

Advice to decision maker on coal mining project

IESC 2025-155: Bloomfield Colliery Continuation Project Modification 5 (EPBC 2024/09978) – Expansion

Requesting agency	The Australian Government Department of Climate Change, Energy, the Environment and Water
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Advice stage	Assessment

The Independent Expert Scientific Committee on Unconventional Gas Development and Large Coal Mining Development (the IESC) provides independent, expert, scientific advice to the Australian and state government regulators on the potential impacts of unconventional gas and large coal mining proposals on water resources. The advice is designed to ensure that decisions by regulators on unconventional gas or large coal mining developments are informed by the best available science.

The IESC was requested by the Australian Government Department of Climate Change, Energy, the Environment and Water to provide advice on the Bloomfield Collieries Pty Ltd's Bloomfield Colliery Continuation Project Modification 5 in New South Wales. This document provides the IESC's advice in response to the requesting agency's questions. These questions are directed at matters specific to the project to be considered during the requesting agency's assessment process. This advice draws upon the available assessment documentation, data and methodologies, together with the expert deliberations of the IESC, and is assessed against the IESC Information Guidelines (IESC 2024).

Summary

The Bloomfield Colliery Continuation Project Modification 5 (the 'project') is an open-cut coal mine extension located southeast of Maitland and approximately 20 kilometres (km) northwest of Newcastle in the Hunter Valley region, New South Wales (NSW). The proposed modification will include extending mining of the Creek Cut and Workshop Cut over 39 hectares (ha), extracting an additional 5.8 million tonnes (Mt) of Run-of-Mine (ROM) thermal coal (GHD 2025a, p. i). The mine life will be extended from 2030 to 2035 (GHD 2025a, p. 1). The project will continue to use existing infrastructure, including the water management system, tailings storage in U-Cut and S-Cut South voids, and the Coal Handling and

Processing Plant (CHPP) (GHD 2025a, p. 15). It will also continue to discharge water within the limits of Environmental Protection Licence (EPL) 396 (GHD 2025b, p. 68).

The project area is adjacent to two third-order streams within the lower Hunter River catchment: Buttai Creek and Four Mile Creek (GHD 2025a, p. 58). Elwells Creek is a tributary of Four Mile Creek within the project area which may be impacted by both the Workshop Cut and Creek Cut mining. A 775-m diversion of the creek is proposed to allow mining of the Workshop Cut (GHD 2025a, p. 66), and the Creek Cut appears to remove an unspecified portion of its uppermost head waters (Figure 6.1, GHD 2025b, p. 42).

The riparian zone along Elwells Creek and surrounding vegetation include habitat for several species listed by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), including koala (*Phascolarctos cinereus*), swift parrot (*Lathamus discolor*) and large-eared pied bat (*Chalinolobus dwyeri*), which likely use the vegetation for foraging and possibly breeding (EcoResolve 2025, pp. 16 – 17). Due to current and historical mining operations, the proponent claims that it is unlikely that terrestrial groundwater-dependent ecosystems (GDEs) in and near the project area are currently supported by groundwater (GHD 2025c, p. 47).

Key potential impacts from this project are:

- clearing of 51.69 ha of native vegetation within the proposed project area, including riparian zones and potential terrestrial GDEs, some of which may be used by EPBC Act-listed species;
- changes to flow regimes and water quality from controlled and uncontrolled discharges to the receiving environment; and
- loss of riparian and instream habitat, and potential increased erosion and sedimentation, from diverting Elwells Creek.

The IESC has identified areas in which additional work is required to address potential impacts, as detailed in this advice. These include:

- Further characterisation of the existing surface water environment, including instream habitats, water quality and ecologically important components of the flow regime of Four Mile and Elwells creeks. This will inform impact assessment of increased discharges to Four Mile Creek and guide appropriate design and operation of the proposed diversion and reinstatement of Elwells Creek.
- Surface water monitoring of Dissolved Organic Carbon (DOC), nutrients and metals/metalloids to inform impact assessment and mitigation measures.
- An updated water balance that includes quantification of increased discharge volumes due to the project, as well as an impact assessment of increased discharges in relation to flow regimes and ecologically important flow components.
- Detailed discussion about proposed mitigation measures for erosion and sedimentation arising from the stream diversion and altered flooding depths and velocities.
- Mapping of potential alluvial extent and shallow groundwater, especially along Elwells Creek, followed by field surveys of any potential GDEs.
- Field collection of baseline data on aquatic biota and instream and riparian habitats along Elwells Creek as well as from Four Mile Creek downstream of its confluence with this tributary.
- A post-audit of the groundwater model, using recent groundwater monitoring data to determine if the model's predictions remain valid or if a model update is required.

- An impact assessment based on the updated conceptualisation of the amended final landform that will address potential changes to groundwater and surface water quality.
- Once further site-specific data have been collected, an impact pathway diagram should be developed to refine the understanding of how and where the project may impact water resources. This will inform further proposed monitoring programs and support development of management plans.
- A thorough assessment of cumulative impacts on water resources from the proposed project with current mining at Bloomfield Colliery and surrounding historical and current operations.

Context

The Bloomfield Colliery Continuation Project Modification 5 ('the project') is an extension of existing open-cut coal operations at Bloomfield Colliery, 20 km northwest of Newcastle, NSW (GHD 2025a, p. i). The project includes extending mining north into the Creek Cut and Workshop Cut areas within Mine Lease 1738 and extending the life of the mine to 2035. The project proposes to extract 5.8 Mt ROM thermal coal over the life of mine, at 0.9 Mt/year (GHD 2025a, p. i). Existing infrastructure will continue to be used, including the CHPP, train load-out facility, rail loop, water management infrastructure and the tailings storage facilities at U-Cut and S-Cut South voids (GHD 2025a, p. i). The proposal also includes changes to the approved final landform design, including a new location of the final void, decreased surface area and volume of the void, reduced slope angles of the rehabilitated landform to improve post-mining land use, and removal of shallow underground workings (GHD 2025a, p. 21).

The project is adjacent to two third-order streams within the lower Hunter River catchment: Buttai Creek to the west of the project area and Four Mile Creek to the east (GHD 2025a, p. 58). Elwells Creek and Whites Creek are two minor tributaries of Four Mile Creek that flow northeast through the project area. These watercourses are part of the clean water system that is kept separate from the mine water system. A temporary diversion of Elwells Creek is proposed to allow for mining at the Workshop Cut for less than a year (GHD 2025b, p. 53), after which Elwells Creek will be reinstated in approximately the same location (GHD 2025b, p. 54).

The mine water system includes two main storages: Lake Kennerson and Lake Foster (GHD 2025b, p. 41). Mine water from the open-cut pits and runoff from operational and disturbed areas are directed or transferred into Lake Kennerson. Water is treated via settlement (GHD 2025a, p. 60) before it can be discharged via an open drain to the licenced discharge point EPA ID1 on Four Mile Creek (GHD 2022a, p. 3). Controlled discharges occur from EPA ID1 under specific conditions, including a volume limit of 40 ML/day after rainfall and water quality limits for conductivity, pH, total suspended solids and filterable iron, as specified in EPL 396. No changes to the EPL are proposed by the proponent as part of this project (GHD 2025b, p. 68).

The project area is within the Four Mile Creek Formation of the Tomago Coal Measures. Mining will target the seams of the Tomago Coal Measures down to the Big Ben seam (GHD 2025c, p. 20). Quaternary alluvial deposits are present along Buttai and Four Mile creeks, with small areas of the Mining Lease in the east and west intersecting this alluvium (GHD 2025c, p. 20). Groundwater occurs within the fractured rock of the Four Mile Creek Formation, likely within the cleats and fractures of the coal seams. This source is generally low-yielding and brackish to saline. Groundwater yields in the alluvium are also low, due to a predominance of clay (GHD 2025c, p. 21). Based on current groundwater elevations, groundwater interception from mining at the Creek Cut as part of this project is expected to be minimal or none (GHD 2025c, p. 45).

The total disturbance area of the project is 58.86 ha (EcoResolve 2025, p. 4), of which 51.69 ha comprises native vegetation to be cleared (EcoResolve 2025, p. 6). This native vegetation is

commensurate with Lower Hunter Spotted Gum – Ironbark Forest in the Sydney Basin Bioregion Endangered Ecological Community listed under the *Biodiversity Conservation Act 2016* (GHD 2025a, p. 81). This vegetation includes foraging and possibly breeding habitat for various EPBC Act-listed species, including koala (*Phascolarctos cinereus*), swift parrot (*Lathamus discolor*) and large-eared pied bat (*Chalinolobus dwyeri*) (EcoResolve 2025, pp. 16 – 17). The riparian and surrounding vegetation have also been identified on the NSW *Probable Vegetation Groundwater Dependent Ecosystem – Hunter/Central Rivers* dataset as being potential GDEs (GHD 2025c, p. 24).

A long history of open-cut and underground mining has occurred in and around the project leaving some areas highly disturbed (GHD 2025a, p 11). The most recent surrounding mines are currently in care and maintenance (GHD 2025a, p. 11). Extensive drawdown of the fractured rock aquifer has occurred (GHD 2025c, p. 39), and the catchments of Buttai and Four Mile creeks have already been modified by previous operations.

Response to questions

The IESC's advice in response to the requesting agency's specific questions is provided below.

Surface Water

Question 1: Are conclusions reached in relation to the impacts of the proposed action on surface water resources, supported by the evidence having regard to:

- i. available monitoring data (locations, length of record, sampling frequency, representativeness of record) for defining baseline, current impact and proposed impact scenarios
- ii. conceptualisation of surface water system, including interactions with groundwater, modelling assumptions and uncertainty analysis
- iii. adequacy of existing water management infrastructure and processes to manage the surface water impacts of the proposed action?

If not, what additional information is required to enable a full assessment of the potential impacts to surface water resources?

1. The conclusions reached in relation to potential impacts of the project to surface water resources are presented with limited quantitative assessment and justification and are not supported by adequate evidence. The proponent has relied heavily on previous assessment documents related to current operations which do not include the proposed project. Although catchment and water quality information is presented, there is limited conceptualisation of flow regimes, discharge volumes, flooding, and interactions with groundwater and ecological receptors. No modelling or uncertainty analysis has been undertaken.
2. An increase in catchment area reporting to the mine water system will result in an increase in controlled discharges from the licenced discharge point EPA ID1 (GHD 2025b, p. 61) into Four Mile Creek. The proponent has not presented predicted increases in the volume and/or number of discharges that may occur as a result of the project. The proponent states that they will continue to discharge within water quality and daily volume limits as per the current EPL 396 (GHD 2025b, p. 61), and does not consider potential impacts from further increases. The EPL does not include limits for nutrients, major ions or metals/metalloids.
 - a) Site-specific baseline water quality data, based on long-term monitoring data, are presented as minimum, median and 90th percentile values for physicochemical parameters, major ions and iron. These data represent a current baseline but not a pre-mining baseline, which limits their

applicability for distinguishing baseline, current impact and proposed impact scenarios. The proponent should also provide information about how water quality may change over time, to understand baseline conditions and inform assessment of impacts from discharges of differing water quality.

- b) The EPL has a limit of 1 mg/L for dissolved iron (GHD 2025b, Figure 5.9, p. 36), and therefore dissolved iron has been monitored in on-site storages, discharges and the receiving environment (GHD 2025b, Table 5.3, pp. 30 – 33). Despite on-site soil contamination (Paragraph 4), no other metals/metalloids, nutrients or other contaminants have been monitored. In line with industry best practice, the proponent should monitor the full suite of metals/metalloids, as well as nutrients and DOC, at the same locations and frequency as major ions (i.e. every 6 months) to assess the potential movement of contaminants from the mine water system into the receiving environment.
 - c) Site-specific trigger values are presented for Elwells and Buttai creeks for a limited number of parameters, and no trigger values have been defined for Four Mile Creek, as the proponent relies on the conditions of the EPL (GHD 2025b, p. 29). As a result, trigger values are only defined for pH, electrical conductivity (EC), total suspended solids (TSS) and filterable iron. The proponent should compare monitoring data of metals/metalloids (as outlined in 2b) to ANZG (2018) guidelines.
 - d) No flow monitoring data are presented to understand the baseline and current flow regime of Four Mile Creek. Information is required about the current flow regime and seasonality of flows to assess how changes to ecologically important flow components due to discharges may impact the creek's water quality and the biota of the aquatic and riparian zones.
 - e) The current site water balance (AECOM 2021) has not been updated to include changes resulting from the proposed project. The proponent states that the water management system can manage increased volumes due to the project, but this also includes increased controlled discharges (GHD 2025b, p. 61). Additionally, water balance modelling for current operations underestimates predicted discharge volumes compared to measured volumes (AECOM 2021, Appendix B, Table 10, p. 17). The proponent should quantify the proposed changes to discharges in relation to the capacity of the mine water management system so that potential impacts to the receiving environment can be mitigated and managed. Calibration of the model to measured discharges is required.
3. There is potential for uncontrolled discharges from the mine water system (including Lake Foster and other storage dams) into the receiving environment. The proponent states that the mine water system has overflowed in the past from pipeline rupture and during wet weather events (AECOM 2018, p. 32). The proponent should provide further information regarding the capacity of the mine water system to manage large rainfall events, especially as extreme rainfall events are expected to become more frequent due to climate change (AdaptNSW, <https://www.climatechange.environment.nsw.gov.au/impacts-climate-change/weather-and-oceans/storms-and-floods>).
4. Contaminated soils that have ecological exceedances of arsenic, copper, nickel and zinc are present across the Bloomfield site (GHD 2022a, p. 36). There is potential for surface water contamination from runoff from disturbed areas, including disturbed runoff during construction of the Workshop Cut pit and diversion of Elwells Creek. The proponent presents high-level measures, including possible disposal off-site to manage contaminated soils before operations begin (GHD 2025a, p. 21) but further details are needed.
- a) The proponent states that surface water contamination is unlikely, as any runoff from site is controlled through the mine water system and off-site discharges are monitored (GHD 2022a, Table 11.1, p. 35). However, metals/metalloids and other contaminants are not being monitored.

These should be monitored in all storages, releases and surface water monitoring stations (Paragraph 2b).

- b) Long-term mining and contamination on the site may have resulted in movement of metals and other contaminants into the surface water system, leading to accumulation in creek sediments over time. Sediment quality monitoring should be undertaken in Four Mile and Elwells creeks to establish a baseline before operations begin.
5. It is unclear if mining of the Creek Cut area and the new location of the final void will reduce the catchment of Elwells Creek. Maps of the creek lines show Elwells Creek begins in the northwest corner of the project area (e.g. GHD 2025a, Figure 7.2, p. 59; GHD 2025b, Figure 6.1, p. 42). The temporary reduction in Elwells Creek catchment due to mining of the Workshop Cut is discussed (GHD 2025b, p. 53) but not the reduction due to the Creek Cut. Clarification is needed about the extent of the catchment area of Elwells Creek, and whether the project and final landform will permanently reduce the catchment area.
6. The project proposes to temporarily divert 775 m of the headwaters of Elwells Creek (GHD 2025a, p. 66) to allow for mining of the Workshop Cut. The proponent acknowledges that no site visit has been undertaken, and that their assessment is based on aerial imagery (GHD 2025b, p. 6). Field-collected information should be provided about the creek's geomorphology and bed structure, flow regimes and aquatic and riparian ecosystems to understand baseline conditions and to assess the potential impacts from diverting the reach for one year (GHD 2025b, p. 53). This information will also be needed to assess the success of the reinstatement of the diverted channel after mining.
- a) The diversion may alter flood depths and velocities and increase erosion and sedimentation downstream.
 - i) The proponent should undertake flood modelling to inform assessment of potential impacts and design of management measures downstream.
 - ii) Before constructing the diversion, sediment monitoring (amounts and quality) should be undertaken along Elwells Creek to establish a pre-project baseline, especially if these sediments are contaminated (Paragraph 4b). Monitoring should continue during operations to identify any changes in erosion and sedimentation due to the diversion and any alteration in sediment movement and distribution that could potentially impact instream and riparian habitats downstream (Paragraph 18c).
 - b) Riparian vegetation, present along Elwells Creek (EcoResolve 2025, p. 15), may be supported by groundwater in alluvial sediments. The diversion is likely to remove or modify alluvium along the creek but limited to no information is provided regarding the presence of alluvium and the potential for associated GDEs. Field verification of the extent of the alluvium and any vegetation it may support should be provided to document baseline conditions and assess potential impacts from the creek diversion (see Paragraph 19).
 - c) The proponent plans to reinstate Elwells Creek over backfilled material to its approximate original position after mining finishes (GHD 2025a, p. 20). Limited detail is provided on rehabilitation measures (GHD 2025b, p. 53). The proponent should provide further detail about how they plan to re-establish the creek system, including discussing measures that address reinstating the creek and the proposed 20 m of native riparian vegetation (GHD 2025b, p. 53) across a different substrate (waste rock) that is likely to have very different streambed characteristics and may be contaminated.
7. The proposed changes to the final landform will result in changes to surface drainage, catchment reduction and flood behaviour. The mine closure plan (GHD 2022d) should be updated to represent the amended final landform, to provide information about changed drainage lines, changes to scour

potential and how the final void will be designed to avoid overtopping. This information is needed to properly assess any long-term impacts of the final landform.

Groundwater

Question 2: Are conclusions reached in relation to the impacts of the proposed action on groundwater resources, including groundwater dependent ecosystems, the final void, privately owned bores and local watercourses, supported by the evidence having regard to:

- i. available monitoring data for defining baseline, current impact and proposed impact scenarios
- ii. conceptualisation of the groundwater systems, including inter-aquifer connectivity and interactions with the surface
- iii. modelling approach, including assumptions made and uncertainty analysis
- iv. post-mining recovery
- v. adequacy of existing water management infrastructure and processes to manage the groundwater impacts of the proposed action?

Question 3: If not, what additional information is required to enable a full assessment of the potential impacts to groundwater resources?

8. The conclusions reached in relation to potential impacts of the project to groundwater resources are presented with limited quantitative assessment and justification and are not supported by adequate evidence. The proponent has relied heavily on previous assessment documents related to current operations which do not include the proposed project.
9. The proponent's documentation is deficient in defining baselines for groundwater as it does not provide data prior to 2006. However, given the complex historical operations in the area, the IESC considers that the current impact and proposed impact scenarios are more relevant than baselines. The available monitoring data are not adequate to define current impact and proposed impact scenarios to support the proponent's conclusions. The existing monitoring program includes eight sites. Only three sites monitor the alluvium (two of which are now dry), while all sites monitor various levels of the target coal measures (and the underlying Rathluba Seam) (GHD 2025c, Table 6.1 pp. 30 – 31). At least one additional monitoring well in the Big Ben Seam should be constructed to the east of the proposed mine extension, as the coal seams have not been monitored in that area since Site 4 ceased monitoring the Rathluba Seam in 2012.
10. The conceptual modelling has only included cross sections that contain the water-bearing Big Ben Seam and lower Rathluba Seam of the Tomago Coal Measures. The proposed Creek Cut is included in cross sections but not the proposed Workshop Cut (GHD 2025c, Figures 7.1 – 7.4, pp. 41 – 44). The conceptualisation assumes the depth to groundwater but does not provide a map of depth to water that is based on observed data or groundwater model results. Although the final void will be relocated and resized as part of the project (GHD 2022c, Figure 2-8, p. 27), conceptualisation of this new void has not been updated from previous modelling. These omissions should be rectified to improve evaluation of inter-aquifer connectivity and interactions with the surface.
11. The groundwater modelling presented by the proponent is out of date, having been developed between 2008 and 2016, with an update in 2017. There is a further 8 years of monitoring data that have not been used in the conceptual or numerical model. Additionally, the documentation about the numerical model provided in HydroSimulations (2017) is incomplete, and it is not possible to fully assess the groundwater modelling assumptions from the information provided. No uncertainty

analysis is presented for the groundwater model. Potentially significant changes to the mine plan, such as the size and location of the final pit void are not included in the 2017 model.

12. These shortcomings are acknowledged in the project documentation, with arguments advanced as to why the outdated modelling is sufficient to assess impacts from the project. At a minimum, a post-audit is required to compare model predictions to observed potentiometric head, drawdown and mine inflows, and to demonstrate whether the model is adequate to assess impacts from the current project. The post-audit should document the model assumptions and results more fully than HydroSimulations (2017) and should have a review by an external expert who has not been involved in the development of the model. If the post-audit shows the model is incapable of adequately representing the 2017 to 2025 period, further conceptual and numerical model development is required. An updated numerical model should incorporate the additional 8 years of data, the proposed project, changes to the final landform and timing of mine closure, and uncertainty analysis.
13. Water management infrastructure is proposed to remain largely unchanged from the existing mine works and approvals (GHD 2025c, pp. 8 – 9). The proponent assumes that due to the size and depth of the proposed Creek Cut and Workshop Cut, inflows from the project will be less than previous years and “may be negligible or zero if there is no groundwater interception” (GHD 2025c, p. 45). The proponent needs to demonstrate that these groundwater impacts of the project will be limited or non-existent.
14. Additional information through a more comprehensive monitoring program, updated conceptual modelling and post-audit of the groundwater model or other suitable evidence of groundwater impacts are required to ascertain the impacts to groundwater resources, including implications for GDEs, the final void, privately owned bores and local watercourses.

Cumulative Impacts

Question 4: Has appropriate consideration been given to the potential cumulative impacts on surface and groundwater resources from historical, current and proposed mining operations at the site and from nearby mining activities?

Question 5: Does the assessment adequately differentiate impacts for the proposed extension to mining operations, current mining operations and historical mining activities?

15. Appropriate consideration has not been given to the potential cumulative impacts on surface and groundwater resources from historical, current and proposed operations from the proponent's operations (e.g., Bloomfield Colliery) and nearby mines (e.g., Abel Underground Mine, Donaldson Open Cut Mine and Tasman Underground Mine). A detailed assessment of the cumulative impacts (IESC 2024) should be provided to understand the cumulative changes to surface and groundwater resources.
16. The assessment does not adequately differentiate impacts from the proposed project, current operations and historical mining activities. Once the additional work outlined in responses to Questions 1 to 3, 6 and 9 has been undertaken and the potential impacts of the proposed project are adequately identified and differentiated, a thorough assessment of the cumulative impacts on surface and groundwater resources of the proposed project, current mining operations and historical mining activities should be provided.

Water-dependent ecosystems

Question 6: Have the potential impacts of the project on aquatic biota, riparian habitat and groundwater dependent ecosystems been adequately described and assessed?

17. Potential impacts of the project on aquatic biota have not been adequately described or assessed. The proponent states that aquatic ecology monitoring of Four Mile Creek will occur every 5 years and involve sampling limited water quality parameters, invertebrates and habitat health (AECOM 2021, Appendix D, Table 5, p. 12). However, limited to no baseline information and assessment were provided for the aquatic biota within the creeks in and surrounding the project area. Before the project commences, baseline data on aquatic biota and instream and riparian habitats should be collected from multiple sites along Elwells Creek as well as from Four Mile Creek downstream of its confluence with this tributary.
- a) At each site, aquatic habitat should be assessed using a standard method such as the Riparian, Channel and Environmental Inventory (Petersen 2006) or the Physical Assessment module in the Australian Rivers Assessment Protocol (AUSRIVAS, <https://ausrivas.ewater.org.au/index.php/introductionmainmenu>), paying particular attention to parameters such as geomorphology and sediment particle size that may be altered by project activities (e.g. channel diversion).
 - b) Similarly, standard methods such as the Bioassessment module in AUSRIVAS (<https://ausrivas.ewater.org.au/index.php/bio-assessment/macrobenthos>) should be used to sample aquatic invertebrates. Invertebrates should be sampled sufficiently frequently (e.g. annually) to capture natural variations in response to seasonal changes in flow and to be able to assess impacts of the channel diversion followed by recovery of aquatic biota after its reinstatement.
18. Potential impacts to instream habitat and riparian vegetation along Elwells Creek have not been adequately described in the documentation. The assessment provided is high-level with limited information about the current ecological condition. The proponent plans to clear the vegetation in the upper reaches of Elwells Creek to allow for mining of the Creek Cut Area (EcoResolve 2025, Table 18, p. 71) and the proposed stream diversion of Elwells Creek in the Workshop Area (GHD 2025a, p. 66).
- a) Information is limited about the proposed reinstatement of the channel and the timescale needed for riparian vegetation to be re-established. Further baseline information is needed on the composition, distribution and condition of current riparian vegetation along the section of Elwells Creek that is to be diverted. This information can then be used to guide channel design and riparian re-vegetation when the diverted creek is reinstated.
 - b) The potential impacts of altered flows from modified catchment area and diversion of Elwells Creek on riparian vegetation and instream habitat have not been adequately assessed. Limited information about the current flow regimes in Elwells Creek has been provided. This information, together with modelling, should be provided to identify changes in ecologically important flow components and support assessment of potential impacts to the instream habitat and riparian vegetation of Elwells Creek (Paragraph 6).
 - c) The removal of riparian vegetation and changes in flow velocities from the stream diversion could increase erosion and sedimentation downstream, potentially impacting on riparian vegetation and instream habitat along the remaining stretch of Elwells Creek and perhaps into Four Mile Creek. Limited discussion is provided on how the proponent will re-establish vegetation and ensure bank stability in the diversion and reinstatement of the creek to limit potential impacts of increased erosion and sediment movement downstream. Increased suspended sediment would potentially impact riparian vegetation and instream aquatic habitats, from light attenuation and sediment smothering of roots and benthic communities. The proponent should discuss these potential impacts in more detail and explain what remediation measures will be in place if planned controls fail and if monitoring (Paragraph 25) indicates downstream impacts of erosion and sedimentation.

19. The proponent's assessment of potential impacts to GDEs has not been adequately described in the documentation. Only desktop studies were provided, with no field surveys being conducted (GHD 2025c, Figure 5.7, p. 27). In addition, limited maps of the alluvium within the proposed project area were provided. If the recommended depth to water map (Paragraph 10) indicates shallow groundwater, then a detailed assessment should be conducted, including field surveys of GDEs and mapping of alluvium, to identify the composition, location and condition of potential GDEs in the project area.

Avoidance, Mitigation and Monitoring

Question 7: Are the proposed measures to avoid, mitigate and minimise the impacts (including cumulative impacts) to water related resources adequate?

Question 8: What, if any, additional measures are needed to avoid and minimise impacts to water resources?

20. The proponent states that the site water balance will be updated to forecast potential water take and discharge ranges if the project is approved (GHD 2025b, p. 61). The proponent should update the water balance to be able to assess the potential impacts of the predicted changes in discharge on Four Mile Creek (Paragraph 2e).
21. Surface water monitoring locations, including all on-site storages, should be monitored for an expanded range of parameters, including DOC, nutrients and metals/metalloids (Paragraphs 2b and 4a) to identify any risks of movement of potential contaminants into the surface water system during controlled and uncontrolled discharges. The concentrations of metals/metalloids should be compared to ANZG (2018) guidelines and any exceedances reported (Paragraph 2c).
22. Sediment monitoring (amounts and quality, including metals/metalloids) should be undertaken in Four Mile and Elwells creeks to establish suitable baseline datasets before operations begin (Paragraph 4b). During operations, monitoring should be undertaken to identify any changes in sediment amounts and quality in Four Mile Creek from controlled and uncontrolled discharges, and in Elwells Creek from construction of the Workshop Cut and creek diversion. Sediment quality monitoring should use the ANZG (2018) guidelines for toxicants in sediments and any exceedances should be reported.
23. The historic data used to develop trigger values for Buttai and Elwells creeks provide a pre-project baseline from which to monitor changes or impacts to water quality from the project. It is not recommended that these trigger values be updated with new monitoring data, as suggested in the Water Management Plan (AECOM 2021, p. 14), so that a pre-project baseline can be kept as a comparison.
24. The Water Management Plan, including the site Water Balance Model, Erosion and Sediment Control Plan, Surface Water Management Plan and Groundwater Management Plan, should be updated to assess the potential impacts and management measures of the current project.
25. As indicated in Paragraph 17b, the IESC considers that monitoring the aquatic ecology of Four Mile Creek every 5 years (AECOM 2021, Appendix D, Table 5, p. 12) is too infrequent. Once a reliable pre-mining baseline dataset of community composition of aquatic biota and riparian vegetation has been generated, sampling frequency will need to be adjusted to consider the likely response times of different receptors to the project, especially the diversion and reinstatement of a 775-m stretch of Elwells Creek. For example, ecological responses by aquatic invertebrates and some fishes may occur within months, and so the proponent needs to propose a more appropriate sampling frequency to detect impacts and demonstrate post-mining recovery in response to channel re-vegetation and the stabilisation of the final landform.

Other

Question 9: Does the IESC have any additional advice or comments on the Modification Report and associated documentation not already covered above in this request for advice?

26. The impact assessments in the Environmental Impact Statement (EIS) relied primarily on summaries of outdated impact assessments for previous extension projects, desktop studies, and remote data gathering approaches. Although these analyses and approaches are important components of an impact assessment, they need to be supplemented with site-specific fieldwork to enable adequate baseline characterisation and validation of modelling to ensure conclusions are evidence-based as outlined in the Information Guidelines (IESC 2024). Data collected during recent fieldwork are needed to reliably represent current conditions. The lack of current, ground-truthed, site-specific data means that the impact assessments and conclusions in the EIS are inadequately supported, hindering reliable determination of the extent and magnitude of specific and cumulative impacts of the project. Specific issues with the impact assessment and the additional information required to address these are discussed further in Questions 1 – 8.
27. The project includes extending the use of the tailings storage facility for five years. There is no discussion about potential impacts of tailings storage. Some information is presented about storage volumes in Evans and Peck (2012), which is now outdated. The proponent should include assessment of potential impacts (e.g. seepage of contaminants) from the extended use of the tailings storage facility.
28. Following collection of the data and information outlined in responses to Questions 1 – 3 and 6, an updated evidence-based ecohydrological conceptual model and associated impact pathway diagrams (described in Commonwealth of Australia 2024) should be developed for all water resources and their ecological components in the project area to ensure that all potential impact pathways are identified and assessed. This will also help guide the development of appropriate monitoring, mitigation and management actions (see responses to Questions 7 and 8).

Date of advice	23 June 2025
Source documentation provided to the IESC for the formulation of this advice	GHD 2025a. <i>Bloomfield Colliery Continuation – Modification 5, Modification Assessment</i> , prepared by GHD on behalf of Bloomfield Collieries Pty Limited, 28 March 2025.
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