EPBC Act referral

Australian Government
Department of Agriculture, Water and the Environment

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

Title of proposal	2021/9109 - CDSCC solar array

Section 1

Summary of your proposed action

1.1 Project industry type Commonwealth

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

Overview

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) proposes to install a new solar array of about 990 kVA capacity (the project) located at the Canberra Deep Space Communication Complex (CDSCC) at Tidbinbilla in the ACT (Block 254).

The solar array would be constructed within an area of about 1.7 hectares that has been predominantly cleared and located outside the boundary fence line to the north-west of the main building complex. Each solar panel would be supported by a 1.1 metre deep pole with associated trenching for new cables to be included as part of the project.

The project also includes the installation of a 22 kV powerline that would be installed underground from the solar array, south along fenceline and connect to existing electrical services at the facility.

The project site is located in a rural environment, on land predominantly cleared of native vegetation due to past agricultural activities and the development of the CDSCC. The land on which the project site is located on is owned by the Commonwealth Government of Australia and located about 20 kilometres south-west of the city of Canberra.

Construction access would be via the existing access roads and security gate to the east of the proposed solar array within the CDSCC facility and within the proposed disturbance area. A security fence would be constructed around the solar array. No demolition of any existing facilities is proposed. Direct impacts of the proposed action would be largely limited to the removal of groundcover vegetation in the area of the solar array and for trenching of the 22kV cable, which is about 500 metres in length and 450 millimetres wide. Impacts for the cable trench would be temporary, with groundcover allowed to regenerate following construction.

Noise and air impacts from the proposal would be temporary and short-term in nature, for the duration of the construction period. There is not anticipated to be any substantial ongoing increase in noise impacts during operation of the project that exceed the existing conditions at the site. There are no adjacent sensitive receivers that are likely to be impacted by the proposed action. For information on vegetation clearing please refer to attachment ‘CDSCC Referral_EcologyV2’.

The solar array would be used to provide an additional long term power supply for the CDSCC site to supplement the existing utility supply. This would reduce the facility’s cost of power and is aligned with the CSIRO’s 2020-2030 Sustainability Strategy priorities of having a sustainable property portfolio and transitioning to a clean energy future. Dramatic reductions in recent years in cost of solar array technology have altered the economics of solar array installations. This, coupled with the recent steep increase in utility power supply costs, of about 30 percent in Australia, have significantly reduced pay back periods for solar power. CDSCC operates four large antennas as part of NASA’s Deep Space Network, supporting spacecraft throughout the solar system, which the solar array would assist in powering.

The construction of four antennas at the site was previously assessed and approved by the Australian Government (Reference Number: 2009/4895 and 2012/6633). In addition, the current project was previously approved at an alternative location within the CDSCC site (Reference Number: 2019/8527). The project requires relocating due to constructability issues at the previous location.

Key elements

The area in which the solar array would be constructed is located north-west of the main building complex, with the fenceline located on its eastern boundary and open grassland to the north, west and south. Larry’s Creek is located adjacent to the open grassland on the western side of the site.

The project would include:

- 37 rows of solar units, with each unit having the following characteristics:
  - The unit would be about three metres in height
  - Comprising two solar modules each about two metres in length
  - Be supported by a pole 1.1 metres below the ground surface
  - There would be a distance of 4.5 metres between rows measured pole to pole
- A trenched cable connecting the CDSCC power house to the 22 kV transformer and switchgear for the solar array
- Associated cabling from array panels to solar inverters and transformer
- DC to AC conversion equipment.

The remnant tree and saplings within the site are proposed to be removed. The mature tree was identified by RAOs as an important tree, but it is unlikely to meet the criteria to be of Commonwealth Heritage value.

The tree was assessed by an arborist (see attached 'Tree Report Tidbinbilla Jan 21') who concluded that:

- It is one of many similar trees in the valley

- There are no scars on the bole or other evidence which could lead one to the possibility of an indigenous association with the tree
- There is no indication of the tree having habitat value. Except for occasional cover for birds it is not of significance for habitat

This assessment was supported by the heritage consultant in their Cultural Heritage Assessment, which noted 'the tree is not a culturally modified tree' and was unlikely to meet the criterion of the place's importance as part of Indigenous tradition.

An assessment has been made by the proponent on not removing the tree and the following information is provided.

Regarding the impact of leaving the tree in place:

- Loss of 10x rows of 22 due to tree footprint = ~130kW
- Shading on further 8x 22 rows = ~104kW
- Additional costs for more extensive trenching
- Additional costs and delays for redesign
- Additional costs & delays to modify connection application.

The contractor has advised that they are highly unlikely to be able to recover the lost capacity by shifting panels due to limitations imposed by:

- Steep gradients at west
- Steep south facing gradients at south-west
- Gully at north. antenna exclusion zone to the east around DSS45. JPL/NASA require 100 metre radial clearance from the centre of the antenna.

By reducing the size of the array to allow for the tree as well as the subsequent shading caused by the tree, the energy produced by the system will reduce by an estimated 14.1%. It is currently estimated that the PPA contractor will increase the currently agreed tariff rate by 12.8% to cover this loss. It is currently estimated that the project will lose around $710,000 in savings over the 15 year term of the PPA if the tree is required to be protected. This is around 20% of the originally estimated savings.

It is concluded that the proposed development action is likely to have an impact on the environment, however, that impact is not assessed as being significant and can be mitigated.

Project schedule

Subject to approval of the project, construction is planned to commence in May 2022 and is expected to take about three to four months to complete. Construction is expected to be completed by the end of August 2022.

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

See Appendix B

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

The project site is located about 20 kilometres south-west of the city of Canberra and about four kilometres west of the southern suburbs of Canberra. The site is located in rural setting. The project would predominantly be located on previously cleared land, dominated by native groundcover species.

The topography of the study area is undulating, becoming hilly outside the CDSCC boundary. It is situated between the Bullen Range to the east and Tidbinbilla Range about seven kilometres to the west.

The study area is located between the Murrumbidgee River and Paddy's River, south of their confluence. Larry's Creek occurs about 75 metres to the west of the project site and drains into Paddy's River about 1.5 kilometres north of the study area. Two ephemeral drainage lines occur within the vicinity of the project site. The complex contains four operational antennas on site.The project is located to the north-west of the existing complex.

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 proposed development footprint is 1.7 hectares, comprised of a disturbance footprint of 1.66 hectares for the solar array (includes a buffer around the array for construction access and temporary impacts) and 0.025 hectares for the 22kV cable trench. Groundcover would be mostly retained and allowed to regenerate beneath the solar array, as would groundcover in the location of the 22kV cable trench following construction. The solar array has been designed to minimise impacts outside of the maximum required disturbance footprint.

An assessment has been made by the proponent on not removing the tree and the following information is provided.

Regarding the impact of leaving the tree in place:

-Loss of 10x rows of 22 due to tree footprint = ~130kW

-Shading on further 8x 22 rows=~104kW

-Additional costs for more extensive trenching

-Additional costs and delays for redesign

-Additional costs & delays to modify connection application

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1.7 Proposed action location

Address - Canberra Deep Space Communication Complex, Tidbinbilla, ACT, 2620, Australia

1.8 Primary jurisdiction Australian Capital Territory

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

☐ Yes ☑ No

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

☐ Yes ☑ No

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

Start Date 01/05/2022
End Date 31/08/2022

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

The land on which the development is proposed is owned by the Commonwealth Government of Australia, therefore the development is subject to approval under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

CDSCC is subject to the Australian Capital Territory (Planning and Land Management) Act 1988 and operates under an approved Development Control Plan Paddy's River, Section 214 and 215 (Canberra Deep Space Communications Complex) DCP No: 136/93/0053 issued by the National Capital Authority.

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

Consultation was undertaken with Recognised Aboriginal Organisations (RAOs) to inform them of the proposal and to organise representation during the field survey and subsequent test excavations. Contact was made by email, letter and phone to the following RAOs:

- Buru Ngunawal Aboriginal Corporation (BNAC)
- King Brown's Tribal Group Pty Ltd (KBTG)
- Mirrabei (a listed ACT RAO, formerly know as Little Gudgenby River Tribal Council)
- Ngarigu Currawong Clan (Ngarigu).

Further information on the consultation process is provided in 'CDSCC_Solar Array_Heritagev4.4_Redacted'.

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

The construction of four antennas at the CDSCC, to the east of the project site, was approved by the Australian Government in two separate referrals (Reference Number: 2009/4895 and 2012/6633). In addition, the current project was previously approved at an alternative location within the CDSCC site (Reference Number: 2019/8527). The project requires relocating due to constructability issues at the previous location.

A biodiversity assessment was conducted, including field surveys on 22 March 2021 to identify potential impacts on biodiversity matters. Please refer to 'CDSCC Referral_EcologyV2'. In addition, a tree assessment of the tree to be removed was conducted on 13 January 2021. Please refer to 'Tree Report Tidbinbilla Jan 21' for further information.

An Aboriginal cultural heritage assessment was conducted for the proposed action, including field surveys, which commenced 31 March 2021. Please refer to 'CDSCC_Solar Array_Heritagev4.4_Redacted'.

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

☐ Yes ☑ No

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

☐ Yes ☑ No

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Section 2

Matters of national environmental significance

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

☐ Yes ☑ No

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

☐ Yes ☑ No

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

☐ Yes ☑ No

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

☑ Yes ☐ No

Species or threatened ecological community

A desktop assessment and database search was carried out to identify any listed species and/or threatened ecological communities listed under the EPBC Act that are likely to occur within the project site or study area. Matters identified as potentially occurring were based on recent records in the locality and/or presence of suitable potential habitat in the study area. An assessment of the potential impacts on these matters includes both direct and indirect impacts from the project.

Suitable habitat exists within the project site or the wider study area to potentially support two ecological communities, three bird species, one insect species, four flora species, and one mammal species (see below).

The study area for the purposes of this assessment is defined as the area within 500 metres of the project site. The locality is defined as the area within 10 kilometres of the project site.

-White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland

Impact

No impact

The EPBC Act listing of this critically endangered ecological community and associated derived native grasslands could potentially occur within the Canberra Deep Space Complex site, or in woodlands surrounding the site. However, this community was not recorded in, or within the vicinity of the project site. The project site contains native grassland but is not the derived grassland form of this community, as no key species (White Box, Yellow Box, Blakely's Red Gum trees) occur around the site. Trees within the site are limited to one mature Apple Box (Eucalyptus bridgesiana) and some small regenerating Apple Box saplings. The Box-Gum Woodland within the CDSCC boundary occurs about 150 metres to the east of the project site.

The native grassland in the site is derived from an Apple Box woodland community previously cleared for agriculture and development of the CDSCC site with a small patch of regenerating Apple Box woodland also present within the site.

Vegetation impacts would be restricted to one mature Apple Box tree, some small regenerating saplings and 1.7 hectares of grassland that does not form part of this community and construction is unlikely to indirectly impact on the community to the east. As such, this project will not affect this critically endangered community.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-11'

Species or threatened ecological community

-Natural Temperate Grasslands of South Eastern Highlands

Impact

No impact

Native grassland identified during the recent site surveys is derived from an Apple Box woodland community previously cleared for agriculture and development of the CDSCC site and is not a naturally occurring grassland community. Apple Box trees are present in the project site. Therefore the native grassland recorded on site does not meet the criteria for the EPBC Act listed critically endangered Natural Temperate Grasslands of South Eastern Highlands, which is a naturally occurring grassland. In addition to the grassland being derived from a woodland vegetation community, the landscape position is unlikely to be suitable for the community, grassland within the project site lacks diagnostic species diversity of the community and it is heavily modified by regular mowing and disturbance.

Grassland within the project site and adjacent to the site contains a high species abundance of introduced vegetation, including Phalaris aquatica, Plantago lanceolata, Paspalum dilatatum and Hypochaeris radicata.

This community did not occur within the project site boundary or in the study area, and as such, this project is unlikely to have an adverse impact on the critically endangered community.

Please refer to ‘CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-12’

Species or threatened ecological community

- Regent Honeyeater
Anthochaera phrygia

Impact

Negligible impact

Although this species or species habitat is predicted to occur in the area there is a lack of records of the species in the locality. Due to the limited woodland in the study area from past clearing, the species is unlikely to be reliant on potential habitat in the project site. Trees present in the project site are not key eucalypts the species is known to forage on and there are no mistletoes within the trees.

The removal of potential woodland habitat (restricted to one mature tree and small regenerating saplings) in the context of the additional potential habitat in the study area and locality, is unlikely to substantially impact on the species, which is likely to utilise preferred woodland habitat outside the study area where significant large numbers of mature trees, a high canopy cover and an abundance of mistletoes is present, habitat known to be favoured by the species.

As such, it is unlikely that the project would have a significant impact on the species.

Please refer to ‘CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-12’

Species or threatened ecological community

- Superb Parrot
Polytelis swainsonii

Impact

Negligible impact

Although this species or species habitat is predicted to occur in the area there is a lack of records of the species in the locality. Trees and groundcover in the project site may be utilised by the species for foraging, however unlikely to provide important habitat due to the small area of the project site. The trees within the site do not contain any hollows to provide potential breeding habitat for the species.

The removal of potential woodland habitat (restricted to one mature tree, small regenerating saplings and grassland) in the context of the additional potential habitat in the study area and locality, is unlikely to substantially impact on the species, which is likely to utilise preferred woodland habitat outside the study are, including areas of Box-Gum Woodland, known to provide important habitat for the species.

As such, it is unlikely that the project would have a significant impact on the species.

Please refer to ‘CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-13’

Species or threatened ecological community

Swift Parrot
Lathamus discolor

Impact

Negligible impact

Although this species or species habitat is predicted to occur in the area there is a lack of records of the species in the locality. Due to the limited woodland in the study area from past clearing, the species is unlikely to be reliant on potential habitat in the project site. Trees present in the project site are not favoured feed trees or commonly used lerp infested trees.

The removal of potential woodland habitat (restricted to one mature tree and small regenerating saplings) in the context of the additional potential habitat in the study area and locality, is unlikely to substantially impact on the species, which is likely to utilise preferred woodland habitat outside the study area where eucalypts flower profusely, habitat known to be favoured by the species.

As such, it is unlikely that the project would have a significant impact on the species.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-13'

Species or threatened ecological community

- Golden Sun Moth
Synemon plana

Impact

Negligible impact

Native grasslands were recorded during recent site surveys of the project site, which contained Rytidosperma species. These grassland species are known to provide habitat for the Golden Sun Moth. The species has not been previously recorded in the locality. The species main threats include degradation of habitat, invasion of habitat by weeds and colonisation of dense Kangaroo Grass, which is the dominant grass species within the project site. As such the grassland in and around the project site is likely to only provide marginal habitat for the species if present. The grassland also has limited availability of microhabitats found in open grasslands with bare ground between tussocks, which are necessary for the species to attract breeding partners. The project would not create a barrier to movement for this species, if present in the area.

Given the degraded and modified nature of the project site, including regular mowing and an abundance of introduced weed species, low relative abundance of Rytidosperma species recorded within the project site, lack of suitable microhabitats, the presence of additional grassland habitat adjacent to the project site and within the study area, and lack of local records, it is unlikely that this species will be reliant on potential habitat within the project site boundary. As such, it is unlikely that that the project would have a significant impact on the species.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-14'

Species or threatened ecological community

- Greater Glider
Petrogale penicillata

Impact

No impact

Habitat for this species is mapped as occurring over four kilometres to the south-west of the project site, however no woodland connected to large tracts of potential habitat exists within the project site, so this species will not occur here. The species is forest dependent and prefers older tree age classes in moist forest types, with hollow-bearing trees present for breeding, which is not present in the project site.

Habitat loss and fragmentation through clearing are major threats to the species. The fragmented nature of the woodland in the study area is unlikely to provide habitat for the species due to its limited ability to recolonise these areas. The single mature tree is located well beyond the glide distance of this species.

Given lack of woodland and connected habitat and trees available for this species in the project site, the species would not occur in the area. It may be present in the woodland in the wider study area.

As only one tree and some small regenerating saplings will be impacted by the proposal, which would not provide habitat for the species, this project will not have a negative impact on the Greater Glider

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-14'

Species or threatened ecological community

- Grey-headed Flying-fox
Pteropus poliocephalus

Impact

Negligible impact

Although this species or species habitat is predicted to occur in the area there is a lack of records of the species in the locality. Due to the limited woodland in the study area from past clearing, the species is unlikely to be reliant on potential habitat in the project site.

The removal of potential woodland habitat (restricted to one mature tree and small regenerating saplings) in the context of the additional potential habitat in the study area and locality, is unlikely to substantially impact on the species, which is likely to utilise preferred woodland habitat outside the study area.

As such, it is unlikely that the project would have a significant impact on the species.
Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-14'

Species or threatened ecological community

- Smoky Mouse
Pseudomys fumeus

Impact

No impact
The Smoky Mouse typically prefers woodland with a heathy understory and high floristic diversity, especially a high diversity of shrubs. They require dense groundcover and a high quantity of shelter sites, and are not found in disturbed areas.
Habitat for this species has previously been recorded approximately 5.3 kilometres west of the proposal site, and suitable habitat may occur in the locality. Suitable habitat for this species is not available within the CDSCC site, or within the project site itself.
The habitat within the project site has been highly disturbed and modified by the construction of the CDSCC, and by regular mowing of the grassland within the project site. There are no shrubs present in the project site and trees are sparse and restricted to one mature trees and small regenerating saplings. As such, the site is unlikely to support this species, and the project will not have an adverse effect on the species.
Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-15'

Species or threatened ecological community

- Leucochrysum albicans var. tricolor
Hoary Sunray

Impact

Impact unlikely
This species is known to occur in disturbed sites, in associated with Box-gum woodlands and native grasslands, and could potentially occur within the project site and wider study area. This species relies on bare ground to germinate, and a heavy dominance of groundcover species and grasses such as Themeda triandra would make seed germination for this species unlikely in the project site.
Given the abundance of cover within the project site and the abundance of weed species, it is unlikely that conditions are suitable for this species to persist in the project site. There was not a high occurrence of bare ground suitable for this species to germinate, and the area is regularly disturbed by routine mowing that would negatively affect this species ability to persist and germinate. The species was not recorded within the project site and surrounding area during the survey period.
As it is unlikely that habitat to be removed will constitute suitable or critical habitat for this species, it is unlikely that the project will impact on this species. In addition, groundcover vegetation would be allowed to regenerate underneath the solar array following completion of the project.
Given the lack of records in the study area, the nearest records being 6.4 kilometres north-east, the occurrence of the Hoary Sunray within the project site or study area is considered unlikely. The project is therefore considered unlikely to have a direct or indirect impact on the Hoary Sunray or its habitat.
Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-15'

Species or threatened ecological community

- Pomaderris pallida
Pale Pomaderris

Impact

No impact
This species is found in open forests, woodlands and shrub communities and typically its distribution overlaps with the EPBC Act listed threatened ecological communities of White Box- Yellow Box and Blakely's Red Gum Grassy Woodland and Derived Native Grassland and Natural Temperate Grasslands of the Southern Tablelands of NSW and the Australian Capital Territory
Known habitat for this species is mapped about 2.7 kilometres east of the proposal site, scattered along the banks of the Murrumbidgee River. The species, or any other shrub species, was not recorded within the project site and surrounding area during the survey period.
It is unlikely that this species will occur within the project site due to the absence of suitable woodland and shrubland habitat and the threatened ecological communities it is often associated with do not occur within the project site or adjacent area. The

modified native grassland and regenerating woodland to be impacted by the project does not comprise suitable habitat for this species. The species will not therefore be impacted by the project.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-16'

Species or threatened ecological community

- Rutidosis leptorrhynchoides
Button Wrinklewort

Impact

No impact

In the Canberra region this species is associated with Yellow Box/ Red Gum Grassy woodlands, and with Natural Temperate Grasslands. Given the occurrence of White Box, Yellow Box, Blakely's Red Gum Grassy Woodland and Derived Native Grassland within the CDSCC boundary, and the recorded native grasslands within the project site itself, suitable habitat potentially exists for this species.

The species was not recorded within the project site and surrounding area during the survey period and there are no previous records of the species in the nearby area. The species has not previously been recorded in the locality, with the nearest record over 13 kilometres north-east of the study area. The Species Profile and Threats Database (DAWE (2021b) and ACTmapi (ACT Government 2021) do not identify the study area as potential habitat.

It is unlikely that this species will occur within the project site due to the study area being outside the known and likely distribution of the species and the threatened ecological communities it is often associated with do not occur within the project site or adjoining area. The modified native grassland and regenerating woodland to be impacted by the project does not comprise suitable habitat for this species. The species will not therefore be impacted by the project.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-16'

Species or threatened ecological community

- Swainsona recta
Small Purple-pea

Impact

No impact

This species occurrence is typically associated with grassy woodlands, and at times extends into grassy open forests. Given the potential occurrence of White Box, Yellow Box, Blakely's Red Gum Grassy Woodland within the CDSCC site, suitable habitat potentially exists for this species.

The species was not recorded within the project site and surrounding area during the survey period and there are no previous records of the species in the nearby area.

Box-Gum woodland was not recorded within or surrounding the project site, which is comprised of native grassland derived from an Apple Box community. It is unlikely that this species will occur in grasslands within the project site, as they are regularly degraded and disturbed by mowing.

It is unlikely that this species will occur within the project site due to the absence of suitable grassy woodland habitat in the project site or adjoining area. The modified native grassland and regenerating woodland to be impacted by the project does not comprise suitable habitat for this species. The species will not therefore be impacted by the project.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-17'

Species or threatened ecological community

- Thesium australe
Austral Toadflax

Impact

Impact unlikely

This species has a habitat association with White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands, and Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory. Australe Toadflax is semi-parasitic on the roots of a range of grass species, and is strongly associated with Kangaroo Grass (Themeda triandra) which was recorded within the project site during site surveys.

There is a record for this species about 3.1 kilometres east of the project site. The species was not recorded within the project site and surrounding area during the survey period.

However, although Kangaroo Grass was present within the project site, associated Box-gum woodland does not occur in the project site or surrounding area. It is unlikely to be present within the project site due to recent and frequent disturbance, both during the construction of the CDSCC and frequent mowing of the project site. In addition, groundcover vegetation would

be allowed to regenerate underneath the solar array following completion of the project.

As it is unlikely that habitat to be removed would constitute suitable or critical habitat for this species, it is unlikely that the project will impact on this species. In addition, groundcover vegetation would be allowed to regenerate underneath the solar array following completion of the project.

Based on the lack of any records in the vicinity of the study area and the generally unfavourable understorey conditions due to frequent disturbance, the occurrence of Austral Toadflax within the project site or study area is considered unlikely. The project is therefore considered unlikely to have a direct or indirect impact on Austral Toadflax or its habitat.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-17'

2.4.2 Do you consider this impact to be significant?

☐ Yes ☑ No

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

☑ Yes ☐ No

Migratory species

The literature review and database search identified five migratory terrestrial species, one migratory marine species and seven migratory wetland species listed under the EPBC Act that could potentially occur in the locality.

Migratory marine
- Fork-tailed Swift
Apus pacificus

Impact

No impact

Given that and no marine habitat will be impacted by the project, and all impacts will be restricted to native grassland and regenerating woodland occurring in a montane environment, the proposal will not have an adverse impact on this migratory marine species. In addition, the species is almost exclusively aerial over mainland habitats and the proposal would not impact on potential aerial resources of the species.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-11 and 18'

Migratory species

Migratory terrestrial
- Black-faced Monarch
Monarcha melanopsis
- White-throated Needletail
Hirundapus caudacutus
- Yellow Wagtail
Motacilla flava
- Satin Flycatcher
Myiagra cyanoleuca
- Rufous Fantail
Rhipidura rufifrons

Impact

No impact

Habitat in the project site is limited to native grassland habitat and a small patch of regenerating woodland. One mature tree and some small regenerating saplings would be removed by the project. It is unlikely this habitat would be considered important or critical habitat for these migratory species in the context of the surrounding alternative woodland habitat in the locality. As such, the project will not adversely impact these species.

Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-11 and 18-19'

Migratory species

Migratory wetland
- Curlew Sandpiper
(Calidris ferruginea)
- Sharp-tailed Sandpiper
(Calidris acuminata)
- Common Sandpiper
(Actitis hypoleucos)

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- Pectoral Sandpiper
(Calidris melanotos)
- Eastern Curlew
(Numenius madagascariensis)
- Latham's Snipe
(Gallinago hardwickii)
- Osprey
(Pandion haliaetus)

Impact

No impact
Habitat removal for this project is restricted to an area of about 1.7 hectares of modified grassland habitat and regenerating woodland in a montane region. This does not constitute suitable habitat for migratory wetland birds. No habitat suitable or critical to these species' survival will be impacted by the proposed action, and as such, these migratory species will not be impacted by the project.
Please refer to 'CDSCC Referral_EcologyV2, section 2 and section 3, pages 7-11 and 19-20'

2.5.2 Do you consider this impact to be significant?

☐ Yes ☑ No

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

☐ Yes ☑ No

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

☑ Yes ☐ No

2.7.1 Is the proposed action likely to have any direct or indirect impact on the Commonwealth land?

☑ Yes ☐ No

2.7.2 Describe the nature and extent of the likely impact on the whole of the environment

Ecosystems
The project is wholly located on Commonwealth land.The project site contains native grassland and a small area of regenerating woodland (one mature Apple Box tree and some saplings).The groundcover underneath and directly adjacent to the mature Apple Box is highly disturbed and dominated by introduced groundcover species.Further from the tree, the groundcover becomes dominated by native groundcover species.Down slope of where the project site is located and outside the area routinely mowed, the groundcover becomes dominated by introduced species such as Phalaris aquatica. This area has been previously cleared due to past agricultural activities and for the development of the CDSCC.
About 1.7 hectares of native grassland, including one mature tree and some small regenerating saplings, would be potentially impacted by the project, both directly and indirectly, with groundcover underneath the solar array to mostly be retained and allowed to regenerate following construction of the project. The area in which the 22 kV powerline would be installed underground, along the fenceline of the CDSCC,is dominated by introduced groundcover species such as Phalaris aquatica, Paspalum dilatatum, Plantago lanceolata, and Trifolium species.
The project site is maintained by frequent mowing and was previously routinely grazed by sheep with the land leased to a neighbouring landowner. Therefore, fauna habitat within the project site is generally limited. Birds are likely to forage within the mature tree and saplings on the site, however no threatened species are likely to be dependent on these trees which are unlikely to provide important habitat. Small terrestrial fauna such as lizards and ground-foraging birds would continue to forage within the project site following construction
Natural and physical resources
Aquatic habitat within the project site is limited to ephemeral drainage lines that were mostly dry during the survey period, with minor flows through one culvert. Construction of the main solar array for the project would be located outside of these drainage lines, with management measures imposed during construction to minimise any potential impacts on site or downstream. The drainage lines are located in the area of the proposed cable trench, which would be located underground with minor temporary impacts occurring during the construction period. It is unlikely that the project would impact on the water quality of Larry's Creek in the study area, which is already significantly degraded with heavy bank scouring, infestations of introduced weeds and disturbance by feral animals. Mitigation measures would be implemented to prevent erosion and sedimentation in the vicinity of these drainage lines.
The project is unlikely to intercept groundwater, given the minimum distance to groundwater in the CDSCC was identified as

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2.4 metres below ground. Trenching and solar unit installation is unlikely to exceed 1.1 metres during construction. In addition, the project is unlikely to have more than a minor impact on soils during construction due to the minimal excavation and alteration of the ground surface required during installation, which would be limited to trenching and installation of poles for the mounting structures. Therefore,it is unlikely the project would significantly impact on landform or soils

Qualities and characteristics of locations, places and areas

The project is located in a rural landscape within the existing CDSCC boundary.The facility fills an integral role in international deep space communications and is one of three stations that together maintain a constant communications link with spacecraft owned and operated by NASA.The complex is regularly visited by tourists, who come to view the antennas and visit the museum.The site is highly valued in the ACT and Australia for its technological role in international deep space communications and has substantial aesthetic appeal, with the visual impressiveness of the antennas in the rural setting and the backdrop of the Bullen Ranges

The project is unlikely to have an adverse impact on the qualities and characteristics of the site as it is located at the rear of the complex and unlikely to be in view from the main building area visited by tourists

Social, economic and cultural aspects

There are four large operational antennas at the site that track deep space robotic scientific missions. The project would provide an additional longer term power source for the CDSCC site to supplement the existing utility supply and assist in powering the antennas, facilities and operational equipment.The project is being constructed as part of a power purchase agreement and will enable reduced costs of powering the CDSCC site and supporting NASA operations.This would enable the complex to continue its operations into the future, benefiting both space exploration and the tourism industry in the area

Refer to 'CDSCC Referral_EcologyV2, sections 2&3'

2.7.3 Do you consider this impact to be significant?

☐ Yes ☑ No

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

☐ Yes ☑ No

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

☐ Yes ☑ No

2.10 Is the proposed action a nuclear action?

☐ Yes ☑ No

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

☑ Yes ☐ No

2.11.1 Describe the nature and extent of the likely impact on the whole of the environment

The CDSCC was formally established in 1965 and operated under a Government to Government Agreement between Australia and the United States of America. The Agreement reached its 50th anniversary in early 2010 and events held at CDSCC and around the national capital highlighted Australia's mission critical role in the exploration of the solar system. There are four large operational antennas at the site that track deep space robotic scientific missions. The project would provide an additional longer term power source for the CDSCC site to supplement the existing utility supply and assist in powering the antennas, facilities and operational equipment. The project is being constructed as part of a power purchase agreement and will enable reduced costs of powering the CDSCC site and supporting NASA operations.. This would enable the complex to continue its operations into the future, benefiting both space exploration and the tourism industry in the area.

Further information is provided in section 2.7.2 and 'CDSCC Referral_EcologyV2', Section 3, pages 11-21'

2.11.2 Do you consider this impact to be significant?

☐ Yes ☑ No

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

☐ Yes ☑ No

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

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

☐ Yes ☑ No

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Section 3

Description of the project area

3.1 Describe the flora and fauna relevant to the project area

Survey effort

Field surveys were undertaken over one day on the 22 March 2021.Surveys were aimed at identifying potential habitat for flora and fauna species, particularly those which may be listed as threatened. Specifically, the surveys sought to identify the potential presence of the threatened ecological community White Box Yellow Box Blakely's Red Gum Grassy Woodland, which is known to occur within the CDSCC boundary.Surveys comprised vegetation integrity plots and random meanders. Information obtained from surveys conducted for the construction of the antennas and the for the construction of the solar array at its previous location were used to supplement current surveys.

Vegetation

Vegetation within the study area has previously been disturbed and modified for agriculture and by the construction of the Canberra Deep Space Communications Complex. Vegetation within the complex is comprised mostly of derived native grasslands, with some small stands of trees scattered throughout. Non-locally native planted trees are present, but mostly restricted to the building areas and roadways. The project site contains derived native grassland, which is regularly mown and a small patch of regenerating woodland comprised of one mature tree and small regenerating saplings. Native grassland in the project site is dominated by Kangaroo Grass (Themeda australis) and Red-leg Grass (Bothriochloa macra). The project site also features a high abundance of introduced species, such as Lamb's Tongues (Plantago lanceolata), Flatweed (Hypochaeris radicata) and Paspalum (Paspalum dilatatum). Introduced species become more common along the fenceline where the powerline would be constructed and in the southern section of the site, closer to the main building area.

One mature Apple Box (Eucalyptus bridgesiana) is present within the proposed solar array site with additional small regenerating saplings surrounding the tree. The native grassland in the site is likely derived from an Apple Box woodland community previously predominantly cleared for agriculture and development of the CDSCC site.

Two ephemeral drainage lines exist to the south of the proposed solar array site draining from east to west through culverts on the western side of the boundary fenceline. These drainage lines drain into Larrys Creek to the west of the site. Although highly degraded and dominated by introduced species including Phalaris and Paspalum, they also contain some wetland species, including sedges (Carex spp.) and rushes (Juncus spp.).

Blackberry (Rubus fruticosus) a weed of national significance was recorded growing within the grassland adjacent to the project site. It generally occurs along the creek and surrounding grassland to the north-west of the solar site

Fauna

Fauna activity on site during the site assessment was minimal, with few fauna sightings recorded.This is most likely attributed to the rain and windy conditions experienced during the survey period. Birds were the most common faunal group occurring during site surveys, with 17 fauna species recorded, 15 of which were birds.

The most abundant bird species recorded were Galahs (Eolophus roseicapillus) and Willie Wagtails (Rhipidura leucophrys).No introduced species were recorded during site surveys.

Eastern Grey Kangaroos (Macropus giganteus) were observed within the grassland surrounding the site and Spotted Marsh Frogs (Limnodynastes tasmaniensis) were heard calling from the drainage lines running through the proposed powerline site and the creek to the west of the site

The open and relatively treeless landscape within and immediately surrounding the CDSCC site also lacks suitable cover and habitat for many fauna species, in addition to the grassland being regularly mown. The six foot high cyclone chain link fence that encompasses the majority of the site would likely prevent easy movement of macropods that are otherwise likely to graze on open grassland areas, from adjacent patches of habitat outside the CDSCC boundary. The proposed new location of the solar array is located outside the main fence and therefore provides grazing habitat for macropods such as Eastern Grey Kangaroos, which were observed adjacent to the site during the site survey.

The project site itself and adjacent area provides limited habitat for fauna species, however, it may provide habitat for suitably mobile bird species that are likely to forage in or over grassland areas, including Australian Magpies (Gymnorhina tibicen) and Galahs (Eolophus roseicapilla).Mobile bird species may also use the tree and saplings present within the site as foraging and movement habitat between patches of woodland surrounding the site. The project site lacks the structural and floristic diversity needed to support small woodland species such as Scarlet Robins (Petroica boodang)

Further information on field surveys, including species lists is included in the attached file 'CDSCC Referral_EcologyV2', Section 2&3,pg 7-20.

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

The study area is located between the Murrumbidgee River and Paddy's River, south of their confluence. Larry's Creek occurs about 75 metres to the west of the project site and drains into Paddy's River about 1.5 kilometres north of the study area. Two ephemeral drainage lines occur in the area of the proposed powerline, draining into Larry's Creek to the west.

These drainage lines are ephemeral and likely to have intermittent water flows during times when rainfall is sufficient to generate surface runoff in the area. Concrete pipe culverts have been constructed on the drainage lines on the western side of the boundary fenceline to convey flows under the fence. These drainage lines are likely to convey groundwater flows for much of the year.

During previous aquatic ecology surveys in the study area, conducted by GHD in November 2018, there was no surface flow within Larry's Creek, with the creek occurring only as pools with generally low level water. Although permanent, the creek exists for much of the year only as a series of pools with low flow. It is likely that groundwater flow is occurring through the creek all year round.

Groundwater levels at existing bores within CDSCC to the south of the project site indicate water is between 2.4 and 3.782 metres below ground level. The inferred groundwater flow is in a westerly direction towards Larry's Creek (GHD 2017).

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

The Land Management Plan completed for the installation of the new antennas at CDSCC, to the east of the project site (Soil and Land Conservation Consulting 2009) identified soils in the study area, which are likely to be the same as those present in the project site. The soils on the upland terrain comprise moderately deep sandy kandosols developed in situ on the adamellites, and red chromosols on associated slope wash deposits. The soils comprise a coarse sandy loam textured upper layer overlying a red brown to yellow brown light clay subsoil. Soil depth is typically 80 to 120 centimetres before grading to firmer, weathered gravelly clays. The organic rich topsoil layer is no thicker than six to 10 centimetres (Soil and Land Conservation Consulting 2009).

The soil in the study area is not inherently highly erodible. The topsoil contains relatively little fine sand and silt which are associated with high soil erodibility. The subsoils are not highly dispersive as reflected by the lack of gully erosion in the vicinity (Soil and Land Conservation Consulting 2009).

The project site comprises previously cleared land, likely to have been used for agriculture prior to development of the CDSCC site. Grazing of livestock has been occurring at the site up until recent times, with the land outside the main boundary fence leased to a neighbouring landholder. The grassland contains native species such as Red-leg Grass, Kangaroo Grass and Hairy Panic (Panicum effusum). Introduced groundcover species such as Lambs Tongues, Phalaris and Flatweed are also common. The area is regularly mowed during maintenance activities.

The area is likely to have contained woodland prior to European settlement. One remnant Apple Box tree and some regenerating saplings are present within the proposed solar array location.

The vegetation along the ephemeral drainage lines and adjacent area in the proposed powerline site is dominated by introduced species including Phalaris, Paspalum, Lambs Tongues and Clover species (Trifolium spp.). Some wet area species are also present in low density, including species of sedge (Carex sp.).

On the eastern side of the fence, where the powerline would connect into the powerhouse, the groundcover is dominated by introduced species, with the most commonly occurring species being Paspalum.

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

The study area does not contain any features of outstanding value.

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

Site surveys of the proposed solar array site indicated that vegetation is consistent with that of a derived native grassland and although dominated by native grass species, contains a low diversity of native species with introduced species common. One remnant Apple Box tree and some regenerating saplings are present within the site and indicate that the grassland is derived from an Apple Box woodland community likely cleared previously for agriculture and development of the CDSCC site. Grassland present within the proposed solar array site is frequently disturbed by routine mowing, and combined with the continued development at the CDSCC site, this has influenced and contributed to the prevalence of various weed species recorded within the proposed project site.

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

Land gradients in the study area vary from about 1:4 on the steeper slopes to 1:15 on the lower slopes. The proposed solar site is relatively flat, grading into a gentle slope to the north-east with a more prominent slope from the proposed solar site to the fence line where the powerline would be located. The proposed powerline alignment and connection into the powerhouse is relatively flat.

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

The land on which the project is located comprises native grassland that has been previously cleared due to past agricultural activities and for the development of the CDSCC. The grassland contains native species such as Red-leg Grass, Kangaroo Grass and Hairy Panic. Introduced groundcover species such as Phalaris, Paspalum, Lambs Tongues and Flatweed are also common. The area is regularly mowed during maintenance activities.

The area is likely to have contained woodland prior to European settlement. One remnant Apple Box tree and some regenerating saplings are present within the proposed solar array location.

One Weed of National Significance (Blackberry) was recorded in grassland adjacent to the project site. It generally occurs along the creek and surrounding grassland to the north-west of the solar site. Other weed species identified on site that are listed as common weeds in the CDSCC Weed Management Plan (GHD 2017b) include St John's Wort (Hypericum

perforatum) and Horehound (Marrubium vulgare).

Weeds at the CDSCC site have been managed for the last 20 years and are currently managed under a routine weed management program, which involves mowing, physical removal, herbicide treatments and revegetation with native species (GHD 2017b).

A number of introduced fauna species are known to occur in the study area, including the Feral Pig (Sus scrofa), European Rabbit, Brown Hare (Lepus europaeus) and Red Fox (Vulpes vulpes).

Larry's Creek occurs in the west of the study area. The creek is highly degraded, with heavy scouring of the channel and infestations of introduced species such as Blackberry and Willow (Salix sp.). Feral Pigs occupy the creek and may have contributed to a general decline in water quality through increased turbidity from stream bank erosion.

The minor ephemeral drainage lines in the project site are in a stable condition, and have not been subject to erosion gully development. These drainage lines were mostly dry during the survey period, with minor flows through one culvert, and are likely to only convey substantial water flows during high rainfall events, when water would divert into Larry's Creek to the west.

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

No National heritage properties are located in close proximity to the project. The Mount Stromlo Observatory Precinct is located about nine kilometres to the north of the CDSCC site. The Australian Alps National Parks and Reserves, a National Heritage Property, includes Tidbinbilla Nature Reserve, which is located over six kilometres to the south of the CDSCC site.

3.9 Describe any Indigenous heritage values relevant to the project area

The National Capital Authority (NCA) referred a Works Approval to the ACT Heritage Council related to the project in April 2019. Although the project is located on Commonwealth Land and subject to Commonwealth approvals, it is common for the NCA to refer works to the ACT Heritage Council for advice and in order to adhere to the provisions of the ACT Heritage Act 2004.

The CDSCC site did not contain any previously known Aboriginal places or objects. However, the ACT Heritage Council was of the view that, given the paucity of previous assessment on the CDSCC site, combined with the broader landscape context and semi-rural nature of the site, an Aboriginal cultural heritage assessment of the project site and surrounding area was necessary.

An assessment of the previous project site and surrounding area was conducted by two archaeologists and two RAOs on 25 July 2019. Four local Aboriginal organisations have stated an objective to represent traditional Aboriginal cultural values and interests within the ACT. These groups have been recognised by the Minister as RAOs as defined under the ACT Heritage Act 2004. These groups are:

-Buru Ngunawal Aboriginal Corporation
-King Brown's Tribal Group Pty Ltd
-Mirrabei
-Ngarigu Currawong Clan

It is the policy of the ACT Heritage Council that the RAOs should be consulted with regard to the management of, and potential impacts to, Aboriginal cultural values and places within the ACT.

An assessment of the current project site and surrounding area was conducted by two archaeologists and attending RAOs on 31 March 2021.

The site assessment was supplemented by a literature and database review. Literature sources included the Heritage Registers and associated reports held by ACT Heritage and the ACT Department of Environment, Planning and Sustainable Development Directorate.

Searches were undertaken of the following statutory and non-statutory heritage registers and schedules:

-World Heritage List
-The National Heritage List (Australian Heritage Council)
-The Commonwealth Heritage List (Australian Heritage Council)
-The Heritage Register (ACT Heritage Council)
-The Register of the National Estate (Australian Heritage Council)
-Register of the National Trust of Australia (ACT)

An updated search was requested from ACT Heritage for Aboriginal sites within two kilometres of the CDSCC project site with 15 sites identified, all of which occur outside of the CDSCC site.

Two scarred trees were identified adjacent to the previous project site to the south (sites CDS-ST1 and CDS-ST2), which are of cultural significance to the attending Representative Aboriginal Organisations (RAOs).However, given the highly impacted nature of both sites it is unlikely that they would meet the threshold for inclusion on the Commonwealth Heritage List.

The archaeologists concluded that due to the combination of lightening damage, and felling/chain sawing of the trees, it is very difficult to assess the features of the scarred trees from an archaeological perspective. The sites are assessed as being of unlikely (site CDS-ST1) or possible (site CDS-ST2) Aboriginal origin, according to the archaeologists.

The surveys at the current project site identified three Aboriginal sites and one potential archaeological deposit (PAD):

•Sites CDSCC-1 and CDSCC-3 (artefact scatters) are in the CDSCC solar array study area

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

•Site CDSCC-2 (artefact scatter) is outside the CDSCC solar array study area
•CDSCC-PAD1 encompasses all of the above sites and is predominantly within the study area

These sites are shown on Figure 6.17 of the Cultural Heritage Assessment (NOCH 2021) attached to this referral. The mature tree within the site was identified by RAOs as a matriarch tree, however it is unlikely to meet the criteria for listing on the Commonwealth Heritage List based on a significance assessment and self-assessment of the potential importance of the tree.

No historic sites were identified within the study area.

Subsequent test excavations were undertaken on 15-18, 21, 22 and 25 June and 6-8 July 2021 to determine the extent of subsurface artefacts in the area of the solar array and the potential for direct impacts from construction activities. RAO representatives were present during the test excavations.A total of 186 artefacts and one surface artefact were recovered within the CDSCC-PAD1 site during the test excavations.

The presence of these sites in the landscape, and their association with the lifeways of their Aboriginal forebears are a tangible connection for the local Aboriginal community. The three surface artefact scatters, CDSCC-1, CDSCC-2 and CDSCC-3 are unlikely to meet the threshold for inclusion on the Commonwealth Heritage List or the threshold for inclusion on the ACT Heritage Register. CDSCC-PAD1 may meet the criteria for listing on the Commonwealth Heritage List.

Further information is included in the attached 'CDSCC_Solar Array_Heritagev4.4_Redacted'

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

The land on which the project is located is owned by the Australian Government.

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

The land on which the proposed action is located was previously used for agricultural purposes, which included pasture for livestock. There were no other uses of the land previously. No land uses are proposed for the area in addition to the proposed land uses described in this referral, which comprises the solar array. The surrounding land is used for the purposes of the CDSCC activities.

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Section 4

Measures to avoid or reduce impacts

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

Avoidance

The project is located in a previously disturbed area and therefore the impacts are substantially less than would occur in a greenfield location. The siting of the project has avoided the known location of the critically endangered ecological community Box-Gum Woodland and involves minimal tree removal.

Mitigation

A construction environment management plan (CEMP) would be prepared for the construction phase of the project by the responsible contractor. The CEMP would include, as a minimum, industry-standard measures for the management of soil, surface water and groundwater, weeds and pollutants, as well site-specific measures. The proposed mitigation measures would include environmental safeguards for protection of waterways in accordance with relevant policy documentation and Government guidelines.

Proposed mitigation measures include:

— Impacts to sites CDSCC-1, CDSCC-2 and CDSCC-3 to be avoided.

— Subsurface impacts to CDSCC-PAD1 to be avoided.

— Where surface sites can be avoided, such as CDSCC-2 and CDSCC-3, sites should be marked on maps and fenced prior to construction works, so as to avoid unintentional impacts. These works should be conducted with archaeologists and RAOs on site.

— Where surface sites cannot be avoided, such as CDSCC-1, they and the surrounding area should be subject to surface artefact collection prior to construction works by archaeologists and RAOs.

— Where impacts to CDSCC-PAD1 cannot be avoided, a program of subsurface archaeological salvage should be undertaken prior to ground disturbance works. This salvage should focus on the areas with the highest artefact numbers recovered in Clusters 3 and 4 and either Cluster 1 or 2 to recover a larger assemblage to allow greater understanding of past activities within the solar array area. Additional testing to bridge the area between Transect 1 and Transect 3 within the area of impact is also recommended. These locations are shown on Figure 7.1 of NOHC 2021, attached to this referral.

— In the event that previously unrecorded or unanticipated Aboriginal or non-Aboriginal archaeological material is encountered, all ground surface disturbance in the area of the find should cease immediately the finds are uncovered and the site supervisor and development proponent must be contacted.

— Minimisation of area proposed for development as far as practicable.

— The construction zone boundary would be marked using temporary high visibility fencing material.

— In all areas where earthworks are conducted erosion control measures would be implemented to prevent erosion and sedimentation of drainage lines and waterways in the study area. An erosion and sediment control plan (ESCP) would be developed and implemented before, during and after the proposed works. The ESCP would be implemented to protect soils and prevent erosion from rainfall runoff and wind.

— Soil disturbance will be avoided as much as possible to minimise the potential for spreading weeds.

— During and after completion of the development weed control would be implemented to ensure that the prevalence of exotic species does not significantly increase. Particular attention would be given to the control of Blackberry, which is listed as a Weed of National Significance. The CSIRO has funded a site weed management plan as part of its management for the CDSCC site, which includes weed control measures and monitoring across the site. Control measures include weed spraying and manual weed removal.

— Stockpiling of materials for the proposal would only occur within areas that have previously been developed or modified, to prevent additional impacts on native vegetation. These would be located at least 50 metres from the creek

— Materials capable of environmental harm (eg. cement) will be stored in a secure area. Resources will be on hand to contain, secure and clean up spills.

— The contractor will remove all construction materials, spoil scrap and waste from the construction area and CDSCC on practical completion of construction.

— A sediment control fence will be installed between the array site and the drainage lines on site to prevent sediment runoff.

— The removal of all sediment containment barriers would take place under dry conditions.

— Where possible, groundcover on site will be retained in the areas of the solar arrays where disturbance will be limited to the installation of the poles for the mounting structure.

— Disturbed areas will be stabilised following completion of construction and resown with seed from native grasses identified on site. Monitoring of the site will be conducted to ensure that native grasses re-establish.

— A groundcover management plan will be developed that includes measures to manage any bare areas and erosion that develop beneath the solar arrays.

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

The project occurs entirely within Commonwealth Land, which is comprised of native groundcover vegetation that is

regularly mowed during maintenance activities on site. The vegetation to be impacted by the project is derived native grassland, in addition to one remnant Apple Box tree and some regenerating saplings which do not form part of a threatened ecological community and unlikely to provide habitat for threatened flora or fauna species. The grassland may provide marginal habitat for the Golden Sun Moth, however the small area of highly modified grassland to be disturbed for the proposed action is unlikely to be important habitat for a local population and its removal would be highly unlikely to have a significant impact on the species. The tree is unlikely to provide important habitat for mobile bird species and other fauna given the alternative and higher quality habitat in the surrounding woodland adjacent to the site, including Bullen Range Nature Reserve to the east.

As the project would not be likely to result is a significant impact on any threatened or migratory biota, no biodiversity offsets for MNES are therefore required in accordance with the EPBC Act Environmental Offsets Policy.

Vegetation and weed management actions will be developed and included in the CEMP to minimise clearing of grassland vegetation and manage weeds during the construction phase of the project. Erosion and sedimentation mitigation measures would also limit impacts on drainage lines and nearby vegetation.

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Section 5

Conclusion on the likelihood of significant impacts

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

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

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

The project site contains about 1.7 hectares of derived native grassland comprised of a mixture of native and introduced species, in addition to one remnant Apple Box tree and some regenerating saplings. The grassland is likely derived from the clearing of Apple Box woodland for agriculture and development of the CDSCC site. The site does not comprise a threatened ecological community or habitat for threatened flora species and is regularly mown as part of the facilities maintenance activities. The site was also recently grazed by livestock on a regular basis. The project is unlikely to have a direct or indirect impact on any habitat for threatened ecological communities or threatened species, which are not present in the area adjacent to the project site.

The project would impact on about 1.7 hectares of grassland vegetation, which may impact on the Golden Sun Moth, however is unlikely to cause a significant impact on the species due to the small area of proposed impacts in the context of larger areas of potential habitat available in the study area and locality. The grassland to be impacted by the project is likely to provide only marginal habitat for the species due to its disturbed nature, low incidence of Rytidosperma species (Wallaby Grasses) compared to other groundcover species, limited availability of bare ground microhabitats which are necessary for the species to attract breeding partners, and given the regular maintenance and disturbance of the site. Given the small area of potential habitat to be disturbed and the additional habitat available in the study area and locality, the project would be unlikely to have a significant impact on this species.

The site provides habitat for mobile birds that can access the site and forage in grassland habitats and those that may also use the tree and saplings present within the site as foraging and movement habitat between patches of woodland surrounding the site. It does not provide suitable habitat for those threatened fauna species that require forest and woodland habitats such as those that are known to occur in the study area and wider locality, including in Bullen Range Nature Reserve to the east. The project site lacks the structural and floristic diversity needed to support woodland bird species.

Grassland habitat would not be entirely or permanently removed within the project site and would be allowed to regenerate following completion of the proposal. This would allow continued use by small terrestrial species and ground-foraging birds.

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Section 6

Environmental record of the person proposing to take the action

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

Yes, CSIRO does have a satisfactory record of responsible environmental management. They operate under a Health, Safety and Environment Policy, complying with all applicable laws and regulations with a clear framework for managing the health and safety of their people and their environmental impact. The Canberra Deep Space Communication Complex as an entity managed by CSIRO has not been the subject of an adverse environmental finding, notice (for improvement) or prosecution under ACT or Commonwealth environmental legislation. CSIRO regularly commissions OHS&E audits of CDSCC.

CSIRO has satisfactorily implemented the conditions of the previous approvals for the construction of new antennas at CDSCC.

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

There are no past or present proceedings against the proponent or person making the application.

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

☑ Yes ☐ No

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

This application and approval will be subject to CSIRO's Health, Safety and Environmental Sustainability Policy (refer attached 'CSIRO_Health-safety-and-environment-policy')

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

☑ Yes ☐ No

6.4.1 EPBC Act No and/or Name of Proposal

CSIRO/Science and research/Tidbinbilla/ACT/Construction of Two Antennae at the Canberra Deep Space Communication Complex, Tidbinbilla, ACT

Reference Number: 2009/4895

Construction of two additional antennas, Canberra Deep Space Communication Complex, Tidbinbilla, ACT

Reference Number: 2012/6633.

Commonwealth Scientific and Industrial Research Organisation/Commonwealth/421 Discovery Drive, Paddys River/Australian Capital Territory/Canberra Deep Space Solar Array

Reference Number: 2019/8527

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

Section 7

Information sources

Reference source

ACT Government (2015). ACTmapi, Significant Species, vegetation communities and registered trees

Reliability

Moderate.

Uncertainties

Mix of records based on known occurrences and predictions based on modelling.

Reference source

GHD (2017a). Groundwater well installation and monitoring: Canberra Deep Space Communication Complex (CDSCC), Tidbinbilla, ACT. October 2017.

Reliability

Good. Based on field surveys and data analysis.

Uncertainties

N/A

Reference source

GHD (2017b). CDSCC Consulting Services – Site Weed Management Plan: CSIRO, November 2017.

Reliability

Good. Based on field surveys within the study area.

Uncertainties

N/A

Reference source

DAWE (2021a). Protected Matters Search Tool

Reliability

Moderate

Uncertainties

Mix of records based on known occurrences and predictions based on modelling.

Reference source

DAWE (2021b). Species Profile and Threats Database. Department of Agriculture, Water and Environment, Online database, accessed April 2021

Reliability

Good. Based on field verification and ecological studies.

Uncertainties

Dependent on scientific information, may not be specifically relevant to project location.

Reference source

DPIE (2021a). NSW Bionet. The website for the atlas of NSW wildlife

Reliability

Good. Based on field verification and ecological studies.

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

Uncertainties

Uncertainties regarding distribution due to large scale areas that have not been surveyed in detail.

Reference source

DPIE (2021b). Threatened Species Profiles.

Reliability

Good. Based on field verification and ecological studies.

Uncertainties

Dependent on scientific information, may not be specifically relevant to project location.

Reference source

Soil and Land Conservation Consulting (2009). Land Management Plan for New Antenna Sites: Canberra Deep Space Communication Complex, Tidbinbilla. August 2009, Version 1.2.

Reliability

Good. Based on field surveys within the study area.

Uncertainties

N/A

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

Section 8

Proposed alternatives

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

Yes ☑ No

Australian Government
Department of Agriculture, Water and the Environment

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

Section 9

Person proposing the action

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

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
Business name	CSIRO
ABN	41687119230
ACN	
Business address	Canberra Deep Space Communication Complex, Paddys River, 2620, ACT, Australia
Postal address	
Main Phone number	0262017983
Fax	
Primary email address	pr@cdscc.nasa.gov
Secondary email address	

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

☐ Small business
☑ Not applicable

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

☐ Yes ☑ No

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

First name	Cameron
Last name	Lyon
Job title	Electrical Engineer
Phone	02 6201 7938
Mobile	04837 7717
Fax	
Email	cameron.lyon@csiro.au
Primary address	Canberra Deep Space Communication Complex, Paddys River, 2620, ACT, Australia
Address	

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

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

Signature: ..... **Date:** 29/11/2021

I, Cameron Lyon, **the person proposing the action, consent to the designation of** CSIRO **as the proponent for the purposes of the action described in this EPBC Act Referral.**

Signature: ..... **Date:** 29/11/2021

Australian Government
Department of Agriculture, Water and the Environment

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

Proposed designated proponent

9.2.1 Is the proposed designated proponent an organisation or business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
Business name	CSIRO
ABN	41687119230
ACN	
Business address	Canberra Deep Space Communication Complex, Paddys River, 2620, ACT, Australia
Postal address	
Main Phone number	(02) 6201 7983
Fax	
Primary email address	pr@cdscc.nasa.gov
Secondary email address	

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

First name	Cameron
Last name	Lyon
Job title	Electrical Engineer
Phone	02 6201 7938
Mobile	04837 7717
Fax	
Email	Cameron.Lyon@csiro.au
Primary address	Canberra Deep Space Communication Complex, Paddys River, 2620, ACT, Australia
Address	

Declaration: Proposed Designated Proponent

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

Signature: ..... **Date:** 29/11/2021

Australian Government
Department of Agriculture, Water and the Environment

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

Referring party (person preparing the information)

9.3.1 Is the referring party an organisation or a business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	GHD PTY LTD
Business name	
ABN	39008488373
ACN	
Business address	161-169 Baylis St, Wagga Wagga, 2650, NSW, Australia
Postal address	
Main Phone number	0269237400
Fax	
Primary email address	wgamail@ghd.com
Secondary email address	

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

First name	Melissa
Last name	Cotterill
Job title	Environmental Scientist
Phone	0269237433
Mobile	
Fax	
Email	melissa.cotterill@ghd.com
Primary address	1 Endeavour St, Kooringal, 2650, NSW, Australia
Address	

Declaration: Referring party (person preparing the information)

I, _____Melissa Cotterill_____, 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: M Cotterill **Date:** 29/11/2021

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

Appendix A

Attachment

Document Type	File Name
action_area_images	*12537466_Figure 1_CDSCC_SolarSitereferral_a.pdf
action_area_images	12537466_Figure 1_CDSCC_SolarSitereferral_aV2.pdf
public_consultation_reports	**CDSCC_Solar Array_Heritagev4.4_Redacted.pdf
supporting_tech_reports	CDSCC_Referral_EcologyV2.pdf
flora_fauna_investigation	*CDSCC Referral_Ecology2.pdf
flora_fauna_investigation	Tree Report Tidbinbilla Jan 21.pdf
corp_env_policy_docs	CSIRO_Health-safety-and-environment-policy.pdf

* NOT PUBLISHED - SUPERSEDED
** NOT PUBLISHED - SENSITIVE

Appendix B

Coordinates

Area 1
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Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

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