EPBC Act referral

Australian Government
Department of Agriculture, Water and the Environment

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Title of proposal	2021/8999 - Meandu Mine King 2 East Project

Section 1

Summary of your proposed action

1.1 Project industry type Mining

1.2 Provide a detailed description of the proposed action, including all proposed activities

TEC Coal Pty Ltd (TEC Coal) (a wholly owned subsidiary of Stanwell Corporation Limited (Stanwell)) is seeking approval to increase the approved surface rights area within the existing Meandu Mine Mining Lease (ML) 6674 by an additional 186 ha (an approximate 7% increase to the existing surface rights area) which will allow progression of the King 2 East (K2E) pit to the east (the K2E Project) (Attachment 1_Figure 1). The K2E Project is Stanwell's preferred strategy to develop and deliver the 2019 Life of Mine Plan for the Meandu Mine and will enable the continuation of mining activity up to 2037-2039.

Meandu Mine is an open-cut coal mine that is operated for the purpose of supplying thermal coal to the adjacent Tarong and Tarong North power stations (Tarong power stations). Environmental performance at the mine is regulated by Environmental Authority (EA) EPML00709113 (Attachment 3). TEC Coal owns the Meandu Mine and is the holder of ML6674 and EA EPML00709113.

The K2E Project is a brownfield development. The new activities for the K2E Project comprise mining in an additional surface area (ASA) to the east of the K2E pit (Attachment 1_Figure 1). The approved annual extraction rate under EA EPML00709113 for run-of-mine (ROM) coal from the Meandu Mine is not more than 11 Mtpa. The addition of the K2E ASA to Meandu Mine will not increase the annual production rates at the mine. The resource to be extracted within the K2E ASA is to be transported to the neighbouring Tarong power stations to be used as fuel for power generation, using the same mining equipment types, processing and transport methods as are currently used. This includes open cut mining with a dragline and truck and excavator fleets. Key associated activities to be undertaken as part of the K2E Project within the K2E ASA will be:

— extension of the existing mine haul/vehicle road network
— extension of the existing internal electrical transmission network for mine equipment
— extension of the existing water management network
— establishment of communication network requirements.

Mining of the K2E ASA will otherwise utilise existing infrastructure and facilities within the existing approved Meandu Mine operations for efficiency and to minimise disturbance (Attachment 4_pp 20_Figure 2.7). The K2E Project will not give rise to any changes to activities undertaken within the existing Meandu Mine surface rights area. This EPBC Act Referral therefore relates to the K2E Project activities only (i.e. activities proposed to be undertaken within the K2E ASA).

PRE-MINING ACTIVITIES WITHIN THE K2E ASA (Approximate timing 2022 - 2023):

The K2E Project activities required to be undertaken prior to commencing mining operations in the K2E ASA and which form part of the action being referred are:

— Permanent closure of Ridge Road (Attachment 4_Section 2.4.2.1_pp 15).
— Clearing of the remnant vegetation and any unharvested plantation areas within the K2E ASA by TEC Coal or its contractors.
— Erection of a perimeter fence around the K2E ASA boundary and connecting it to the existing fence line around the Meandu Mine.

The indicative proposed timing for clearing of the K2E ASA of vegetation is shown on Attachment 1_Figure 2. Further details on the proposed methodology for clearing the K2E ASA of vegetation, erecting the perimeter fence and topsoil stripping is provided in Attachment 5_Part 1_Section 2.3_pp 8.

MINING OPERATIONS (Approximate timing 2024 - 2037/39):

Mining in the proposed K2E ASA will be conducted using the same mining equipment types as currently used for existing mining operations. This includes open-cut mining with a dragline and truck and excavator fleets. All material at Meandu Mine is blasted, with the exception of the overlying Tertiary sediments. Blasted and free-dug spoil material from the K2E ASA will be transported to in-pit and out-of-pit overburden emplacement areas in accordance with current approved practices at the Meandu Mine. No out-of pit overburden emplacement areas are proposed within the K2E ASA.

The K2E ASA will not alter the way mine waste materials (i.e. waste rock, rejects and tailings) are dealt with and disposed of at the Meandu Mine or the way coal combustion products (ash) from the Tarong power stations are stored at the Meandu Mine (Attachment 4_Section 2.5_pp 22). As the K2E Project is within the same geology and coal seams as the existing mining operations, the waste rock has similar geochemical characteristics to the waste rock already being mined and managed on-site (Attachment 4_Section 2.7_pp 22).

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As mining of the K2E pit progresses to the east, each additional pre-strip area will be cleared, stripped and profiled in advance of the pit's high wall crest. At the earliest possible time after topsoil stripping, the mining areas are graded with mining equipment and a cross fall is established to west into the active pit, minimising the risk of runoff from the disturbed areas spilling to the east. In areas of very steep terrain, in which the ricks of any runoff of sediment laden water cannot be adequately managed with the standard techniques of windrows, retained stumps and groundcover ahead of disturbance zone, temporary diversion drains and/or sediment basins will be utilised to avoid releases of sediment laden water leaving the K2E ASA (Attachment 4_Section 2.6.1_pp 18).

REHABILITATION AND DECOMMISSIONING (Approximate timing 2037/39 onwards):
Rehabilitation requirements and management practices for the K2E Project will be the same as those observed and planned for the existing Meandu Mine operations. The rehabilitation process at the Meandu Mine involves regrading and contouring spoil to the design slope of final landforms recommended in EA EPML00709113, followed by vegetation establishment (Attachment 4_Section 2.8_pp 25). Post-mining land uses proposed for the K2E ASA are predominantly Water Storage (final void), Steep Rocky Ecosystem and Native Ecosystem (Attachment 4_Section 2.8.3_pp 27 and Figure 2.9_pp 29).

Further information on the K2E Project is provided in Attachment 4_Section 2_pp 7.

ASSOCIATED ACTIONS (NOT PART OF REFERRING ACTION):
Prior to mining operations commencing in the K2E ASA the following activities will be undertaken (both of which are outside the scope of the K2E Project and this EPBC Act Referral):
— Relocation of the existing Powerlink Feeder 831 275 kV transmission line (this infrastructure will be relocated regardless of whether the K2E Project is approved and approval for this relocation is being sought separately and do not form part of the K2E Project).
— Harvesting of commercially viable plantation timber by HQPlantations Pty Ltd (HQPlantations) in accordance with its Plantation Licence. The harvesting undertaken by HQPlantations is outside the scope of the action being referred by TEC Coal (Section 1.16 of this Referral and Attachment 4_Section 2.4.1_pp 12).

1.3 What is the extent and location of your proposed action?

See Appendix B

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland)

Meandu Mine is an open-cut coal mine located in Queensland's South Burnett region, approximately 150 km north-west of Brisbane, 14 km south-west of Nanango and 1.5 km south of the Tarong power stations. The nearest town to the mine is Yarraman located approximately 6 km south south-east from approved mining activities (Att 4_Figure 2.1_pp 8).
Meandu Mine is located wholly within ML6674, which occupies an area of 4,267 ha within both the South Burnett and Toowoomba regional council local government areas. TEC Coal currently holds surface rights for approximately 2,640 ha of ML6674. The K2E ASA adjoins the existing surface rights area of Meandu Mine to the east within ML6674 (Att 1_Figure 1).
The primary land use within the K2E ASA is forestry plantation (Yarraman State Forest), with a small portion of local road reserve. The topography is undulating with a north-south ridgeline forming the western boundary of the K2E ASA. The slopes are dissected by gullies draining to the east.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

The K2E ASA (which is the relevant disturbance footprint) is approximately 186 ha, which represents an approximate 7% increase in the existing surface rights area within ML6674. TEC Coal has designed the K2E Project to minimise impacts on remnant vegetation to 17.7 ha by restricting the K2E ASA to the area necessary for mining activities. Measures implemented to reduce the overall disturbance footprint include maximising the use of existing internal haul roads and the existing mine water management system. All associated infrastructure (apart from the extension of haul road and light vehicle roads, the internal communication network and water management system) will be from the existing operational Meandu Mine. No buildings or out-of-pit spoil dumps are proposed within the K2E ASA. Implementation of these measures during planning has avoided direct impacts to more extensive mapped remnant vegetation areas immediately to the east of the K2E ASA within the Yarraman State Forest.

1.7 Proposed action location

Lot - Portion of Lot 289 on FTY1859 (Yarraman State Forest)

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1.8 Primary jurisdiction	Queensland	

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

☐ Yes ☑ No

1.10 Is the proposed action subject to local government planning approval?

☐ Yes ☑ No

1.11 Provide an estimated start and estimated end date for the proposed action	Start Date	01/01/2023
	End Date	31/12/2039

1.12 Provide details of the context, planning framework and state and/or local Government requirements

State approval for the K2E Project is being sought via an EA Amendment to EPML00709113 issued under the Queensland Environmental Protection Act 1994 (EP Act). On 6 January 2021, the Department of Environment and Science (DES) notified TEC Coal that an EIS under the EP Act was not required for the K2E Project (Attachment 2). On 1 April 2021, TEC Coal submitted an EA Amendment application for the K2E Project under Chapter 5, Part 7 of the EP Act, which DES formally received on 6 April 2021.

On 19 April 2021, TEC Coal received formal notification from DES that the K2E Project was to be assessed as a major EA Amendment (Attachment 2). On 20 April 2021, DES confirmed that public notification under the EP Act was not required for the K2E Project.

As all activities will occur within the existing ML6674, a new mining lease application under the Mineral Resources Act 1989 (MR Act) is not required. However, approval under the MR Act is required for the additional surface area, which requires the EA Amendment, native title and compensation agreement processes to be completed. On 1 April 2021, TEC Coal submitted an application for the additional surface area under section 275 of the MR Act. A Mining Lease Notice for the additional surface area for ML6674 was issued by the Department of Resources on 16 June 2021 (Attachment 2).

Local planning frameworks do not apply as the K2E Project is entirely within ML6674, which is regulated by the Queensland Government under the EP Act and MR Act.

Associated approvals which may be required for the K2E Project, and which will be submitted separately, are:
— Regional Interests Development Approval (RIDA) under the Regional Planning Interests Act 2014 for resource activities in an area mapped as a Priority Agricultural Area.
— A protected plant clearing permit or exemption clearing notification under the Nature Conservation Act 1992 (regulated vegetation within the K2E ASA is mapped as a high-risk area for protected plants on the flora survey trigger map and a protected plants flora survey in accordance with the Flora Survey Guidelines will need to be undertaken for the K2E Project prior to vegetation clearing).
— Development of low-risk and high-risk Species Management Programs under the Nature Conservation Act 1992.
— Road closure permit under the Land Act 1994.
— Yarraman State Forest, being State land, is potentially subject to Native Title as non-exclusive land. The K2E Project comprises activities in the Yarraman State Forest and so is subject to a Native Title Notification process under the Native Title Act 1993. In addition, Stanwell is currently negotiating a Cultural Heritage Management Plan (or Agreement) with the current Native Title applicant in respect of adjoining land to facilitate ongoing compliance with cultural heritage duty of care obligations under the Aboriginal Cultural Heritage Act 2003.
— The K2E Project may trigger a requirement to prepare an Underground Water Impact Report, and if required, this will be prepared in accordance with the Water Act 2000.
— Environmental offsets for a significant residual impact (in accordance with the Queensland Environmental Offset Policy Significant Residual Impact Guideline) to 16.7 ha of Endangered remnant regional ecosystem 12.5.13c under the Environmental Offsets Act 2014.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders

TEC Coal, through its parent company Stanwell, has a well-established stakeholder consultation program based on its relationship in the local area through the existing Meandu Mine and Tarong power station operations. The stakeholder consultation program has and will continue to be extended to include the K2E Project. The program includes consultation with

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potentially affected persons and interested parties.

The objectives of the continued stakeholder consultation program for the K2E Project include:
— establishing open communication with all stakeholders
— identifying stakeholder issues and concerns with the K2E Project
— addressing stakeholder issues and concerns through project planning and communication (where possible)
— providing feedback to stakeholders in relation to issues and concerns and how they have been addressed
— facilitating stakeholder understanding of the K2E Project.

Stanwell hosted meetings with various affected persons and interested parties to discuss details of the K2E Project prior to submission of the EA Amendment application (Attachment 2). A summary of these consultation activities is outlined below:
— Project briefings, updates, and discussions with the following government regulators around approval applications:
- DES (EA Amendment application) - September 2017, August 2019, 6 December 2019, 21 February 2020, 30 July 2020, 4 November 2020, 10 November 2020, 4 February 2021 and 23 February 2021
- DAWE (EPBC referral) - 3 December 2020 and 28 May 2021
- Department of Resources - Coal Assessment Hub (MR Act application) - 26 March 2019, 24 August 2020 and 12 February 2021
- Queensland Treasury (RIDA Application) - 15 October 2020
— Local landowners: 27 nearby landowners have been provided with individual updates or information on the K2E Project. Landowners and the community have also been informed of the K2E Project through Community Information Sessions, Near Neighbour Committee and Community Newsletters.
— Traditional owners (Wakka Wakka people) (27 October 2017 and 17 July 2020): discussed the K2E Project and Aboriginal cultural heritage assessments needed for the Project. Meeting regarding negotiations for Cultural Heritage Management Plan (CHMP) included presentation slides about the K2E Project.
— Project updates and discussions around compensation agreements:
- Toowoomba and South Burnett Regional Councils (Ridge Road closure) - both councils have given in principle approval to the permanent closure of Ridge Road. Formal compensation agreements are close to final drafts.
- DES (Parks and Forests) (September 2019, 22 October 2019, 8 November 2019, June 2019 and 22 February 2021) - General terms of the compensation agreement have been discussed. Drafting of compensation agreement will occur in 2021.
- HQPlantations (13 November 2017, 22 January 2018, 19 April 2018, 28 February 2020, 26 June 2020, 19 October 2020 and 1 February 2021) - General terms of compensation agreement have been discussed. Negotiating commercial terms will progress to drafting in 2021.

Public notification: MR Act public notifications are being undertaken over June/July 2021. On 20 April 2021, DES confirmed that public notification under the EP Act was not required for the K2E Project.

Ongoing consultation: Stanwell will continue its targeted engagement and communication to ensure those potentially affected by or interested in the K2E Project have information and know how to contact Stanwell should they have an enquiry or concern.

Stanwell will proactively inform stakeholders and, identify and respond to issues and concerns through the following activities:
— MR Act application public notifications to provide timely responses and deliver community consultation with statutory timeframes
— statutory requirements including letters to neighbouring landowners
— community newsletters
— targeted (including unscheduled) engagement with potentially affected and other relevant stakeholders in the local area
— community information and near neighbour consultative committee sessions
— social media and website updates.

A summary of consultation activities is provided in Attachment 2 along with DES notifications, Mining Lease notifications and community newsletters.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project

The application under section 228 of the EP Act to amend EPML00709113 to include the K2E ASA was accompanied by a number of technical assessments including:
— K2E Project: Terrestrial ecological assessment (Attachment 5)
— K2E Project: Surface water quality and aquatic ecology (Attachment 6)
— K2E Project: Surface water hydrology and hydraulics assessment (Attachment 7)
— K2E Project: Water and salt balance model (Attachment 8)

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— K2E Project: Groundwater model (Attachment 9).

These technical assessments were carried out to inform the EA Amendment application submitted to DES and to meet the requirements of this EPBC referral. The identification and assessment of environmental impacts was undertaken to satisfy DES impact assessment guidelines and DAWE significant impact assessment policies (Attachment 4).

The assessment undertaken for the K2E Project did not identify any significant changes to conditions of approval under EPML00709113.

1.15 Is this action part of a staged development (or a component of a larger project)?

☐ Yes ☑ No

1.16 Is the proposed action related to other actions or proposals in the region?

☑ Yes ☐ No

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation)

The K2E ASA currently includes part of the Powerlink Qld Feeder 831 275kV transmission line corridor. This portion of Feeder 831 must be relocated regardless of whether the K2E Project is approved as:

— future mining footprint within the existing surface rights area requires that a section of land underneath the current Feeder 831 is mined

— a section of the current Feeder 831 corridor is potentially geotechnical unstable.

Approvals for relocation of the transmission line are being sought separately and do not form part of the K2E Project approvals. Approval is likely to be through the Infrastructure Designation process under the Planning Act 2016. The transmission line will be relocated prior to mining operations commencing in the K2E ASA.

Harvesting of the commercially viable plantation timber within the K2E ASA, to be undertaken by HQPlantations in accordance with its Plantation Licence, is also outside of the scope of the action being referred (Att4_Section2.4.1_pp12).

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Section 2

Matters of national environmental significance

2.1 Is the proposed action likely to have any direct or indirect impact on the values of any World Heritage properties?

☐ Yes ☑ No

2.2 Is the proposed action likely to have any direct or indirect impact on the values of any National Heritage places?

☐ Yes ☑ No

2.3 Is the proposed action likely to have any direct or indirect impact on the ecological character of a Ramsar wetland?

☐ Yes ☑ No

2.4 Is the proposed action likely to have any direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

☑ Yes ☐ No

Species or threatened ecological community

BLACK-BREASTED BUTTON-QUAIL (Turnix melanogaster) Vulnerable

Fauna surveys confirmed the presence of several individual Black-breasted Button-quail from the semi-evergreen vine thicket/dry rainforest within the K2E ASA as well as the wider study area (Att 1_Figure 3). The individuals were recorded by means of active platelet searches, stationary bird surveys and motion sensor cameras. The number of Black-breasted Button-quails within the extent of the K2E ASA is estimated to be between 12 to 15 adults, based on 9 individuals being visually recorded therein during targeted surveys for the species.

The Black-breasted Button-quails within the K2E ASA are part of the larger Yarraman-Nanango sub-population, which is recognised as an important population of the species and estimated in the National Recovery Plan for the Black-breasted Button-quail to comprise approximately 2,000 adults. There are numerous records of Black-Breasted Button-quail in the Locality (Att 1_Figure 4).

Impact

The semi-evergreen vine thicket and dry rainforest vegetation within the K2E ASA aligns with habitat types recognised in the National Recovery Plan for the Black-breasted Button-quail (Mathieson & Smith, 2009) as critical to the survival of the species. Whilst the 17.7 ha corridor of semi-evergreen vine thicket and dry rainforest habitat within the K2E ASA (Att 1_Figure 3) provides viable foraging, breeding, sheltering and dispersal habitat for the individual Black-breasted Button-quails residing in the K2E ASA, the semi-evergreen vine thicket/dry rainforest habitat outside the K2E ASA plays a more substantial role in maintaining genetic diversity and the long-term evolutionary development of the species. The habitat within the K2E ASA represents only 0.4% of the 41,189 ha currently available to the important Yarraman-Nanango sub-population (Att 1_Figure 4).

A review of Black-breasted Button-quail scientific literature (Attachment 5_Part 2_Attachment G_pp G-1) and observations during seasonal surveys conducted in the Yarraman State Forest for the K2E Project, suggest that Hoop Pine plantations are not a viable or even secondary habitat for the species. This is attributed to leaf litter within the Hoop Pine plantations predominantly being composed of only Hoop Pine and Lantana leaf litter, thus potentially limiting the diversity of decomposer invertebrates and potential absence of preferred prey species and the necessary food web for the Black-breasted Button-quail. The large number (several hundred) of platelets observed by the survey team were exclusively confined to the semi-evergreen vine thicket and dry rainforest habitat.

The Black-breasted Button-quail is a mobile species sensitive to disturbance. The individuals residing within the K2E ASA

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are highly likely to relocate into adjoining habitat once clearing commences, thus preventing the fragmentation of these individuals from the larger important Yarraman-Nanango sub-population within the Yarraman State Forest. Furthermore, clearing of this narrow corridor of habitat within the K2E ASA will only displace (into adjoining areas) an estimated 12 to 15 adults or 0.75% of the estimated 2,000 adults associated with the Yarraman-Nanango sub-population.

Clearing this 17.7 ha narrow corridor of habitat and the resultant displacement of the individual Black-breasted Button-quails residing therein may result in increased competition for habitat between relocating and resident groups within the adjoining habitat areas. It is also possible that the slight reduction of existing habitat (as a result of the removal of the 17.7 ha corridor), may result in a minor decline in species numbers through intraspecific competition. It is however unlikely to result in a significant decline of the population within the wider study area, Locality or across the species' known range.

Measures proposed to minimise impacts on the Black-breasted Button-quail from clearing works in the semi-evergreen vine thicket/dry rainforest habitat of the K2E ASA include:
— undertaking clearing works between June to August to align with the dry season and avoid the breeding season for the Black-breasted Button-quail (September through to April/May)
— commencing clearing activities in areas closest to the approved surface rights area and progressing downslope towards the east, enabling fauna to be flushed towards adjoining habitat areas within the Yarraman State Forest
— undertaking a native fauna pre-clearance survey prior to the clearing works, to flush or capture and relocate any fauna into adjacent habitat areas within the Yarraman State Forest
— undertaking clearing activities in the presence of a qualified spotter catcher
— staging clearing activities at a pace that allows fauna to progressively escape and relocate into adjacent habitat areas.
Refer further to Attachment 5_Part 1_Section 7_pp 75 and Section 8_pp 93.

These measures will be formalised in a high-risk Species Management Program under the Nature Conservation Act 1992 for species including the Black-breasted Button-quail. The Species Management Program will be submitted to DES for assessment and approval prior to implementation.

An assessment of potential impacts on the Black-breasted Button-quail (in line with EPBC Act Policy Statement 1.1) was undertaken and is presented in Attachment 5_Part 2_Section F1.4_pp F-14. The results of this assessment suggest that the K2E Project has the potential to have a significant impact on the Black-breasted Button-quail within the meaning of the Significant Impact Guidelines.

As such TEC Coal has committed to delivering land-based offsets for the significant residual impact (within the meaning of the Significant Impact Guidelines) to 17.7 ha of Black-breasted Button-quail habitat (refer Attachment 5_Part 1_Section 9_pp 99). The proposed offset management commitments will be formalised into an Offset Management Plan following approval of the K2E Project.

Species or threatened ecological community

SPOTTED-TAIL QUOLL (Dasyurus maculatus mactulatus) - Endangered

The Spotted-tail Quoll was not recorded from within the K2E ASA or the wider study area during field surveys but has been assessed as having a moderate likelihood of occurring within the K2E ASA due to the presence of potential habitat.

The Spotted-tail Quoll prefers mature wet forest habitats, especially areas with rainfall of 600 mm/year. The species is predominantly nocturnal and rests during the day in dens. Habitat requirements include suitable den sites (i.e. hollow logs, tree hollows, rock outcrops or caves). Individuals also require an abundance of food, such as birds and small mammals, and large areas of relatively intact vegetation in which to forage. This subspecies is moderately arboreal and approximately 11% of travelling is done in trees. The semi-evergreen vine thicket and dry rainforest within the K2E ASA is considered potential habitat for the Spotted-tail Quoll (Attachment 1_Figure 5).

Impact

Potential K2E Project-related impacts on the Spotted-tail Quoll are associated with habitat loss in association with land clearing for the proposed action. It is possible that a population of the Spotted-tail Quoll may occur in the Locality and may occur periodically within the K2E ASA as part of a larger home range, when seeking prey.

Approximately 17.7 ha of potential Spotted-tail Quoll habitat will be impacted by the K2E Project (Att 1_Figure 5). This 17.7 ha of potential habitat may be used by the species (if present) as a foraging resource, as part of a larger home range. This thin linear strip does not support viable denning / breeding resources due to the absence of large mature hollow-bearing trees, hollow logs and rocky outcrops, and has limited to no dispersal value. More viable denning / breeding resources are located to the east of the K2E ASA within the wider study area. This more viable habitat will not be impacted by the K2E Project.

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While the K2E Project will incrementally increase (by 17.7 ha) the loss of Spotted-tail Quoll potential habitat at the local, subregional, regional and national scales, the proposed action is primarily associated with periodically disturbed areas (forestry plantations), and is not likely to further fragment or isolate habitat, or be detrimental to the long-term persistence of a local population of the species (if present). In addition, the affected potential habitat is unlikely to be important for the conservation of the local Spotted-tail Quoll population over the long-term.

Measures to minimise potential impacts to the Spotted-tail Quoll will be identified and formalised in the high-risk Species Management Program developed the K2E Project which will be submitted to DES for assessment and approval prior to implementation. Measures will include ensuring that all clearing of the semi-evergreen vine thicket and dry rainforest takes place in the presence of a suitably qualified spotter-catcher whose responsibility it will be to examine any potential denning sites (if revealed), and to capture and release any denning Spotted-tail Quolls and/or any that are encountered during clearing and grubbing activities. In addition, TEC Coal will continue to implement existing site pest animal control programs (including baiting and/or trapping) for fox and feral dog populations (Attachment 5_Part 1_Section 7.1.6_pp 79).

An assessment of potential impacts on the Spotted-tail Quoll (in accordance with the EPBC Act Policy Statement 1.1) has been undertaken (Attachment 5_Part 2_Section F1.3.1_pp F-3 and Section F1.3.2_pp F-5). This assessment determined that the K2E Project is unlikely to have a significant impact on the Spotted-tail Quoll within the meaning of the Significant Impact Guidelines.

Species or threatened ecological community

COSSINIA AUSTRALIANA - Endangered

Cossinia australiana was identified as potentially occurring within the K2E ASA from the Protected Matters Search Report and, while not recorded within the K2E ASA or the Study area during field surveys, was assessed as having a moderate likelihood of occurring within the K2E ASA due to the presence of potential habitat (Attachment 1_Figure 6).

Impact

Cossinia australiana is found in fragmented remnant patches of Araucarian vine forests or vine thickets on fertile soils in central and southern Queensland. The species' distribution is from Rockhampton to Kingaroy, east of the Great Dividing Range (Queensland Government 2020). Cossinia australiana occurs up to 520 m altitude in Araucarian microphyll vine forest and relict semi-evergreen vine thicket on a variety of soils (Queensland Government 2020). The narrow corridor of field verified RE12.5.13c within the K2E ASA provides potential supporting habitat for Cossinia australiana.

No individuals of Cossinia australiana were recorded within K2E ASA or surrounding the narrow strip of potential supporting habitat for Cossinia australiana within the K2E ASA. There are no known records of the species from within or surrounding the K2E ASA. The nearest known record to the K2E ASA occurs in fragmented patches of vine forests surrounding Kingaroy (approximately 35 km from the proposed action) (Attachment 1_Figure 6). Additional records occur to the north-east of Kingaroy. Furthermore, the potential habitat within the K2E ASA (a narrow corridor of field verified RE12.5.13c) is almost completely fragmented and unlikely to be considered habitat critical to the survival of the species.

Potential K2E Project-related impacts to Cossinia australiana are associated with habitat loss in association with land clearing for the proposed action. Approximately 16.7 ha of potential habitat for Cossinia australiana will be impacted by the K2E Project.

The main identified threat to Cossinia australiana is exotic weeds, including Lantana (Lantana camara), Dutchman's Pipe (Aristolochia elegans), Madeira Vine (Anredera cordifolia), Cat's Claw Creeper (Macfadyena unguis-cati) and Climbing Asparagus (Asparagus plumosus) (Queensland Government 2020).

Potential threats to the species include:
— habitat loss due to clearing
— increased disease and susceptibility to insects due to the very small isolated populations and fragmented habitat.

In particular, the two known populations in Queensland are confined to roadside remnants and are threatened by road widening and maintenance activities (Queensland Government, 2020).

The extent of clearing of potential habitat within the K2E ASA for Cossinia australiana will be limited to the narrow corridor of field verified RE12.5.13c (16.7 ha) and weed hygiene management procedures will be followed, including using weed free certified machines for clearing. No clearing or disturbance will occur as a result of the proposed action in potential supporting habitat surrounding the K2E ASA. Due to the clearing being limited to the extent of K2E ASA and the use of weed hygiene

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procedures, the Project is unlikely to introduce or result in the spread of invasive weed species harmful to Cossinia australiana.

An assessment of potential impacts to Cossinia australiana (in accordance with the EPBC Act Policy Statement 1.1) has been undertaken (Attachment 5_Part 2_Section F1.3.3_pp F-10). This significant impact assessment concluded that, due to the fragmented nature of the existing potential habitat for Cossinia australiana both within and surrounding the K2E ASA and the lack of records within and immediately surrounding the study area, the K2E Project is unlikely to have a significant impact on Cossinia australiana within the meaning of the Significant Impact Guidelines.

In addition, as the regulated vegetation within the K2E ASA is mapped as high-risk area on the flora survey trigger map, a protected plants flora survey in accordance with the Flora Survey Guidelines under the Nature Conservation Act 1992, will need to be undertaken for the K2E Project. This flora survey needs to be completed within the preceding 12 months of the clearing permit or exemption being submitted to DES. Cossinia australiana will be a target species for the flora survey (Attachment 5_Part 1_Section 8.2.2.2_pp 97).

2.4.2 Do you consider this impact to be significant?

☑ Yes ☐ No

2.5 Is the proposed action likely to have any direct or indirect impact on the members of any listed migratory species or their habitat?

☑ Yes ☐ No

Migratory species

Bird species listed as migratory under the EPBC Act that have been recorded or assessed as having a high likelihood of occurrence in the K2E ASA are:

— Oriental Cuckoo (Cuculus optatus)
— Black-faced Monarch (Monarcha melanopsis) (recorded from within the K2E ASA)
— Spectacled Monarch (Monarcha trivirgatus)
— Rufous Fantail (Rhipidura rufifrons) (recorded from within the K2E ASA).

Impact

Potential K2E Project-related impacts on the Oriental Cuckoo, Black-Faced Monarch, Spectacled Monarch and Rufous Fantail are associated with habitat loss associated with land clearing for the proposed action. Approximately 17.7 ha of potential habitat (being semi-evergreen vine thicket and dry forest habitat) for the Oriental Cuckoo, Black-Faced Monarch, Spectacled Monarch and Rufous Fantail, occurs within the K2E ASA (Attachment 1_Figure 7).

This 17.7 ha of potential habitat, which is being used by the migratory species recorded (Black-faced Monarch and Rufous Fantail) and may be used by those likely to occur (Oriental Cuckoo and Spectacled Monarch), is a thin strip of habitat in the order of 50 to 70 m wide located along the perimeter of Yarraman State Forest and the Meandu Mine. These four migratory species only use this habitat seasonally, as part of their annual migration patterns for foraging, roosting, nesting and breeding.

This habitat only supports a small number of Black-faced Monarch and Rufous Fantail, and possibly individuals of Oriental Cuckoo and Spectacled Monarch, which is not a significant proportion of the populations of each species. Even though this habitat provides potential foraging, roosting, nesting and breeding habitat resources for the migratory species, the level of fragmentation of this thin strip of habitat in comparison to the more contiguous habitats in the Locality and further afield, is not of critical importance to any of these species for all of their respective life-cycle stages.

Furthermore, the K2E ASA is not at the limit of any of the four-species' known ranges or in a location where they are currently declining. All four species are relatively common in Australia, and Australia provides a seasonal stronghold for each species, particularly during the breeding season.

Based on the above assessment it is determined that the migratory populations of Oriental Cuckoo, Black-faced Monarch, Rufous Fantail and Spectacled Monarch that have been recorded or are likely to occur in the semi-evergreen vine thicket and dry rainforest habitat within the K2E ASA, are not ecologically significant proportions of each species' population in the region or nationally. The proposed action is unlikely to substantially modify, by means of fragmentation beyond that already present, or destroy or isolate important habitat that supports (i.e. recorded Black-faced Monarch and Rufous Fantail) or may support (i. e. high likelihood of occurring Oriental Cuckoo and Spectacled Monarch), local populations of these highly mobile migratory bird species.

In summary, the proposed action is unlikely to have a significant impact on the Oriental Cuckoo, Black-faced Monarch, Rufous Fantail and/or Spectacled Monarch, Rufous Fantail and/or Spectacled Monarch within the meaning of the Significant

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Impact Guidelines (Attachment 5_Part 2_Section F1.5_pp F-24).

2.5.2 Do you consider this impact to be significant?

☐ Yes ☑ No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

☐ Yes ☑ No

2.7 Is the proposed action likely to be taken on or near Commonwealth land?

☐ Yes ☑ No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

☐ Yes ☑ No

2.9 Is the proposed action likely to have any direct or indirect impact on a water resource from coal seam gas or large coal mining development?

☑ Yes ☐ No

Water resource

SURFACE WATER QUALITY - ROCKY CREEK:

The K2E ASA is located in the Brisbane River sub-basin, however the K2E Project will use Meandu Mine infrastructure (including water management system), which is located in the Barker and Barambah Creeks sub-basin. The creeks near the K2E ASA in the Brisbane River sub-basin (Rocky Creek and Yarraman Creek) are ephemeral and persistently dry.

Surface waters and sediment of the Brisbane River sub-basin in the vicinity of the K2E ASA are typical of moderately disturbed ecosystems and influenced primarily by surrounding land uses. Overall, water quality was found to be poor in areas high in the catchment near the K2E ASA and improved with distance downstream. Sediment quality was typically good, with concentrations of most metal / metalloid parameters below the default guideline values for toxicants in sediments (Attachment 6_Section 5.3.5.7_pp 115).

Impact

No releases of mine-affected water are proposed from the K2E ASA to the Rocky Creek catchment. All mine-affected water generated from the K2E Project will be directed to the Meandu Mine water management system and ultimately either reused on site or discharged to the receiving waters of Meandu Creek downstream of Meandu Creek Dam in line with relevant discharge conditions prescribed in EA EPML00709113. The Meandu Mine water management system has been designed to protect environmental values and water quality objectives of the receiving waters, including aquatic ecology values. Elements of the Meandu Mine water management system are outlined in Attachment 4_Section 2.6.1_pp 18 and Attachment 8_Section 5_pp 22.

Management of runoff from the K2E ASA during vegetation clearing and pre-stripping is crucial to ensuring that sediment-laden and potentially contaminated runoff does not flow into Rocky Creek and then further downstream into Yarraman Creek and the Brisbane River. The risk of bank stability, erosion and stormwater runoff will be minimised by the implementation of erosion and sediment control measures, including:

— Leaving the bases of tree stumps and organic material undisturbed until that area is required for mining or associated infrastructure. This process aims to maximise the length of time that stumps and groundcover remain undisturbed to minimise disturbance areas and any subsequent sediment laden water runoff.

— With respect to leaf litter and debris from harvesting, either:

- leaving leaf litter and debris on the ground after harvesting so that this ground cover protects the exposed soil from rain drop impact erosion; or
- using dozers to push the excess leaf litter and debris into timber windrows placed at regular intervals to act as berms to break up long flow paths to prevent erosion.

The windrows will effectively slow the runoff to limit erosive velocities, pond flows and encourage the sedimentation of any coarse particles.

— In areas of very steep terrain in which the risk of any runoff of sediment laden water cannot be adequately managed with the standard techniques of windrows, retained stumps and groundcover ahead of the disturbance zone, utilising temporary diversion drains and/or small sediment basins to ensure no sediment laden water leaves the surface rights area. Disturbance areas will be sized and staged to ensure the exposed ground and associated runoff area is within the capacity of the provided control measures.

— Reclaiming topsoil to an appropriate depth (as confirmed by field inspection) and either directly placing it onto re-contoured landforms or stockpiling it for later reuse in rehabilitation. Stockpiled topsoil volumes and locations will be recorded

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to maintain an up-to-date inventory of topsoil resources.
— At the earliest possible time after topsoil stripping, grading down the mining areas with mining equipment and establishing a cross fall to the west into the active pit, minimising the risk of runoff from the disturbed area spilling to the east. Removal of stumps and debris and the instigation of clearance activities including topsoil removal will occur on an “as needs” basis, meaning that stripping and profiling will only occur when the area is required for bulk mining operations (Attachment 4_Section 2.6.1.1_pp 18) .

Potential impacts to Rocky Creek are expected to be minor where the erosion and sediment control measures are effectively implemented. Event monitoring triggered by heavy rainfall will be undertaken to assess the effectiveness of the erosion and sediment controls. This monitoring would assess the water quality (concentrations of dissolved oxygen, turbidity, suspended solids and nutrients) at the Rocky Creek and Yarraman Creek sites established during the current baseline monitoring program. Comparisons between relevant sites to baseline (80th percentile) conditions would be made to assess any potential impacts from stormwater runoff. This monitoring would cease following five consecutive events indicating no potential impact (Attachment 6_Section 7.5_pp 176).

A self-assessment against the Significant Impact Guidelines 1.3 - Coal seam gas and large coal mining developments – impacts on surface water resources has been undertaken and is provided in Attachment 4_Section 4.3.3.1_Table 4.7_pp 75. Based on this assessment it is considered unlikely that the K2E Project will result directly or indirectly in a substantial change in the water quality of surface water resources in the Rocky Creek catchment.

Water resource

SURFACE WATER QUALITY - MEANDU CREEK:

As noted previously, while the K2E ASA is located in the Brisbane River sub-basin, the K2E Project will use Meandu Mine infrastructure (including water management system), which is located in the Barker and Barambah Creeks sub-basin. The creeks in the Barker and Barambah Creeks sub-basin in the vicinity of the Meandu Mine (Meandu Creek and Black Creek) are highly modified, with Meandu Creek downstream of Meandu Creek Dam now a permanent waterway. In 2000, Black Creek was de-gazetted as a watercourse under the Water Act 2000.

Mine-affected water released to Meandu Creek (upstream of Meandu Creek Dam) (via CP3 or CP4) and Black Creek (via CP2) is managed to protect the integrity of water quality and aquatic ecosystems in the receiving environment through water contaminant limits and release contaminant trigger investigation levels in the EA designed to protect the receiving environment values (i.e. downstream of Meandu Creek Dam).

Impact

Mine-affected water generated from the K2E Project will be directed to the Meandu Mine water management system and ultimately discharged into receiving environment waterways of Meandu Creek downstream of Meandu Creek Dam. Under the EA EPML00709113, release waters are directed to Meandu Creek Dam via compliance points CP3 and CP4; or during overflow events via CP2 to Black Creek. Water released through CP3 and CP4 flow to, and are diluted by, Meandu Creek Dam. As noted previously, release of mine-affected water to the Rocky Creek catchment is not proposed for the K2E Project.

Water and salt balance modelling for the K2E Project (Attachment 8), assessed three specific locations for impacts to flow and water quality with the K2E Project. These were CP1 (Meandu Creek Dam), CP2 (RD17 overflow) and CP3 (located on Meandu Creek upstream of Meandu Creek Dam). The majority of runoff from the Meandu Mine site drains through CP3 and CP1, which are therefore considered key locations for assessing impacts. A smaller portion of the Meandu Mine site can discharge via CP2 (RD17).

In terms of electrical conductivity (EC) of flow, the water and salt balance modelling results for the K2E 2030 Scenario (when mining landforms result in the greatest net catchment loss from Meandu Creek to the Meandu Mine water management system) predicted:
— very little change in EC at CP1
— an increase in EC in overflows at CP2 (median increase of 33 percent) (note paragraph below for additional context)
— a trend of decreasing EC of flow through CP3.

With respect to the predicted increase in EC in the overflow at CP2, it is worth noting that any overflows at this location occur at times of extreme rainfall and impacts are expected to quickly dissipate downstream. Discharges via CP2 also flow to Black Creek Dam, where water is pumped back to the Cooling Water Dam at the Tarong power stations for reuse in the cooling towers. The model predicts an increase in EC within Black Creek Dam of approximately 2%, which is a significant reduction from the 33% median increase identified for discharges from RD17 through CP2. The impact at CP2 is therefore not considered significant. TEC Coal has committed to implementing Meandu Mine site water management practices for RD28

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and RD17 to maintain release water quality to appropriate levels. This could involve maintaining freeboard in the dams and/or changing pumping locations as appropriate to improve water quality (Attachment 8_Section 8.2.3_pp 57).

As such, water quality in Meandu Creek downstream of Meandu Creek Dam will remain within acceptable levels to protect the moderately disturbed aquatic ecosystem in Meandu Creek downstream of Meandu Creek Dam during the K2E Project (Attachment 6_Section 7.6_pp 177).

The Meandu Mine Receiving Environment Monitoring Program (REMP) has been developed and implemented to monitor and assess the potential impacts that releases of mine-affected water and associated contaminants have on the receiving environment. Previous studies have found that Meandu Mine mine-affected water releases are likely to be of low risk to the Meandu Creek receiving environment downstream of Meandu Creek Dam, given the dilution and attenuation capacity of Meandu Creek Dam. Under current operation, potential impacts of mine-affected water released to Meandu Creek tend to be contained on or adjacent to the mining lease or within the mixing zone (and are unlikely to extend downstream of Meandu Creek Dam) (Attachment 6_Section 7.6_pp 176).

Potential impacts to flora, fauna and environmental values of the receiving environment (downstream of Meandu Creek dam) from releases of mine-affected water as a result of the K2E Project, are expected to be minor (Attachment 6_Section 7.6 _pp 176).

A self-assessment against the Significant Impact Guidelines 1.3 - Coal seam gas and large coal mining developments – impacts on surface water resources has been undertaken and is provided in Attachment 4_Section 4.3.3.1_Table 4.7_pp 75. Based on this assessment it is considered unlikely that the K2E Project will result directly or indirectly in a substantial change in the water quality of the receiving environment surface water resources (i.e. Meandu Creek downstream of Meandu Creek Dam).

Water resource

SURFACE WATER HYDROLOGY - ROCKY CREEK:

The K2E ASA is located on the crest of a ridge and extends into the north-easterly draining catchment of Rocky Creek. Progression of open cut mining within the K2E ASA to the east will result in a loss of catchment area from the Rocky Creek catchment.

The upstream channels of Rocky Creek in the K2E ASA are ephemeral and persistently dry, only flowing following periods of high rainfall.

Impact

The extent of catchment loss from Rocky Creek across the mine design horizons assessed is:
— FY2025 - 110 ha loss in catchment draining to Rocky Creek (approximate 2% catchment loss to Yarraman Creek junction) all of which is associated with already approved mining activities in the K4E/K4S pits (and therefore not to the K2E Project).
— FY2030 –161 ha loss in catchment draining to Rocky Creek (approximate 3% catchment loss to the Yarraman Creek junction), of which 51 ha is associated with the K2E Project and 110 ha is associated with already approved mining activities.
— FY2035 – Net 57 ha loss in catchment draining to Rocky Creek (approximate 1.2% catchment loss to the Yarraman Creek junction) comprising 124 ha loss associated with the K2E Project; a 20 ha loss associated with rehabilitation of the K4E pit (already approved mining activity), and an 87 ha gain associated with backfilling of K4S pit (already approved mining activity).
— FY2039 (Final Landform) – Net 75 ha loss in catchment draining to Rocky Creek (approximate 1.6% catchment loss to the Yarraman Creek junction) comprising a 134 ha loss is associated with the K2E Project; a 25 ha loss associated with rehabilitation of the K4E pit (already approved mining activity), and an 84 ha catchment gain associated with backfilling of K4S pit (already approved mining activity) (Att7_Section 3.4_pp10).
The K2E Project, in conjunction with already approved mining activities, will reduce the catchment area draining to Rocky Creek. This reduction in catchment area will not be uniformly distributed throughout the catchment. By FY2039 (Final Landform) there will be a catchment gain of 84 ha in the upper reaches of the catchment (at the south-western extremity of the catchment) corresponding to the proposed rehabilitation of the K4S pit (already approved mining activity). The lost catchment area associated with the K2E Project is proposed to occur along the central western edge of the catchment (Att7_Section 3.4 _pp10).
Whilst the localised catchment gain in the south-west corner of the Rocky Creek catchment associated with the rehabilitation and reinstatement of the K4S pit will restore some lost flows due to reduced catchment areas, it also has the potential to adversely affect the natural flow conditions within the upper reaches of Rocky Creek. There will be some regions along Rocky Creek that will experience higher flow conditions, due to an increase in the size of the catchment draining to

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these areas.

Hydrologic and hydraulic modelling of the Rocky Creek catchment and watercourse was undertaken to quantify potential impacts and to provide commentary on the stability of the watercourse (Att7_Section 4_pp20). In particular, the hydraulic modelling results have been interrogated to identify how the peak flow rates and peak flow velocities along the Rocky Creek channel vary throughout the overall length of the watercourse.

Estimated peak flow rates for the Final Landform (FY2039) scenario were found to be higher than the corresponding pre-mining peak flow rates for the reach of Rocky Creek upstream of the eastern boundary of ML6674. Downstream of the eastern boundary of ML6674, the Final Landform (FY2039) flow rates are shown to be slightly lower than the comparative pre-mining flow rates, which is consistent with the net reduction in catchment area.

A comparison of peak flow velocities found that, for the Final Landform (FY2039) condition, there is one location just upstream of the ML6674 boundary where localised high flow velocities are expected to be slightly worse than the pre-mining condition. In this location:

— the 1% AEP flow velocity is calculated to increase from 3.5 m/s to 3.6 m/s
— the 10% AEP flow velocity is calculated to increase from 3.0 m/s to 3.1 m/s
— the 50% AEP flow velocity is calculated to increase from 2.3 m/s to 2.4 m/s.

The Final Landform (FY2039) flow velocity is still however comparable to the pre-mining flow velocities that currently exist along Rocky Creek, particularly in the area downstream of the Rocky Creek waterholes. Visual assessment of the Rocky Creek upstream from the D'Aguilar Highway bridge crossing found the channel to be very stable, with no evidence of any bank slumping, scour holes or surface rilling along its entire length. As such, the small modelled increase in flow velocity is not expected to result in any significant scouring and is unlikely to promote any creek instability issues (Att7_Section 4.3_pp28).

These changes in flow conditions are therefore considered within acceptable levels to protect the low to moderate ecosystem values within Rocky Creek downstream of ML6674.

A self-assessment against the Significant Impact Guidelines 1.3 has been undertaken and is provided in Att 4_Section 4.3.3.1_Table 4.6_pp73. Based on this assessment it is considered unlikely that the K2E Project will result directly or indirectly in a substantial change in the hydrology of Rocky Creek.

Water resource

SURFACE WATER HYDROLOGY - MEANDU CREEK:

As noted previously, while the K2E ASA is located in the Brisbane River sub-basin the K2E Project will use Meandu Mine infrastructure (including water management system) which is located in the Barker and Barambah Creeks sub-basin.

Prior to 1985, Meandu Creek was an ephemeral system. Since 1985, due to controlled releases from Meandu Creek Dam, the creek experiences long periods of continual flow, and as a result, Meandu Creek downstream of Meandu Creek Dam is now a perennial system.

Impact

From review of the mine landforms it has been determined that, while there will be localised changes to catchments reporting to pits and dams within the Meandu Mine site as a result of the K2E Project, there will be no increase in catchment areas draining to Meandu Creek. Accordingly, there will be no increase in flood flows reporting to Meandu Creek as a result of the K2E Project and therefore no adverse impacts associated with the existing flow regime in Meandu Creek. All of the changes to the Meandu Creek catchment are located within the approved surface rights area and, as such, they are associated with already approved mining activities (Attachment 7_Section 6_pp 52).

Mine-affected water generated from the K2E Project will be directed to the Meandu Mine water management system and ultimately discharged into receiving environment waterways of Meandu Creek downstream of Meandu Creek Dam. Under the existing Meandu Mine EA EPML00709113, release waters are directed to Meandu Creek Dam via compliance points CP3 and CP4; or during overflow events via CP2 to Black Creek. Water released through CP3 and CP4 flow to, and are diluted by, Meandu Creek Dam. Release of mine-affected water to the Rocky Creek catchment is not proposed for the K2E Project.

With respect to flow volumes the water and salt balance modelling results (Attachment 8_Section 8.2.2_pp 50) for the K2E 2030 Scenario (year when mining landforms result in the greatest net catchment loss from Meandu Creek to the Meandu Mine water management system) predicted:

— a slight decrease (approximately 2 percent) in annual flow discharged from Meandu Creek Dam with the K2E Project at CP1 as a result of an increase in rehabilitated areas within the catchment
— slightly greater volumes (4 ML) of overflow at CP2 due to increased catchment area (noting that CP2 only overflows following periods of significant rainfall)
— reduction in flow at CP3 resulting from an increase in rehabilitated areas within the catchment (Attachment 8_Section 8.2.2_pp 50).

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As such flows in Meandu Creek downstream of Meandu Creek Dam will remain within acceptable levels to protect the moderately disturbed aquatic ecosystem in Meandu Creek downstream of Meandu Creek Dam with the K2E Project (Attachment 6_Section 7.4.1_pp 171).

A self-assessment against the Significant Impact Guidelines 1.3 has been undertaken and is provided in Attachment 4_Section 4.3.3.1_Table 4.6_pp 73. Based on this assessment it is considered unlikely that the K2E Project will result directly or indirectly in a substantial change in the hydrology of Meandu Creek.

Water resource

GROUNDWATER DRAWDOWN:

Assessment of the potential impact on groundwater values (including private landowner bores and GDEs) from the K2E Project was facilitated through a desktop assessment, hydraulic test of groundwater monitoring bores, and development of both a conceptual groundwater model and numerical groundwater model. The groundwater assessment was undertaken to meet the requirements of the Independent Expert Scientific Committee (IESC) on Coal Seam Gas and Coal Mining Development Information guidelines for proponents preparing coal seam gas and large coal mining development proposals (IESC, 2018). In line with the IESC requirements, the assessment has been independently peer reviewed (Attachment 9_Attachment C).

Impact

A 3-dimensional numerical groundwater model was created to investigate groundwater level drawdown associated with the K2E Project (i.e. the additional drawdown that is related to the progression of the K2E pit to the east within the K2E ASA, relative to the already approved mining within the approved surface rights area). The groundwater model reproduces all groundwater units within ML6674 and MDL200 (a mining tenure immediately to the south of ML6674 and held by TEC Coal) (from surface to hydraulic basement) as well as groundwater units that occur regionally and in which landholder groundwater bores and sensitive environmental receptors (e.g. GDEs) are located.

With the K2E Project, groundwater drawdown is predicted to marginally extend to the east beyond the boundary of the Tarong Basin (by approximately 120 m). That is, drawdown is predicted to reach groundwater monitoring bore GW64_d where drawdown in the order of 1 m is predicted. Groundwater drawdown does not extend further to the east within the low-permeability Maronghi Creek beds (Attachment 9_Section 5.3_pp 101).

Groundwater drawdown is also predicted to extend south along the Boulevard Fault. The limit of groundwater drawdown is the southern mapped limit of the fault, which occurs at the southern boundary of MDL200 (i.e. the limit of data in the Meandu Mine geological model). It is possible that the fault extends further south and that drawdown impacts could extend further south, but this is concluded to be a low-risk for the following two reasons:

— Interpretation of available basement drilling data, as well as interpretation of gravity geophysics, suggests that the zone of intense faulting that is observed within ML6674/MDL200 is restricted to the deepest region of the Tarong Basin (i.e. the area where the greatest subsidence has occurred and where the coal deposits have formed). To the south of this area (i.e. to the southern extent of the MDL200 boundary) it is reasonable to conclude that the intensity of faulting is less and that the Boulevard Fault has not developed further to the south as a regional feature.

— The Boulevard Fault has been modelled with a consistent horizontal hydraulic conductivity (Kh); however, it is judged as likely that the Kh decreases with increasing distance south from the K2E pit and this would limit the propagation of drawdown along the fault and to the south (Attachment 9_Section 5.3.1_pp 101) .

Based on the predicted extent of groundwater drawdown, the potential impact of the K2E Project on groundwater resources is summarised as follows:

— Existing groundwater users – based on data available from the Department of Resources Groundwater Database, there are no existing registered groundwater bores within the zone of predicted impact and it is therefore concluded that there are no existing registered groundwater bores that could be impacted by the K2E Project.

— Potential impacts on GDEs – creeks to the east and south of the K2E ASA (Rocky Creek and Yarraman Creek, respectively) are ephemeral and available groundwater level data indicates that the regional water table is generally below the base of alluvium. Groundwater modelling predicts that there will be no discernible impacts beneath Rocky Creek or Yarraman Creek as a result of the K2E Project (refer to the assessment of impacts to GDEs discussed further in this section of the Referral Form). It is assessed that the K2E Project does not pose a significant risk through groundwater level drawdown to existing groundwater bores and users or GDE's (Attachment 9_Section 7_pp 130).

There are no other projects (i.e. existing or planned mining operations) that could be assessed for cumulative impact within the groundwater model area. Landholder bores are assessed to be utilised for occasional, low volume water supply (i.e. generally stock and domestic) and do not constitute a source that needs to be considered for cumulative impact assessment

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(Attachment 9_Section 7.2_pp 132).

Additional groundwater monitoring bores will be placed adjacent to the Boulevard Fault within MDL200 to allow collection of water level data for verification of the model results and later re-calibration of the model if required (Attachment 9_Section 9.3 _pp 138).

A targeted bore census is being undertaken of selected properties that are adjacent to the southern extent of the Boulevard Fault, with targeted bore surveys (which may include a baseline assessment report) to be prepared as considered appropriate by a suitably qualified person(Attachment 9_Section 9.3_pp 138).

A self-assessment against the Significant Impact Guidelines 1.3 has been undertaken and is provided in Attachment 4_Section 4.3.3.2_Table 4.8_pp 77. Based on this assessment it is considered unlikely that the K2E Project will result, directly or indirectly, in a substantial change in the hydrology of groundwater resources.

Water resource

GROUNDWATER QUALITY:

The groundwater assessment (Attachment 9_Section 2.6_pp 31) found that the average electrical conductivity of groundwater in the groundwater model area to be in the range of 2,000 to 4,000 µS/cm. The exception is the spoil groundwater unit, which is an anthropogenic groundwater unit comprised of mined material. The average electrical conductivity of spoil groundwater is 4,686 µS/cm.

Impact

Potential impacts to groundwater quality are discussed in Attachment 9_Section 7.2_pp 132.

The groundwater numerical modelling predicts the development of a permanent cone of depression that will direct groundwater flow towards the final voids. In addition, final void modelling predicts (Attachment 8_Attachment C_pp C-1) that the water level within the final voids will not rise to a point where it becomes a flow-through system; instead the final voids will develop into groundwater sinks.

In terms of water quality of the K2E final void, modelling predicts that the electrical conductivity will stabilise at approximately 1,800 µS/cm (Attachment 8_Attachment C_pp C-1). It is noted that an electrical conductivity level of 1,800 µS/cm is lower than the average electrical conductivity of all groundwater units present in the groundwater model area with the exception of the Ace Seam (Attachment 9_Section 2.6_pp 31). Therefore, the risk of the K2E Project impacting on water quality (via outflow to the groundwater system) is assessed to be low.

It is assessed that the K2E Project does not pose a significant risk either through direct or indirect releases to groundwater or via groundwater level drawdown that may impact on groundwater quality in the area of existing groundwater bores or GDEs.

The groundwater system underlying the Meandu Mine can be considered to be part of a basin that grades towards Meandu Creek and may express in surface water upstream of Meandu Creek Dam. As such it is generally considered accepted practice to manage groundwater that occurs within alluvium deposits as surface water. The current Meandu Mine EA includes water contaminant limits for pH, turbidity and electrical conductivity and release contaminant trigger investigation levels for a suite of metals and metalloids to protect the highly disturbed ecosystem of Meandu Creek upstream of Meandu Creek Dam and adjacent to active mining areas. As discussed above (in the assessment of impact on surface water quality - Meandu Creek) where releases remain in accordance with existing EA Conditions potential impacts to flora, fauna, and environmental values of the receiving environment (downstream of Meandu Creek dam) from releases of mine-affected water as a result of the K2E Project, are expected to be minor (Attachment 6_Section 7.6_pp 177).

A self-assessment against the Significant Impact Guidelines 1.3 has been undertaken and is provided in Attachment 4_Section 4.3.3.2_Table 4.9_pp 81. Based on this assessment it is considered unlikely that the K2E Project will result directly or indirectly in a substantial change in the water quality of groundwater resources.

Water resource

STYGOFAUNA:

There are no published studies on stygofauna occurrence in the vicinity of the K2E ASA or from the Barker and Barambah Creeks and Brisbane River sub-basins. No stygofauna specimens were recorded from bores sampled during the pilot study. Bores were screened across various lithologies including the alluvium and tertiary basalt surface units (Attachment 6_Section

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6_pp 157).

No cave systems have been identified within the K2E ASA or immediate surrounds.

Impact

Although no stygofauna were recorded during the pilot study, the potential exists for stygofauna communities to occur in the region (particularly in the alluvium of the Meandu Creek and Rocky Creek systems) and as such potential impacts on stygofauna communities from the K2E Project were considered. Impacts to stygofauna are addressed in Attachment 6_Section 7.11_pp 181.

The alluvium within Rocky Creek is relatively thin and unsaturated, with a regional water table below the base of the creek and, because of this lack of groundwater in the alluvium stygofauna are highly unlikely to occur in this area. Within Meandu Creek, the aquifers are generally less than 5 m thick, but a thickness of up to 35 m has been observed from drilling along Barkers Creek. Stygofauna also have the potential to occur in the water bearing units of the Tarong beds (although these areas present marginal habitat, given the depth below ground level is typically deeper than would be expected for stygofauna communities).

Changes to the interactions between groundwater systems and between groundwater and surface systems can potentially affect stygofauna communities (if present). Impacts to groundwater interactions may result from:
— reduced catchment area
— vegetation clearing, particularly where the depth to the water table is less than 20 m (which can reduce potential habitat for stygofauna associated with root systems)
— decreased and / or increased surface flows
— surface sealing and / or compaction
— backfilling and rehabilitation works.

Areas potentially impacted by vegetation clearing, surface sealing / compaction and backfilling rehabilitation works are within the K2E ASA where stygofauna are unlikely to occur. Further, changes in catchment area and surface flow are unlikely to significantly impact Meandu and Rocky creeks. As such, any potential stygofauna communities within the alluvium in this area are unlikely to be impacted. Groundwater modelling predicts that, in terms of groundwater drawdown in the water table layer in the model (Tertiary basalt, regolith and alluvium), there will be no discernible impacts beneath either Rocky Creek or Yarraman Creek as result of the K2E Project.

Therefore, any potential K2E Project impacts on stygofauna communities which may exist are likely to be minor and not assessed as a significant impact (Attachment 6_Section 7.11_pp 181).

Water resource

GROUNDWATER DEPENDENT ECOSYSTEMS

Impact

SURFACE EXPRESSION GDES:

No known surface expression or terrestrial GDE are mapped as occurring within the K2E ASA or surrounds. Derived terrestrial GDEs (based on mapped GDE aquifers) of low and moderate confidence are mapped along Rocky and Yarraman creeks. Drainage channels within the K2E ASA are mapped as low to moderate confidence surface expression GDEs (Department of Resources through Queensland Globe and WetlandMap and Bureau of Meteorology through GDE Atlas) but would very rarely hold water, only acting as drainage channels to convey flow during significant rainfall events (Attachment 6_Section 4.3.1_pp 35, Figure 4.8_pp 36 and Section 5.3.6.1_pp 117).

All aquatic ecology field survey sites were located on mapped potential surface expression GDEs (Attachment 6_Section 5.2.4.1_pp 88). No evidence of groundwater influence was noted during the field surveys (Attachment 6_Section 7.13_pp 184).

ECOSYSTEMS DEPENDENT ON THE SUB-SURFACE PRESENCE OF GROUNDWATER (TERRESTRIAL GDES):

No known terrestrial GDEs areas are mapped as occurring within the K2E ASA or surrounds. Derived terrestrial GDEs (based on mapped GDE aquifers) are mapped as occurring within and adjacent to the K2E ASA and associated with:
— Rocky Creek (low confidence) - RE12.9-10.3 Eucalyptus moluccana open forest on sedimentary rock and RE12.5.13 Microphyll to notophyll vine forest +/- Araucaria cunninghamii on remnant tertiary surfaces
— Yarraman Creek (moderate confidence) - RE 12.3.3 Eucalyptus tereticornis woodland on Quaternary alluvium.

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POTENTIAL IMPACT
Potential impacts to GDEs are outlined in Attachment 6_Section 7.13_pp 184 and Attachment 9_Section 7.2.4_pp 132.

The K2E Project may affect GDEs through direct impacts to ecosystems (aquatic and terrestrial) that are dependent on groundwater or through changes in groundwater quantity (levels) and quality.

Creeks to the east and south of the K2E ASA (Rocky Creek and Yarraman Creek) are ephemeral and available groundwater level data indicates that the regional water table is generally below the base of alluvium. Groundwater modelling predicts that there will be no discernible impacts beneath either Rocky Creek or Yarraman Creek as a result of the K2E Project because:

— Groundwater drawdown does not extend beneath the Yarraman Creek alluvium.
— In the area within ML6674 where groundwater drawdown extends beneath Rocky Creek, groundwater monitoring data indicates that the groundwater level is below the interpreted base of alluvium with a groundwater level approximately 9 m below the base of the creek. It is therefore concluded that the groundwater system is not providing baseflow to Rocky Creek at this location. As such it is considered unlikely that the mapped low confidence derived terrestrial GDEs along Rocky Creek are reliant on groundwater.

It is considered unlikely that the mapped low confidence derived terrestrial GDEs (RE12.9-10.3 and RE12.5.13) along Rocky Creek rely on groundwater as:

— the vegetation communities are not part of a river baseflow system but situated along losing-stream reaches (i.e. surface water is lost to groundwater)
— the flow regime in Rocky Creek is entirely ephemeral and only flows in direct response to rainfall
— the base of the stream channel is above the groundwater table at all times
— there is no evidence of baseflow feeding groundwater to the streams.

In addition, available data suggests that groundwater dependency of vegetation decreases at depths greater than 10 m and/or is minimal (Eamus et al. 2006 in IESC, 2019). It can therefore be assumed that, in those areas where the water table is less than 10 m below the surface, terrestrial and wetland vegetation will be groundwater dependent. In those areas where water table levels exceed 10 m (areas of high dunes and hills) vegetation is less likely to be dependent on groundwater.

Due to the depth to groundwater below Rocky Creek (greater than 9 m) and the ephemeral nature of Rocky Creek, the mapped vegetation communities along Rocky Creek are considered likely to be classified as vadophytic, being plants associated with drainage lines that rely on moisture in the soil surface profile and independent of groundwater.

No evidence of groundwater influence was noted during the field surveys at sites along Rocky Creek and its tributaries. These channels are considered to be of low aquatic ecological value based on the field assessment and were dry except for small, isolated dams (also of low aquatic ecological value). They are also unlikely to flow and connect to downstream waterways except for short periods during very high rainfall, when they would convey surface flows.

As groundwater drawdown does not extend beneath Yarraman Creek alluvium no discernible impacts to mapped GDEs in this location are predicted from mining in the K2E ASA.

Water resource

K2E FINAL VOID:

The current LOM Plan proposes a final pit void post-mining in the K2E pit. The planned post-mining land use of the final void is Water Storage and Steep Rocky Ecosystems (Attachment 4_Section 2.8.4_pp 30). Post-mining land use and success criteria for Water Storages are outlined in Appendix 5 of EA EPML00709113 (Attachment 3).

Impact

Results from the GoldSim modelling (Attachment 8_Attachment C_pp C-1) undertaken to assess water levels and electrical conductivity in the K2E final void (under a stock water demand modelling scenario of extraction of 2.08 ML/year) indicate that the equilibrium water level in the K2E final void is between 430 and 440 m AHD, and below the void overflow level of 508 m AHD. As such, the risk of the final void overflowing is considered low. For the same modelling scenario, the model predicts electrical conductivity levels of around 1,800 µS/cm, which is equivalent to around 1,000 mg/L and achieves the Total Dissolved Solids success criteria of <5,000 mg/L for water storages stipulated in Appendix 5 of EA EPML00709113 (Attachment 8_Attachment C_pp C-1).

Based on the assessment undertaken, the K2E final void is unlikely to impact on the water quality or hydrology of surface

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water or groundwater resources to any significant extent.

Refer further to Attachment 4_Section 2.8.4_pp 30.

2.9.2 Do you consider this impact to be significant?

☐ Yes ☑ No

2.10 Is the proposed action a nuclear action?

☐ Yes ☑ No

2.11 Is the proposed action to be taken by a Commonwealth agency?

☐ Yes ☑ No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage place overseas?

☐ Yes ☑ No

2.13 Is the proposed action likely to have any direct or indirect impact on any part of the environment in the Commonwealth marine area?

☐ Yes ☑ No

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Section 3

Description of the project area

3.1 Describe the flora and fauna relevant to the project area

Terrestrial flora and fauna values relevant to the K2E ASA are described in Att 5_Part 1_Sect 6_pp47 and aquatic ecological values in Att 6_Sect 4.3_pp35, Sect 5.3_pp99 and Sect 6.2_pp160. Terrestrial ecology field surveys were completed across 6 mobilisations between August 2017 and August 2019 (Att 5_Part 1_Sect 4.4_pp25). Aquatic ecology field surveys were completed across 2 mobilisations between April 2018 and September 2019 (Att 6_Sect 5.2_pp81). A summary of the key flora and fauna relevant to the K2E ASA is described below.

The K2E Project is located within the South Burnett subregion of the South East Queensland (SEQ) bioregion. The South Burnett subregion has experienced a long history of human disturbance as a result of agriculture, forestry and mining. Vegetation within the South Burnett subregion is generally fragmented forming a mosaic of cleared land, patches of native vegetation and forestry plantation.

Current land use within the K2E ASA comprises commercial forestry plantation and native ecosystems. Over 82% of the K2E ASA is subject to commercial forestry production (Hoop Pine and mixed hardwood plantations). Relatively large areas of native vegetation associated with the Yarraman State Forest occur to the east of the K2E ASA. Large areas of native vegetation are also present within the nearby Tarong State Forest and Tarong National Park.

Field verification surveys confirmed that the majority of the K2E ASA consists of previously cleared non-remnant vegetation associated with Hoop Pine (71.4%) and mixed hardwood timber plantations (11%) as well as areas of non-remnant cleared mixed grassland, regrowth and tracks (8.2%). The remainder of the K2E ASA comprises a narrow strip of remnant vegetation associated with semi-evergreen vine thickets (RE 12.5.13c) (8.8%) and notophyll vine forest (RE 12.11.11) (0.5%).

Terrestrial ecology field surveys identified 95 flora species within the K2E ASA and wider study area. No threatened flora species were recorded within the K2E ASA. One threatened flora species, Haloragis exalata subsp. velutina, listed as Vulnerable under the EPBC Act, was recorded in the open forest to woodland habitat along Rocky Creek, more than 800 m to the east of the K2E ASA (Att 5_Sect 6.3_Figure 6.3_pp57). This habitat type is not present within the K2E ASA. Based on the results of the likelihood of occurrence assessments the following EPBC Act listed threatened flora species have a moderate likelihood of occurring in the wider study area:

— Cossinia australiana
— Dichanthium setosum
— Paspalidium grandispiculatum
— Rhaponticum australe
— Sarcochilus weinthalii
— Thesium australe.

None of these species were identified as having a high likelihood of occurrence within the K2E ASA and only Cossinia australiana was identified as having a moderate likelihood of occurrence within the K2E ASA.

Four exotic species were recorded within the K2E ASA and wider study area:

— Opuntia sp. (Prickly Pear)
— Lantana camara (Common Lantana)
— Eragrostis curvula (African Lovegrass).

Of these, Lantana is also listed as a Weed of National Environmental Significance.

Terrestrial ecology field surveys recorded 114 fauna species within the study area, including 78 birds, 34 mammals (including 18 microbat species) and 2 reptiles. No amphibians were recorded during the seasonal field survey. This is attributed to the lack of waterbodies and permanent streams in the study area, particularly within the extent of the K2E ASA, which is located on a relatively dry elevated ridgeline and associated upper slopes. Two pest animal species (the Feral Dog (Canis familiaris) and Feral Cat (Felis catus)) were recorded within the K2E ASA and wider study area on motion sensor cameras during seasonal surveys.

Threatened and migratory fauna species recorded within the K2E ASA during field surveys included:

— Black-breasted Button-quail (Vulnerable–EPBC Act and NC Act)
— Short-beaked Echidna (Special Least Concern–NC Act)
— Black-faced Monarch and Rufous Fantail (Migratory-EPBC Act).

In addition, the following threatened species were recorded within the wider study area:

— Greater Glider (Vulnerable–EPBC Act and NC Act)
— Powerful Owl (Vulnerable–NC Act).

No MNES aquatic flora or fauna species were recorded within the K2E ASA, and they are highly unlikely to occur given the lack of habitat and the low value of drainage channels within the K2E ASA. Several MNES fauna and/or their habitat were recorded within the wider study area and they may occur in larger waterways downstream of the K2E ASA and Meandu Mine, including Yarraman Creek, Barambah Creek and waterways further downstream. Potential habitat for these species will not be directly impacted by the K2E Project and, where appropriate mitigation measures are implemented to protect downstream water quality and flow in Meandu and Rocky creeks, no indirect impacts to these species are expected.

3.2 Describe the hydrology relevant to the project area (including water flows)

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The K2E ASA is located in the Brisbane River sub-basin. However the K2E Project will utilise Meandu Mine infrastructure (including the water management system) which is located in the Barker and Barambah Creeks sub-basin.

The K2E ASA is within the Upper Brisbane River catchment. The Brisbane River, which is 309 km long, flows from in its origin in a southerly direction, through Wivenhoe Dam (approximately 140 km downstream of the K2E ASA), and then east until it eventually discharges into Moreton Bay, which is a marine park and RAMSAR wetland (approximately 310 km downstream of the K2E ASA).

Waterways within the Brisbane River sub-basin that are of relevance to the K2E Project are:

— Rocky Creek and its tributaries, located within, upstream of, adjacent to and downstream of the K2E ASA
— Yarraman Creek, into which Rocky Creek flows (9 km downstream of the K2E ASA)
— Cooyar Creek, into which Yarraman Creek flows (15.5 km downstream of the K2E ASA)
— the upper Brisbane River, into which Cooyar Creek flows (45 km downstream of the K2E ASA).

Waterways within the Brisbane River basin have been assessed as being in poor condition. As a whole, the basin is considered highly modified and riparian vegetation from many of the waterways has been cleared. Land use is varied, including significant areas of urban, grazing, cropping and forested lands. The upper region is mainly rural, while the lower region is urbanised. Freshwater stream health of the Upper Brisbane River is also considered very poor.

The K2E ASA is located near the headwaters of Rocky Creek which originates approximately 2.5 km upstream of the K2E ASA. Rocky Creek proper flows in a north-east direction to the south of the K2E ASA, however several of its tributaries are located within and in close proximity to the K2E ASA and flow to Rocky Creek proper. The headwaters of Rocky Creek and its tributaries flow within the Yarraman State Forest, which is largely licensed for forestry use. Land use downstream of the State forest is dominated by agriculture.

Rocky Creek comprises stream order one, two, three and four waterways, all of which are ephemeral. The headwaters and tributaries of Rocky Creek (including those in the K2E ASA) are not mapped as watercourses under the Water Act and, based on email advice from the former DNRME (now Department of Resources), are considered unnamed drainage lines. Rocky Creek downstream from ML6674 is mapped as a watercourse.

There are two mapped lacustrine wetlands in the vicinity of the K2E ASA; one is a riverine wetland located within the small-order tributaries on the eastern boundary of the K2E ASA, and the other is a farm dam located on Rocky Creek proper approximately 6 km downstream of the K2E ASA. Several unmapped wetlands (constructed dams) are also located on reaches of Rocky Creek proper within the Yarraman State Forest (Att 6_Sect 5.3_pp99).

Within the Barker and Barambah Creeks sub-basin, Barker Creek originates below the Stuart Range and flows in a north-easterly direction into the Bjelke-Petersen Dam approximately 100 km downstream. Downstream of Bjelke-Petersen Dam, Barker Creek turns into Barambah Creek, which eventually flows into the Burnett River, which discharges into the Coral Sea at Bundaberg.

Waterways relevant to this assessment within this sub-basin are:

— Meandu Creek, upstream, adjacent and downstream of Meandu Mine, including Meandu Creek Dam
— Black Creek, including Black Creek Dam
— the comparative areas within the region that are considered not impacted by existing Meandu Mine and Tarong power stations activities, including Barker and Barambah creeks.

Meandu Mine and the Tarong power stations are located near the headwaters of Meandu Creek, a tributary of Barker Creek. Meandu Creek Dam is an artificial dam located on Meandu Creek that forms part of the overall water management system for Meandu Mine and the Tarong power stations. Black Creek flows into Meandu Creek approximately 2 km downstream of Meandu Creek Dam and has been modified through the construction of Black Creek Dam, the Tarong Ash Dam and the Black Creek Dam overflow diversion channel (which are all located on the Tarong power station site). Black Creek was de-gazetted as a watercourse in 2000.

Prior to 1985, Meandu Creek was an ephemeral system. Since 1985, due to controlled releases from Meandu Creek Dam, the creek experiences long periods of continual flow, and, as a result, Meandu Creek downstream of Meandu Creek Dam is now a perennial system that provides a component of recharge to the alluvial aquifer.

Meandu Creek downstream of Meandu Creek Dam is a stream order five waterway and is mapped as a watercourse under the Water Act. While there are mapped lacustrine wetlands within Meandu Mine, these are artificial dams that form part of the water management system for Meandu Mine and the Tarong power stations. No wetlands are mapped within the Black Creek catchment (Att 6_Sect 4.3_pp35).

3.3 Describe the soil and vegetation characteristics relevant to the project area

GEOLOGY AND SOILS

The Meandu Mine is located in an area where the Late Triassic Tarong beds (the host unit for the coal seams mined at Meandu Mine) occur at the surface. ML6674 overlies part of the Triassic-aged Tarong Basin, a north north-west / south south-east trending elongate pull-apart basin. The maximum width of the Tarong Basin in the vicinity of the Meandu Mine is in the order of 9 to 10 km.

Geological units within the K2E ASA comprise:

— Tertiary basalt – Main Range Volcanic along the ridgeline and through the middle of the K2E ASA
— Triassic coal measures - Tarong beds with sandstone/siltstone between the coal seams.

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Field survey encountered three soil types across the K2E ASA:
— Soil A – Red Ferrosol – along the ridge line underlain by weathered lateritised basaltic rocks
— Soil B – Red Ferrosol – mid slopes of the K2E ASA
— Soil C – Grey Dermosol – lower slopes of the K2E ASA.

The Grey Dermosols on the lower slopes of the K2E ASA have the potential for dispersive behaviour.

VEGETATION
The K2E ASA is dominated by softwood and hardwood forestry plantations with only a narrow corridor of remnant vegetation present. This linear strip of remnant vegetation fans outwards to the east from its south-eastern extent where it adjoins more contiguous remnant vegetation and habitat, which extends further into the wider study area. At its northern extent, the narrow corridor of remnant vegetation adjoins contiguous remnant vegetation and habitat, which also extends further into the study area. In the most part, the narrow corridor of remnant vegetation and associated habitat within the K2E ASA is adjacent to forestry plantations.

The Hoop Pine plantation within the K2E ASA is essentially a monoculture of Hoop Pine, with some native shrub and tree species present in the understorey. Lantana dominates the edges and is present in varying densities within the understorey of the Hoop Pine. In some places the Lantana becomes very dense and difficult to traverse.

The linear strip of remnant vegetation within the K2E ASA is associated with field verified:
— Endangered (VM Act) RE12.5.13c - Low microphyll vine forest and semi-evergreen vine thicket with emergents on deeply weathered remnant Tertiary surfaces (16.7 ha)
— Least Concern RE12.11.11 - Microphyll to notophyll vine forest +/- Araucaria cunninghamii on interbedded volcanics (1 ha)

The semi-evergreen vine thicket (RE 12.5.13c) is predominant within the K2E ASA along an elevated ridgeline and associated upper slopes on Land Zone 5 deeply weathered remnant tertiary surfaces. The dry rainforest (RE 12.11.11) becomes more prominent on the lower slopes on Land Zone 11 interbedded volcanics.

The semi-evergreen vine thicket and dry rainforest habitat supports most of the biodiversity recorded from within the K2E ASA. It provides a range of foraging, sheltering and breeding resources for native fauna and has a relatively high abundance of fallen woody debris and deep leaf litter. Overall it exhibits a low number of hollow bearing trees and logs, which become more prominent in the lower elevation dry rainforest vegetation than in the semi-evergreen vine thicket.

Edge effects along the semi-evergreen vine thicket and dry rainforest habitat mainly consist of densely regenerating native shrub and tree species with occurrences of the restricted invasive plant and Weeds of National Environmental Significance, *Lantana camara (Lantana). Lantana was observed as also being present in decreasing densities away from the edge effects within the semi-evergreen vine thicket and dry rainforest understorey.

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area

The K2E ASA does not support unique or outstanding habitat features, rather it is characteristic of modified habitats used for plantation forestry throughout the broader region.

3.5 Describe the status of native vegetation relevant to the project area

Field verification surveys confirmed that the majority of the K2E ASA consists of previously cleared non-remnant vegetation associated with Hoop Pine (71.4%) and mixed hardwood timber plantations (11%) as well as areas of non-remnant cleared mixed grassland, regrowth and tracks (8.2%). The remainder of the K2E ASA comprises a narrow strip of remnant vegetation associated with semi-evergreen vine thickets (RE 12.5.13c - Endangered) (8.8%) and notophyll vine forest (RE 12.11.11 – Least Concern) (0.5%).

The Protected Matters Search Report generated for the K2E Project identified three EPBC Act-listed Threatened Ecological Communities (TECs) as potentially occurring within the 10 km search area of the K2E ASA:
— Lowland Rainforests of Subtropical Australia;
— Poplar Box Grassy Woodland on Alluvial Plains;
— White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands.

An assessment of regional ecosystems analogous with these TECs determined that only the Lowland Rainforest of Subtropical Australia TEC has the potential to occur within the K2E ASA.

The field data obtained for RE12.5.13c and RE12.11.11 in the K2E ASA was assessed against the key diagnostic

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characteristics and condition thresholds of the Lowland Rainforest of Subtropical Australia Listing Advice. Neither RE met the key diagnostic characteristics and condition thresholds of the Lowland Rainforest Subtropical TEC (Attachment 5_Part 1_Section 6.5_pp 66).

Further to this assessment, the Lowland Rainforest of Subtropical Australia TEC is generally not described as dry rainforest but may include intergrades with dry rainforest and other rainforest types that meet the key diagnostic characteristics.

Based on the results of the flora surveys, it is confirmed that the Lowland Rainforest of Subtropical Australia TEC is not present within the K2E ASA. No other TECs listed under the EPBC Act have potential to occur in the K2E ASA.

The EPBC Act Protected Matters Search Report identified 19 threatened flora species as potentially occurring within the K2E ASA and a 10 km buffer zone. An additional flora species was identified through Wildlife Online search results.

No EPBC Act listed flora species were recorded within the K2E ASA during the field surveys.

One threatened flora species, Haloragis exalata subsp. velutina, listed as Vulnerable under the EPBC Act was recorded within the wider study area in open forest to woodland habitat along Rocky Creek (Attachment 5_Figure 6.3). It was not recorded from the K2E ASA and is unlikely to occur due to the absence of its preferred habitat – open forest to woodland. The population of Haloragis exalata subsp. velutina and the open forest to woodland habitat is located >800 m to the east of the K2E ASA (Attachment 5_Figure 6.3). No other threatened flora species listed under the EPBC Act were recorded.

Based on the results of the likelihood of occurrence assessments, six additional MNES threatened flora species have a moderate likelihood of occurring in the wider study area:

- Cossinia australiana (Cossinia) (Endangered)
- Dichanthium setosum (Bluegrass) (Vulnerable)
- Paspalidium grandispiculatum (Vulnerable)
- Rhaponticum australe (Austral Cornflower) (Vulnerable)
- Sarcochilus weinthalii (Blotched Sarcochilus) (Vulnerable)
- Thesium australe (Austral Toadflax) (Vulnerable).

Of these, only Cossinia australiana was identified as having a moderate likelihood of occurrence in the K2E ASA. None of these species were identified as having a high likelihood of occurrence in the K2E ASA.

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

The region surrounding Meandu Mine is predominantly undulating hills of low relief, characterised by steep upper slopes and gentle summits and ridges. These hills are spurs of the Cooyar Range (altitude 600 m), which lies to the south-east of the mining area. Flat-lying basalt flows and associated sediments form the generally subdued scarp of the Cooyar Range. Remnants of sandstones and conglomerates of the coal measures form isolated knobs and subdued hill scarps.

The topography associated with the K2E ASA and surrounding area is heavily undulating and well drained. A north-south ridgeline along Ridge Road forms the western boundary of the K2E ASA. This ridgeline has been formed along the crest of a deeply weathered basalt ridge. The ridge is reasonably level, with upper slopes typically between 5% and 10%, mid slopes between 15% and 20% and more gentle gradients at the toe of the slope towards the ephemeral drainage line known as Rocky Creek. The slopes are dissected by gullies draining to the east.

Surface elevation at the K2E ASA ranges from 480 m Australian Height Datum (AHD) to 590 m AHD.

3.7 Describe the current condition of the environment relevant to the project area

The current primary land use within the K2E ASA is State forest (Yarraman State Forest) used for forestry plantation. HQPlantations manages the forestry plantation in Yarraman State Forest under Plantation Licence PLP0289.

Ridge Road forms the western boundary of the K2E ASA, which runs in a general north to south direction before dissecting the southern part of the K2E ASA in a north-west to south-east direction. A Powerlink Feeder 831 275 kV transmission line runs immediately to the west of the K2E ASA in an easement across the approved surface rights area of Meandu Mine before also dissecting the K2E ASA in a north-west to south-east direction, along the same alignment as Ridge Road. No easements exist within the K2E ASA. A number of tracks associated with forestry operations are found in the KSE ASA.

The current land uses surrounding the K2E ASA includes coal mining at Meandu Mine, electricity generation at the Tarong power stations, State forest and grazing/agricultural land. The surrounding area is sparsely populated with predominantly large rural pastoral holdings. The closest town is Yarraman which is located approximately 6.5 km to the south-east from

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approved mining activities.

The K2E ASA is dominated by softwood (Hoop Pine) and hardwood forestry plantations with only a narrow corridor of remnant vegetation present (Attachment 5_Part 1_Section 6.1_pp 48 and Figure 6.2_pp 50). This linear strip of remnant vegetation fans outwards to the east from its south-eastern extent where it adjoins more contiguous remnant vegetation and habitat, which extends further into the wider study area. At its northern extent, the narrow corridor of remnant vegetation adjoins contiguous remnant vegetation and habitat, which also extends further into the study area. In the most part, the narrow corridor of remnant vegetation and associated habitat within the K2E ASA is adjacent to forestry plantations.

The semi-ever green vine thicket and dry rainforest habitat supports most of the biodiversity recorded within the K2E ASA. It provides a range of foraging, sheltering and breeding resources for native fauna and has a relatively high abundance of fallen woody debris and deep leaf litter. Overall, it exhibits a low number of hollow bearing trees and logs, which become more prominent in the lower elevation dry rainforest vegetation than in the semi-evergreen vine thicket (Attachment 5_Part 1_Section 6.4.1.1_pp 61).

Edge effects along the semi-evergreen vine thicket and dry rainforest habitat mainly consists of densely regenerating native shrub and tree species with occurrences of the restricted invasive plant and WoNS Lantana camara. Lantana was observed as also being present in decreasing densities away from the edge effects within the semi-evergreen vine thicket and dry rainforest understorey (Attachment 5_Part 1_Section 6.4.1.1_pp 61).

The Hoop Pine plantation within the K2E ASA is essentially a monoculture of Hoop Pine, with some native shrub and tree species present in the understorey. Lantana dominates the edges and is present in varying densities within the understory of the Hoop Pine. In some places the Lantana becomes very dense and difficult to traverse (Attachment 5_Part 1_Section 6.4.1.2_pp 63).

3.8 Describe any Commonwealth Heritage places or other places recognised as having heritage values relevant to the project

There are no World Heritage or National Heritage Places within the K2E ASA or surrounds, and there are no places listed on the National Heritage List. Due to the past land uses of the K2E ASA (native vegetation and forestry plantation) it is assessed as highly unlikely that items of non-Indigenous cultural heritage will occur in the K2E ASA. Neither the Toowoomba Regional Council nor South Burnett Regional Council local heritage registers identify local heritage values within the vicinity of the K2E ASA.

3.9 Describe any Indigenous heritage values relevant to the project area

The Traditional Owners of the land on which the K2E Project is proposed, the Wakka Wakka people, have an established relationship with Stanwell and its representatives. This relationship is presently formalised in an Indigenous Land Use Agreement (ILUA) with the Wakka Wakka people (represented by the former native title applicants to the Wakka Wakka People #2 native title claim) which incorporates a Cultural Heritage Investigation Agreement (CHIA). The CHIA outlines how TEC Coal will meet its cultural heritage duty of care. Stanwell is currently seeking to develop a new agreement with the relevant Traditional Owners that will govern all future aspects of the investigation and management of Aboriginal cultural heritage in place of the CHIA.

Numerous cultural heritage surveys have been completed between 2009 and August 2019 under the existing CHIA within the broader Meandu East area (which incorporates the K2E ASA). These cultural heritage surveys have been undertaken by representatives of the Wakka Wakka people with the support of Archaeo Cultural Heritage Services Pty Ltd (Archaeo) and any items of Aboriginal cultural heritage identified and managed accordingly. This will continue to be the case in future (including in respect of the K2E ASA) under the proposed new agreement

On 21 July 2021, Stanwell performed a search of the State Aboriginal Cultural Heritage Database and Register. The report identifies a number of cultural heritage site point for the broader area of ML6674. It is not necessarily a complete history of all Aboriginal cultural heritage or indigenous heritage values for the relevant area, but provides an indication of what may be expected within the K2E ASA.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area

Meandu Mine is located wholly within coal mining lease ML6674, which was granted on 19 February 1981. ML6674 occupies a total area of 4,267 ha within the South Burnett Regional Council and Toowoomba Regional Council local government areas. TEC Coal currently holds surface rights for approximately 2,640 ha of ML6674.

The K2E ASA adjoins the eastern side of the approved surface rights area of Meandu Mine within ML6674. The K2E ASA is located within Yarraman State Forest (Lot 289 on FTY1859), which has ‘State Forest’ tenure. A road easement (Ridge Road) dissects the proposed K2E ASA (Attachment 4_Section 2.1_pp 7).

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

3.11 Describe any existing or any proposed uses relevant to the project area

The K2E ASA is located within Yarraman State Forest, which was gazetted in 1901 and protected as a State forest since that time. Historical aerial photography illustrates that the K2E ASA has been used for a forestry plantation since (at least) 1982, prior to which it was native vegetation.

The current primary land use within the K2E ASA is State forest (Yarraman State Forest) used for forestry plantation. HQPlantations manages the forestry plantation in Yarraman State Forest under Plantation Licence PLP0289.

Ridge Road forms the western boundary of the K2E ASA, which runs in a general north to south direction before dissecting the southern part of the K2E ASA in a north-west to south-east direction. A Powerlink Feeder 831 275 kV transmission line runs immediately to the west of the K2E ASA in an easement across the approved surface rights area of Meandu Mine before also dissecting the K2E ASA in a north-west to south-east direction, along the same alignment as Ridge Road. No easements exist within the K2E ASA. A number of tracks associated with forestry operations are found in the KSE ASA.

The current land uses surrounding the K2E ASA includes coal mining at Meandu Mine, electricity generation at the Tarong power stations, State forest and grazing/agricultural land. The surrounding area is sparsely populated with predominantly large rural pastoral holdings. The closest town is Yarraman which is located approximately 6.5 km to the south-east from approved mining activities.

The future land uses within and surrounding the K2E ASA, as identified under the strategic framework within the planning schemes for both Toowoomba Regional Council and South Burnett Regional Council, includes mining, plantations, nature conservation, rural residential and agriculture. These are generally consistent with the current land use in the vicinity of the KSE ASA.

The K2E Project will change the current land use of the K2E ASA from State forest/plantation to coal mining land use, resulting in a loss of 186 ha of State forest, of which 152.5 ha is plantation area. A portion of public road reserve along Ridge Road will also be permanently closed. Having compensation agreements in place with the relevant landowners and occupiers is a statutory requirement of the MR Act. The following compensation agreements will be required for the K2E Project:

— DES (Parks and Forests) which is responsible for the custodial, regulatory and most non-commercial aspects of the management of State-owned native forests.

— HQPlantations as holders of the plantation licence for Yarraman State Forest.

— Department of Agriculture and Fisheries which is responsible for managing State native forestry production and the sale of State quarry material from State forests, timber reserves and other relevant lands across Queensland under the Forestry Act 1959 and administering compliance with HQPlantations' plantation licence over plantation forests on State land.

— Toowoomba Regional Council and South Burnett Regional Council as the local councils responsible for the public roads within the K2E ASA.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 4

Measures to avoid or reduce impacts

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action

Measures to be implemented by TEC Coal to avoid or minimise potential impacts of the K2E Project on MNES are:

TERRESTRIAL ECOLOGY (Att 5_Part 1_Section 8_pp 93):

— Avoid disturbance to ecologically sensitive areas (i.e. native vegetation and habitat containing threatened species and the Endangered RE 12.5.13c) outside the K2E ASA (refer Section 1.6 of this Referral Form).

— Provide co-located land-based offsets for significant residual impacts (within the meaning of the Significant Impact Guideline) to 17.7 ha of Black-breasted Button-quail habitat and 16.7 ha of remnant RE 12.5.13c (refer further Section 4.2 of this Referral Form).

— Undertake clearing of the semi-evergreen vine thicket / dry rainforest habitat during the dry season (June to August) to avoid the breeding season for the Black-breasted Button-quail.

— Implement the following measures for clearing works in the semi-evergreen vine thicket/dry rainforest habitat:

- undertake a native fauna pre-clearance survey prior to clearing of the remnant vegetation areas, to flush or capture and relocate any fauna into adjacent forested areas
- mark habitat trees (i.e. those with hollows and fissures) to enable appropriate tree dismantling prior to broader clearing operations
- undertake clearing activities in the presence of a qualified spotter catcher
- stage clearing activities at a pace that allows fauna to progressively escape and relocate into adjacent habitats
- commence clearing at a single point (closest to the mine) and progress eastwards and northward towards vegetated areas, to enable fauna to be flushed towards adjoining unaffected habitat areas
- plan clearing activities so that multiple separate areas of clearing do not occur at any one time
- clear the understorey first, avoiding temporarily marked habitat trees to encourage fauna to move away from the clearing zone, before the marked habitat trees are removed.

— Prepare a high-risk Species Management Program (SMP) for impact to potential breeding places for species including the Black-breasted Button-quail and Spotted-tail Quoll, which will be submitted to DES for assessment and approval prior to implementation.

— Ensure that high-risk SMP is implemented by suitably qualified spotter-catchers.

— Where practicable, restrict fauna access to active mine areas (the perimeter fence constructed prior to operations will assist with restricting the movement of larger ground dwelling fauna into the K2E ASA).

— Implement the weed and pest animal management procedures as outlined in the current site management plans and procedures.

SURFACE WATER AND AQUATIC ECOLOGY (Att 6_Section 7_pp 169; Att 8_Section 8.2_pp50):

— Minimise the total area of disturbance at any given time by undertaking progressive rehabilitation and re-vegetation of disturbed landforms as soon as practicable after mining activities release the area.

— Update and implement the site Erosion and Sediment Control Plan to include the necessary site specific and proven erosion and sediment control measures applicable to the K2E ASA.

— Undertake event monitoring triggered by heavy rainfall to assess the effectiveness of the erosion and sediment controls. This monitoring would assess the water quality (concentrations of dissolved oxygen, turbidity, suspended solids and nutrients) at the Rocky Creek and Yarraman Creek sites established during the current baseline monitoring program. Monitoring would cease following five consecutive events indicating no potential impacts.

— Design the project to avoid releases of mine-affected water to the Rocky Creek catchment.

— Manage mine-affected water in accordance with existing Meandu Mine site practices and the requirements of EA EPMP00709113.

— Implement site water management practices for RD28 and RD17 to maintain release water quality.

— Continue to monitor water levels in Rocky Creek.

GROUNDWATER (Att 9_Section 7.2_Table 7.1_pp 134 and Section 9.3_pp 138):

— A targeted bore census is being undertaken of selected properties that are adjacent to the southern extent of the Boulevard Fault, with targeted bore surveys (which may include a baseline assessment report) to be prepared as considered appropriate by a suitably qualified person.

— Install groundwater monitoring bores adjacent to the Boulevard Fault to allow for the collection of water level data for verification of the groundwater model results and later re-calibration of the groundwater model (if required).

— Re-calibrate the groundwater model in the event of other projects (i.e. existing or planned mining or gas operations) within the area of the groundwater model that could result in cumulative impacts with the K2E Project.

— Continue to monitor groundwater quality from bores in the existing groundwater monitoring network as well as the extended groundwater monitoring network bores within MDL200 adjacent to the Boulevard Fault.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved

Biodiversity offsets will be required for any significant residual impacts on MNES. The K2E Project has the potential to give rise to significant residual impacts (within the meaning of the Significant Impact Guideline) on the Black-breasted Button-quail. Offsets are therefore proposed for clearing of approximately 17.7 ha of Black-breasted Button-quail habitat.

TEC Coal has committed to delivering land-based offsets for the impacted matters and, through the development of a Preliminary Offset Strategy (Attachment 5_Part 1_Section 9_pp 99), has commenced identifying how these offsets will be managed, measured and protected into the future to ensure additionality and no net loss for the relevant matters. Post-approval of the K2E ASA, the proposed offset management commitments will be formalised into an Offset Management Plan which will be applied to the offsettable matters for the duration of the offset commitment for the K2E Project.

TEC Coal has commenced a process of identifying potential offset properties within the local area to accommodate any potential environmental offset commitments that may emerge from the approval process for the K2E Project. All of the potential offset properties identified are owned by Stanwell. Field surveys confirmed that all of the properties under consideration contained viable foraging, roosting and sheltering habitat for the Black-breasted Button-quail. Black-breasted Button-quails were also recorded (either through visual recordings or platelets) from most of the offset properties under consideration.

It is anticipated that the MNES offset will protect and enhance an area of viable habitat that supports populations of the Black-breasted Button-quail, which would be greater in extent than the impacted habitat (17.7 ha).

The additionality for the Black-breasted Button-quail could be primarily generated via the improvement of habitat in the more degraded parts of the potential offset areas for the Black-breasted Button-quail. This would be achieved by effective land management actions to improve the quality of the MNES offset over time and the risk management actions to protect the habitat values for the duration of the MNES offset.

It is anticipated that the existing Black-breasted Button-quail populations in the lower quality offset areas will increase in number over time in response to habitat improvement and habitat protection. In relation to the higher quality offset areas, the existing Black-breasted Button-quail populations are expected to be maintained, if not increase gradually over time in response to increasing habitat carrying capacity, with breeding success and dispersion of fledglings increasing in response to habitat protection and enhancement. Overall, the provision of the MNES offset will provide additionality and no net loss for the species against habitat that will be lost at the K2E ASA impact area.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 5

Conclusion on the likelihood of significant impacts

5.1 You indicated the below ticked items to be of significant impact and therefore you consider the action to be a controlled action

- ☐ World Heritage properties
- ☐ National Heritage places
- ☐ Wetlands of international importance (declared Ramsar wetlands)
- ☑ Listed threatened species or any threatened ecological community
- ☐ Listed migratory species
- ☐ Marine environment outside Commonwealth marine areas
- ☐ Protection of the environment from actions involving Commonwealth land
- ☐ Great Barrier Reef Marine Park
- ☐ A water resource, in relation to coal seam gas development and large coal mining development
- ☐ Protection of the environment from nuclear actions
- ☐ Protection of the environment from Commonwealth actions
- ☐ Commonwealth Heritage places overseas
- ☐ Commonwealth marine areas

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action

Significant matters are identified.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 6

Environmental record of the person proposing to take the action

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Explain in further detail

Yes TEC Coal has a satisfactory record of responsible environmental management.

A major component of the Stanwell business strategy is the reduction of environmental footprint through improvements to asset performance and adoption of the highest environmental standards across Stanwell sites including the Meandu Mine. Stanwell and its subsidiary TEC Coal undertake routine monitoring to measure environmental performance and implement strategies to minimise adverse effects. Stanwell's Environmental Sustainability Policy is included (Attachment 10).

Meandu Mine operates under an EMS which defines the environmental and cultural heritage responsibilities of all employees, contractors and visitors to Meandu Mine. The EMS provides a framework for environmental practices across Meandu Mine operations. The framework covers the processes used on-site to prevent or minimise environmental harm, ensure compliance and promote continuous improvement (refer Section 6.3 of this Referral Form).

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application

In May 2002, the Qld EPA commenced proceedings under the EP Act against Stanwell following a fire event at the Rocky Point Cogeneration Plant. In October 2004, Stanwell pleaded guilty to an offence of causing material environmental harm based on an agreed statement of facts and was fined $100,000 with no conviction recorded. Stanwell disposed of this asset in 2006.

TEC Coal/Stanwell has received the following Penalty Infringement Notices under the EP Act:

— April 2014 - Tarong North Power Station for instrument calibration failure and particulate matter levels in excess of the EA limit

— December 2015 - Meandu Mine for exceedances of EA limits to electrical conductivity at release point CP3

— October 2016 - Tarong Power Station for omission of a fluoride test in quarterly groundwater sampling of ash dam groundwater monitoring bores. Fluoride levels before and after the non-compliance were below compliance limits.

No environmental harm was caused by these infringements.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

☑ Yes ☐ No

6.3.1 If the person taking the action is a corporation, provide details of the corporation's environmental policy and planning framework

As described above in Section 6.1, Meandu Mine operates under an Environmental Management System which defines the environmental and cultural heritage responsibilities of all employees, contractors and visitors to Meandu Mine. The EMS provides a framework for environmental practices across Meandu Mine operations. The framework covers the processes used on-site to prevent or minimise environmental harm, ensure compliance and promote continuous improvement. The framework is aligned to ISO14001 Environmental Management Systems.

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

☑ Yes ☐ No

6.4.1 EPBC Act No and/or Name of Proposal

Previous referral lodged by TEC Coal Pty Ltd are:

— 2008/4571 TEC Coal Pty Ltd/Mining/Nobby Smith Way, via Nanango/QLD/Extension of Existing Coal Mining Operation (Referral decision made)

— 2007/3334 TEC Coal Pty Ltd/Mining/South Burnett/QLD/Kunioon Coal Project (Lapsed)

Previous referrals lodged by Stanwell Corporation Limited are:

— 2011/5580 Stanwell Corporation Pty Ltd/Waste management (non-sewerage)/25km southwest of Rockhampton QLD/QLD/Stanwell Power Station Ash Pipeline Development (Referral decision made)

— 2008/4065 Griffin Windfarm II Pty Ltd and Stanwell Corporation Ltd Joint Venture /Energy Generation and Supply (renewable)/Shire of Dandaragan, 30 km east of Cervantes/Western Australia/Development of the Badgingarra Wind Farm (Referral decision made)

— 2007/3529 Griffin Windfarm II Pty Ltd and Stanwell Corporation Ltd Joint Venture/Energy generation and supply (renewable)/Badgingarra/WA/Badgingarra Wind Farm (Withdrawn)

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

— 2005/1988 Stanwell Corporation Ltd/Energy generation and supply/Rockhampton/QLD/Coke plant & Power Station project at Stanwell Energy Park (Referral decision made)
— 2002/568 Stanwell Corporation Ltd/Energy generation and supply/Kongorong/SA/Kongorong Wind Farm (Referral decision made)
— 2001/471 Stanwell Corporation Limited/Energy (Renewable) & Infrastructure/Nirranda/VIC/Wind Farm Construction and Operation (Referral decision made).

Previous referrals lodged by the former Tarong Energy Corporation (Stanwell's predecessor in law) are:
— 2007/3430 Tarong Energy Corporation/Mining/Toowoomba/QLD/Coal Conveyor between New Acland Coal Mine and Tarong Power Station (Referral decision made).
— 2006/2641 Tarong Energy Corporation Limited/Mining/Tarong/QLD/Ash Storage Facility (Referral decision made)
— 2003/1264 Tarong Energy Corporation/Land transport/Brigalow to Tarong/QLD/Surat Basin to Tarong Railway project (Referral decision made)
— 2003/1173 Tarong Energy Corporation Limited/Mining/Surat Basin/QLD/Glen Wilga Open-cut Coal Mine (Lapsed)
— 2001/412 Tarong Energy/Energy and Infrastructure (incl. Pipelines)/Stuart-Townsville/QLD/North Queensland Power Project (Withdrawn).

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 7

Information sources

Reference source

K2E Project: Terrestrial Ecological Assessment (WSP, 2021) (Attachment 5)

Reliability

Reliable - appropriate scope and methodology used, skilled experts conducted the work

Uncertainties

None known - appropriate scope and methodology used, skilled experts conducted the work

Reference source

K2E Project: Surface Water Quality and Aquatic Ecology (ESP, 2021) (Attachment 6)

Reliability

Reliable - appropriate scope and methodology used, skilled experts conducted the work

Uncertainties

None known - appropriate scope and methodology used, skilled experts conducted the work

Reference source

K2E Project: Surface Water Hydrology and Hydraulic Assessment (WSP, 2021) (Attachment 7)

Reliability

Reliable - appropriate scope and methodology used, skilled experts conducted the work

Uncertainties

Inherent scientific uncertainty associated with modelling and the data relied upon in the modelling.

Reference source

K2E Project: Water and Salt Balance Model (WSP, 2021) (Attachment 8)

Reliability

Reliable - appropriate scope and methodology used, skilled experts conducted the work

Uncertainties

Inherent scientific uncertainty associated with modelling and the data relied upon in the modelling.

Reference source

K2E Project: Groundwater Model (JBT Consulting, 2021) (Attachment 9)

Reliability

Reliable - appropriate scope and methodology used, skilled experts conducted the work

Uncertainties

Inherent scientific uncertainty associated with mathematical modelling and the monitoring data relied upon in the modelling.

Reference source

Mathieson, M.T and G.C. Smith (2009). National Recovery Plan for the Black-breasted Button-quail Turnix melanogaster. Report to the Department of the Environment, Water, Heritage and the Arts, Canberra . Department of Environment and Resource Management, Brisbane. Accessed from http://www.environment.gov.au/biodiversity/threatened/recovery-plans/black-breasted-button-quail-turnix-melanogaster-2009

Reliability

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reliable

Uncertainties

None known

Reference source

Department of Agriculture, Water and the Environment (2021) Species Profile and Treats Database (SPRAT) - Dasyurus maculatus gracilis - Spotted-tailed Quoll. Accessed at: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=64475

Reliability

Reliable

Uncertainties

None known

Reference source

Queensland Government (2020). Species profile - Cossinia australiana. Queensland Government. Accessed at: https://apps.des.qld.gov.au/species-search/details/?id=13684

Reliability

Reliable

Uncertainties

None known

Reference source

Threatened Species Scientific Committee (2015). Conservation Advice Turnix melanogaster Black-breasted Button-quail. Canberra, Australian Capital Territory. Accessed at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/923-conservation-advice-31102015.pdf

Reliability

Reliable

Uncertainties

None known

Reference source

Independent Expert Scientific Committee (IESC) on Coal Seam Gas and Coal Mining Development (2019). Information Guidelines Explanatory Note: Assessing groundwater dependent ecosystems.

Reliability

Reliable

Uncertainties

None known

Reference source

Independent Expert Scientific Committee (IESC) on Coal Seam Gas and Coal Mining Development (2018). Information guidelines for proponents preparing coal seam gas and large coal mining development proposals. Commonwealth of Australia, May 2018

Reliability

Reliable

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Uncertainties

None known

Reference source

Department of the Environment (2013). Matters of National Environmental Significance, Significant Impact Guidelines 1.1. Department of the Environment. Canberra, ACT, Commonwealth of Australia. Available from: http://www.environment.gov.au/epbc/publications/signfiicantimpact-guidelines-11-mattersnational-environmental-significance.

Reliability

Reliable

Uncertainties

None known

Reference source

Department of the Environment (2013). Significant Impact Guidelines 1.3: coal seam gas and large coal developments - Impacts on water resources, Department of the Environment, Canberra, ACT, Commonwealth of Australia, December 2013. Available from: http://environment.gov.au/epbc/publications/significant-impact-guidelines-13-coal-seam-gas-and-large-coal-mining-developments-impacts.

Reliability

Reliable

Uncertainties

None known

Reference source

Bureau of Meteorology (BoM) (2021). Groundwater Dependent Ecosystem Atlas. Commonwealth of Australia. Accessed through: http://www.bom.gov.au/water/groundwater/gde/

Reliability

The GDE Atlas shows the general location of groundwater-dependent ecosystems (GDEs). Each polygon represents an area within which groundwater interaction potentially occurs. This does not mean that the whole polygon is interacting with groundwater. Mapping in the GDE Atlas relies on broadscale analysis, existing datasets. and remote sensing methods.

Uncertainties

The GDE Atlas shows the general location of groundwater-dependent ecosystems (GDEs). Each polygon represents an area within which groundwater interaction potentially occurs. This does not mean that the whole polygon is interacting with groundwater. Mapping in the GDE Atlas relies on broadscale analysis, existing datasets. and remote sensing methods.

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 8

Proposed alternatives

Do you have any feasible alternatives to taking the proposed action?

Yes ☑ No

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 9

Person proposing the action

9.1.1 Is the person proposing the action an organisation or business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	TEC Coal Pty Ltd
Business name	
ABN	55119063900
ACN	
Business address	Level 2, 180 Ann St, Brisbane, 4000, QLD, Australia
Postal address	
Main Phone number	07 3228 4333
Fax	
Primary email address	info@stanwell.com
Secondary email address	

9.1.2 I qualify for exemption from fees under Regulation 5.23(1)(ii) of the EPBC Regulations because I am:

☐ Small business
☑ Not applicable

9.1.2.2 I would like to apply for a waiver of full or partial fees under Regulation 5.21A of the EPBC Regulations

☐ Yes ☑ No

9.1.3 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Jacob
Last name	Orbell
Job title	General Manager Mining
Phone	07 32284464
Mobile	
Fax	
Email	Jacob.Orbell@stanwell.com
Primary address	Level 2, 180 Ann St, Brisbane, 4000, Qld, Australia
Address	

Declaration: Person proposing the action (To be signed by the person at 9.1.3)

I, Jacob Orbell on behalf of TEC Coal Pty Ltd, 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.

Signature: ..... Date: 12/7/2021

I, Jacob Orbell on behalf of TEC Coal Pty Ltd, the person proposing the action, consent to the designation of Jacob Orbell on behalf of TEC Coal Pty Ltd as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature: ..... Date: 12/7/2021

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Proposed designated proponent

9.2.1 Is the proposed designated proponent an organisation or business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	TEC Coal Pty Ltd
Business name	
ABN	55119063900
ACN	
Business address	Level 2, 180 Ann St, Brisbane, 4000, Qld, Australia
Postal address	
Main Phone number	07 32284333
Fax	
Primary email address	info@stanwell.com
Secondary email address	

9.2.2 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Jacob
Last name	Orbell
Job title	General Manager Mining
Phone	0732284333
Mobile	
Fax	
Email	Jacob.Orbell@stanwell.com
Primary address	Level 2, 180 Ann St, Brisbane, 4000, Qld, Australia
Address	

Declaration: Proposed Designated Proponent

I, Jacob Orbell on behalf of TEC Coal Pty Ltd. ,the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature: ..... Date: 12/7/2021

Australian Government
Department of Agriculture, Water and the Environment

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Referring party (person preparing the information)

9.3.1 Is the referring party an organisation or a business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	WSP AUSTRALIA PTY LIMITED
Business name	
ABN	80078004798
ACN	
Business address	Level 12, 900 Ann Street, Brisbane, 4006, Queensland, Australia
Postal address	
Main Phone number	07 3854 6200
Fax	
Primary email address	brisbaneannstreet@wsp.com
Secondary email address	

9.3.2 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Allison
Last name	Rushton
Job title	Principal Environmental Scientist
Phone	07 3854 6241
Mobile	
Fax	
Email	allison.rushton@wsp.com
Primary address	Level 12, 900 Ann Street, Fortitude Valley, 4006, QLD, Australia
Address	

Declaration: Referring party (person preparing the information)

I, Allison Rushton, **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.**

Signature: ARushton **Date:** 12-7-2021

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Appendix A

Attachment

Document Type	File Name
action_area_images	Att 1__Fig1_Project Location.pdf
action_area_images	Att 1_Fig2_PreMiningVegClearingActivities.pdf
action_area_images	Att 1_Fig3_BlackBreastedButtonQuail.pdf
action_area_images	Att 1_Fig4_BBButtonQuail_Locality.pdf
action_area_images	Att 1_Fig5_SpottedQuoll.pdf
action_area_images	Att 1_Fig6_CossianiaAustraliana.pdf
action_area_images	Att 1_Fig7_MigratoryBirds.pdf
govt_approval_conditions	Att 3_EA EPML00709113.pdf
public_consultation_reports	Att 2_Consultation Material.pdf
supporting_tech_reports	Att 4_K2E Project EPBC Referral Supporting Information Report.pdf
supporting_tech_reports	Att 5_Part 1_K2E Project Terrestrial Ecology Report.pdf
supporting_tech_reports	Att 5_Part 2_K2E Project Terrestrial Ecology Attachments.pdf
supporting_tech_reports	Att 6_K2E Project Surface Water and Aquatic Ecology.pdf
supporting_tech_reports	Att 7_K2E Project Surface Water Hydrology and Hydraulics.pdf
supporting_tech_reports	Att 8_K2E Project Water and Salt Balance Model.pdf
supporting_tech_reports	Att 9_K2E Project Groundwater Model.pdf
corp_env_policy_docs	Att 10_Environmental Sustainability Policy.pdf

Appendix B

Coordinates

Area 1
-26.828675493,151.915792947
-26.827789642,151.916710174
-26.827786035,151.916714035
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-26.815356276,151.925540483
-26.812382694,151.92562227
-26.810446373,151.925680707
-26.809016928,151.927268863
-26.806336947,151.928470424
-26.805771604,151.929702394
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-26.802645905,151.932230378
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