

Framework Landscape Management Plan

JEMALONG HYBRID SOLAR PARK: 50MW SOLAR PV PLANT

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Acronyms and Abbreviations

AHIMS	Aboriginal Heritage Management Information System
Council	Forbes Shire Council
EIS	Jemalong Hybrid Solar Park: 50MW PV Plant Environmental Impact Statement 2016
EEC	Endangered Ecological Community
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cwth)
FLMP	<i>Jemalong 50MW PV Plant Framework Landscape Management Plan</i>
OEH	Office of Environment and Heritage
Project	JEMALONG HYBRID SOLAR PARK: 50MW SOLAR PV PLANT
Proposal Site	Lot 13 DP753118 which comprises of the direct development footprint of the PV Plant and the immediate surrounds of the PV Plant, as well as the area assessed for the 66kV powerline with a 45m buffer

1 PURPOSE AND OBJECTIVES

1.1 PURPOSE

The purpose of this Framework Landscape Management Plan (FLMP) is to describe how the Vast Solar Pty Ltd proposes to manage Landscaping of the Project.

1.2 OBJECTIVES

The key objective of the FLMP is to ensure that landscaping is planned and completed in accordance with the recommendations and mitigation measures outlined in the EIS.

A complementary objective of the FLMP is to sustain and build upon the considerable landscape plantings that have already been undertaken by the proponent for the CSP Pilot Plant. The consent authority for the CSP Pilot Plant is Forbes Shire Council. The landscape screening plantings that have been undertaken for the CSP Pilot Plant enhance visual amenity for two neighbours who are some 1.7-2.5 kilometres from the PV site. These plantings screen the proposed PV transmission line as well as the CSP Pilot Plant. These plantings also screen traffic on Lachlan Valley Way from both the CSP Pilot Plant and PV transmission line. Some of the plantings undertaken for the CSP Pilot Plant are located within (and include protective fencing from grazing stock) the Western Grey Woodland EEC of this EIS. This fenced area includes 3 lines of appropriate new vegetation plantings and enables natural seeding, protection and growth of Western Grey Woodland native vegetation in the protected, fenced area.

Vast Solar has consulted with:

- Council to confirm and establish screening plantings for the CSP Pilot Plant
- The Office of Environment and Heritage regarding the proposed PV Plant development and associated landscape and heritage ‘enhancements’ provided by the PV Plant in comparison to the previously proposed CSP Plant for the Halldiays site (ie. reduced removal of native vegetation, change of transmission line route to avoid PAD near/in Thurumbidgee Lagoon).

To achieve the key and complementary objectives, Vast Solar Pty Ltd will undertake the following:

- Ongoing consultation with Council and the Office of Environment and Heritage regarding landscaping of the project.
- Ensure appropriate planning, controls and procedures are implemented during construction to facilitate the preparation and completion of landscape area.
- Retain and enhance native vegetation existing on the site.

1.3 TARGETS

The following targets have been established for the management of biodiversity and landscape and visual impacts during construction of the Project:

- Restrict impacts to access clearing only for on-site native vegetation during construction and operation.
- Implement weed control strategies prior to and during construction and operation.
- Appropriate weed management.
- Ensure landscaping is installed and maintained during construction and operation to achieve the requirements of the plan.

- Exclude construction activities from the Western Grey Box Grassy Woodland EEC adjacent to the alignment of the 66kV Power Line
- Tube stock are to be established from seed collected in or endemic to the local area (100km radius).

1.4 CONSULTATION

Consultation for the preparation of the Final LMP will be undertaken with the OEH's and Forbes Shire Council. Consultation will incorporate and build upon consultation undertaken to date with all immediately adjacent neighbours (5), all of whom's residences are 1.7 km or further from the proposal site.

During November 2017 meetings were held with 4 of the 5 adjacent neighbours. No objections were raised and no requests were made for additional visual screening of the proposal site with the exception that the neighbour nearest the proposal site (1.7km) did request some screening planting in the north east corner of the Hallidays site. This FLMP proposes screening planting to accommodate this request.

The image below is taken from the above neighbours property and indicates the visual break in native vegetation, some 500m, that they request screening planting to address in the north east corner of the proposal site. The image is taken from north of the proposal site.



Above image: View south from the neighbour located nearest the Hallidays site, Whispering Pines Lane. Screening planting for the north east corner of the site is requested and is addressed in this FLMP.

2 EXISTING ENVIRONMENT

2.1 THE SITE

The PV Plant would be located on Lot 13 of DP 753118, approximately 36 kilometres southwest of Forbes in central NSW. The proposed works would be undertaken within the Jemalong Station in the Forbes Shire LGA. The Project is accessed via Naroo lane from the eastern boundary of the site.

The Proposal Site covers 165 ha part of the 15,478 ha rural property that makes up Jemalong Station. The Proposal Site is zoned as Primary Production (RU1) and is mostly cleared and relatively flat farmland with a long history of cropping with small remnants of Poplar Box woodland (ranging from 0.1 to 0.5 ha) remaining.

Thurumbidgee Lagoon is the closest waterway on the Site, approximately 400m from the proposed PV Plant and runs east to west on the northern part of the Proposal Site filling intermittently following good rain. The Lachlan River is located approximately 3.7 km to the north. Refer to Section 3 of the EIS.

2.2 VEGETATION IMPACTS

Approximately 0.64 hectares of moderate to good condition native vegetation would be permanently removed as a result of the proposed works for the transmission line, which accounts for a small amount of such vegetation in the Proposal Site. The two Plant Community Type (PCT) impacted include Poplar Box Woodland (0.21ha) and River Red Gum swampy woodland wetland (0.43ha). Neither of these communities are threatened under the TSC Act or EPBC Act. The remainder of vegetation to be impacted is exotic crop species with scattered native grasses and forbs which do not constitute a native PCT. Refer to Section 6.1 of the EIS.

During the design phase, an 'avoid and minimise' approach to loss of native vegetation has been adopted. All remnant patches of woodland within the Proposal Site have been avoided for clearing and most of the remnant woodland along the proposed transmission line has also avoided by designing the transmission line to be constructed around these patches. Only minor areas of woodland could not be avoided for clearing.

One TSC Act listed vegetation community (Inland Grey Box Woodland) was recorded adjacent to the proposed transmission line but would not be impacted by the proposed works.

The supplementary plantings of the proposed FLMP will enhance both the extent and complexity of existing Grey Box Woodland. Management strategies will minimise weed and pest impacts during the establishment of plantings.

2.3 SENSITIVE RECEIVERS

Residential properties are sparsely distributed in the locality. The nearest non-involved residential dwelling is approximately 1.7km north of the PV Plant boundary and 350 m from the transmission line and road works. This owner and resident of this dwelling in Whispering Pines Lane has been consulted and their request for screening planting in the north east corner of the site has been described above. In total 4 residential receivers have been identified in the locality with medium to long duration views. These property owners have been consulted and one have indicated any visual concerns with the proposed development. The closest houses are in Whispering Pines Lane.

Several elements of the proposal would not be seen except by visitors to the site and workers in paddocks near the proposal site. This is due to the flat terrain of the Proposal Site and the low height of PV modules as well as the screening vegetation surrounding the Proposal Site. The main visual effect identified is from the transmission line. Screening plantings for the transmission line have already been undertaken in association with the CSP Pilot Plant as described above.

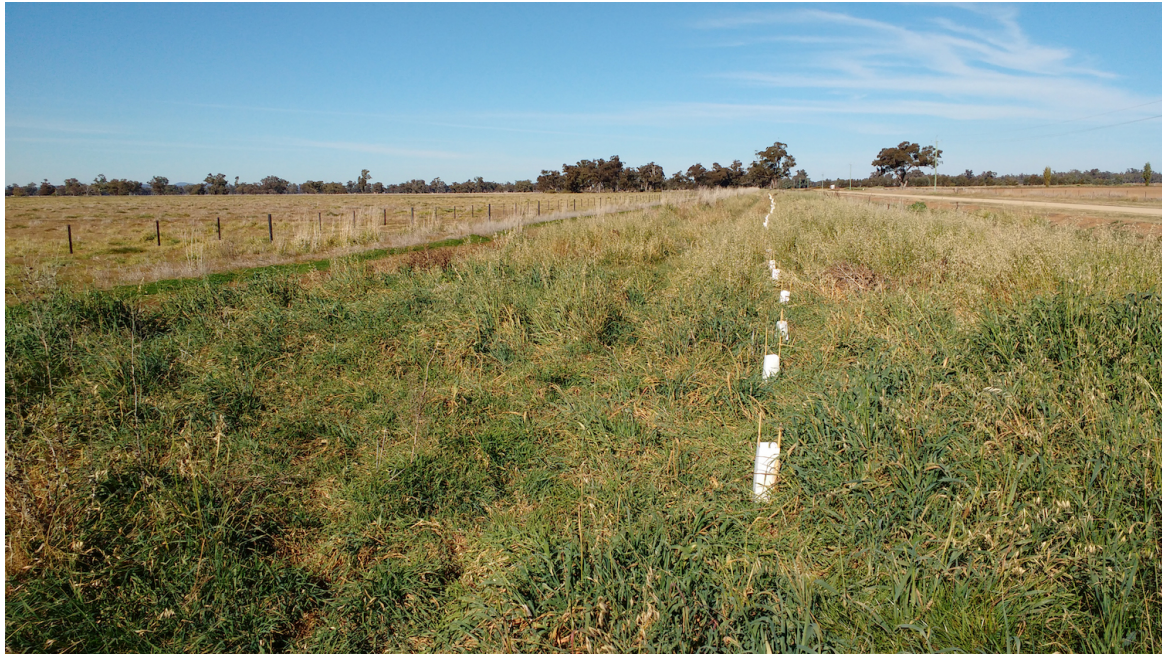
As such, when considering the visual envelope of the locality and assessing the various viewpoints across the landscape, a total 26 viewpoints were considered, and of these only two were predicted to be impacted by the visibility of the Power Line. These two receivers are residential dwellings located north of the PV Plant site. Refer to Master Plan, Infrastructure and Constraints Map in this EIS and attachments.

This FLMP has been prepared noting and incorporating considerations detailed by Forbes Shire Council for the CSP Pilot Plant landscape planting screenings. These include:-

- The applicant is to provide a landscaping buffer to the eastern side of Whispering Pines Lane to screen the development from the surrounding residents.
- REASON: To provide screening for the development from Whispering Pines Lane.
- REASON: So as to ensure the amenity of the locality adjoining the site is maintained".

Four Images below illustrate landscape screening plantings that have already been undertaken by the proponent for the CSP Pilot Plant that add value/visual screening for Whispering Pine Lane residents and traffic on Lachlan Valley Way. The location of these images is detailed in Appendix B, Corridors 1 and 2 and the extensions thereof.







2.4 SOILS

The topography of the Proposal Site and surrounding area is flat within a low lying area of the Lachlan River Catchment. Forbes 1:250, 000 Geological Sheet (Raymond et al, 2000) identifies the soils in the site as mostly alluvium including active depositional plains and terraces containing present day drainage. Small areas of the south west and south east sections of the Proposal Site is occupied by inactive alluvial plains.

Soil at the Proposal Site is mapped as three soil landscapes including Corinella, Scrubby plains and Warroo Channel (King, 1998).

Soil landscape	Location	Description/Limitations
Corinella (alluvial)	Proposal site, transmission line and access track.	<p>Dominant soils of this landscape are deep (>100cm) Red Brown Earths.</p> <p>Soil limitations include sodicity/dispersability, hardsetting surfaces and low fertility.</p> <p>Landscape limitations include flood hazards.</p> <p>Topsoils in this soil landscape have a moderate erodibility. Erosion hazard is low.</p>
Scrubby plains (stagnant alluvial)	Northern sections of the proposal site.	<p>Dominant soil types include moderately deep (>80cm), brown clay..</p> <p>Soil limitations include sodicity/dispersability, localised salinity, low permeability, high plasticity, Hugh shrink-swell potential. Low to moderate fertility.</p> <p>Landscape limitations include flood hazard, foundation hazard and seasonal waterlogging.</p> <p>Soil erodibility is moderate, and erosion hazard is low.</p>
Warroo Channel (alluvial)	Northern end of the transmission line connection with existing substation.	<p>Dominant soils of this landscape are Red Brown Earths, Alluvial soils and Podzoic soils.</p> <p>Soil limitations include sodicity/dispersability, high permeability and low fertility.</p>

		<p>Landscape limitations include seasonal waterlogging and known recharge area.</p> <p>Topsoils in this soil landscape have a high erodibility. Erosion hazard is moderate.</p>
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The Proposal Site had evidence of moderate wind erosion in particular around Thurumbidgee Lagoon and Naroo Lane. All soils were noted to be hard setting and cracking could occur during dry periods. The NSW Natural Resources Atlas searches did not show any occurrences of Acid Sulfate Soils (ASS) or dryland salinity. The soils of the Proposal area would be susceptible to erosion due to previous vegetation clearing and agricultural activities. Rural land capability mapping indicates that the site is not subject to severe limitations, and is generally suitable for cultivation (NSW Government, 2014).

3 ONSITE PLANTINGS

3.1 LOCATION

The planting areas are identified (Appendix C). New plantings are to be undertaken in the north east corner of the Hallidays site. Plantings established to screen the CSP Pilot Plant are to be maintained and where possible augmented to ensure screening of the PV plant transmission line.

Area ID	General Location	Length (m)
A	Hallidays site east corner – gap planting between Poplar Box Woodland to screen Whispering Pines residence north of the site	500
B	<p>Plantings established to screen the CSP Pilot Plant and the proposed PV and Jemalong Hybrid Solar Park transmission line.</p> <p>Plantings undertaken in 2017 to accord with Forbes Council requirements for the CSP Pilot Plant. These plantings also screen the PV Solar Plant transmission line – Whispering Pines Lane and Lachlan Valley Way.</p>	<p>848</p> <p>290m triple row plantings</p> <p>558m single row plantings</p>

Table 3-1: Planting location details

Plantings will be a mix of trees and shrubs appropriate to the site and to complement plantings undertaken for the CSP Pilot Plant.

The above plantings will be enhanced by initiatives to protect and regenerate native bushland onsite wherever possible. Fencing of Poplar Box Woodland on the proposal site to enable natural seeding, bush regeneration and protection from stock will be pursued where possible.

3.2 MAINTAIN AND ENHANCE

This plan seeks to maintain existing native vegetation by minimising clearing of native vegetation. Only the isolated paddock trees nominated for removal will be removed as part of the project. Vegetation to be retained on-site will be protected with a visual barrier (flag tape or similar) prior to construction. Induction of staff will identify the value of and need for the protection and retention of existing vegetation.

Exclusion of introduced species including pigs, cattle and goats will assist in the protection of existing native flora. In addition, the reduced grazing pressure especially in the planting areas will likely see the emergence of native flora. Planting barriers will be used to exclude grazing livestock (sheep, horses) used for weed suppression and vegetation management (fuel reduction) in the PV Plant.

Existing stands of Western Grey Box woodland and Poplar Box Woodland will be enhanced by selected plantings pertinent to local area and as per selections undertaken for the CSP Pilot Plant plantings. This will enhance the diversity of the existing native vegetation by adding a diverse shrub layer and additional over story species. In addition to diversity the overall area of native vegetation will increase. The plantings will add about 500m x 30m additional native vegetation to the site. This increase in native vegetation will make site vegetation substantial providing additional fauna resources. The plantings will improve connectivity between existing vegetation patches. The addition of shrubs and trees of varying heights and widths will increase the complexity of the vegetation structure. This additional complexity of vegetation structure will enhance the environment for fauna that will connect with the plantings north to Lachlan Valley Way undertaken for the CSP Pilot Plant.

Stands of Poplar Box woodland on the proposal site will be fenced for protection and regeneration where possible to enhance biodiversity and connectivity.

Where possible hollow bearing vegetation removed by clearing will be placed as **single logs only** adjacent proposed planting areas or areas protected from construction activities. These logs will not be stockpiled and will be at or below benchmark for coarse woody debris.

3.3 SPECIES

Species to be selected for plantings for the Hallidays site will replicate and/or complement those selected and approved for the CSP Pilot Plant facility plantings given biodiversity connectivity and landscape/species proximity.

These plantings include species for upper storey trees and suitable lower storey coverage.

Corridors 1 and extension include *A Nummularia* (Old Man Saltbush) and *A Decora* (Western Golden Wattle).

Corridors 2 and extension thereof include an even mix of shrub, medium and large species: Shrubs – *A Deani* (Dean's Wattle), *Dodonea* (Wedge Leaf Hopbush). Medium: *A Pendula* (Myall), *A Salicina* (Coobah). Talls: *E Microcarpa* (Western Grey Box), *E Mellidora* (Yellow Box).

The species for use as screen planting would be endemic to the area to enhance the existing landscape character and be a continuation of the existing native vegetation.

Three distinct Plant Community Types (PCTs) were observed in the study area. These include:

1. Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) (PCT 244)
2. Western Grey Box – Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregions (PCT 82)
3. River Red Gum swampy woodland wetland on cowals (lakes) and associated flood channels in central NSW (PCT 249)

Only the Western Grey is listed as Endangered Ecological Community (EEC) *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penneplain, Nandewar and Brigalow Belt South Bioregions*.

However, the vegetation community within the Proposal Site **does not** meet condition requirements of the equivalent listing for EECs and CEECs under the EPBC Act for the ecological community Grey Box (*E. macrocarpa*) Grassy Woodlands and Derived Native Grasslands of south-eastern Australia. Using the condition threshold guidelines (Dept, Environment, Water, Heritage and the Arts, 2010) this patch is; more than 0.5 ha, has Western Grey Box (*Eucalyptus macrocarpa*) as the dominant tree species and is more than 30% native groundcover. Thus, this zone of Grey Box (*E. macrocarpa*) Grassy Woodlands and Derived Native Grasslands of south-eastern Australia is not listed as the endangered ecological community under the EPBC Act.

The species selected, were selected based on their growth characteristics, including height and form. In addition, these species reflect the species of the grey box woodland. The tree and shrubs selected will enhance the complexity and diversity of native flora at the site currently dominated by over story species. No groundcover planting is proposed. The groundcover across the site is exotic weeds or crop species.

3.4 DENSITY AND PLANTING METHODS

- An asset protection zone (APZ) of 10 meters will be created between the planting and panels.
- Tube stock would be germinated from locally collected endemic seed where feasible.
- Hardened tube stock will be planted out in to ripped planting beds following weed control.
- Planting would occur in autumn following sufficient rainfall.
- Trees and shrubs within each row will be spaced at 2 to 3 metres dependent on the species.
- Plantings will be staggered, mixed and offset to produce a heterogeneous mix of plantings.

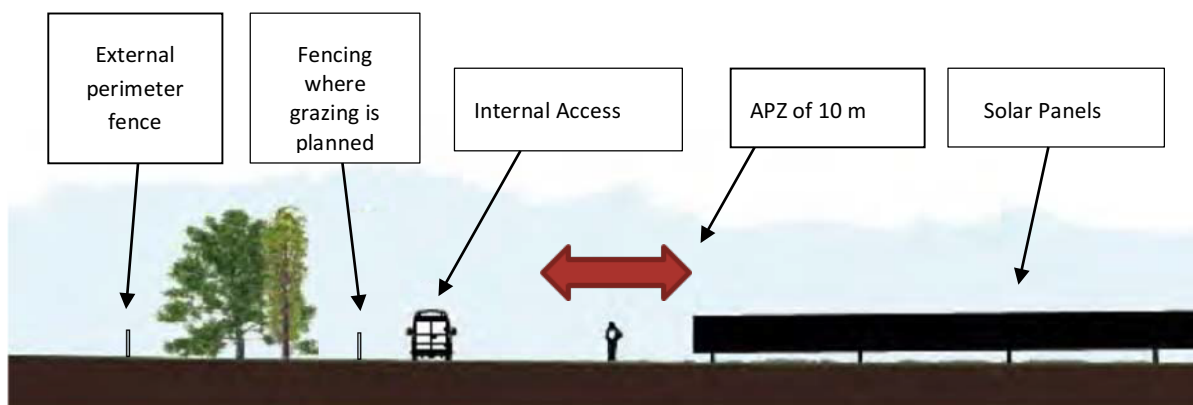


Figure 3-1: Landscape planting sketch

3.5 ESTABLISHMENT AND MONITORING REQUIREMENTS

Tube stock will be planted in autumn or spring with:

- Water crystals and fertiliser.
- Regularly weekly watering (where <30mm of rain has occurred in that month) until established.
- Rain fall is to monitored daily during the first 12 months of planting
- Tree guards, to provide some protection from wind and wildlife.
- Stock proof fencing where grazing is expected.
- Fencing is to be monitored daily during grazing for the first five years.

- Spraying and or mulching will be used to control weeds and competition during establishment.
- Weed inspections/control spraying is to be completed monthly during establishment and quarterly during the first five years of planting.

Trees will be monitored for mortalities monthly during establishment. Mortalities greater than 10% or gaps greater than 5m replaced in the first 5 years, to ensure the screen is well established.