Title of Proposal - Teewana Solar Farm, Gidgegannup

Section 1 - Summary of your proposed action

Provide a summary of your proposed action, including any consultations undertaken.

1.1 Project Industry Type

Energy Generation and Supply (renewable)

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

Teewana Farm Pty Ltd (Teewana) proposes to construct and operate a photovoltaic (PV) 9.9 MW (maximum designed output) solar farm on portions of Lots 147 and 250 Burgess Road, Gidgegannup. Teewana has contracted HFM Asset Management Pty Ltd (HFM) to act on its behalf as the Proposed Designated Proponent for the purposes of this referral. The site layout is shown in Figure 1. The Site lies within the jurisdiction of the City of Swan on rural land between Burgess Road in Gidgegannup and Barcelona Drive in Brigadoon, Western Australia.

Description of the Solar Farm
The solar farm will be comprised of approximately 31,270 PV panels on single axis, tracking frames covering an area of 17.4 ha. Associated infrastructure will consist of:
• Four inverters, four transformers and housings
• Underground cabling
• Switchgear in control room and housing
• Export cable from the control room to an existing 22 kV overhead transmission line
• Car park and lay-down area
• Fire fighting water tanks and pump
• Perimeter fence and access gates.

The area encompassed by the fencing will be approximately 27.4 ha. PV modules will be arranged in north-south aligned strips of panels (strings), set out to be close to horizontal or inclined to the north as the lay of the land allows. Each string will tilt along its north-south horizontal axis to follow the sun through its path across the sky. The angle of each panel string will change constantly through the day, tilting from 52° towards the east in the morning and 52° to the west in the evening and be driven by electric motors on each frame. PV panels within each string will be connected via cabling set within conduits on the frames. Individual strings will be connected together and to the inverter modules via underground cabling which carries direct current (DC) electricity to the inverters and transformers. The inverters change the current to alternating (AC) and the transformers convert the voltage prior to transmission to the control room. The export cables will connect to the South West Interconnecting System (SWIS) via an existing 22 kV overhead transmission line that terminates near the south-west corner of the development and runs to the west through paddocks.

Construction
Associated works will include minor amounts of cut and fill where depressions or humps form in the landscape. The grass sward in the paddocks will be retained across most of the

development footprint although temporary damage will occur through vehicular and plant movement. A very small proportion of the development area will be excavated along cable trenchlines and at each foundation and fence post but will be reinstated along trenchlines. Foundations for the PV frames will be either driven or drilled small diameter piles. Some piles may need to be concreted depending on ground conditions.
Trees and woodland within the array footprint will need to be removed to allow the solar farm to be constructed. Some areas of woodland, and semi-isolated trees near the array, inverters and transformers will also need pruning to control fuel loads for bushfire management. A small number of trees may also need removing to reduce the shadow falling on PV panels; shadow has a disproportionate impact on electrical generation.
Construction will take approximately six months to complete and is currently scheduled to begin in Q1 2021. Lay-down and parking areas will be required during construction and all access will be from existing access gates and tracks either from Barcelona Drive to the north-west or Burgess Road in the south.

Operations
The solar farm will be controlled and monitored remotely from Perth. It is expected that personnel will visit the development at most on a fortnightly basis to conduct panel cleaning, maintenance, fire management and vegetation control. Major maintenance may be required periodically to replace PV modules, inverter equipment and other components. Major maintenance would involve similar activities as construction, but through selection of highly reliable components and the relative simplicity of solar power generation, major maintenance is not anticipated. The expected life of the solar farm is 25 years.
Grassland, trees and adjacent vegetation will need trimming periodically to maintain a constant level of vegetation. This is required to help reduce shadow and manage bushfire risk.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action.

Area	Point	Latitude	Longitude
Teewana Solar Farm Bndry	1	-31.79154144116	116.09760865532
Teewana Solar Farm Bndry	2	-31.791596156307	116.10073074661
Teewana Solar Farm Bndry	3	-31.79330142883	116.10079511963
Teewana Solar Farm Bndry	4	-31.793574999034	116.1065886911
Teewana Solar Farm Bndry	5	-31.796338012704	116.10662087761
Teewana Solar Farm Bndry	6	-31.796283300363	116.10348805748
Teewana Solar Farm Bndry	7	-31.796073569425	116.10327348076
Teewana Solar Farm Bndry	8	-31.795754412737	116.10058054291

Area	Point	Latitude	Longitude
Teewana Solar Farm Bndry	9	-31.79602797568	116.10041961037
Teewana Solar Farm Bndry	10	-31.795991500668	116.09839186035
Teewana Solar Farm Bndry	11	-31.793219357611	116.09835967384
Teewana Solar Farm Bndry	12	-31.793219357611	116.09763011299
Teewana Solar Farm Bndry	13	-31.79154144116	116.09760865532

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

The site of the proposed solar farm is located on the edge of the Darling Scarp in the Perth Hills, approximately 28 km north-east of Perth Central Business District (CBD). Elevations on the site vary between 258 and 276 m above Australian height datum (AHD) with the highest location being on the mid-western end of the development area. The site lies between the township of Gidgegannup 8.5 km east and the suburb of Brigadoon 620 m to the north-west. The site is relatively flat from east to west with a crest along the centre of Lot 147. The land falls gently to the south and north. A small seasonal watercourse lies just outside the development footprint in the valley to the north.

Lots 147 and 250 are currently managed as agricultural pasture on which horses are kept, but sheep have been historically grazed on the paddocks (Gidgegannup Community Website, 2018). While the land on Lots 147 and 250 is rural, it contains a small number of residences with the nearest being approximately 324 m south-west of the solar farm. The nearest houses in the suburb of Brigadoon are located 620 m north-west of the solar farm.

A shearing-shed and vertical wind turbine are present in the western end of Lot 147, the latter of which is to be removed prior to installation proceeding.

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

The solar array will cover an area of approximately 17.5 ha with the fenced enclosure containing 27.4 ha.

1.7 Is the proposed action a street address or lot?

Lot

1.7.2 Describe the lot number and title. Lot 147 and Lot 250 Burgess Road, Gidgegannup, WA.

1.8 Primary Jurisdiction.

Western Australia

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

No

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

Yes

1.10.1 Is there a local government area and council contact for the proposal?

Yes

1.10.1.0 Council contact officer details

1.10.1.1 Name of relevant council contact officer.

Philip Russell

1.10.1.2 E-mail

Philip.Russell@swan.wa.gov.au

1.10.1.3 Telephone Number

08 9267 9267

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date 01/2021

End date 01/2046

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

Environmental Framework

A referral under Western Australia's *Environmental Protection Act 1986* (EP Act) and relevant associated regulations is not considered necessary as the proposed development is not considered to be a significant proposal.

In consultation with the Department of Water and Environmental Regulation, it has been identified that the proposed removal of the native vegetation does not require an application for a native vegetation clearing permit under section 51E of the Western Australian EP Act. A permit is not considered necessary as the proposed vegetation clearance is not at variance with the ten clearing principles in Schedule 5 of the EP Act and is deemed to be of a "kind prescribed" for the purposes of section 51C(c) of the EP Act. Definition of a “kind prescribed” is given in Regulation 5(1)(a) of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004, and the proposed clearing meets the conditions set out in Item 1 of the Table in Regulation 5. Teewana Farm has confirmed that no recent clearing of native vegetation has occurred on the property and therefore the 5 ha allowed under the exemptions will not have been exceeded. This conclusion is based on approval to develop the solar farm being given through the Development Application.

Planning Act

The proposed development site, Lots 147 and 250 are designated as ‘Rural’ in the Metropolitan Region Scheme and General Rural in the City of Swan Local Planning Scheme No. 17 (LPS 17). Planning Solutions Pty Ltd (2019) has prepared a Development Application in support of the solar farm which was submitted to the City of Swan on the 28 March 2019. The context, planning framework, state and local government requirements are described in that document to demonstrate that the solar farm is compatible with the current land use and area as follows:

Local Planning Scheme

Clause 4.2.17 of LPS17 sets out the following objectives for the General Rural zone:

a) facilitate the use and development of land for a range of productive rural activities, which will contribute towards the economic base of the region;

b) provide for a limited range of compatible support services to meet the needs of the rural community, but which will not prejudice the development of land elsewhere which is specifically zoned for such development;

c) ensure the use and development of land does not prejudice rural amenities, and to promote the enhancement of rural character;

d) ensure that development and land management are sustainable with reference to the capability of land and the natural resource values.

The proposed installation of a photovoltaic solar farm is entirely consistent with the above objectives for the General Rural zone for the following reasons:

• The solar farm will facilitate the use of General Rural land for a productive activity, through the capture and generation of renewable energy into Western Power’s South West Interconnected System. This will provide a local benefit by providing renewable power into the local electricity grid.

• The solar farm is proposed on a large site totalling approximately 396ha, and will not prejudice site's existing use for General Rural purposes, or its further development for General Rural purposes. The development site could also be reinstated for rural use, if/when the solar farm ceases use and is decommissioned.

• The proposed solar farm is located within a portion of the subject site which is substantially screened by existing vegetation, and positioned in a location where the site's topographical features prevents views from the surrounding area (maintaining rural character).

• The proposed development site has been the subject of environmental assessment, demonstrating the installation of the solar farm will not result in unacceptable environmental impacts.

• The proposal is a sustainable form development which matches the capability of the land without the need for any substantial alterations or construction practices, thereby not impacting on the values of any natural resources.

In addition to the above, it is important to highlight that it is a commonly recognised and accepted notion that rural zones are flexible by their nature, suitable for accommodating a range of activities which utilise or capture natural resources (e.g. Northam Solar Farm, Merredin Solar Farm, Collie Solar Farm, Gingin Solar Farm, Cunderdin Solar Farm).

The activity of photovoltaic solar farm does not align with any land use class defined within *Schedule 1 – Dictionary of Defined Words and Expressions* of LPS17. Clause 4.4.2 provides the following guidance when dealing with uses which are not defined by LPS17:

4.4.2. If a person proposes to carry out on land any use that is not specifically mentioned in the Zoning Table and cannot reasonably be determined as falling within the type, class or genus of activity of any other use class the local government may –

a) determine that the use is consistent with the objectives of the particular zone and is therefore permitted;

b) determine that the use may be consistent with the objectives of the particular zone and thereafter follow the advertising procedures of clause 9.4 in considering an application for planning approval; or

c) determine that the use is not consistent with the objectives of the particular zone and is therefore not permitted.

Additionally, there are numerous examples/precedents of solar farms being approved and developed within rural zones, evidenced in Planning Solutions (2019).

State Planning Policy

State Planning Policy 2.0 – Environment and Natural Resources Policy (**SPP2**) defines the principles and considerations relating to the preservation/conservation of the natural

environment and natural resources. The key objectives of SPP2 are:

• *To integrate environment and natural resource management with broader land use planning and decision-making.*

• *To protect, conserve and enhance the natural environment.*

• *To promote and assist in the wise and sustainable use and management of natural resources.*

The proposed development is comprised of a photovoltaic solar farm facility which generates renewable energy by capturing solar power. The use of renewable energy is commonly accepted as a form of development which has lower carbon emissions and is sympathetic to the natural environment. The proposal is therefore in direct alignment with the key objectives of SPP2 by harnessing renewable energy resources.

State Planning Policy 2.5 – Rural Planning (**SPP2.5**) applies to all rural zoned land in Western Australia. The intent of SPP2.5 is to protect and preserve Rural zoned land, to ensure its economic, natural resource, food production, environmental and landscape values are maintained. Section 5.1 of SPP2.5 provides measures for the protection of rural land and land uses and is assessed against each of the relevant measures of Section 5.1 as follows:

Requiring that land use change from rural to all other uses be planned and provided for in a planning strategy or scheme.

There is no particular element of the applicable statutory or strategic framework which provides for the specific nature of the subject proposal.

However, as discussed above, there are numerous state and local strategic planning documents which encourage the development of renewable energy facilities. Some documents, including the Gidgegannup Local Area Plan, make specific references to solar power as a suitable solution to reduce carbon emissions.

The assessment carried out by Planning Solutions (2019) demonstrates that solar farm facilities are commonly approved in rural areas and are considered suitable for a rural context. It is also noted that the proposed development site encompassing the solar farm is 27.4 ha in size, representing only 7% of the total combined 396 ha site area. The development site forms part of a much larger area which is not utilised (or likely to be utilised) for any particular productive rural purposes. The low-impact nature of a solar farm also allows for the reactivation of rural activity upon cessation/decommissioning. The remainder of the site contains existing rural pursuits which will not be impacted upon by the proposed solar farm development.

Retaining land identified as priority agricultural land in a planning strategy or scheme for that purpose.

The subject site is not identified as ‘priority agricultural land’.

Ensuring retention and protection of rural land for biodiversity protection, natural resource management and protection of valued landscapes and views.

The proposal is supported by comprehensive environmental assessment which demonstrates no areas for biodiversity protection will be impacted upon by the proposed solar farm. The proposal is supported by a visual landscape assessment which demonstrates the solar farm is unlikely to be visible from any surrounding or adjacent properties and public places, therefore resulting in a negligible visual impact.

Protecting land, resources and/or primary production activities through the State's land use planning framework.

The subject site is not identified for any particular resources or primary production activities under the planning framework. The use of a 27.4 ha portion of the wider 396 ha subject site for a solar farm is not likely to prejudice the development of resources and/or primary production activities elsewhere on the site, at some stage in the future.

Creating new rural lots only in accordance with the circumstances under which rural subdivision is intended in Development Control Policy 3.4:Subdivision of rural land.

No new rural lots would be created as a result of the proposal. As the proposed solar farm straddles the boundary of Lot 147 and Lot 250, it is likely that a minor realignment of lot boundaries will be required, however this will not result in the fragmentation or dissolution of rural land.

Preventing the creation of new or smaller rural lots on an unplanned or ad-hoc basis, particularly for intensive or emerging primary production land uses.

No sensitive land uses are proposed as part of this application.

Comprehensively planning for the introduction of sensitive land uses that may compromise existing, future and potential primary production on rural land.

The proposed development does not negatively impact on the capability of primary production on any neighbouring rural lots. Conversely, primary production on neighbouring lots can continue to occur with no impacts on the proposed solar farm.

Accepting the impacts of well-managed primary production on rural amenity.

The low-impact nature of the proposed solar farm use is one which can operate in harmony with traditional rural/agricultural uses.

Western Australia Planning Commission Position Statements

The proposed solar farm has been assessed against each of the policy measures set out in the *Draft Position Statement – Renewable Energy Facilities* including:

- Environmental impact

- Visual and landscape impact

- Noise impact (wind turbines only)

- Construction impact

- Public and aviation safety

- Cultural heritage

Each of the above measures have been addressed in the Development Application.

Planning Solutions (2019) conclude that the proposed solar farm development is consistent with the Rural and General Rural designation of Lots 147 and 250 from both local and State government requirements.

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

HFM (on behalf of Teewana) and Planning Solutions have been in consultation with the City of Swan and has submitted a Development Application. During the process of the Development Application assessment, the City of Swan will advertise the application over a 21-day period and invite comments from the public. These comments will be considered and answered as part of the planning assessment process.

An Aboriginal heritage risk assessment has been conducted, which considers the solar farm proposal in the context of the following surrounding heritage sites which are located within a 1 km radius from the centre of the proposed solar farm footprint:

• Registered Site ID 3722 – O'Brien Road.

• Place ID 3817 – Brigadoon 24.

• Place ID 17507 – Gidgegannup 01.

• Place ID 17510 – Gidgegannup Soak + Camp 01.

• Place ID 17511 – Balgorup/Big Pond

In summary, the Aboriginal heritage assessment concludes a low risk of any disturbance of cultural heritage artefacts and recommends:

• That an Ethnographic Site Identification survey is not conducted for the solar farm proposal, as previous studies in the locality have not indicated that any extant cultural values intersect the development site.

• That an archaeological survey is not conducted prior to excavation occurring.

• That the proponent considers engaging Aboriginal Heritage Monitors to inspect areas more likely to contain cultural material located sub-surface or that may be obscured by ground cover.

• That all personnel and contractors are aware of legislative obligations to stop work an report the discovery of any cultural artefacts or materials.

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

A comprehensive environmental impact assessment has been conducted in support of the Development Application by Matters of Environment (MoE) (2019) as attached. This document considers a range of environmental risks and potential impacts including Commonwealth protected matters, State values, general environment, noise, glare and bushfire. In support of the environmental impact assessment a series of ecological survey was conducted. A Level 1 fauna survey and black-cockatoo habitat and breeding survey was conducted by MoE in June 2018 with further visits in January 2019 to inspect potential black-cockatoo nesting hollows in trees that may require clearing. To do this, a pole cam was used but where the pole cam could not access, a tree-climbing expert inspected the hollows. In addition, Focused Vision conucted a flora and vegetation survey to describe the native vegetation present on site and establish the condition.

The environmental survey and impact assessment identified that Baudin's, Carnaby's and Forest Red-tailed black-cockatoos (all Threatened) are known to be present and use the habitat in the area on which the site sits. Removal of native vegetation on which the three black-cockatoos forage, therefore requires consideration by the Department of Environment and Energy (DEE).

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

No

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

No

Section 2 - Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

• Profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;

• Significant Impact Guidelines 1.1 – Matters of National Environmental Significance;

• Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies.

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

No

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

No

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

No

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

Yes

2.4.1 Impact table

Species	Impact
Carnaby's Black-cockatoo (Calyptorhynchus latirostris) – Endangered Baudin's Black-cockatoo (Calyptorhynchus baudinii) -	Construction and presence of the solar array over the paddock grassland is not considered likely to have a direct impact on any population

Species	Impact
Vulnerable Forest Red-tailed Black-cockatoo (Calyptorhynchus banksii naso) - Vulnerable. Lots 147 and 250 fall within Region 3, Jarrah Forest and the modelled breeding ranges of Carnaby's Black-cockatoo and Forest Red-tailed Black-cockatoo, and the region in which Baudin's Black-cockatoo is likely to occur (DEE, 2017). The breeding range of Carnaby's Black- cockatoo is primarily in the wheatbelt to the east where rainfall is between 300 and 750 mm annually and where Wandoo (Eucalyptus wandoo) and Salmon Gum (Eucalyptus salmonophloia) are more common (DEC, 2010). Two black-cockatoo night-time roosts have been recorded in the Gidgegannup area (Peck et al. 2018) with the nearest being for white-tailed black-cockatoo 1.8 km south of the site boundary and two mixed roosts approximately 4.9 km south-west at the base of the scarp. During ecological survey on Lots 147 and 250, all three species of black-cockatoo endemic to Western Australia were observed on or near the site. Baudin's Black-cockatoo was observed in a small group of five individuals in June 2018 and a small number of Marri nuts with chew marks consistent with Baudin's were found in the largest stand of woodland on site. This species was not observed in the summer or autumn; and was presumed to be further south in its breeding range at these times. A group of nine Carnaby's Black-cockatoo which included juvenile birds probably from the 2018 spring brood was observed flying over the site in late January 2019. No feeding remains were found on site that were indicative of Carnaby's Black-cockatoo. There is no indication of where these animals had nested. Forest Red-tailed Black-cockatoos were observed during all site visits in winter, summer and autumn and three Marri nuts with chewmarks consistent with this species were found at a couple of locations on the site. This species was heard calling at each early morning start to survey in June and in January suggesting year-round residence in the area. Two family groups (one of three birds and one of four) were observed in trees just outside the southern boundary of the site in January	of Threatened or Migratory species. Drinking water availability in the field dams adjacent to the site or in the wider area will not be affected by the development proceeding. Impacts on the larger stand of Jarrah/Marri/Sheoak woodland in the centre of the development area has been avoided as it is slightly more intact and in better condition than the smaller stands on the site. Indirect impacts to the black-cockatoos (and other fauna) as a result of construction work or operations could occur if plant pathogens such as Dieback (Phytophthora cinnamomi) or invasive weeds were introduced via infected vehicles, shoes or clothing. Dieback could infect Jarrah, banksias and grass trees and reduce the availability of foodplants for black-cockatoos. Vehicle and clothing hygiene prior to visiting the site will be a focus of environmental management to reduce this risk. Periods of wet weather will be given a particular focus. Management measures will include: - Vehicle (including privately owned) and plant washdowns - Inspections of vehicles, plant, equipment and clothing - Prohibit site personnel from moving outside the development boundary either on foot or in a vehicle (unless in an emergency) Similarly, bushfire could present a risk to black-cockatoos (and other fauna). A Bushfire Management Plan will be prepared and applied through the construction and operations period. Management measures including reducing fuel-loading near higher risk equipment will be implemented so that fire risk as a result of the solar farm is negligible. However, an area of 2.01 ha of completely degraded native vegetation will need to be cleared from within the development footprint to allow the solar farm to be installed (see Figure 2). This native vegetation is comprised of the following: - 1.83 ha of four remnant Jarrah/Marri stands one which also contains Sheoak. These stands contain young (>100 mm <500 mm) and mature trees a small number of which are dead. - 0.177 ha of Jarrah/Marri trees in small clumps or isolated or semi-isolation trees in paddock grassland. The clumps contain young and mature trees whereas isolated trees are more mature (>500 mm DBH), a small number of

Species	Impact
2019 suggesting these birds had nested nearby. During an autumn roost survey, three roosts were recorded by calls in the surrounding area and a pair appeared to be preparing to breed were recorded in a tree to the south of the project area. No roosts were present within the development footprint. A foraging habitat survey consistent with DEE (2017) was conducted in June 2018 and supplemented with further inspections in January 2019. This survey identified small stands of Jarrah (Eucalyptus marginata) and Marri (Corymbia calophylla), some containing Sheoak (Allocasuarina fraseriana), small clumps of Jarrah/Marri trees and isolated and semi-isolated trees. Some recruitment of Marri was occurring in the smaller clumps but generally, the habitats within the development footprint were all completely degraded through grazing and weed infestation. No weed species known to provide food for black-cockatoos were recorded. Two small field dams lay just outside the northern boundary of the site and other ponds were shown to be present on aerial photography in the wider area and available as standing water for black-cockatoos. Large swathes of Jarrah/Marri forest surround the site and were observed from the perimeters to be in much better condition, contain more flora species and have better structure of understorey and ground cover than the habitats present on site. The foraging habitat survey considered breeding, roosting and foraging habitat for Carnaby's and Forest Red-tailed black-cockatoos due to their potential to breed in the area, and foraging and roosting habitat only for Baudin's as it is considered they breed further to the south. Using the DEE's foraging habitat scoring tool (DEE 2017) and as detailed in Appendix 1 of Matters of Environment (2019), the habitats present on the development site received a total score of 6 for Baudin's (High Quality), 4 for Carnaby's (Quality) and 9 for Forest Red-tailed (Very High Quality). The area of Jarrah/Marri stands and isolated and semi-isolated trees that would be lost through clearing to make way for the solar farm or pruning to limit fuel loading across the site is	which are dead. A further 0.09 ha of vegetation (mainly Marri) requires some level of pruning or clearing at ground and understorey levels to reduce fuel loading for bushfire management, but large trees over 400 mm DBH will remain. Periodic maintenance clearance in the same locations will also be required through the 25 year operational period to keep fuel loads near inverters, transformers and the control room to an acceptable level for bushfire management. The Jarrah/Marri trees across the development footprint have been identified as providing foraging habitat for black-cockatoos. All three species of black-cockatoo were recorded either in trees near the site or flying over. In addition, a few signs of feeding Baudin's and Forest Red-tailed black-cockatoos were found across the site in three separate visits. No feeding remains of Carnaby's Black-cockatoo were found. Two trees (see Figure 2) that need to be cleared for the development were found to have hollows considered suitable for nesting black-cockatoos. Both hollows are in trees in open paddocks and therefore potentially susceptible to windthrow although shelter from the extensive swathes of surrounding Jarrah/Marri forest will reduce this risk. Only one of the two hollows showed signs that black-cockatoos had entered and inspected, but neither contained evidence of occupation by black-cockatoos. Therefore, they are not confirmed as known nesting trees. The DEE (2017) suggests that the clearing of known nesting trees, roost sites, breeding habitat or clearing of high quality or very-high quality foraging habitat is likely to result in a significant impact on the species concerned. While the suggestions by DEE are acknowledged, the loss of 2.1 ha of completely degraded Jarrah/Marri vegetation and two potential nesting hollows at this location is not considered to be a significant impact because the loss forms only a very small proportion of the surrounding habitat on which the black-cockatoos can fend and breed successfully as evidenced through the records of Forest Red-tailed Black-cockatoo. The majority of forest in the vicinity of the solar farm, in the surrounding landscape and wider region is in better

Species	Impact
2.1 ha when taken to the drip line (vertical line to ground from outer reaches of canopy). However, the feeding signs were relatively few compared with the large quantities of Marri nuts under many trees on other sites. Cooper et al. (2003) identified that black-cockatoos detect nutrient value within the seed pods of certain Marri trees (large or small) and target the fruit on those trees to the apparent exclusion of other trees nearby despite large numbers of fruit being present. Hence why the ground can be heavily littered under certain trees and little or none under others. It is concluded therefore that the evidence of few feeding signs shows that the habitat that falls within the site boundary may not be high quality or very high quality as suggested by the DEE's foraging habitat scoring tool. Three Forest Red-tailed Black-cockatoo roosts of unknown size were detected within 1 km of the project area in the surrounding landscape during an evening roost survey in April 2019. The apparently constant use of the surrounding landscape through the year, suggests this one species finds adequate resources in the area to support foraging, roosting and breeding. Therefore, it is concluded that the black-cockatoos recorded near the site in June 2018 and January and April 2019 appear to rely upon foraging (and thus breeding) habitat in the wider area and not so much on the habitat on site given that the foraging evidence found on site was scant. At the same time as the foraging habitat survey, all trees larger than 500 mm diameter at breast height (DBH) were inspected for potential nesting hollows. A total of 47 Marri and Jarrah trees of suitable DBH were present within the area needing to be cleared. Five of these trees were dead and two in particular were close to collapsing. In January 2019, all trees that appeared to have hollows suitable for black-cockatoos from the ground were inspected either by pole camera or by a tree-climbing specialist where safe to do so. The results of these surveys are presented in Appendix 1 of Matters of Environment (2019) as submitted in support of this referral. In summary, two trees had one hollow each that were considered to	condition, covers a substantial area and offers all three species of black-cockatoo extensive nesting, breeding and foraging habitat. A query of the Department of Primary Industries and Regional Development's shapefile of existing native vegetation that lies within 15 km of the site boundary, shows that 29,315 ha of native vegetation remains, most of which is on the Darling Scarp and mostly Jarrah/Marri Forest (see Figure 3). This amounts to 41% of the surrounding 15 km area. The 2.1 ha of proposed clearing therefore comprises less than 0.007% of the remaining habitats. Inspection of the Managed Lands and Waters shapefile (DPAW, 2017) show that 5,293 ha within 15 km are within National Park, 1,087 ha are vested in the Conservation Commission of WA and a further 628 ha are designated as state forest. In total 7,008 ha are under permanent management within 15 km of the solar farm, of which the 2.1 ha would be 0.05%. In the wider Perth Hills region, a larger proportion of the land is managed by State authorities due to the inclusion of Avon Valley National Park and Moondyne Nature Reserve approximately 16 km to the north and Mundaring State Forest and Beelu National Park 16 km to the south-east. The Gnangara-Moore River State Forest (which includes the Gnangara Pine Plantation) lies 16 km north-west which has been identified as an important roosting area for Carnaby's Black-cockatoo outside of the breeding season (Peck et al. 2018). A loss of less than 0.007% of the remaining area of foraging habitat cannot be considered significant unless there is clear evidence that the portion to be lost provides a significant portion of the black-cockatoos annual or breeding energy and nourishment when compared with the remaining habitats. While feeding remains from two black-cockatoo species were found on the site, they were relatively few compared with the large quantities of feeding remains often found under certain trees in other areas across their ranges (B.Shepherd pers. obs.). For the period leading up the the surveys it is therefore concluded that the habitats that need clearing are not highly

Species	Impact
have suitable internal dimensions, opening size and orientation of the opening for either Carnaby's Black-cockatoo or Forest Red-tailed Black-cockatoo. One of the hollows had chew marks considered to be consistent with Forest Red-tailed but neither contained evidence that black-cockatoos had nested inside.	sought by black-cockatoos and that the area to be lost does not provide for a significant portion of their annual or breeding energy budgets. All three black-cockatoos depend on Jarrah and Marri seeds for their survival but all three also feed on other species to augment their diet. With the exception of Sheoak which are foodplants of Carnaby's and Forest Red-tailed, the habitats on the site offer no more than Jarrah and Marri. While the loss of 2.01 ha of Jarrah and Marri trees and several Sheoaks will result in a reduction of total foraging area available for black-cockatoos in the area, it is not considered that a 0.007% loss of foraging habitat at this location and of this quality can be considered significant. It is acknowledged that patch habitats such as those found on Lots 147 and 250 are important to birds that occupy areas at the landscape scale, many patches in better condition remain within 50 m of those that are to be lost. It is unlikely therefore, that the proposed removal of the Jarrah and Marri trees will interrupt the feeding intervals of the black-cockatoos to an extent that will stress their energy requirements. While no nesting evidence of black-cockatoos was found on the site, it is possible that black-cockatoos could occupy the two tree hollows prior to clearing works commencing around Q1 2021. Felling a tree that contained adults, young or eggs would be considered a significant impact on any of the three species. For this reason (and protection of wildlife generally), the proponent has committed to clearing native vegetation outside of peak breeding periods for black-cockatoos (August to December and April to June) where possible. If however, the construction timing does not allow for this, a qualified and experienced ecologist or zoologist will be employed to inspect trees and vegetation prior to clearing to ensure active nests, eggs or nestlings are not affected. Trees in which nests are active would be left until the young birds have fledged and left the nest. It is recognised that for black-cockatoos this may be as long as three months. Activities during operation of the solar farm or decommissioning are not expected to impact black-cockatoos. In recognition of the loss of 2.01 ha of native

Species	Impact
	vegetation and two tree hollows of suitable size for black-cockatoos, the Proponent has agreed to plant 1.2 ha of native plant species in an area just to the north-west of the site. The replanting will also serve to screen the solar farm from local housing. The replanting will comprise of a number of local plant species, including Jarrah and Marri as foodplants for black-cockatoos, at a density of 400 plants per ha. The proposed location for the replanting is flexible but intended to lie between two stands of separated vegetation and thus will improve linkages for a range of species. In addition, the Proponent has agreed to install five artificial black-cockatoo nest tubes (aka Cockatubes) in the remaining woodland to retain nesting potential and encourage more birds to nest.
Chuditch (Dasyurus geoffroii) - Vulnerable No signs of Chuditch were found during survey. However, Chuditch (or Western Quoll) are known to occur in the area where they occupy large home ranges and will cross open paddocks as they transit through the landscape to hunt small vertebrates and large invertebrates, mainly at night. During the day they seek shelter in the hollows of fallen trees, tree limbs, rocky outcrops and burrows. They require large areas of well-structured Jarrah forest and woodland in which to hunt and these habitats are not found on Lots 147 or 250. Therefore, they may occur periodically on the Site as they travel through the landscape especially when the young disperse after weaning, and may take refuge within the few dead fallen trees located within the remnant woodland. However, Chuditch are not likely to depend on the habitats on the site for anything more than brief period of hunting while in transit.	The loss of native vegetation on Lots 147 and 250 is unlikely to impact significantly on Chuditch as it is not intact or extensive enough to constitute critical habitat or an area essential to their survival. While site fencing will be a barrier to other large fauna, including foxes and cats, Chuditch are agile climbers and the fence is unlikely to be a barrier to them. The largest stand of trees in the middle of Lot 147 will therefore remain available for passing Chuditch. Existing fallen trees that contain hollows suitable for Chuditch to shelter in are not common features in agricultural landscapes and therefore the few dead and fallen trees that exist in the development footprint can be retained and moved to a safe location instead of being removed. This will ensure the number of potential hollows for Chudtich remain. Furthermore, if Chuditch are sheltering on the site during vegetation clearing, they could be injured or killed. The Proponent has committed to employ an ecologist to check all habitats and features on site to ensure large fauna, including Chuditch are not at risk of harm. Therefore, no impacts on Chuditch are expected.

2.4.2 Do you consider this impact to be significant?

No

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

No

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

No

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

No

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

No

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

2.10 Is the proposed action a nuclear action?

No

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

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No

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

No

Section 3 - Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area.

The site is comprised of two paddocks in partially cleared Jarrah-Marri forest. Habitats within the paddocks comprises improved grassland on which horses were present and sheep have been grazed historically. The grassland contained a large amount of common weed species. A few isolated trees, of which several were dead, were located in the open paddocks and some stands of remnant Jarrah and Marri vegetation of varying sizes were located within the surveyed area. The smaller stands were generally open and degraded by grazing and weeds. Two larger stands in Lot 147 were still heavily degraded, but appeared less accessible to livestock due to rubble and contained a higher number of native flora.

A botanical survey was conducted in the larger stands of Marri/Jarrah that lie within the PV Array footprint. The survey established that the stands of Jarrah/Marri were completely degraded and contained only a small number of the plant species that could be expected in intact vegetation. A number of common weed species were present throughout the paddocks and dominated the ground flora in the stands of Jarrah/Marri. No conservation significant plant species were found or were likely to be present due to the historical degradation caused by original clearance and subsequent grazing and trampling. An area of approximately 2.1 ha native vegetation is expected to require clearing to allow installation of the solar farm. This is comprised of 1.83 ha of remnant Jarrah/Marri stands, 0.177 ha of isolated or semi-isolated trees in paddocks and 0.09 ha of vegetation on the edge of woodland or around isolated and semi-isolated trees that need to be trimmed or pruned to reduce fuel loading for bushfire management.

Fauna use on the two Lots is limited mostly to common species including invertebrates, frogs, reptiles, birds and some mammals including several introduced pests. Bleating Froglets (*Crinia pseudinsignifera*) and Quacking Frogs (*Crinia georgiana*) were heard in association with the creek to the north and dam in an adjacent paddock to the south, but more are likely to be present and call at other times of the year. No reptiles were seen as the day of survey had unsuitable weather, but several common species are likely to be present. Sixteen common bird species were recorded on or adjacent to the site and Emus (*Dromaius novaehollandiae*) were seen in an adjacent paddock after leaving the site. Notwithstanding the black-cockatoos and Chuditch discussed in section 2, conservation significant species that may infrequently occur on the site but are not expected to be dependent on it or impacted, include Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*), Quenda (*Isoodon fusciventer*), Tammar Wallaby (*Notamacropus eugenii* subsp. *derbianus*), Brush Wallaby (*Notamacropus irma*) and Western False Pipistrelle (*Falsistrellus mackenziei*). Potential risks and impacts on these species are addressed in the Environmental Assessment Report attached in Section 2.

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

The site lies within the Lower-Swan River Catchment with groundwater draining into two sub-catchments which drain to the north-west and south respectively. The sub-catchment that lies to the north-west drains via an unnamed non-perennial water course which joins the Swan River between Cathedral Avenue and St Albans Road. Water flow to the north-west is disrupted by field dams making the creek discontinuous. The soils and vegetation of the northern headwater extends into the north-eastern area of the site. A smaller non-perennial and unregistered tributary of the Susannah Brook sub-catchment flows to the south of the site. Both sub-catchments drain to the Swan River at the base of the scarp.

The Site lies within the Swan River System which is proclaimed as a Surface Water Area under Section 27 of the Rights in Water Irrigation Act 1914 (The RIWI Act). Proclamation of a river system applies more regulatory control to the use, flow and control of surface waters (Waters and Rivers Commission, 2001). Extraction licences are required from surface water on a property if that property lies within a Surface Water Area.

The Swan Groundwater Area lies 3 km west of the Site, is a proclaimed groundwater management area under the RIWI Act. This sits at the base of the Darling Scarp on the Swan Coastal Plain, is used as a freshwater supply and is partly fed by water draining from the catchments within which the Site lies. The Site lies approximately 19 km from the Mundaring Weir Catchment Area.

The map unit covering the northern, central and southern areas of Lots 147 and 250 are classified as L1 for flooding showing that less than 3% of the land unit is at risk of flooding. The watercourse and associated soils on the northern perimeter of Lot 147 and the soils adjacent the creek along the northern boundary of Lot 250 are classified as H1 indicating a 50-70% of the area has a moderate to high risk of flooding.

No surface water was present on the Site but two small field dams have been formed on the watercourse to the north and another on the watercourse to the south. A larger dam can also be seen from aerial photography to the west on the site.

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

The site lies on the edge of the Darling Range escarpment which was originally formed from the Darling Fault separating the east-lying Archaean Yilgarn Craton from the Phanerozoic Perth Basin which overlies the Pinjarra Orogen in the west. The scarp of the Darling Range now lies approximately 15 km to the east of the fault after the escarpment has eroded eastward. The Yilgarn Craton forms the higher ground of the Darling Range and is comprised of metamorphic granites and gneisses. Weathered regolith and laterised soils cover the granites and gneisses of the Darling Range but the rock is frequently shallow and often breaks through the surface forming large megalithic and boulder formations.

The resulting soils are variably shallow, sandy duplexes containing buckshot gravels of more than 20%. The soils on the higher ground are laterites with thick sandy gravel. Soils on the slopes are of loose red-brown gravel and variable quartz sand. Soils along the water courses are comprised of moderate brown silty sand containing pebbles and occasional gneiss and in

depressions collect clayey gravelly sand which can be partly laterised. All soils in this area are well-drained, acidic and poor in nutrients.

The soils in the central portion of Lot 147 are mapped as Code M2 indicating that 30-50% of the map unit has a high to extreme risk of wind erosion. The northern and southern sections of Lots 147 and 250 are mapped as L1 showing that less than 3% of soils have high to extreme risk of wind erosion. The Central area of Lot 147 is classified as L1 which indicates that less than 3% of the land unit is at medium to high risk of the effects of salinity. The northern and southern areas of Lots 147 and 250 are classified as M1 meaning that 10-30% of the land within the map unit are at medium to high risk of salinization.

The study area supports the Dwellingup vegetation complex in medium to high rainfall and the Yarragil complex (minimum development swamps) in medium to high rainfall (both of the Darling Plateau System) (Heddle *et al.* 1978). The site lies within the Jarrah Forest Bioregion designated under the Interim Biogeographic Regionalisation for Australia (IBRA) and is within the Northern Jarrah Forest subregion (DEE, 2012). IBRA regions are used to classify areas with broadly similar characteristics of climate, landform, geology and, flora and fauna. The regions are used to identify threatened features for use in conservation planning.

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

Important natural features are described in Matters of Environment (2019) as submitted with this referral. No outstanding natural features or important values are present on the site. A number of reserves, Bush Forever Sites and National Parks lie within 15 km of the site boundary. The most notable are the John Forrest National Park and Walyunga National Park which lie approximately 4.7 and 5.5 km due south and due north respectively. Both national parks contain large numbers of Jarrah and Marri. Large areas of remnant native vegetation remain between these two National Parks although certain areas are fragmented at the local scale and native vegetation is comprised of many small stands. However, it can be seen in Figure 3 that large pockets of contiguous forest remain.

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

The site lies within the Jarrah Forest Bioregion designated under the Interim Biogeographic Regionalisation for Australia (IBRA) and is within the Northern Jarrah Forest subregion (DEE, 2012). IBRA regions are used to classify areas with broadly similar characteristics of climate, landform, geology and, flora and fauna. The regions are used to identify threatened features for use in conservation planning. Beard *et al*. (1990) describes the original vegetation of the Gidgegannup area as dry schlerophyll forest of trees reaching a height at maturity of between 10 and 30 m, with a mid-dense canopy. Native vegetation prior to European arrival was dominated mostly by Jarrah (*Eucalyptus marginata*), or with a mixture of Jarrah and Marri (*Corymbia calophylla*). Jarrah is associated with the lateritic soils while Marri has a better holding on the poorer leached soils. Understory trees included Bull Banksia (*Banksia grandis*), Sheoak (*Allocasuarina fraseriana*) and Snottygobble (*Persoonia longifolia*).

The project area is comprised mostly of agricultural grassland historically having been cleared

of native vegetation for grazing. Several small stands of native vegetation, clumps of trees and isolated trees remain that are comprised predominantly of Jarrah and Marri trees. Most trees are of moderate age but a number are large and mature and there are some young trees too showing recruitment has occured. The most intact area of native vegetation within the development footprint covers an area of 2.16 ha and has been identified as "*Corymbia calophylla* Low Woodland" in a degraded to completely degraded condition. Since this is the most intact stand of vegetation present on site, the layout of the solar farm has been adjusted so that most impacts on it have been avoided. All other stands and clumps of native vegetation are completely degraded and are comprised of Jarrah and Marri trees with little else.

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

The site has gentle gradients from north to south with a ridge running east to west along the centre of Lot 147. Elevation ranges between 250 and 300 m above height-datum (AHD) with the lowest in the north-west corner and highest on the central western end of Lot 147.

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

The project area lies within a rural setting of agricultural paddocks and remnant vegetation. The primarly use of the site, is grazing horses. Very low density housing lies elsewhere on Lots 147 and 250, and the suburb of Brigadoon lies to the north-west with the nearest residence being 620 m from the boundary of the solar farm.

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

There are no Commonwealth Heritage Places on or surrounding the site. The nearest Commonwealth Heritage Place is Inglewood Post Office approximately 24 km south-west of the project area.

3.9 Describe any Indigenous heritage values relevant to the project area.

Brad Goode and Associates conducted an desktop study for Aboriginal Heritage sites on and around the project area. There are no Aboriginal Heritage Sites within the footprint of the solar farm. Five Aboriginal Heritage sites lie within 1 km of the centre of the site as follows:

- Registered Site ID 3722 – O'Brien Road.
- Place ID 3817 – Brigadoon 24.
- Place ID 17507 – Gidgegannup 01.
- Place ID 17510 – Gidgegannup Soak + Camp 01.
- Place ID 17511 – Balgorup/Big Pond

It is expected that none of these sites will be impacted by the development.

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

Freehold

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

The project area is currently zoned as Rural and is used for agricultural grazing. Although sheep have historically been raised on the site, horses are currently the only livestock present.

Section 4 - Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

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

The solar farm has been arranged to avoid impacts on the largest stand of native vegetation on Lot 147. This stand is also in the best condition despite being classed as degraded to completely degraded. Adjustments have occured through the engineering process to reduce avoidable impacts on important features, including native vegetation and some trees with hollows.

Despite the relatively low level of impact of the development, several management measures are proposed to be implemented in order to ensure identified impacts do not exceed those predicted.

1. Adopt weed and dieback hygiene management measures for vehicles, equipment and personnel. Measures are to consider as a minimum:

- Vehicle cleanliness prior to travelling to Teewana Solar Farm

- Footwear and clothing cleanliness prior to travelling to the Site

- Personnel to be prohibited from moving outside the development boundary on Lots 147 and 250

- Personnel to be discouraged from entering surrounding woodland during breaks or after work

- Vehicles to be checked for weeds and soil prior to moving to other sites around Western Australia.

2. Vehicles and plant used during installation will be maintained to manufacturers recommendations to reduce the risk of hydrocarbon spill (and reduce fire risk).

3. 1.2 ha of landscape planting to be of local species found in adjacent woodland and suited to

the soils of Lots 147 and 250. Planting scheme would provide other native fauna with shelter and foraging opportunities when moving across the landscape.

4. A minimum of five artificial nesting tubes suited for black-cockatoos (e.g. Cockatubes) are to be installed in suitable locations in surrounding native vegetation that will be retained to replace the two suitable tree hollows that are to be lost.

5. Vegetation clearance should ideally be scheduled outside the peak nesting seasons for birds (August to early December) and for Forest Red-tailed Black-cockatoos between April and June. If this cannot be achieved, trees should be checked for nesting birds prior to clearing. Trees in which active nests are found should be left until birds have hatched and fledged.

6. Vegetation clearance should be carried out under the supervision of a qualified and experienced ecologist or zoologist who should conduct the following checks under a Section 15 license of the *Biodiversity Conservation Act 2016*:

- Check trees with hollows for black-cockatoo occupation prior to felling

- Attend removal of regolith boulders and fallen deadwood to help capture and safely relocate displaced fauna

- Attend tree felling to capture and safely relocate fauna that may be roosting or sheltering inside.

7. Fallen trees and dead trees that need felling, are to be retained on Site by relocating them as fallen deadwood around the perimeter of Lots 147 and 250. This will provide shelter and resources for existing fauna and potentially roosting cavities for Chuditch that are likely to be present in the area. Consideration of placement should be given to fire risk.

8. Regolith boulders and rubble that need to be removed should be relocated to a location adjacent remaining vegetation and piled to offer refugia for reptiles, small mammals and invertebrates.

9. Vegetation (fuel loading) control during operations should be conducted using mechanical or biological means and to avoid chemicals if possible. If chemicals are the only option, they should be used sparingly and in discrete applications not broadscale.

10. Soil erosion under panels is to be monitored annually by the operator and corrective action taking if erosion occurs.

11. Notwithstanding the recommendations from the bushfire consultant, a suite of fire management measures should be adopted to reduce the risk of bush fires and associated threat to surrounding habitats, fauna and property. These measures should include consideration of the following:

- selection, maintenance and operation of plant, vehicles and tools

- reduction of fuel loads and volume of combustible materials on the site

- control of vegetation under overhead export cables in accordance with state requirements

- control of hot work considering ambient conditions and fire risk

- control of flammable liquids and combustible materials stored on site

- remote monitoring of switchgear and loading

- firefighting equipment appropriate to the most credible fire risks on site

- awareness and training of site staff in minimizing fire risk and fire response actions.

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

- Maintain and enhance existing numbers of tree hollows that are suitable for black-cockatoos by installing five artificial nest tubes in surrounding native vegetation

- Maintain existing surface water in the area by monitoring erosion and pro-actively managing erosion if signs are found of its occurrence

- Protect and maintain foraging habitat on or near the site by managing vehicle and visitor hygiene for weeds and plant pathogens, and planting and maintaining 1.2 ha of native vegetation using local species but dominated by Jarrah and Marri

- Retain fallen dead wood on site as potential shelter for Chuditch.

Section 5 – Conclusion on the likelihood of significant impacts

A checkbox tick identifies each of the matters of National Environmental Significance you identified in section 2 of this application as likely to be a significant impact.

Review the matters you have identified below. If a matter ticked below has been incorrectly identified you will need to return to Section 2 to edit.

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

No

5.1.4 Listed threatened species or any threatened ecological community

No

5.1.5 Listed migratory species

No

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

No

5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

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

No impacts on Chuditch are expected.

Black-cockatoos
The potential indirect impacts on black-cockatoos as a result of Teewana Solar Farm would be limited to the loss of 2.01 ha of Jarrah/Marri trees that offers foraging and breeding habitat. This includes the loss of two trees with hollows suitable for black-cockatoos to nest in. All other essential resources necessary to sustain the black-cockatoos in the area such as standing water, roost locations and a number of other potential nesting hollows within adjacent forests and woodlands would be retained. The installation of a solar farm at this location is highly unlikely to affect the ongoing use of the area by black-cockatoos. Potential indirect impacts through the introduction of Dieback or invasive weeds would be controlled during construction and operations. Similarly, the risk of bushfire would be controlled through ongoing fuel-load reduction and measures to reduce the risk of starting fires. Direct impacts on individual black-cockatoos will be avoided by management actions leading up to clearing the trees. In addition, a planting scheme to reduce visual impacts for local residents will use locally sourced native plant species that are known to provide food opportunities for black-cockatoos and eventually provide foraging, roosting and nesting habitat. Furthermore, the location of this replanting will provide connectivity between two separate stands of native vegetation and help protect a watercourse. Five artifical nests will also be provided in remaining native vegetation adjacent to the site, thus mitigating for the loss of the unused tree-hollows and provide long-term nesting opportunities for Carnaby's and Forest Red-tailed Black-cockatoos.

The significant impact criteria given in DoE (2013) *Matters of National Environmental Significance, Significant impact guidelines 1.1*, are listed below with an explanation against each to examine whether the loss of the one hollow will have a significant impact on black-cockatoos.

Lead to a long-term decrease in the size of a population
The two tree hollows do not appear to have been nested in despite being of the right form, and therefore are unlikely to have contributed to the current population or recruitment of individual birds. Both have the potential of being used by black-cockatoos in the future and for this reason, five artifical nest tubes will be installed in surrounding woodland.

The 2.01 ha of native vegetation that needs to be removed provide foraging and roosting habitat to black-cockatoos but this resource does not appear to be used heavily as evidenced by the

low numbers of Marri nuts found during survey. Furthermore, this habitat is relatively common in the Gidgegannup area with more than 40% of the area within 15 km being covered in native vegetation and most of that is in the Perth Hills and in similar landscape. The vegetation surrounding the site also appears to be in better condition than the stands of Jarrah and Marri being removed. More than 7000 ha of the surrounding native vegetation is also vested in State authorities and therefore unlikely to be impacted. The portion of native vegetation that will need clearing for the solar farm amounts to less than 0.007% of the total native vegetation and 0.05% of the land managed by State authorities.

Therefore, it is unlikely that the loss of 2.01 ha of Jarrah and Marri vegetation and two unused nesting hollows have a real chance or possibility of leading to a long-term decrease in the size of the population of Baudin's Black-cockatoo, Carnaby's Black-cockatoo or Forest Red-tailed Black cockatoo or reduce the success of individual birds in the area.

Reduce the area of occupancy of the species
Black-cockatoos are expected to continue to use Lots 147 and 250 once the solar farm has been installed. Therefore, it is highly unlikely that the construction and operation of the proposed solar farm has a real chance or possibility of reducing the area of occupancy of the population or area that individual birds can occupy.

Fragment an existing population into two or more populations
Black-cockatoos are active at the landscape scale, but the loss of a small area of Jarrah and Marri vegetation at the location of the project area and two potential nesting hollows are not a landscape-scale impact. It is also highly unlikely that any black-cockatoo will avoid the solar farm once constructed Therefore, it is highly unlikely that the loss of 2.01 ha of vegetation and two hollows have a real chance or possibility of fragmenting the population.

Adversely affect habitat critical to the survival of a species
According to DEE (2017), *Revised draft referral guideline for three threatened black cockatoo species*, critical habitat for black-cockatoos in the Gidgegannup area is comprised of:
- extensive areas of high quality Jarrah-Marri forest vested to the Conservation Commission
- foraging areas associated with breeding black-cockatoos
- other stands of high-quality forest, woodland and isolated trees
- known nesting trees in the forests, woodlands and paddocks
- roosting sites.

Tree hollows cannot be considered critical habitat in isolation from the other resources black-cockatoos require for successful breeding. It has been established that the habitat to be cleared is not extensively used by black-cockatoos despite them breeding and roosting around the site. The birds present in the area appear to rely instead on other stands of habitat that offer higher-quality resources. Thus, critical habitat in the Gidgegannup area will continue to function intact, as far as it stands at present, despite the loss of 2.01 ha of foraging habitat and two unused hollow-bearing trees. Consequently, the loss of 2.01 ha of Jarrah/Marri vegetation and two hollows is not considered an impact that affects habitat critical to the species' survival. Therefore, it is unlikely that the proposed solar farm has a real chance or possibility of adversely affecting critical habitat for black-cockatoos.

Disrupt the breeding cycle of a population
The loss of a small amount of low-use foraging habitat and two unused tree hollows, in the landscape of the project area does not have a chance or possibility of disrupting the breeding

cycle of the population or individuals now or in the future.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The loss of 2.01 ha of Jarrah and Marri trees and the loss of two unused but suitable tree hollows will result in a small but insignificant decrease in habitat available for black-cockatoos in the Gidgegannup area. It has been shown that the two tree hollows contain no sign of prior nesting and the habitats appear not to have been used extensively for foraging. Given the large areas of remaining forest, woodland and isolated trees surrounding the project area, much of which is in better condiiton than the area to be lost and a significant porportion is vested in State authorities, it is considered highly unlikely that it will result in a real chance or possibility of causing a decline of the population or impact significantly on individuals, now or in the future.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Through the application of site hygiene measures, the potential for introducing invasive species that are harmful to black-cockatoo remain negligible. Therefore, the solar farm development is not considered likely to have a real chance or probability of causing invasive species to become established in black-cockatoo habitat.

Introduce disease that may cause the species to decline

Through the application of site hygiene measures, the potential for introducing invasive species (and plant pathogens) will be negligible. The solar farm development is not considered likely to have a real chance or probability of introducing disease that could cause any species of black-cockatoo to decline.

Interfere with the recovery of the species

The proposed solar farm is not taking place within an area that is being managed to help the three black-cockatoo species recover. Additionally, the solar farm will not interfere with actions being implemented elsewhere to help recovery of the black-cockatoos. The development is not considered likely to have a real chance or probability of interfering with the recovery of any of the three species of black-cockatoo in Western Australia.

The three key considerations for significant impacts on black-cockatoos on page 27 of DEE (2017) are also examined below.

Any loss of nesting or breeding habitat

While the loss of two unused nest hollows potentially impacts future nesting and breeding habitat, the loss must be viewed in context of the surrounding landscape. While both hollows are in isolated trees which are known to be susceptible to windthrow, they are relatively well protected by the large stands of forest surrounding the project area. The landscape surrounding the project area is dominated by high-quality forest and woodland, all of which constitutes better quality nesting and breeding habitat that the native vegetation on the project area appears to offer. Furthermore, a substantial portion of the remaining habitat within 15 km of the site is vested in state authorities and therefore protected. It is known that Forest-Red-tailed Black-cockatoos breed in the area but they were not recorded on the project area and foraging signs in the project area were few. This suggests that the black-cockatoos are acquiring adequate resources through their breeding period in the surrounding landscape and not a significant quantity from the area that would be cleared. In this regard, the loss of the two

hollows and small area of foraging habitat does not constitute a significant impact for the populations or individuals.

Any loss of very high to high quality foraging habitat

Although the foraging habitat assessment scoring tool concluded that the project area contained quality to very high quality foraging habitat depending on the species, the apparent use of the site by black-cockatoos did not reflect this assessment at the time of survey. The relatively scant feeding remains show that over the last couple of years, black-cockatoos have not targetted the trees in the development footprint to the extent that indicates quality habitat. The presence of two young families and what appeared to be a courting pair (in April) of Forest Red-tailed Black-cockatoos in the habitat surrounding the site, suggests that resources are adequate and thus that they must rely on foraging habitat offsite. Furthermore, the area of habitat needing clearing is insignificant in terms of the large area of forest and woodland in the surrounding landscape and is highly unlikely to cause a significant impact on black-cockatoos at the population or individual level.

Your mitigation commitments which reduce the likelihood of your action interferring substantially with the recovery of a black-cockatoo

The mitigation commitments defined in section 4.1 will help avoid direct impacts on black-cockatoos. Conversely, the provision of five artificial nesting tubes and a wider variety of foodplants in the proposed replanting will help support black-cockatoos in the Gidgegannup area.

Therefore, it is concluded that the action of developing the Gidgegannup Solar Farm will not significantly impact on any black-cockatoo species or individuals and the action is not a Controlled Action.

Section 6 – Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

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

Yes. Teewana Farm (through HFM Asset Management), sought early input to the planning of the solar farm and consulted on the layout and environmental impacts to avoid. Teewana has enthusiastically committed to environmental management measures proposed and commited to revegetation and the installation of artificial nesting tubes despite the surveys showing that the nesting hollows had not been occupied or that the habitat was extensively used by black-cockatoos.

Teewana Farm is owned by a consortium of members, each/most of which have extensive responsibilities of land ownership throughout Western Australia. Other interests include extensive retail premises, rural and commercial properties. Their interests are partly managed by a large property management practise based in Perth and jointly employ a large number of Western Australians that depend on good stewardship of the management body for their income. A large number of premises under their co-ownership have extensive energy, waste, maintenance and transport needs all of which require good environmental management. In this regard, the oversight of the Teewana Solar Farm ownership and management have already demonstrated responsible environmental management.

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

Teewana Farm or its owners have not had any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources.

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

No

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

No

Section 7 – Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source).

Reference Source	Reliability	Uncertainties
Department of the Environment and Energy (2017) Revised draft referral guideline for three threatened black cockatoo species.	Department of the Environment and Energy	Nil
Department of Environment and Conservation (DEC)(2008) Forest Black Cockatoo (Baudin's Cockatoo Calyptorhynchus baudinii and Forest Redtailed Black Cockatoo Calyptorhynchus banksii naso) Recovery Plan.	Department for Environment and Conservation	Nil
Department of Parks and Wildlife (DPAW) (2013) Carnaby's Cockatoo (Calyptorhynchus latirostris) Recovery Plan.	Department of Parks and Wildlife	Nil
CALM (2006) Draft Forest Black Cockatoo (Baudin's Cockatoo Calyptorhynchus baudinii and Forest Red-tailed Black Cockatoo Calyptorhynchus banksii naso) Recovery Plan 2005-2014. Department of Conservation and Land Management, Perth.	Department of Conservation and Land Management	Nil
Peck, A., Barrett, G. and Williams, M. (2018). The 2018 Great Cocky Count: a community-based survey for Carnaby's Black-Cockatoo (Calyptorhynchu latirostris), Baudin's Black-Cockatoo (Calyptorhynchus baudinii) and Forest Red-tailed Black-Cockatoo (Calyptorhyncus	BirdLife Australia	Nil

Reference Source	Reliability	Uncertainties
banksii naso). BirdLife Australia, Floreat, Western Australia.		
Cooper, C.E., Withers, P.C., Mawson, P.R., Johnstone, R., Kirkby, T., Prince, J., Bradshaw, S.D. and Roberston, H. (2003). Characteristics of Marri (Corymbia calophylla) fruits in relation to the foraging behaviour of the Forest Red-tailed Black Cockatoo (Calyptorhynchus banksii naso). Journal of the Royal Society of Western Australia, 86: 139-142.	University of Western Austrlia, University of New England, CALM, WA Museum and Perth Zoo.	Nil
Department of the Environment (2013). Matters of National Environmental Significance, Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999	Department of the Environment	Nil

Section 8 – Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.0 Provide a description of the feasible alternative?

No feasible alternatives have been identified to the proposed action of constructing Teewana Solar Farm on Lots 147 and 250. The southern slopes of Lot 147 were inspected in June 2018 but the southern facing slope would have required extensive earthworks to achieve the right level for the solar panels. The project area was selected because it has ideal contours and a grid connection with adequate capacity through which the generated electricity can be exported. Retention of the native vegetation and trees with nesting hollows result in shadowing the solar array, substantially reduce electricity generation and increase fire risk. Visual impacts, impacts on Aboriginal Heritage or other values are also minimised by the selection of Lots 147 and 250.

By not constructing the solar farm, an estimated 24,000,000 kWh of electricity per annum would need continued generation by fossil fuels, resulting in the continued release of 22,080 tonnes of CO2 as a greenhouse gas annually.

8.1 Select the relevant alternatives related to your proposed action.

8.27 Do you have another alternative?

No

Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

Director

9.2.2 First Name

James Evangelos

9.2.3 Last Name

Litis

9.2.4 E-mail

Jim@primewest.biz

9.2.5 Postal Address

GPO Box H555
Perth WA 6841
Australia

9.2.6 ABN/ACN

ACN

121917155 - Teewana Farm Pty Ltd

9.2.7 Organisation Telephone

0418953385

9.2.8 Organisation E-mail

Jim@primewest.biz

9.2.9 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable

Small Business Declaration

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small a business entity and confirm that I qualify for a small business exemption.

Signature:..... Date: .....

9.2.9.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.2.9.3 Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made

Person proposing the action - Declaration

I, JAMES EVANGELOS LITIS, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature:..... Date: .....6/6/19.....

I, JAMES EVANGELOS LITIS, the person proposing the action, consent to the designation of TEEWANA FARM PTY LTD. as the proponent of the purposes of the action describe in this EPBC Act Referral.

Signature:..... Date: .....6/6/19.....

9.3 Is the Proposed Designated Proponent an Organisation or Individual?

Organisation

9.5 Organisation

9.5.1 Job Title

Senior Project Manager

9.5.2 First Name

Scott

9.5.3 Last Name

Brotherwood

9.5.4 E-mail

Scott.Brotherwood@hfmassets.com.au

9.5.5 Postal Address

Mezzanine

15-17 William Street
Perth WA 6000
Australia

9.5.6 ABN/ACN

ABN

71105493221 - HFM ASSET MANAGEMENT PTY LTD

9.5.7 Organisation Telephone

08 9213 7100

9.5.8 Organisation E-mail

Scott.Brotherwood@hfmassets.com.au

Proposed designated proponent - Declaration

I, SCOTT BROTHERWOOD, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature: S. Brotherwood Date: 5 JUNE 2019

9.6 Is the Referring Party an Organisation or Individual?

Organisation

9.8 Organisation

9.8.1 Job Title

Director and Principal

9.8.2 First Name

Barry

9.8.3 Last Name

Shepherd

9.8.4 E-mail

bshepherd@moenviron.com

9.8.5 Postal Address

6 MAITLAND RISE
Woodvale WA 6026
Australia

9.8.6 ABN/ACN

ABN

54615415328 - MATTERS OF ENVIRONMENT PTY LTD

9.8.7 Organisation Telephone

411487743

9.8.8 Organisation E-mail

bshepherd@moenviron.com

Referring Party - Declaration

I, BARRY SHEPHERD, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature: B. Shepherd Date: 5th JUNE 2019

Appendix A - Attachments

The following attachments have been supplied with this EPBC Act Referral:

1. M18008_EPBC Figure 3 Surrounding Vegetation.jpeg
2. MOE18001_REP_Flora and Veg Appendix 4 Rev0.pdf
3. MP18008 Teewana Solar Farm EPBC Enviro Survey Rep Rev 1.pdf
4. MP18008 Teewana Solar Farm Env Assessment Rep Rev 1.pdf
5. MP18008 Teewana Solar Farm Site Boundary.zip
6. MP18008_EPBC Figure 1 Site Plan.jpeg
7. MP18008_EPBC Figure 2 Vegetation and Tree Clearance.jpeg