Bamarang 330 kV Network Connection

SUBMISSIONS REPORT

November 2009

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1. Introduction

1.1. Overview

Delta Electricity is currently developing gas fired power generation options for its generating portfolio and, as part of this process, has identified a site at Bamarang, near Nowra on the south coast of NSW, for a gas turbine generation plant. On 27 February 2007, Delta Electricity was granted Concept Approval for Stage 1 and Stage 2 and Project Approval for Stage 1 of a gas turbine power generation facility at Bamarang, west of Nowra, under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Stage 1 plant would have a power generation capacity of approximately 300 MW and would be used as a peaking plant. The Stage 1 Project Approval also included the new 132 kV transmission line connecting the Bamarang facility to the 132kV Shoalhaven Substation and associated Integral Energy 132 kV sub-transmission system at West Nowra.

On 29 October 2008, Delta Electricity received Project Approval for Stage 2 of the Bamarang Gas turbine facility under Part 3A of the EP&A Act. Stage 2 comprises conversion of the Stage 1 OCGT facility into a 400 MW combined cycle gas turbine (CCGT) facility via the addition of, a steam turbine, a condenser and a generator. Stage 2 Project Approval also enables the facility to be constructed as a base load facility directly, depending on electrical demand and other power generation developments in NSW.

The proposed 132 kV transmission line for connection of the Bamarang Gas Turbine Facility to the Shoalhaven Substation, under certain demand conditions, will place constraints on the output from the CCGT facility. Delta Electricity is therefore seeking an alternative higher voltage electricity grid connection that would allow for output from the facility to a 330 kV network. The existing TransGrid Kangaroo Valley-Canberra 330 kV Transmission Line (Line 6), located approximately five kilometres to the west of the proposed Bamarang Gas Turbine Project site, was identified as the best 330 kV grid connection option.

Delta seeks to retain the already approved option of constructing and operating a 132 kV transmission line between the approved facilities site and the existing Integral Energy electricity grid to the east. The decision on which transmission line connection will be constructed will be made at a stage when the Bamarang project programme is confirmed and the timing and design details of a proposed new 330kV bulk supply point for the south coast region is known.

1.2. Planning Process

Delta Electricity is applying to modify the existing gas turbine generating facility approval under Section 75W of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The proposed modification is for the construction and operation of a 330 kV transmission line between the gas turbine generating facility and the existing TransGrid Kangaroo Valley-Canberra 330 kV Transmission Line (Line 6) to the west of the site. Delta seeks to retain the already approved option of constructing and operating a 132 kV transmission line between the approved facilities site and the existing Integral Energy electricity grid to the east. The decision as to which option will be selected will be made at a stage when the Bamarang project programme is confirmed and the timing and design details of a proposed new 330kV bulk supply point for the south coast region is known.

As part of the application for modification of the approved project under Section 75W(2) of the EP&A Act, an Environmental Assessment (EA) report was prepared. This modification to the approved project EA was prepared in accordance with Part 3A of the EP&A Act to satisfy this requirement. The Director-General's requirements for the modification to the approved project EA were issued by the NSW Department of Planning (DoP) on 29 March 2009.

The EA described the proposed modification to the approved project, assessed the environmental issues associated with the construction and operation of the proposed modification, and identified the additional measures that would be required, over and above those already specified in the current conditions of approval, to mitigate and manage the potential impacts of the proposed modification.

1.3. Project Description

The proposed modification to the approved project involves construction and operation of a new 330 kV transmission line to connect the Bamarang Gas Turbine Facility to TransGrid Line 6. As part of the proposed modification, a new sub-station within the Bamarang Gas Turbine Facility site would also be required to convert the voltage output from the gas turbines to 330 kV. The details of the proposed transmission line are summarised in **Table 1-1**.

Table 1-1: Details of the proposed transmission line

Voltage and circuit type	Grid connection location	Connection type	Tower height	Easement width	Line length	Associated infrastructure
330 kV double circuit / single tower (DCST)	TransGrid Line 6	Turn-in / Turn-out	42-47 m	60 m	5.2 km	Sub-station located at gas turbine site

1.4. Assessment of Impacts

The assessment of impacts was based on specific requirements provided by the Department of Planning. The key environmental issues associated with the construction and operation of the proposed modification were assessed and the measures identified that would be required to mitigate and manage the potential impacts of the proposed modification.

The main issue addressed in the EA and in responses from agencies was related to biodiversity. The surveys undertaken for flora and fauna were scoped to provide an overview of the likely impacts of the power line construction, assisting in defining the concept design and the need for mitigation measures to offset the impacts identified in the concept. It showed that the proposed transmission line easement would require the removal/modification of up to approximately 30 ha of vegetation, based on the establishment of a 60 m wide easement, although it was shown there was some scope to limit the amount of clearing in areas where vegetation would be below the required buffer distance between the vegetation and the proposed transmission line.

More detailed field survey and detailed design would need to be undertaken to quantify the exact level of impact and how to minimise the impacts on biodiversity. The overview studies suggested that the impacts to EECs and threatened flora species which potentially occur in the study area would be limited (as many of these are shrub, herb or orchid species which can be retained within the easement), with direct impacts limited to the proposed pole locations and access trails. However, it is likely that any clearing of the canopy and larger shrubs would result in changes to the species composition and vegetation structure of the understorey, which may or may not advantage some of these species.

The main mitigation measure would be the acquisition of habitat (at least 60 ha of quality vegetation) for biodiversity offsets. Other management and mitigation would occur by minimising vegetation clearance, avoiding EECs by using topographic elements surrounding the EECs in the study area, avoiding individual habitat features of conservation significance within the study area and managing general habitat features of importance by use of appropriate management practices in the study area. These management measures would only be described in detail when the detailed design of the line is developed. This design and the exact location of pylon sites and access roads would be developed with the benefit a more detailed survey of flora and fauna.

1.5. Submissions to the Environmental Assessment

The Environmental Assessment for the Bamarang 330 kV Connection was placed on public exhibition by the Department of Planning in September 2009. A total of 8 submissions were received by the Department, comprising:

- Submissions from NSW Government agencies, namely the Department of Environment, Climate Change and Water, Roads and Traffic Authority and the NSW Office of Water;
- Submissions from Commonwealth agencies, namely Department of Defence and Civil Aviation Safety Authority (CASA); and
- Submissions from Shoalhaven City Council, Southern Rivers CMA and the Rural Fire Service.

No submissions were received from the general community (individuals or groups).

Submissions were summarised and responses provided. These are outlined in Chapter 2. Recommended changes to commitments are outlined in Chapter 3.

2. Agency Submissions

Table 2-1 Shoalhaven Council

Comment	Response
The flora and fauna consultant has conducted surveys from 23 to 27 February 2009. The surveys have not been conducted having regard for the DECC produced Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities. For examples, the survey period does not coincide with the flowering times of threatened orchids identified as having a potential to occur within the habitat proposed to be cleared and the consultant has admitted this limitation.	It is noted that the timing of the survey was conducted in late summer and outside of the season of some cryptic flora. Of the 19 species of threatened flora possibly within the survey area, 15 of those would be expected to flower during February when the surveys were undertaken. Other months had fewer flowering species. However the survey period was optimum for the detection of the majority of species of flora and fauna, and this limitation is discussed.. The DECC guidelines specifically state that any limitation to the survey design and period should be discussed.
The fauna survey effort and techniques employed are inadequate given the number of vegetation communities identified and the area and distance of the study area. Once again, the applicant/consultant should refer to the DECC produced Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities.	The surveys were aimed at providing an overview of the fauna habitats, species and assemblages present and likely to occur in the study area. The approach was to identify and assume the likely presence of threatened fauna as a precautionary measure (Table 2-3 and Table 5-2).
This survey effort is inadequate for the collection of data with which to conduct an assessment of impacts for the proposal and additional surveys in line with the above mentioned guidelines should be conducted prior to the assessment of impacts.	The response above applies. It is noted that further survey work may identify additional ecological values within the study area, including habitats of significance for threatened species and provide more information on potential impacts and assist in refining the design of appropriate mitigation measures.
The applicant should be requested to complete a flora and fauna assessment in accordance with the DECC produced Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities	There is no legislative requirement under the EP&A Act or TSC Act at this stage to conform to the DECC draft guidelines for biodiversity surveys. The document was used as a guide to determine survey effort.

Table 2-2 Southern Rivers Catchment Management Authority

Comment	Response
The Native Vegetation Act 2003 incorporates an assessment methodology which aims to 'improve or maintain' native vegetation. This concept of 'improve or maintain' is assessed using a tool called PVP Developer. PVP Developer assesses the impact of the proposed clearing on water quality, threatened species, land and soil capability (including salinity) and biodiversity. The negative impact of clearing is 'offset' by areas that are managed for environmental purposes. Whilst the Native Vegetation Act 2003 does not apply to Part 3A developments, the Southern Rivers CMA suggests that the principles incorporated into the PVP Developer represent 'best practice' in vegetation management. Therefore we suggest that the assessment requirements reflect those articulated in the Environmental Outcomes Assessment Methodology (EOAM) which	The Native Vegetation Act 2003 does not apply to Part 3A developments.

Comment	Response
underpins the PVP Developer. This methodology can be found at www.nativevegetation.nsw.gov.au.	
Clause 5.2.1 of the EOAM states: "Clearing of over cleared vegetation does not improve or maintain environmental outcomes for biodiversity".	Noted
Clause 5.2.1 also states that offsets cannot be used to balance the impacts of clearing in these circumstances.	Noted
The Flora and Fauna Assessment of the site indicates that two Endangered Ecological Communities (EECs), River Flat Eucalypt Forest and Lowland Rainforest may be present as listed under the Threatened Species Conservation Act 1995. The Southern Rivers CMA supports the retention of all EECs.	The potential loss of these areas is low. The design of the alignment will seek to minimise any impacts on EECs including spanning of these habitats.
The Southern Rivers Catchment Action Plan (CAP) sets the direction for natural resource management in the region to 2016. The Targets within the CAP cover five themes: Water, Biodiversity Community and Partnerships, Soil and Land Capability, Coastal and Marine. Specific areas within the CAP that should be taken into consideration in the assessment of the concept plan are river and wetland protection, water quality, native vegetation and species conservation.	Noted
Removal of dead native vegetation and hollow bearing trees should be kept to a minimum as these activities have been identified as Key Threatening Processes.	Agree. As part of the management planning process during detailed design detailed surveys of hollow bearing trees will be undertaken to ensure the retention of these will be maximised in the final alignment and clearing for poles / pylons and access tracks.
The Southern Rivers CMA supports the view, in the Flora and Fauna assessment, that the option to utilise existing topography to span the powerline across the EECs above the canopy is preferable to native vegetation removal.	Noted
Where possible the proponent should retain the shrub layer within the easement to conserve habitat which is potentially utilised by threatened species populations including the Eastern Pygmy Possum and White Footed Dunnart. This should reduce the potential for fragmenting their habitat.	Agreed. Clearing between poles/pylons within the easement will be kept to a minimum. Clearing will be confined to access tracks and trees which may impinge upon power lines.

- **Table 2-3 Roads and Traffic Authority**

Comment	Response
Where applicable, the applicant shall obtain a permit for an oversized and over mass load from the RTA Special Permits Unit in Glenn Innes.	Noted. This would be obtained as part of the Construction Traffic Management Plan.

Where applicable, any B-Double access from the Princes Highway to the site shall be via Flinders Street, South Nowra then via Albatross Road to Yalwal Road. However, it should be noted that B-Double access does not continue all the way to the power plant.	Noted. Access for appropriate vehicles will be sought from the relevant road authority.
In accordance with Section 79C(1)(b) of the EP&A Act, Council as the Consent Authority, is responsible to consider any likely impacts on the natural or built environment in the road reserve fronting this proposed development. The RTA will not be making a separate Part 5 environmental assessment of the environmental impacts in the road reserve for this proposal.	Noted. No works are proposed in the road reserve fronting the proposal.

Table 2-4 NSW Rural Fire Service

Comment	Response
The NSW Rural Fire Service has reviewed the plans and documents received for the modification and subsequently raise no new concerns or issues in relation to bush fire, subject to ongoing compliance with our original advice dated 22 May 2006.	Noted.

Table 2-5 Department of Environment, Climate Change and Water (Office of Water)

Comment	Response
THE NSW Office of Water (NOW) has undertaken desk top mapping and classification of the watercourses on the subject land using the Riparian Corridor Objective Setting (RCOS) stream categorisation methodology to identify minimum riparian corridor widths. The RCOS stream classification uses three categories which reflect the environmental significance of watercourses. The minimum widths to achieve the riparian categories are as follows: ■ Category 1 – Environmental Corridor. Minimum width: a CRZ width of 40 metres (measured from the top of bank) along both sides of the watercourse + a 10 metre vegetated buffer. ■ Category 2 – Terrestrial and Aquatic Habitat. Minimum width: a CRZ width of 20 metres (measured from the top of bank) along both sides of the watercourse + a 10 metre vegetated buffer. ■ Category 3 – Bank Stability and Water Quality. Minimum width: a CRZ width of 10 metres (measured from the top of bank) along both sides of the watercourse (generally no buffer is required). The above riparian widths are minimum widths and opportunities for achieving greater corridor widths are encouraged. Additional width may be required for	No structures will be placed within riparian zones of Calymea Creek or its tributaries.

Comment	Response
geomorphological and environmental considerations (eg to protect and enhance remnant native vegetation adjacent to the riparian corridor and biodiversity). The riparian corridors should be protected and/or enhanced with native riparian vegetation.	
Calymea Creek is a Category 1 watercourse. The EA has not provided details on the location of other watercourses in the vicinity of the proposed route but it would appear the proposed route will be located over or in close proximity to a tributary of Calymea Creek with is Category 2 watercourse. The proposal should be consistent with the minimum riparian setback requirements of the RCOS.	Noted
The NOW notes an area of up to 50m x 50m is required for each typical pole/pylon location (Section 2.2.3 of the EA). Section 4.7.2 of the EA indicates that adverse impacts on Calymea Creek can be avoided by spanning the creek with pole placements located well away from riparian areas. The NOW supports mitigation measure as this will minimise the need for clearing.	Noted.
Section 4.7.3 of the EA includes as a mitigation measure that pole placement would be avoided within 40 m of the banks of any waterways (Calymea Creek) and that the proposed method for stringing of conductors would avoid the need for machinery to be operation at or near the banks of waterways (pg 76). The poles/pylons and any other direct impacts associated with the proposal should be located outside the riparian zones (CRZ and VB) in accordance with NOW's stream categorisation.	Noted
Any requirement for an Asset Protection Zone (APZ) should be located outside the riparian zones (CRZ and VB).	Noted. There is no requirement for an APZ associated with the power line project.
Any disturbance of watercourses associated with the proposal must be rehabilitated to emulate a naturalised system for aquatic and terrestrial environments.	Noted. It is not intended to disturb watercourses
It is noted that the proposed new easement access tracks will not involve any waterways crossings (Section 4.7.3, page 76). The NOW recommends that any access crossing of Calymea Creek should be avoided. Access should be able to be gained from both ends of the proposed transmission line as well as utilising existing private access roads from Bamarang Road and which parallel Calymea Creek on both sides of it. Should any other watercourse access crossing be required it is to be designed and constructed in accordance with the *DWE Guidelines for Controlled Activities Watercourse Crossings* (February 2008).	Noted. If practicable access across waterways will be avoided. If crossings are necessary they will be designed in accordance with DWE guidelines.
Recommended Conditions of Approval	
All works and disturbance areas associated with the proposal (with the exception of any crossing) must be located outside the riparian zones as identified by the stream categories in Attachment C and must not comprise the riparian zones in any way.	Agree
The extent of the riparian zones is to be measured horizontally landward from the top	Noted

Comment	Response
of the bank of the watercourses. The widths of the riparian zones are to be a minimum of 50 metres on both sides of Category 1 watercourses and a minimum of 30 meters on both sides of Category 2 watercourses in accordance with the stream categories shown in Attachment C.	
There should be no new access track crossing of Calymea Creek. Any other watercourse access crossing is to be designed and constructed in accordance with the *DWE Guidelines for Controlled Activities Watercourse Crossings* (February 2008).	Noted
Erosion and sediment control measures are to be implemented prior to any works commencing at the site and must be maintained for as long as necessary after the completion of works, to prevent sediment and dirty water entering the watercourse. These control measures are to follow relevant management practices as outlined in the Landcom manual "*Managing Urban Stormwater: Soils and Construction – Volume 1" (4th Ed., 2004) – the "Blue Book".*	Agree
Any requirements for bushfire asset protection zones, including fire trails, are not to compromise in any way the extent, form or function of the riparian zones. Fuel reduced areas are to be located outside of riparian zones.	Noted

- **Table 2-6 Department of Defence**

Comment	Response
The EA acknowledges that Delta Electricity has consulted with the Department of Defence with regard to the 330kV transmission line alignment and tower heights and will continue to do so during final design and decision on the final location of towers.	Noted
Defence has not objection to the modification subject to further consultation during final design to ensure tower heights do not infringe the Obstruction Clearance Surfaces (OCS) for HMAS *Albatross*.	Noted

- **Table 2-7 CASA**

Comment	Response
The matter is for consideration of the Department of Defence as the powerline is in close facility to Nowra aerodrome. Air Services Australia should also be consulted to enable an assessment to be made of possible impacts on instrument approaches.	Noted

Table 2-8 Department of Environment, Climate Change and Water

Comment	Response
The proposed route of the 330 kV transmission line is through high quality intact native vegetation which provides habitat for a large number of threatened and non-threatened fauna and flora species. The ecological and conservation values of the vegetation which will be impacted by the proposed 330 kV line are likely to be much higher than the areas to be impacted by the previously approved Bamarang Gas Fired Power Station site, and the associated 132 kV transmission line route.	It is noted that the impacts of the modified design are likely to be higher and of greater significance than the approved design.
DECC considers the proposed location of the 330 kV transmission line to be undesirable for the following reasons, which are further described below: ▪ The need for clearing of high conservation value native vegetation ▪ Potential impacts from the construction of access roads into the proposed transmission line alignment. ▪ Direct and indirect impacts on areas of Endangered Ecological Community including areas of rainforest. ▪ Inadequate survey has been undertaken for ground dwelling fauna ▪ Impacts on ground dwelling fauna. ▪ Inadequate survey has been undertaken for threatened orchid species. ▪ The amount, size and location of hollow bearing trees impacted by the development has not been well documented in the report. ▪ Potential impacts on the boundary of the Bamarang Nature Reserve and the creation of a 60 metre wide cleared strip between Bamarang Nature Reserve and Colymea State Conservation Area. ▪ The offset proposal does not meet maintain or improve test for environmental outcomes.	It is noted that the impacts of the modified design are likely to be higher and of greater significance than the approved design. It is also possible that further survey work may identify additional ecological values within the study area, including habitats of significance for threatened species and provide a more detailed assessment of impacts and input into the design of appropriate mitigation measures. This level of detail would be done following approval and would be undertaken as part of the detailed design of the project, allowing for precise location of pylon sites and access tracks along the proposed easement. Specific comments on the points raised in the commentary are addressed where relevant in the responses provided below.
Consideration of alternatives	
No consideration has been given in the report as to whether the proposed 330 kV transmission line from the Bamarang Power Station could be routed along existing road reserves, transmission easements or other less ecologically sensitive land heading West which intersect the main Canberra – Kangaroo Valley 330 kV transmission line.	This was assessed in Section 3.2.2 of the EA. The analysis of options considered opportunities for using existing road reserves and transmission line easements between the approved power station and the main 330 kV line. As clearly explained in Section 3.2 of the EA Yalwal Road reserve and the existing 33kV line (there is no easement) are not suitable for a 330 kV line. In both cases it would be necessary to pass into Bamarang Nature Reserve and that would not be approved by DECCW. In areas outside the nature reserve the extent of clearing of vegetation would be similar

Comment	Response
	to the preferred option.
Section 3.2.2 of the report considers a number of alternative routes for the proposed transmission line. The Northern corridor route options are discounted as not being viable for a 330kV line due to the width of the existing 33kV line corridor. No consideration was given in the report to examining whether or not that existing transmission line corridor could be augmented so as to carry a higher voltage line and thereby avoid some of the impacts detailed below.	The 33 kV line passes through Bamarang Nature Reserve and any augmentation of the line would require extensive clearing into the nature reserve and approval for a new easement. The 33 kV line only proceeds as far west as Calymea Creek. To provide a 330 kV line in the northern corridor would require a clearing width of up to 60m in a new easement within the Bamarang Nature Reserve.
Clearing of high conservation value native vegetation	
DECCW considers the impact of the proposed transmission line route on areas of high conservation native vegetation to be significant.	It is noted that the impacts of the modified design are likely to be higher and of greater significance than the approved design.
DECCW has reviewed the descriptions of the vegetation in the report and notes that most of the vegetation is described as being in good condition showing very little sign of disturbance. The plant species list indicates all vegetation types had a high species diversity and very few weeds with only 16 introduced species being recorded across the route and 365 native plant species.	Noted
The report indicates the vegetation along the proposed transmission line route is in very good condition with high species diversity and all structural layers intact, this vegetation also forms part of a large patch of vegetation which does not appear from the aerial photographs in the report to be fragmented. The vegetation impacted by the proposed transmission line route also forms part of an important north-south and east-west running corridor of vegetation providing movement for species through the landscape.	Noted.
The proposed transmission line route and associated access tracks will likely fragment this corridor creating avenues for feral animal and weed infestations, and will likely limit the movement of some species in the landscape.	Section 4.6.1 of the working paper provides an overview of the expected impacts associated with the barrier effect of the easement. The greatest level of impact as stated may affect small ground-dwelling fauna, although other groups including birds would also be impacted. Further information would be collected during the detailed design phase to ensure that pylon and track locations would minimise connectivity issues and weed infestation.
Potential impacts from the construction access roads into the current alignment	
DECCW notes that the Fauna and Flora Assessment did not assess the impacts associated with the construction of access/maintenance tracks into the proposed transmission line route. Section 2.2.3 of the report does forecast the need for access tracks along the easement and from existing roads. DECCW therefore considers that further survey and assessment should be undertaken to adequately assess the impacts of the entire development including any proposed access/maintenance tracks.	It is noted that further survey work may identify additional ecological values within the study area, including habitats of significance for threatened species and provide a more robust assessment of impacts and input into the design of appropriate mitigation measures. This would be undertaken at detailed design stage.

Comment	Response
Direct and indirect impacts on areas of Endangered Ecological Communities (EEC).	
The report has not addressed the direct and indirect impacts of the development on the EEC located along the proposed transmission line route, these being *Lowland Rainforest on the NSW North Coast and Sydney Basin Bioregion* and *River Flat Forest on Coastal Floodplains of the NSW North Coast Sydney Basin and South East Corner Bioregions*. DECCW found it difficult to determine from the report the impacts on the EEC.	It is noted that further information will be collected in relation to the direct and indirect impacts on EECs during the detailed design. Pylons and tracks will be positioned to minimise any potential impacts.
The impacts described in Section 5 indicate measures which could be undertaken to avoid the areas of EEC however it was unclear if these measures were going to be used in the construction of the transmission line. Section 6.12 of the Flora and Fauna Assessment suggests options to minimise the impact from vegetation clearance on EEC however firm measures or commitments which are proposed in the statement of commitments (Section 4.8) are all pre-empted by the words "where possible." Who is to make the assessment of where, for example, vegetation clearance is necessary is unclear.	It is noted that further information is required in relation to the direct and indirect impacts on EECs. More detailed assessment will be undertaken during detailed design to assist in minimising impacts. During construction sites to be cleared for works will be monitored by an ecologist. Section 4.8 of the EA states that "where possible vegetation clearance would be minimised." This means that in the context of the need to clear for pylon locations and access tracks all care will be taken to minimise vegetation clearance and that if possible impacts on EECs will be nil. This may be achieved by locating pylons and access roads away from these communities. The exact locations of these sites will be worked out when the detailed design is known and will provide input to the design.
There is no assessment of the indirect impacts from the development on these EEC including the construction impacts. DECCW seeks clarification as to how much of the Lowland Rainforest and River Flat Forest EECs will be impacted by the development and what measures have been taken to limit the impact on these areas, particularly during construction.	The working paper and EA quantifies the likely direct impact on EECs. It is noted however that further measures to mitigate impacts could be described. As noted above the exact loss of EECs, if any, will be quantified during the detailed design and where possible avoided.
The NSW Department of Planning draft Part 3A Threatened Species Assessment Guidelines indicate in Step 4 the requirements for developments to avoid, mitigation, and as a last resort offset the impacts of the development on biodiversity values. The impacts from the proposed development appear unlikely to be able to meet an "improve or maintain" outcome.	Further assessment in regard to determining an appropriate offset ratio may assist this process. Given the approved ratio for the project of 2:1 we have suggested this ratio should apply for the modification. However, It is also recognised that such a Consent Condition should appropriately address the offsetting of the biodiversity impacts of the project rather than be based on a specific offset ratio. Considering the linear nature of the proposal it traverses through several vegetation communities and habitats including floodplain and escarpment areas. Therefore it may be difficult to find a property which supports the diversity of habitats present in the study area and it is suggested that habitats within the proposed offset site should support similar fauna habitat attributes such as a moderate-high of hollow trees, rocky outcrops and support at least one EEC such as Lowland Rainforest. The offset should be in a similar condition supporting little weed invasion and disturbance from agricultural activities.

Comment	Response
There are two NSW Government endorsed tools (the “PVP Developer” and “Biobanking Credit Calculator”) that are used to assess an “improve” or “maintain” environmental outcome resulting from a development proposal. Both of these tools do not permit EEC in moderate to good condition to cleared (i.e. they are red flagged). A red flag in either of these tools indicates that the species or community is unable to withstand further loss of habitat or individuals. The proponent has not used either of these two tools in the report.	Further assessment in regard to determining an appropriate offset ratio by using the Biobanking tool may assist this process. All appropriate processes would be used when the biodiversity offsets are determined.
Inadequate survey has been undertaken for ground dwelling fauna	It is noted that further survey work may identify additional ecological values within the study area, including habitats of significance for threatened species and provide a more robust assessment of impacts and input into the design of appropriate mitigation measures. The retention of ground vegetation will be maximised thus reducing the possible extent of impact on ground dwelling fauna. This more detailed study would be needed at detailed design stage to assist in minimising impacts by design adjustments.
DECCW notes that only hair tubes were used in the survey for fauna across the proposed transmission line route. It appears from the results of the survey that no ground dwelling fauna were detected during the survey period even though the vegetation is in very good condition with a good structural diversity. This indicates that the survey results for ground dwelling fauna may be unreliable, as it is state in the report that these areas are in very good condition and would provide habitat for a large number of ground dwelling and arboreal fauna.	As noted above, further survey work may identify additional ecological values within the study area, including habitats of significance for threatened species and provide a more robust assessment of impacts and input into the design of appropriate mitigation measures.
The report indicates the clearing associated with development will not have a significant impact on these species, however there is no reasoning or justification for this statement. DECCW believes that arboreal and ground dwelling fauna will be impacted by removal of structural layers in the area and the potential increase in high order predators from the fragmentation of the landscape.	The EA and Working Paper acknowledge that arboreal and ground dwelling fauna would be affected by this proposal. The impacts have been assessed in the context of the scale of the habitat loss in relation to the extent of intact comparable habitats in the surrounding landscape. The significance of the impacts was assessed in relation to impacts on the viability of local populations, being populations of fauna in the study area and in habitats contiguous with the study area. As the majority of the impacts will be associated with construction, and therefore occur over the short to medium term, the longer term impacts would be associated with edge effects and access by predators. Such impacts could be argued to have minimal long term negative impacts on the viability of local populations.
Inadequate survey has been undertaken for threatened orchid species	
The report indicates no surveys were undertaken for orchids which may occur in the area, therefore DECCW recommend that further orchid surveys need to be undertaken to adequately assess the impacts of this development. Several threatened native orchid species are known from the area and the vegetation appears to provide	It is noted that further survey work may identify additional ecological values within the study area, including habitats of significance for threatened species and provide a more robust assessment of impacts and input into the design of appropriate mitigation measures.

Comment	Response
suitable habitat, therefore surveys need to be undertaken to adequately assess impact of this development on these species.	
The amount, size and location of habitat trees impacted by the development has not been documented in the report.	Surveys of habitat trees were designed to provide a measure of density across the landscape.
DECC considers that the level of habitat tree assessment, data provided and the amount of survey for habitat trees is inadequate as it does not meet the information required by DECCW in the DGRs.	Surveys of habitat trees were designed to provide a measure of density across the landscape. It is noted that further survey work may identify habitat trees and inform the impact assessment and assist in defining appropriate mitigation measures
Stagwatch surveys have not been undertaken for hollow dependent threatened species. The Hollow Bearing Trees on-site potentially provide suitable habitat for the several threatened species including yellow bellied gliders identified during the surveys, gang-gang cockatoos, gloss black cockatoos, large forest owls and micro bats.	It is noted that further survey work may identify additional ecological values within the study area, including habitats of significance for threatened species and provide a more robust assessment of impacts and input into the design of appropriate mitigation measures.
DECCW recognises that transects for HBTs have been undertaken, however the report does not map HBTs according to hollow size within the proposed development route. It is recommended that the HBTs, especially those to be removed, are quantified for the potential habitat they may provide for the above threatened species and stagwatched for a period consistent with the DECCW Threatened Species Assessment Guidelines, to enable proper assessment of the likely impact of the proposal.	Further survey work will quantify the details of tree hollows. This will be undertaken during detailed design and assist in minimising impacts by informing the selection of areas for clearing.
Potential impacts on the boundary of the Bamarang Nature Reserve	
DECCW do not support the clearing of a 60m wide easement along the boundary of Bamarang Nature Reserve. This level of clearing will have significant impacts on the reserve, increasing the potential for weed and feral animal invasions, increasing ease of access for illegal vehicles (e.g. trail bikes), loss of biodiversity values along the reserve boundary from the influence of the transmission line corridor.	Impacts on the national park estate were addressed in Section 4.3.2 of the EA. Potential for edge effects on Bamarang Nature Reserve was acknowledged but management processes will be developed to manage these possible impacts. Clearing between poles/pylons within the easement will be kept to a minimum. Clearing will be confined to access tracks and trees which may impinge upon power lines.
Other impacts may include an increase in access to reserve allowing the spread of *Phytophora* fungus into the reserve. Also, the clearing of a 60 metre power line easement may impact on fauna movement between the Bamarang Nature Reserve and Colymea State Conservation Area to the south. These impacts have not been adequately addressed in the report (e.g. Section 5.6 of the Flora and Fauna Assessment has not suggestions about how weed invasion might be prevented), and further information is required how these potential impacts will be mitigated by the proponent.	Given the nature of the existing vegetation and grazing land between the two conservation areas and the limited clearing which would occur along the easement it is not anticipated there will be any change in movement of fauna between the areas. A comprehensive weed management plan would be prepared during the detailed design phase to enable management of weed invasion.
Offset proposal does not meet maintain or improve test for environmental outcomes	

Comment	Response
The NSW Department of Planning Draft Part 3A Threatened Species Assessment Guidelines have several guiding principles which should be applied to this development, including the principle of maintaining or improving biodiversity values, and the protection of areas of high conservation value.	Noted
The principle of "maintain or improve" biodiversity values does not appear to be met with this proposed development. The report indicates that a compensatory habitat package be developed at a 2:1 land area ration. DECCW considers this ratio to be inadequate considering the level of impact of the development and the high quality of the vegetation and habitat features which will be impacted by the development.	The offset ratio was determined on the basis of the approved project. Considering the linear nature of the proposal it traverses through several vegetation communities and habitats including floodplain and escarpment areas, therefore it may be difficult to find a property which supports the diversity of habitats present in the study area. Therefore it is suggested that habitats within the proposed offset site should support similar fauna habitat attributes such as a moderate-high of hollow trees, rocky outcrops and support at least one EEC such as Lowland Rainforest. The offset should be in a similar condition supporting little weed invasion and disturbance from agricultural activities. Several surrounding properties in the area have been identified which may provide a suitable offset for the proposal, including areas of Lowland Rainforest, rocky outcrops, escarpment areas and mature hollow bearing trees. Ecological assessments and land owner negotiations for potential habitat offset lands would take place following the establishment of the relevant consent conditions. Further survey work would be undertaken during the detailed design stage to identify additional ecological values within the study area, including habitats of significance for threatened species and provide a more robust assessment of impacts and appropriate mitigation measures. It is premature to negotiate with land owners before the extent and details of the vegetation clearance are known. It is recognised that such a Consent Condition should appropriately address the offsetting of the biodiversity impacts of the project rather than be based on a specific offset ratio.
The ecological values and conservative value of the vegetation which will be impacted by the proposed 330 kV transmission line route are much higher than the areas impacted at the previously approved Bamarang Gas Fired Power Station site, and the 132 kV transmission line route. DECCW considers it inappropriate to apply the same offset ratio to this proposed development.	See above.
DECCS considers that the use of "Biobanking" methodology by the proponent may be useful in assessing the offset required for this development and this methodology has not been used in the report.	It is noted that further survey work using the "Biobanking' methodology would be useful in identifying the offset requirements. This will be considered at the detailed design phase.
Conclusion	
DECCW considers the proposed 330 kV transmission line route to be in undesirable	Noted. The project justification identifies the approximate location and the route

Comment	Response
location as its proposed impacts on ecological and conservation values are much higher than the existing approved 132 kV transmission line route associated with the Bamarang Gas Fired Power Station.	selection was made on the basis of a number of criteria, including biodiversity. No other option with less impact on biodiversity is possible.
The proposed development will likely result in the direct loss of 30 hectares of high conservation value vegetation within the landscape, which is not proposed to be offset adequately. The remaining vegetation and two conservation areas will likely be fragmented by a large cleared corridor of the proposed transmission line easement. This will compound the impacts of the clearing on the threatened species and EEC which are known to occur on the proposed route of the 330 kV transmission line.	It is acknowledged that the loss of good quality vegetation will be up to 30 ha, based on an assumed clearance of 60 m in the power line easement corridor. It should be noted that: ■ More detailed ecological survey undertaken during the detailed design phase would provide the opportunity to minimise the loss of any particularly sensitive areas or communities. This would be achieved by careful location of pylons and access tracks; ■ Once pylons and access tracks are located at detailed design stage, it would then be possible to be more precise about the exact area of vegetation to be cleared. These other cleared areas would be confined to areas where trees are required to be below the power line and hence removed . All other vegetation within the easement would be able to be retained. It is clear that the vegetation within the 60m easement would not be cleared entirely. The need to assist in retaining the value of the corridor between two conservation areas will also be factor in locating pylons and access tracks; ■ More detailed knowledge of the habitat which will be lost or retained will allow biodiversity offsets to be evaluated. It has been assumed that the approved offset ratio of 2:1 would apply to a 30 ha level of impact and thus 60 ha of habitat would be required. During detailed design and more detailed field surveys it would be possible to calculate the exact area of clearance and the nature of the vegetation to be lost. It would also be possible, with this knowledge, to evaluate options for the acquisition of land for offset purposes (see comment below). ■ Also at detailed design stage, the more detailed information on the biodiversity will allow the appropriate refinement of mitigation measures to minimise the level of impact.
DECCW has assessed the offset proposal provided in the report and determined that this offset proposal does not meet the 'maintain or improve' test for environmental outcomes.	The offset ratio was determined on the basis of the approved project. Considering the linear nature of the proposal it traverses through several vegetation communities and habitats including floodplain and escarpment areas, therefore it may be difficult to find a property which supports the diversity of habitats present in the study area. Therefore it is suggested that habitats within the proposed offset site should support similar fauna habitat attributes such as a moderate-high of hollow trees, rocky outcrops and support at least one EEC such as Lowland Rainforest. The offset should be in a similar condition supporting little weed invasion and disturbance from agricultural activities. Several surrounding properties in the area have been identified which may provide a

Comment	Response
	suitable offset for the proposal, including areas of Lowland Rainforest, rocky outcrops, escarpment areas and mature hollow bearing trees. Ecological assessments and land owner negotiations for potential habitat offset lands would take place following the establishment of the relevant consent conditions. Further survey work would be undertaken during the detailed design stage to identify additional ecological values within the study area, including habitats of significance for threatened species and provide a more robust assessment of impacts and appropriate mitigation measures. It is premature to negotiate with land owners before the extent and details of the vegetation clearance are known. It is recognised that such a Consent Condition should appropriately address the offsetting of the biodiversity impacts of the project rather than be based on a specific offset ratio.
The report would benefit for a wider search for alternative routes for the proposed 330 kV transmission line, and a more in-depth examination of the presented alternatives to minimise the significant nature of the environmental impacts using the currently proposed route.	The project justification identifies the approximate location and the route selection was made on the basis of a number of criteria, including biodiversity. No other option with less impact on biodiversity is possible.
Aboriginal Heritage	
The proposed modification meets Interim Community Consultation Guidelines for Aboriginal heritage Recommendations for the 3 sites recorded are supported Development of an AHMP or CEMP in consultation with Aboriginal stakeholders is supported “Stop work” protocol is supported	Noted

3. Statement of Commitments

3.1. Statement of Commitments

The statement of commitments was discussed in Section 4.8 of the EA. It was derived from previous EAs prepared for the project and is relevant to and generally consistent with the construction and operation of a new 330 kV line. The commitments in the four key issues areas assessed are:

- Flora and fauna – natural ecosystems to be protected from off-site impacts, habitat located on-site to be protected, habitat values of land to be maintained;
- Indigenous heritage – appropriate management of Aboriginal heritage;
- Visual amenity and landscape – minimise the visual impact of the proposal on the landscape;
- Hazard and risk – bushfire hazards and risks are reduced.

The relevant new management measures for each of these existing outcomes are described below, along with changes resulting from consideration of submissions (as shown in underline).

3.2. Management and mitigation measures

Flora and Fauna

Objective: natural ecosystems to be protected from off-site impacts, habitat located on-site to be protected, habitat values of land to be maintained.

- Detailed flora and fauna surveys will be undertaken during detailed design phase to maximise the information available to designers and so minimise impacts on flora and fauna. Surveys will include records of hollow trees and maximisation of their retention;
- Where possible vegetation clearance would be minimised;
- River-flat eucalypt Forest along Calymea Creek would be retained through spanning the proposed transmission lines from pole locations higher on adjacent slopes above the existing vegetation;
- The area of Lowland Rainforest west of Calymea Creek will be spanned;
- All works and disturbance areas associated with the proposal (with the exception of any crossing) will be located outside the riparian zones.
- Individual habitat features of conservation significance within the study area would be avoided where possible by the proposed easement clearing. These will include trees with hollows, trees with a trunk diameter greater than 20 cm, standing dead trees greater than 3 metres in height, trees with bird nests and riparian vegetation zones;
- General habitat features of importance will be protected and appropriate management practices in the study area maintained. This will include fallen logs encountered within the works corridor being pushed aside and retained in their natural state, timber felled for clearing to be retained on the ground as cover for terrestrial fauna and minimising the loss of shrub cover and ameliorating any impact by the retention of felled vegetation to facilitate natural regeneration;

- The removal of hollow-bearing trees and hollow logs would be supervised by an experienced ecologist to minimise direct impacts to fauna potentially sheltering in these habitats;
- All construction machinery would be thoroughly washed down and sterilised as much as practicable to ensure weed propagules and pathogens such as Root Rot Fungus (*Phytophora cinnamomi*) are removed from equipment;
- Any exotic species cleared during construction will be disposed of appropriately;
- To offset the impacts of vegetation clearance of this proposal, Delta Electricity will investigate compensatory habitat offset options. The compensatory habitat package would consist of no fewer than two hectares of compensatory habitat for each hectare of vegetation removed as part of the project or as otherwise agreed by the DECC. Specifications for the compensatory habitat, including location, composition, quality and management of the habitat and the methods for assessment would be determined in consultation with the DECC;
- The potential for impact on Grey-headed Flying-fox to collide and be electrocuted on the newly established overhead transmission lines while seeking foraging habitat will be mitigated by the transmission lines being constructed so that the wires are not arranged in one plane or are greater than 1.6 metres apart, that is, greater than the wingspan of a flying-fox;
- All construction personnel would be inducted to the study corridor and be aware of their environmental responsibilities, including the preservation of endangered ecological communities, threatened species, tree cover and riparian habitats.

Indigenous Heritage

Objective: appropriate management of Aboriginal heritage.

- Of the three recorded Indigenous sites along the proposed alignment, all will be avoided by the project impacts, although they may require the implementation of appropriate site management measures to ensure no inadvertent impacts occur;
- All management of Indigenous sites in relation to the proposal will be embodied into an AHMP or CEMP. Development of these management documents would occur in consultation with the Indigenous community. Management measures may include that:
  - If identified sites can be avoided, they would be identified in the field prior to any construction impacts occurring. An appropriate curtilage would be delineated around these sites using a highly visual physical barrier (ie 1m high orange roadwork fencing). This would ensure all sites can be easily identified and protected from inadvertent machinery impacts. Should sites be in areas where tracks are required, mitigation may include protecting sites from the impacts of vehicles through the use of geofabrics, matting and materials imported to cover site areas for the construction period;
  - If sites cannot be avoided, depending on the assessed level of significance, their management may include the test/salvage excavation of these sites, or simply the collection of artefacts prior to construction impacts occurring;
- In defining the remaining project impacts, the following guiding principles will help reduce impact to the Indigenous heritage resource:

  - Attempts to avoid direct impacts within 100m of any waterway that the proposed line transects, as these are 'sensitive' in terms of Indigenous site location. Such areas should be spanned, where possible;
  - Avoid any sandstone overhangs, where possible. Although most of the line surveyed to date did not possess overhangs suitable for human habitation, the area east of the proposed structure 6 (unsurveyed) has potential;
  - Ensure that the inaccessible portions of the line are assessed once design detail has determined where impacts in these areas may be; and
  - Ensure survey is undertaken for all access tracks – existing, those to be upgraded and newly proposed;
- Members of the construction team, including sub-contractors, machine operators and truck drivers would be required to undergo site induction concerning cultural heritage issues, prior to working on the site. This would preferably be undertaken by an individual who has a good working knowledge of Indigenous sites and of the legislation protecting them. This induction should inform workers/contractors of the location of nearby sites, and of their legislative protection under Section 90 of the NSW National Parks and Wildlife Act 1974. These inductions should be recorded in a register, with all those present signing their complicity with these guidelines and the Conservation Environmental Management Plan (CEMP);
- Should any previously unidentified Indigenous 'objects' or other Aboriginal sites (such as burials) be uncovered during the course of construction, work in that area would cease and the DECC Regional Archaeologist (Queanbeyan Office), and the Nowra Local Aboriginal Land Council would be contacted to discuss how to proceed.

Visual and Landscape

Objective: minimise the visual impact of the proposal on the landscape.

- In areas, where the topography does not conceal the development from surrounding areas, vegetation will be used to screen the development from sensitive viewpoints. In general, smaller trees with low canopies can be used effectively on gentle slopes or flat areas to screen developments, and taller trees with high canopies are more effective on steeper slopes;
- The selection of the alignment corridor considered the means by which as many residences as practicable could avoid having a view of the structures. This was particularly so on the western side of Calymea Creek where there were few opportunities for residences to view the structures. On the eastern side of Calymea Creek, opportunities for alignment changes were very difficult due to the need to avoid Bamarang Nature Reserve and Bamarang Reservoir lands. The alignment was located below ridge lines so that the lines would be seen with vegetation as background and this principle will be retained in any further alignment adjustments;
- In areas where transmission towers would be visible in the foreground (VMU 3), the design of the structures will be modified to minimise impacts. The use of poles instead of pylons in this area and the ability to use dull surface and dark green structures as they are seen against the vegetation retained higher up the slope will mean that the visual impacts in VMU 3 will be reduced significantly. In all locations along the alignment, and especially in VMU 3, the degree

of clearance within the easement would be minimised, with vegetation lopped rather than cleared as far as practicable to reduce the extent of any clearance impacts.

Hazard and Risk

Objective: bushfire hazards and risks are reduced.

- All construction work would be carried out in accordance with standard procedures, practices and guidelines for bushfires set out in relevant transmission agency manuals and as advised by the Rural Fire Service;
- The risk of fire and its prevention would be part of the Hazard Identification, Risk Assessment and Control process to be carried out prior to work commencing;
- Contractors/work staff would be trained in how to prevent, control and survive bush fires;
- Work vehicles would be equipped with appropriate bushfire control equipment.
- Bush fire prone areas are identified and classified in consultation with local councils and the NSW Rural Fire Service;
- To minimise the chance of vegetation coming into contact with transmission lines and starting bushfires, the required clearances and the requirements of ISSC3 (Industry Safety Clearing Committee Guideline No. 3) of additional clearances of bush fire prone areas would be met;
- The Operator would liaise and consult with the NSW Rural Fire Service, NSW Fire Brigades, local government and other relevant government departments regarding bush fire-related matters;
- The Operator would inform the general public about the fire hazards associated with overhead transmission lines and vegetation, particularly during storms and conditions of high fire danger;
- To identify any factors associated with overhead lines that could lead to the initiation of a bush fire, the Operator would carry out a number of mitigation patrols, including annual aerial or ground inspections in bush fire prone areas, vegetation maintenance (every 2-3 years), and pole and line inspections (every 4-5 years);
- Delta Electricity will consult with the Department of Defence during final design and decision on the final locations of towers and seek any necessary approvals with respect to the management of aviation hazards associated with operations at HMAS Albatross;
- Several review panels and public inquiries have recommended prudent avoidance as an appropriate response to the present state of scientific uncertainty of EMF. In designing and locating the new transmission line, Delta Electricity will implement measures consistent with the concept of prudent avoidance.