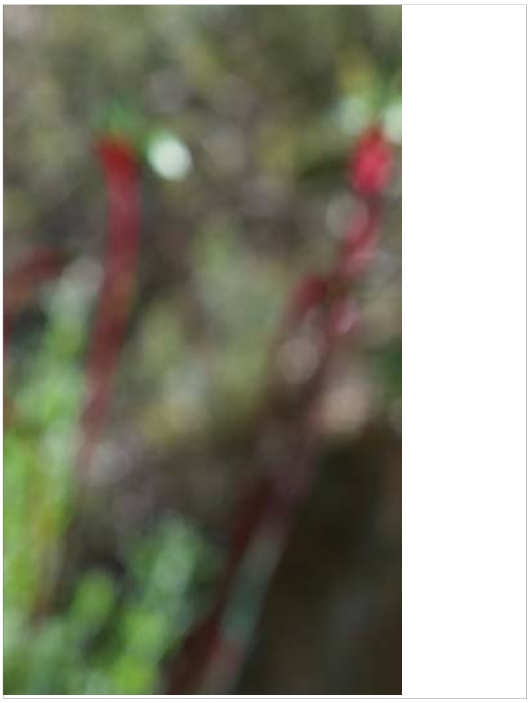
LANDSCAPE PLAN

Jemalong Solar Farm

February 2020

Project Number: 19-837



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ACRONYMS AND ABBREVIATIONS

BC Act	Biodiversity Conservation Act 2016
CEMP	Construction environmental management plan
Council	Forbes Shire council
Cwth	Commonwealth
DECCW	Refer to OEH
DP&I	(NSW) Department of Planning and Infrastructure
DPIE	(NSW) Department of Planning Infrastructure and Environment (formerly DP&I)
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cwth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
ha	hectares
km	kilometres
LEP	Local Environment Plan
LGA	Local Government Area
LP	Landscape Plan
m	Metres
MNES	Matters of National environmental significance under the EPBC Act (*c.f.*)
Noxious Weeds Act	*Noxious Weeds Act 1993* (NSW) (repealed by the *Biosecurity Act 2015*)
NPW Act	*National Parks And Wildlife Act 1974* (NSW)
NSW	New South Wales
NV Act	*Native Vegetation Act 2003* (NSW)
OEH	(NSW) Office of Environment and Heritage, Replaced by DPIE Environment, Energy and Science
REP	Regional Environmental Plan
sp/spp	Species/multiple species
TSC Act	*Threatened Species Conservation Act 1995* (NSW) (repealed by BC Act)

DEFINITIONS

Ancillary infrastructure	All project infrastructure with the exception of solar panels, including but not limited to collector substations, switching stations, permanent offices, site compounds, electricity transmission lines and internal roads
Applicant	Genex Power Limited, or any person who seeks to carry out the development approved under this consent
Battery storage	Large scale energy storage system
BCD	Biodiversity and Conservation Division
Cessation of operations	Operation of the development has ceased for a continuous period of 6 months
Construction	The construction of the development, including but not limited to the carrying out of any earthworks on site and the construction of solar panels and any ancillary infrastructure (but excludes road upgrades or maintenance works to the public road network required under this consent, installation of fencing, artefact survey, overhead line safety marking, geotechnical drilling and/or surveying)
Decommissioning	The removal of solar panels and ancillary infrastructure and/or rehabilitation of the site
Development	The development as described in the EIS
Development footprint	The area within the project site on which the components of the project will be constructed (shown in Appendix A of this LP)
EIS	The environmental impact statement for *Jemalong Hybrid Solar Park Environmental Impact Statement* (NGH Environmental Pty Ltd, 17 November 2018) as amended by: Jemalong Hybrid Solar Park Response to Submissions Report (NGH Environmental Pty Ltd, 14 February 2018) and the Applicant's letter dated 5 April 2018; Jemalong Hybrid Solar Park Modification Application (NGH Environmental Pty Ltd, 15 June 2018) and the Applicant's letters dated 2 and 12 July 2018; Jemalong Solar Modification Report (RPS Group, July 2019); and Jemalong Solar Modification Report (RPS Group, September 2019) and the Applicant's letters dated 21 October 2019.
Feasible	Feasible relates to engineering considerations and what is practical to build or implement
Incident	A set of circumstances that causes or threatens to cause material harm to the environment
Material harm	Is harm that: involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial; or results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (such loss includes the reasonable costs and expenses that will be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the development
Non-compliance	An occurrence, set of circumstances or development that is a breach of this consent but is not an incident

Operation	The operation of the development, but does not include commissioning, trials of equipment or the use of temporary facilities
Project site	The land defined in the figure in Appendix A of the Development Consent
Public infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, irrigation channels, drainage channels
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The restoration of land disturbed by the development to a good condition, to ensure it is safe, stable and non-polluting
Temporary facilities	Temporary facilities used for the construction, upgrading and/or decommissioning of the development, including but not limited to temporary site offices and compounds, materials storage compounds, maintenance workshops, or material stockpiles, laydown areas and parking spaces

1. THE PROJECT

Genex Power Limited (Genex Power) received approval to develop the Jemalong Solar Farm ('Project') at Jemalong in Central West New South Wales on 18 May 2018. The proposed Project comprises a solar photovoltaic plant of approximately 50 megawatt (MWac) within the Forbes Local Government Area (LGA).

2. PURPOSE AND OBJECTIVES

2.1. PURPOSE

The purpose of this Landscape Plan ('LP') is to meet the Conditions of Consent ('CoC') for SSD 8803 Modification-3 ('Mod-3') regarding the planting, managing, monitoring and maintenance of the vegetation buffer at the location outlined in Appendix 1 of CoC.

2.1.1. Conditions of Consent

The CoC relevant to this LP are outlined in Table 2-1 below, and the location in this report where the conditions are addressed.

Table 2-1 Project CoC.

Condition		Where addressed
Vegetation Buffer		
10.	The Applicant must establish and maintain a mature vegetation buffer (landscape screening) at the location outlined in the figure in Appendix 1 to the satisfaction of the Secretary. This vegetation buffer must:	This document
	(a) consist of a variety of vegetation species that are endemic to the area;	Section 4.3
	(b) within 5 years of the commencement of construction be effective at screening views of the solar panels and ancillary infrastructure (excluding the overhead power lines) on site from surrounding residences; and	Section 4.4
	(c) be properly maintained with appropriate weed management.	Section 4.7
Landscaping Plan		
11.	Prior to the commencement of construction, the Applicant must prepare a detailed Landscaping Plan for the development in consultation with Council and surrounding landowners, to the satisfaction of the Secretary. This plan must:	This document

Condition		Where addressed
	(a) include a description of measures that would be implemented to ensure that the vegetated buffer achieves the objectives of condition 10[1](a) – (c) of this consent;	Section 5.2
	(b) include a program to monitor and report on the effectiveness of these measures; and	Section 5.2
	(c) include details of who would be responsible for monitoring, reviewing and implementing the plan, and timeframes for completion of actions.	Section 5.1
	Following the Secretary's approval, the Applicant must implement the Landscaping Plan.	

2.2. OBJECTIVES

The key objective of the LP is to:

- Implement the recommendations and mitigation measures outlined in the EIS (refer to Table 2-2)
- Ensure landscaping is planted to provide vegetation screening along a portion of the northern boundary of the Project site to further reduce visual impacts on nearby residences
- Achieve effective screening within 5 years of the commencement of construction

To achieve these objectives and the requirements of the CoC, the Applicant will undertake the following:

- Ongoing consultation with Forbes Shire Council, nearest sensitive receivers and the DPIE Biodiversity Conservation Division (formerly 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
- Implement the LP.

2.2.1. Environmental Control Measures

A range of mitigation requirements and control measures are identified in the EIS. The following measures relevant to the LP are listed. The contractor is the engineering procurement contractor (EPC) and operations and maintenance (O&M) contractor.

[1] Condition 11(a) of Schedule 3 references condition 22(a) – (c) however this is assumed to be an administrative error and should in fact reference condition 10(a) – (c) Vegetation Buffer, as per other solar farm development consents.

Table 2-2 Management and mitigation measures.

Measure / Requirement	When to implement	Responsibility
Visual Amenity and Landscape Character		
The following screening requirements will be met: • Planting will be more than one row deep and preferably be located on the outside of the security fence, so that it breaks up views of the fencing as well as onsite infrastructure. The final location of planting and density will be undertaken following verification of actual impacts. • Plant species to be used in the screen are to be native and consistent with existing vegetation types on the Project site. They should be fast growing, with spreading habit. Species selection will be undertaken in consultation with a botanist. • Vegetation should include a high shrub layer which will provide a more effective visual screen compared to trees as the panels will be maximum 3 metres high. Where feasible, plants selected should be of adequate size when initially planted to allow immediate effect as a visual screen. • Timing is recommended to be close to completion of construction so that actual and not predicted impacts of infrastructure are mitigated. • The screen will be maintained for the operational life of the Project. Dead plants will be replaced. Pruning and weeding will be undertaken as required to maintain the screens visual amenity and effectiveness in breaking up views.	Construction	Contractor
Landscaping		
Spray drift form weed control within the landscaping area will be minimized through the use of course droplet nozzles. Spraying will be by hand following planting. Mulching will be used where possible for weed suppression.	During construction and as required	Contractors

2.3. TARGETS

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

- 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
- Establish tube stock from seed collected from or endemic to the local area (100km radius).

2.4. CONSULTATION

2.4.1. Previous consultation – EIS

Consultation for the preparation of the framework landscape plan (FLP) under the EIS was undertaken with the NSW Office of Environment and Heritage (OEH, now the Biodiversity Conservation Division [BCD]) and Forbes Shire Council. The FLP incorporated and built upon consultation undertaken with all immediately adjacent neighbours (4).

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

Figure 2-1 below was taken from the above resident's property, north of the Project site, and indicates the visual break in native vegetation, some 500m. They requested screening planting in the north east corner of the Project site to address this gap.

Figure 2-1 View south from the neighbour located nearest the Project site, Whispering Pines Lane.

2.4.2. Ongoing consultation

Community Consultation

Consultation was conducted by the Applicant (Justin Coburn, Beon Stakeholder and Community Engagement Manager) with the two nearest visually impacted receivers identified in Appendix A.

Additional consultation was conducted by Harrison Holihan from Genex Power Ltd with neighbouring stakeholders; Optifarm, Twynam, Moxey's, and Stewart's (Appendix D). Two responses were received, and the other two stakeholders did not respond. Table 2-3 summarises the community comments. Appendix D is the letter from H. Holihan summarising the results of consultation.

Community consultation will be continued throughout the implementation of the Landscape Plan.

Table 2-3 Community Consultation summary

Receiver	Comment	Addressed in LP
Meeting with David and Karen 19/11/19 House no. 2 on plan.	• Don't see much of the solar farm apart from a tiny part where the landscaping is to go. • Dave – you are going to have to water them. Ten years ago, this was an open paddock and we …. • Preference for native plants. • Plants will need to be flood tolerant as well. Grey box, yellow box, gum trees, to provide a screen – anything that hedges will not survive a flood. Maybe you could do wattles. • Grow what is down there…keep the stock out of there…and they will grow	Section 4 Section 6
Gael, Denis and Greg Greg owns the house at no.1	• Trees they have planted was gums and sheoak pines are going well…. • Must use what is local…even some wattles…	Section 4
Optifarm	• No response	N/A
Moxey's	• No response	N/A

2.4.3. Agency Consultation

Consultation was conducted by Harrison Holihan of Genex Power Ltd with Forbes Shire Council.

Council provided the following comments via email in February 2020.

Table 2-4 Council Consultation summary

Comment	Addressed in LP
500 x 30m of vegetation buffer will generally be sufficient	Section 4.2
The choice of species are appropriate for the area and tolerate waterlogging to an extent	Section 4.3
Consultation with immediate landowners should continue	Section 2.4.2
Council requests that the plan be amended to ensure the 6 monthly reports referenced in Section 6.2 be referred to Council in addition to DPIE.	Section 6.2

Appendix D is the letter from Council to H. Holihan summarising the comments.

3. EXISTING ENVIRONMENT

3.1. THE SITE

The Project will be located on Lot 7 and 8 of DP 1245348; an area where the Project is principally located (i.e. solar array and Project substation area) and the 66kV powerline that runs along the electricity easement established between the Project substation and the Essential Energy substation in the north. The Project is located approximately 36 kilometres southwest of Forbes in Central West NSW, in the Forbes Shire LGA. The Project will be accessed via Naroo lane from the eastern boundary of the site.

The Project site covers approximately 140 ha of the 15,478 ha rural property that makes up Jemalong Station. The Project site is zoned as Primary Production (RU1) and is mostly cleared and relatively flat farmland with a long history of cropping.

Thurumbidgee Lagoon is the closest waterway to the Project site, approximately 400m from the proposed Project and runs east to west on the northern part of the Project site filling intermittently following sufficient rain. The Lachlan River is located approximately 3.7 km to the north. Refer to Appendix A.

3.2. PLANT COMMUNITY TYPE IN THE PROJECT SITE

Two Plant Community Types (PCT) is present in the Project site:

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. River Red Gum swampy woodland wetland on cowals (lakes) and associated flood channels in central NSW (PCT 249)

Approximately 3.1 ha of Poplar Box Woodland will be impacted by the development footprint. This PCT is not threatened under the *Threatened Species Conservation Act 1995* repealed and replaced by the *Biodiversity Conservation Act 2016* BC Act) or EPBC Act.

Approximately 0.64 hectares of moderate to good condition native vegetation will be impacted by the works for the transmission line, which accounts for a small amount of such vegetation in the Project site.

The supplementary plantings of the proposed LP 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.

3.3. SOILS

The topography of the 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 Project Site is occupied by inactive alluvial plains.

Soil at the site is mapped as two soil landscapes, Corinella and Scrubby plains (King, 1998). Refer Table 3-1 below.

Table 3-1 Soil landscapes

Soil landscape	Location	Description/Limitations
Corinella (alluvial)	Project site	Dominant soils of this landscape are deep (>100cm) Red Brown Earths. Soil limitations include sodicity/dispersibility, hard setting surfaces and low fertility. Landscape limitations include flood hazards. Topsoils in this soil landscape have a moderate erodibility. Erosion hazard is low.
Scrubby plains (stagnant alluvial)	Northern sections of the Project site.	Dominant soil types include moderately deep (>80cm), brown clay. Soil limitations include sodicity/dispersibility, localised salinity, low permeability, high plasticity, Hugh shrink-swell potential. Low to moderate fertility. Landscape limitations include flood hazard, foundation hazard and seasonal waterlogging. Soil erodibility is moderate, and erosion hazard is low.

The site has 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 Project 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).

3.4. HYDROLOGY

3.4.1. Groundwater

There are a number of bores in the local area. One bore is within the Project site near the Hallidays Farm House to the west of the proposed vegetation buffer. No new bores are currently planned as part of the Project.

The soil and groundwater survey conducted by ARUP in 2017 included drilling two bores at the Project site. Groundwater levels were encountered between 7m and 10m (refer Table 3-2). These ground water levels may reflect the proximity of the site to a lagoon and the Lachlan River flood plain.

Table 3-2 Encountered depths of groundwater

Location ID	Groundwater Type	Depth (mbgl)	Reduced Level (m AHD)
BH101	Ingress	7.0	208.1
BH101	Standing level in standpipe	5.9	209.2
BH102	Ingress	10.0	206.9

3.4.2. Surface Water

Thurumbidgee Lagoon is the closest waterway to the Project site, located approximately 400 m to the north. Other irrigation channels and canals are located in the area, supplying water to agricultural properties. The lagoon is approximately 3 km long oriented east to west. The lagoon water volume varies substantially with rainfall. It is shallow lagoon and intermittently filled after moderate to heavy or prolonged rainfall. There are no defined drainage lines or other waterways that enter the lagoon.

The Project site is located on the Lachlan River floodplain, immediately downstream of the Jemalong Gap. Floods in this area are common and cover a vast area of the floodplain for prolonged periods (DECCW, 2009). The plantings are located in an area previously impacted by flood events greater than 0.5m (occurring in 1990, the 25 year Average Recurrence Interval [ARI] event) (refer Figure 3-1).

The Project site and the plantings are located outside of the floodway network, however events greater than 4% Annual Exceedance Probability (AEP) will overflow onto the floodplain, which did occur in 2017. Potential impacts to the plantings may result if this event was to take place during the establishment period.

3.5. SENSITIVE RECEIVERS

Residential properties are sparsely distributed in the locality. The nearest non-involved residential dwelling is approximately 1.7 km north of the Project boundary. The owner and resident of this dwelling on Whispering Pines Lane has been consulted and their request for screening in the north east corner of the site has been described above. In total, four residential receivers have been identified in the locality with views of the Project. These property owners have been consulted and none have indicated any visual concerns with the proposed Project.

Several elements of the approved Project will not be seen except by visitors to the site and workers in paddocks near the Project site. This is due to the flat terrain of the Project site and the low height of PV modules (approximately 3 metres), as well as the screening vegetation surrounding the site.

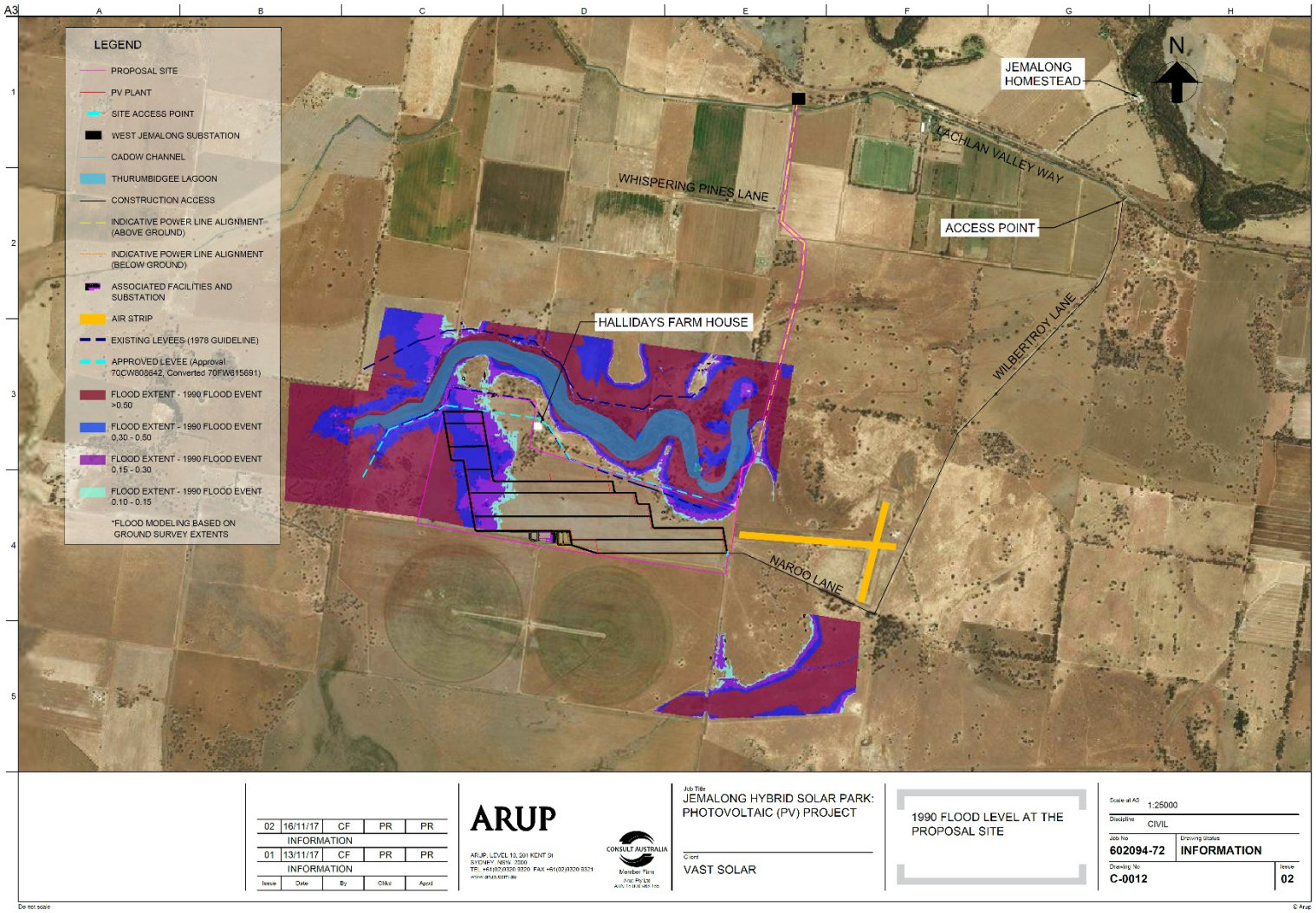


Figure 3-1 1990 Flood levels at the Project site (ARUP, 2017)

4. ONSITE PLANTINGS

4.1. LOCATION

The existing and proposed planting areas are identified in Table 4-1 below and Appendix A. New plantings are to be in the north east corner of the Project site. The plantings will be located within the subdivision boundary fence and outside the solar farm security fence.

Table 4-1 Planting location details

General Location	Length
Project site north east corner – gap planting between Poplar Box Woodland to screen Whispering Pines residence north of the site	500m

Plantings will be a mix of native trees and shrubs endemic to the site (refer Section 4.3 below).

The row of plantings will be approximately 6 m wide, or equivalent to three rows of vegetation.

4.2. MAINTAIN AND ENHANCE

The vegetation buffer will add an area about 500m x 30m of new native vegetation to the site. Existing stands of Poplar Box Woodland will be enhanced by selected species endemic to the local area. The selected planting species will include shrubs and trees of varying heights and widths to buffer views of the solar arrays and other elements of the Project. The plantings will improve connectivity between existing vegetation patches and minimise visual impact for sensitive receivers.

4.3. SPECIES

Species selected for plantings for the Project site reflect the species of the Poplar Box grassy woodland. These species will complement nearby vegetation enhancing biodiversity connectivity and species diversity. The species selection is based on growth characteristics, including height and form. The list includes upper storey, mid storey and lower storey species.

- Trees:
  - Bimble Box *Eucalyptus populnea* subsp. *bimbil*
  - Belah *Casuarina cristata*
  - White Cypress Pine *Callitris glaucophylla*
- Shrubs:
  - Wilga *Geijera parviflora*
  - *Alectryon oleifolius*
- Bushes:
  - Thorny Saltbush *Rhagodia spinescens*
  - Warrior Bush *Apophyllum anomalum*
  - Lignum *Muehlenbeckia florulenta*

Refer to Appendix B for more info about these species.

4.4. DENSITY AND PLANTING METHODS

- An asset protection zone (APZ) for fire management of 10 meters will be created between the planting and panels (refer Figure 4-1 below).
- Tube stock will be germinated form locally collected endemic seed.
- Hardened tube stock will be planted out into ripped planting beds following weed control.
- Planting will occur in autumn following sufficient rainfall or prewatering.
- Trees and shrubs within each row will be spaced at 2 to 3 metres apart, dependent on the species.
- Plantings will be staggered, mixed and offset to produce a heterogeneous mix of plantings.
- To compensate for likely plant loses during establishment a contingency of 20% will be added to the total number of plants required for the vegetation buffer.

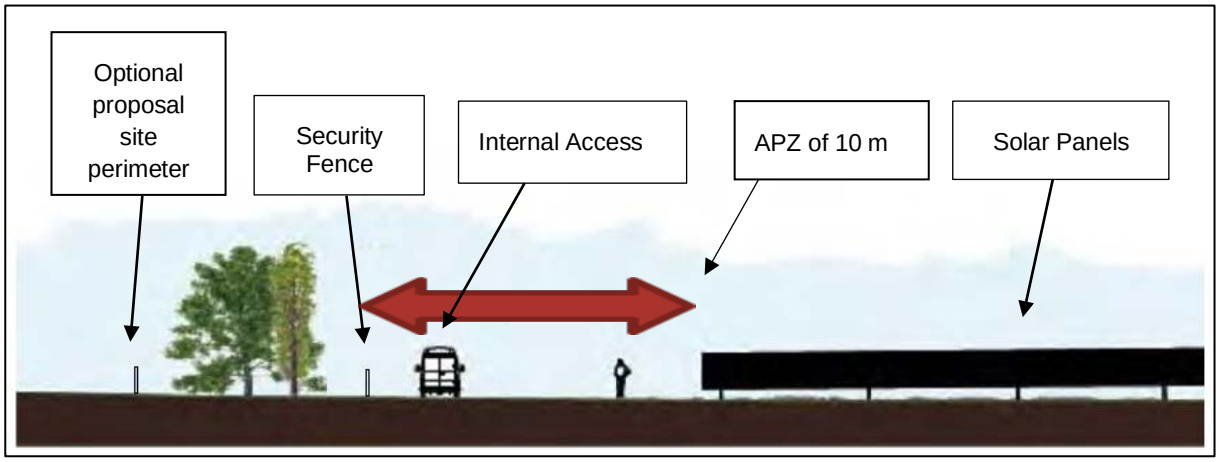


Figure 4-1 Landscape planting sketch

4.5. ESTABLISHMENT REQUIREMENTS

Tube stock will be planted in autumn or spring with:

- Water crystals and fertiliser.
- Regular watering (where required – refer Section 5).
- Tree guards, to provide protection from wind and wildlife.
- Stock proof fencing where grazing is expected.
- Spraying and or mulching will be used to control weeds and competition during establishment.
- Weed inspections/control spraying as per Section 4.7.

Trees will be monitored monthly for mortalities during establishment. Monitoring requirements are described further in Section 5.

Pest and weed control will consider biological and manual control methods and will limit the amount/volume of chemical based products. At a minimum pest and weed control procedures will follow Forbes Council guidelines and best practice for limiting ecological and environmental impact to non-target species.

4.6. WATER USE

Several sources of water are available for landscape irrigation. The identification of the most suitable source would be based on recommendations by the landscape contractor, taking into account the total demand for planting establishment and long-term irrigation demand of the landscape plantings.

The various sources include:

- Groundwater or surface water entitlement could be obtained through purchase and trade in accordance with the water sharing plan for the Lachlan Unregulated and Alluvial Water Source or the water sharing plan for the Lachlan Regulated River Water Source.
- Jemalong Station bore located southeast of the Project site. The water allocation for this bore is 1,000ML and is licensed to Twynam Pastoral Co Pty Ltd.
- Bulk water tankers could be used to supply non-potable water to site.
- Irrigation channels at present under the landowner's farm rights.

In order to optimise water use and minimise waste, water use optimisation options will be considered. One option is a drip irrigation system that would be installed at the planting site. The system would be operated on a timer, set for irrigating in the early morning and or in the late afternoon, in order to avoid the hottest part of the day when evaporation losses will be greatest.

During establishment the watering schedule will be reviewed and modified weekly based on the results of the rainfall and moisture content of the soil. Once the planting is established the watering schedule will be adjusted to ensure sufficient volumes for sustained growth, avoid wastage of water and restricting root development.

Daily monitoring of the Australian Bureau of Meteorology (BOM) for predicted rain events and actual rainfall received will be used to adjust the irrigation schedule. The aim is to optimise water use and avoid over watering of the plantings.

Mulch will also be spread throughout the planting area to a depth of 70-100 mm. Medium to coarse textured materials such as river redgum chip will be use retain soil moisture and minimise weed growth and water use.

4.7. WEED MANAGEMENT

Of the 54 species of plants recorded during the flora surveys as part of the EIS, 17 (31%) were not indigenous to the region. One species, African Boxthorn (*Lycium ferocissimum*), is declared as a Priority

Weed by Forbes Shire Council. Under Forbes Shire Council regulations, the species must not be imported into the state or sold. No biosecurity zones apply to the species.

The spread of weeds will be controlled through the Biodiversity Management Plan (BMP) that will be prepared and implemented during the construction and operation phases of the Project. These measures will be implemented for the Project site, including the plantings.

Applying mulch will be used to control weeds in the planting area.

Weed monitoring requirements for the plantings will be in accordance with the BMP.

5. MONITORING AND INSPECTION

5.1. ROLES AND RESPONSIBILITIES

The following roles and responsibilities follow the organisation structure of the lead construction contractor. Upon handover to Operation and Maintenance (O&M), the roles and responsibilities will be adjusted to the O&M's organisation structure.

The Project Manager will:

- Ensure resources are allocated for the implementation of the LP
- Ensure the objectives and monitoring activities of the LP are implemented
- Review and approving internal and external reporting
- Submit 6 monthly reports to DPIE throughout the first 2 years of establishment

The Site Environmental, Health and Safety (EHS) Compliance Officer will:

- Identify and resourcing the necessary materials and equipment to implement the LP
- Ensure materials being used for the LP are environmentally friendly and safe
- Oversee and managing the implementation of the LP
- Conduct monitoring in accordance with the schedule outlined in the LP
- Prepare regular monitoring reports for internal reporting
- Prepare 6 monthly monitoring reports for external reporting to DPIE throughout the first 2 years of establishment
- Review and update the LP as required, based on monitoring results and requirements stipulated by DPIE
- Prepare and maintain a record of all reports and monitoring activities
- Ensure the Construction Manager is notified of any changes to the LP
- Liaise with the Construction Manager to ensure any variations to the scope or timing of the work that may impact on the implementation of the LP are discussed, and be point of contact for all landscaping issues

5.2. MONITORING AND SUCCESS

Inspections of the landscaping area will occur weekly during construction. Inspection of the landscaping during the first five years of planting will be in accordance with Table 5-1 below. Actions that will occur as a result of monitoring are identified in Table 5-2 below.

If all intervention measures for a criterion fail, seek advice from arborist or landscape professional. Frequency of monitoring will be increased as required to verify that the intervention methods are successful.

Table 5-1 Monitoring program – first five years

Parameter	Frequency of monitoring		
	Year 1	Year 2-4	Year 5
Rainfall	Daily	Daily	Daily
Fences	Weekly	Monthly during grazing	Monthly during grazing
Weeds	Quarterly	Quarterly	Quarterly
Pests	Monthly	Monthly	Monthly
Plantings	Monthly*	Six monthly	Annually
Soil erosion	After rainfall greater than 20mm	After rainfall greater than 20mm	After rainfall greater than 20mm
Water use	Daily	Daily	Daily
* Monthly monitoring only if drip irrigation system is used. In the first 4 months of planting, monitoring frequency could be increased to bi-weekly and consequently adjusted based on observations.			

Table 5-2 Management program during planting establishment

Parameter	Trigger for action	Action
Rainfall	Rainfall is less than 20% of evaporation	Water plantings as appropriate
Fences	Broken fence identified	Repair any damage immediately
Weeds	Weeds identified within 1.5 m of planting	Remove weed according to BMP, preference to use biological or mechanical control methods.
Pests	Pests identified on site (through sightings or other evidence of presence)	Implement pest management measures as appropriate for the pest type. May include physical barriers, biological control or chemical controls as a last option.
Plantings	Plant mortality	Replace (Winter/spring)
Soil quality	Evidence of erosion within 3 metres of plantings	Stabilise soils through implementation erosion and sediment control measures.
Water use	Water required to maintain the plantings exceeds licensed amounts	Identify permissible additional sources of water. Increase licensing amounts if required.

5.2.1. Photographs

The monitoring reports will include photographs of the planting so as to visually document the progression of the plantings over time throughout the first 2 years of establishment.

Photographs to be incorporated into the monitoring report will include:

- General shots of the plantings (all species) to show growth progression
- Weeds identified
- Unhealthy/improperly growing individuals
- Mortalities

5.3. CRITERIA FOR SUCCESS AND INTERVENTION

The process of developing and refining criteria will be progressive and allow for continual improvement. Table 5-3 and Table 5-4 below outline criteria for the success of plantings and of weed management measures respectively, as well as triggers if criteria are not being met, when intervention should be taken and appropriate intervention methods.

Table 5-3 Criteria for success of plantings and intervention measures

Criteria	Trigger for intervention	Intervention
Plantings grow in accordance with the species' natural growth speed and formation	Slow or deformed growth	Ensure plants are receiving adequate watering. Increase or decrease watering levels as required for best outcome. Verify soil condition and quality is suitable for plant growth and water retention.
Plantings are free of disease	Parasites or moulds identified on or around the plantings	Treat parasites or fungus in accordance with best practice methods. Monitor the infestation daily until resolved.
Mortality rate is less than 10% and no gaps greater than 5m.	Mortalities greater than 10% of plantings or gaps greater than 5m	Replace individuals to ensure the screen is well established.
Roots are not exposed	Root damage on greater than 10% of plantings	Ensure area is adequately fenced off from livestock. If root damage is a result of pests, review pest management measures and implementation. Amend or increase measures as required.
After 5 years, plantings will screen the development from views for the neighbour located nearest the Project site, at Whispering Pines Lane	Development visible from the identified viewpoint	If plantings appear healthy, continue monitoring frequency for year 5, or increase if required, to ensure continued growth and health of plantings.

Criteria	Trigger for intervention	Intervention
		If plantings unsuccessful, determine cause and address accordingly to ensure successful growth and screening.

Table 5-4 Criteria for success of weed management and intervention measures

Criteria	Trigger for intervention	Intervention
No priority weeds identified on site	Priority weeds identified on site	Eliminate priority weed species as soon as possible in accordance with recommended control methods and timing. Review weed management measures and implementation. Amend Weed Management Plan as required to reduce likelihood of future occurrences.
New invasive weeds detected on site are controlled.	Invasive weeds detected on site	Eliminate invasive weed species as soon as possible in accordance with recommended control methods and timing. Increase targeted weed control measures as required.
No weeds within 1.5m of the plantings.	Weeds identified within 1.5m of the plantings.	Implement weed control measures as per the BMP soon as possible.

5.4. MANAGEMENT AFTER 5 YEARS

After five years of planting, the monitoring and management program identified in Table 5-5 below will be implemented. Should a problem with the plantings be identified, such as increased presence of weeds or sickly or dead plantings, more frequent monitoring of the plantings (i.e. weekly or monthly monitoring) will be undertaken as require until the situation redresses.

Table 5-5 Monitoring and management program after five years

Parameter	Frequency	Trigger for action	Action
Rainfall	Daily	Rainfall is less than 10mm/month	Water plantings as required if forecast identifies less than 10% chance of rain in the subsequent three days
Fences	Monthly	Broken fence identified	Repair any damage immediately
Weeds	Every 3 months	Weeds identified within 1.5 m of planting	Spot spray weeds with appropriate herbicide

Parameter	Frequency	Trigger for action	Action
Pests	Every 3 months	Pests identified on site (through sightings or other evidence of presence)	Implement pest management measures as appropriate for the pest type. May include physical barriers or chemical controls.
Plantings	Annually in summer	Plant mortality	Replace planting, in autumn or as recommend by landscaper
Soil quality	After rainfall greater than 20mm	Evidence of erosion within 3 metres of plantings	Stabilise soils through implementation erosion and sediment control measures.
Water use	Monthly	Water use required to maintain the plantings exceeds licensed amounts	Identify permissible additional sources of water. Consider using recycled water, or rain water. Check soil quality and mulch thickness to reduce evaporation losses. Increase licensing amounts if required.

6. REPORTING

6.1. INTERNAL REPORTING

Internal reporting will occur monthly for the first two years following planting and monitoring implementation. Frequency will decrease to quarterly for the next two years and finally reduce to bi-yearly throughout the lifetime operation of the Project. The reports should reflect the findings of daily and monthly inspections as outlined in Section 5.

A sample monthly reporting form is provided in Appendix C. These forms will be completed and compiled to be submitted as part of six-monthly regulatory requirement to DPIE throughout the first 2 years of establishment.

6.2. REGULATORY REPORITNG

Monthly reports (including attachments and photos) will be compiled and submitted to DPIE and Council every six months for the first two years following planting and monitoring implementation. The reports will be accompanied by cover letter summarising:

- Monitoring results
- Actions taken
- Results of actions taken
- Future actions required
- Proposed changes to the monitoring program, i.e. increase in frequency of monitoring or monitoring of additional parameters.

7. REFERENCES

ARUP (2017) Summary Technical Report: Flood Study of Jemalong Solar PV Plant – Summary Technical Report

Department of Environment and Climate Change. (2009b). Lachlan River Jemalong Gap to Condobolin Floodplain Risk Management Study.

King, D.P. (1998). Soil Landscapes of the Forbes 1:250,000 Sheet. NSW Department of Land and Water Conservation, Sydney

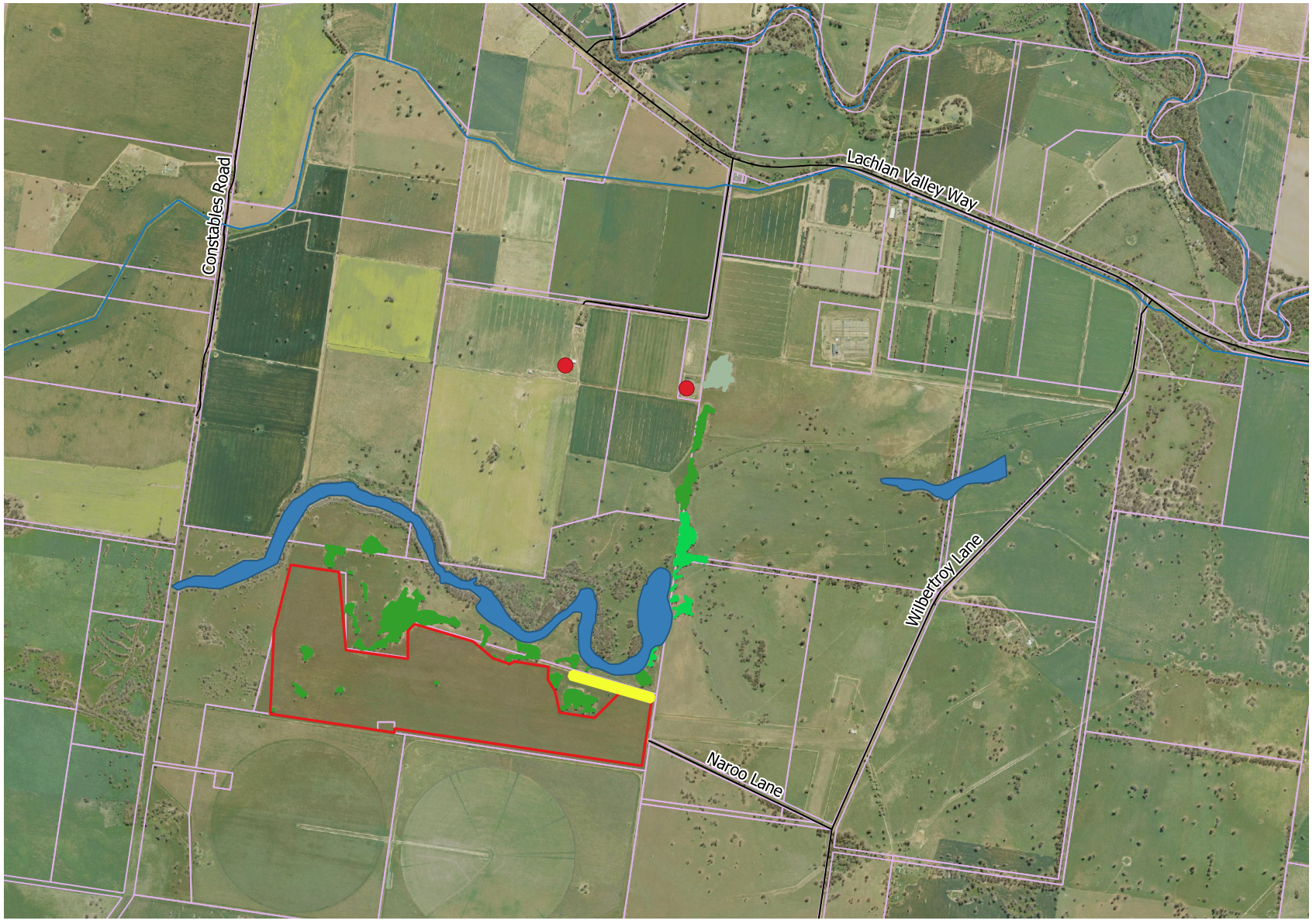
NGH Environmental (2017). Environmental Impact Statement; Jemalong Hybrid Solar Park: 50MW Solar Photovoltaic (PV) Plant.

NSW Government. (2014). Natural Resources Atlas website. Accessed November 2014, from http://www.nratlas.nsw.gov.au/wmc/custom/homepage/home.html

Southeast Engineering and Environmental (2015) Flood Impact Assessment: Jemalong Solar

APPENDIX A MAPS

A.1 JSF PLANTING MAP



Jemalong Solar Farm

Legend

- Vegetation Buffer
- Fence line
- Thurumbidgee Lagoon
- Creeks

Proposal Site Vegetation

- Poplar Box Woodland
- River Red Gum Swampy Woodland
- Western Grey Box Woodland
- Roads
- Cadastre Lot DP
- Sensitive receivers

Data Attribution
© NGH 2019
© Beon Energy Solutions 2019
© Sixmaps2019

Ref: Jemalong LMP GIS \ Jemalong Solar Farm
Author: zeina.j
Date created: 28.11.2019
Datum: GDA94 / MGA zone 55

0 500 1000 m

NGH

A.2 JSF GENERAL ARRANGEMENT

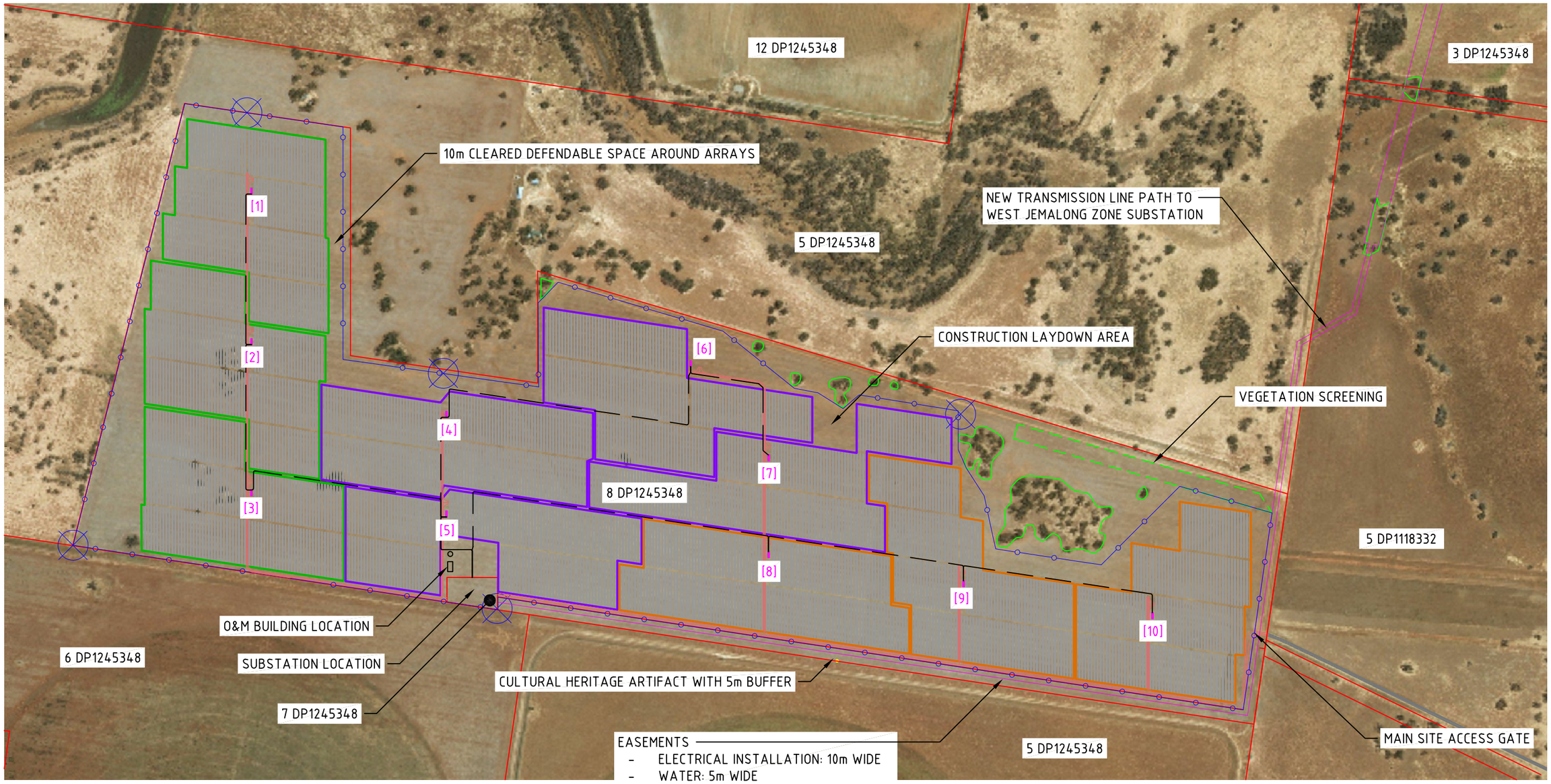


TABLE 1 - LEGEND

	LOT BOUNDARY		ELECTRICAL EASEMENT		PV TRACKER
	SECURITY FENCE		FEEDER 1 BLOCK BOUNDARY		INVERTER STATION
	VEGETATION		FEEDER 2 BLOCK BOUNDARY		PROTECTED HERITAGE SITE
	NEW VEGETATION		FEEDER 3 BLOCK BOUNDARY		33kV CABLE ROUTE
	ACCESS TRACK				EMERGENCY ACCESS GATE

160 80 0 160 320 480 640 800

SCALE 1 : 8000

N

REVISION HISTORY	COMMENT
A	ISSUED FOR INFORMATION
-	-
-	-
-	-
-	-

beon Energy Solutions

DRAWING NUMBER	JEM	CIVIL	SKC	003	A	SHEET 1 OF 1

JEMALONG SOLAR FARM
SITE EQUIPMENT LAYOUT
FOR VEGETATION MANAGEMENT PLAN

DRAWN	DRAFTING CHECK	DESIGNER	DESIGN APPROVAL	PROJECT MANAGER
P.OXLEY 14/01/2020	H.MURTAGH 14/01/2020	P.OXLEY 14/01/2020	H.MURTAGH 14/01/2020	

280x400

A3

P:\DEPT\Projects\Solar\Jemalong\02 Delivery Stage\12 Design\03 Drawings, Schedules and Calcs\01 Beon\DWG\JEM-CIV-SKC-003 - Site Equipment Layout for Vegetation Management Plan RevA - DRAFT.dwg 27/08/2018 3:03 PM

APPENDIX B PLANTING SPECIES

B.1 TREES

Trees
Bimble Box (*Eucalyptus populnea* subsp. *bimbil*) **Description**: Tree to 20 m high; bark persistent on trunk and larger branches, grey with whitish patches, fibrous-flaky ('box'), smooth above, glossy, grey, shedding in short ribbons. *Source: PlantNET, http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Eucalyptus~populnea*

Trees

Belah (*Casuarina cristata)*

Description: Dioecious tree 10–20 m high, frequently producing suckers.

Source: PlantNET, http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Casuarina~cristata

Trees

White Cypress Pine (*Callitris glaucophylla*)

Description: Tree to 20 m high, with a single trunk, bark rough and furrowed, foliage bluish grey

Source: PlantNET, http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Callitris~glaucophylla

B.2 SHRUBS

Shrubs
Wilga (*Geijera parviflora*) **Description**: Shrub or tree to 10 m high, leaves and branches pendent and often reaching to ground level but frequently trimmed by sheep; glabrous or inflorescences and young branchlets slightly hoary. *Source: PlantNET, http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Geijera~parviflora*

Shrubs

Western Rosewood (*Alectryon oleifolius)*

Description: Small tree with new growth silky, branches and leaves usually pendent.

Source: PlantNET, http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Alectryon~oleifolius

Image: Atlas of Living Australia, Don Wood: Alectryon oleifolius subsp. Canescens
https://bie.ala.org.au/species/http://id.biodiversity.org.au/node/apni/2900874#gallery

B.3 BUSHES

Bushes

Thorny Saltbush, Spiny Saltbush (*Rhagodia spinescens*)

Description: Intricately branched spinescent or unarmed shrub to 3 m high, branches covered with vesicular hairs when young.

Source: PlantNET, http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Rhagodia~spinescens

Image: http://plantselector.botanicgardens.sa.gov.au/Plants/Details/2845

Bushes

Warrior Bush (*Apophyllum anomalum*)

Description: Shrub mostly 3–5 m high, sometimes taller and tree-like, older branches leafless, glabrous, sometimes drooping.

Source: PlantNET, http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Apophyllum~anomalum

Bushes

Lignum (*Muehlenbeckia florulenta*)

Description: Intricate, rounded shrub 1–3 m high and diam., regularly and usually strongly striate, with stems grey-green, often ending in a spine.

Source: PlantNET, http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Duma~florulenta

APPENDIX C INTERNAL MONTHLY REPORT FORM

Details			
Person completing form		Date form completed	
Company and role		Monitoring start/end dates	
Photographs included?			
Monthly climate conditions	Temperature:		
	Humidity:		
Rainfall			
Monthly rainfall	Min:	Max:	Average:
Fences			
Damages identified			
Location of damages			
Actions taken			
Weeds			
Location			
Species			
Maturity			
Density			
Treatment undertaken			
Pests			
Species/quantity			
Impact caused			
Treatment undertaken			
Plantings			
General condition			
Height of plantings			

Details	
Mortalities	
Problem areas	
Treatment taken	
Soil quality	
Evidence of increased erosion?	
Location	
ESC implemented	
Water use	
Amount of water used	
Exceedance of license?	

APPENDIX D CONSULTATION RESULTS

Jemalong Solar Farm
Jemalong Solar Farm
Jemalong
NSW 2871 Australia

Genex Power LTD
Level 6, 28 O'Connell St
Sydney
NSW 2000 Australia

MAIL TYPE
General Correspondence

MAIL NUMBER
GENXPL-GCOR-000011

REFERENCE NUMBER
GENXPL-GCOR-000011

Landscape Plan

From	Harrison Holihan - Genex Power LTD
To	Irene Shyshko - Beon Energy Solutions
Cc (6)	Mr Andy McCutcheon - Beon Energy Solutions
	Mr Richard Reynolds - Beon Energy Solutions
	Mr Shaun Griggs - Beon Energy Solutions
	Mr Jake Darby - Beon Energy Solutions
	Mr Arran McGhie - Genex Power LTD
	Ms Wendy Moloney - Genex Power LTD
Sent	Monday, 13 January 2020

MESSAGE

Hi Irene,

The cut-off for the landscape management plan is today in terms of requesting feedback from stakeholders.

The plan was sent to all stakeholders (Optifarm, Twynam, Moxey's, Stewart's & Forbes Council).

We received two emails back from Twynam and Stewart's who confirmed they had no issues with the proposed plan. The remaining three stakeholders did not respond.

As such, happy for this plan to now be finalised and then I can upload to the NSW DPIE portal.

Please let me know if you require anything further.

Kr,

Harrison

From:	Eliza Noakes
To:	Harrison Holihan; Mathew Teale; Paul Bennett
Cc:	Wendy Moloney; Arran McGhie
Subject:	RE: Landscape Management Plan
Date:	Tuesday, 4 February 2020 3:06:19 PM
Attachments:	image003.png image009.png image010.png

Dear Harrison,

The document we received on Christmas Eve appears to be in draft form and doesn't have full details regarding location of vegetation buffer and community consultation. Despite this, Council makes the following comments:

- 500 x 30m of vegetation buffer will generally be sufficient;
- The choice of species are appropriate for the area and tolerate waterlogging to an extent;
- Consultation with immediate landowners should continue; and
- Council requests that the plan be amended to ensure the 6 monthly reports referenced in Section 6.2 be referred to Council in addition to DPIE.

Thank you for taking the time to consult with Council regarding the draft Landscape Plan, and thank you for your patience in awaiting our response. Council supports the Landscape Plan pending minor corrections to finalise the document and the amendments requested above.

Kind regards,

Eliza Noakes | Town Planner
Forbes Shire Council

P: 02 6850 2300
E: Eliza.Noakes@forbes.nsw.gov.au
W: www.forbes.nsw.gov.au
Forbes NSW 2871

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From: Harrison Holihan [mailto:hh@genexpower.com.au]
Sent: Tuesday, 4 February 2020 11:31 AM
To: Mathew Teale <Mathew.Teale@forbes.nsw.gov.au>; Eliza Noakes <Eliza.Noakes@forbes.nsw.gov.au>; Paul Bennett <Paul.Bennett@forbes.nsw.gov.au>

Cc: Wendy Moloney <wm@genexpower.com.au>; Arran McGhie <am@genexpower.com.au>
Subject: RE: Landscape Management Plan
Importance: High

Hi team,

The department of planning unfortunately requires sign off of the landscape management plan before we can submit for final approval.

Could you please provide either feedback or approval of the below submission before COB tomorrow (Wednesday 5th February), otherwise we will start to experience project delays.

Thank you very much.

Kind regards,

Harrison Holihan | Commercial Manager

D: +61 2 9048 8865 **M** +61 408024851
E: hh@genexpower.com.au
W: www.genexpower.com.au
A: Level 6, 28 O'Connell Street, Sydney NSW 2000
P: GPO Box 4626, Sydney NSW 2001

From: Harrison Holihan
Sent: Tuesday, 24 December 2019 3:58 PM
To: 'Mathew Teale (mathewte@forbes.nsw.gov.au)' <mathewte@forbes.nsw.gov.au>; Eliza Noakes <Eliza.Noakes@forbes.nsw.gov.au>; Paul Bennett <Paul.Bennett@forbes.nsw.gov.au>
Cc: Wendy Moloney <wm@genexpower.com.au>; Arran McGhie <am@genexpower.com.au>
Subject: Landscape Management Plan

Hi all,

As part of our Development Approval with the NSW Department of Planning, Industry and Environment (DPIE), we are required to prepare a landscape management plan which details the vegetation screening that will be developed on the project site. To assist with this plan, we would like to seek your comments (if any) and approval before submitting to the DPIE.

The plan is also being sent to all other key stakeholders.

Could you please let us know before Monday 13th January 2020 if you have any comments or if you are happy with the proposed plan (attached).

If you have any immediate questions, please don't hesitate to ask.

Kind regards,

Harrison Holihan | Commercial Manager

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