

Attachment B: Detailed BDAR review against BAM requirements (BCD)

BAM	Biodiversity Assessment Method 2017
BAM-C	Biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016</i>
BC Regulation	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
BOP-C	Biodiversity Offsets Payment Calculator
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
MNES	Matters of National Environmental Significance
PCT	Plant Community Type
SF	State forest
TARP	Trigger Action Response Plan
TEC	Threatened Ecological Community
TBDC	Threatened Biodiversity Data Collection
VI score	Vegetation Integrity Score

Summary of the impact:

- The transmission connection is approximately 9 km through predominantly natural vegetation within Kosciuszko National Park and adjoining state forest.
- Disturbance area is approximately 143 ha within a construction envelope of approximately 224 ha (74% NPWS estate, 26% State forest)
- Overlaps with the approved Snowy 2.0 Exploratory / Main Works footprint by 6.9 ha.

BCD considers that the EIS does not fulfil requirements of the BAM. The Applicant needs to do more work by addressing issues A to E below.

In summary, there are five key issues. In the Submissions Report, we expect a clear statement or list of matters that are not going to be addressed in the Preferred Infrastructure Report. Changes made to the Revised Environmental Mitigation Measures should be clearly identified. BCD expect to see a fully revised BDAR, rather than an addendum or revised sections within the Submissions Report.

Key issues:

- A. Misleading and confusing terminology – there is ambiguity and potential for post-approval misinterpretation of the project description, assessment of indirect impacts, the project footprint, and what is being included in the offset obligation into the future.**
- B. Residual biodiversity risk to Booroolong frog needs to be quantified and account for proximity of the impacts to breeding habitat and location of the project on steep terrain above headwaters and mapped habitat.**
- C. There is not enough detail about mitigation measures, monitoring of threatened species and adaptive management to give certainty that the impacts have been adequately**

assessed and that there will be effective impact mitigation after project approval. There are non-binding terms used throughout the mitigation measures.

D. The Biodiversity Offset Strategy is incomplete. More work is needed before project determination.

E. The BAM assessment is incomplete. *Caladenia montana* needs to be included and there are BAM non-compliance issues.

A. Misleading and confusing terminology – there is ambiguity and potential for post-approval misinterpretation of the project description, assessment of indirect impacts, the project footprint, and what is being included in the offset obligation into the future.

1. Several definitions require clarification and are not consistent with the BAM.

The Glossary (pages xiii – xvi) is inconsistent with the BAM and uses several terms for describing the same thing. Some of these are repeated in Section 2.2.1 (page 26), several are incorrect and are not consistent with the BAM. Consistent and accurate terms should be used to assist the proponent, assessors and consent authority to have a shared understanding of the assessment.

- The definition for mitigation measure is not accurate and should follow the BAM Stage 2 Operational Manual.
- The project area, subject land and construction envelope appear to be defining the same extent (pages xiv, xv, s2.2.1). 'Project area' has been used on all maps, rather than construction envelope. 'Permanent easement' (page xxii) only appears in the Executive Summary and is not defined. To limit confusion of terms please use the one term to describe the area that the disturbance footprint will be limited to.
- The definition of subject land is not consistent with the BAM. 'Subject land' as used in the BAM is the area assessed for biodiversity values in Stage 1. Biodiversity values must be assessed beyond the disturbance area to cater for the "flexible design" and assessment of indirect impacts. It is broader than 30m from direct disturbance to assess habitat for mobile threatened species that may be subject to impact. Subject land as per BAM matches most closely with the boundary described as the 'study area' (construction envelope plus 200 m) in the glossary (page xv).
- The definition of Indirect Impact buffer is misleading and indicates an incorrect application of BAM. How do TransGrid propose to limit all indirect impacts (including those listed on page 32) to a 20m distance? As TransGrid are not offsetting indirect impacts on native vegetation we anticipate all identified indirect impacts will be addressed to whatever practicable distance is required to successfully mitigate them. This may require management actions over a greater buffer distance (200m is more appropriate).
- Please include a definition of Prescribed Impacts as this is a term used throughout the assessment.
- The Biodiversity and Conservation Division (BCD) is part of the Environment, Energy and Science (EES) Group within the Department.
- 'Permanent easement' is used in the Executive Summary but not used or explained elsewhere. This should be defined or removed from the BDAR.
- Study Area - include indirect impacts in this definition, for example "Study area: The study area is the area of land that includes the construction envelope and a suitable buffer to capture the biodiversity values *and consideration of indirect impacts* outside of the project area". The study area must also be considered for indirect impact mitigation measures – measures must not be restricted to a 20 m buffer.

- 'Transmission corridor' is only used once in Table 2.1 when describing the location of suitable tensioning and pulling sites.

Recommendation:

- 1.1. Clarify imprecise, incorrect and duplicated terms, preferably to align with the BAM, and ensure consistent use throughout the assessment.
2. The Executive Summary needs updating to include correct and meaningful summaries of assessment results.

The Executive Summary should provide:

- an overview of threatened entities found during the assessment, including the four threatened bats identified in Appendix E but not mentioned in the report or Executive Summary; and *Caladenia montana* unless samples are determined by further analysis to be not a threatened species.
- total area for direct impacts to each PCT in Table ES.1.1

Page xxii states that "offset obligations would be revised considering areas where total clearing and permanent infrastructure is not required i.e. the permanent easement". "Permanent easement" (also referred to on page 232) needs to be defined.

Recommendation:

- 2.1. The Executive Summary include all of the threatened species recorded on the subject land, clarify the source of the *Thelymitra atronitida* report, and provide the total area of direct impacts to each PCT. Undefined terms should be removed.
3. More detail is required about some aspects of the proposal as described in the EIS and BDAR Sections 2.2 and 2.3 to ensure that all impacts to biodiversity have been adequately considered.

Description of the project

Section 2.1 (page 25) will the helipad require an asset protection zone in the future? If so, has that been included in the assessed footprint?

Construction activities

Access tracks: Table 2.1 (page 30) mentions that sediment retention basins will be installed where required. Does the current design include capacity for sediment basins? Where are the existing tracks that will be reshaped (where this is required)?

Management of excavated material

The EIS (Section 5.4.7.1, page 56) states that approximately 38,000 cubic metres of excess spoil generated from the project will be disposed of at offsite locations or by spreading within the easement. These activities have not been addressed in the current BDAR.

- Additional permanent changes to landforms within the disturbance footprint or spreading of subsurface soil that may impact surrounding biodiversity should be included in the assessment.
- Impacts to biodiversity for ancillary activities, including off-site spoil disposal, must be included in the development proposal and assessed according to the BAM.

Operation and maintenance

Section 2.3 (page 35) should include all operation and maintenance activities that impact biodiversity. This section needs to specify the activities and methods that will be undertaken in and around the easement over the life of the project, and the potential impacts to biodiversity.

For example: the Exploratory Works BDAR identified that increases in human activity can generate food waste that may attract feral animals. While the number of people involved in the regular maintenance of the substation and transmission structures will be low in comparison to construction activity at Lob's Hole, there is an opportunity for any unmanaged waste on the site to alter fauna behaviour.

Recommendation:

- 3.1. Confirm that all activities relating to construction, operation and maintenance, including off-site spoil disposal, have been identified and examined to identify potential impacts to biodiversity.
- 3.2. Confirm whether access track disturbance area is large enough for sediment retention basins, as described in EIS Section 5.2.3 (page 47).
4. Details of vegetation removal, trimming and easement maintenance activities during long-term operation should be provided in the BDAR, along with a commitment and mechanism for aligning TransGrid's standard maintenance procedures with these requirements.

The quantification of residual impacts relies upon accurate identification of avoidance and mitigation measures. The description of operation and maintenance activities in Section 2.3 (page 35) and the EIS (Section 5.5, page 64) does not specify how vegetation will be managed during routine hazard assessments. The EIS states that "ensuring the [required] clearances are achieved is critical in managing the risk of bushfire, ensuring public safety and maintaining system reliability" (section 5.2.2.2, page 47). It is understandable that TransGrid's policies and procedures are likely hazard-based and safety focussed.

Standard TransGrid procedures are not publicly available and have not been provided to BCD. As such we are not able to determine if biodiversity protection and mitigation commitments included in this project are feasible within the operational procedures that are followed by TransGrid staff and contractors for routine maintenance over the stated 100-year life of the transmission connection.

The TransGrid Environmental Policy (undated) and Overview of TransGrid's Environmental Management System (undated) are available on the TransGrid website. Environmental procedures to support the Environmental Policy are not publicly available. The Overview includes results of a 2018 review into TransGrid's environmental management system, which identified 'significant environmental aspects' needing to be resolved through the updating of standard protocols. The highlighted issues included:

- failure of employee or contractor to adhere to conditions of approval, legislative requirements or Environmental Assessment Framework during construction activities
- insufficient clearing of easements resulting in arcing and bushfire
- off-easement trees causing significant bushfire.

TransGrid is required by the Australian Energy Regulator to report certain information about its operations. Results are provided in an annual Regulatory Information Notice (TransGrid 2020). The most recent report indicates that there is no centralised spatial repository of critical factors for biodiversity management on each easement or line segment. For example, in response to items about tracking aspects of vegetation management, TransGrid stated that it "does not currently directly record [in the spatial database] vegetation types on easements or spans where no vegetation management is required... does not directly record vegetation corridor widths for every section of lines... does not directly record this information [frequency of vegetation cutting] or spans where no vegetation management is required – scheduled maintenance is detailed in an Easement Maintenance Plan... and maintenance "is tracked through expenses for Contractors managing easement vegetation".

As we are unable to verify whether TransGrid's procedures have the capacity to manage variation and ensure specific management for biodiversity conservation in separate segments of the

easement and outside the assessed disturbance footprint, BCD require greater certainty that the disturbance area feasibly includes all potential vegetation and habitat clearance.

An existing agreement between NPWS and TransGrid (2014) specifies expectations for easement works however there is no requirement to apply these standards outside KNP, such as within the Bago and Maragle State forests.

Recommendation:

- 4.1. The EIS provide a commitment and mechanism for ensuring TransGrid's policy and procedures for easement maintenance, hazard identification and vegetation management are updated according to avoidance and mitigation commitments in the BDAR.
- 4.2. The EIS provide evidence (in the form of LiDAR data analysis mentioned in the EIS Section 5.2.2.2, page 47) that the assessed corridor includes all vegetation removal associated with the proposal, including (but not limited to): vegetation that will infringe the "absolute limit" clearances; tall-growing individual plants that are likely to infringe safe clearances; and potential hazard trees outside the easement.
5. Specify the location and objectives of rehabilitation activities (site-specific), including target landforms and PCTs, species selection considering height restrictions within the cleared easement, and treatment of asset protection zones.

Rehabilitation is included in Table 12.1 (page 217) as a measure for mitigating the impacts of clearing native vegetation. It is not clear where the rehabilitation activities described in the EIS will be carried out (EIS Table 5-5 and BDAR Table 2-1, page 63), or the landforms and plant community types that will be achieved. Successful rehabilitation requires long-term planning, monitoring and active adaptive management.

The Rehabilitation Management Plan for Main Works was scheduled for completion within 18 months of the start of construction. BCD consider that some aspects of rehabilitation need to happen before clearing, such as recording of pre-clearing landform for future reinstatement. Some aspects of monitoring should commence immediately post-construction. To that end, we request that the Rehabilitation Management Plan be prepared alongside the Biodiversity Management Plan and completed before construction.

Rehabilitation activities can negatively impact native vegetation and threatened species habitat through the introduction of weeds and pathogens if adequate controls have not been identified and implemented.

BCD expect to see more detail about rehabilitation activities, before determination, to be certain that mitigation of biodiversity impacts can be achieved.

Recommendation:

- 5.1. Provide more detail about proposed rehabilitation activities, including rehabilitation objectives, location, target landforms and plant community types, specific success measures, adaptive monitoring actions and a TARP.
- 5.2. Identify and assess indirect and prescribed impacts associated with rehabilitation activities, and include relevant mitigation measures.
- 5.3. COA require the Rehabilitation Management Plan to be completed, to the satisfaction of NPWS, prior to any development.
6. The assessment of indirect impacts is poorly justified. There needs to be acknowledgement that indirect impacts have the potential to extend beyond a 20 m buffer and the BDAR revised to

more clearly identify indirect impacts with a commitment to realistic mitigation measures with appropriate monitoring. Any residual impact should be offset.

Indirect impact buffer

There is not enough evidence in Section 11 for application of a blanket 20 m buffer to quantify indirect impacts of the project. BCD disagree with naming this the buffer for indirect impacts – it should be renamed the buffer for edge effects as indirect impacts will not be restricted to a distance of 20 m.

The Main Works assessment calculated a partial offset to a 20 m distance, however the Main Works BMP requires mitigation and monitoring of indirect impacts to a greater distance than 20 m.

Section 11.1.2 (page 198): “*Indirect impacts have not been calculated within existing modified vegetation types such as regrowth native grasslands, and shrublands or within 20 m of existing edges (i.e. roads, dirt trails and modified/disturbed vegetation zones) as these areas are already expected to experience edge effects*”.

BCD agree with the justification for not calculating a VI loss adjoining existing roads. However we disagree that there would not be indirect impacts and a loss in VI score on ‘regrowth’ or shrublands where new impacts are introduced and new edges are created.

In response to the assumptions about extent and severity of edge effects in Section 11.1.2 (page 198): monitoring will be required to detect and report on additional impacts (as a CoA). The BMP should include an adaptive management strategy to calculate any residual impacts to native vegetation beyond that which has already been offset and any impacts that have not been successfully mitigated (refer BAM Section 2.6).

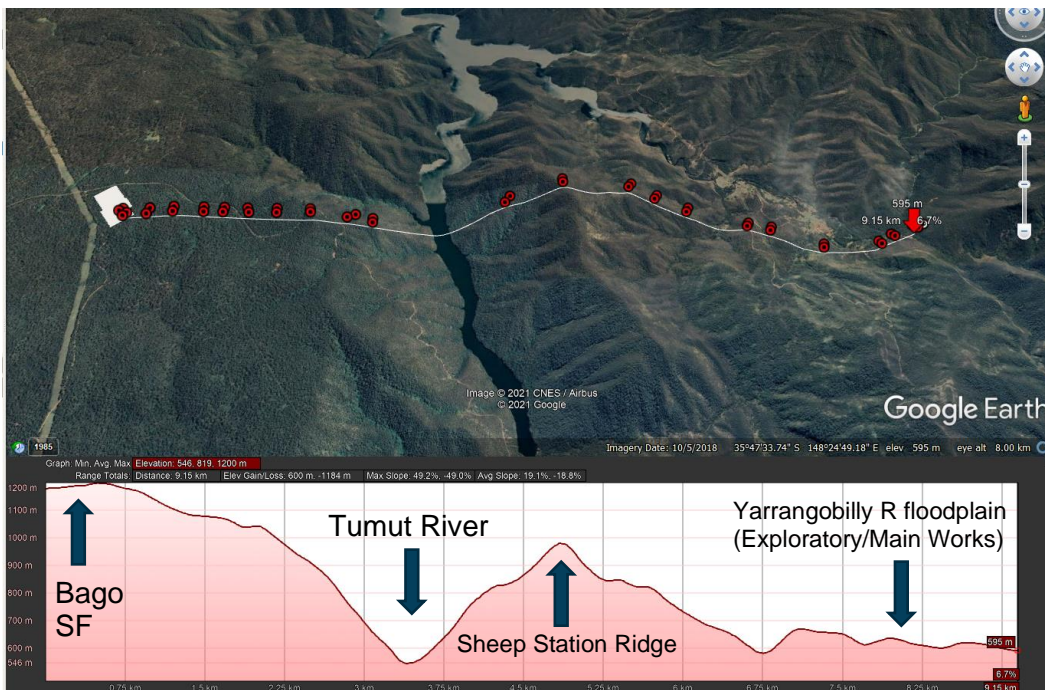
Extent of indirect impacts

The main justification for the 20 m buffer is an edge effect due to weed spread. Other edge effects have not been considered, such as an increase in feral predators and resulting impacts on threatened fauna. A study in south-eastern NSW found edge effects on birds in areas between 25 and 125 m into forest from the edge of powerline easements (Baker et al. 1998).

BCD consider that removal of vegetation and ground disturbance during construction is likely to alter surface hydrology and result in mobilised sediment along natural drainage lines. This is likely to result in spread of water-dispersed weed seeds along those drainage lines into the Yarrangobilly River floodplain.

The second paragraph under Section 8 Aquatic Assessment (page 175) describes the probable path of surface water within the vicinity of the project. It is clear from this description that drainage from the project site will flow into the Tumut River and Talbingo Reservoir, and to Yarrangobilly River via Sheep Station Creek, Lick Hole Gully, Cave Gully, and Wallace’s creeks. The very steep slopes are shown in photos 8-17 and 8-18 (page 182), and an elevation profile in Figure B.1 shows the topographical changes along the proposed line.

Figure B.1 Elevation profile for Snowy 2.0 Transmission Connection, west to east (Google Earth Pro)



Indirect impact of weeds

Weed cover and exotic species diversity is likely to increase in downhill areas, particularly in the post-fire environment, potentially causing long-term floristic and structural changes to native vegetation and threatened species habitat.

To assess the potential for weeds, it would be informative to provide a consolidated plant list from the vegetation survey, identify the exotic species and their dispersal mechanism (wind, animals/equipment, water) and develop a list of priority weed species (in consultation with NPWS). Then specific measures could be assessed for their feasibility to minimise impacts. For example, blackberry was recorded in wetter areas. There is the potential for blackberry propagules to be spread by heavy machinery and in moving soil from one part of the development footprint to another. Blackberry will spread along drainage lines and will not be limited to 20 m if it is not controlled. Minimising the edge effects of weed incursion would be to identify, map and remove priority weeds before any development and during clearing, ensure vehicle hygiene measures during construction and operation, and develop and implement an ongoing weed control program.

Recommendation:

- 6.1. Revised BDAR includes an adaptive management strategy (as per BAM s9.3.1.2) to verify the extent of indirect impacts, mitigate indirect impacts and calculate any residual impacts to native vegetation (beyond that which has already been offset and any impacts that have not been successfully mitigated).
7. Assessment of prescribed and uncertain impacts applies to all threatened species, not just species credit species, and requires more consideration of realistic mitigation measures and a commitment to long-term adaptive management.

As explained in the BAM Operational Manual Stage 2, some impacts are difficult to predict or assess prior to commencement of the development. The management of uncertain impacts requires the development of an adaptive management plan with the aim of adjusting actions based on results to achieve a specified outcome. It requires a trigger for necessary remedial action to be taken, such as adjusting the activity causing the impact or adjusting the mitigation measure. Monitoring should enable the proponent to determine if measures are being implemented as

planned and provide an early warning of measures that are ineffective and/or the uncertain impact is being realised. This level of information has not been provided for the current project.

Specific prescribed impacts

Section 11.2 does not fully justify conclusions about prescribed and uncertain impacts. Evidence that is provided does not appear to result in commitment to realistic mitigation measures.

For example:

Section 11.2.2 (page 202) describes various karst, rock and cliff features with assumptions about how construction impacts will occur (e.g. para 2, page 203). The BDAR should assume everything in the disturbance footprint would be cleared unless controls are specified and committed to in the project approval.

Section 11.2.3 (page 204) does not include details about the options for bridge design to ensure stream flow is unaffected (e.g. single span to minimise stream disturbance), provides no evidence for the statement that gliders can traverse up to 100 m if there is in areas with obstruction by powerlines and towers. This section should also consider predation.

Section 11.2.4.2 (page 206) should include the impact of fires on availability of hollow-bearing trees for forest owls and how stronger protection for remaining breeding habitat could be included.

Section 11.2.4.5 (page 207) - one of the reasons for listing the 'yellow-bellied glider population in the Bago Plateau' was for the risk of extinction due to powerline easements. There is no evidence that gliders can avoid powerlines or fences with barbed/razor wire.

Section 11.2.5 (page 209) details about the impacts on water quality are thorough, however there is no demonstration that the mitigation measures can work. This section requires more detail about mitigation, such as frequency of monitoring barriers, cleaning sedimentation basins, etc.

Vehicle strike

Section 10.2 (page 194) "*Increased vehicle movements during construction of the project have the potential to result in increased fauna mortality from vehicle strikes and this impact would be managed appropriately.*" This statement requires a cross reference to relevant measures and specific BMP requirements.

Section 11.2.6 (page 210) cannot assume vehicle speeds will be low without a COA. The BDAR states that construction activities will occur for 12 hours each day (from 6 am to 6 pm), seven days a week (Section 2.2.4, page 33). This is contradicted by the EIS (Section 5.4.9.2, page 61), which says all project-related heavy transport on the surrounding road network is expected to be between 5 am to 7 pm.

Collision and electrocution of birds and bats

Collision and electrocution of birds and bats is mentioned in Section 11.3 (page 211) but there is no assessment of the species that may be impacted, likelihood or extent of impact or proposed mitigation (required by BAM s9.4). BCD suggest the following should be provided as a minimum:

- determine the species at risk of electrocution or collision from a consolidated list of threatened birds and bats recorded from the subject land, likely flyways and roost sites (particularly those associated with Tumut River and other areas missing from the assessment)
- describe the nature, extent and duration of short-term and long-term impacts to the high-risk species identified
- predict the consequences of the impacts for the bioregional persistence of the threatened species

The BDAR should outline the adaptive management strategy proposed for minimising impacts that are uncertain. BCD strongly recommends using an adaptive management plan similar to that required for impacts to wind turbine strikes (BAM s9.4.2.3) or vehicle strikes (BAM s9.4.2.4).

Uncertain impacts of electrical and magnetic fields (EMF)

There is no consideration of the potential impact of EMF on birds and bats. Certain types of birds (e.g. larger raptors) are more likely to use towers to nest for longer periods of time, which poses a higher risk due to EMF exposure. The BDAR should assess the indirect impacts to specific threatened species habitat caused by the EMF associated with operation of the proposal.

Noise and vibration

There is no proposed mitigation for noise or vibration impacts to biodiversity or geodiversity in Section 11.5 (page 211).

Table 5-3 (page 26) of the noise and vibration assessment (Appendix J) indicates that the safe working distance for a human from a vibratory roller >18 tonne is 100 m. The vibratory rollers proposed for use in this project are 20 – 30 tonne. Other potential construction noise impacts are from airblast or ground vibration due to the use of hydraulic rock breakers during blasting. Monitoring is proposed to protect heritage items by guiding modifications to blast design and buffer zones if impacts to heritage items in Lob's Hole are detected during construction, including a works suspension protocol.

A conservative approach would be to consider the implications for breeding hollow-dependent fauna, particularly gang-gang cockatoo, up to 100 m outside the boundary of the disturbance footprint.

Recommendation:

- 7.1. Provide specific details for proposed mitigations for the identified impacts (required by BAM s9.3) and demonstrate that these are captured in Section 12.
 - 7.2. Utilise the survey data to identify specific bird and bat populations that are at risk of collision and electrocution impacts. Include more specific mitigation measures for transmission line strike and EMF exposure for larger species, including actions to minimise disturbance of nesting raptors. Provide targeted mitigation measures for high risk species in the BDAR and commit to adaptively managing impacts through the BMP.
 - 7.3. Provide an adaptive management strategy according to BAM s9.3.2 and s9.3.3 for impacts of transmission line strike and EMF exposure to bird and bat species in consultation with BCD.
 - 7.4. COA requiring all vehicle-strike mitigation measures applying to Main Works either through the approved Biodiversity Management Plan or Project Approval must be adhered to during construction of the Transmission Connection.
8. Mitigation measures for the Booroolong frog (*Litoria booroolongensis*) should be revised to remove rescue of individuals and identify areas where the 50 m stream protection buffer is unlikely to be implemented.

Item B1 in EIS Table 7-7 (page 96) and the BDAR Table 12.1 (page 216) includes searching within 50 m of riparian areas and capturing and relocating, or providing off-site care to, individual Booroolong frogs that are encountered. This mitigation measure should be removed. BCD do not support any handling or removal of individual frogs due to licensing and disease transmission risks.

Areas within 50 m of Yarrangobilly River and Wallace's Creek were identified in the Exploratory Works BDAR as potential dispersal and refuge habitat for Booroolong frog. Avoidance of works within a 50 m buffer along the river and creek was a key measure for reducing impacts to Booroolong frog. The Exploratory Works BDAR mapped areas where a 50 m 'no-go' zone would be in place, identified areas where design changes were made to avoid the buffer, and locations where the buffer would not be possible (Section 7.2.2, page 156, in EMM 2017).

Table 12.1 (page 216) describes measures to include, where possible, a 50 m buffer around Booroolong frog habitat in which *only approved works with adequate controls in place will be permitted*. There is no detail about acceptable works, approval processes or standards for adequate controls. As such, there does not appear to be an effective outcome for Booroolong frog from the measure. Sediments mobilised within the disturbance area during construction or from maintenance during operation must be strictly controlled to the highest specifications to minimise impacts to KNP. Areas of Booroolong frog habitat that are within the disturbance footprint and are unlikely to be avoided should be included in the assessment of impacts.

Recommendation:

- 8.1. Remove the measure that involves handling Booroolong frog and removing individuals from the disturbance area.
- 8.2. Specify where a 'no go' zone within 50 m of identified Booroolong frog habitat can be effectively used to limit riparian disturbance. Do not include areas where construction impacts cannot be avoided. Direct impacts to Booroolong frog habitat should be included in offset calculations.

B. Residual biodiversity risk to Booroolong frog needs to be quantified and account for proximity of the impacts to breeding habitat and location of the project on steep terrain above headwaters and mapped habitat.

9. Impact assessment for Booroolong Frog has underestimated the potential impact if sedimentation mitigation measures during construction are unsuccessful. The BDAR does not demonstrate adequate mitigation.

The Booroolong frog species polygon in Figure 7.3 shows potential and known habitat within the subject land (defined as 200 m from the centreline).

Table 11.2 (page 197) and 11.6 (page 215) state that there are direct impacts to 3.12 ha of habitat from the project. Table 13.4 (page 224) and the SEH BAM-C case indicate that 2.57 ha from Zone SEH-7 needs to be offset for direct impacts and 1.05 ha for indirect impacts (Zone SEH-18).

Section 2.4.1 (page 17) of the BAM Operational Manual Stage 2 explains that offsets can be calculated for indirect impacts where these cannot be avoided or adequately minimised, for example if mitigation measures fail. The consent authority has the discretion increase the number of biodiversity credits to be retired.

The current assessment fails to consider impacts to the entire mapped species polygon (Figure 7.3). Without mitigation, Booroolong frog habitat that is downstream or downhill of the development footprint will be sterilised through ongoing sedimentation during construction. Identified breeding habitat outside the direct impact area (with 20 m buffer) has not been included in the credit obligation by assuming that mitigation will be successful.

There is not enough detail about the feasibility of stormwater and sediment mitigation for BCD to be confident that mitigation can be achieved. The potential movement of water and sediment downhill/downstream into known Booroolong frog breeding habitat (mapped on Figure 7.3) should be modelled and mapped to create a realistic species polygon. The 50 m buffer used for the protection of habitat for Booroolong frog movement in the Exploratory Works BDAR should be included in the species polygon if it will be subject to indirect impacts from construction works. The BDAR should also include BAM-C credit requirement if this habitat is impacted (i.e. the whole area downstream/downhill of the disturbance footprint).

A comprehensive monitoring program implemented before, during and after construction will demonstrate impacts to habitat, and loss of habitat would be appropriately offset according to BOP-C.

Recommendation:

- 9.1. Revise the species polygon for Booroolong frog to include all areas of known habitat that would be subject to potential impacts and re-calculate the offset obligation.
- 9.2. Include stringent controls for mitigating indirect impacts of runoff and sediment mobilisation from the disturbance footprint during construction and operation, until site stabilisation completion criteria are met.
- 9.3. BDAR include a monitoring program (BAM s9.3) to demonstrate effectiveness of stormwater and sediment mitigation measures on Booroolong frog habitat during construction to trigger immediate ameliorative action if controls fail, with the full BAM-C offset requirement payable if breeding habitat is sterilised due to project impacts.

C. There is not enough detail about mitigation measures, monitoring of threatened species and adaptive management to give certainty that the impacts have been adequately assessed and that there will be effective impact mitigation after project approval. There are non-binding terms used throughout the mitigation measures.

10. Mitigation measures do not have enough detail to meet BAM requirements, include non-binding terminology, and do not demonstrate that impacts to threatened entities will be effectively minimised.

The success of impact mitigation will depend entirely on how well post-approval construction and operation management plans are implemented. It is difficult to determine likely success because these plans have not yet been prepared.

The BAM Operational Manual Stage 2 includes guidance about the level of detail that is expected for a BDAR to minimise impacts that cannot be avoided and includes examples of reasonable measures to minimise impacts. For all remaining impacts mitigation strategies should be implemented. Section 9.3 of the BAM outlines the requirements for a mitigation strategy which provides the level of detail that BCD expect to see in BDAR Section 12. Mitigation strategies should include the following:

- *documenting mitigation measures for each residual impact, meaning:*
 - *the type of action*
 - *the detailed method to implement the action*
 - *schedule for implementation (location, timing and frequency)*
 - *the person/organisation responsible for undertaking the action*
 - *ecological measures for working out if the mitigation has been successful that adhere to SMART (Specific, Measurable, Achievable, Realistic, Timebound) principles*
 - *reporting requirements (timing and frequency)*
 - *how to determine when the action is complete (ecologically-based completion criteria)*
- *triggers for remedial actions leading to adaptive management (see section 2.7 of Operational Manual for information on adaptive management)*
- *consideration of the risk of failure including constraints to implementation such as financial, biophysical and resource availability*
- *evaluation of the remaining risks and associated consequence for biodiversity. Where the risk of failure remains high, consideration should be given to alternatives that assume failure such as additional offsets either in the form of credits or conservation actions.*

Section 12 does not currently provide the required detail. Mitigation measures that are presented include terms that limit effectiveness of the measure.

Comments about non-binding terminology and specific issues in the table of proposed mitigation measures (Table 12.1, page 216) are provided in Table B.1.

Table B.1 BCD comments about proposed mitigation measures

Table 12.1 Item	Existing text	Recommendation
Threatened species mitigation (page 216)	“Where possible , within areas of retained vegetation that are not impacted by the Snowy 2.0 Main Works construction, a 50 m buffer around Booroolong Frog habitat will be clearly demarcated by fencing and signage and identified on maps for construction personnel”	<p>Replace with:</p> <p>“Remove non-binding terminology such as ‘where possible’ and ‘as soon as possible’ and, instead, provide a commitment to ensure the mitigation measures will be implemented within a specified timeframe. Alternatively, provide justification & describe the circumstances under which the relevant action would not be possible”.</p>
Revegetation / rehabilitation works (page 217)	“Revegetation of slopes will be undertaken as soon as possible , in accordance with the rehabilitation plan”	
Limiting use of barbed/razor wire (page 218)	“Where possible the barbed wire/razor wire fencing installed around the substation switchyard will have improved visibility measures”	
Increase in pest species (page 218)	“weed and pathogen monitoring program will be implemented during construction and operation, with weed control to occur if new weed outbreaks are identified within the construction footprint . The details of the monitoring program will be determined during the preparation of the Biodiversity Management Plan.”	<p>Replace with:</p> <p>“Weed control and monitoring will be implemented as per the BMP requirements and /or conditions of approval”</p>
Weed and pest monitoring (page 218)	“The details of the monitoring program will be determined during the preparation of the Biodiversity Management Plan.”	<p>Replace with:</p> <p>“The details of the monitoring program will be included in the Biodiversity Management Plan”</p> <p>An Accredited BAM Assessor should determine appropriate mitigation measures for assessed impacts, in the BDAR.</p>
Minimising light and noise impacts (page 218)	“Directional lighting will be used for any permanent lighting required (i.e. substation) to minimise light spill as much as possible ”	Remove “as much as possible’ from this sentence – or describe the circumstances where this would not be achievable
Pre-clearing surveys (page 216)	“Pre-clearing surveys will be conducted prior to clearing, including	Replace “prior to clearing” with “prior to any development”

Table 12.1 Item	Existing text	Recommendation
	translocation of fauna into areas of retained vegetation.”	Include: “must record and report to the Department on any fauna relocated or euthanised, including: name of qualified/licensed handler, species, location notes, and release location and method
Documentation and reporting (page 216)	“The final clearing extent will be documented. This information will be used to inform and refine the Biodiversity Offset Strategy and offset requirements for the project. This process involves the preparation of a pre-clearing report”	Include: “...and post clearing report. As follows: The final clearing extent shall be recorded and mapped using a GPS and a post-clearing report provided with GIS data to demonstrate whether clearing is within the approved disturbance footprint. Should clearing exceed this area then the post clearing report shall provide the recalculations of additional offset obligations for each PCT, subject to CoA requirements”
Documentation (page 12.1)	“A Biodiversity Management Plan will be prepared and implemented...”	The Biodiversity Management Plan is not a mitigation measure. It is a plan for implementing mitigation measures and monitoring specified in the BDAR, and evaluating and reporting on effectiveness of those measures.
Impacts to threatened species – monitoring (page 217)	“Monitoring of threatened species to ensure impacts arising from the project are within predicted levels. The details of the monitoring will be determined during the preparation of the Biodiversity Management Plan.”	This action relies on the BDAR specifying expected impacts and thresholds above which impacts are unacceptable, which has not been provided. Include: “the BMP must stipulate objectives for monitoring, how baseline data will be captured and represented.

Recommendation:

- 10.1. Specific detail about mitigation measures and controls must be provided before approval so the Department can be confident that the controls are likely to be feasible and effective.
- 10.2. Provide details of a comprehensive threatened species adaptive monitoring program (including pest plants and animals) to determine if measures are being implemented as planned, response of the threatened entity is as expected, provide triggers for ameliorative action if the controls are ineffective or the impact is not as predicted, and include a program to evaluate and publicly report on the outcomes.

11. Evidence is needed to justify statements about impact avoidance and minimisation in Section 10.

The explanation of avoid, minimise and offset in Section 10 (page 192) is incorrect – mitigation measures are part of minimising impacts, and offsetting is required for residual impacts.

Section 10.1 includes unjustified statements about avoidance. This section needs to clarify what can feasibly be avoided so residual impacts are identified and offset:

- The EIS does not provide evidence of the LiDAR assessment used to determine the disturbance area, so BCD cannot evaluate whether the area being cleared has been minimised.
- The 50 m ‘no-go’ zone for protecting Booroolong frog breeding habitat around the Yarrangobilly River and Wallace’s Creek in Lob’s Hole is part of the Snowy 2.0 Main Works approval. Outside of the Main Works ‘no-go’ zone, the 50 m buffer around riparian areas in the construction envelope for the Transmission Connection does not appear to be limiting impacts and BCD question whether it is a genuine ‘no-go’ zone.
- Section 10.1.2 (page 193) seems to indicate that the disturbance area will be increased in the future, stating that avoidance of impacts has been achieved as “future transmission line augmentation works required to transmit the full capacity of Snowy 2.0 would also avoid large areas of national park under this option”.
- The substation location requires clearing of intact native vegetation in areas with existing threatened species records. Stating that it is ‘suitable’ (in Section 10.1.2) is not evidence that impacts have been avoided.
- The statement in Section 10.1.1 (page 193) that the overall environmental impacts to biodiversity have been avoided by using towers up to 75 m instead of 94 m towers (above the tree canopy) has not been supported by evidence. The comparison of concept options in the EIS Table 3-3 (page 34) does not give an adequate evaluation of impacts to KNP for the two options. We would expect to see a comparison of the total vegetation clearing required for the preferred option and alternative ‘over-canopy’ design. Taller structures are needed to span above the vegetation canopy, so clearing for larger footings is required. Construction of tracks to access the larger structures for emergency works or wildfire suppression would also need vegetation clearing, however direct impact beneath the wires would be avoided. The EIS does not provide any information to support the perceived relationship between height of wires above vegetation and catastrophic failure during bushfire. Removal of the canopy from below the powerlines is likely to alter the vegetation community and may promote the growth of flammable shrubs.
- Section 10.2 (page 194): discussion about potential impacts to the known karst area needs to be linked to other parts of the BDAR. The known karst area has not been previously identified or included on maps. The BDAR does not include enough information to enable micro-siting of tracks to avoid rock outcrop areas (such as mapped protection zones), and the construction envelope around the new tracks does not appear to have any room for the track footprint to move. Remove the terms ‘may’ and ‘where possible’.
- Section 10.2.1 (page 194): include that barbed and razor wire are known to result in mortality of individual gliders.

Recommendation:

- 11.1. Provide evidence to support statements about impact avoidance or remove the unjustified statements made in the BDAR.
- 11.2. Provide evidence (including from overseas) that the alternative over-canopy concept design is more likely to result in catastrophic failure of the transmission lines during bushfire than a cleared easement.

D. The Offset Strategy is not sufficiently detailed to provide certainty that offsets can be met or achieved within KNP

12. Clarify offset calculations for BAM Stage 2, including what is, and is not, being offset.

There are various statements throughout the BDAR about revision of the calculated offset obligation after detailed design is complete. Assumptions about how a reduction in the calculated biodiversity credit requirement can be achieved, and the post-approval mechanism to effect the reduction, are not clear enough to define the credit obligation.

- a. The Executive Summary states “The project impacts and offset obligations have been calculated based on the concept design, as is normal for a major project at this stage of the process. Therefore, project impacts and offset obligations would be revised considering areas where total clearing and permanent infrastructure is not required i.e. the permanent easement” (page xxii).

This requires some clarification. Are TransGrid proposing a potential refund in credit obligation where there is only partial clearing or temporary clearing? Or will this be provided/assessed in the RTS? If so, this would have to be supported by BAM data. Any areas cleared for the project (even if considered by TransGrid to be a temporary disturbance) should be treated as clearing/direct impact and must be offset. ‘Permanent easement’ has also not been defined.

- b. Section 2.4.1 (page 39) states “this BDAR will seek to recalculate impacts and offsets once the final Snowy 2.0 Main Works disturbance boundary is confirmed and detailed design for the transmission line (this project) is complete”

BDAR figures show the Main Works development footprint, which appears to match the Main Works Approval. However, it is important to note that the construction envelope assessed by EMM for Main Works has not been offset, only the disturbance footprint. The Main Works final footprint may change within the construction envelope (see Main Works Infrastructure Approval, Schedule 3 COA 13 and 14), and the current project may require offsets for areas assumed to be offset by Main Works. This situation will need a CoA requiring recalculation and final payment within a specified time-frame post-approval as the Main Works final footprint may not be known for 3 years.

A CoA will be required to restrict activities to within the construction envelope/ project area (whichever term is used) and require reporting on final disturbance and re-calculation of any residual offset obligation. The BDAR should note that the consent authority can require that this residual is offset in accordance with BAM S8.6(5) if mitigation measures are determined to be insufficient to mitigate this impact.

Recommendation:

- 12.1. Resolve overlap with the approved Main Works boundaries and future changes to the Main Works footprint to ensure all impacted areas are offset.
- 12.2. Consolidate statements about post-approval reduction and recalculation of the biodiversity offset liability into Section 14 and remove them from other parts of the BDAR. Section 14 should provide details of the mechanism for reducing the approved credit requirement, if appropriate.
- 12.3. CoA requiring recalculation of offset liability and final payment within a specified post-approval timeframe.

13. The Biodiversity Offset Strategy is not sufficiently detailed to provide certainty that offsets can be met or achieved within KNP

The BDAR/EIS does not provide sufficiently detailed strategies or information to demonstrate the credit obligations can be met.

The Executive Summary (page xxii) indicates that TransGrid propose to use the same framework which has been developed for Main Works and included in the Snowy 2.0 Main Works Infrastructure Approval (SSI 9687), that is the proponent would “make payments to the NPWS to offset the residual biodiversity impacts of the project, and NPWS would use these funds to enhance the biodiversity and conservation values of KNP. This framework for the Snowy 2.0 project would allow NPWS to carry out actions to substantially improve catchment health, strengthen ecosystems, protect threatened species and communities and deliver long-term strategic conservation benefits for the KNP”.

The Minister for Planning and Public Spaces has discretion to determine the number and type of credits required to be retired to offset the residual impacts on biodiversity values. Consistent with the intent of the Scheme and for transparent decision making, any funding for payment for biodiversity offsets for impacts in KNP should correspond with a specified number and type of credits associated with those impacts, with a potential for appropriate flexibility for National Parks and Wildlife Service in the delivery of those biodiversity offsets.

Payment for biodiversity impacts due to the Snowy 2.0 Main Works development was achieved by the granting of particular consent conditions. BCD recommends that the proponent works with NPWS to investigate how the biodiversity within KNP could benefit from application of the scheme.

There will need to be some further consideration of how this offset strategy will determine the credit values. The low condition areas of KNP were utilised for the Main Works offset requirement and therefore those credits/areas are now unavailable. It must be made clear in the EIS (and BDAR) that the offsets will be above that already applied to offset Main Works. An analysis of any increase in current low condition areas post 2019/20 fires would potentially be useful for this purpose.

The proponent needs to demonstrate how a proposed offset strategy will meet the direct offset requirements for each significantly impacted Commonwealth species and in particular, ‘provide a measurable conservation gain for an impacted protected matter’ in accordance with the EPBC Act Environmental Offsets Policy.

Replace ‘*Biodiversity Offsets Strategy*’ in Section 15 (page 238) and Table 1.1 (Page 22) with *Proposed framework for Biodiversity Offsets*’.

Recommendation:

- 13.1. Revise Section 16 to ‘*Proposed Framework for Biodiversity Offsets*’ and include more detail and further analysis about how credits will be determined and how the credit obligation can be met within and outside KNP.

E. The BAM assessment is incomplete. *Caladenia montana* needs to be included and there are BAM non-compliance issues.

14. BAM assessment is incomplete for *Caladenia montana* (BAM sections 6.4, 9.1.3.5 and 11.2.4).

As previously agreed, Section 7.4.1 (page 157) and Section 11.1.1 (page 195) should include *Caladenia montana* unless samples are determined by further analysis to be not a threatened species. Credits from impacts to *Caladenia montana* will need to be included if it is positively identified. This information needs to be identified upfront in the Executive Summary (page xx), which should provide a commitment to incorporate the results and any credit obligation in the RTS.

Recommendation:

- 14.1. The BDAR must commit to providing an impact assessment for *Caladenia montana* and incorporate the results and any credit obligation in the RTS.

BAM Non-compliance

15. Feedback provided by BCD to Jacobs about the draft BDAR has not been fully addressed.

BCD was provided with a draft BDAR (Rev 1, dated 12 October 2020) and associated BAM-C calculator cases to review on 13 October 2020. Our initial feedback on 30 October 2020 included key points and annotated comments throughout the document. BCD met with Jacobs on 9 November 2020 to clarify some of the comments and had subsequent email discussions about aspects of the assessment.

Much of the feedback about meeting BAM minimum requirements has not been addressed, and errors identified in the draft are still evident in the exhibited document. Table B.2 shows the key issues we raised and whether they were addressed in the submitted BDAR. The table does not include our detailed comments within the draft document.

Table B.2 Status of issues identified in BCD draft BDAR review 30 October 2020

Summary issue	BCD comment 30/10/2020	Has it been addressed in BDAR (February 2020)?
1. MNES assessment- the project is a controlled action.	Jacobs can use BAM under the bilateral agreement to assess biodiversity values and quantify impacts but still have to assess against EPBC criteria	MNES assessment has been provided however it is incomplete. <ul style="list-style-type: none">• No justification for removing species• Habitat occupancy not addressed• Contradictory statements• Lack of significance is not justified re offsets• No actions for Booroolong frog• Assessment should not be based on measures – the impact needs to be identified. For example, what happens if the unspecified sedimentation mitigation measures do not work?
2. Areas have been left out of the assessment	a). Figure 2-2 shows the 'project area' and 'disturbance footprint'. The BDAR is to provide an assessment for the whole project area. The project update in February 2020 showed vegetation mapping for the whole project area – there has not been agreement that the assessment only cover a smaller disturbance footprint. b). BDAR p 25 states that 50 m buffer has been used as an estimation of indirect impacts however the gis data shows a 20 m buffer. c). Include potential impacts within the project area easement (shown in red) where vegetation clearing is not proposed. d). A description of all impacts of the project, including ongoing maintenance. e). Overlap with Snowy 2 Main and Exploratory Works construction envelope:	Partially addressed – clarification is needed There are too many terms to define the project area and development footprint and they do not align with the BAM. Design and construction impacts remain unclear. For example, where are the bridges and how many? The location of these structures is known and more work should be done to provide options to be assessed for environmental impacts.

Summary issue	BCD comment 30/10/2020	Has it been addressed in BDAR (February 2020)?
	<ul style="list-style-type: none"> We suggest seeking the most recent disturbance footprint from SHL and overlay on relevant map The assessed construction envelope for Exploratory/Main approved disturbance footprint will not be finalised until construction is complete. Advice will be sought from Planning and Assessment, however the BDAR will need to clarify how this assessment interacts with other S2.0 approvals. 	See current review for comments about indirect impact assessment approach (Point 6).
3. Source of data	<p>a). Tables listing threatened species habitat preferences and exclusions from the assessment require the data source.</p> <p>b). Suggest including a table clearly identifying species-credit-species required by the BAM-C and showing what has been excluded and that any exclusions are compliant with BAM s6.4.1.17.</p> <p>c). Reference to consultation about agreed methods for fauna survey (between May 2018 and May 2019) is missing. BDAR provides an opportunity for stating that survey has been completed according to agreed methods, and, if not, to provide justification</p>	<p>Addressed.</p> <p>Consultation on methods has been included (EESG = BCD)</p>
4. Indirect impacts	<p>Address specific indirect impacts to threatened species and TECs, with adequate justification from literature for assessment decisions, such as a 20 m buffer. For example:</p> <ul style="list-style-type: none"> Edge effects on birds have been found between 25 and 125 m into forest from the edge of powerline easements (Baker et al 1998). Collision and electrocution of birds and bats is mentioned in the BDAR (S11.3, page 124) – demonstrate that adequate survey for potential roost sites has been undertaken and any mitigating impacts to breeding pairs are appropriate. 	<p>Indirect impact assessment is very unclear.</p> <p>See current review (Point x)</p>
5. Location of mitigation actions	<p>Suggest providing diagrams of spans showing air space between actual vegetation height and lines with justification for impact assessment. Any required tree trimming during construction or operation / maintenance is to be included in the BDAR.</p> <p>In general, mitigation measures could be more closely linked to the impacts for this project – they seem to largely replicate the mitigation measures for Main Works which has different impacts.</p>	Not addressed
6. BAM minimum requirements	<p>Ideally the document would be presented to enable us to readily determine if BAM minimum requirements have been met (as per BAM Tables 25 & 26). The format of the BDAR (i.e. separate methods and results sections) makes it difficult to find and understand evidence for some of those requirements.</p> <p>We strongly suggest restructuring chapters 4 to 7 to ensuring that minimum BAM requirements are clearly presented and adequately justified</p>	Not addressed
7. Offset Strategy	<p>a). There is no mapping of vegetation types or habitats for threatened species outside the project area or species locations to support the offset strategy.</p>	<p>Not addressed, however BCD internal discussions are ongoing.</p> <p>See current review (Issue C)</p>

Summary issue	BCD comment 30/10/2020	Has it been addressed in BDAR (February 2020)?
	<p>b). Will need to consider applying to areas outside that already considered for Main works approval.</p> <p>c). This may require additional work/analysis of condition and PCT's to which the offsets will be applied so that appropriate areas and management actions can be determined and costed over that area, including additional consideration and mapping of threatened species. Condition post-fire will also be a consideration.</p> <p>d). Final offset strategy for Main Works approval required several weeks of negotiations between planning, NPWS & Snowy Hydro. Suggest liaison with planning about how best to address the proposed offset strategy for KNP component for this project</p>	

16. The format of the BDAR and distribution of information through the document does not follow the BAM and makes it difficult to review. Editorial comments are provided to assist with future reporting

- c. Specific information required for BCD's BAM review is scattered throughout the document and does not follow the assessment logic. This has resulted in it being difficult to review against the minimum requirements and some requirements not being met. We request that future BDARs more closely follow requirements of the BAM. Ideally the document would be structured to enable reviewers to readily determine if the BAM minimum requirements have been met, as per BAM Tables 25 and 26. The format of the Transmission Connection BDAR, having separate methods and results sections, makes it difficult to find and understand the evidence given for meeting some of those requirements. In future we strongly suggest restructuring the information in chapters 4 to 7 and ensuring that minimum BAM requirements are clearly presented and adequately justified.
- d. Some information required for the landscape assessment (BAM section 4.2) is hard to find and difficult to read. For example, the area (ha) of each bioregion is in Section 4.5.1 (page 41). It should be in Section 5.1 (page 80). The relative location of the two IBRA subregions is not intuitive – it could be expected that the Australian Alps would be east of the South Eastern Highlands, but it is not. The BAM requires a map with the other contextual information to clearly show the subregion boundaries. Similarly, there is no easily readable map of the NSW Landscapes, as required by BAM Appendix 10. Percentage of NPWS estate (74%) and State forest (26%) is also relevant, due to offsetting arrangements.
- e. Section 5.1 (page 80) incorrectly states that the BAM does not specify how to deal with a project that occurs across multiple IBRA regions – BAM Section 6.4.1.7 and page 36 of the Stage 1 Operational Manual (2018 version) state that separate calculators must be used.
- f. Section 11.6, page 213: Cumulative impact figures are incorrect – Exploratory Works Mod 2 resulted in cumulative impact to 113.9 ha

Recommendation:

- 16.1. The BAM Accredited Assessor note editorial comments about the BDAR to be implemented for future assessments.
- 16.2. The structure and content of BDARs follow BAM minimum requirements in BAM Appendix 10, or a table is provided to demonstrate that the BAM has been applied.

17. The BDAR should be certified as BAM compliant within 14 days of the submission date.

Section 6.15 of the BC Act states '*a biodiversity assessment report cannot be submitted in connection with a relevant application unless the accredited person certifies in the report that the report has been prepared on the basis of the requirements of (and information provided under) the biodiversity assessment method as at a specified date and that date is within 14 days of the date the report is so submitted*'.

The BDAR for the project does not include a statement of certification by an accredited assessor. A separate statement has been provided by Brenton Hays of Jacobs on 18 February 2021 certifying that the BDAR is BAM compliant. A document control table in the draft BDAR provided to BCD for review (Revision 1, 12 October 2021) has been removed from the final BDAR making it difficult to determine currency of the assessment. The BAM-C reports at Appendix I show that the calculator cases had not been finalised at the date of EIS submission.

Recommendation:

- 17.1. The revised BDAR submitted with the Submissions Report should be certified, and the credit calculations in the BAM calculator should be finalised within 14 days of the report being submitted.

18. The submission did not include all required spatial data. Supplied datasets were ambiguously labelled and did not allow easy replication of maps or confirmation of area calculations.

Spatial data, digital field datasheets and survey results were sent to BCD with the draft BDAR in October 2020. Spatial data supporting the final BDAR was provided after a request from BCD, however it is incomplete and required several emails to confirm mapping for all the assessed vegetation zones:

- The extent of final species polygons is ambiguous.
- There has been no advice about which datasets have been updated since the draft BDAR submission making it difficult to determine dataset currency.
- Point locations for orchid survey completed in October/November 2020 are also missing.

We note that the state forests spatial dataset shows the subject land to be within Bago SF. It is locally considered that the proposal is within Maragle SF, meaning that the spatial data is probably incorrect.

Recommendation:

- 18.1. Submission of a revised BDAR must include clearly labelled spatial data for all components of the BAM assessment, including separate species polygons and advice about currency of previously supplied spatial data.

- 18.2. Note that while the proposal is generally understood to be within Maragle SF, the state forest corporate dataset shows the proposal within Bago SF.

19. For transparency, the number of VI plots that spatially exist in each vegetation zone and the plot identifiers should be stated in Table 4.3 (page 42). All plots should be shown on maps, not just those in the construction envelope. Copies of all field datasheets have not been supplied. Not all of those supplied are able to be matched to plot numbers in the BDAR.

Section 4.5.2 states that 94 vegetation integrity plots were completed in the "construction envelope and broader area" (the subject site). Not all of this dataset has been provided to BCD. The spatial dataset has locations for 80 plots and Appendix C provides data for 80 plots within the construction envelope. Copies of field datasheets for 37 plots were provided in October 2020, some of which cannot be matched to plot identifiers used in the BDAR or spatial data.

PCT identification and mapping should be to the boundary of the subject land, i.e. an area larger than the construction envelope. The BAM requires a map showing location of vegetation integrity plots in relation to PCTs, including plots outside the development footprint/construction envelope.

Section 4.5 (page 40) says PCT identification and mapping was undertaken within the construction envelope. BAM 5.2.1.7 requires a plot-based vegetation survey of the subject land (within the meaning of the BAM), not just the development footprint (or construction envelope). Figure 6.1 shows PCT mapping to the subject land boundary. Figure 4.1 (pages 46-48) should include PCTs as required by BAM or be removed as it appears to duplicate Figure 6.1.

If the indirect impact zone is going to be used, Table 4.3 (page 42) should show the number of plots that spatially exist in each vegetation zone (see Table B.3) and the plot identifiers. In this instance, BCD accept the rationale in Section 4.5.2 for using plots in other zones, however management zones are more appropriate in future. The 'Management Zone' function in BAM-C should be used to capture the indirect impact zones, as explained in Section 2.2 of the BAM Operational Manual Stage 2 (page 13). Where a development proposes a mixture of complete and partial clearing within the same vegetation zone, an assessor can map and identify these as separate management zones with different future attributes scores. Using management zones removes the need to duplicate the condition metrics and meet minimum sampling requirements for vegetation zones.

Table B.3 Number of VI plots in each vegetation zone (according to spatial data)

Vegetation Zone	Number VI plots (from GIS)
outside impact zone	21
AA-1	1
AA-2	2
AA-3	1
AA-4	5
AA-5	1
AA-6	0
SEH-1	1
SEH-2	0
SEH-3	8
SEH-4	1
SEH-5	11
SEH-6	1
SEH-7	2
SEH-8	1
SEH-9	1
SEH-10	8
SEH-11	4
SEH-12	2
SEH-13	5
SEH-14	0
SEH-15	0
SEH-16	0
SEH-17	1
SEH-18	1

Vegetation Zone	Number VI plots (from GIS)
SEH-19	0
SEH-20	1
SEH-21	2

Recommendation:

- 19.1. Revise Table 4.3 (page 42) to show the number of VI plots that spatially exist in each vegetation zone and the plot identifiers. Include all plots sampled within the subject site on Figure 6.1.
- 19.2. As per BAM minimum requirements (BAM Appendix 10), supply scanned copies of vegetation integrity field data sheets (or digital copies if captured electronically), clearly labelled to match plots data presented in the BDAR.

20. The BDAR needs to provide clear and specific information about targeted threatened fauna survey methods, specify limitations, and discuss how these were resolved.

Section 4.7 (page) 49 – definitions of area covered by threatened species habitat assessment is incorrect. It was performed over the subject land as defined by the BAM.

Section 16 (page 240), Table D3 and Executive Summary (page xx) – update to reflect that Squirrel Glider was detected via targeted spotlighting survey, rather than assumed to be present.

In Section 4.8.2 (page 59), the important point to note about consultation is that OEH threatened species experts were consulted (by the coordinators) and the fauna survey program was agreed by BCD.

Section 4.8.2.1 (page 60):

- Habitats should be mapped on Figure 4-3. Table 4.6 would be more informative if it included a measure for each method in each bioregion (number of sites/nights, etc). Are the caves included with rock outcrops and cliffs shown on figure 5-4 (page 87)? If so, that should be mentioned here.
- Remove 'typically' and 'generally' from this section and specify what happened at the sites.

Section 4.8.2.4 (page 66) survey for nocturnal birds notes that large hollow-bearing trees were noted as ecologists walked through the project alignment and mapped. The results of this mapping have not been provided.

Section 4.8.2.5 (page 67)

- This section is confusing. It is difficult to tell what happened and where.
- describes survey effort for small terrestrial mammals noting that broad-toothed rat was 'targeted incidentally'. The BDAR needs to specify whether broad-toothed rat was subject to targeted survey or not surveyed.
- Mentions analysis of predator scats (page 68) but does not include the location and the results are not discussed within the BDAR.

Section 4.8.2.7 (page 72) says that koala feed trees were targeted at random locations. Did this occur throughout the subject land/study area, or was it focussed on the construction envelope?

Section 4.8.2.9 (page 78):

- It is unclear if any additional survey was completed within identified Booroolong frog habitat. There was intensive survey for the Snowy 2.0 Exploratory Works EIS and some of those records are within the study area.

- To note - optimal conditions for the Alpine Tree Frog within NSW are provided in the new NSW Survey Guide for Threatened Frogs (DPIE 2020) and are different to the Commonwealth guideline.
- GPS tracks for the frog survey would be informative.

Section 4.9 (page 78) states that the study was limited by the need to survey over several years and seasons. The survey period for this project covered three years. Survey limitations should include discussion of the 2019/2020 bushfire season.

Recommendation:

- 20.1. Address identified issues in the documentation of fauna survey methods.

21. Identification of geological and soil hazard features needs to place the features in the context of the project.

Section 5.6 (page 82) describes tufa deposits that occur within the construction envelope. Everything within the study area should be identified and described in the context of potential impacts – i.e. are they uphill or downhill of the construction envelope?

Section 5.9 (page 84) Figure 5.4 shows that PCT 302, identified as a resource flow/sink in section 5.9, is downhill from the development footprint. Resource flows and sinks are important for post-bushfire recovery. This location should be monitored during construction to allow rapid amelioration of any sediment mitigation failures. Monitoring should also occur in strategic locations to trigger urgent works if mitigation measures are not to be working and mapped resource flows and sinks on Figure 5-4 are likely to be impacted.

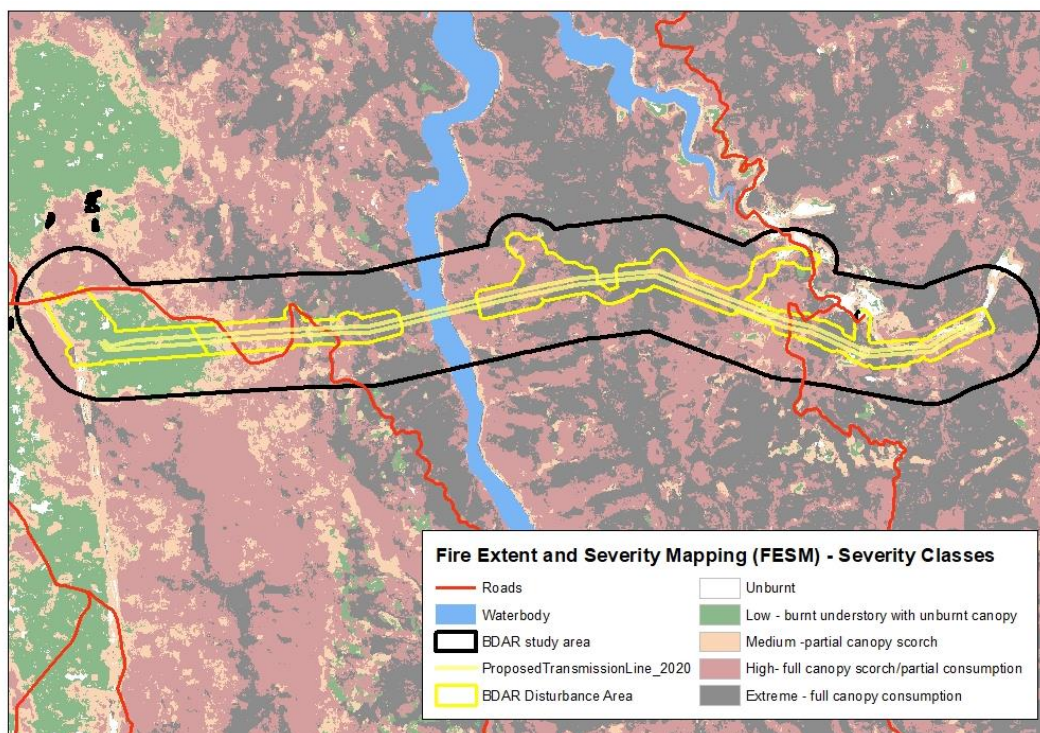
Recommendation:

- 21.1. Identify any areas of geological significance and include in construction monitoring for indirect impacts. Include the area of PCT 302 mapped as a post-fire resource sink in Figure 5.9 in monitoring for construction sedimentation.

22. The more recent bushfire severity data (FESMv2.1) should be identified in the BDAR and used to guide management and mitigation actions specified in post-approval construction and operational plans.

The impact of the 2019/20 catastrophic fire season is discussed in Section 5.9 (page 83). The bushfire severity mapping shown on Figure 5-2 (page 86) is based on the 'Google Earth Engine Burnt Area Map' (GEEBAM) spatial dataset available on the NSW government SEED data portal, which maps relative burnt area canopy classes and is useful for preliminary, broad-scale assessments. BCD acknowledge that the 'Guideline for applying the BAM at severely burnt sites' specifies use of the GEEBAM data, however in mid-2020 this dataset was superseded for indicating fire severity by the 'Fire Extent and Severity Mapping' (FESM). FESM is based on field-validated data and more appropriate for use at a site scale (Figure B.2).

Figure B.2 Fire Severity mapping



Recommendation:

22.1. Ensure that the most recent version of 'Fire Extent and Severity Mapping' (FESM) is used for planning rehabilitation and biodiversity monitoring programs in post-approval construction and operational management plans.

23. Section 6 needs to provide the percent cleared for each vegetation type and total assessed disturbance area for each PCT. There need to be clearer links between the information provided for each PCT and vegetation zone (within the study area), including zone and plot labels for photos throughout the BDAR.

Table 6.1 (page 93) needs to be totalled to show the assessed disturbance area for each PCT. The percent cleared for each vegetation type (from BioNet Vegetation Classification database or BAM-C) should be included in Table 6.1 or in PCT descriptions. This figure assists with assessment of impacts for non-TECs.

All pictures must be labelled with the appropriate zone name for reference so they can be matched with the relevant zone descriptions in the BDAR, maps and tables of VI scores (Table 6.9), BAM_C and spatial data.

Use "regenerating" instead of "regrowth" to describe vegetation that is returning from a cleared state.

Section 6.4.2 (page 132) – more specifics are needed about the location of areas mapped as montane peatlands and swamps in the vicinity of the disturbance footprint. Are they likely to be impacted by runoff or sedimentation?

Recommendation:

23.1. Include percent cleared for each vegetation type and total assessed disturbance area for each PCT. Label all photos with zone and plot number.

23.2. Specify where GDEs and TECs are likely to be impacted by direct or indirect impacts of the proposal

24. There are existing records for threatened bats and birds along the Tumut River. There was no agreement that the area below the transmission line would be removed from the assessment.

Previously supplied information from Jacobs shows that vegetation beneath the transmission line on the banks of the Tumut River is likely to be PCT 729 Broad-leaved Peppermint – Candlebark shrubby open-forest. There has been no agreement that the area below the transmission line would be removed from the assessment and BCD expected it to be included. Stage 1 threatened species habitat assessment is not restricted to the construction envelope.

Threatened forest owls, bats and raptors including little eagle and square-tailed kite are predicted by BAM-C to forage in this vegetation. Indirect or uncertain impacts due to powerline strike are possible for avifauna using the river as a flyway. There is no indication the banks of the Tumut River surrounding the transmission crossing were surveyed for nest trees or cliffs/caves.

Bionet has records for large bent-wing bat (*Miniopterus orinae oceanensis*), southern myotis (*Myotis macropus*) and white-throated needle-tail (*Hirundapus caudacutus*) on the Tumut River, approximately 3.5 km from the disturbance footprint.

Section 7.4.2.2 (page 158) mentions that white-bellied sea-eagle (*Haliaeetus leucogaster*), little eagle (*Hieraaetus morphnoides*) have been recorded around the Tumut River, and that no breeding habitat was found in the construction envelope. The BDAR does not demonstrate that surveys were undertaken in the subject land beneath the transmission line or in the surrounding area where indirect impact may occur.

Recommendation:

- 24.1. Include the area below the transmission line over the Tumut River in the assessment due to potential prescribed impacts in that location, particularly for threatened avifauna that are predicted to occur in PCT 729.

25. Candidate species: an expert report has not been provided for *Thelymitra atronitida* in accordance with the BAM s6.5.2.

Belinda Pellow is on the list of Approved Experts for *Thelymitra atronitida* (version current 18 January 2021) However, it could be inferred from the Executive Summary and Section 7.3.4.1 (page 155) that a report was commissioned by the proponent to justify removal of *Thelymitra atronitida* as a candidate species from the assessment. However, the report at Appendix F was commissioned by the Department (Office of Environment and Heritage) in 2019 to improve gaps in knowledge about the species' distribution and refers only generally to the Bago records. BAM section 6.5.2 requires that an expert report is commissioned for the project and refers directly to the project or development site.

Recommendation:

- 25.1. Clarify the status of the report for *Thelymitra atronitida* and justify why an expert report has not been provided.

BCD acknowledge that there are questions about the presence of the species in the region and we are seeking advice about BAM-C predictions for this species. We will notify the assessor when resolved.

26. Provide a consolidated list and map of threatened fauna that were identified during surveys including existing records

The BDAR needs to provide a consolidated list or map of threatened fauna that were identified during surveys (including existing records). Existing records (Bionet and EMM) should be included in maps of the fauna survey results (Figure 7-2). Section 7.2 (page 146) mentions existing records

but does not provide a map or list. There is no detail about methods or survey for yellow-bellied glider mentioned in paragraph 4.

Information in Table 7.2 (page 147) should inform Stage 1 of the assessment and field survey.

Table 7.3 (page 149) needs to indicate the species that were added and provide the complete list. *Caladenia montana* should be a candidate for SEH bioregion. *Thelymitra alpicola*, southern myotis and yellow-bellied glider on the Bago Plateau endangered population are missing.

The results in Appendices need to indicate threatened species and be consolidated into the BDAR, particularly Table D7 and Appendix E. Appendix E lists three threatened bat species recorded from acoustic survey, eastern false pipistrelle (*Falsistrellus tasmaniensis*), large bent-wing bat (*Miniopterus orinae oceanensis*) and yellow-bellied sheath-tail bat (*Saccolomaimus flaviventris*), and another possible record, greater broad-nosed bat (*Scoteanax ruppellii*).

Recommendation:

- 26.1. Provide a complete and consolidated list of threatened species that were recorded during the surveys, including the threatened bats in Appendix E. Include all existing threatened species records on Figure 7-2.

27. Total area of direct impact for PCTs and the area of species credit species polygons should be provided to be compliant with BAM s9.1.2

The BDAR should provide a summary of the total area of direct impact to native vegetation. We expect to see a table with total area for each PCT as well as the areas separated by BAM-C case and vegetation zone in Table 11.1. Section 11.1 (page 195) also needs a table of direct impact to species credit species (area or count).

Recommendation:

- 27.1. Provide tables with total area for residual direct impact to each PCT and area or count for each species credit species.

28. Number each mitigation measure to enable tracking through the development approval, construction and operation processes.

Section 2.1 (page 12) of the Stage 2 BAM Operational Manual specifies that each mitigation measure should be given a unique identifier to assist in future planning and compliance auditing.

Recommendation:

- 28.1. In the EIS and BDAR, number each mitigation measure with a unique identifier to enable tracking.

29. The MNES assessment is inadequate. It needs more evidence to justify conclusions and cannot rely on unspecified mitigation measures to minimise impacts.

Booroolong frog: The MNES assessment needs to quantify the cumulative and proportionate impact of the project on the Booroolong frog population (including Exploratory and Main Works).

The Main Works BDAR reported that recent fires within the KNP have impacted on all Booroolong Frog habitat along Yarrangobilly River and Wallace's Creek fire trail, and that Main Works would not result in the removal of any unburnt critical vegetation for Booroolong frog.

BCD consider there may be increased risks above that assessed for Main Works of indirect impact from sedimentation due to the location of the project on steep ridges and its proximity to mapped Booroolong frog breeding habitat (see Point 4 above).

Given that 50 m has been identified as the appropriate buffer to protect Booroolong frog habitat from the impacts of the development, and encroachment into that buffer must be considered as an

impact to the species. This impact is likely to increase where surrounding catchment slopes exceed those of Main Works.

The area being impacted within 50 m buffer and proportionate impact on population is required to determine if failure of sediment mitigation will result in a long-term decrease in the size of the population.

Section 9 states that impacts from surface water flow due to the proposal will be managed by standard erosion control measures. These measures have not been specified and we are not confident that standard measures will be successful. There is also no monitoring proposed to trigger ameliorative action if controls fail. A commitment to undertake water quality and sediment monitoring program for Booroolong frog (prior and during construction activities), such as that implemented for Main Works, is necessary.

Greater glider: there is no quantification of breeding habitat or results from the hollow-bearing tree survey to support the assessment.

Species are missing from Section 9.5 (page 190) including white-throated needle-tail, which is vulnerable and included on the migratory schedules.

Recommendation:

- 29.1. Revise the MNES assessment to include the area being impacted within the 50 m buffer for Booroolong frog and proportionate impact on the population. Refer to BCD comments about mitigation and monitoring in Point 10.

References

Baker JL, Goldingay RJ & Whelan R (1998), Powerline easements through forests: a case study of impacts on avifauna. *Pacific Conservation Biology* 4: 79–89.

DPIE (2020). *NSW Survey Guide for Threatened Frogs*. Department of Planning, Industry & Environment, Sydney.

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Attachment C: Detailed comments – Flooding (BCD)

BCD have reviewed the EIS (Section 7.4, page 113) and Appendix I: 'Hydrology Assessment, Snowy 2.0 Transmission Connection' against the amended Secretary's Environmental Assessment Requirements provided by the Department to the proponent on 1 November 2019, and the BCD environmental assessment requirements provided to Planning and Assessment on 7 December 2018.

1. The qualitative flood risk assessment requires more work to meet BCD requirements for flooding assessment. Further assessment must be undertaken during the detailed design phase, prior to any development, and to the satisfaction of the Secretary.

The EIS and Hydrology Assessment do not address the BCD environmental assessment requirements related to flooding, however BCD accepts that it does address the Secretary's requirements for flooding due to the general nature of these SEARs.

BCD also acknowledges that the infrastructure design has not progressed to a stage when site specific flood impact assessments can be completed to comply with the BCD requirements. However, since any flood impacts are likely to be minor, flood modelling and assessments that are completed in the detailed design stage (on infrastructure located in floodplain areas) can inform any design modifications needed to mitigate identified flood impacts.

The aim of assessments should be to determine if there would be any detrimental changes in potential flood effects on other developments or land, including redirection of flow, flow velocities, flood levels, hazards and hydraulic categories. New and upgraded infrastructure such as temporary and permanent access tracks and bridges/culverts that cross drainage lines specifically require an assessment of flooding impacts. If any flood impacts are determined to be real and prejudicial, then the designs should be modified to reduce the impacts to an acceptable level.

The extension of existing flood modelling already completed to assess other Snowy 2.0 projects would define the flood risks across the project site and allow for the appropriate design of these infrastructure components commensurate with the flood risks as well as assist in the development of emergency management procedures.

Recommended condition of consent:

- 1.1. *Quantitative flood modelling and assessments must be completed during the detailed design phase for infrastructure that will be located in floodplain areas with the aim of reducing flood impacts to acceptable levels of risk. The assessment must be completed prior to any development, and to the satisfaction of the Secretary.*