rainfall) where the formation of a dense ground cover causes a lack of suitable open/bare habitat for the species.

Oriental Pratincole also occurs in open country, usually on plains, floodplains, or grassland with little vegetation and often near water. It also uses agricultural land, airfields and mudflats and occurs around the margins of wetlands, including artificial waterbodies. It is widespread north of Julia Creek but occurs only sporadically further south. Database records of the species in the surrounding region are all located to the west and are all older than 1970. Similar to the previous species the Project area will contain suitable habitat, but only during dry conditions.

The Project area comprises habitat that is widespread in the MGD bioregion. The occurrence of either species will be occasional at best. There is no reason to believe the Project area would provide important habitat for either species. The only potential impact on these species is a minor loss of occasional habitat which is widespread in the surrounding region.

Sharp-tailed Sandpiper (Calidris acuminata) and Common Greenshank (*Tringa nebularia*)

There is a possibility for two migratory wetland-associated bird species to be present: Sharp-tailed Sandpiper and Common Greenshank. These species would only be occasional visitors (at best) to wetland habitats in the Project area. Both species are non-breeding visitors to Australia, most commonly in the south-east. They are widespread in both inland and coastal locations and in both freshwater and saline habitats. Sharp-tailed Sandpipers prefer muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. Common Greenshank prefers edges of shallow wetlands, mudflats and channels and may occur on a variety of freshwater, marine and modified habitats including sewage treatment ponds and reservoirs. The Project area does not contain good habitat for either species, but it could occur on habitats such as the bore drain and farm dams, especially in transit. Both species are more likely to occur in the region during migratory movements to the south and east of Australia.

The current Disturbance Footprint largely avoids existing waterbodies (farm dams) except for a single dam in the north of the Project area. Several minor waterways will be affected with some loss of catchment area. Nevertheless, the affected waterways are in the upper catchment, comprise shallow channels and are highly ephemeral. These areas would only retain water after sustained heavy rainfall events. There is abundant similar habitat in the region not affected by the Project. The only potential impact on these species is a minor loss of occasional habitat which is considered a very minor risk at worst and therefore no direct habitat reduction calculations have been undertaken.

Fork-tailed Swift (*Apus pacificus*)

Fork-tailed Swift is an aerial species that may occur over any habitat including inland, coastal and marine areas and disturbed habitat such as urban areas. It has only occasionally been recorded as landing in Australia. The species is highly mobile and may forage anywhere from 1 m up to 100s of metres above ground. There are no possible roosting sites within the Project area that would be affected by the Project. Given the species' aerial habits, it is inconceivable the Project area would represent an 'important habitat' for the species and the Project activities would be highly unlikely to impact the species in any way.

4.1.5.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.5.6 Describe why you do not consider this to be a Significant Impact. *

Attachment C - Ecological Assessment Report (Section 6, Page 48-58) provides a comprehensive assessment of the potential impacts arising from the Action by addressing the Significant Impact Criteria outlined in the MNES Guidelines.

Migratory species are considered to be only very temporary and transient visitors to the Project Area, if present at all, given the lack of permanent water bodies or other suitable habitat, and the highly ephemeral nature of habitats which may retain water following substantial rainfall events. Following any substantial rainfall events, habitats which are more suitable than those within the Project Area are expected to be available more broadly across the landscape.

4.1.5.7 Do you think your proposed action is a controlled action? *

No

4.1.5.9 Please elaborate why you do not think your proposed action is a controlled action. *

Significant impacts on migratory species are not predicted.

There are no possible roosting sites for the Fork-tailed Swift which is the only migratory species known to occur within the Project area that would be affected by the Project. Given the species' aerial habits it is inconceivable the Project area would represent an 'important habitat' for the species and the Project activities would be highly unlikely to impact the species in any way.

The use of the Project area by the remaining species is considered marginal at best. The loss of habitat that these species may only very occasionally use is not considered a significant impact.

Attachment C - Ecological Assessment Report (Section 6, Page 48-58) provides a comprehensive assessment of the potential impacts arising from the Action by addressing the Significant Impact Criteria outlined in the MNES significant impact guidelines 1.1 (MNES Guidelines).

4.1.5.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

The avoidance and minimisation of impacts on national and state significant environmental values have been a major consideration during the planning and design of the Project to date. The Disturbance Footprint will be further refined during the advancement of the engineering studies and through the Environmental Impact Assessment Process.

The Proponent will commit to a range of measures to minimise impacts to ecological values associated with the Project area. The final design process for the Project will aim to minimise the Disturbance Footprint to areas representing habitat for threatened species (i.e. Julia Creek Dunnart and Grey Falcon) as much as is feasible for the construction of the required infrastructure. Where avoidance is not possible, a range of mitigation strategies will be implemented under an overarching Construction Environmental Management Plan, Operation Environmental Management Plan and subplans.

A PRCP will be developed in accordance with requirements under the State's approval processes. Rehabilitation will be carried out in a progressive manner over the project's life. The PRCP will inform rehabilitation and management measures throughout the Project's life.

Attachment C - Ecological Assessment Report (Section 5.2, Page 45) provides a comprehensive list of mitigation measures designed to avoid or minimise potential environmental impacts and identifies relevant legislation.

4.1.5.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

As no notable impacts to migratory species are anticipated, no specific offsets have been considered for migratory species.

4.1.6 Nuclear

4.1.6.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.6.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed activities described in this document do not constitute a nuclear action.

4.1.7 Commonwealth Marine Area

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.7.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.7.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no Commonwealth Marine Areas within the Project area, or within proximity to the Project area (confirmed via the EPBC Act Protected Matters Report). Therefore, the potential for a significant direct and/or indirect impact on the natural or cultural heritage values of Commonwealth Marine Areas is unlikely.

4.1.8 Great Barrier Reef

4.1.8.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.8.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Great Barrier Reef Marine Park is not within the Project area, or within proximity to the Project area (confirmed via the EPBC Act Protected Matters Report). Therefore, the potential for a significant direct and/or indirect impact on the natural or cultural heritage values of the Great Barrier Reef Marine Park is unlikely.

4.1.9 Water resource in relation to large coal mining development or coal seam gas

4.1.9.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.9.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed activities described in this document do not constitute a large coal mining development of coal seam gas project.

4.1.10 Commonwealth Land

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.10.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.10.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There is no Commonwealth Land within the Project area, or within proximity to the Project area (confirmed via the EPBC Act Protected Matters Report). Therefore, the potential for a significant direct and/or indirect impact on the natural or cultural heritage values of Commonwealth Land is unlikely.

4.1.11 Commonwealth Heritage Places Overseas

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.11.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.11.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no Commonwealth Heritage Places Overseas within the Project area or within proximity to the Project area (confirmed via the EPBC Act Protected Matters Report). The Project is located in Australia. Therefore, the potential for a significant direct and/or indirect impact on Commonwealth Heritage Places Overseas is unlikely.

4.1.12 Commonwealth or Commonwealth Agency

4.1.12.1 Is the proposed action to be taken by the Commonwealth or a Commonwealth Agency? *

No

4.2 Impact summary

Conclusion on the likelihood of significant impacts

You have indicated that the proposed action will likely have a significant impact on the following Matters of National Environmental Significance:

- Threatened Species and Ecological Communities (S18)

Conclusion on the likelihood of unlikely significant impacts

You have indicated that the proposed action will unlikely have a significant impact on the following Matters of National Environmental Significance:

- World Heritage (S12)
- National Heritage (S15B)
- Ramsar Wetland (S16)
- Migratory Species (S20)
- Nuclear (S21)
- Commonwealth Marine Area (S23)
- Great Barrier Reef (S24B)
- Water resource in relation to large coal mining development or coal seam gas (S24D)
- Commonwealth Land (S26)
- Commonwealth Heritage Places Overseas (S27B)
- Commonwealth or Commonwealth Agency (S28)

4.3 Alternatives

4.3.1 Do you have any possible alternatives for your proposed action to be considered as part of your referral? *

No

4.3.8 Describe why alternatives for your proposed action were not possible. *

The Project area and Disturbance Footprint directly is primarily defined by the location of the deposit and therefore, there is limited scope to avoid impacts that would occur in the direct path of the Project. There are, however, opportunities to avoid and minimise impacts to native vegetation through design and placement of ancillary infrastructure and access roads associated with the Action.

The locations of surface infrastructure, for example, have been determined through an iterative approach with consideration to environmental, social and cultural values, including:

- Locations of State and Commonwealth threatened species, communities and habitat
- Locations of areas and sites of cultural significance, including aboriginal heritage sites and waterways
- Locations of existing pastoral infrastructure, including access tracks and stock watering points surrounding topography and hydrology, avoiding areas prone to flooding
- Health safety risks have been considered for infrastructure placement including standoff and exclusion requirements for the magazine, petroleum and hydrogen storage. Risks will be further considered and identified during engineering studies and EIS risk assessment process
- Mine haulage has been optimised to reduce associated greenhouse gas (GHG) emissions. Opportunities to advance this, and other GHG reduction opportunities, further will be considered in the engineering studies and EIS
- Infrastructure locations have considered flooding risks and creeks mapped as fish passage

Avoidance was selected in the first instance, and minimisation of impacts was considered when avoidance could not be achieved.

The Disturbance Footprint represents the current optimised conceptual configuration, developed by QEM in a collaborative, multi-disciplinary process through the completion of the Scoping Study.

Where possible environmental impacts have been avoided or minimised as far as practicable and will continue to be considered during engineering studies and the EIS.

If the Action was not to proceed, the following consequences are likely to occur:

- No local and regional direct and indirect employment opportunities

- Local and regional social and economic benefits of the development will not be realised
- Tax revenue from the development will not be created
- Royalties for the State of Queensland will not be generated
- Impact the acceleration of vanadium development within a designated CMZ critical for sustainable supply chains to support the energy transition challenge
- A missed opportunity to improve regional and national fuel security
- A missed opportunity towards the progression of the *National Hydrogen Strategy 2024* (specifically using hydrogen to decarbonise Australian industries and exports)

5. Lodgement

5.1 Attachments

1.2.1 Overview of the proposed action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment A - Proposed Action Description.pdf A description of the proposed Action.	02/11/2024	No	High
#2.	Document	Attachment B - Project Location.pdf Project location, Project area and Disturbance Footprint	30/09/2024	No	High

1.3.2.18 (Person proposing to take the action) If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment E - QEM Environmental Policy.pdf QEM's environmental policy.	15/11/2024	Yes	High

3.2.1 Flora and fauna within the affected area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment C - Ecological Assessment Report.pdf Ecological desktop, likelihood and significant impact assessment.	02/11/2024	No	High

3.2.2 Vegetation within the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Attachment D - Ground-thruthed Regional Ecosystems.pdf Ground-truthed Regional Ecosystems	30/09/2024	No	High

5.2 Declarations

Completed Referring party's declaration

The Referring party is the person preparing the information in this referral.

ABN/ACN	54169579275
Organisation name	EPIC ENVIRONMENTAL PTY LTD
Organisation address	4000 QLD
Representative's name	Mark Longbottom
Representative's job title	Principal Environmental Scientist
Phone	0409 690 874
Email	mlongbottom@epicenvironmental.com.au
Address	L17, 95 North Quay, Brisbane, QLD, 4000

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ By checking this box, I, **Mark Longbottom of EPIC ENVIRONMENTAL PTY LTD**, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

Completed Person proposing to take the action's declaration

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	167966770
Organisation name	QEM LIMITED
Organisation address	4217 QLD
Representative's name	Gavin Loyden
Representative's job title	Managing Director
Phone	0403 256 580
Email	gavin@qldem.com.au

Address	Level 6, 50 Appel Street, Surfers Paradise 4217

- [x] Check this box to indicate you have read the referral form. *

- [x] I would like to receive notifications and track the referral progress through the EPBC portal. *

- [x] I, **Gavin Loyden of QEM LIMITED**, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity. *

- [x] I would like to receive notifications and track the referral progress through the EPBC portal. *

Completed Proposed designated proponent's declaration

The Proposed designated proponent is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

- [x] Check this box to indicate you have read the referral form. *

- [x] I would like to receive notifications and track the referral progress through the EPBC portal. *

- [x] I, **Gavin Loyden of QEM LIMITED**, the Proposed designated proponent, consent to the designation of myself as the Proposed designated proponent for the purposes of the action described in this EPBC Act Referral. *

- [ ] I would like to receive notifications and track the referral progress through the EPBC portal. *