Your ref: SSD-11826621 & SSD-11826681
Our ref: DOC23/57326-18

Mr Joe Fittell
Team Leader
Energy, Resources & Industry
Department of Planning and Environment

By email: Joe.Fittell@planning.nsw.gov.au

Dear Mr Fittell

Hunter Valley Operations Continuation Project (SSD-11826621 & SSD-11826681) – Review of Environmental Impact Statement

I refer to your request for advice on the Major Projects Portal, dated 27 January 2023, in which the Planning and Assessment Division (P&A) of the Department of Planning and Environment (the Department) invited Biodiversity and Conservation Division (BCD) to provide advice in relation to the Hunter Valley Operations Continuation Project (the project). BCD notes that the project comprises the Hunter Valley Operations South Open Cut Coal Continuation Project (SSD-11826621) and the Hunter Valley North Open Cut Coal Continuation Project (SSD-11826681), both of which are covered by the same Environmental Impact Statement (EIS).

BCD has reviewed the EIS, including relevant appendices, in relation to impacts on biodiversity (including Matters of National Environmental Significance [MNES] under the *Environment Protection and Biodiversity Conservation Act 1999*) and flood risk assessment. BCD has also reviewed GIS shapefiles for the project that were provided by the proponent in December 2022 and in February 2023. BCD's assessment has been informed by a site inspection on 22 February 2023.

During this review BCD identified several f issues, including those summarised below:

- BCD considers that the project presents a likely risk of Serious and Irreversible Impact to the Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregion EEC and Warkworth Sands Woodland in the Sydney Basin Bioregion EEC
- BCD considers that further details are required to demonstrate how survey effort has met BCD's threatened species survey requirements
- BCD considers that the proponent has not assessed flood impacts to the township of Singleton.

BCD's recommendations are provided in **Attachment A** and detailed comments are provided in **Attachment B.** If you have any further questions about this issue, please contact Steven Crick, Senior Team Leader Planning, on 4927 3248 or at huntercentralcoast@environment.nsw.gov.au

Yours sincerely

Joe Thompson
Director Hunter Central Coast Branch
Biodiversity and Conservation Division

13 March 2023
Enclosure: Attachments A and B

BCD's recommendations

Hunter Valley Operations Continuation Project (SSD-11826621 and SSD-11826681) – Review of EIS

Biodiversity

1. BCD recommends that if the project is approved it includes specific conditions of consent that will minimise the impact of the project on Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregion EEC and Warkworth Sands Woodland in the Sydney basin Bioregion EEC. BCD further recommends that management and mitigation strategies for these EECs are produced, and this is done in consultation with Planning and Assessment Group and with BCD.

2. The proponent should provide the following information to demonstrate the effectiveness of the two-phase grid-based systematic survey technique applied for this assessment:

    - A table of candidate threatened plant species surveyed for this project, with the area of suitable habitat within the subject area given in hectares by Vegetation Zone and by Plant Community Type (PCT), and a total area within the subject land; the number of circular survey areas per Vegetation Zone, per PCT and in the subject land; and the area surveyed by these circular survey areas by Vegetation Zone, by PCT and for the subject land.
    - A description of how the two-phase grid-based systematic survey approach was applied for this project, including details of how the one kilometre grids that were sampled were chosen, and a discussion on any assumptions and limitations of the use of this method.

3. Columns should be added to a revised version of Table D2.2 of the BDAR that cover:

    - 'Minimum survey effort requirements'
    - 'Survey requirements met?' (to be answered by 'Yes', 'No' or 'Partially').

    A 'Notes' column may be added, or the same text otherwise provided to explain why survey effort and survey methods used may not have met survey requirements.

4. Further assessment should be undertaken for the potential presence of koalas, where survey effort does not meet BCD's survey requirements. The additional assessment may be in the form of additional targeted threatened species survey, done in accordance with current survey guidelines, or from the provision of an expert report, or by assuming the presence of koalas in areas of suitable habitat.

5. Further information should be provided about the survey effort undertaken within the specified months for targeted surveys for all candidate species-credit species, and that surveys within the specified months are compared against the required survey effort. If some species have been inadequately surveyed then further surveys (done in the appropriate months), an expert report, or the species is assumed to be present and offset accordingly.

6. Areas of suitable habitat for the common Planigale in the subject land should be surveyed using pitfall trapping, or the species is assessed by an expert report, or that the species is assumed to be present and then offset in accordance with the Biodiversity Offset Scheme.

7. The species and habitat polygons for the southern Myotis should be updated to include waterbodies as outlined in the BAM 2020 and associated guidance documents.

8. The assessor should not exclude the Stephens banded snake from assessment and should provide further details of potential habitat for cave-dwelling bats within the project area that could be provided by built structures and mine shafts

9. An assessment of potential impacts to Warkworth Sand Woodland in areas adjacent to BAM Plot 18 should be undertaken if development activities in that area are likely to change local groundwater conditions.

10. The BDAR should be amended to discuss how the project fits within the wider landscape and presents a new, or revised version of Figure 6.1, or both that has clear lines that indicate probably corridors.

11. Further details should be provided around measures to be implemented to prevent new weeds from becoming established in Warkworth Sands Woodland from the re-routed Lemington Road.

12. The BDAR should be revised to include the limitations and risk of failure of the proposed measures to mitigate or manage impacts, as required under the BAM 2020.

13. The BDAR should be amended to include an assessment of prescribed impacts to the southern Myotis from the removal of water bodies within the subject land.

14. The BDAR should be amended to provide more information on the location of temporary or ancillary construction facilities that will require additional clearing, and to show these locations on one or more maps.

15. The BDAR should be amended to include a map, or maps of likely indirect impacts from the project in order to meet requirements of the BAM 2020.

16. The BDAR should include a discussion on the limitations and assumptions in the assessment of indirect impacts of the project to meet the requirements of the BAM 2020.

17. BCD recommends that additional information is provided to meet the requirements of the BAM 2020 as outlined in this letter of advice.

Flooding and flood risk

18. BCD recommends that the proponent's flood model is peer reviewed to identify the cause of boundary condition instabilities and assess the model's suitability for assessing flood impacts. Or alternatively, the proponent seeks Singleton Council's permission to use the TUFLOW model developed for the 2022 Singleton Flood Study.

19. BCD recommends that the proponent provides mapping that shows flood impacts down to 10 mm and clearly identifies all private land and residential dwellings where flood impacts are predicted to occur.

20. BCD recommends that the proponent provides mapping that clearly identifies all private land and residential dwellings where flood impacts are predicted to occur.

21. BCD recommends that the proponent assesses the change to the frequency and duration of flooding on all impacted private property.

22. BCD recommends that the proponent provides mapping, at a suitable scale, such that all impacted private landholders can clearly understand the predicted change in flood behaviour on their land. This mapping should include property boundaries and residential dwellings.

23. BCD recommends that conditions of consent are required to ensure that flood impacted landowners are equitably compensated.

BCD's detailed comments

Hunter Valley Operations Continuation Project (SSD-11826621 and SSD-11826681) – Review of EIS

Biodiversity

1. Serious and Irreversible Impacts

Section 6.4 'Serious and Irreversible Impacts' of the Biodiversity Development Assessment Report (BDAR), which forms Appendix L of the Environmental Impact Statement (EIS), provides an assessment of four entities considered to be at risk of Serious and Irreversible Impacts (SAII) from the project. The four entities are:

- Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregion Endangered Ecological Community (EEC)
- Warkworth Sands Woodland in the Sydney Basin Bioregion EEC
- large-eared pied bat (*Chalinolobus dwyeri*)
- little bent-winged bat (*Miniopterus australis*).

The four threatened entities have been identified as being at risk of SAII in BCD's Threatened Species Data Collection in BioNet, with SAII triggered for the two threatened microbats if breeding habitat is affected.

BCD has assessed the extinction risk to the four SAII entities by considering:

- the principles outlined in Clause 6.7 of the Biodiversity Conservation Regulation 2017 for determining if an action is likely to cause an SAII
- the proposed measures to avoid, minimise and mitigate impacts to the SAII entities for this project
- SAII considerations outlined under Sections 10.2.2 and 10.2.3 of the Biodiversity Assessment Method (BAM) 2020.

BCD has considered these measures and the residual impacts of the project on matters at risk of SAII as required under Section 7.16 of the *Biodiversity Conservation Act 2016* (BC Act).

The SAII implications of the project to the SAII entities are discussed further below.

Threatened microbats

The risk of SAII impacts to the two threatened microbats was excluded in the EIS on the basis that no potential breeding habitat was present in or adjacent to the Project area. However, the EIS is not clear on whether mine shafts and other old coal mine features such as buildings in the development footprint have been examined to support this conclusion. Nevertheless, BCD considers that the predicted impacts of the project on threatened microbats is unlikely to be a risk of SAII for this project due to the large area of occupancy of those two species of microbats.

Hunter Floodplain Red Gum Woodland and Warkworth Sands Woodland Endangered Ecological Communities

Table 6.8 'Impact Assessment for SAII Entities – Hunter Floodplain Redgum Woodland EEC' of the BDAR concludes that the Hunter Floodplain Redgum Woodland EEC meets SAII Principle 1 (Further decline of TEC), SAII Principle 2 (Further reduce the size of TEC) and SAII Principle 3 (Further limit distribution of TEC), but not SAII Principle 4 (Inability to respond to management).

The BDAR outlines that the project will clear 1.5 hectares of the EEC, which is about 0.35% of its estimated extent of 436 hectares. Section 5.2.3 of the BDAR describes measures that have been undertaken to avoid impacts to this EEC, including the avoidance of impacts to about 255 of the 269 River Red Gums that are in the vicinity of the transmission line that forms the part of the project that will cause impacts to this EEC.

Table 6.9 'Impact Assessment for SAII Entities – Warkworth Sands Woodland EEC' of the BDAR states that the project triggers SAII Principle 3 for the Warkworth Sands Woodland EEC. The project would clear 5.2 hectares of the EEC which represents 1.59% of its estimated extent of 333 hectares.

BCD notes that both EECs have a very limited geographic distribution by having an extent of occurrence of < 1,000 square kilometres. Weeds have also caused a decline in the environmental quality and biotic interactions within both EECs, hampering the recruitment and establishment of characteristic species, even in areas of active management such as the Carrington Billabong for Hunter Floodplain Red Gum Woodland EEC and the Warkworth Mine's Northern Offset for Warkworth Sands Woodland EEC. As a result of these two factors BCD considers the project represents a risk of SAII to both EECs.

The response to management for both EECs is likely to be dependent upon the nature and frequency of management actions. Both EECs are highly susceptible to weed incursion, to the point where groundcover, shrub layer and canopy species are unable to establish. That is because of weed competition, not because of any reproductive characters that limit the ability of the plants in the EECs to set seed or that the weeds or other key threatening processes cannot be controlled. Thus, both EECs are likely to respond to management, but only if the management is effectively able to reduce the establishment of weeds in areas of active planting, natural recruitment and continue into the plant establishment phase.

The proponent provided an e-mail, dated 24 February 2023, which outlined that the project, if approved, would result in the avoidance of clearing of 8.95 hectares of known Warkworth Sands Woodland EEC and up to 14.28 hectares of possible Warkworth Sands Woodland EEC by not conducting approved clearing associated with the South Lemington Pit 1 Coal Mine.

Recommendation 1

BCD recommends that if the project is approved that it includes specific conditions of consent that will minimise the impact of the project on Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregion EEC and Warkworth Sands Woodland in the Sydney basin Bioregion EEC. BCD further recommends that management and mitigation strategies for these EECs are produced, and this is done in consultation with Planning and Assessment Group and with BCD.

2. The effectiveness of threatened flora survey effort needs to be demonstrated

The effectiveness of threatened flora survey effort for the candidate species and site has not been fully demonstrated. Table 4.1 'Species-credit Species Surveys' states that targeted threatened flora surveys were undertaken using the two-phase grid-based systematic survey approach. However, as described in Section 4.4 of 'Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method' (EES, 2020) this survey method applies only where suitable habitat for a particular species is larger than 50 hectares, and this has not been demonstrated in the BDAR. BCD notes that only vegetation zones 13, 19 and 20 are larger than 50 hectares.

Targeted surveys for threatened plants for BAM assessments are usually done by parallel transects, the width of the transects is proportional to the size of the targeted plant species and density of the vegetation.

Recommendation 2

The proponent should provide the following information to demonstrate the effectiveness of the two-phase grid-based systematic survey technique applied for this assessment:

- A table of candidate threatened plant species surveyed for this project with the area of suitable habitat within the Project area given in hectares by Vegetation Zone and by Plant Community Type (PCT), and a total area within the subject land; the number of circular survey areas per Vegetation Zone, per PCT and in the Project area; and the area surveyed by these circular survey areas by Vegetation Zone, by PCT and for the subject land.
- A description of how the two-phase grid-based systematic survey approach was applied for this project, including details of how the one kilometre grids that were sampled were chosen, and a discussion on any assumptions and limitations of the use of this method.

3. Targeted surveys must be demonstrated to have met the required survey effort and used the appropriate methods

Table D.2 'Targeted Species-credit Species Survey Effort' of the BDAR does not provide sufficient information to demonstrate how survey effort has met the appropriate survey methods and met the minimum survey effort required for each of the candidate species considered for this project. This is required as outlined in Appendix K 'Requirements for a Biodiversity Development Assessment Report and a Biodiversity Certification Assessment Report' of the BAM 2020.

Recommendation 3

Columns should be added to a revised version of Table D2.2 of the BDAR that cover:

- 'Minimum survey effort requirements'
- 'Survey requirements met?' (to be answered by 'Yes', 'No' or 'Partially').

A 'Notes' column may be added, or the same text otherwise provided to explain why survey effort and survey methods used may not have met survey requirements.

4. Further assessment of the presence of koalas is required

Section 4.1.3.1 'Key Resources' of the BDAR identifies that survey requirements for the koala changed during the period that the BDAR was being prepared, and after most targeted surveys for the koala has been undertaken. Nevertheless, the survey effort outlined in the BDAR for the koala does not meet the survey requirements applicable at the time of submission. BCD recommends that for under-surveyed areas of potentially suitable koala habitat that additional surveys are undertaken, or the species is assumed to be present, or an expert report is prepared.

Recommendation 4

Further assessment should be undertaken for the potential presence of the koala where survey effort does not meet BCD's survey requirements. The additional assessment may be in the form of additional targeted threatened species survey, done in accordance with current survey guidelines, or from the provision of an expert report, or by assuming the presence of the koala in areas of suitable habitat.

5. Further information is required on the timing of surveys for threatened species

Appendix D 'Threatened Species Assessment and Survey Methodology' and the BAM Calculator file shows that the targeted surveys for some threatened species were either partially (e.g., Gang-gang Cockatoo, Eastern Pygmy Possum, and *Thesium australe*), or fully

(e.g., *Cryptostylis hunteriana*) done outside of the specified survey months. Further details are required to demonstrate that BCD's minimum survey requirements have been followed and that the minimum survey effort has been done; if not those species will require further surveys (in the appropriate months), or an assessment by an Expert Report or to be assumed to be present and offset accordingly.

Recommendation 5

Further information should be provided about the survey effort undertaken within the specified months for targeted surveys for all candidate species-credit species, and that surveys within the specified months are compared against the required survey effort. If some species have been inadequately surveyed then further surveys (done in the appropriate months), an expert report, or the species is assumed to be present and offset accordingly.

6. The common Planigale requires pitfall trapping

The survey requirements for the common Planigale (*Planigale maculata*) have not been met. The appropriate survey technique for this species is pitfall trapping however, Table 4.1 'Species-credit Species Surveys' of the BDAR states that the following survey has been conducted for common Planigale:

- Nocturnal spotlighting; and
- Remote camera survey

The Threatened Biodiversity Data Collection in BioNet states that 'surveys must be undertaken using pitfall traps.' Where that is not possible, due to rocky ground, for example, then the alternative is an expert report. BCD therefore recommends that the proponent survey for this species using pitfall traps, or provides an expert report, or assumes that the species is present in all insufficiently surveyed areas of potentially suitable habitat and provides a suitable offset. This would meet Section 5.3 'Threatened Species Survey Requirements' of the BAM 2020.

Recommendation 6

Areas of suitable habitat for the common Planigale in the subject land should be surveyed using pitfall trapping, or the species is assessed by an expert report, or that the species is assumed to be present and then offset in accordance with the Biodiversity Offset Scheme.

7. The southern Myotis species polygons do not encompass the entirety of all waterbodies

Section 4.2.2.1 'Southern Myotis (*Myotis macropus*)' of the BDAR outlines that habit polygon mapping for the southern Myotis was calculated on the direct impacts to the population by buffering all recorded individuals by 30 metres. This approach does not cover all waterbodies within the project site.

Under the BAM 2020, for fauna species assessed by area (as per the threatened biodiversity data collection (TBDC)), the species polygon is meant to be used to measure the area of suitable habitat on the subject land.

The '*Species credit' threatened bats and their habitats - NSW survey guide for the Biodiversity Assessment Method,* outlines that '*All habitat on the subject land where the subject land is within 200m of a waterbody with pools/ stretches 3m or wider including rivers, creeks, billabongs, lagoons, dams and other waterbodies on the subject land'* should be included in the species polygon for the southern Myotis.

Recommendation 7

The species and habitat polygons for the southern Myotis should be updated to include waterbodies as outlined in the BAM 2020 and associated guidance documents.

8. Exclusion of some species from assessment

Table D1 'Threatened Species Excluded from Assessment' of the BDAR provides justification for the exclusion of species from assessment. BCD notes the following regarding excluded species:

- Stephens banded snake (*Hoplocephalus stephensii*) – the TBDC notes that this species uses very old primary forest with many large old hollow bearing trees and therefore discounts this species. However, this description is provided as a general guidance and the TBDC also states that fallen timber, hollow bearing trees and areas within 500 metres of arboreal vine tangles can also provide habitat. As the Project area contains these features, the species habitat constraints, the species should not be ruled out due to lack of habitat.

- Cave-dwelling microbats (*Chalinolobus dwyeri* and Bentwings) – the BDAR does not contain enough information to quantify prescribed impacts to threatened microbats from the loss of mine shafts, and other old mine workings, and buildings in the Project area. This is required to meet Section 6.1.2 of the BAM 2020.

  Foraging *Miniopterus australis* bats were recorded on site. This species roosts in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges, and buildings. BAM assessments that require surveys for roosting sites for this species and also require an assessment of the importance of the habitat to the migration of this species. This species is very selective for roosting habitat and will move between roosts sites depending on temporal variance. The removal of any roosting habitat should be compensated with supplementary habitat so as to not disrupt migration to the maternity roost: a significant impact to a maternity roost for this species would be considered to be a Serious and Irreversible Impact.

Recommendation 8

The assessor should not exclude the Stephens banded snake from assessment and should provide further details of potential habitat for cave-dwelling bats within the project area that could be provided by built structures and mine shafts.

9. An assessment of impacts to the water table around BAM Plot 18 may be required

Vegetation at and around BAM Plot 18, within Warkworth Sands Woodlands appears to be in a discharge zone of the local aquifer, this suggests that consideration of groundwater impacts will be required for the proposed relocation of Lemington Road in this area. During the site visit of 22 February 2023, it was noted that the vegetation in and around BAM Plot 18 included *Myriophyllum* sp., *Xyris* sp., and *Drosera burmanni*. The soil at the site was wet too, with standing water, but the presence of these wetland species suggests this is due to a local, relatively persistent source of water rather than from the heavy rain that fell before the site visit. Given that this site is downslope of part of the biodiversity offset for the Warkworth Mine, with Warkworth Sands Woodland, BCD recommends that an assessment of the local aquifer, within the sandsheet is undertaken to ensure that any development of the site will not adversely affect the aquifer and affect other areas of Warkworth Sands Woodland, by either draining the upslope section of sandsheet or blocking the flow of water.

Recommendation 9

An assessment of potential impacts to Warkworth Sand Woodland in areas adjacent to BAM Plot 18 should be undertaken if development activities in that area are likely to change local groundwater conditions.

10. Descriptions of vegetated corridors are required and how the project fits within the wider landscape

Figure 6.1 'Location of Prescribed Impacts' shows the general location of corridors within the project area. However, the BDAR does not show how the corridors in the project area fit within the wider landscape and important corridors have not been identified. This does not meet the requirements of Section 7.2.1 (c) of the BAM 2020, which requires the proponent to '*locate the proposal to avoid severing or interfering with corridors connecting different areas of habitat and migratory flight paths, to important habitat or local movement pathways.*'

Recommendation 10

The BDAR should be amended to discuss how the project fits within the wider landscape and presents a new, or revised version of Figure 6.1, or both that has clear lines that indicate probably corridors.

11. Further details are required of weed management for new areas of Warkworth Sands Woodland to be exposed to greater traffic along the re-routed Lemington Road

Table 6.4 'Assessment of Indirect Impacts' of the BDAR provides a brief discussion of indirect impacts, including from weed invasion. BCD recommends that further information is provided in relation to measures to be implemented to prevent new weeds from becoming established in Warkworth Sands Woodland from the re-routed Lemington Road. BCD notes that several exotic species are already present in the patch of Warkworth Sands Woodland at Archerfield (such as *Eragrostis curvula*, *Melinis repens* and *Heterotheca grandiflora*) but the patch is vulnerable to the establishment of other weeds from sandy soils nearby (such as *Bryophyllum delagoense* and *Coreopsis lanceolata*).

Recommendation 11

Further details should be provided around measures to be implemented to prevent new weeds from becoming established in Warkworth Sands Woodland from the re-routed Lemington Road.

12. Identify the limitations and risk of failure for measures to mitigate or management impacts

Table 5.4 'Impacts and Avoided Impacts in Easement Realignment Design' of the BDAR does not document the limitations and risk of failure of the proposed measures to mitigate or manage impacts as required by Chapter 8 'Assessing the impacts of the proposal on biodiversity values' of the BAM 2020.

Recommendation 12

The BDAR should be revised include the limitations and risk of failure of the proposed measures to mitigate or manage impacts, as required under the BAM 2020.

13. An assessment of likely prescribed impacts to the southern Myotis is required

The BDAR does not adequately discuss prescribed impacts in relation to southern Myotis from direct impacts to waterbodies, including dams, within the subject land.

Table 6.5 ‘Prescribed Impacts identified at HVO North and HVO South’ discusses potential impacts to the habitat of threatened species or ecological communities, including impacts to human-made structures, impacts to connectivity, and impacts to ‘…water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities.’ The first two potential impacts were identified as likely to occur for this project, but not the last one. Table 6.6 ‘Prescribed Impacts Assessment’ discusses ‘…impacts on the habitat of threatened species or ecological communities associated with the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range’ in relation to all threatened fauna species and native vegetation but does not discuss the likely impact on the loss of water bodies on the subject land in relation to the movement of the southern Myotis.

The BDAR should include an assessment of potential prescribed impacts of the project on the southern Myotis by the removal of water bodies in accordance with section 8.3 ‘Assess prescribed biodiversity impacts’ in the BAM 2020.

Recommendation 13

The BDAR should be amended to include an assessment of prescribed impacts to the southern Myotis from the removal of water bodies within the subject land.

14. Further information is required about temporary and ancillary facilities associated with the project

Section 1.1.1 ‘HVO North’ of the BDAR does not provide enough information on the likely location of ancillary or temporary construction facilities and infrastructure and the likely amount of clearing associated with them. The BDAR does not identify these areas on any maps, such as Figure 1.3 ‘Hunter Valley Operations Continuation Project’ or Figure 1.4. ‘The Development Footprints HVO North and HVO South’ This information is required under Section 2 ’Stage 1: Biodiversity assessment’ (page 5) and also Table 24 ‘Minimum information requirements for the Biodiversity Development Assessment Report and the Biodiversity Certification Assessment Report – Stage 1: Biodiversity assessment’ (page 116) of the BAM 2020.

Recommendation 14

The BDAR should be amended to provide more information on the location of temporary or ancillary construction facilities that will require additional clearing, and to show these locations on one or more maps.

15. A map of areas likely to be affected by indirect impacts is required

A map showing the location of indirect impacts from the project is required. Table A-1 ‘Assessment of compliance with BDAR minimum information requirements’ of the BDAR states, on page A-15, that maps of indirect impact zones for the project are not applicable for this project. However, indirect impacts for the project have been identified in Section 6.2 ’Indirect impacts’ and described in Table 6.4 ‘Assessment of indirect impacts’. A map showing the location of areas of indirect impacts; specifically:

- where drawdown impacts to groundwater-dependent ecosystems are located
- where rubbish dumping on the aligned Lemington Road is a threat to any threatened species of communities
- edge effects that may impact threatened species or communities outside of the development footprint
- fugitive light, noise and dust impacts to native plant communities and threatened species.

A map, or maps, would meet the requirements of Table 25 ‘Minimum information requirements for the BDAR or BCAR – Stage 2: Impact assessment (biodiversity values)’ (page 124) of the BAM 2020.

Recommendation 15

The BDAR should be amended to include a map, or maps of likely indirect impacts from the project in order to meet requirements of the BAM 2020.

16. Provide the assumptions and limitations to the assessment of indirect impacts

Section 6.2 'Indirect impacts' of the BDAR does not identify or describe the limitations and assumptions of the assessment of indirect impacts for the project. This is required to meet Section 8.2.1 (c) of 'Assess indirect impacts on native vegetation, threatened ecological communities, threatened species and their habitat' for the BAM 2020.

Recommendation 16

The BDAR should include a discussion on the limitations and assumptions in the assessment of indirect impacts of the project to meet the requirements of the BAM 2020.

17. Further information is required to meet the requirements of the BAM 2020

The BDAR does not include all of the information required by BAM 2020, including:

- The BAM 2020 assesses the biodiversity values of the 'subject land', however the BDAR does not define the 'subject land' for this project.
- Figures 2.1 'Site Map', 2.2A 'Location Map – HVO North' and 2.2B 'Location map - HVO South' do not show dams and mine sites on a Map as required under Section 3.1.3 'Identify landscape features' of the BAM 2020
- Maps of Native Vegetation Extent are not presented at < 1:10,000 scale, as required by Section 4.1 'Map of native vegetation extent on the subject land' of the BAM 2020 (The maps of native vegetation extent in APPENDIX C are presented at a scale of 1:28,000)
- Threatened Ecological Communities that are dependent on or use habitat features associated with prescribed impacts are not listed, as required under Section 6.1 of the BAM 2020.

Recommendation 17

BCD recommends that additional information is provided to meet the requirements of the BAM 2020 as outlined in this letter of advice.

Flooding and flood risk

18. The proponent has not demonstrated that there will be no adverse flood impacts on the township of Singleton

The Water Assessment, prepared by Engeny Water Management 2022 (Appendix K of the Environmental Impact Statement) has not assessed flood impacts to the township of Singleton. This was justified by:

- The town is well downstream of the Project site and area of interest.
- The model intentionally lacks resolution in town as it is well beyond the expected area of interest.
- Avoidance of duplication with previous and ongoing Singleton Council flood study models.

- Comparison to the Council study (WMB, 2007) indicates the Project flood extents in town are more extensive.
- Model results in Singleton were found to be sensitive to the downstream boundary, which could result in changes to flood characteristics that would be purely a result of model anomalies rather than real impacts.

The township of Singleton is highly vulnerable to flooding. Residential properties in Dunolly and Glenridding are inundated in a 10% Annual Exceedance Probability (AEP) flood event. And a number of low-lying properties in Singleton begin to be inundated in a 5% AEP flood event. Consequently, the proponent must demonstrate that there will be no impacts to these residential areas.

BCD does not accept the proponent's justification for not assessing the impacts to the Singleton township as:

- The Singleton township is a key area of interest.
- Avoidance of duplication of flood levels cannot be used as a justification for not assessing flood impacts to residential properties.
- Flood levels that are sensitive to adopted downstream boundary conditions are a strong indicator of underlying issues in the hydraulic model, such as not extending the model far enough downstream, or modelling instabilities. Further, BCD notes that sensitivity testing for the both the BMT 2022 and WBM 2007 flood studies found that the downstream boundary water surface slope had negligible impact on predicted flood levels.

Using a model that makes conservative estimates of flood levels, does not indicate that predicted flood impacts will be conservative.

Recommendation 18

BCD recommends that the proponents flood model is peer reviewed to identify the cause of boundary condition instabilities and assess the model's suitability for assessing flood impacts. Or alternatively, the proponent seeks Singleton Council's permission to use the TULFOW model developed for the 2022 Singleton Flood Study.

19. Flood impacts less than 20 mm have not been assessed

The proponents flood impact assessment mapping does not show impacts less than 20mm. This effectively ignores any afflux less than 20 mm. However, this criterion is not consistent with other similar major projects where the maximum afflux of above-floor inundation was 10 mm.

To allow the flood impacts to be assessed, the proponent must provide mapping that shows flood impacts down to 10 mm. Where the proponent considers that achieving a maximum afflux of 10 mm is not possible or practical then justification should be provided to ensure the impacts are well understood and appropriately justified. Any justification would need to:

- Identify all residential properties that transition from not flooded to flooded in a 1% AEP event.
- Identify any sensitive receivers. These are land uses that:
  - Require ongoing functionality during and after a flood event such as hospitals and emergency services facilities.
  - Require high levels of assistance with evacuation, such as seniors housing, group homes, boarding houses, hostels, caravan parks, educational establishments, centre-based childcare facilities and hospitals

    - Store hazardous materials that pose environmental and health risks if exposed to flood waters.
- Identify impacts on the flood protection provided by key infrastructure, including levees and the role they play in flood protection for the community, such as the Singleton levee.
- Impacts on the frequency of flooding in smaller events that the 1% AEP event
- Demonstrate that there are no practical alternative design measures that could further mitigate impacts for that location.
- Demonstrate that the proposed afflux is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.
- Impacts on the frequency, depth and timing of inundation of local evacuation routes and associated impacts on existing emergency management arrangements.

Recommendation 19

BCD recommends that the proponent provides mapping that shows flood impacts down to 10 mm and clearly identifies all private land and residential dwellings where flood impacts are predicted to occur.

20. The flood impact mapping does not show private properties where impacts are predicted to occur

The proponents flood impact assessment mapping does not show private properties where impacts are predicted to occur.

Recommendation 20

BCD recommends that the proponent provides mapping that clearly identifies all private land and residential dwellings where flood impacts are predicted to occur.

21. Changes in the frequency and duration of flooding has not been assessed

The flood impact mapping only considers changes to flood depths and velocities. However, understanding and managing changes in flood behaviour resulting from major projects requires consideration of a broad range of aspects to understand the potential impacts on the community and identify how these impacts could be addressed. This goes beyond considering afflux in a design event, such as the 1% AEP flood. It should also consider changes in the frequency and duration of flooding as key indicators of adverse flood impacts on the community.

Recommendation 21

BCD recommends that the proponent assesses the change to the frequency and duration of flooding on all impacted private property.

22. Insufficient information has been provided to determine the extent of flooding impacts on private property

The flood assessment, prepared by Engeny Water Management 2022, identifies that 31 properties, not owned by JV partners, will have adverse flood affluxes in the range of 20-50mm. However, the affected properties are not identified on the flood impact mapping provided. Consequently, it is difficult for landholders to understand the impacts to their dwellings and property.

Recommendation 22

BCD recommends that the proponent provides mapping, at a suitable scale, such that all impacted private landholders can clearly understand the predicted change in flood behaviour on their land. This mapping should include property boundaries and residential dwellings.

23. Appropriate conditions of consent are required to ensure that adversely impacted landowners are equitably compensated

Where material impacts to private land or residential dwellings cannot be mitigated, then the proponent should consult with the affected landholders on appropriate compensation.

Recommendation 23

BCD recommends that conditions of consent are required to ensure that flood impacted landowners are equitably compensated.