GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

Woodside Solar Facility

Woodside Energy Ltd

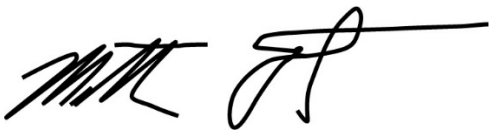
Report 1746

September 2023

This assessment report has been prepared by the Environmental Protection Authority (EPA) under s. 44 of the *Environmental Protection Act 1986* (WA). It describes the outcomes of the EPA's assessment of the Woodside Solar Facility proposal by Woodside Energy Limited.

This assessment report is for the Western Australian Minister for Environment and sets out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment
- the EPA's recommendations as to whether or not the proposal may be implemented and, if it recommends that implementation be allowed, the conditions and procedures, if any, to which implementation should be subject
- other information, advice and recommendations as the EPA thinks fit.



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1 Summary

Proposal

The Woodside Solar Facility (the proposal) involves the development of a solar facility in the Maitland Strategic Industrial Area (MSIA) and associated buffer area. The proposal is located approximately 15 kilometres (km) from Karratha, in the Pilbara region of Western Australia within the City of Karratha. The proponent for the proposal is Woodside Energy Ltd (the proponent).

The proposed solar facility includes a solar photovoltaic farm (solar PV farm), comprising of up to one million solar panels and solar plant supporting infrastructure (SPSI), including a battery energy storage system, electrical substation and access road. The proposal would generate electricity from the solar PV farm, complemented by battery storage facilities. Electricity would be delivered to industrial customers via the North-West Interconnected System which provides for connection of new generators and loads.

Context

The proposal is located approximately 15 km south-west from Karratha, within the City of Karratha. It is located within the MSIA and associated buffer area that has been subject to previous pastoral use. The MSIA comprises 2,500 hectares (ha) of land strategically located to promote and facilitate the processing of the Pilbara region's resources.

The proposal is located within Ngarluma Traditional Country and is subject to non-exclusive Native Title rights of the Ngarluma People which are recognised under the Native Title Claim WCD2005/001. The majority of land within the development envelope is currently used for grazing cattle by the Ngarluma Aboriginal Corporation (NAC).

The proposed development envelope overlaps an area subject to a proposed commercial-scale algae farm and processing facilities that was approved under Ministerial Statement 950 in 2013. Ministerial Statement 950 has not been implemented and the time limit for substantial commencement has expired. The proponent, Aurora Algae Pty Ltd, was deregistered as a company in 2018 by the Australian Securities and Investments Commission. No further consideration is provided to Ministerial Statement 950.

Environmental values

Flora and vegetation, terrestrial fauna, and social surroundings are the key environmental factors that would be impacted by the proposal.

Consultation

The Environmental Protection Authority (EPA) published the proponent's referral information for the proposal on its website for seven days public comment 10–16

January 2022). The EPA also published the proponent's additional information on its website for public review from 27 February 2023 to 17 March 2023. The EPA considered the comments received during these public consultation periods in its assessment.

Mitigation hierarchy

The mitigation hierarchy is a sequence of proposed actions to reduce adverse environmental impacts. The sequence commences with avoidance, then moves to minimisation, rehabilitation, and offsets are considered as the last step in the sequence.

The proponent considered the mitigation hierarchy in the development and assessment of its proposal, and as a result will:

- avoid direct disturbance to 7.7 ha of locally significant vegetation type 34 (vegetation type 34) (AcAxTt) (VLA 2020)
- minimise impacts to the Priority 1 (P1) Priority Ecological Community (PEC) Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays to 40 ha within the development envelope
- implement a weed management plan to prevent the introduction and spread of weeds during construction, with targeted measures for high-risk areas near PECs and recorded weeds that are declared pests / weed of national significance or known threats to PECs
- minimise impacts to terrestrial fauna through the retention at least 10% of vegetation in the development envelope for fauna corridors
- avoid direct disturbance to 0.6 ha of granite habitat that represents high quality habitat for short range endemic invertebrates
- design solar PV arrays around natural drainage lines and breaking the outline of the infrastructure minimising its appearance as a false water body
- avoid impacts to Aboriginal heritage sites through the provision of appropriate demarcation of sites, buffer areas of 50 metres (m) to known heritage sites and preclearance surveys to identify and avoid (and include 50 m buffers) for any additional sites
- minimise impacts from clearing through establishment of exclusion zones, access controls and staged construction
- implement a cultural heritage management plan that outlines an adaptive management approach to manage potential impacts and risks to Aboriginal heritage aspects of the environment
- consult with NAC in the development of decommissioning plans, including Traditional Owner access
- implement rehabilitation of temporary construction areas disturbed during construction, where ongoing land use not is not required during operations
- implement a decommissioning and rehabilitation management plan which outlines rehabilitation measures prior to project closure

- propose offsets to 'Good' to 'Excellent' vegetation, PECs, (*Dasyurus hallucatus*), the grey falcon (*Falco hypoleucos*), ghost bat (*Macroderma gigas*), Pilbara olive python *(Liasis olivaceus barroni*) and Pilbara leaf-nosed bat (*Rhinonicteris aurantia Pilbara form*) habitat through the provision of contributions to the Pilbara Environmental Offsets Fund (PEOF).

The EPA has assessed the entire 975.6 ha which is a combination of both the solar PV farm and SPSI development envelope. The EPA notes, through the proposed avoidance measures clearing for the proposal would directly impact 878 ha within the development envelope.

Residual impacts are those that remain after the mitigation hierarchy has been applied. The residual impacts of the proposal for the relevant key environmental factors are outlined below.

Assessment of key environmental factors

The EPA has identified the key environmental factors (listed below) in the course of the assessment. For each factor, the EPA has assessed the residual impacts of the proposal on the environmental values and considered whether the environmental outcomes are likely to be consistent with the EPA environmental factor objectives.

Flora and Vegetation

Residual impact or risk to environmental value	Assessment finding or Environmental outcome
Clearing of up to 878 ha of vegetation in 'Good' to 'Excellent' condition.	The proposal is located within the Pilbara bioregion and Roebourne subregion and would directly impact on 878 ha of vegetation in 'Good' to 'Excellent' condition. The clearing of 'Good' to 'Excellent' vegetation within the Pilbara bioregion is a residual impact in the context of biological diversity and ecological integrity. The EPA advises that this residual impact can be regulated through reasonable conditions (limitations on extent condition A1-1) and a requirement of offsets (recommended condition B7). The EPA has concluded that the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation.
Clearing of up to 40 ha of vegetation type 41 which represents the P1 PEC Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays.	The proposal would directly impact on 40 ha of vegetation type 41 which represents the P1 PEC Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (41% impact within the development envelope and 0.6% impact of the mapped extent of the PEC). The EPA advises that this significant residual impact should be subject to conditions (recommended condition B2-1 (1)) to require maximum clearing extents for the PEC and offsets to counterbalance the significant residual impacts this community (recommended condition B7). This ensures consistency with the EPA objective for flora and vegetation.

Clearing of up to 526.6 ha of vegetation type 42 which represents of the P3 PEC Horseflat land system of the Roebourne Plains.	The proposal would directly impact on 526.6 ha of vegetation type 42 which represents the P3 PEC Horseflat land system of the Roebourne Plains (88% impact within the development envelope and 0.3% impact of the mapped extent of the PEC). The EPA advises that this significant residual impact should be subject to conditions (recommended condition B2-1 (2)) to require maximum clearing extents for the PECs and offsets to counterbalance the significant residual impacts this community (recommended condition B7). This ensures consistency with the EPA objective for flora and vegetation.
Indirect impacts to PECs associated with the introduction and spread of weeds.	The proposal has the potential to result in indirect impacts on adjacent significant vegetation through the introduction and spread of weeds. Active management is required to mitigate the impact. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended condition B2-3) to ensure the environmental outcome is consistent with the EPA objective for this factor.
Clearing of up to 7.7 ha of large trees of *Acacia coriacea* and *A. xiphophylla* on larger drainage lines (vegetation type 34).	The proposal would directly impact on 7.7 ha of vegetation type 34 within the development envelope. This community represents a rare occurrence of unusually old age and large size *Acacia coriacea* and *A. xiphophylla* trees and is considered of high conservation value at a local scale. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended condition B2-1 (3)) to ensure the environmental outcome is consistent with the EPA objective for this factor.

Terrestrial Fauna

Residual impact or risk to environmental value	Assessment finding or Environmental outcome
Clearing up to 40.4 ha of minor drainage line habitat that is critical habitat for the northern short-tailed mouse (*Leggadina lakedownensis*) and lined soil-crevice skink (*Notoscincus butleri*).	The loss of 40.4 ha of critical habitat for the northern short-tailed mouse and lined soil-crevice skink is considered to be a significant residual impact resulting from the proposal. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended conditions B3-1 (1) and (4)) to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.
Clearing up to 40.4 ha of minor drainage line habitat that is moderate to high value foraging habitat for grey falcon (*Falco hypoleucos*), Pilbara olive python (*Liasis olivaceus barroni*) and northern quoll (*Dasyurus hallucatus*).	The loss of 40.4 ha of foraging habitat for the northern quoll, Pilbara olive python and grey falcon is considered to be a significant residual impact resulting from the proposal. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended condition B3-1 (1)), including a requirement for an offset (recommended condition B7), to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Clearing up to 104.2 ha of hummock grasslands on rocky plain habitat (*Triodia* species on stony soils) that is moderate to high value foraging habitat for northern quoll (*Dasyurus hallucatus*), ghost bat (*Macroderma gigas*), Pilbara olive python (*Liasis olivaceus barroni*) and Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form).	The loss of 104.2 ha of foraging habitat for the northern quoll, Pilbara leaf-nosed bat, ghost bat, and Pilbara olive python is considered to be a significant residual impact resulting from the proposal. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended condition B3-1 (1)), including a requirement for an offset (recommended condition B7) to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.
Clearing up to 733.4 ha of tussock grasslands on cracking clays habitat that is moderate to high value foraging habitat for northern quoll (*Dasyurus hallucatus*), ghost bat (*Macroderma gigas*), Pilbara olive python (*Liasis olivaceus barroni*) and grey falcon (*Falco hypoleucos*).	The loss of 733.4 ha of foraging habitat for northern quoll, ghost bat, Pilbara olive python and grey falcon is considered to be a significant residual impact resulting from the proposal. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended condition B3-1 (1)), including a requirement for an offset (recommended condition B7), to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.
Clearing of 0.8 ha of critical habitat for northern quoll (*Dasyurus hallucatus*).	The EPA has determined that there is a significant residual risk of direct impacts to northern quoll critical habitat. The significant residual impact should be subject to conditions of no adverse impacts to northern quoll critical habitat from clearing (recommended conditions B3-1 (3) and B3-1 (4)) to ensure the environmental outcome is consistent with the EPA objectives for this factor.
Clearing of 144.6 ha of foraging habitat for peregrine falcon (*Falco peregrinus*).	The EPA advises that clearing of 144.6 ha of foraging habitat within the development envelope is unlikely to have a material impact on the habitat associated with the species and the residual impact of the proposal to the peregrine falcon are likely to be consistent with EPA objective for terrestrial fauna.
The proposal would impact up to 0.6 ha of high potential short range endemic invertebrate habitat.	The proposal would result in the complete loss of short range endemic invertebrate habitat within the development envelope. The EPA has determined that there is a residual risk of direct impacts to high potential short range endemic invertebrate habitat. The residual impact should be subject to conditions to exclude the clearing of granite habitat (recommended condition B3-1 (2)) to ensure the environmental outcome is consistent with the EPA objectives for this factor.
Indirect impacts to 10% of the vegetation within the development envelope protected for fauna corridors.	The proposal has the potential to result in indirect impacts on vegetation protected for fauna corridors within the development envelope through the introduction and spread of weeds. Active management is required to mitigate this impact.

	The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended conditions B1-2, B3-1 (4) and B2-3) to ensure the environmental outcome is consistent with the EPA objectives for this factor.
Indirect impacts to threatened fauna through vehicle strike, noise emissions, feral animals and attraction to solar PV panels.	The proposal has the potential to result in indirect impacts on threatened fauna through vehicle strike, noise emissions, feral animals and attraction to solar PV panels. Active management is required to mitigate this impact. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended condition B3-2 and B3-4 to B3-7) to ensure the environmental outcome is consistent with the EPA objectives for this factor.

Social Surroundings

Residual impact	Assessment finding or Environmental outcome
Potential for Aboriginal heritage sites and areas of cultural significance to be directly affected through implementation of the proposal.	The EPA advises that there is a risk of residual impacts to Aboriginal cultural heritage associated with disturbance to heritage sites or features. The EPA advises that this residual impact should be subject to conditions (recommended condition B4) to ensure no impacts to Aboriginal heritage sites. The EPA concludes that implementation of the recommended condition would ensure consistency with the EPA objective for social surroundings.
Potential for Aboriginal cultural and ethnographic values to be directly affected through reduced access to heritage features or use of land for traditional activities and disturbance to flora and vegetation that would result in impacts to species used for cultural purposes.	The EPA advises that there is a residual impact to Aboriginal cultural heritage through the loss of access to, or restriction of access to use of land and flora and vegetation for traditional activities within the development envelope. The EPA advises that this residual impact should be subject to conditions (recommended condition B4) to ensure access to the land and flora and vegetation used for cultural purposes subject to reasonable health and safety requirements. The EPA concludes that implementation of the recommended condition would ensure consistency with the EPA objective for social surroundings.

Holistic assessment

The EPA has considered connections and interactions between relevant environmental factors and values to inform a holistic view of impacts to the whole environment.

The EPA is aware of the potential for industry and other activities located within the MSIA to influence the interactions between environmental factors. These interactions have the potential to influence the environment in a holistic and non-linear nature, effecting all environmental values which are physically and intrinsically linked to social surroundings, specifically Aboriginal cultural heritage.

The EPA formed the view that holistic impacts would not alter the EPA's conclusions

about consistency with the EPA's factor objectives. The EPA therefore recommends several conditions which support the holistic management of impacts, including protection of terrestrial fauna habitat which form part of the cultural landscape and conditions to ensure the protection of species and communities of Aboriginal cultural importance.

Conclusion and recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values which may be significantly affected by the proposal
- assessment of key environmental factors, separately and holistically (this has included considering cumulative impacts of the proposal where relevant)
- likely environmental outcomes which can be achieved with the imposition of conditions
- consistency of environmental outcomes with the EPA objectives for the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- whether other statutory decision-making processes can mitigate the potential impacts of the proposal on the environment
- principles of the *Environmental Protection Act 1986*.

The EPA has recommended that the proposal may be implemented subject to conditions recommended in Appendix A.

Other advice

The EPA has provided other advice to the Minister for Environment regarding cumulative impacts within the MSIA. The EPA recognises the geographical location of the MSIA is relatively undisturbed and therefore proponents of future proposals within the MSIA will need to consider how to address cumulative impacts to flora and vegetation, terrestrial fauna and other environmental factors and how these impacts will contribute to and intersect with impacts to social surroundings, specifically Aboriginal cultural heritage. The EPA proposes that a cumulative assessment of the MSIA is required to establish a framework and to set out the EPA's expectations for future proposals within the MSIA. In addition, the EPA has provided advice regarding potential co-benefits for conservation with land being set aside within the MSIA specifically for the use of the Ngarluma People.

The EPA has also included other advice to future proponents of renewable energy projects. The EPA expects proponents to consider the level and amount of disturbance required to implement each renewable proposal, comparative to the savings of greenhouse gas.

The EPA advises that management of waste produced by future renewable energy projects will also be a key consideration in its assessment of these types of proposals. The EPA notes that the industry to manage and recycle solar panels and other infrastructure is underdeveloped and therefore, it is expected that future renewable energy proposals will need to consider waste management and recycling

of solar panels and other associated renewable energy infrastructure as part of a circular waste economy.

2 Proposal

The Woodside Solar Facility (the proposal) by Woodside Energy Ltd (the proponent) is to develop a solar facility in the Maitland Strategic Industrial Area (MSIA) and associated buffer area. The proposal is located approximately 15 kilometres (km) from Karratha, in the Pilbara region of Western Australia (see Figure 1).

The proposal is comprised of two key physical elements, being the solar photovoltaic farm (solar PV farm) and the solar plant supporting infrastructure (SPSI). The solar PV farm is located to the east of the MSIA, within the MSIA buffer area and former Karratha pastoral lease. The farm would be developed with an initial capacity of up to 100 megawatts (MW). Future expansions of 100 MW each over five stages may expand the solar generation capacity up to 500 MW, within the development envelope (Woodside 2023a).

The SPSI is located within the MSIA and would be used for temporary or permanent infrastructure to support construction and operation of the solar PV farm. Access to the site would be via a bituminised road from North West Coastal Highway to the SPSI. The road would extend into the solar PV farm and is unlikely to be bituminised. Supporting infrastructure for the facility would include a battery energy storage system, electrical substation, maintenance workshop, laydown areas, office, ablutions, and crib facilities (see Figure 2).

The disturbance footprint across both the solar PV farm and SPSI is 878 hectares (ha) within a 1100.3 ha development envelope.

The proponent referred the proposal to the Environmental Protection Authority (EPA) on 30 November 2021. The referral information was published on the EPA website for seven days public comment. On 6 January 2022, the EPA decided to assess the proposal at the level of Referral information with additional information required under section 40(2)(a) of the *Environmental Protection Act 1986* (the EP Act). The EPA published the additional information, including a revised environmental referral supporting document (ERSD) (Woodside 2023a) and four environmental management plans on its website for public review from 27 February to 17 March 2023.

The proposal was determined under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to be a controlled action and to be assessed by the EPA under an accredited process on 13 December 2022.

The proposal is set out in section 1.2 and 3.1 of the proponent's referral supporting document (Woodside 2023a), which is available on the EPA website.

The elements of the proposal which have been subject to the EPA's assessment are included in Table 1. The EPA notes that, through the process of its assessment, the proponent has appropriately applied the mitigation hierarchy to reduce the disturbance footprint total from 975.6 ha (presented in Table 1 below) to 878 ha.

Table 1: Proposal content document (proponent reference)

Proposal element	Location	Maximum extent or range
Physical elements		
Solar PV Farm	Figure 2	Disturbance of up to 942.7 ha of native vegetation within a 942.7 ha development envelope.
Solar Plant Supporting Infrastructure (SPSI)	Figure 2	Disturbance of up to 32.9 ha of native vegetation within a 157.6 ha development envelope.
Operational elements		
Solar PV Farm	Figure 2	Operation of a Solar PV Farm capable of generating up to 500 $MW_{(ac)}$ of electricity from Solar PV including a battery energy storage system delivered to industrial customers via the North West Interconnected System.
Solar Plant Supporting Infrastructure (SPSI)	Figure 2	Operation of infrastructure supporting the Solar PV Farm.
Timing elements		
Proposal time	Maximum project life	Up to 70 years.

Units and abbreviations
ha – hectare
MW – Megawatt
Ac – alternating current

Proposal alternatives

The proponent's initial proposed concept incorporated the use of gas engine technology to complement renewable energy generation. This proposal eliminates the need for fossil fuel generation, partially due to incorporation of a battery energy storage system (Woodside 2023a).

The proponent considered alternative locations for the proposal, however, no other locations with available and appropriately-zoned land in proximity to the North-West Interconnected System (NWIS) and with relatively low environmental sensitivity were identified (Woodside 2023a).

Proposal context

The proposal is located approximately 15 km south-west from Karratha, within the City of Karratha. It is located within the MSIA and associated buffer area that has been subject to previous pastoral use, located at least 14 km from sensitive receptors. The MSIA comprises 2,500 ha of land strategically located to promote and facilitate the processing of the Pilbara region's resources. A 2 km special control area surrounds the MSIA, acting as a buffer to sensitive land uses (DevelopmentWA 2023). The majority of the MSIA is Crown land, and when required by proponents, would be transferred to DevelopmentWA in freehold ownership and leased to proponents (DevelopmentWA 2023). Currently one other development is located within the MSIA and four other proponents have been approved land allocation in the MSIA.

The proposal is located on the Roebourne Plain that contains two priority ecological communities (PECs): Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays (Priority 1) and Horseflat land system of the Roebourne Plains (Priority 3).

The proposal is situated south west of the Dampier Salt Ponds which are identified as an important habitat for migratory shorebirds and are monitored by Rio Tinto and Bird Life Western Australia as part of the Shorebirds 2020 project (Woodside 2023a).

The proposal is located within Ngarluma Country and is subject to non-exclusive Native Title rights of the Ngarluma people which were recognised under the Native Title Claim WCD2005/001. The majority of land within the development envelope is currently used for grazing cattle by the Ngarluma Aboriginal Corporation (NAC).

The proposed development envelope overlaps an area subject to a proposed commercial scale algae farm and processing facilities that was approved under Ministerial Statement 950 in 2013. Ministerial Statement 950 has not been implemented and the time limit for substantial commencement has expired. The proponent, Aurora Algae Pty Ltd, was deregistered as a company in 2018 by the Australian Securities and Investments Commission. No further consideration is provided to Ministerial Statement 950.

Figure 1: Proposal location

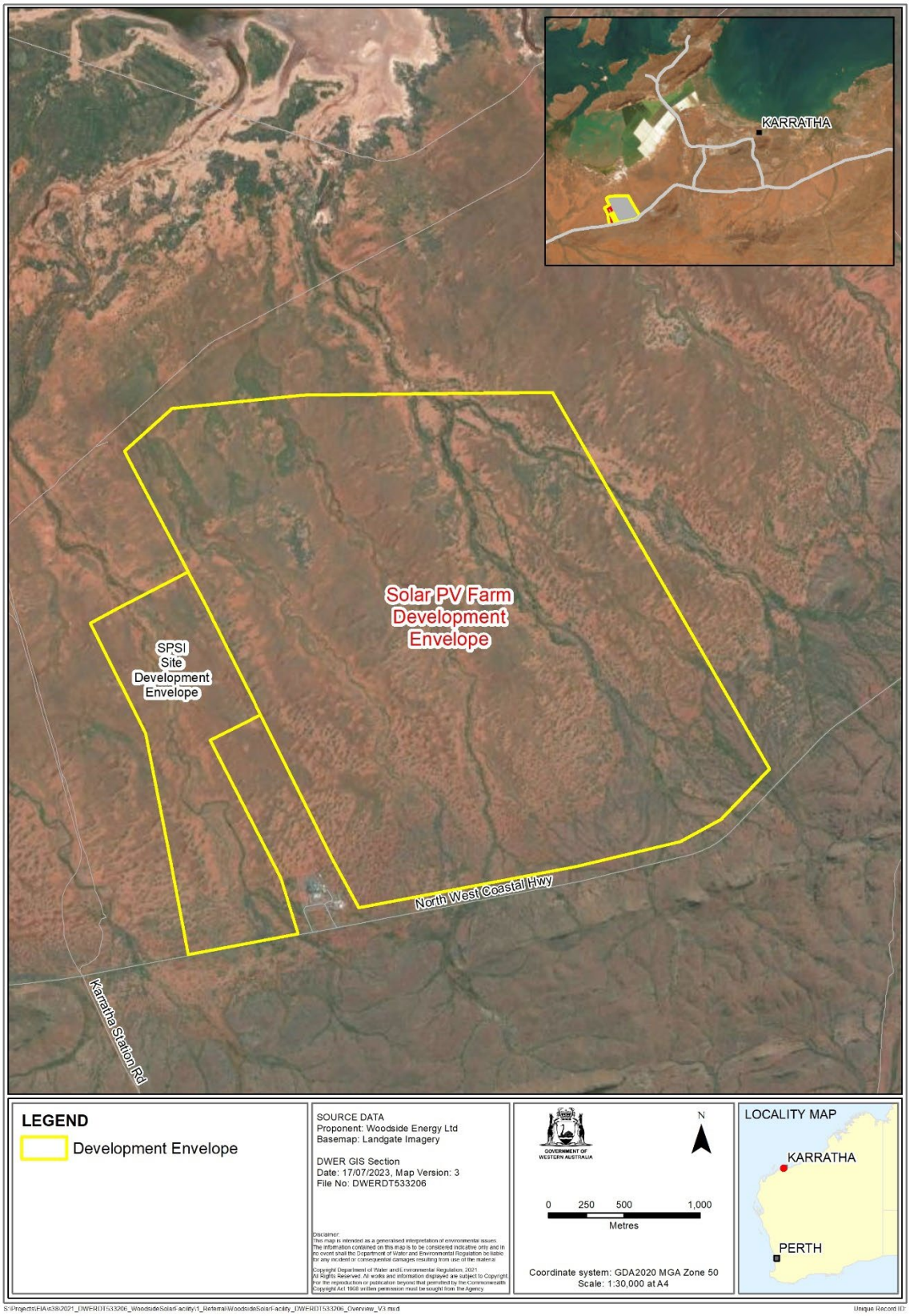

Figure 2: Development envelope

3 Assessment of key environmental factors

This section includes the EPA's assessment of the key environmental factors. The EPA also evaluated the impacts of the proposal on other environmental factors including terrestrial environmental quality, greenhouse gas emissions and inland waters and concluded these were not key factors for the assessment. This evaluation is included in Appendix D.

3.1 Flora and Vegetation

2.1.1 Environmental objective

The EPA environmental objective for flora and vegetation is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained* (EPA 2016a).

2.1.2 Investigations and surveys

The EPA advises the following investigations and surveys were used to inform the assessment of potential impacts to flora and vegetation:

- Karratha heavy industry site study – flora, vegetation and vertebrate fauna (report prepared for AGC Woodward-Clyde Pty Ltd) (Mattiske 1994)
- Woodside power project, flora and vegetation surveys desktop assessment report (VLA 2019)
- Woodside power project, detailed wet season vegetation surveys within the solar PV and power plant footprint (VLA 2020).

Flora and vegetation surveys did not cover 11.5 ha of the development envelope. This area was not surveyed as the Department of Planning, Lands and Heritage changed its preferred location of an access road (Woodside 2023a). As a precautionary measure, the proponent proposes to only clear 0.3 ha of the 11.5 ha of unsurveyed lands.

The *Woodside power project, detailed wet season vegetation surveys within the solar PV and power plant footprint* was undertaken as the previous survey in 2019 was undertaken during dry conditions. Collectively, the 2019 and 2020 surveys were consistent with the *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016a).

The EPA considers that it has sufficient information to assess impacts to flora and vegetation.

2.1.3 Assessment context – existing environment

The proposal is situated within the Roebourne subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) of the Pilbara region which is characterised by quaternary alluvial and older colluvial coastal and sub-coastal Plains with vegetation described as grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia* species and ephemeral drainage lines

support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands (Kendrick and Stanley 2001).

Vegetation

The vegetation condition of the development envelope ranges from ‘Excellent’ to ‘Poor’ condition (Woodside 2023a), with approximately 816.4 ha of the development envelope in ‘Excellent’ to ‘Very Good’ condition (assuming 11.5 ha of unsurveyed areas is in ‘Excellent’ condition). The development envelope is located within the Karratha Station, with evidence of low levels of stock grazing throughout or slightly aggressive weeds (Woodside 2023a). Small areas of drainage line (approximately 20.4 ha) were recorded in 'Poor’ and ‘Poor’ to ‘Good’ condition (Woodside 2023a and VLA 2019).

No threatened ecological communities defined under the EPBC Act or the *Biodiversity Conservation Act 2016* (BC Act) were found to occur within the development envelope (VLA 2019).

The Priority 1 (P1) priority ecological community (PEC) Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays and the Priority 3 (P3) PEC Horseflat land system of the Roebourne Plains as listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were recorded within the development envelope (94.9 ha and 526.5 ha respectively).

Ten vegetation types were described within the development envelope, of which two were considered representative of the P1 and P3 PECs (vegetation type 42 Ex and vegetation type 41 SpExEb). The proposal would directly disturb all of these vegetation types during construction. Refer to section 2.1.9 for further information.

In the north-east corner of the development envelope, 7.7 ha of large, aged *Acacia coriacea* and *Acacia xiphophylla* trees (vegetation type 34) associated with a larger drainage line were recorded during surveys. These trees are considered locally significant as they are fire sensitive and are believed to have reached maturity and age given the Roebourne Plains grasslands are insufficient to maintain a large fire. Trees of this age and size in the Pilbara coastal plain are uncommon (VLA 2019).

Approximately 143 ha of the development envelope comprise drainage lines, ranging from very shallow to broad major drainage lines. Six vegetation types associated with drainage lines occur within the development envelope (vegetation types 28, 34, 35, 37, 38 and 41); they range from *Vachellia farnesiana* shrubland to closed shrubland over *Cenchrus ciliaris* tussock grassland on minor shallow drainage line (vegetation type 35) to *Acacia coriacea* with *A. xiphophylla* low (old) woodland over scattered *Vachellia farnesiana* shrubs over *Themeda triandra* and *Cenchrus ciliaris* tussock grassland on broad major drainage channel (vegetation type 34).

Approximately 11.5 ha of the development envelope is unsurveyed (Woodside 2023a). For the assessment of impacts from the proposal, the EPA has applied a precautionary approach, and therefore it is assumed the unsurveyed areas are considered to represent the P1 PEC.

The development envelope occurs within the *EPA Advice: Protection of Tropical Arid Zone Mangroves Along the Pilbara Coastline section 16(j) of the EP Act* (EPA 2001*).* No mangroves were recorded within the development envelope during surveys and therefore the EPA has not considered the advice in undertaking its assessment.

The development envelope is predominantly located on the Horseflat land system described as level plains with clay soils and gilgai microrelief, stony plains and very gently inclined slopes marginal to major rivers. A small area to the south of the development envelope comprise the Boolgeeda land system made up of stony lower slopes, level stony plains and narrow sub-parallel drainage floors (Woodside 2023a).

Mapping of the pre-European extent of vegetation association identified Abydos Plain – Roebourne within the development envelope, of which there is 99.4% of pre-European extent remaining in the Roebourne subregion.

Flora

Surveys identified 83 plant taxa from 20 families within the development envelope. A summary of the findings include:

- no threatened flora as listed under the EPBC or BC Acts recorded
- no priority taxa listed by DBCA recorded
- one Priority 2 (P2) and four P3 flora taxa have the potential to occur within the development envelope:
    - *Trianthema* sp. Python Pool (P2)
    - *Atriplex lindleyi* subsp. *conduplicata* (P3)
    - *Gomphrena cucullata* (P3)
    - *Gomphrena leptophylla* (P3)
    - *Dolichocarpa* sp. Hamersley Station (AA Mitchell PRP 1479) (P3).
- two range extensions at the southern extent of their ranges were identified within the development envelope for species *Bonamia media* and *Stemodia kingii* (VLA 2020).

Weeds

Four weed species were recorded during field surveys including buffel grass (*Cenchrus ciliaris*), mimosa bush (*Vachellia farnesiana*), caltrop (*Tribulus terrestris*) and spiked malvastrum (*Malvastrum americanum*). None of these species are weeds of national significance or are declared pests under the *Biosecurity and Agriculture Management Act 2007.* They were mostly confined to disturbed and semi-disturbed areas within the development envelope. Buffel grass and mimosa bush were recorded in drainage lines, while caltrop was common throughout the development envelope. These weeds are common throughout the Pilbara and are classified as having high ecological impact and rapid invasiveness (VLA 2020).

2.1.4 Consultation

Matters raised during stakeholder consultation and the proponent's responses to those matters are provided in the response to submissions document (Woodside 2023b). Specific issues raised related to direct and indirect impacts to flora and vegetation during construction, environmental management and offsets.

The issue raised during the public consultation about potential impacts to culturally important plant species is addressed in section 2.3. The key issues raised during the public consultation on the proposal have been considered in the assessment in sections 2.1.5, 2.1.7 and 2.1.9.

2.1.5 Potential impacts from the proposal

Implementation of the proposal has the potential to impact on flora and vegetation from:

- clearing of up to 878 ha of native vegetation in predominantly 'Good' to 'Excellent' condition
- clearing of up to 40 ha of a P1 PEC and 526.6 ha of a P3 PEC within the development envelope
- indirect impacts to large trees of *Acacia coriacea* and *A. xiphophylla* on larger drainage lines (vegetation type 34)
- clearing of priority flora and flora at the southern extent of their ranges
- alteration of fire regimes and hydrological flows
- introduction and spread of weeds
- indirect impacts of solar panel shading and microclimate effects
- alteration of hydrological flows (Woodside 2023a).

The EPA considers that clearing of flora may affect the cultural activity of gathering for Traditional Owners. Impacts to flora of cultural importance are considered under social surroundings in section 2.3.

2.1.6 Avoidance measures

The proponent has identified the following avoidance measures:

- avoided disturbance to 7.7 ha of locally significant vegetation type 34 (AcAxTt) (VLA 2020) (Woodside 2023a).

Public consultation raised concerns regarding removal of large *Acacia coriacea* and *A. xiphophylla* trees identified in the drainage lines. The proponent has committed to avoiding impacts to 7.7 ha of mature *Acacia xiphophylla* (Snakewood) and/or *A. coriacea* trees, which is representative of vegetation type 34.

2.1.7 Minimisation measures (including regulation by other DMAs)

The proponent has identified the following minimisation measures:

- establishment of exclusion zones and access controls to prevent unnecessary clearing and disturbance during construction
- environmental corridors / buffer zones would be established within the development envelope comprising no less than 10% of the development envelope
- minimised impacts to the P1 PEC Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays to 40 ha within the development envelope
- proposed implementation of a weed management plan to prevent the introduction and spread of weeds during construction, with targeted measures for high-risk areas near PECs and recorded weeds that are declared pests, weeds of national significance or known threats to PECs
- a minimum of annual weed treatments to be implemented within the development envelope during operation (Woodside 2023a).

2.1.8 Rehabilitation measures

The proponent has identified the following rehabilitation measures for flora and vegetation:

- rehabilitation of temporary construction areas disturbed during construction, where ongoing land use not is not required during operations
- exclusion of stock animals from the development envelope to promote grassland recovery through the construction of a fence
- a decommissioning and rehabilitation management plan which outlines rehabilitation measures prior to project closure (Woodside 2023a).

2.1.9 Assessment of impacts to environmental values

The EPA considered that the key environmental values for flora and vegetation likely to be impacted by the proposal are the P1 and P3 PECs, locally significant vegetation communities, vegetation in 'Good' to 'Excellent' condition, habitat potentially suitable for priority flora species and range extensions.

The EPA recognises that cumulative loss of native vegetation through current and future mining, pastoralism, and infrastructure developments is a key threat to flora and vegetation values within the Pilbara bioregion.

Vegetation

A total of 878 ha of native vegetation, including 0.3 ha of unsurveyed lands, would be cleared for the proposal, predominantly ranging in 'Good' to Excellent' condition. The proposal is located within the Roebourne IBRA subregion of which only 3.55% is currently reserved for conservation. The EPA has recommended conditions B1-3 (staged disturbance footprint report) to ensure there is no disturbance of land that has not been surveyed.

Of the ten native vegetation types recorded within the development envelope, three are considered significant (Woodside 2023a). Impacts to these three units are provided below.

Table 2 sets out the potential impacts to vegetation of significance within the development envelope. The proponent proposes to clear 40 ha of the P1 PEC Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays in 'Excellent' condition. The proposal would also impact 526.9 ha of the P3 PEC Horseflat land system of the Roebourne Plains. The known occurrences of these PECs have been subject to historical disturbance, fragmentation and degradation, and areas of these PECs mapped as in 'Good' or better vegetation condition are of high conservation value, particularly given there are no occurrences of these PECs represented in the formal conservation reserve. The EPA notes that clearing 40 ha of the P1 PEC is a 41% loss within the development envelope and 0.6% loss at the regional scale with approximately 6,394.9 ha remaining of the mapped extent of this PEC. The EPA further notes that the P3 PEC would have an 88% loss at the local scale and a 0.3% impact at the regional scale with approximately 173,928 ha remaining of the mapped extent of this PEC.

Vegetation type 34 (AcAxTt) was identified during surveys as large trees of *Acacia coriacea* and *A. xiphophylla* on larger drainage lines in the north-east corner of the development envelope (VLA 2020). Surveys recorded 7.7 ha of this vegetation type within the development envelope. These trees were identified as unusually old aged and large size within the Pilbara coastal plain and were considered a rare occurrence and of high conservation value at the local scale (VLA 2020). The trees are sensitive to weed invasion and intensified fire regimes (Woodside 2023a). As part of its response to submissions, the proponent committed to avoiding impacts to vegetation type 34 due to its local and cultural significance. The EPA considers that, due to the local and cultural significance of vegetation type 34 and the flexible design of the proposal, it is suitable to condition avoidance of impacts to vegetation type 34 and therefore has recommended condition B2-1 (3).

The proponent has proposed to develop and implement a decommissioning and rehabilitation management plan in consultation with Traditional Owners, within five years of commencement of the proposal, and at five yearly intervals thereafter. At decommissioning, equipment would be removed and the land and native vegetation within the development envelope would be rehabilitated. The EPA considers that to ensure native vegetation is reinstated to at least 'Good' quality vegetation condition, it is suitable to condition the rehabilitation of the development envelope and therefore has recommended condition B5-2.

In assessing the potential impacts to high conservation value vegetation type 34 and the PECs, the EPA concluded that it's unlikely that the status and viability of the PECs would change or be impacted. However, to ensure that impacts are appropriately minimised the EPA has recommended a condition (recommended condition B2-1) to limit the extent of clearing. Due to the cumulative impacts to native vegetation in the Pilbara, the EPA considers the residual impacts to vegetation in 'Good' to 'Excellent' condition, which includes the proposed impacts to PECs, to be significant in the context of biological diversity and ecological integrity. The EPA is of the view that this significant residual impact should be counterbalanced through

Table 2: Potential impacts on vegetation of significance within the development envelope (Woodside 2023a).

Vegetation Code / ID	Reason for conservation significance	Extent proposed to be cleared	Extent in development envelope	Regional Extent (DBCA in Woodside 2023b)	Percentage loss in development envelope	Percentage remaining in known extent
		ha	ha	ha	%	ha
SpExEb / vegetation type 41	Corresponds with the priority 1 PEC *"Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays"*	40*	97.6	6449.8	41%	0.6%
Ex / vegetation type 42	Corresponds with the priority 3 PEC "*Horseflat land system of the Roebourne Plains"*	526.6	598.1	174,455	88%	0.3%
AcAxTt / vegetation type 34	Trees are unusually old and large for Pilbara coastal plain	7.7	7.7	n/a	100%	n/a

***Up to 0.3 ha of unsurveyed lands within the development envelope are considered as the P1 PEC (Woodside 2023a).**

offsets and therefore considers an offset (recommended condition B7) is required (see offsets detailed under section 4).

Subject to above recommended conditions the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation.

Introduction and spread of weeds

Four weed species were recorded during surveys within the development envelope; buffel grass (*Cenchrus ciliaris*), spiked malvastrum (*Malvastrum americanum*) caltrop (*Tribulus terrestris*) and mimosa bush (*Vachellia farnesiana*) (Woodside 2023a). Weeds have the potential to be spread during construction and maintenance activities of the proposal. The spread of weeds may impact vegetation type 34 as it is identified as sensitive to weed invasion. Vegetation adjacent to the development envelope comprises of PECs, priority flora habitats and wooded areas of conservation value. These areas are also vulnerable to weed invasion (Woodside 2023a).

The EPA considers that the proponent can appropriately manage the spread of weed species through the implementation of a weed management plan. The proponent submitted a weed management plan with the following targets:

- no new weed infestations identified in PECs or in known populations / habitat for priority flora habitat adjacent to construction area
- no new declared weeds or weeds of national significance identified within or adjacent to the development envelope as a result of construction, operational or maintenance activities (Woodside 2023a).

The weed management plan contains management actions to ensure the integrity of the remaining PECs are retained include sequencing working in areas of high weed abundance after working in the areas containing PECs to minimise the introduction of weeds and undertaking pre-construction weed surveys of construction areas within 50 m of PECs (Woodside 2023a).

The issue raised during public consultation about the susceptibility of moderate to high value habitat for conservation significant species and their susceptibility to weed invasion once disturbed has been addressed, in that weeds would be managed in accordance with the weed management plan for the proposal.

The EPA has recommended condition B2-3 for the proponent to implement the weed management plan to ensure there are no indirect impacts from the introduction or spread of weeds. The EPA has assessed that the environmental outcome is likely to be consistent with the EPA objective for this factor.

Conservation significant flora

Implementation of the proposal would result in the disturbance to five Priority flora species habitat and flora at the southern extent of their ranges, which occur within the development envelope.

Flora surveys of the development envelope recorded *Bonamia media* and *Stemodia kingii* flora at the southern extent of their ranges (VLA 2020). *Bonamia media* has previously been recorded approximately 40 km east of the development envelope and records of *Stemodia kingii* occur approximately 20 km to west and east of the development envelope. Given the distribution of these species range over 400 km across the Pilbara region and they do not have restricted habitats, the EPA considers impacts to these species within the development envelope are not significant.

Impacts on potential priority flora habitat have been calculated within the development envelope. The maximum extent of potential habitat for each species is shown in Table 3.

Table 3: Potential impacts on priority flora habitat within the development envelope (Woodside 2023a).

Species	Conservation status	Habitat representation	Potential habitat within development envelope	Recorded distribution (closest individuals)
Trianthema sp. Python Pool	Priority 2	vegetation types 25, 29, 37, 40, 42	938	Approximately 40 km from development envelope
Atriplex lindleyi subsp. *conduplicata* (F.Muell.) Paul G.Wilson	Priority 3	vegetation types 37, 41, 42	785.6	Approximately 5 km from development envelope
Gomphrena cucullata	Priority 3	vegetation types 25, 29, 37, 40, 41, 42	1035.6	Approximately 9 km from development envelope
Gomphrena leptophylla	Priority 3	vegetation types, 25, 29, 35	233	Approximately 10 km from development envelope
Dolichocarpa sp. Hamersley Station (AA Mitchell PRP 1479)	Priority 3	vegetation types 35, 40, 41, 42	740.5	Approximately 7 km from development envelope

The EPA is of the view that the proposal is unlikely to significantly impact priority flora species, given none have been recorded within the development envelope during surveys. These species have been recorded 5 km to 40 km from the development envelope. Habitats for these species (apart from the tussocks grasslands vegetation type 41 and 42) are well represented in the local and regional area (VLA 2020).

The EPA notes that should the proponent record Priority flora within the development envelope, impacts to Priority flora would be managed through exclusion zones of 50 m, captured in table 4-1 of the environmental management plan (Woodside 2023a).

The EPA has assessed the likely residual impacts of the proposal to be the loss of Priority flora habitat and potential individuals. The Priority flora and their habitats extend beyond the impact areas and the development envelope and therefore the potential impacts on Priority flora are unlikely to be significant (Woodside 2023a). The EPA advises that the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation.

Indirect impacts to flora and vegetation

Alteration of fire regimes and hydrological flows

The proposal comprises and is adjacent to the Roebourne Plain grassland and PECs which are susceptible to altered fire regimes. The EPA notes that increased fire frequency can impact the structure and condition of the grasslands and that the incidence of fire may occur during construction and maintenance activities. The proponent has committed to undertake standard preventative management measures during construction and operational activities to minimise potential impacts of fire on conservation significant vegetation (Woodside 2023a).

The EPA notes that the proponent would manage the incidence of fire through fire control management practices. The EPA considers the proponent can appropriately manage the proposal for alteration of fire regimes and therefore potential impacts on conservation significant vegetation are unlikely to be significant.

Vegetation type 34 comprises large trees of *Acacia coriacea* and *A. xiphophylla* on larger drainage lines within the development envelope and is susceptible to impacts from erosion and sediment deposition from changes to hydrological flows. The solar PV modules have small footings at the ground surface, presenting limited hindrance to surface water flows. The proposal also includes raised access roads with stormwater drainage infrastructure and therefore roads are not expected to impact surface water flows.

During the public comment period, NAC requested the proponent conserve 10% of the development area, with a focus on preserving high value vegetation and trees along drainage lines (Woodside 2023b). The EPA notes that the proponent has committed to retaining at least 10% of vegetation in the development envelope for environmental corridors (Woodside 2023a). The EPA considers the retention of 10% of high value vegetation in the development envelope for environmental corridors would ensure the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation. The EPA has recommended condition A1 (limitations and extent of proposal) and condition B1-2 for retention of 97.6 ha across the development envelope which addresses the retention of at least 10% of vegetation in the development envelope for environmental corridors.

The EPA considers that, given the drainage infrastructure and limited obstruction of surface water flows, impacts from erosion and sediment deposition to large trees of *Acacia coriacea* and *A. xiphophylla* on larger drainage lines is unlikely to be significant. The EPA notes that the proponent would manage erosion through management actions captured in table 4-3 of the environmental management plan (Woodside 2023a). The EPA has recommended condition B2-4 (environmental

management) which addresses the management of potential impacts to large trees of *Acacia coriacea* and *A. xiphophylla* on larger drainage lines.

The EPA has assessed the impact of altered fire regimes and hydrological flows from the proposal and considers that through implementation of the environmental management plan, the environmental outcome is likely to be consistent with the EPA objective for this factor.

Dust deposition

Dust has the potential to indirectly impact the PECs, Priority flora habitat and wooded areas of conservation value within and adjacent to the development envelope, which are susceptible to dust deposition produced through construction of the proposal. Dust has the potential to smother and kill flora and vegetation and may increase the susceptibility of vegetation to pests and diseases (Woodside 2023a).

Construction activities such as clearing of vegetation, earth works and vehicular movements are likely to generate dust, however, impacts on vegetation and flora are expected to be localised and temporary.

The EPA notes that the proponent would manage dust deposition through staged construction and management actions captured in table 4-1 of the environmental management plan (Woodside 2023a). Impacts from dust are expected to be contained within the development envelope, with limited impacts on adjacent vegetation. The EPA notes that the proponent would manage dust deposition through management actions captured in table 4-3 of the environmental management plan (Woodside 2023a). The EPA has recommended condition B2-4 (environmental management) which accounts for potential impacts from dust deposition through construction activities. Subject to the above recommended condition the environmental outcome is likely to be consistent with the EPA objective for this factor.

Indirect impact of solar panel shading and microclimate effects

The proposal comprises predominantly of grassland vegetation which may be susceptible to the effects of solar panel shading and other microclimate effects. The potential impacts of solar panel shading and other microclimate effects across large areas of native vegetation are likely to include the loss of vegetation due to shading, which could result in increased water or wind erosion and/or the replacement of native vegetation with weeds. The impacts of water or wind erosion and the increase in weeds may have a significant impact on vegetation within the proposal area and indirect impacts to adjacent vegetation.

The shading and microclimate effects from the proposal are unknown and impacts on vegetation are assumed to be worst case. The EPA notes that the proponent can manage shading and microclimate effects through vegetation monitoring captured in table 3 of the weed management plan (Woodside 2023a). The EPA has recommended condition B2-3 (weed management) which addresses potential impacts from weeds on flora and vegetation.

The solar panel arrays would be designed around natural drainage lines and to avoid conservation significant vegetation (vegetation type 34). The EPA notes the proponent can manage impacts of clearing on vegetation to support natural revegetation through rehabilitation of temporarily cleared areas captured in Table 4-1 of the environmental management plan (Woodside 2023a). The EPA notes the proponent can manage impacts from water and soil erosion within the development envelope and on adjacent vegetation through stormwater runoff and drainage management measures outlined in table 4-3 of the environmental management plan (Woodside 2023a). The EPA has recommended condition B2-4 (environmental management) which accounts for potential impacts of water and soil erosion caused through vegetation loss from shading and microclimate effects on flora and vegetation.

The EPA considers that the impacts of shading and microclimate effects are unlikely to have a significant impact and that the environmental outcome is likely to be consistent with EPA objective for flora and vegetation, noting the management measures and conditions above.

Cumulative impacts to flora and vegetation

The proponent has assessed the cumulative effects of the proposal by considering the proposed impacts of additional projects within the local area. The EPA's cumulative impact assessment has considered:

- cumulative effects due to the range of impacts and pressures in the area affected by the proposal
- whether the environment affected by the proposal has significant value due to other successive, incremental, and interactive cumulative impacts in the assessment area.

The EPA considers that the cumulative impacts to the Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays PEC, Horseflat land system of the Roebourne Plains PEC and vegetation in a 'Good' to 'Excellent' condition are not at a level that would warrant a decision to allow no further clearing of these values for this proposal. However, mining and infrastructure development impact pressures in the region and local area are such that the EPA must consider and appropriately manage the incremental loss of these values. The detailed assessment of cumulative impacts to these values is presented below.

The EPA has assessed the cumulative effects by considering the impacts of the proposal in addition to the following related approved projects (by virtue of their relatively proximity), including Mt Regal Project, North-West Interconnected System geotechnical investigations, Mount Regal Quarry and Dampier Operations – Cyclone Protection Works. The impact of each project on fauna habitat values consistent with the proposal are shown in Table 4.

Table 4: Cumulative vegetation impacts of the projects in the local area

Environmental value being impacted	Mt Regal Project	North-West Interconnected System, geotechnical investigations	Mount Regal Quarry	Dampier Operations – Cyclone Protection Works	Cumulative impact
Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays PEC (Priority 1)	Not recorded	Not recorded	Not recorded	48.35 ha	48.35 ha
Horseflat land system of the Roebourne Plains PEC (Priority 3)	Not recorded	3.94 ha	Not recorded	196.1 ha	200.04 ha
Native vegetation in 'Good' to 'Excellent' condition	'Excellent' condition, quantity not provided	Very Good' condition, quantity not provided	'Very Good' condition, quantity not provided	170.7 ha	170.7 ha

The EPA notes that the figures presented in Table 4 are limited, and therefore the total cumulative impact on the communities at a regional scale is difficult to ascertain. From the information available, the proposal, when combined with the above projects, is likely to contribute to a loss of 1,078.5 ha of vegetation in a 'Good' to 'Excellent' condition from the Pilbara Bioregion. The Pilbara Bioregion contains an estimated 17,731,764 ha of native vegetation (Government of Western Australia 2019). The cumulative impact represents the loss of around 0.01% of vegetation in 'Good' to 'Excellent' condition from the Pilbara. Cumulatively, the native vegetation to be impacted is limited to a relatively small extent in comparison to the native vegetation remaining in the Pilbara Bioregion.

The cumulative impact to the Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays PEC and Horseflat land system of the Roebourne Plains PEC are 88.35 ha and 726.64 ha respectively. Based on indicative mapping from DBCA, approximately 6,394.9 ha and 173,928 ha of the Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays PEC and Horseflat land system of the Roebourne Plains PEC remain. The cumulative impacts to PECs represent a loss of up to 1.38% and 0.4% of the total mapped extent of the PECs respectively.

There is limited mapping of the extent of PECs in the local area, however the EPA notes the PECs occur north-west and north-east of the proposal area within approved projects North-West Interconnected System geotechnical investigations and Dampier Operations – Cyclone Protection Works. The proposal intersects a local tract of the PECs that runs east to west along the coast within the local area. The EPA considers that cumulatively, impacts to the PECs are likely to be small relative to the extent of their recorded local occurrence. The EPA considers that the

cumulative impacts with the specified nearby projects do not have the effect of creating smaller, discrete and unviable patches of the two PECs.

Cumulatively, and when assessed in the context of other projects, the proposal would result in a relatively small incremental loss of native vegetation in a 'Good' to 'Excellent' condition, Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays PEC and Horseflat land system of the Roebourne Plains PEC in the bioregion and local area. The EPA considers that, despite the relatively small loss of native vegetation from the proposal, the total cumulative loss of vegetation across the Pilbara bioregion must be considered for all proposals within the region, and therefore a significant residual impact remains.

The EPA has recommended condition B7 (offsets) to counterbalance the cumulative significant residual impacts to vegetation within the Pilbara. Implementation of condition B7 would combine with offset contributions from other projects in the bioregion, to deliver offset projects through the Pilbara Environmental Offsets Fund (PEOF) to provide environmental benefits within the Pilbara. The EPA has provided further consideration of offsets in section 4 of this report.

2.1.10 Summary of key factor assessment and recommended regulation

- The EPA has considered the likely environmental outcomes of the residual impacts to flora and vegetation environmental values. In doing so, the EPA has considered whether reasonable conditions could be imposed, or whether other decision-making processes can ensure consistency with the EPA's factor objective. The EPA's assessment findings are presented in Table 5.The EPA has also considered the principles of the EP Act (see Appendix C) in assessing whether the residual impacts would be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 5: Summary of assessment for Flora and Vegetation

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
1.	Clearing of up to 878 ha of vegetation in 'Good' to 'Excellent' condition.	The proposal is located within the Pilbara bioregion and Roebourne subregion and would directly impact on 878 ha of vegetation in 'Good' to 'Excellent' condition. The clearing of 'Good' to 'Excellent' vegetation within the Pilbara bioregion is a residual impact in the context of biological diversity and ecological integrity. The EPA advises that this residual impact can be regulated through reasonable conditions (limitations on extent condition A1-1) and a requirement of offsets (recommended condition B7). The EPA has concluded that the environmental outcome is likely to	**Condition A1-1 (Limitations and extent of proposal)** Limit on the extent to vegetation clearing (878 ha) • Condition B7 (Pilbara Environmental Offsets Fund) Offsets through PEOF.

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
		be consistent with the EPA's objective for flora and vegetation.	
2.	Clearing of up to 40 ha of vegetation type 41 which represents the P1 PEC Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays.	The proposal would directly impact on 40 ha of vegetation type 41 which represents the P1 PEC Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (41% impact within the development envelope and 0.6% impact of the mapped extent of the PEC). The EPA advises that this significant residual impact should be subject to conditions (recommended condition B2-1 (1)) to require maximum clearing extents for the PEC and offsets to counterbalance the significant residual impacts this community (recommended condition B7). This ensures consistency with the EPA objective for flora and vegetation.	**Condition B2-1 (Vegetation)** Vegetation limits on the extent of clearing of vegetation unit vegetation type 41 to 40 ha. • Condition B7 (Pilbara Environmental Offsets Fund) Offsets through PEOF.
3.	Clearing of up to 526.6 ha of vegetation type 42 which represents of the P3 PEC Horseflat land system of the Roebourne Plains.	The proposal would directly impact on 526.6 ha of vegetation type 42 which represents the P3 PEC Horseflat land system of the Roebourne Plains (88% impact within the development envelope and 0.3% impact of the mapped extent of the PEC). The EPA advises that this significant residual impact should be subject to conditions (recommended condition B2-1 (2)) to require maximum clearing extents for the PEC and offsets to counterbalance the significant residual impacts this community (recommended condition B7). This ensures consistency with the EPA objective for flora and vegetation.	**Condition B2-1 (Vegetation)** Limit on the extent of clearing of vegetation unit vegetation type 42 (Ex) to 526.6 ha. • Condition B7 (Pilbara Environmental Offsets Fund) Offsets through PEOF.
5.	Indirect impacts to PECs associated with the introduction and spread of weeds.	The proposal has the potential to result in indirect impacts on adjacent significant vegetation through the introduction and spread of weeds. Active management is required to mitigate this impact. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended condition B2-3) to ensure the environmental outcome is	**Condition A1-1 (Limitations and extent of proposal)** Limit on the extent to vegetation clearing (919.8 ha). **Condition B2-3 (Vegetation)** Implementation of a weed management plan.

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
		consistent with the EPA objectives for this factor.	
6.	Clearing of up to 7.7 ha of large trees of *Acacia coriacea* and *A. xiphophylla* on larger drainage lines (vegetation type 34).	The proposal would directly impact on 7.7 ha of vegetation type 34 within the development envelope. This community represents a rare occurrence of unusually old age and large size *Acacia coriacea* and *A. xiphophylla* trees and is considered of high conservation value. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended condition B2-1 (3)) to ensure the environmental outcome is consistent with the EPA objectives for this factor.	**Condition B2-1 (Vegetation)** Vegetation limits on the extent of clearing of vegetation unit vegetation type 34 to 7.7 ha.

3.2 Terrestrial Fauna

2.2.1 Environmental objective

The EPA environmental objective for terrestrial fauna is *to protect terrestrial fauna so that biological diversity and ecological integrity are maintained* (EPA 2016b).

2.2.2 Investigations and surveys

The EPA advises the following survey reports have been used to inform the assessment of the potential impacts to terrestrial fauna:

- *Karratha heavy industry site study – flora, vegetation and vertebrate fauna* (report prepared for AGC Woodward-Clyde Pty Ltd) (Mattiske 1994)
- *Environmental due diligence – MSIA* (AECOM 2013)
- *Woodside Power hybrid renewable power plant fauna survey* (GHD 2021)
- *Woodside Power solar PV plant fauna survey* (GHD 2022)
- *Short-range endemic invertebrate assessment for the Woodside Solar Facility* (Phoenix 2023)
- *Draft proposed Woodside Solar Farm Targeted Fauna Survey* (Biota 2023).

The EPA notes that surveys from 1994 and 2013 were not consistent with EPA *Technical Guidance – Terrestrial vertebrate surveys for environmental impact assessment* (EPA 2020), however, provide background information (Woodside 2023a). The latest surveys (Biota 2023 and GHD 2022) are consistent with EPA Technical Guidance (EPA 2020).

2.2.3 Assessment context – existing environment

The proposal area predominantly occurs on the Horseflat land system of the Roebourne Plains, comprising relatively flat topography covered by grasslands and dissected by ephemeral drainage lines with scattered trees (Woodside 2023a). The development envelope has been subject to historical grazing by stock use in the region (Woodside 2023a).

Biological surveys identified four broad fauna habitat types within the development envelope ranging in moderate to high value habitat:

- minor drainage lines
- hummock grasslands on rocky plain (*Triodia* on stony soils)
- tussock grasslands on cracking clays
- exposed granite outcrops (Biota 2023).

All habitats are part of a contiguous, largely intact area of remnant vegetation and are part of a much larger area of similar habitats within the local and regional area (GHD 2022).

The proposal would impact 40.4 ha of minor drainage line habitat type. This habitat type provides high value habitat for peregrine falcon (*Falco peregrinus*), northern short-tailed mouse (*Leggadina lakedownensis*) and the lined soil-crevice skink (*Notoscincus butleri*), and moderate to high value habitat for northern quoll (*Dasyurus hallucatus*), Pilbara olive python (*Liasis olivaceus barroni*) and grey falcon (*Falco hypoleucos*).

The proposal would impact 104.2 ha of hummock grasslands on rocky plain (*Triodia* on stony soils). This habitat type provides moderate to high value habitat for migratory birds (seasonal opportunistic), peregrine falcon (*Falco peregrinus*), northern short-tailed mouse (*Leggadina lakedownensis*), the lined soil-crevice skink (*Notoscincus butleri*), northern quoll (*Dasyurus hallucatus*), Pilbara olive python (*Liasis olivaceus barroni*), ghost bat (*Macroderma gigas*) and Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form).

The proposal would impact 733.4 ha of tussock grassland on cracking clays. This habitat type provides moderate to high value habitat for ghost bat (*Macroderma gigas*), Pilbara olive python (*Liasis olivaceus barroni*) grey falcon (*Falco hypoleucos*), and northern quoll (*Dasyurus hallucatus*).

The exposed granite outcrops are associated within the minor drainage line habitat and provide high potential short range endemic (SRE) invertebrate habitat within the development envelope.

The minor drainage line habitat drains towards the coast and provides corridors of scattered shrub and tree vegetation, with relative shelter compared to the more exposed grasslands (Woodside 2023b). The drainage lines provide the only available vegetative corridors from the coast to the surrounding hills in the east (GHD 2022).

The results of the biological surveys identified 84 fauna species, including four introduced species within the development envelope. Northern quoll (*Dasyurus hallucatus*) was recorded three times from two locations from motion camera traps in the minor drainage line habitat and one scat recorded during a targeted fauna survey of the development envelope (Biota 2023).

Conservation significant fauna

Species of conservation significance considered likely to occur in the development envelope include:

- northern quoll (*Dasyurus hallucatus*) listed endangered under the EPBC Act and BC Act (recorded)
- Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form) listed vulnerable under the EPBC Act and BC Act
- ghost bat (*Macroderma gigas*) listed vulnerable under the EPBC Act and BC Act
- Pilbara olive python (*Liasis olivaceus barroni*) listed vulnerable under the EPBC Act and BC Act
- grey falcon (*Falco hypoleucos*) listed vulnerable under the BC Act
- peregrine falcon *(Falco peregrinus)* listed as specially protected under the BC Act
- northern short-tailed mouse (*Leggadina lakedownensis*) listed as P4 under the BC Act
- lined soil-crevice skink (*Notoscincus butleri*) listed as P4 under the BC Act
- migratory birds (3 species) listed under EPBC Act and BC Act (confirmed).

Short range endemic invertebrates

A desktop assessment undertaken for the development envelope identified 204 SRE invertebrate taxa within the desktop search area. Of these, 12 were confirmed SRE taxa and 164 potential taxa. No records were recorded within the development envelope. The nearest SREs were two millipedes located 1.9 km from the development envelope in rocky hill/ridge habitat. All the confirmed SREs were recorded in specialist habitats such as rocky hills/ridges, valleys, major drainages, or islands (Phoenix 2023).

Four suitable SRE habitats were recorded within the development envelope including exposed granite outcrops, *Triodia* on stony soils, tussock grasslands on cracking clays and minor drainage lines. Three habitats were considered to have a low potential SRE habitat rating. The granite habitat was considered a high potential SRE habitat (Phoenix 2023). The development envelope contains 0.6 ha of granite habitat.

Potential SRE taxa are known to occur in similar habitats to that of the development envelope, however, these taxa are not restricted to these habitats. They include two millipede species, *Boreohesperus undulatus* and *Antichiropus salutus* (both confirmed SRE's) and an isopod (*Buddelundia* 'sp. Indet.') (potential SRE), all recorded within 1.9 km of the development envelope. Species that are found within the study area are less likely to have restricted habitats and are more likely to freely

disperse outside of the development envelope. Given the widespread nature of the habitats and land systems, and lack of dispersal barriers, the likelihood of SREs occurring only within the development envelope (Phoenix 2023) is reduced.

2.2.4 Consultation

Matters raised during stakeholder consultation and the proponent's responses to those matters are provided in the response to submissions document (Woodside 2023b). During the public review of the updated referral information, concerns were raised regarding impacts to conservation significant fauna. The key issues raised during the public consultation on the proposal and how they have been considered in the assessment are described in section 5.

2.2.5 Potential impacts from the proposal

The proposal has the potential to significantly impact on terrestrial fauna from:

- clearing of 878 ha native vegetation that is terrestrial fauna habitat, including moderate to high value habitat for conservation significant species
- clearing of 0.6 ha of granite habitat that is high value SRE habitat
- clearing of 0.8 ha of critical habitat for northern quoll (*Dasyurus hallucatus*)
- direct loss of potential foraging habitat for threatened and priority species
- direct loss of fauna corridors through clearing and presence of infrastructure
- fauna injury or mortality from entrapment, collision and/or entanglement with infrastructure, vehicles and machinery
- indirect impacts associated with weed spread and increased incidence of fire (Woodside 2023a).

Potential impacts to fauna habitat with moderate to high value within the development envelope are provided in section 2.2.9. Approximately 878 ha of clearing would occur within moderate to high value habitats (Woodside 2023a).

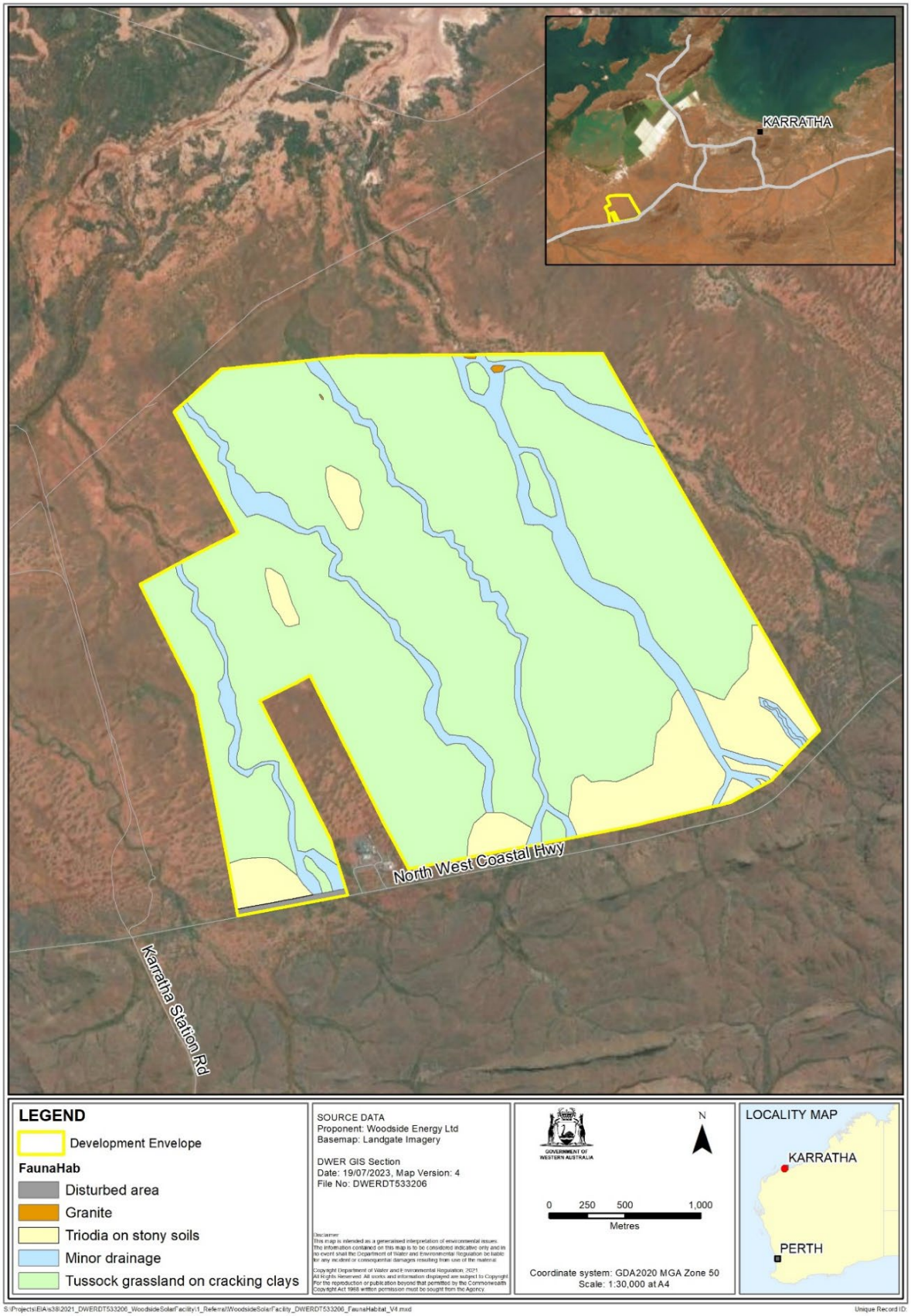

Figure 3: Fauna habitats within the development envelope (Biota 2023)

2.2.6 Avoidance measures

The proponent has identified the following avoidance measures:

- avoided 0.6 ha of granite habitat that represents high quality habitat for SRE invertebrates
- committed to designing solar PV arrays around natural drainage lines and breaking the outline of the infrastructure minimising its appearance as a false water body (Woodside 2023a).

2.2.7 Minimisation measures (including regulation by other DMAs)

The proponent has proposed the following measures to minimise impacts to terrestrial fauna:

- minimise disturbance to drainage lines during construction to allow fauna safe passage through the development envelope
- implementation of the environmental management plan
- undertake pre-clearance surveys prior to ground disturbing works
- fauna spotters to be present during clearing activities to supervise dispersal and relocation of remaining fauna
- implementation of dust mitigation measures during construction, including a staged construction approach to reduce dust generation
- implementation of appropriate construction and maintenance of stormwater drainage infrastructure and erosion protection where required, to prevent impacts to major drainage lines
- minimise impacts to terrestrial fauna through the retention at least 10% of vegetation in the development envelope for fauna corridors (Woodside 2023a).

2.2.8 Rehabilitation measures

The proponent has proposed the following rehabilitation measures for terrestrial fauna:

- proposed implementation of rehabilitation of temporary construction areas disturbed during construction, where ongoing land use not is not required during operations
- exclusion of stock animals from development envelope to promote grassland recovery through the construction of a fence
- proposed implementation of a decommissioning and rehabilitation management plan which outlines rehabilitation measures prior to project closure (Woodside 2023a).

2.2.9 Assessment of impacts to environmental values

The EPA considered that the key environmental values for terrestrial fauna likely to be impacted by the proposal are high potential SRE habitat and conservation significant species and their habitats.

Clearing of terrestrial fauna habitat

Northern quoll (Dasyurus hallucatus)

Northern quoll was recorded from surveys via motion camera traps and one scat. There were three records in two locations from the minor drainage line habitat within the development envelope. Minor drainage lines in the east of the development envelope provide dispersal habitat. A small tree-lined creek with hollows recorded in the south-east of the development envelope was considered to have trees of sufficient size and age to form hollows that could potentially be used as den sites (Figure 4). An area of approximately 0.8 ha of tree-lined creek with hollows as potential den sites was assessed as critical habitat for the northern quoll. The remaining habitat within the development envelope is considered foraging habitat for the northern quoll as it connects to suitable shelter habitat and quoll records (Biota 2023).

Structurally diverse woodland or forest areas containing large diameter trees, termite mounds or hollow logs is considered critical habitat for the northern quoll (Commonwealth 2016). Specifically, the northern quoll referral guideline notes the importance of foraging or dispersal habitat within a 1 km buffer of shelter habitat or quoll records (Commonwealth 2016).

The proposal would clear 0.8 ha of northern quoll critical habitat and 877.2 ha of foraging habitat (Biota 2023). The total proposed impact to critical and supporting habitat for the northern quoll is 878 ha (tussock grassland on cracking clays, hummock grasslands on rocky plain (*Triodia* on stony soils), and minor drainage line habitat) out of 1,100.3 ha of suitable habitat present within the development envelope, with 222.3 ha of foraging and dispersal habitat remaining. The EPA notes that northern quoll have been recorded in the Rocklea, Horseflat and Boolgeeda land systems within 20 km of the development envelope (Biota 2023 and Woodside 2023a). The development envelope predominantly comprise of gilgaied plains of the Horseflat land system with a small area comprising of stony lower plains of the Boolgeeda land system (Vreeswyk et al. 2004). The EPA considers these land system's represent northern quoll foraging and dispersal habitat, with quolls likely utilising the nearby Rocklea land system (stony ridges, hills and plateaus) for sheltering and denning. The EPA notes impacts to northern quoll foraging and dispersal habitat at the regional level, based on the remnant vegetation of 322,465 ha remaining within the Horseflat and Boolgeeda land systems in the Roebourne IBRA subregion, would be a 0.3% impact.

In assessing the impacts of the proposal to the northern quoll, the EPA considers there would be a significant residual impact from the clearing of conservation significant habitat within the development envelope. To ensure the proposal can be managed so that it does not cause significant population decline impacting the population viability, the EPA recommended condition A1-1 (limitations and extent of proposal) and condition B3-1 (1) and (3) (terrestrial fauna). Condition B3-1 (3) would restrict the proponent from clearing 0.8 ha of critical habitat for the northern quoll. The EPA considers the restriction to clear critical habitat is appropriate due to the flexible and staged design of the proposal. In addition, due to the cumulative

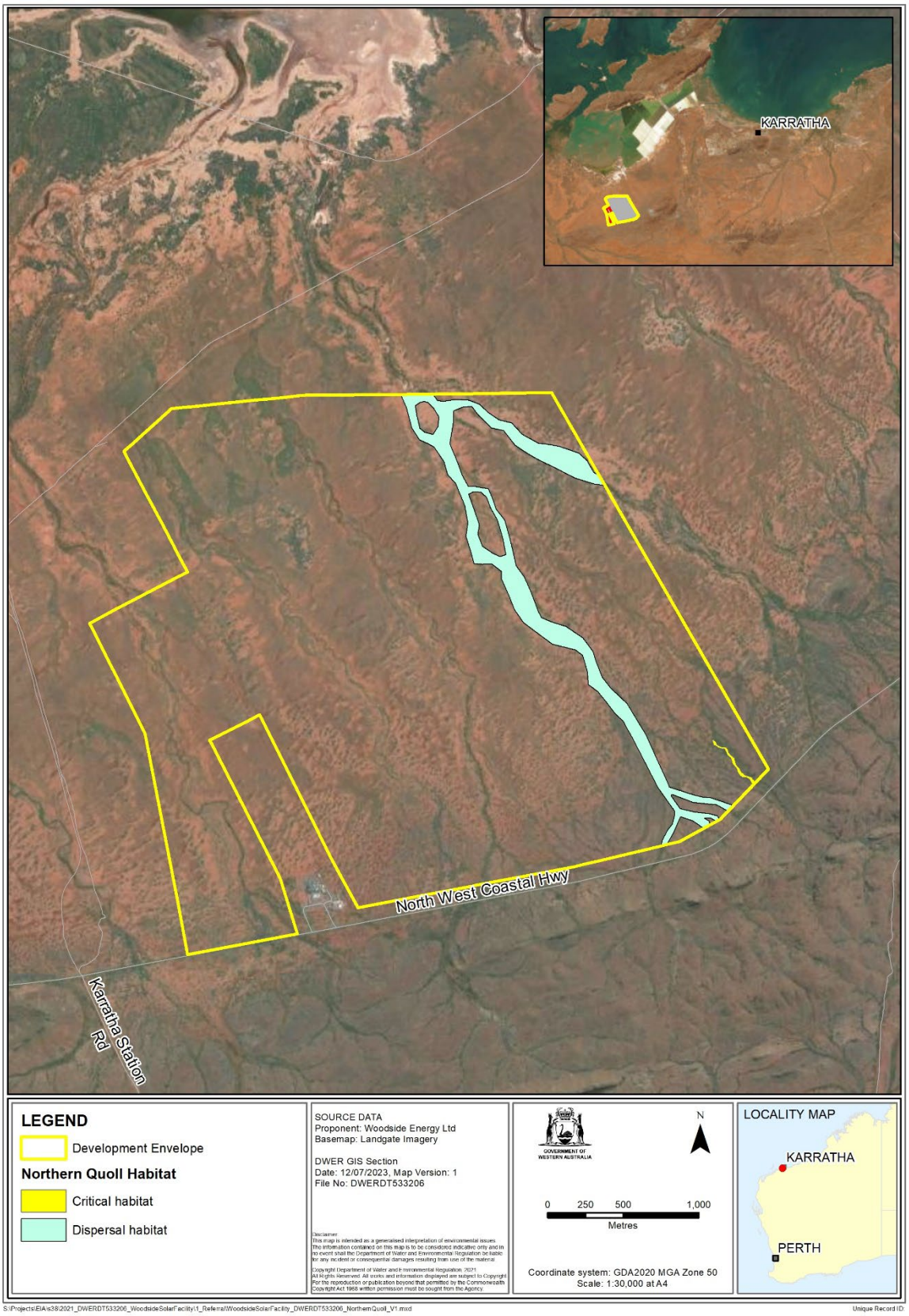

Figure 4: Northern quoll critical and dispersal habitat within the development envelope

impacts associated with conservation significant fauna habitat in the Pilbara region, the EPA expects offsets would be provided to counterbalance the impacts and therefore has recommended condition B7 (offsets) to provide environmental benefits within the Pilbara. These conditions would ensure that the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Ghost bat (*Macroderma gigas*)

Ghost bat was not recorded within the development envelope during field surveys. The closest known recording is situated approximately 13.8 km north-west of the development envelope (Biota 2023). Suitable ghost bat roosting locations in the form of caves, rock crevices and disused mine adits were not recorded during surveys of the development envelope. Ghost bat preferred foraging habitat include thin mature woodland over patchy or clumped tussock or hummock grass (*Triodia* species) on sand or stony ground. Isolated trees on the edge of thickets or along water courses appear to be preferred vantage points. Ghost bat was considered to have the potential to occur as a foraging visitor within the development envelope. The development envelope represents supporting habitat for the species (Biota 2023).

The proposal would clear 837.6 ha of ghost bat foraging habitat (tussock grassland on cracking clays and hummock grasslands on rocky plain (*Triodia* on stony soils)) out of 1,100.3 ha of suitable habitat present within the development envelope, with 222.3 ha of foraging habitat remaining.

Pilbara leaf-nosed bat (Rhinonicteris aurantia Pilbara form)

Pilbara leaf-nosed bat was not recorded within the development envelope during field surveys. The closest known recording is situated within 5 km of the development envelope (Biota 2023). The EPA notes that the accuracy of this location is unknown, given the nearest roost is 100 km to the south and individuals have not been recorded foraging more than approximately 30 km from their roost site (Biota 2023).

Pilbara leaf-nosed bat roosting locations in the form of caves or mine adits were not recorded during surveys of the development envelope. Pilbara leaf-nosed bat preferred foraging habitat includes *Triodia* hummock grassland, sparse tree and shrub savannah and riparian vegetation along drainage lines. The development envelope contain marginally suitable foraging habitat for the Pilbara leaf-nosed bat (Biota 2023).

The proposal would clear 104.2 ha of Pilbara leaf-nosed bat foraging habitat (hummock grasslands on rocky plain (*Triodia* on stony soils)) out of 1,100.3 ha of suitable habitat present within the development envelope, with 222.3 ha of foraging habitat remaining.

Grey falcon (Falco hypoleucos)

Grey falcon was not recorded within the development envelope during field surveys. The closest known recording is situated within 35 km of the development envelope (Biota 2023). Grey falcon prefers tall trees and man-made structures for nesting and roosting sites, which was not recorded within the development envelope during

surveys. Grey falcon preferred foraging habitat include sparsely timbered tussock grasslands of the development envelope, bisected at intervals by minor drainages with some waterholes. The entirety of the development envelope was considered foraging habitat for the grey falcon (Biota 2023).

The proposal would clear 773.8 ha of grey falcon foraging habitat (tussock grassland on cracking clays and minor drainage line habitat) out of 1,100.3 ha of suitable habitat present within the development envelope, with 222.3 ha of foraging habitat remaining.

Pilbara olive python (Liasis olivaceus barroni)

Pilbara olive python was not recorded within the development envelope during field surveys, and the species is considered unlikely to occur within the development envelope (Biota 2023). A local population of Pilbara olive python occur on the Burrup Peninsula, approximately 11 km to the north of the development envelope, where the preferred habitat are granophyre rock piles and secondary habitats of adjacent spinifex grasslands. The proponent's targeted fauna survey indicated that the Pilbara olive python was unlikely to occur in the development envelope, as there is an approximately 8 km wide expanse of salt flat between the Burrup and the development envelope, that Pilbara olive pythons are unlikely to traverse (Biota 2023).

Pilbara olive python preferred habitat include gorges, escarpments, rocky outcrops and water holes and usually in closer proximity to water and rock outcrops to attract suitable prey. The development envelope does not contain any critical habitat for the species, however foraging habitat for the species is present in the form of small, ephemeral pools of water above granite substrate (Biota 2023).

The proposal would clear 878 ha of Pilbara olive python habitat (tussock grassland on cracking clays, hummock grasslands on rocky plain (*Triodia* on stony soils), and minor drainage line habitat) out of 1,100.3 ha of suitable habitat present within the development envelope, with 222.3 ha of foraging habitat remaining.

The EPA considers that the development envelope contains moderate to high supporting habitat for the Pilbara olive python and therefore a significant residual impact to the species remains.

The EPA has assessed the impacts of the proposal to ghost bat (*Macroderma gigas*), Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form*)*, grey falcon (*Falco hypoleucos),* Pilbara olive python (*Liasis olivaceus barroni)* and considers there would be a significant residual impact from the clearing of conservation significant habitat within the development envelope. The EPA considers that the significant residual impact to threatened fauna can be regulated through recommended condition B3-1 (1), which sets the limit of disturbance to high value fauna habitat types that provide foraging habitat for threatened fauna, and that the loss of important habitat can be counterbalanced by offsets (section 4) to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Peregrine falcon (Falco peregrinus)

Peregrine falcon was not recorded within the development envelope during field surveys. The closest known recording is situated approximately 25 km from the development envelope (GHD 2022). Peregrine falcon is known from the region and foraging habitat is present for the species within the development envelope in the form of minor drainage lines and hummock grasslands on rocky plain (*Triodia* on stony soils) (GHD 2022). The development envelope provides limited breeding habitat for the species, however, the species may forage opportunistically within the development envelope (GHD 2022).

The proposal would clear 144.6 ha of peregrine falcon foraging habitat. The EPA considers the Boolgeeda land system to represent peregrine falcon foraging habitat in the form of stony lower plains supporting hard and soft spinifex grasslands and mulga shrublands (Vreeswyk 2004). The EPA notes, impacts to peregrine falcon foraging habitat at the regional level, based on the remnant vegetation of 27,076 ha remaining within the Boolgeeda land system in the Roebourne IBRA subregion, would be a 0.8% impact.

The EPA has assessed the impacts of the proposal on peregrine falcon and considers the proposal is unlikely to have a significant residual impact on the falcon subject to recommended conditions B3-1 (1), which sets the limit of disturbance to high value fauna habitat types. The EPA considers that the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Lined soil-crevice skink (Notoscincus butleri) and northern short-tailed mouse (Leggadina lakedownensis)

The lined soil-crevice skink and northern short-tailed mouse was not recorded within the development envelope during field surveys. The closest known recording is situated within 2 km of the development envelope (GHD 2022). Minor drainage lines, hummock grasslands on rocky plain (*Triodia* on stony soils) and tussock grassland on cracking clays provide 878 ha of suitable habitat for these species within the development envelope. The minor drainage line habitat is considered critical habitat for these species as they provide the only available vegetative corridors from the coast to the surrounding hills in the east (GHD 2022).

The proposal would clear 878 ha of suitable habitat for these species, of which 40.4 ha is considered critical habitat. The EPA considers the Horseflat and Boolgeeda land systems to represent suitable lined soil-crevice skink and northern short-tailed mouse habitat in the form of gilgaied plains supporting tussock grasslands and stony lower plains supporting hard and soft spinifex grasslands and mulga shrublands (Vreeswyk 2004). The EPA notes, impacts to the lined soil-crevice skink and northern short-tailed mouse habitat at the regional level, based on the remnant vegetation of 322,465 ha remaining within the Horseflat and Boolgeeda land systems in the Roebourne IBRA subregion, would be a 0.3% impact.

There is a risk of direct impact to individuals within the development envelope during construction activities. The EPA notes that the proponent would manage direct impacts to the lined soil-crevice skink and northern short-tailed mouse through fauna

monitoring management practices, captured in table 4-2 of the environmental management plan. The proponent has committed to active monitoring for conservation significant fauna during clearing to allow for relocation (Woodside 2023a).

The minor drainage line habitat provides the only available vegetative corridors from the coast to the surrounding hills within exposed cracking clay plains (GHD 2022). The effect of clearing the minor drainage line habitat for the lined soil-crevice skink, northern short-tailed mouse and the northern quoll is likely to reduce the area of occupancy of these species and fragment or increase fragmentation of these species.

The EPA has assessed the combined effect of impacts from clearing the minor drainage line habitat on these species and considered there would be a significant residual impact from the clearing of the minor drainage line habitat. The EPA recommended condition A1-1 (limitations and extent of proposal) and condition B3-1 (1) and (4) (terrestrial fauna), which takes into account the significant residual impact to these species. The EPA recommended condition B6-3 (1) (performance reporting) and condition B1-2 (staged disturbance footprint report) which considers the proposal impacts on the protected habitat corridors that these species may utilise.

Migratory birds

No migratory bird species were recorded during surveys. Three species listed as migratory under the BC Act and EPBC Act have the potential to utilise the tussock grassland on cracking clays habitat for foraging on a seasonally opportunistic basis.

The three species are the bridled tern *(Onychoprion anaethetus)*, oriental pratincole *(Glareola maldivarum)* and oriental plover *(Charadrius veredus)* (Woodside 2023a).

The proposal would clear 837.6 ha of potential foraging habitat for migratory birds in the development envelope. The development envelope is adjacent to mangroves, mudflats and chenopod herblands to the north and northeast of the proposal area, which are suitable for migratory birds to forage (GHD 2022). The EPA notes that migratory birds are highly mobile and, whilst they may use vegetation within the development envelope opportunistically, there is extensive foraging habitat adjacent to the proposal.

The EPA considers that impacts to migratory birds are unlikely to have a significant impact and that the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Short range endemic invertebrates

The high value granite habitat fauna type was identified as potentially supporting restricted SREs due to the associated microhabitats (Phoenix 2023). Up to 0.6 ha of granite habitat occurs within the development envelope. As part of its response to submissions the proponent committed to avoiding impacts to the granite habitat due to its high value for SREs.

The EPA considers that, due to the significance of the granite habitat and the flexible design of the proposal, it is suitable to condition avoidance of impacts to 0.6 ha of granite habitat and therefore has recommended condition B3-1 (2).

Indirect impact to terrestrial fauna

The recovery plan for northern quoll (*Dasyurus hallucatus)* highlights the need to manage populations, to halt their decline and prevent fragmentation and further genetic isolation of these population, particularly in areas not affected by cane toads (Hall and Ward 2010). The development envelope traverses the minor drainage line habitat in the east that provides vegetative corridors from the coast to the surrounding hills and critical habitat in the form of small tree-lined creek with hollows in the southeast of the development envelope. Therefore, the development envelope would impede some movement of fauna between populations and areas of critical habitat.

To minimise the impact of habitat fragmentation and to ensure the proposal does not adversely impact on northern quoll dispersal and critical habitat, the EPA has recommended conditions B3-1 (3) and (4). The EPA considers that through recommended conditions to minimise habitat fragmentation, in conjunction with recommended conditions to minimise mortality and injury to northern quoll individuals (conditions B3-4, B3-5 and B3-7), the proposal can be managed so that it does not cause significant population decline impacting the population viability. The EPA considers that impact to northern quoll (*Dasyurus hallucatus*) can be managed to be consistent with the EPA objective for terrestrial fauna.

During the public comment period, NAC requested the proponent conserve 10% of the development area, with a focus on preserving high value vegetation and trees along drainage lines (Woodside 2023b). The EPA notes that the proponent would commit to retaining at least 10% of vegetation in the development envelope for fauna corridors (Woodside 2023a). The EPA considers the retention of 10% of high value vegetation in the development envelope for fauna corridors would be sufficient to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna. The EPA has recommended condition A1 (limitations and extent of proposal) which addresses the retention of at least 97.6 ha (10%) of vegetation in the development envelope for fauna corridors.

Terrestrial fauna habitat is not expected to be significantly impacted by dust emissions. Emissions would be stabilised during construction activities and vehicle access to operational areas would be infrequent. The EPA notes that the proponent would manage dust deposition through management actions captured in table 4-1 of the environmental management plan (Woodside 2023a). The EPA assessed the proponent's proposed mitigation measures for managing dust during construction and determined that they would be sufficient to ensure the EPA objective for terrestrial fauna is met.

Vehicle and machinery movement have the potential to result in fauna strike, causing injury or mortality. Vehicle strike is likely to be highest during construction of the proposal. The EPA notes that the proponent would manage fauna strike through management actions captured in table 4-2 of the environmental management plan

(Woodside 2023a). The EPA recommended condition B3-4 (1) (terrestrial fauna) requiring the proponent to undertake pre-clearance fauna surveys prior to ground-disturbing activities, minimising the risk of injury and mortality of individuals.

The EPA notes that there may be risks to migratory and raptorial birds from the solar PV arrays acting as 'false' waterbodies, causing prey attraction or provision of shade, leading to a risk of collision with installed infrastructure or modification of natural habits (Woodside 2023a). There is also an increased risk to the opportunistic presence of water birds within the development envelope (Woodside 2023a).

The EPA notes that the proponent would manage collisions of birds through management actions captured in Table 4-2 of the environmental management plan (Woodside 2023a). These include the monitoring of deceased birds to determine if cause of death is related to the presence of infrastructure and the management action to modify infrastructure, such as installing bird deterrents, if collisions are identified as a significant cause of mortality. The EPA has recommended condition B3-2 (3) (terrestrial fauna) requiring the proponent to achieve the environmental objective, minimise the risk of adverse impacts to migratory and raptorial birds from collisions with infrastructure. The EPA recommended condition B6-3 (2) (performance reporting) and condition B1-2 (staged disturbance footprint report) which consider the proposal impacts on migratory birds and allow an adaptive approach of proposed disturbance.

The EPA considers that the risk of fauna collision with infrastructure and vehicle strike from the proposal is unlikely to be significant and that the environmental outcome is likely to be consistent with EPA objective for terrestrial fauna.

Cumulative impact assessment

The proponent has assessed the cumulative effects by considering the impacts of The proposal with additional projects within the local area, as detailed below. The EPA's cumulative impact assessment has considered:

- cumulative effects due to the range of impacts and pressures in the area affected by the proposal
- whether the environment affected by the proposal has significant value due to other successive, incremental, and interactive cumulative impacts in the assessment area.

The EPA considers that the cumulative impacts to significant fauna habitat are not at a level that would warrant a decision to allow no further clearing of these values for this proposal. However, mining and infrastructure development impact pressures in the region and local area are such that the EPA must consider and appropriately manage the incremental loss of these values. The detailed assessment of cumulative impacts to these values is presented below.

The EPA has assessed the cumulative effects by considering the impacts of the proposal in addition to the following related approved projects (by virtue of proximity), including Mt Regal Project, North-West Interconnected System, Geotechnical Investigations, Mount Regal Quarry and Dampier Operations – Cyclone Protection

Works. The impact of each project on fauna habitat values consistent with the proposal are shown in Table 6.

Table 6: Cumulative fauna habitat impacts of projects in the local area

Environmental value being impacted	Mt Regal Project	North-West Interconnected System, Geotechnical Investigations	Mount Regal Quarry	Dampier Operations – Cyclone Protection Works	Cumulative impact
Northern Quoll (*Dasyurus hallucatus*).	272 ha of critical habitat (rock piles and rock outcropping) and supporting habitat.	3.94 ha supporting habitat.	55.56 ha supporting habitat.	No suitable habitat.	331.5 ha of critical and supporting habitat.
Ghost bat (*Macroderma gigas*).	272 ha of supporting habitat.	3.94 ha supporting habitat.	55.56 ha supporting habitat.	No suitable habitat.	331.5 ha supporting habitat.
Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form).	272 ha of supporting habitat.	3.94 ha supporting habitat.	55.56 ha supporting habitat.	No suitable habitat.	331.5 ha supporting habitat.
Grey falcon (*Falco hypoleucos*).	272 ha of supporting habitat.	3.94 ha supporting habitat.	55.56 ha supporting habitat.	No suitable habitat.	331.5 ha supporting habitat.

The EPA considers that on a bioregional scale, implementation of this proposal would contribute to cumulative impacts to the abovementioned threatened fauna species, through habitat loss. As assessed in this section, the proposal is likely to constitute a significant residual impact to fauna habitats.

Cumulatively, the impacts are not to a level that would alter the likely environmental outcomes of this proposal. This is noting the extent of vegetation remaining in the Pilbara Bioregion which contains an estimated 17,731,764 ha of native vegetation (Government of Western Australia 2019). This conclusion also considers the location of northern quoll (*Dasyurus hallucatus*) critical habitat within the development envelope relative to the abovementioned projects and likely presence of critical habitat in the local area. Specifically, the EPA notes that there is extensive rocky ridgeline habitat that extends immediately southeast of the proposal location for several kms, which has not been impacted on, or bisected by development, and would likely offer high quality denning habitat for northern quoll (*Dasyurus hallucatus*) free of disturbance.

The EPA considers that, despite the relatively small loss of fauna habitat from the proposal, the total cumulative loss of fauna habitat across the Pilbara bioregion must be considered for all proposals within the region, and therefore a significant residual impact remains.

The EPA has recommended condition B7 (offsets) to counterbalance the cumulative significant residual impacts to fauna habitat within the Pilbara. Implementation of condition B7 would combine with offset contributions from other projects in the bioregion, to deliver offset projects through the Pilbara Environmental Offsets Fund (PEOF) to provide environmental benefits within the Pilbara. The EPA has provided further consideration of offsets in section 4 of this report.

2.2.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal on terrestrial fauna environmental values. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective.

The EPA assessment findings are presented in Table 7.

The EPA has also considered the principles of the EP Act (see Appendix C) in assessing whether the residual impacts would be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 7 : Summary of assessment for Terrestrial Fauna

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
1.	Clearing up to 40.4 ha of minor drainage line habitat that is critical habitat for the northern short-tailed mouse (*Leggadina lakedownensis*) and lined soil-crevice skink (*Notoscincus butleri*).	The loss of 40.4 ha of critical habitat for the northern short-tailed mouse and lined soil-crevice skink is considered to be a significant residual impact resulting from the proposal. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended conditions B3-1 (1) and (4)) and B1-2 to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.	**Condition A1-1 (Limitations and extent of proposal)** Limit on the extent to vegetation clearing (878 ha) • Condition B3-1 (Terrestrial Fauna) • Limit on the extent of clearing of terrestrial fauna habitats • Condition B1-2 (Terrestrial Fauna) • Minimise the risk of adverse impacts to terrestrial fauna movement through retention of at least 10% of habitat for fauna corridors.

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
2.	Clearing up to 40.4 ha of minor drainage line habitat that is moderate to high value foraging habitat for grey falcon (*Falco hypoleucos*), Pilbara olive python (*Liasis olivaceus barroni*) and northern quoll (*Dasyurus hallucatus*).	The loss of 40.4 ha of foraging habitat for the northern quoll, Pilbara olive python and grey falcon is considered to be a significant residual impact resulting from the proposal. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended condition B3-1 (1)), including a requirement for an offset (recommended condition B7), to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.	**Condition A1-1 (Limitations and extent of proposal)** Limit on the extent to vegetation clearing (878 ha) • Condition B3-1 (Terrestrial Fauna) • Limit on the extent of clearing of terrestrial fauna habitats • Condition B7 (Pilbara Environmental Offsets Fund) Offsets through PEOF.
3.	Clearing up to 104.2 ha of hummock grasslands on rocky plain habitat (*Triodia* species on stony soils) that is moderate to high value foraging habitat for northern quoll (*Dasyurus hallucatus*), ghost bat (*Macroderma gigas*), Pilbara olive python (*Liasis olivaceus barroni*) and, Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form).	The loss of 104.2 ha of foraging habitat for the northern quoll, Pilbara leaf-nosed bat, ghost bat and Pilbara olive python is considered to be a significant residual impact resulting from the proposal. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended condition B3-1 (1)), including a requirement for an offset (recommended condition B7), to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.	**Condition A1-1 (Limitations and extent of proposal)** Limit on the extent to vegetation clearing (878 ha) • Condition B3-1 (Terrestrial Fauna) • Limit on the extent of clearing of terrestrial fauna habitats • Condition B7 (Pilbara Environmental Offsets Fund) Offsets through PEOF.
4.	Clearing up to 733.4 ha of tussock grasslands on cracking clays habitat that is moderate to high value foraging habitat for the northern quoll (*Dasyurus hallucatus*), the ghost bat (*Macroderma gigas*), Pilbara olive python (*Liasis olivaceus barroni*) and the grey falcon (*Falco hypoleucos*).	The loss of 733.4 ha of foraging habitat for the northern quoll, ghost bat, Pilbara olive python and grey falcon is considered to be a significant residual impact resulting from the proposal. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended condition B3-1 (1)), including a requirement for an offset (recommended condition B7), to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.	**Condition A1-1 (Limitations and extent of proposal)** Limit on the extent to vegetation clearing (878 ha) • Condition B3-1 (Terrestrial Fauna) • Limit on the extent of clearing of terrestrial fauna habitats • Condition B7 (Pilbara Environmental Offsets Fund) Offsets through PEOF.

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
5	Clearing of 0.8 ha of critical habitat for the northern quoll (*Dasyurus hallucatus*).	The EPA has determined that there is a residual risk of direct impacts to northern quoll critical habitat. The residual impact should be subject to conditions of no adverse impacts to northern quoll critical habitat from clearing (recommended conditions B3-1 (3) and (4)) to ensure the environmental outcome is consistent with the EPA objective for this factor.	**Condition A1-1 (Limitations and extent of proposal)** Limit on the extent to vegetation clearing (878 ha) • Condition B3-1 (Terrestrial Fauna) • No adverse impacts to northern quoll critical or dispersal habitat Minimise adverse impacts of habitat fragmentation on northern quoll.
6.	Clearing of 144.6 ha of foraging habitat for peregrine falcon (*Falco peregrinus*).	The EPA advises that clearing of 144.6 ha of foraging habitat within the development envelope are unlikely to have a material impact on the habitat associated with the species and the residual impact of the proposal to the peregrine falcon are likely to be consistent with EPA objective for terrestrial fauna.	-
7.	Direct impacts to 0.6 ha of high potential short range endemic invertebrate habitat.	The proposal would result in the complete loss of short range endemic invertebrate habitat within the development envelope. The EPA has determined that there is a residual risk of direct impacts to high potential short range endemic invertebrate habitat. The residual impact should be subject to conditions to exclude the clearing of granite habitat (recommended condition B3-1 (2)) to ensure the environmental outcome is consistent with the EPA objective for this factor.	• Condition B3-1 (Terrestrial Fauna) • No disturbance to granite habitat.
8.	Indirect impacts to 10% of the vegetation within the development envelope protected for fauna corridors.	The proposal has the potential to result in indirect impacts on vegetation protected for fauna corridors within the development envelope through the introduction and spread of weeds. Active management is required to mitigate this impact. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended conditions B1-2, B3-1 (4) and B2-3) to ensure the environmental outcome is consistent with the EPA objective for this factor.	• Condition B1-2 (staged disturbance footprint report) • Retain at least 10% of habitat for fauna corridors • Condition B3-1 • (Terrestrial Fauna) • No disturbance or adverse impacts to fauna habitat identified in the staged disturbance footprint report

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
			• Condition B2-3 (Vegetation) • Management of weeds.
9.	Indirect impacts to threatened fauna through vehicle strike, noise emissions, feral animals and attraction to solar PV panels.	The proposal has the potential to result in indirect impacts on threatened fauna through vehicle strike, noise emissions, feral animals and attraction to solar PV panels. Active management is required to mitigate this impact. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended conditions B3-2 and B3-4 to 3-7) to ensure the environmental outcome is consistent with the EPA objective for this factor.	• Condition B3 (Terrestrial Fauna) • Minimise risk of adverse impacts and indirect disturbance to native fauna.

3.3 Social Surroundings

2.3.1 Environmental objective

The EPA environmental objective for social surroundings is *to protect social surroundings from significant harm* (EPA 2023).

2.3.3 Investigations and surveys

The EPA advises that the following investigations and surveys were undertaken to inform the assessment of the potential impacts to social surroundings:

- Heritage assessment: archaeological site avoidance survey for Woodside power project, stages 1, 2 & 3 the Pilbara, Western Australia (Black Wattle Archaeology Pty Ltd 2019)
- Ethnographic site avoidance and site assessment survey for Woodside power project, stages 1, 2 & 3 the Pilbara, Western Australia (DB-Consulting 2019).

The proponent undertook consultation and fieldwork with NAC to support mapping and identification of cultural heritage sites and vegetation of cultural significance across the development envelope.

The proponent's heritage surveys targeted areas of the proposed initial impact footprint, covering approximately 234 ha of the development envelope, including 110 ha of the solar PV farm development envelope and 20 ha of the SPSI development envelope (Woodside 2023a).

The proponent provided updated information on Aboriginal heritage sites identified in a desktop assessment as part of its response to submissions (Woodside 2023c). Searches identified four previously lodged heritage sites within the development

envelope (Department of Planning Lands and Heritage (DPLH) IDs 16590,16591, 21673 and 21674) (Woodside 2023b). Surveys identified a further four new sites within the development envelope. The proponent considered these sites as unlikely to meet the standards of site under section 5 of the *Aboriginal Heritage Act 1972* (BWA 2019). The EPA has considered this below.

The proponent has an Indigenous Land Use Agreement and a Relationship Agreement with NAC, which states any additional surveys would be undertaken by NAC prior to disturbance, and heritage surveys over the remaining portion of the solar farm would be conducted no later than 12 months after the commencement date.

2.3.3 Assessment context: existing environment

Cultural heritage values

The proposal is located within the MSIA and associated buffer area, which was formerly Karratha Station pastoral lease. The majority of the proposal is located within the Ngarluma Native Title Determination Area (WCD 2005/001). NAC is the Registered Native Title Body Corporate and the proposal is located on Ngarluma land (Woodside 2023a).

The Government of Western Australia entered into the Burrup and Maitland Industrial Estates Agreement (BMIEA) Implementation Deed in 2003. Native title parties included in the agreement include the Wong-Goo-tt-Oo, Ngarluma, Yindjibarndi and Yaburara Mardudhunera peoples (Woodside 2023a).

The proposal is located within Ngarluma Country, which is used by Aboriginal people for cultural and spiritual use, hunting, fishing and collection of seed and plant material. The Karratha Station pastoral lease is subleased and operated by NAC.

Results of a database search did not identify any registered heritage sites, however, four lodged heritage places were identified within the development envelope. Sites include artefacts/scatters, grinding patches/grooves, quarries and shell middens (Woodside 2023). A further four potential new sites were recorded within the development envelope. These sites and places included a combination of stone tool assemblages, grinding patches, quarries and middens (Woodside 2023b).

Amenity

The proposal lies within the MSIA and associated buffer, which has been strategically located, with substantial buffers to sensitive receptors; Karratha town and Murujuga National Park are located approximately 15 and 16 km south-west of the MSIA and Dampier town is located approximately 16 km south of the MSIA. The MSIA is surrounded by Karratha Station, with the Dampier Salt Ponds located to the north of the station.

Consultation

Matters raised during stakeholder consultation and the proponent's responses to these matters are provided in the Response to Submissions document (Woodside

2023b). The key issues raised during the public consultation on the proposal were direct impacts to Aboriginal heritage sites, consultation with Traditional Owners in conducting further surveys and ongoing use of the development envelope for traditional purposes, conservation of 10% of high value vegetation and trees along drainage lines, and consultation with NAC on decommissioning rehabilitation plans and activities.

2.3.5 Potential impacts from the proposal

The proponent has identified that the proposal has the potential to impact on the EPA objective for social surroundings through:

- direct, physical disturbance to Aboriginal heritage sites (DPLH ID 16590 and four archaeological survey sites) as a result of clearing and ground disturbance
- indirect impacts to municipal European heritage features (De-Grey – Mullewa Stock Route, No. 9701 and Old Stock Route Wells, Place No. 25267) as a result of clearing and ground disturbance
- constraints on access to heritage features or use of land for traditional activities
- disturbance to flora and vegetation that would result in impacts to species used for cultural purposes
- reduced public amenity as a result of light and dust emissions (Woodside 2023a).

2.3.6 Avoidance measures

The proponent has proposed the following avoidance measures:

- avoided impacts to Aboriginal heritage sites through the provision of appropriate demarcation of a sites, buffer areas of 50 m to known heritage sites and preclearance surveys to identify and avoid (and include 50 m buffers) for any additional sites
- minimised impacts from clearing through establishment of exclusion zones, access controls and staged construction
- proposed implementation of a cultural heritage management plan which outlines an adaptive management approach to manage potential impacts and risks to Aboriginal heritage aspects of the environment
- proposed opportunities for Traditional Owners to collect traditional resources within the development envelope prior to clearing
- proposed future consultation with NAC in the development of decommissioning plans, including Traditional Owner access
- infrastructure layout optimised to avoid the need to clear locally important vegetation in co-ordination with NAC
- design proposal to minimise disturbance to significant populations of flora species *Stemodia grossa*. Disturbance planned in consultation with NAC
- fenced boundary of the development envelope to be limited to that required for operational purposes (Woodside 2023a).

2.3.7 Minimisation measures (including regulation by other DMAs)

The proponent has proposed measures to minimise impacts to social surroundings:

- implementation of a cultural heritage management plan which outlines an adaptive management approach to manage potential impacts and risks to Aboriginal heritage aspects of the environment
- access for Traditional Owners to Aboriginal cultural heritage sites within the development envelope as required
- prior to undertaking clearing activities, provide opportunities for Traditional Owners to collect traditional resources within the development envelope
- ensure access by Traditional Owners to locations beyond the development envelope (for example fishing/hunting areas) are not unreasonably impacted by the proposal
- dust controls including weather monitoring, covering loads, observing speed limits, and dust suppression utilised when required (Woodside 2023a).

Cultural heritage management plan

The proponent has prepared a cultural heritage management plan including a management framework to avoid disturbance to potential Aboriginal cultural heritage within the development envelope. The proponent has committed to consulting with NAC regarding access matters and cultural heritage surveys. Traditional Owners have requested that Woodside provide opportunities for the harvesting of traditional resources within the planned disturbance zone prior to any native vegetation clearing (Woodside 2023a). This was provided in the cultural heritage management plan of which NAC provided comment on (Woodside 2023a)

2.1.8 Rehabilitation measures

The proponent has committed to consult with Traditional Owners and custodians including NAC in the development of decommissioning plans, considering the need for restoration of Traditional Owner access (Woodside 2023a).

2.3.9 Assessment of impacts to environmental values

The EPA considers that the key values to social surroundings likely to be impacted by the proposal include direct impacts to cultural heritage sites, loss of and/or restriction of access to land and species of cultural importance and indirect impacts of noise, dust and visual amenity. It is noted that the environmental factor flora and vegetation interlink with the cultural aspects within the development envelope.

Aboriginal heritage and cultural values

The proposal has the potential to impact (directly or indirectly) four lodged heritage places, four other sites identified within the development envelope, and new sites on

unsurveyed lands. Approximately 10% of the solar PV farm development envelope and 60% of the SPSI development envelope have been surveyed (Woodside 2023a).

The proponent has committed to undertake additional heritage surveys prior to clearing activities with NAC to identify Aboriginal cultural heritage sites. Aboriginal cultural monitors would be engaged during construction in areas not previously disturbed. The proponent has committed in Table 8-3 of the supporting document (Woodside 2023a) that the required disturbance footprint is smaller than development envelope to allow flexibility to avoid sensitive locations.

Within its response to submissions the proponent committed to avoiding impacts to all heritage sites. To minimise potential impacts a 50 m buffer would be pegged around known heritage sites if activities occur within 100 m of these sites, and this measure would also apply to new sites.

The EPA would usually expect surveys to be conducted to the extent necessary to understand whether there are likely to be any further heritage places of significance. In this case, the proponent has been unable to achieve this due to ongoing negotiations with NAC and at NAC's request. The proponent has instead proposed to avoid all sites (Woodside 2023b, p. 30, 51 and Woodside 2023a, Section 8) and include a 50 m buffer around them all. The EPA considers this avoidance measure is likely to protect any further sites from significant harm.

Native plants were identified during surveys as being used by Aboriginal people. The Traditional Owners advised of a dense population of *Stemodia grossa* within the development envelope which is used in the preparation of bush medicine (Woodside 2023a). The proponent has committed to providing access to Traditional Owners to collect traditional resources from areas prior to clearing. The fenced boundary of the development envelope would be limited to that required for operational purposes, allowing access to by Traditional Owners to resources while the facility is in operation (Woodside 2023a).

During the public comment period, NAC requested the proponent conserve 10% of the development area, with a focus on preserving high value vegetation and trees along drainage lines (Woodside 2023b). Conservation significant fauna rely on the drainage line habitats within the development envelope. The EPA considers the condition of minimise the risk of adverse impacts to terrestrial fauna movement through retention of at least 10% of habitat for fauna corridors (condition B1-2) and the avoidance of large trees of *Acacia coriacea* and *A. xiphophylla* on larger drainage lines (B2-1 (3)) provides protection from significant harm to NAC's social surroundings from biological impacts.

Outside of the development envelope, ethnographic surveys with Traditional Owners were undertaken, and no new sites in the landscape were identified. The EPA notes a review of archaeological information over Ngarluma Country was undertaken by the proponent and identified past Indigenous people who utilised the local landscape. The Ngarluma People continue to use the land in this area for traditional purposes (Woodside 2023a).

The EPA considers that for the proposal to be consistent with the EPA objective for this factor, *to protect social surroundings from significant harm*, the avoidance of any Aboriginal heritage sites and culturally significant areas within the development envelope is required. The EPA also considers Traditional Owner access to and cultural use of land should be required to ensure the proposal is likely to be consistent with the EPA objective for this factor.

The EPA advises that conditions which requires this avoidance and access, in combination with the proponent's commitments to avoid Aboriginal heritage sites, undertake additional heritage pre-clearance surveys, engage suitable Aboriginal cultural monitors, and ongoing consultation with NAC under its cultural heritage management plan (Woodside 2023a), the environmental outcome is likely to be consistent with the objective for social surroundings.

The EPA advises that additional approvals to disturb Aboriginal cultural heritage may be required under Aboriginal heritage legislation. The proponent has advised that approvals under the *Aboriginal Heritage Act 1972* or *Aboriginal Cultural Heritage Act 2021* (whichever is in force) would be sought together with NAC if construction works intersect the boundaries of any Aboriginal Heritage Places (Woodside 2023b, p. 29).

Given current uncertainty about the status of Aboriginal heritage legislation, the EPA has not assessed the proposal with any expectations of the protection which may be provided by it. The EPA notes in the meantime that the proponent has committed that any approvals would be sought together with NAC and considers this is likely to reduce the significance of any potential impact.

Historic heritage

The proposal has the potential to indirectly impact historic heritage sites De-Grey – Mullewa Stock Route, No. 9701 (place number 05113, City of Greater Geraldton, Category 3) and Old Stock Route Wells, Place No. 25267 (City of Karratha Category B/D), municipal inventory heritage sites, as a result of clearing and ground disturbance.

The De-Grey – Mullewa Stock Route No. 9701 is a historic stock route and wells extending from the Midwest Region, east of Geraldton, to the Pilbara, terminating west of Pardoo. The Old Stock Route Wells are isolated sites in various condition that may contain water tanks, troughs, fences and camping areas. These heritage sites are located directly to the north of the development envelope. Potentially other isolated structures (water tanks, troughs and fences) associated with the Old Stock Route Wells may be present in the stock route north of the development envelope.

The proposal has the potential to indirectly impact these sites through dust emissions. The proponent has committed to dust control measures such as weather monitoring, covering loads, observing speed limits, and dust suppression to minimise indirect impacts to historic heritage sites.

If sites are located within the development envelope, the proponent has committed to consult with the City of Karratha regarding appropriate management of the sites prior to disturbance.

The EPA considers that through the proposed management, the proposal is unlikely to significantly impact on historic heritage and therefore meets the EPA objective for social surroundings.

Indirect impacts of lights, noise, dust and amenity

The township of Karratha and Dampier Port are approximately 15 km from the proposal. Construction would be localised and temporary in nature and would occur over 10 km from residential and recreation areas (Woodside 2023a). Construction would occur predominantly during the day. The EPA considers indirect impacts from dust, noise and lights are unlikely to impact nearby receptors due to the distance of the proposal to sensitive receptors.

The development envelope may be subject to soil erosion, which is likely to cause dust emissions (Woodside 2023a). The proponent has committed to staged construction approach, that would limit the extent of cleared areas subject to wind erosion. The EPA considers the proponents dust control measures are appropriate to minimise impacts to amenity from dust.

The area surrounding the proposal has limited existing infrastructure and therefore there is a potential for a visual impact to the aesthetics of the surrounding area. The development envelope would be visible from North West Coastal Highway, however, the infrastructure is flat in nature and is not expected to significantly impact amenity.

Noting the above, the EPA considers the proposal is unlikely to significantly impact on amenity and therefore the environmental outcome meets the EPA objective for social surroundings.

Cumulative impacts

The development envelope is located within the MSIA, a 2500 ha area strategically located for the facilitation and processing of the region's resources. This proposal is one of the first within the industrial area, with an existing Liquified Natural Gas plant already operational within the area. During the public review period, NAC raised the issue of cumulative impacts that future developments in the vicinity of the development envelope, would have, not only on the environment but also on the amenity of and land use by Ngarluma People. NAC suggest in mitigating the impacts of further development within the MSIA, land may need to be set aside specifically for the use and benefit of the Ngarluma People. The EPA notes that, as the proposal is one of the first within the MSIA, there are limited cumulative impacts on social surroundings. However, in the future as more proposals are expected for implementation within the MSIA, consideration of cumulative impacts on visual amenity and Aboriginal cultural heritage should be provided.

The EPA considers the proponent's commitments to ongoing consultation with NAC, avoidance of Aboriginal heritage sites, and limited cumulative impacts from the proposal are unlikely to significantly impact social surroundings at a cumulative scale and therefore the environmental outcome is likely to be consistent with the EPA objective for this factor.

2.3.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal on social surrounding values. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA assessment findings are presented in Table 8.

The EPA has also considered the principles of the EP Act (see Appendix C) in assessing whether the residual impacts would be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 8: Summary of assessment for Social Surroundings

Residual impact		Assessment finding	Recommended conditions and DMA regulation
1.	Potential for Aboriginal heritage sites and areas of cultural significance to be directly affected through implementation of the proposal.	The EPA advises that there is a risk of residual impacts to Aboriginal cultural heritage associated with disturbance to heritage sites or features. The EPA advises that this residual impact should be subject to conditions (recommended condition B4) to ensure no impacts to Aboriginal heritage sites. The EPA concludes that implementation of the recommended condition would ensure consistency with the EPA objective for social surroundings.	**Condition B4 (Aboriginal Cultural Heritage)**
2.	Potential for Aboriginal cultural and ethnographic values to be directly affected through reduced access to heritage features or use of land for traditional activities and disturbance to flora and vegetation that would result in impacts to species used for cultural purposes.	The EPA advises that there is a residual impact to Aboriginal cultural heritage through the loss of access to, or restriction of access to use of land and flora and vegetation for traditional activities within the development envelope. The EPA advises that this residual impact should be subject to conditions (recommended condition B4) to ensure access to the land and flora and vegetation used for cultural purposes subject to reasonable health and safety requirements. The EPA concludes that implementation of the recommended condition would ensure consistency with the EPA objective for social surroundings.	**Condition B4 (Aboriginal Cultural Heritage)** Subject to reasonable health and safety requirements, no interruption of ongoing access to land utilised for traditional use or custom by the Ngarluma People.

4 Holistic assessment

While the EPA assessed the impacts of the proposal against the key environmental factors and environmental values individually in the key factor assessments above, given the link between social surroundings, flora and vegetation, and terrestrial fauna, the EPA also considered connections and interactions between them to inform a holistic view of impacts to the whole environment.

Figure 5 illustrates the connections and interactions between the key environmental factors to inform the EPA's holistic assessment.

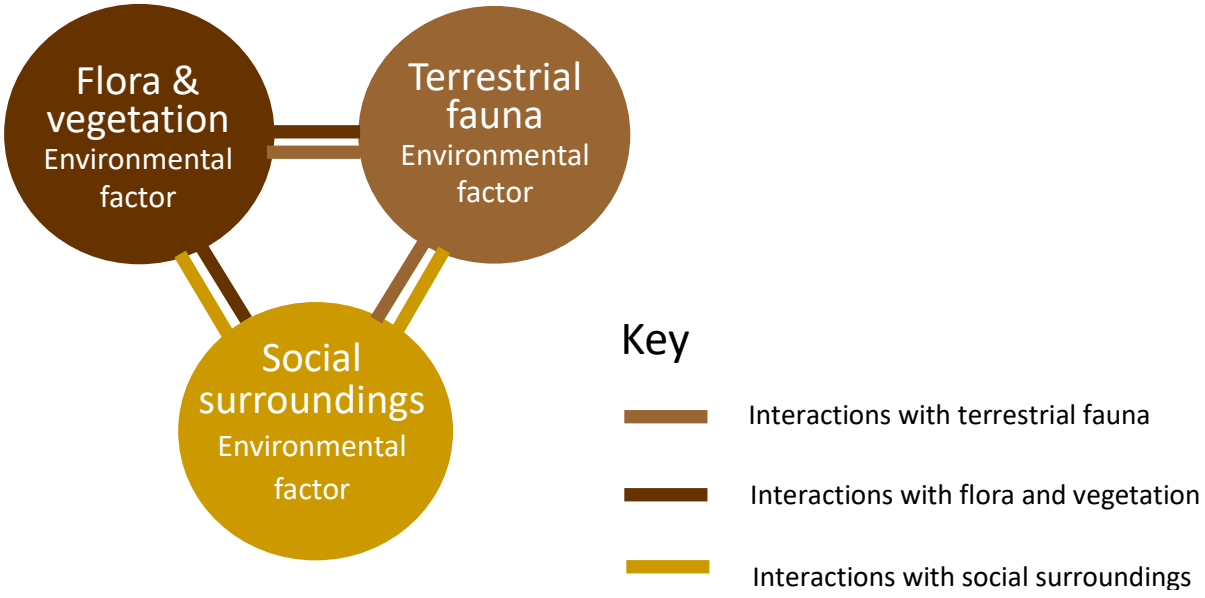

Figure 5: Intrinsic interactions between environmental factors

Flora and Vegetation – Terrestrial Fauna

There is a high level of connectivity between the environmental factors of flora and vegetation and terrestrial fauna. The flora and vegetation provide habitat for threatened fauna, including the northern quoll, ghost bat, Pilbara olive python and Pilbara leaf-nosed bat. Minor drainage lines intersect the development envelope and provide connectivity for fauna across the landscape. The proponent's avoidance and minimisation actions to flora and vegetation would also minimise impacts to conservation significant fauna (and vice versa). For example, the provision to avoid 7.7 ha of vegetation type 34 protects locally significant vegetation, as well as retaining a fauna habitat for terrestrial fauna.

The EPA considers that the proposed mitigation and management measures, recommended conditions for residual impacts, and provision of offsets to counterbalance the significant residual impacts to flora and vegetation, would also mean the interrelated impacts to the health of other environmental factors, including

the values associated with terrestrial fauna would be consistent with the EPA environmental factor objectives.

Social Surroundings – Flora and Vegetation – Terrestrial Fauna

There is a direct link between Aboriginal culture and the physical and biological aspects of the environment. The area and surrounds are used by Aboriginal people for cultural and spiritual use including hunting, fishing and collection of seed and plant material. Access to land, ability to carry out traditional Aboriginal customs and areas of cultural importance may be impacted through impacts to flora and vegetation and terrestrial fauna.

The impact assessment has considered the strong connection of the Traditional Owner's land, requests to retain at least 10% of native vegetation, focusing on high value vegetation and trees along drainage lines raised during the public comment period, and the potential impact the proposal has on terrestrial fauna and flora and vegetation. The EPA notes the proponent would commit to retaining at least 10% of vegetation in the development envelope for fauna and environmental corridors based on the Traditional Owner's request (Woodside 2023a).

The EPA recommended a staged plan approach (condition B1) to ensure the adaptive management of holistic impacts can be managed over the life of the proposal. The EPA also recommended an environmental performance regime (condition B6) given the long life of the proposal, and the need for monitoring of impacts to ensure the proposal impacts meet the EPA objectives for flora and vegetation, fauna and social surroundings, but also provide information for future assessments of large-scale renewables.

The EPA considers that the proposed mitigation and management measures and recommended conditions for impacts to flora and vegetation and terrestrial fauna would also mean the interrelated impacts to the values associated with social surroundings are likely to be consistent with the EPA environmental factor objectives.

Summary of holistic assessment

When the separate environmental factors and values affected by the proposal were considered together in a holistic assessment, the EPA formed the view that the impacts from the proposal would not alter the EPA's views about consistency with the EPA environmental factor objectives as assessed in section 2.

5 Offsets

Environmental offsets are actions that provide environmental benefits which counterbalance the significant residual impacts of a proposal.

Consistent with the *WA Environmental Offsets Guidelines* (Government of Western Australia 2014), the EPA may consider the application of environmental offsets to a proposal where it determines that the residual impacts of a proposal are significant, after avoidance, minimisation and rehabilitation have been pursued.

The EPA considers that the clearing of native vegetation and impacts on other associated environmental values in the Pilbara IBRA bioregion is significant where the cumulative impact may reach critical levels if not managed (EPA 2014). The Pilbara's unique land tenure hampers the delivery of offsets, and the Pilbara Environmental Offsets Fund (PEOF) has been established to provide a strategic landscape-scale approach that builds on regional programs to deliver environmental offset outcomes greater than can be achieved by individual proposals.

The PEOF's Governance Framework establishes transparent decision-making processes, clarity of roles and responsibilities, and guidance for project delivery. Department of Water and Environmental Regulation (DWER) administers the PEOF with involvement from an Implementation Advisory Group made up of key stakeholders and experts and a Project Recommendation Group made up of representatives from State and Australian governments. The Minister for Environment is the primary decision-maker for the PEOF and approves projects that will address significant residual impacts and receive monies from the PEOF.

The proposal is located within the Roebourne IBRA subregion of which only 3.55 % is currently reserved for conservation.

In the case of this proposal, likely (and potential) significant impacts are:

- flora and vegetation values
- significant fauna habitat values.

In applying the residual impact significance model (Government of Western Australia 2014), the EPA considers that the proposal would result in a significant residual impact to:

- 'Good' to 'Excellent' condition native vegetation
- Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays PEC
- Horseflat land system of the Roebourne Plains PEC
- supporting habitat (foraging) for the northern quoll (*Dasyurus hallucatus)*
- supporting habitat (foraging) for the Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form*)*
- supporting habitat (foraging) for the Pilbara olive python (*Liasis olivaceus barroni)*

- supporting habitat (foraging) for the ghost bat (*Macroderma gigas*)
- supporting habitat (foraging) for the grey falcon (*Falco hypoleucos*).

The EPA has concluded that the clearing of habitat is a significant residual impact on its own, in the context of the proposal, and in the context of the biological diversity and ecological integrity in the local area, as it provides habitat for threatened fauna species.

Due to the remaining quantity and quality of habitat types in the local area and region, the EPA considers that the significant residual impact could be counterbalanced in accordance with the WA Environmental Offsets Guidelines by a contribution to the PEOF. The EPA considers PEOF future projects are expected to be able to counterbalance the significant impacts from the clearing of native vegetation (including conservation significant ecological communities) and supporting fauna habitat of the proposal. The EPA notes that PEOF Governance Framework (August 2019) states that projects will aim to counterbalance the significant residual impacts that have been identified in Ministerial Statements with projects that are designed to deliver enduring and long-term strategic conservation outcomes in the Pilbara. PEOF Implementation Plans identify the significant residual impacts for which contributions to the Fund have been made and how they will be addressed.

The EPA recommends condition B7 (Pilbara Environmental Offsets Fund) be imposed on the proponent to provide an offset in the form of a contribution to the PEOF, to counterbalance the significant residual impacts of the proposal.

The EPA recommends that the following offset rates (calculated on the 2021-2022 financial year) should apply in the form of a contribution to a Pilbara strategic conservation initiative for landscape-scale actions to protect biodiversity in the Pilbara:

- $890 AUD (excluding GST) per hectare of ‘Good’ to ‘Excellent’ condition native vegetation and foraging habitat for northern quoll, Pilbara leaf-nosed bat, ghost bat, Pilbara olive python and grey falcon cleared as a result of the proposal within the Roebourne IBRA subregion
- $1,780 AUD (excluding GST) per hectare of the Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays PEC and the Horseflat land system of the Roebourne Plains PEC cleared as a result of the proposal within the Roebourne IBRA subregion.

PEOF has confirmed it is reasonably likely to be able to offset the required habitat, including the material increases in foraging habitat for the northern quoll, Pilbara leaf-nosed bat, Pilbara olive python, ghost bat and grey falcon as a result of additional impacts due to the proposal.

6 Matters of national environmental significance

The Commonwealth Minister for the Environment has determined that the proposal is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as it is likely to have a significant impact on one or more Matters of National Environmental Significance (MNES). It was determined that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- Listed threatened species and communities (sections 18 &18A).

The EPA has assessed the controlled action on behalf of the Commonwealth as an accredited assessment under the EPBC Act.

This assessment report is provided to the Commonwealth Minister for Environment who will decide whether or not to approve the proposal under the EPBC Act. This is separate from any Western Australian approval that may be required.

Commonwealth policy and guidance

The EPA had regard to the following relevant Commonwealth guidelines, policies and plans during its assessment:

- Commonwealth EPBC Act Environmental Offsets Policy, (Commonwealth of Australia 2012)
- Matters of National Environmental Significance, Significant impact guidelines 1.1, (Department of the Environment (DotE) 2013)
- National Recovery Plan for the Northern Quoll (*Dasyurus hallucatus*) (Hill and Ward 2010)
- Approved Conservation Advice for *Liasis olivaceus barroni* (Olive Python – Pilbara subspecies), (Department of the Environment, Heritage, Water and the Arts (DEHWA) 2008)
- Conservation Advice *Falco hypoleucos* Grey Falcon, (Threatened Species Scientific Committee (TSSC) 2020)
- Conservation Advice *Macroderma gigas* ghost bat (Threatened Species Scientific Committee 2016a)
- Conservation Advice *Rhinonicteris aurantia (*Pilbara form*)* (Pilbara Leaf-nosed Bat) (Threatened Species Scientific Committee 2016b).

EPA assessment

Impacts to the environment relating to MNES are also covered under the key environmental factor terrestrial fauna in section 2.2 of this report. The proponent has provided information on listed threatened species and communities and migratory birds under the EPBC Act as part of its response to submissions (Woodside 2023b). Migratory birds were not a controlled action. The EPA notes the proposed action is

unlikely to have a significant impact these species and as such were not considered as part of the assessment.

Listed threatened species and communities (sections 18 &18A)

Northern quoll (Dasyurus hallucatus)

This species is listed as Endangered under the BC Act and EPBC Act. Northern quoll was recorded from three records from the minor drainage line habitat, within the development envelope. Minor drainage lines in the east of the development envelope provide dispersal habitat. A small tree-lined creek with hollows recorded in the southeast of the development envelope was considered to have trees of sufficient size and age to form hollows that could potentially be used as den sites. The remaining areas within the development envelope are considered foraging habitat for the northern quoll (Biota 2023).

The proposal would clear 0.8 ha of northern quoll critical habitat and 877.2 ha of foraging habitat (Biota 2023).

The EPA has assessed the impacts of the proposal to northern quoll and considers there would be a significant residual impact from the clearing of conservation significant habitat. The EPA recommended condition A1 (limitations and extent of proposal), B3 (terrestrial fauna) and B7 (offsets) which addresses the significant residual impact to the species. Condition B3-1 (3) would restrict the proponent from clearing 0.8 ha of critical habitat for the northern quoll. The EPA considers the restriction to clear critical habitat is appropriate due to the flexible and staged design of the proposal. In addition, due to the cumulative impacts associated with conservation significant fauna habitat in the Pilbara region, the EPA expects offsets would be provided to counterbalance the impacts and therefore has recommended condition B7 (offsets) to provide environmental benefits within the Pilbara.

Ghost bat (Macroderma gigas)

This species is listed as Vulnerable under the BC Act and EPBC Act. Suitable ghost bat roosting locations in the form of caves, rock crevices and disused mine adits was not recorded during surveys of the development envelope. Ghost bat preferred foraging habitat include thin mature woodland over patchy or clumped tussock or hummock grass (*Triodia* species) on sand or stony ground. Isolated trees on the edge of thickets or along water courses appear to be preferred vantage points. Ghost bat was considered to have the potential to occur as a foraging visitor within the development envelope. The development envelope represent supporting habitat for the species (Biota 2023).

The proposal would clear 878 ha of suitable ghost bat foraging habitat (Biota 2023).

The EPA has assessed the impacts of the proposal to ghost bat (*Macroderma gigas*) and considers there would be a significant residual impact from the clearing of conservation significant habitat within the development envelope. The EPA considers that the significant residual impact to threatened fauna can be regulated through recommended condition B3-1 (1), which sets the limit of disturbance to high value fauna habitat types that provide foraging habitat for threatened fauna, and that the

loss of important habitat can be counterbalanced by offsets (section 4) to ensure the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.

Pilbara leaf-nosed bat (Rhinonicteris aurantia Pilbara form)

This species is listed as Vulnerable under the BC Act and EPBC Act. Pilbara leaf-nosed bat roosting locations in the form of caves or mine adits were not recorded during surveys of the development envelope. Pilbara leaf-nosed bat preferred foraging habitat include *Triodia* hummock grassland, sparse tree and shrub savannah and riparian vegetation along drainage lines. The development envelope contains marginally suitable foraging habitat for the Pilbara leaf-nosed bat (Biota 2023).

The proposal would clear 878 ha of suitable Pilbara leaf-nosed bat foraging habitat (Biota 2023).

The EPA has assessed the impacts of the proposal to Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form) and considers there would be a significant residual impact from the clearing of conservation significant habitat within the development envelope. The EPA considers that the significant residual impact to threatened fauna can be regulated through recommended condition B3-1 (1), which sets the limit of disturbance to high value fauna habitat types that provide foraging habitat for threatened fauna, and that the loss of important habitat can be counterbalanced by offsets (section 4) to ensure the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.

Grey falcon (Falco hypoleucos)

This species is listed as Vulnerable under the BC Act and EPBC Act. Grey falcon prefers tall trees and man-made structures for nesting and roosting sites, which was not recorded within the development envelope during surveys. Grey falcon preferred foraging habitat include sparsely timbered tussock grasslands of the development envelope, bisected at intervals by minor drainages with some waterholes. The whole development envelope was considered foraging habitat for the grey falcon (Biota 2023).

The proposal would clear 975.6 ha of suitable grey falcon foraging habitat (Biota 2023).

The EPA has assessed the impacts of the proposal grey falcon (*Falco hypoleucos)* and considers there would be a significant residual impact from the clearing of conservation significant habitat within the development envelope. The EPA considers that the significant residual impact to threatened fauna can be regulated through recommended condition B3-1 (1), which sets the limit of disturbance to high value fauna habitat types that provide foraging habitat for threatened fauna, and that the loss of important habitat can be counterbalanced by offsets (section 4) to ensure the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.

Pilbara olive python (Liasis olivaceus barroni)

This species is listed as Vulnerable under the BC Act and EPBC Act. Pilbara olive python preferred habitat include gorges, escarpments, rocky outcrops and water holes and usually in closer proximity to water and rock outcrops to attract suitable prey. A local population of Pilbara olive python occur on the Burrup Peninsula, approximately 11 km to the north of the development envelope, where the preferred habitat are granophyre rock piles and secondary habitats of adjacent spinifex grasslands.

Pilbara olive python was not recorded within the development envelope during field surveys, and the species is considered unlikely to occur within the development envelope (Biota 2023). The proponent's targeted fauna survey indicated that the Pilbara olive python is unlikely to occur in the development envelope.

The development envelope does not contain any critical habitat for the species, however foraging habitat for the species is present in the form of small, ephemeral pools of water above granite substrate (Biota 2023).

The proposal would clear 878 ha of Pilbara olive python foraging habitat.

The EPA considers that the development envelope contains moderate to high supporting habitat for the Pilbara olive python and therefore a significant residual impact to the species remains.

The EPA has assessed the impacts of the proposal to Pilbara olive python (*Liasis olivaceus barroni)* and considers there would be a significant residual impact from the clearing of conservation significant habitat within the development envelope. The EPA considers that the significant residual impact to threatened fauna can be regulated through recommended condition B3-1 (1), which sets the limit of disturbance to high value fauna habitat types that provide foraging habitat for threatened fauna, and that the loss of important habitat can be counterbalanced by offsets (section 4) to ensure the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.

Summary

The EPA recommends the following environmental conditions to minimise impacts on MNES:

- limit the authorised extent of the clearing of native vegetation in 'Good to Excellent' condition to 878 ha in A1 (limitations and extent of proposal)
- condition B3 (terrestrial fauna) sets limits of disturbance to important fauna habitat types
- condition B7 (environmental offsets).

The EPA considers that there would be a significant impact from the disturbance of foraging habitat for listed species. The EPA has recommended an offset in condition B7 (see section 4) which takes into account the significant residual impact to conservation significant vegetation communities and fauna habitat due to implementation of the proposal.

The EPA's view is that the impacts from the proposal on the above-mentioned listed MNES are therefore not expected to result in an unacceptable or unsustainable impact on listed threatened species and communities.

7 Recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values likely to be significantly affected by the proposal
- assessment of key environmental factors, separately and holistically (this has included considering cumulative impacts of the proposal where relevant)
- EPA's confidence in the proponent's proposed mitigation measures
- likely environmental outcomes which can be achieved with the imposition of conditions
- consistency of environmental outcomes with the EPA's objectives for the key environmental factors
- whether other statutory decision-making processes can mitigate the potential impacts of the proposal on the environment
- principles of the EP Act.

The EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix A.

8 Other advice

The EPA may, if it sees fit, include other information, advice or recommendations relevant to the environment in its assessment reports, even if that information has not been taken into account by the EPA in its assessment of a proposal.

Maitland Strategic Industrial Area

The EPA notes that progression of the proposal is one of the first within the MSIA. While cumulative impacts on visual amenity and Aboriginal cultural heritage are unlikely for the proposal, there are likely to be further proposed developments within the MSIA. The EPA expects future proposals to carefully consider cumulative impacts on the environmental and social values of the area, including Aboriginal cultural heritage. During the assessment, NAC raised concerns of the amount of disturbance to be undertaken within the MSIA and requested that land be set aside within the MSIA for cultural practices and other enterprises. The EPA considers that that any land set aside within the MSIA for the use of the Ngarluma People should consider the potential co-benefit for conservation of threatened ecological communities and fauna.

Renewable Energy Proposals

The EPA advises that the proposal's supply of renewable electricity for use by industrial customers connected to the North-West Interconnected System are predicted to reduce potential greenhouse gas emissions by approximately 404 kilotonnes of carbon dioxide equivalent ($ktCO_2$-e) per annum once all phases are implemented. The EPA notes, however, that to implement the proposal up to 878 ha of native vegetation in predominantly 'Good' to 'Excellent' condition would be disturbed.

Notwithstanding the savings of greenhouse gas emissions from renewable energy projects, the EPA expects proponents of future renewable energy proposals to apply the mitigation hierarchy to its fullest extent for each relevant factor and that the entire lifecycle of the proposal, including decommissioning and replacement of infrastructure, is adequately considered and addressed.

The EPA considers that renewable energy activities such as solar farms and battery energy storage systems are an emerging industry and there are likely to be further large-scale renewable energy proposals to be assessed by the EPA in the future. The EPA also notes that the industry to manage and recycle solar panels and other infrastructure are underdeveloped. The EPA expects renewable energy proposals to consider waste management and recycling of solar panels and other associated renewable energy infrastructure as part of a circular waste economy.

One of the EPA objectives is to minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far as possible. To this end, the EPA supports decarbonisation projects as a key objective in protecting Western Australia's environment. The EPA considers that emissions reduction goals should occur in conjunction with regional environmental protection frameworks, which

is of key strategic interest to the EPA. The EPA also notes that other potentially significant environmental impacts of decarbonisation projects (for example, biodiversity and/or water quality impacts resulting from land clearing) would need to be assessed and mitigated appropriately, as they are for other major projects in Western Australia. To support this, one of the requirements of the EPA's new strategic plan is to develop new guidance for the assessment of green energy proposals. The aim of these would be to encourage all proponents to ensure that projects fully consider and are aligned with the EPA environmental factor objectives and to facilitate a smooth and efficient assessment process. This ensures that decarbonisation projects would have fewer technical environmental assessment and management challenges, public acceptance and trust, and can demonstrate key legislation and policy objectives are met.

Appendix A: Recommended conditions

Section 44(2)(b) of *Environmental Protection Act 1986* specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This appendix contains the EPA's recommended conditions and procedures.

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
***(Environmental Protection Act 1986*)**

WOODSIDE SOLAR FACILITY

Proposal:	The proposal is to construct and operate a large-scale solar photovoltaic farm and energy storage (battery) infrastructure in the Maitland Strategic Industrial Estate, located approximately 15 kilometres south-west of Karratha.
Proponent:	Woodside Energy Ltd Australian Company Number 005 482 986
Proponent Address:	11 Mount St, PERTH WA 6000
Assessment Number:	2321

Report of the Environmental Protection Authority: 1746

Introduction: Pursuant to section 45 of the *Environmental Protection Act 1986,* it has been agreed that the proposal entitled Woodside Solar Facility described in the 'Proposal Content Document' attachment 2 of the referral of 16 November 2021, may be implemented and that the implementation of the proposal is subject to the following implementation conditions and procedures:

Conditions and procedures

Part A: Proposal extent

Part B: Environmental outcomes, prescriptions and objectives

Part C: Environmental management plans and monitoring

Part D: Compliance, time limits, audits and other conditions

PART A: PROPOSAL EXTENT

A1 Limitations and Extent of Proposal

A1-1 The proponent must ensure that the proposal is implemented in such a manner that the following limitations or maximum extents / capacities / ranges are not exceeded:

Proposal element	Location	Maximum extent
Physical elements		
Development envelope	Figure 1	1,100.3 **ha**
Disturbance footprint, including areas subject to shading from infrastructure	Within the development envelopes shown in Figure 1	No more than 878 **ha** within a 1,100.3 **ha** development envelope.
Direct **disturbance** of native vegetation	Within the development envelopes shown in Figure 1	Clearing of no more than 878 **ha** of vegetation in '**Good' to 'Excellent'** condition.
Operational elements		
Solar **PV** farm	Figure 1	Up to 500 **MW** (alternating current) of electricity generated from up to 1,000,000 solar panels and associated infrastructure, including battery storage.
SPSI	Figure 1	A battery energy storage system, electrical substation, and associated infrastructure.
Timing elements		
Proposal life	-	Up to 70 years

PART B – ENVIRONMENTAL OUTCOMES, PRESCRIPTIONS AND OBJECTIVES

B1 Staged Disturbance Footprint Report

B1-1 The proponent must prepare and submit a Staged Disturbance Footprint Report to the **CEO** that identifies the final **disturbance** footprint for the relevant stage of the proposal prior to construction activities. The Staged Disturbance Footprint Report may be submitted in stages and must demonstrate, at every stage, that the maximum clearing extents specified under Condition A1-1 and achievement of environmental outcomes specified under Conditions B2-1 and B3-1 will be met for all stages combined.

B1-2 Each Staged Disturbance Footprint Report must identify protected areas within the development envelope, which include native fauna habitat corridors, **northern quoll (*Dasyurus hallucatus*) critical habitat**, areas supporting large trees of *Acacia coriacea* and *A. xiphophylla* and **Aboriginal cultural heritage** sites which will not be disturbed or subjected to **adverse impacts**. The total protected areas shall be a minimum of 97.6 **ha** across all stages.

B1-3 The proponent must ensure there is no **disturbance** of land that has not been surveyed as at 27 July 2023 until it has been surveyed consistent with EPA guidance and the survey results confirm it is not subject to any of the vegetation, communities or habitat restrictions referenced in condition B2 or condition B3.

B2 Vegetation

B2-1 The proponent must ensure implementation of the proposal achieves the following environmental outcomes:

(1) **disturb** no more than 40 **ha** of the '**Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays' priority ecological community**';

(2) **disturb** no more than 526.6 **ha** of the '**Horseflat land system of the Roebourne plains' priority ecological community**';

(3) no **disturbance** to large trees of ***Acacia coriacea* and *A. xiphophylla* on larger drainage lines (Vegetation Type 34)** identified in Figure 2;

(4) no **disturbance** or **adverse impacts** to native vegetation identified in protected areas in the Staged Disturbance Footprint Report; and

(5) no **adverse impacts** to native vegetation within twenty (20) **m** of the boundary of the development envelope.

B2-2 The proponent must implement the proposal to achieve the following environmental objectives:

(1) no **adverse impacts** to flora and vegetation from the introduction or spread of **environmental weeds** compared with pre-construction condition outside of the development envelopes; and

(2) and no **adverse impacts** to flora and vegetation outside of the development envelopes through generation of dust from **construction activities**.

B2-3 The proponent must implement the Woodside Solar Facility Weed Management Plan (May 2023, Rev 1, PA1000RH0000004) with the purpose of ensuring the flora and vegetation environmental objective in condition B2-2(1) is achieved.

B2-4 The proponent must review and update the Woodside Solar Facility Environment Management Plan (May 2023, Rev 4, PA1000RH0000003) to ensure it demonstrates how achievement of the vegetation environmental outcomes in condition B2-1 will be monitored and substantiated, and how the environmental objective in condition B2-2(2) will be achieved, and submit it to the **CEO**.

B2-5 The proponent must revegetate all areas of native vegetation cleared but not reasonably expected to be required for ongoing **operations** within twenty-four (24) months after completion of each stage of **construction activities** until areas of revegetation achieve a cover and composition of locally native species such that weed cover and abundance is no greater than undisturbed reference sites, and soil is protected from erosion.

B3 Terrestrial Fauna

B3-1 The proponent must implement the proposal to meet the following environmental outcomes:

(1) **disturb** no more than:

(a) 40.4 **ha** of **minor drainage lines** habitat type;

(b) 104.2 **ha** of **hummock grassland on rocky plain (*Triodia* on stony soils)** habitat type; and

(c) 733.4 **ha** of **tussock grassland on cracking clays** habitat type.

(2) no **disturbance** to the short range endemic invertebrate **granite** habitat type;

(3) no **disturbance** to **northern quoll (*Dasyurus hallucatus*) critical habitat** identified in Figure 3;

(4) no **disturbance** or **adverse impacts** to native fauna habitat identified in protected areas in the Staged Disturbance Footprint Report.

B3-2 The proponent must implement the proposal to achieve the following environmental objectives:

(1) minimise the risk of physical injury or mortality from **construction activities** and **operations** on native fauna;

(2) minimise the risk of **adverse impacts** and indirect **disturbance** to native fauna including physical injury or mortality, behavioural changes, and health impacts; and

(3) minimise the risk of **adverse impacts** to migratory and raptorial birds from collisions with infrastructure.

B3-3 The proponent must review and update the Woodside Solar Facility Environment Management Plan (May 2023, Rev 4, PA1000RH0000003) to:

(1) include the results and **management actions** for threatened fauna recorded in the development envelopes from the Proposed Woodside Solar Farm Targeted Fauna Survey (July 2023, Rev B, Biota); and

(2) to ensure it demonstrates how achievement of the terrestrial fauna environmental outcomes in condition B3-1 will be monitored and substantiated, and how the environmental objectives in condition B3-2 will be achieved, and submit it to the **CEO**.

*Clearing for **construction activities***

B3-4 Prior to **ground disturbing activities** the proponent must undertake the following actions:

(1) within seven (7) days prior to clearing, using a licenced **fauna spotter**, undertake **pre-clearance surveys** to detect presence of northern quoll (*Dasyurus hallucatus*) within clearing areas; and

(2) **ground disturbing activities** shall not commence until either:

(a) the individual has been relocated by the **fauna spotter**; or

(b) the individual has been observed by the **fauna spotter** to have moved on from the area to adjoining **suitable habitat**; and

(c) the **fauna spotter** considers that the individual no longer occurs in the area.

B3-5 The proponent must undertake the following actions during **construction activities**:

(1) ensure the presence of **fauna spotters** during all **ground disturbing activities**; and

(2) **construction activities** must cease in any area where northern quoll (*Dasyurus hallucatus*) are identified until:

(a) the individual has been relocated by a **fauna spotter**; or

(b) the individual has been observed by the **fauna spotter** to have moved on from the area to adjoining **suitable habitat**; and

(c) the **fauna spotter** considers that the individual no longer occurs in the area.

B3-6 The proponent must produce and provide a report on fauna management no later than sixty (60) days after the completion of each stage of **construction activities** to the **CEO**. The report shall include the following:

(1) details of fauna inspections;

(2) dates and details of clearing activities for each area inspected;

(3) the number and type of fauna removed and relocated and actions taken;

(4) details of the **fauna spotter** commissioned;

(5) results of the **pre-clearance surveys**; and

(6) vertebrate fauna mortalities.

Trench inspection

B3-7 The proponent must undertake the following actions during **construction activities**:

(1) clear trapped vertebrate fauna from within open **trenches**, using a suitably trained and licensed **fauna spotter**

(a) at least twice daily, with the first daily clearing to be completed no later than three (3) hours after sunrise and the second clearing to be completed between the hours of 3:00 pm and 6:00 pm of that same day, unless otherwise agreed to by the **CEO**; and

(b) within one (1) hour prior to backfilling of **trenches**;

(2) ensure open **trench** lengths shall not exceed a length capable of being inspected and cleared by the requirements set out in condition B3-7(1);

(3) ensure ramps providing egress points and/or fauna refuges providing suitable shelter from the sun and predators for trapped vertebrate fauna are to be placed in the **trench** at intervals not exceeding fifty (50) metres;

(4) in the event of substantial rainfall, and following the clearing of vertebrate fauna from the **trench**, pump out any pooled water in the open **trench** and discharge it to adjacent vegetated areas in a manner that does not cause erosion;

(5) produce and provide a report on fauna management no later than sixty (60) days after the completion of each stage of **construction activities** to the **CEO**. The report shall include the following:

(a) details of fauna inspections;

(b) dates of trenching activities for each **trench** inspected;

(c) the number and type of fauna cleared from **trenches** and actions taken;

(d) details of the **fauna spotter** commissioned; and

(e) vertebrate fauna mortalities.

B4 Aboriginal Cultural Heritage

B4-1 The proponent must implement the proposal to meet the following environmental outcomes:

(1) no **disturbance** to **heritage sites ID 16590,16591, 21673 and 21674** and any **heritage sites** found in **pre-clearance surveys**, including no **disturbance** in a buffer of fifty (50) **m** around any heritage site;

(2) no significant **adverse impacts** to **Aboriginal cultural heritage,** including areas that are outside the development envelope where **Aboriginal cultural heritage** may be directly affected; and

(3) subject to reasonable health and safety requirements, no interruption of ongoing access to land utilised for traditional use or custom by the **Ngarluma People**.

B4-2 The proponent must provide the **Ngarluma People** with the opportunity to be consulted on the Staged Disturbance Footprint Report under condition B1 and Waste Minimisation, Decommissioning and Rehabilitation environmental management plan under condition B5, at least three (3) months before they are submitted to the **CEO**.

B5 Waste Minimisation, Decommissioning and Rehabilitation

B5-1 The proponent must implement the proposal to ensure the following environmental outcomes are achieved:

(1) waste minimisation opportunities are reviewed and implemented throughout the life of the proposal, including review of life cycle of waste from replacement of solar panels and other infrastructure;

(2) rehabilitated landforms are stable and do not cause pollution or environmental harm;

(3) rehabilitated areas are capable of sustaining achievement of the other environmental outcomes in Part B during the life of the proposal;

(4) rehabilitated vegetation is self-sustaining; and

(5) rehabilitated areas are consistent with species diversity and abundance consistent with native vegetation adjacent to the proposal and achieves a cover and composition of locally native species such that weed cover and abundance is no greater than undisturbed reference sites, and soil is protected from erosion.

B5-2 Within five (5) years of the commencement of the proposal, and every five (5) years after, the proponent must prepare a Waste Minimisation, Decommissioning and Rehabilitation environmental management plan that satisfies the requirements of condition C4 and demonstrates how decommissioning and rehabilitation environmental outcomes in condition B5-1 will be achieved, monitored and substantiated, and submit it to the **CEO**.

B6 Environmental Performance Reporting

B6-1 The proponent must submit an Environmental Performance Report to the **CEO** every five (5) years.

B6-2 The first Environmental Performance Report shall be submitted within three (3) months of the expiry of the five (5) year period commencing from the date of substantial commencement of the proposal, or such other time as may be approved by the **CEO**.

B6-3 Each Environmental Performance Report shall report on proposal emissions and proposal impacts on the following environmental values:

(1) state of flora and vegetation;

(2) state of terrestrial fauna;

(3) state of **Aboriginal cultural heritage**; and

(4) state of the holistic environment.

B6-4 The Environmental Performance Report must include:

(1) a comparison of the environmental values identified in condition B6-3 at the end of the five (5) year period; against the state of each environmental value at the beginning of the 5-year period;

(2) a comparison of the environmental values identified in condition B6-3 at the end of the five (5) year period; against the state of the environmental values identified in first Environmental Performance Report submitted in accordance with condition B6-1;

(3) proposed adaptive management and continuous improvement strategies; and

(4) the Environmental Performance Report may be in whole or part prepared in conjunction with other proponents where there are cumulative impacts from their proposals.

B6-5 Each Environmental Performance Report must be published on the proponent's website and provided to the **CEO** in electronic form suitable for on-line publication by the **DWER** within twenty (20) business days of being provided to the **CEO**.

B7 Pilbara Environmental Offsets Fund

B7-1 The proponent must contribute funds to the **Pilbara Environmental Offsets Fund** calculated pursuant to condition B7-2, to achieve the objective of counterbalancing the significant residual impacts by the proposal to:

(1) **'Good' to 'Excellent' condition native vegetation**;

(2) '**Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays' priority ecological community**';

(3) '**Horseflat land system of the Roebourne Plains' priority ecological community**'; and

(4) **northern quoll (*Dasyurus hallucatus*) supporting habitat**, **Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) supporting habitat**, **ghost bat (*Macroderma gigas)* supporting habitat**, **Pilbara olive python (*Liasis olivaceus barroni)* supporting habitat** and **grey falcon (*Falco hypoleucos*) supporting habitat**, subject to any reduction approved by the **CEO** under condition B7-8.

B7-2 The proponent's contribution to the **Pilbara Environmental Offsets Fund** must be paid biennially, with the amount to be contributed calculated based on the clearing of native vegetation undertaken in each year of the biennial reporting period in accordance with the rates in condition B7-3. The first biennial reporting period must commence from **ground disturbing activities** of the environmental value(s) identified in condition B7-3.

B7-3 Calculated on the 2021-2022 financial year, the contribution rates are:

(1) $890 AUD (excluding GST) per **ha** of **'Good' to 'Excellent' condition native vegetation** and **northern quoll (*Dasyurus hallucatus*) supporting habitat**, **Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) supporting habitat**, **ghost bat (*Macroderma gigas)* supporting habitat**, **Pilbara olive python (*Liasis olivaceus barroni)* supporting habitat** and **grey falcon (*Falco hypoleucos*) supporting habitat** cleared as a result of the proposal within the Roebourne **IBRA** subregion.

(2) $1,780 AUD (excluding GST) per **ha** of '**Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays' priority ecological community**' and '**Horseflat land system of the Roebourne Plains' priority ecological community**' cleared as a result of the proposal within the Roebourne **IBRA** subregion.

B7-4 The rates in condition B7-3 change annually each subsequent financial year in accordance with the percentage change in the **CPI** applicable to that financial year.

B7-5 To achieve the objective in condition B7-1 the proponent must prepare an Impact Reconciliation Procedure, and submit to the **CEO**. This procedure must:

(1) spatially define the environmental value(s) identified in condition B7-1;

(2) spatially define the areas where offsets required by condition B7-1 are to be exempt;

(3) include a methodology to calculate the amount of clearing undertaken during each year of the biennial reporting period for each of the environmental values identified in condition B7-3;

(4) state that clearing calculation for the first biennial reporting period will commence from **ground disturbing activities** in accordance with condition B7-2 and end on the second 30 June following commencement of **ground disturbing activities**;

(5) state that clearing calculations for each subsequent biennial reporting period will commence on 1 July of the required reporting period, unless otherwise agreed by the **CEO**;

(6) be prepared in accordance with Instructions on how to prepare *Environmental Protection Act 1986 Part IV Impact Reconciliation Procedures and Impact Reconciliation Reports* (or any subsequent revisions).

B7-6 The proponent must submit an Impact Reconciliation Report in accordance with the **confirmed** Impact Reconciliation Procedure in condition B7-5.

B7-7 The Impact Reconciliation Report required pursuant to condition B7-6 must provide the location and spatial extent of the **ground disturbing activities** undertaken as a result of the proposal during each year of each biennial reporting period.

B7-8 The proponent may apply in writing and seek the written approval of the **CEO** to reduce all or part of the contribution payable under condition B7-2 where:

(1) a payment has been made to satisfy a condition of an approval under the *Environment Protection and Biodiversity Conservation Act 1999* in relation to the proposal; and

(2) the payment is made for the purpose of counterbalancing impacts of the proposal on matters of national environmental significance.

B7-9 The **CEO** may grant approval to discount the amount payable under condition B7-1(4) if the **CEO** is satisfied that the payment will offset the significant residual impacts of the proposal.

B7-10 Condition C2 applies to the **confirmed** Impact Reconciliation Procedure required by condition B7-5 as if it were an environmental management plan.

PART C – ENVIRONMENTAL MANAGEMENT PLANS AND MONITORING

C1 Environmental Management Plans: Conditions Related to Commencement of Implementation of the Proposal

C1-1 The proponent must not undertake:

(1) **ground disturbing activities** until the **CEO** has **confirmed** in writing that the environment management plan required by condition B2-4 and condition B3-3 meets the requirements of that condition and condition C5;

(2) **ground disturbing activities** until the **CEO** has **confirmed** in writing that the Impact Reconciliation Procedure required by condition B7-5 meets the requirements of that condition; and

(3) solar panel or infrastructure replacement, decommissioning and rehabilitation activities until the **CEO** has **confirmed** in writing that the waste minimisation, decommissioning and rehabilitation environmental management plan required by condition B5-2 meets the requirements of that condition and condition C4.

C2 Environmental Management Plans: Conditions Relating to Approval, Implementation, Review and Publication

C2-1 Upon being required to implement an environmental management plan under Part B, or after receiving notice in writing from the **CEO** under condition C1-1 that the environmental management plan(s) required in Part B satisfies the relevant requirements, the proponent must:

(1) implement the most recent version of the **confirmed** environmental management plan; and

(2) continue to implement the **confirmed** environmental management plan referred to in condition C2-1(1), other than for any period which the **CEO** confirms by notice in writing that it has been demonstrated that the relevant requirements for the environmental management plan have been met, or are able to be met under another statutory decision-making process, in which case the implementation of the environmental management plan is no longer required for that period.

C2-2 The proponent:

(1) may review and revise a **confirmed** environmental management plan provided it meets the relevant requirements of that environmental management plan, including any consultation that may be required when preparing the environmental management plan;

(2) must review and revise a **confirmed** environmental management plan and ensure it meets the relevant requirements of that environmental management plan, including any consultation that may be required when preparing the environmental management plan, as and when directed by the **CEO;** and

(3) must revise and submit to the **CEO** the **confirmed** environmental management plan if there is a material risk that the outcomes or objectives it is required to achieve will not be complied with, including but not limited to as a result of a change to the proposal.

C2-3 Despite condition C2-1, but subject to conditions C2-4 and C2-5, the proponent may implement minor revisions to an environmental management plan if the revisions will not result in new or increased **adverse impacts** to the environment or result in a risk to the achievement of the limits, outcomes or objectives which the environmental management plan is required to achieve.

C2-4 If the proponent is to implement minor revisions to an environmental management plan under condition C2-3, the proponent must provide the **CEO** with the following at least twenty (20) business days before it implements the revisions:

(1) the revised environmental management plan clearly showing the minor revisions;

(2) an explanation of and justification for the minor revisions; and

(3) an explanation of why the minor revisions will not result in new or increased **adverse impacts** to the environment or result in a risk to the achievement of the limits, outcomes or objectives which the environmental management plan is required to achieve.

C2-5 The proponent must cease to implement any revisions which the **CEO** notifies the proponent (at any time) in writing may not be implemented.

C2-6 **Confirmed** environmental management plans, and any revised environmental management plans under condition C2-4(1), must be published on the proponent's website and provided to the **CEO** in electronic form suitable for on-line publication by the **DWER** within twenty (20) business days of being implemented, or being required to be implemented (whichever is earlier).

C3 Conditions Related to Monitoring

C3-1 The proponent must undertake monitoring capable of:

(1) substantiating whether the proposal limitations and extents in Part A are exceeded; and

(2) **detecting** and substantiating whether the environmental outcomes identified in Part B are achieved (excluding any environmental outcomes in Part B where an environmental management plan is expressly required to monitor achievement of that outcome).

C3-2 The proponent must submit as part of the Compliance Assessment Report required by condition D2, a compliance monitoring report that:

(1) outlines the monitoring that was undertaken during the implementation of the proposal;

(2) identifies why the monitoring was capable of substantiating whether the proposal limitation and extents in Part A are exceeded;

(3) for any environmental outcomes to which condition C3-1(2) applies, identifies why the monitoring was scientifically robust and capable of **detecting** whether the environmental outcomes in Part B are met;

(4) outlines the results of the monitoring;

(5) reports whether the proposal limitations and extents in Part A were exceeded and (for any environmental outcomes to which condition C3-1 (2) applies) whether the environmental outcomes in Part B were achieved, based on analysis of the results of the monitoring; and

(6) reports any actions taken by the proponent to remediate any potential non-compliance.

C4 Environmental Management Plans: Conditions Relating to Monitoring and Adaptive Management for Outcomes Based Conditions

C4-1 The environmental management plans required under conditions B2-4 and B3-3 and condition B5-2 must contain provisions which enable the substantiation of whether the relevant outcomes of those conditions are met, and must include:

(1) **threshold criteria** that provide a limit beyond which the environmental outcomes are not achieved;

(2) **trigger criteria** that will provide an early warning that the environmental outcomes are not likely to be met;

(3) monitoring parameters, sites, control/reference sites, methodology, timing and frequencies which will be used to measure **threshold criteria** and **trigger criteria**. Include methodology for determining alternate monitoring sites as a contingency if proposed sites are not suitable in the future;

(4) baseline data;

(5) data collection and analysis methodologies;

(6) adaptive management methodology;

(7) **contingency measures** which will be implemented if **threshold criteria** or **trigger criteria** are not met; and

(8) reporting requirements.

C4-2 The environmental management plan required under condition B5-2 is required to include:

(1) removal or, if appropriate, retention of infrastructure and panels in consultation with stakeholders; and

(2) rehabilitation of all disturbed areas to meet environmental outcomes in condition B5-1, in consultation with **Ngarluma People**.

C4-3 Without limiting condition C3-1, failure to achieve an environmental outcome, or the exceedance of a **threshold criteria**, regardless of whether threshold **contingency measures** have been or are being implemented, represents a non-compliance with these conditions.

C5 Environmental Management Plans: Conditions Related to Management Actions and Targets for Objective Based Conditions

C5-1 The environmental management plans required under condition B2-3, condition B2-4 and condition B3-3 must contain provisions which enable the achievement of the relevant objectives of those conditions and substantiation of whether the objectives are reasonably likely to be met, and must include:

(1) **management actions**;

(2) **management targets**;

(3) **contingency measures** if **management targets** are not met; and

(4) reporting requirements.

C5-2 Without limiting condition C2-1, the failure to achieve an environmental objective, or implement a **management action**, regardless of whether **contingency measures** have been or are being implemented, represents a non-compliance with these conditions.

PART D – COMPLIANCE, TIME LIMITS, AUDITS AND OTHER CONDITIONS

D1 Non-compliance Reporting

D1-1 If the proponent becomes aware of a potential non-compliance, the proponent must:

(1) report this to the **CEO** within seven (7) days of being aware of the potential non-compliance;

(2) implement **contingency measures**;

(3) investigate the cause;

(4) investigate environmental impacts;

(5) advise rectification measures to be implemented;

(6) advise any other measures to be implemented to ensure no further impact; and

(7) provide a report to the **CEO** within twenty-one (21) days of being aware of the potential non-compliance, detailing the measures required in conditions D1-1(1) to D1-1(6) above.

D1-2 Failure to comply with the requirements of a condition, or with the content of an environmental management plan required under a condition, constitutes a non-compliance with these conditions, regardless of whether the **contingency measures**, rectification or other measures in condition D1-1 above have been or are being implemented.

D2 Compliance Reporting

D2-1 The proponent must provide an annual Compliance Assessment Report to the **CEO** for the purpose of determining whether the implementation conditions are being complied with.

D2-2 Unless a different date or frequency is approved by the **CEO**, the first annual Compliance Assessment Report must be submitted within fifteen (15) months of the date of this Statement, and subsequent reports must be submitted annually from that date.

D2-3 Each annual Compliance Assessment Report must be endorsed by the proponent's Chief Executive Officer, or a person approved by proponent's Chief Executive Officer to be delegated to sign on the Chief Executive Officer's behalf.

D2-4 Each annual Compliance Assessment Report must:

(1) state whether each condition of this Statement has been complied with, including:

(a) exceedance of any proposal limits and extents;

(b) achievement of environmental outcomes;

(c) achievement of environmental objectives;

(d) requirements to implement the content of environmental management plans;

(e) monitoring requirements;

(f) implement **contingency measures**;

(g) requirements to implement adaptive management; and

(h) reporting requirements;

(2) include the results of any monitoring (inclusive of any raw data) that has been required under Part C in order to demonstrate that the limits in Part A, and any outcomes or any objectives are being met;

(3) provide evidence to substantiate statements of compliance, or details of where there has been a non-compliance;

(4) include the corrective, remedial and preventative actions taken in response to any potential non-compliance;

(5) be provided in a form suitable for publication on the proponent's website and online by the Department of Water and Environmental Regulation;

(6) be prepared and published consistent with the latest version of the Compliance Assessment Plan required by condition D2-5 which the **CEO** has **confirmed** by notice in writing satisfies the relevant requirements of Part C and Part D.

D2-5 The proponent must prepare a Compliance Assessment Plan which is submitted to the **CEO** at least six (6) months prior to the first Compliance Assessment Report required by condition D2-2, or prior to implementation of the proposal, whichever is sooner.

D2-6 The Compliance Assessment Plan must include:

(1) what, when and how information will be collected and recorded to assess compliance;

(2) the methods which will be used to assess compliance;

(3) the methods which will be used to validate the adequacy of the compliance assessment to determine whether the implementation conditions are being complied with;

(4) the retention of compliance assessments;

(5) the table of contents of Compliance Assessment Reports, including audit tables; and

(6) how and when Compliance Assessment Reports will be made publicly available, including usually being published on the proponent's website within sixty (60) days of being provided to the **CEO**.

D3 Contact Details

D3-1 The proponent must notify the **CEO** of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

D4 Time Limit for Proposal Implementation

D4-1 The proposal must be substantially commenced within five (5) years from the date of this Statement.

D4-2 The proponent must provide to the **CEO** documentary evidence demonstrating that they have complied with condition D4-1 no later than fourteen (14) days after the expiration of period specified in condition D4-1.

D4-3 If the proposal has not been substantially commenced within the period specified in condition D4-1, implementation of the proposal must not be commenced or continued after the expiration of that period.

D5 Public Availability of Data

D5-1 Subject to condition D5-2, within a reasonable time period approved by the **CEO** upon the issue of this Statement and for the remainder of the life of the proposal, the proponent must make publicly available, in a manner approved by the **CEO**, all validated environmental data collected before and after the date of this Statement relevant to the proposal (including sampling design, sampling methodologies, monitoring and other empirical data and derived information products (e.g. maps)), environmental management plans and reports relevant to the assessment of this proposal and implementation of this Statement.

D5-2 If:

(1) any data referred to in condition D5-1 contains trade secrets; or

(2) any data referred to in condition D5-1 contains particulars of confidential information (other than trade secrets) that has commercial value to a person that would be, or could reasonably be expected to be, destroyed or diminished if the confidential information were published,

the proponent may submit a request for approval from the **CEO** to not make this data publicly available and the **CEO** may agree to such a request if the **CEO** is satisfied that the data meets the above criteria.

D5-3 In making such a request the proponent must provide the **CEO** with an explanation and reasons why the data should not be made publicly available.

D6 Independent Audit

D6-1 The proponent must arrange for an independent audit of compliance with the conditions of this statement, including achievement of the environmental outcomes and/or the environmental objectives and/ or environmental performance with the conditions of this statement, as and when directed by the **CEO**.

D6-2 The independent audit must be carried out by a person with appropriate qualifications who is nominated or approved by the **CEO** to undertake the audit under condition D6-1.

D6-3 The proponent must submit the independent audit report with the Compliance Assessment Report required by condition D2, or at any time as and when directed in writing by the **CEO**. The audit report is to be supported by credible evidence to substantiate its findings.

D6-4 The independent audit report required by condition D6-1 is to be made publicly available in the same timeframe, manner and form as a Compliance Assessment Report, or as otherwise directed by the **CEO**.

Table 1: Abbreviations and definitions

Acronym or abbreviation	Definition or term
Aboriginal cultural heritage	Means the tangible and intangible elements that are important to the Aboriginal people of the State, and are recognised through social, spiritual, historical, scientific or aesthetic values, as part of Aboriginal tradition to the extent they directly affect or are affected by physical or biological surroundings.
***Acacia coriacea* and *A. xiphophylla* on larger drainage lines (Vegetation Type 34)**	Vegetation type ***Acacia coriacea* and *A. xiphophylla* on larger drainage lines (Vegetation Type 34**) as shown in Figure 2.
Adverse impact	Negative change that is neither trivial nor negligible that could result in a reduction in health, diversity or abundance of the receptor/s being impacted, or a reduction in environmental value. **Adverse impacts** can arise from direct or indirect impacts, or other impacts from the proposal. In relation to flora and vegetation, includes but is not limited to hydrological change, spread or introduction of **environmental weeds**, altered fire regimes, introduction or spread of disease, changes in erosion/deposition/accretion and edge effects. In relation to terrestrial fauna, includes but is not limited to vehicle strike, collision with fencing, habitat fragmentation, artificial light and vibration, noise emissions, dust, cane toads (*Bufo marinus*) and increased predation (by feral cats (*Felis catus*) and the European red fox (*Vulpes vulpes*). In relation to **Aboriginal cultural heritage**, includes but is not limited to disturbance to heritage sites, interference with traditional uses of land outside of the development envelope, or impacts to the heritage values of Aboriginal cultural heritage beyond a level agreed with the prescribed body corporate.
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or the **CEO's** delegate.
Confirmed	In relation to a plan required to be made and submitted to the **CEO**, means, at the relevant time, the plan that the **CEO** confirmed, by notice in writing, meets the requirements of the relevant condition. In relation to a plan required to be implemented without the need to be first submitted to the **CEO**, means that plan until it is revised, and then means, at the relevant time, the plan that the **CEO**

	confirmed, by notice in writing, meets the requirements of the relevant condition.
Construction activities	Activities that are associated with the substantial implementation of a proposal, including but not limited to, earthmoving, blasting, vegetation clearing, grading or construction of right of way. **Construction activities** do not include geotechnical investigations (including potholing for services and the installation of piezometers) and other preconstruction activities where no clearing of vegetation is required.
Contingency measures	Planned actions for implementation if it is identified that an environmental outcome, environmental objective, **threshold criteria** or **management target** are likely to be, or are being, exceeded. Contingency measures include changes to **operations** or reductions in **disturbance** to reduce impacts and must be decisive actions that will quickly bring the impact to below any relevant threshold, **management target** and to ensure that the environmental outcome and/or objective can be met.
CPI	The All Groups Consumer Price Index numbers for Perth compiled and published by the Australian Bureau of Statistics.
Detecting/ Detectable	The smallest statistically discernible effect size that can be achieved with a monitoring strategy designed to achieve a statistical power value of at least 0.8 or an alternative value as determined by the **CEO**.
Disturb / disturbance	Means directly has or materially contributes to the **disturbance** effect on health, diversity or abundance of the receptor/s being impacted or on an environmental value. In relation to flora, vegetation or fauna habitat, includes to result in the death, destruction, removal, severing or doing substantial damage to In relation to fauna, includes to have the effect of altering the natural behaviour of fauna to its detriment. In relation to **Aboriginal cultural heritage** includes to result in the destruction, removal, or doing substantial damage to **sites ID 16590,16591, 21673 and 21674** and **four new sites**.
DWER	The Western Australian Department of Water and Environmental Regulation, or any of its successors responsible for the administration of section 48 of the *Environmental Protection Act 1986.*
Environmental weeds	Any plant declared under section 22(2) of the *Biosecurity and Agriculture Management Act 2007*, any plant listed on the Weeds of National Significance List and any weeds listed on the Department of Biodiversity, Conservation and Attractions' Pilbara Impact and Invasiveness Ratings list, as amended or replaced from time to time.

Fauna spotter	A person who is qualified and has attained the appropriate licence/s and authorisation/s under the *Biodiversity Conservation Act 2016* and the Biodiversity Conservation Regulation 2018.
Four new sites	Four new sites identified in the heritage report titled Black Wattle Archaeology Pty Ltd (BWA) 2019, *Archaeological Site Avoidance Survey for Woodside Power Project, Stages 1, 2 & 3 the Pilbara, Western Australia, November,* prepared for the Ngarluma Aboriginal Corporation & Woodside Energy Limited.
Ghost bat (*Macroderma gigas)* supporting habitat	All **hummock grassland on rocky plain (*Triodia* on stony soils)** and **tussock grassland on cracking clays** habitat types.
'Good'	The condition of native vegetation rated in accordance with the *Technical guidance – Flora and vegetation surveys for environmental impact assessment (EPA 2016)* including any revision to this technical guidance.
'Good' to 'Excellent' condition native vegetation	Means the condition of native vegetation rated in accordance with the *Technical guidance – Flora and vegetation surveys for environmental impact assessment (EPA 2016)* including any revision to this technical guidance.
Granite	The area defined as the habitat type "exposed granite outcrops" in the report and supporting spatial data in the *Proposed Woodside Solar Farm Targeted Fauna Survey (Rev B),* by Biota 2023.
Grey falcon (*Falco hypoleucos*) supporting habitat	All **minor drainage lines** and **tussock grassland on cracking clays** habitat types.
Ground disturbing activities	Any activity or activities undertaken in the implementation of the proposal, including any clearing, civil works or construction.
Ha	Hectare
Horseflat land system of the Roebourne Plains' priority ecological community	Priority ecological community as described by the Department of Biodiversity, Conservation and Attractions in the *Priority Ecological Communities for Western Australia Version 35* (2023).
Heritage sites	Sites protected under, or eligible to be protected under, **Aboriginal cultural heritage** legislation from time to time due to its value as part of Aboriginal tradition

Heritage sites ID 16590,16591, 21673 and 21674	Department of Planning Lands and Heritage identification 16590,16591, 21673 and 21674 sites as shown in Figure 8-4 (Woodside 2023a).
Hummock grassland on rocky plain (*Triodia* on stony soils)	The area defined as the habitat type “Hummock grassland on rocky plain (*Triodia* on stony soils)” in the report and supporting spatial data in the *Proposed Woodside Solar Farm Targeted Fauna Survey (Rev B),* by Biota 2023.
IBRA	Interim Biogeographic Regionalisation for Australia
Management action	The identified actions implemented with the intent of to achieving the environmental objective.
Management target	A type of indicator to evaluate whether an environmental objective is being achieved.
M	Metres
MW	Megawatt
Minor drainage lines habitat	The area defined as the habitat type “minor drainage lines” in the report and supporting spatial data in the *Proposed Woodside Solar Farm Targeted Fauna Survey (Rev B),* by Biota 2023.
Ngarluma People	The appropriate prescribed body corporate in relation to the Native Title Claim WCD2005/001
Northern quoll (*Dasyurus hallucatus*) critical habitat	Tree-lined creeks with hollows, with trees of sufficient size and age to form hollows that could potentially be used as den sites identified in the Biota (2023) targeted fauna survey as shown in Figure 3.
Northern quoll (*Dasyurus hallucatus*) supporting habitat	All **hummock grassland on rocky plain (*Triodia* on stony soils), minor drainage lines** and **tussock grassland on cracking clays** habitat types outside of **northern quoll (*Dasyurus hallucatus*) critical habitat**.
Operations	Operation of the plant infrastructure for the proposal and includes pre-commissioning, commissioning, start-up and operation of the plant infrastructure for the proposal.
PV	Photovoltaic
Pilbara Environmental Offsets Fund	A special purpose account created pursuant to section 16(1)(d) of the *Financial Management Act 2006* by the Department of Water and Environmental Regulation.
Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) supporting habitat	All **hummock grassland on rocky plain (*Triodia* on stony soils)** habitat types.

Pilbara olive python (*Liasis olivaceus barroni)* supporting habitat	All **hummock grassland on rocky plain (*Triodia* on stony soils), minor drainage lines** and **tussock grassland on cracking clays** habitat types.
Pre-clearance surveys	Surveys designed to identify the presence or evidence of threatened fauna listed under the *Biodiversity Conservation Act 2016* prior to **ground disturbing activities**.
Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays' priority ecological community	Priority ecological community as described by the Department of Biodiversity, Conservation and Attractions in the *Priority Ecological Communities for Western Australia Version 35* (2023).
SPSI	Solar plant supporting infrastructure.
Suitable habitat	Any habitat known to support northern quoll (*Dasyurus hallucatus*).
Targeted fauna survey	The targeted fauna survey results and supporting spatial data described in the report Biota 2023, *Draft proposed Woodside Solar Farm Targeted Fauna Survey,* unpublished report for Woodside Energy Ltd.
Threshold criteria	The indicators that have been selected to represent limits of impact beyond which the environmental outcome is not being met.
Trench /Trenches	Any excavation that is of sufficient depth that would cause vertebrate fauna to be become trapped and unable to escape and would include, but not be limited to, trenches or pits for utilities, pipelines, dewatering pits or bell holes.
Trigger criteria	Indicators that have been selected for monitoring to provide a warning that, if exceeded, the environmental outcome may not be achieved. They are intended to forewarn of the approach of the threshold criteria and trigger response actions.
Tussock grassland on cracking clays	The area defined as the habitat type "tussock grassland on cracking clays" in the report and supporting spatial data in the *Proposed Woodside Solar Farm Targeted Fauna Survey (Rev B),* by Biota 2023.

Figures (attached)

Figure 1 Woodside Solar Facility Development envelopes (This figure/map is a representation of the co-ordinates referenced in Schedule 1)

Figure 2 Location of Vegetation Type 34, containing locally significant *Acacia* trees

Figure 3 Location of northern quoll (*Dasyurus hallucatus*) critical habitat

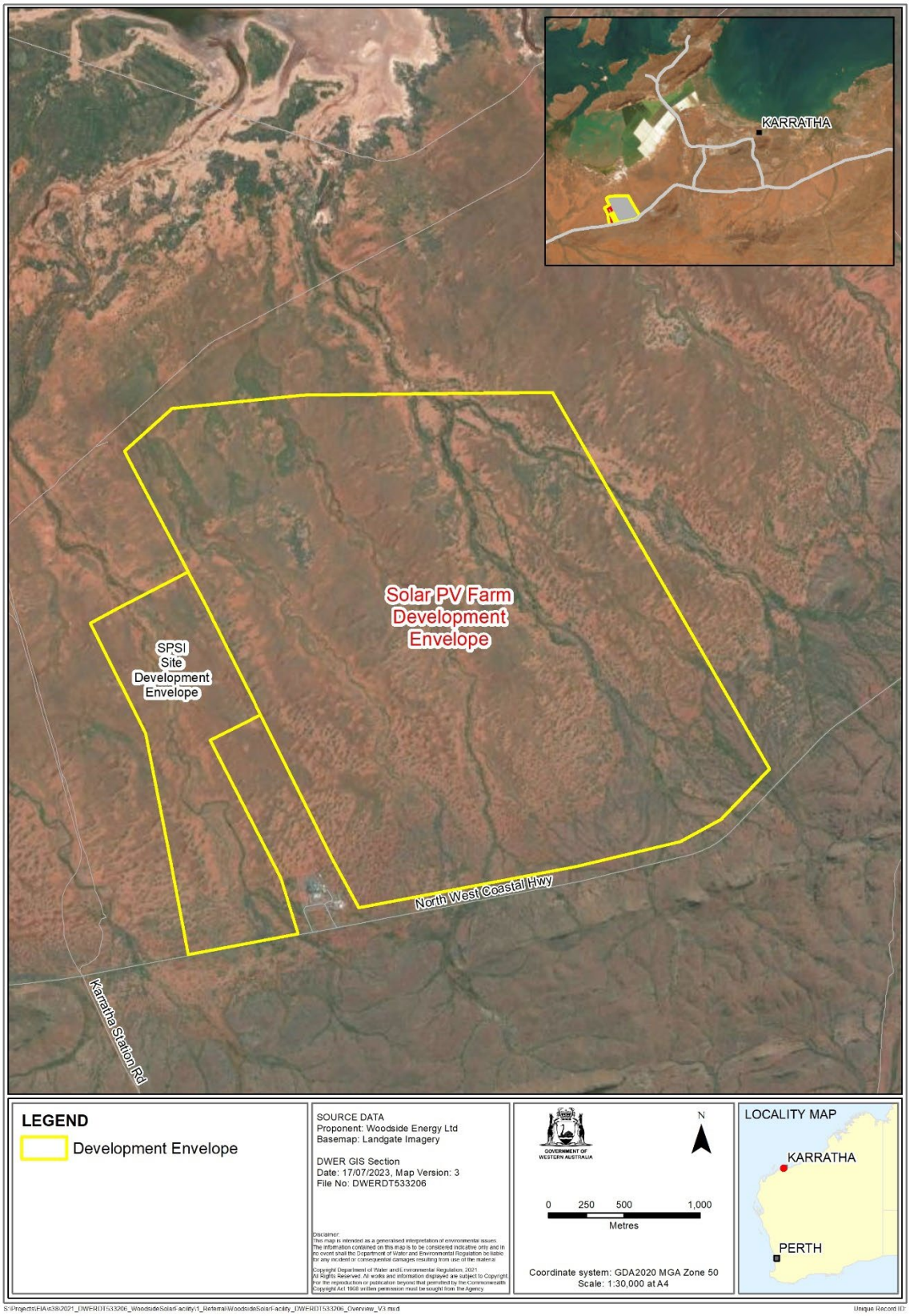

Figure 1 Woodside Solar Facility development envelopment

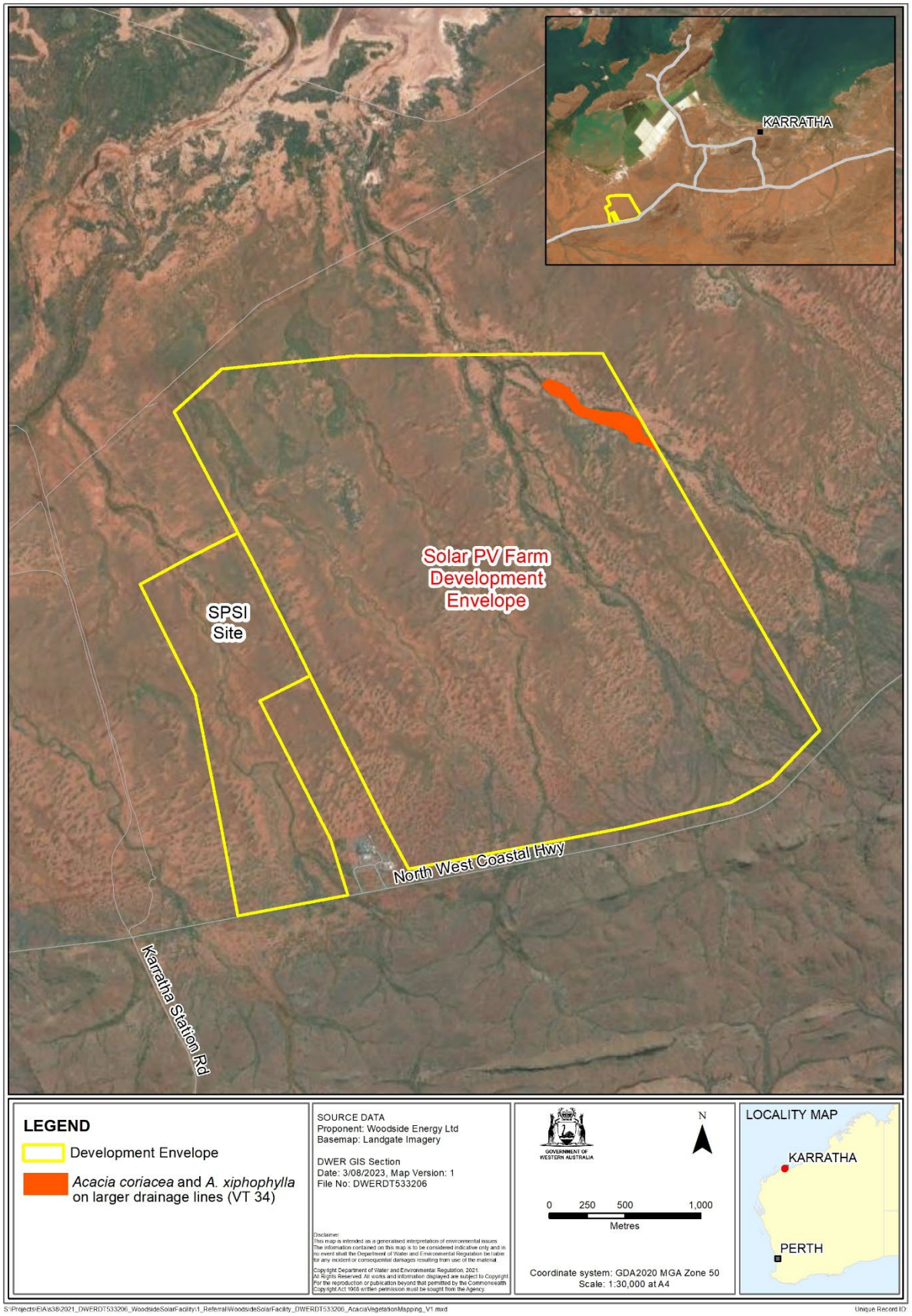

Figure 2 Location of VT34, containing locally significant *Acacia* trees

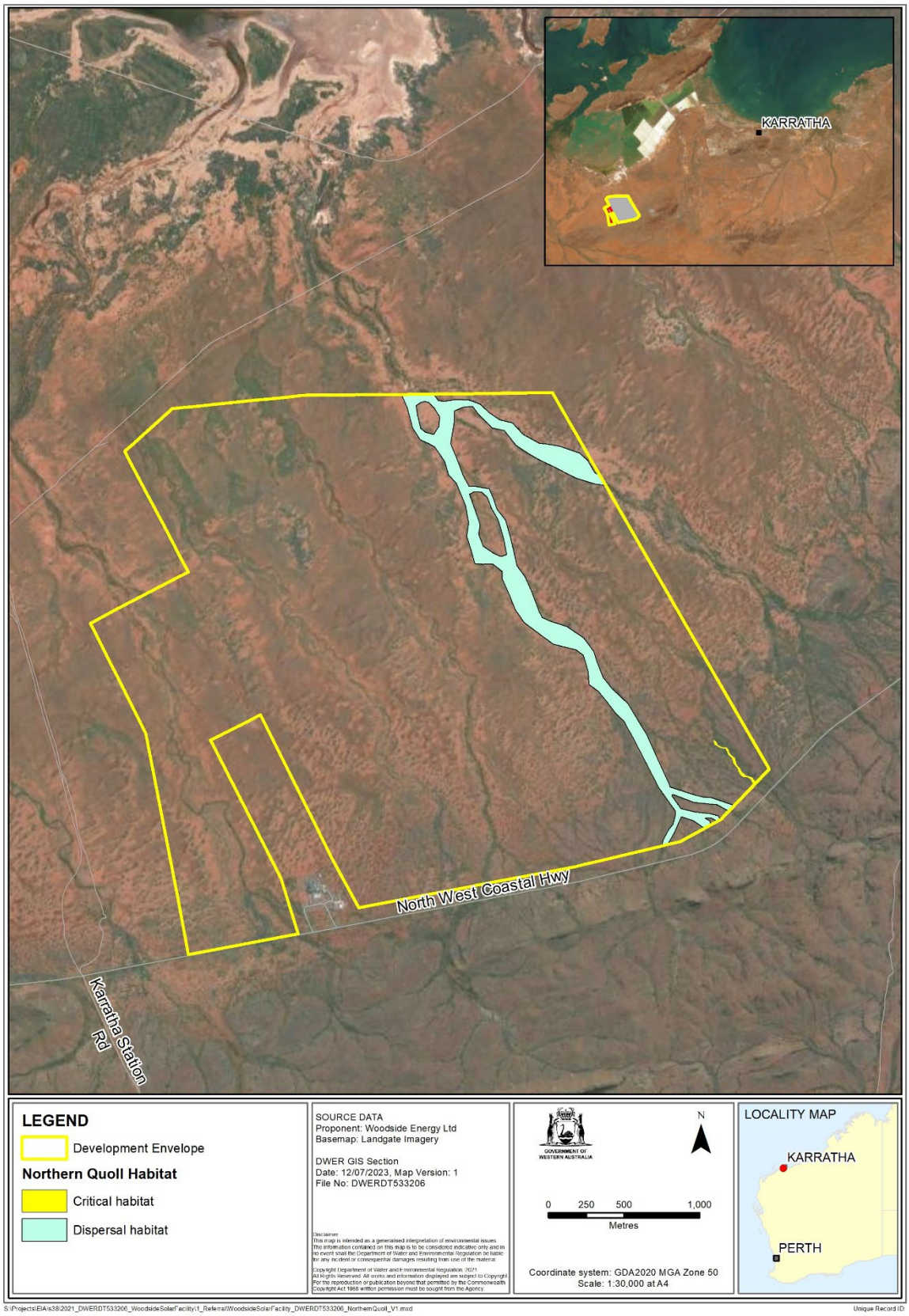

Figure 3 Location of northern quoll (*Dasyurus hallucatus*) critical habitat

Schedule 1

All co-ordinates are in metres, listed in Map Grid of Australia Zone 50 (MGA Zone 50), datum of Geocentric Datum of Australia 2020 (GDA20).

Spatial data depicting the figures are held by the Department of Water and Environmental regulation. Record no. A2189709.

Appendix B: Decision-making authorities

Table B1: Identified relevant decision-making authorities for the proposal

Decision-Making Authority	Legislation (and approval)
Aboriginal Cultural Heritage Council	*Aboriginal Cultural Heritage Act 2021* - s.119(1)(c) and ss. 120(1) and (2) decision to grant or refuse a permit - s. 150(1)(b) decision whether to approve a management plan or *Aboriginal Heritage Act 1972* - section 18 consent to impact a registered Aboriginal heritage site)
Minister for Environment	*Biodiversity Conservation Act 2016* - permit to take threatened flora and fauna - taking or disturbance to threatened species and communities
Minister for Water	*Rights in Water and Irrigation Act 1914* - permit to interfere with beds and banks - licence to construct or alter a well - permit to take water - dewatering licence
Minister for Lands	*Land Administration Act 1997* - lease/licence over Crown land
Minister for Energy	*Electricity Industry Act 2004* - integrated regional licence
Chief Dangerous Goods Officer Department of Mines, Industry Regulation and Safety	*Dangerous Goods Safety Act 2004* - storage and handling of dangerous goods
Chief Executive Officer, Department of Water and Environmental Regulation	*Environmental Protection Act 1986*, Part V Division 3 (WA) - works Approval for category 52 prescribed premises
Chief Executive Officer, City of Karratha	*Health Act 1911* - Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulation 1974
Regional Joint Development Assessment Panel	*Planning and Development Act 2005* - planning approval/development approval
Chief Executive Officer, Economic Regulation Authority	*Electricity Industry Act 2004* - integrated regional licence

Appendix C: Environmental Protection Act principles

Table C1: Consideration of principles of the *Environmental Protection Act 1986*

EP Act principle	Consideration
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In application of this precautionary principle, decisions should be guided by –* *(a)* careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and *(b) an assessment of the risk-weighted consequences of various options.*	The EPA has considered the precautionary principle in its assessment and has had particular regard to this principle in its assessment of flora and vegetation, terrestrial fauna and social surroundings. The assessment of these impacts is provided in this report. For flora and vegetation, the proponent reduced impacts to the P1 PEC Roebourne Plains coastal grassland with gilgai microrelief on deep cracking clays. The EPA has recommended conditions to avoid impacts to 7.7 ha of mature *Acacia xiphophylla* (Snakewood) or *A. coriacea* trees vegetation type 34 (AcAxTt). For terrestrial fauna, the EPA notes the proposal may have significant impacts on northern quoll critical and dispersal habitat and potential high value SRE habitat. The EPA has recommended the conditions, no adverse impacts to northern quoll habitat, minor drainage line habitat and SRE habitat in the form of granite fauna habitat type. For social surroundings, the EPA has considered the lack of Aboriginal heritage survey reports provided to inform the assessment. The EPA determined it could proceed with its assessment despite the surveys not having been completed over the entire development envelope, noting that the proponent is required to seek approval under the ACH Act. From its assessment of the proposal the EPA has concluded that there is no threat of serious or irreversible harm.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*	The EPA has considered the principle of intergenerational equity in its assessment and has had particular regard to this principle in its assessment of flora and vegetation, terrestrial fauna and social surroundings. The EPA is of the view that consistency with this principle could be achieved with the implementation of its recommended conditions, which requires the proponent to: • limit the extent of disturbance to flora, vegetation, and fauna habitat types • contribute to the PEOF for future landscape-scale environmental offset projects, to counterbalance the significant residual impact to vegetation and threatened fauna habitats within the Pilbara

EP Act principle	Consideration
	• develop and implement cultural heritage management plans with relevant Traditional Owners prior to ground-disturbing activities. The EPA has concluded that the environmental values would be protected, and the health, diversity and productivity of the environment would be maintained for the benefit of future generations.
3. The principles of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*	The EPA has considered the principle of conservation of biological diversity and ecological integrity in its assessment and has had particular regard to this principle in its assessment of flora and vegetation and terrestrial fauna. The EPA has considered to what extent the potential impacts from the proposal to these environmental factors can be ameliorated, to ensure consistency with this principle, including by provision of offsets. Surveys have been used to confirm the range and status of environmental values within the vicinity of the proposal. Disturbance within areas of noted higher biological diversity (i.e., PECs, minor drainage line and granite habitat types etc.) have been avoided or minimised. The EPA notes the proponent would retain 10% of high value vegetation in the development envelope for fauna corridors and environmental corridors. The EPA concluded that the actions to avoid and minimise impacts to terrestrial fauna and flora and vegetation, which are also recommended as conditions, would likely conserve terrestrial fauna, and ecological integrity, so that environmental outcomes are achieved. The EPA has concluded that given the nature of the impacts and the proposed offset of contributing to the PEOF are likely to counterbalance the impacts of the loss of terrestrial biological diversity and ecological integrity.
4. Principles relating to improved valuation, pricing and incentive mechanisms (1) Environmental factors should be included in the valuation of assets and services. (2) The polluter pays principle — those who generate pollution and waste should bear the cost of containment, avoidance or abatement. (3) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services,	In considering this principle, the EPA notes that the proponent would bear the cost relating to implementing the proposal to achieve environmental outcomes, and management and monitoring of environmental impacts during construction, operation and decommissioning of the proposal. The EPA has had particular regard to this principle in considering the residual impacts of the proposal on flora and vegetation, terrestrial fauna and social surroundings.

EP Act principle	Consideration
including the use of natural resources and assets and the ultimate disposal of any wastes. (4) Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.	
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*	The EPA has considered the principle of waste minimisation in its assessment and has had particular regard to this principle in its assessment. The EPA notes that the proponent would be implementing appropriate management of wastes on site (refer to Table 4-2 and 4-3 of the environmental management plan) and would be avoiding and minimising discharge of emissions into the environment. The EPA notes the proposal would generate waste from the replacement of solar panels and other infrastructure throughout the life of the proposal and decommissioning activities. The EPA recommended condition B5 (waste minimisation, decommissioning and rehabilitation) which requires the proponent to review and implement waste minimisation opportunities throughout the life of the proposal. Accordingly, the proposal is considered to meet the objectives of the 'Principle of Waste Minimisation'.

Appendix D: Other environmental factors

Table D1: Evaluation of other environmental factors

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
Land			
Terrestrial Environmental Quality	• Soil erosion from clearing, earthworks and vehicle/machinery movement • Soil contamination from spills, leaks and/or discharges of hazardous materials or wastes • Soil contamination from disturbance to acid sulfate soils (ASS)	Public comments No public comments were received. Agency comments Department of Water and Environmental Regulation (DWER) considered the need for investigations to assess the risk of ASS occurring and associated management actions. Department of Primary Industry, Resources and Development considered the need to provide measures to avoid, minimise and rehabilitate impacts from soil erosion.	Terrestrial environmental quality was not identified as a preliminary key environmental factor when the EPA set level of assessment. The assessment of terrestrial environmental quality within the proposal area concluded that: • The proposal would minimise soil erosion impacts through undertaking clearing in a phased approach, and only to the extent required for construction of the proposal • Soil erosion would be further reduced through minimising clearing / disturbance within drainage lines • Rehabilitation of temporary construction areas would be undertaken to stabilise soils as soon as practicable following completion of construction • The proponent's mitigation measures for unintentional spills and leaks are sufficient • Shallow excavations for solar panel footings are not expected to have any interaction with groundwater • Pre-construction ASS investigation would be undertaken for excavations greater than 100 cubic metres or where dewatering is required in mapped ASS risk areas. An ASS management plan would be developed if the investigation identified potential ASS which may be disturbed.

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			Subject to ongoing management as outlined in table 4-3 of the environmental management plan, no new predicted or cumulative effects of terrestrial environmental quality is expected. It is likely that the proposal would be consistent with the EPA objective for terrestrial environmental quality. Accordingly, the EPA did not consider terrestrial environmental quality to be a key environmental factor at the conclusion of its assessment.
Water			
Inland Waters	• Alteration of surface flows and creation of impervious surfaces. • Spills and leaks of chemicals, hazardous materials and/or hydrocarbons. • Inappropriate disposal of wastewater effluent. • Indirect impacts to surface water or groundwater quality during excavation from disturbance of ASS.	Public comments No public comments were received. Agency comments DWER considered the need for licensing under the *Rights in Water and Irrigation Act 1914* for use of groundwater or surface water and the need for investigations to assess the risk of ASS occurring and associated management actions. Department of Climate Change, Energy, the Environment and Water considered the need for an assessment of impacts of sewage and stormwater runoff on habitat for EPBC Act listed species.	Inland waters was not identified as a preliminary key environmental factor when the EPA set level of assessment. The assessment of inland waters within the proposal area concluded that: • There was a lack of permanent water features, wetlands or significant watercourses • The proposal would avoid impervious roads, minimising run off • The proponent's mitigation measures for unintentional spills and leaks were sufficient • The proponent's treatment of sewage effluent, other wastes and stormwater runoff was sufficient • Shallow excavations for solar panel footings is not expected to have any interaction with groundwater • Pre-construction ASS investigation would be undertaken for excavations greater than 100 cubic metres or where dewatering is required in mapped ASS risk areas. An ASS management plan would be developed if the investigation identified potential ASS which may be disturbed.

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			Subject to ongoing management as outlined in table 4-4 of the environmental management plan, no new predicted or cumulative effects of inland waters is expected. It is likely that the proposal would be consistent with the EPA objective for inland waters. Accordingly, the EPA did not consider inland waters to be a key environmental factor at the conclusion of its assessment.
Air			
Greenhouse Gas Emissions	• Generation of greenhouse gas emissions (GHG) contributing to global concentrations. • Potential GHG emissions reductions from the proposal once all phases are implemented are approximately 404 ktCO_2-e per annum.	No comments were received for this factor during consultation.	Greenhouse gas emissions was not identified as a preliminary key environmental factor when the EPA set level of assessment. The proposal would supply renewable electricity for use by industrial customers connected to the North-West Interconnected System (NWIS). Customer use of solar electricity would displace higher GHG intensity electricity sources currently in use. It is predicted emission intensity of the NWIS is currently 580 grams per kilowatt hour. This is projected to fall to approximately 500 grams per kilowatt hour by 2030 due to increasing solar utilisation. Potential GHG emissions reductions from the proposal once all phases are implemented are approximately 404 ktCO_2-e per annum. The Environmental Factor Guideline – Greenhouse Gas Emissions (EPA 2023a) details GHG emissions from a proposal would be assessed where they are reasonably likely to exceed 100,000 tonnes of CO_2-e each year for scope 1 emissions or scope 2 emissions. The EPA notes that based on a 30-year operating life, the lifecycle emission estimates for scope 1 greenhouse gas emissions during construction and operation (including land clearing) for the initial phase and future expansion would be 142.1 kt CO_2-e. If the above

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			lifecycle emissions estimates are averaged across 30 years, scope 1 greenhouse gas emissions are estimated to be 4.74 kt CO_2-e per annum. These are well below 100,000 t CO_2-e per year. Accordingly, based on the predicted scope 1 emissions of the proposal, the EPA did not consider greenhouse gas emissions to be a key environmental factor at the conclusion of its assessment.

Appendix E: Relevant policy, guidance and procedures

The EPA had particular regard to the policies, guidelines and procedures listed below in the assessment of the proposal.

1. *Environmental factor guideline – Flora and vegetation* (EPA 2016)
2. *Environmental factor guideline – Greenhouse gas emissions* (EPA 2023)
3. *Environmental factor guideline – Inland waters* (EPA 2018)
4. *Environmental factor guideline – Social surroundings* (EPA 2023)
5. *Environmental factor guideline – Terrestrial environmental quality* (EPA 2016)
6. *Environmental factor guideline – Terrestrial fauna* (EPA 2016)
7. *Environmental impact assessment (Part IV Divisions 1 and 2) procedures manual* (EPA 2021)
8. *WA Environmental Offsets Policy* (Government of Western Australia 2011)
9. *WA Environmental Offsets Guidelines* (Government of Western Australia 2014)
10. *Statement of environmental principles, factors, objectives and aims of EIA* (EPA 2021)
11. Environmental impact assessment (Part IV Divisions 1 and 2) administrative procedures 2021 (State of Western Australia 2021)
12. *Technical guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016)
13. *Technical guidance – Sampling of short-range endemic invertebrate fauna* (EPA 2016)
14. *Technical guidance – Subterranean fauna surveys for environmental impact assessment* (EPA 2021)
15. *Technical guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020).

Appendix F: List of submitters

7-day comment on referral

Organisations and public

- Conservation Council of WA
- Friends of Australian Rock Art Inc.
- Murujuga Aboriginal Corporation
- Private submitter (4)

Public review of proponent information

Organisations and public

- Ngarluma Aboriginal Corporation

Government agencies

- Department of Climate Change, Energy, the Environment and Water (Commonwealth)
- Department of Primary Industries and Regional Development
- Department of Biodiversity, Conservation and Attractions
- Department of Planning, Lands and Heritage
- Department of Water and Environmental Regulation
- DevelopmentWA
- City of Karratha
- Pilbara Ports Authority.

Appendix G: Assessment timeline

Date	Progress stages	Time (weeks)
2 February 2022	EPA decided to assess – level of assessment set	
27 May 2022	EPA requested additional information	16
20 September 2022	EPA received additional information	16
2 December 2022	EPA accepted additional information	10
23 December	EPA released additional information for public review	3
17 March 2023	Public review period for additional information closed	12
26 July 2023	EPA accepted proponent's Response to Submissions and received final information for assessment	18
27 July 2023	EPA completed its assessment	One day
8 September 2023	EPA provided report to the Minister for Environment	6
13 September 2023	EPA report published	3 days
4 October 2023	Appeals period closed	3

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the EPA decides to assess the proposal and records the level of assessment.

In this case, the EPA met its timeline objective to complete its assessment and provide a report to the Minister.

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