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FOSTERVILLE

FGM Sustained
Operations Project

Chapter 10 Ecology

Fosterville Gold Mine Sustained Operations Project EES

July 2024

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10.0 Ecology

This chapter provides a description of the potential ecological impacts of the Fosterville Gold Mine (FGM) Sustained Operations Project (the Project). Further discussion on the methodology, existing conditions assessment, impact assessment, proposed management and mitigation measures, including offsets, can be found in **EES Technical Appendix D: Ecology existing conditions and impact assessment.**

10.1 Overview

The key objective of the Project is to continue mining operations at the Fosterville Gold Mine from previously unmined areas of MIN5404 and to provide adequate additional storage space for mine-generated waste products (e.g., tailings, waste rock, mine water) for at least another 10 years of mining.

The aboveground components of the Project have the potential to have a direct impact on ecological values due to clearance and habitat fragmentation. Indirect impacts are also possible from changes to surface water and/or groundwater systems, resulting in impacts to Groundwater Dependent Ecosystems.

FGM is located to the east of Wellsford State Forest and Mount Sugarloaf Nature Conservation Area, which represent the largest areas of native vegetation and habitat in the surrounding landscape. Wellsford State Forest and Mount Sugarloaf Nature Conservation Reserve are central to the Bendigo Box-Ironbark Region Key Biodiversity Area which is recognised as a site of international significance for the global persistence of biodiversity.

The Victorian Minister for Planning concluded that the Project has the potential to result in significant environmental effects on native vegetation and associated biodiversity values including threatened species and communities. The Project also has the potential to impact on threatened species and communities listed under Section 18 and 18A of the EPBC Act which are Matters of National Environmental Significance (MNES) including Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia and the Swift Parrot.

This EES chapter responds to the EES scoping requirements issued by the Victorian Minister for Planning.

10.2 EES evaluation objective

The Scoping Requirements for the Fosterville EES were issued by the Victorian Minister for Planning in September 2022. The scoping requirements set out the specific environmental matters to be investigated and documented in the Project's EES, which informs that scope of the EES technical studies. The scoping requirements include a set of evaluation objectives. These objectives identify the desired outcomes to be achieved in managing the potential impacts of constructing and operating the project.

The following evaluation objectives are relevant to the ecology assessment:

- **Biodiversity and ecological values:** *Avoid, and where avoidance is not possible, minimise potential adverse effects on native vegetation, species of flora and fauna (particularly listed threatened species and their habitat and listed ecological communities), as well as address offset requirements (if required) consistent with state and Commonwealth policies.*
- **Water resources and environmental values:** *Avoid and, where avoidance is not possible, minimise adverse effects on water resources and on existing and potential future environmental values and licensed uses of surface water, groundwater, and related catchment values over the short and long-term.*

10.3 Legislation, policy, guidelines, and criteria

The Project is subject to Commonwealth, Victorian and local government controls that protect biodiversity. Table 10-1 summarises the legislation, policy, and standards relevant to biodiversity values that the project must consider. Throughout the assessment process consideration has been given to the following biodiversity legislation and policies:

Table 10-1 Legislation, policies and standards relevant to the project

Legislation, policy or standard	Description
Commonwealth government	
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act is the Australian Government's key piece of environmental legislation which provides a national approach to environment and heritage protection and biodiversity conservation. The EPBC Act focuses on the protection of nine MNES which include World Heritage Properties, National Heritage Places, Ramsar wetlands, nationally listed threatened species and ecological communities and listed migratory species. Actions that are likely to have a significant impact on MNES are subject to assessment and approval under the EPBC Act. The project was referred to the Commonwealth under the EPBC Act (EPBC Act referral number 2021/9050) due to the potential for the Project to have a significant impact on threatened species and communities. In November 2021 the project was determined to be a controlled action to be assessed through the Victorian EES process in accordance with the bilateral agreement between the Australian and Victorian Governments.
Victorian government	
Flora and Fauna Guarantee Act 1988	The FFG Act was established to provide a legal framework for enabling and promoting the conservation of Victoria's native flora and fauna, and to enable management of potentially threatening processes. One of the main features of the FFG Act is the process whereby native species and communities of flora and fauna and associated threatening processes are listed in the schedules of the Act. There are 3 lists: • Threatened list which includes taxa and communities of flora and fauna that have been listed as threatened in accordance with Section 10 of the FFG Act. • Protected flora list which includes: - plant taxa listed as threatened under the FFG Act - plant taxa belonging to communities listed as threatened under the FFG Act - plant taxa which are not threatened but require protection for other reasons. • Processes list which includes processes that have been listed as potentially threatening processes in accordance with Section 10 of the FFG Act. These lists identify species and communities that require management to survive, and the processes that require management to minimise the threat to native flora and fauna species and communities within Victoria.
Wildlife Act 1975 and Wildlife Regulations 2013	The Wildlife Act forms the procedural, administrative and operational basis for the protection and conservation of native wildlife within Victoria. With the exception of pest animals declared under the *Catchment and Land Protection Act 1994* or wildlife declared to be unprotected wildlife, all fauna species native to Victoria are listed as protected under the Wildlife Act. This includes threatened and non-threatened species. Under the Wildlife Act, it is an offence to wilfully damage, disturb or destroy wildlife habitat, disturb protected wildlife or take or destroy take or destroy threatened or protected wildlife (including listed fish) without authorisation. Under the Wildlife Regulations 2013, a person does not commit an offence if they are authorised to damage, disturb or destroy wildlife habitat under any Act. This includes a permit to remove, destroy or lop native vegetation under the *Planning and Environment Act 1987*.

Legislation, policy or standard	Description
Environment Effects Act 1978	Under the EE Act, projects that could have a 'significant effect' on Victoria's environment can require an Environment Effects Statement (EES). The EES referral criteria for impacts to ecological values are listed in (DSE, 2006a). If a single mandatory referral criterion, or combination of 2 or more referral criteria are met, then the proponent is required to submit a referral to the Minister for Planning who will then determine whether an EES is required. The Project was referred to the Victorian Minister for Planning under the EE Act (EES referral number 2021-R03). In November 2021, the Minister determined that an EES was required for the Project due to the potential for a range of significant environmental effects.
Planning and Environment Act 1987	The P&E Act establishes the framework for the use, development and protection of land in Victoria. The P&E Act provides for the preparation of standard provisions for planning schemes which are administered by local government. All Victorian planning schemes contain standard provisions requiring a permit to remove, destroy or lop native vegetation (collectively referred to as 'remove native vegetation') unless an exemption to Clause 52.16 or Clause 52.17 applies. These regulations are known as the 'native vegetation removal regulations.
	Guidelines for the removal, destruction or lopping of native vegetation are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria under Clause 52.17. The Guidelines provide instructions on how an application for a permit to remove native vegetation is to be assessed under the P&E Act.
Catchment and Land Protection Act 1994	The CaLP Act establishes a framework for management and protection of catchments through the management of land and water resources. The CaLP Act is the principal legislation relating to the management of pest plants and animals in Victoria.
Local government – City of Greater Bendigo (Bendigo Planning Scheme)	
Clause 12.01 Protection of biodiversity	Clause 12.01-1S seeks to protect and enhance Victoria's biodiversity through strategies which include identifying important areas of biodiversity. Clause 12.01-1L seeks to enhance biodiversity and biolinks across Greater Bendigo. Clause 12.01-2A seeks to ensure no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation through the application of the three-step approach in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*.
Clause 52.17 Native vegetation	Clause 52.17 enacts the *Guidelines for the removal, destruction or lopping of native vegetation*.
Planning overlays	Planning overlays are part of municipal planning schemes and are applied over areas of land to control development. For the purpose of ecological assessments, consideration of planning overlays is limited to those of particular relevance to flora and fauna values, which include: • Environmental Significance Overlays (ESOs). The broad intent of an ESO is to identify areas where the development of land may be affected by environmental constraints, and to ensure that if development does happen, it is compatible with the values that are highlighted in any schedule to the identified ESO. • Vegetation Protection Overlays (VPOs). A VPO is specific to the removal of vegetation that has been deemed to be significant and protects this vegetation against inappropriate development. • Significant Landscape Overlay (SLOs). A SLO identifies significant landscapes and conserves and enhances the character of significant landscapes. A schedule to these overlays contains a statement of the significance of the environmental, vegetation or landscape value that is protected by the overlay, and the objective to be

Legislation, policy or standard	Description
	achieved. Approval is typically required to remove most vegetation within an ESO, VPO, or SLO, and the application for an approval for vegetation removal must show that the proponent has been cognisant of the intent of each overlay.
Strategic plans	The Bendigo region has several strategies for the protection of the environment under their Planning Policy Framework, including Clause 02.03-2 relating to the Campaspe River and VP02 which provides a statement of environmental significance for areas of the Project covered by it (CIL HS5, CIL HS6, Harrier Waste Rock Dump and ancillary services corridor.

10.4 Project and study area

The Project area (FGM) is located on mining licence MIN5404, about 20 km north-east of the city of Bendigo in Victoria, Australia. MIN5404 is a linear area located between the rural towns of Goornong (approximately 4 km to the north of the MIN5404 northern extent) and Axedale (approximately 1.5 km to the south of the MIN5404 boundary), refer to Figure 10-1.

Within MIN5404, the specific study area for the ecological assessment was defined by the areas for the components of the Project listed in Table 10-2 below. The area assessed is shown in Figure 10-2.

The study area includes the parts of Wellsford State Forest and Mount Sugarloaf Conservation Reserve which contain or are adjacent to Project components i.e. AR bores, southern vent shaft, brine pond and some haul roads.

The Campaspe River is not directly within the Project footprint but is discussed in the context of potential indirect impacts associated with changes in groundwater or surface water conditions.

The study area includes a 15 metre (m) buffer around the proposed Project construction footprint.

The study area is located within a historically modified environment, dominated by existing mining infrastructure in addition to land cleared for mining purposes (both current and historic), agriculture, residential purposes. Interspersed in this area are areas of revegetation and areas of remnant native vegetation and habitat for fauna species.

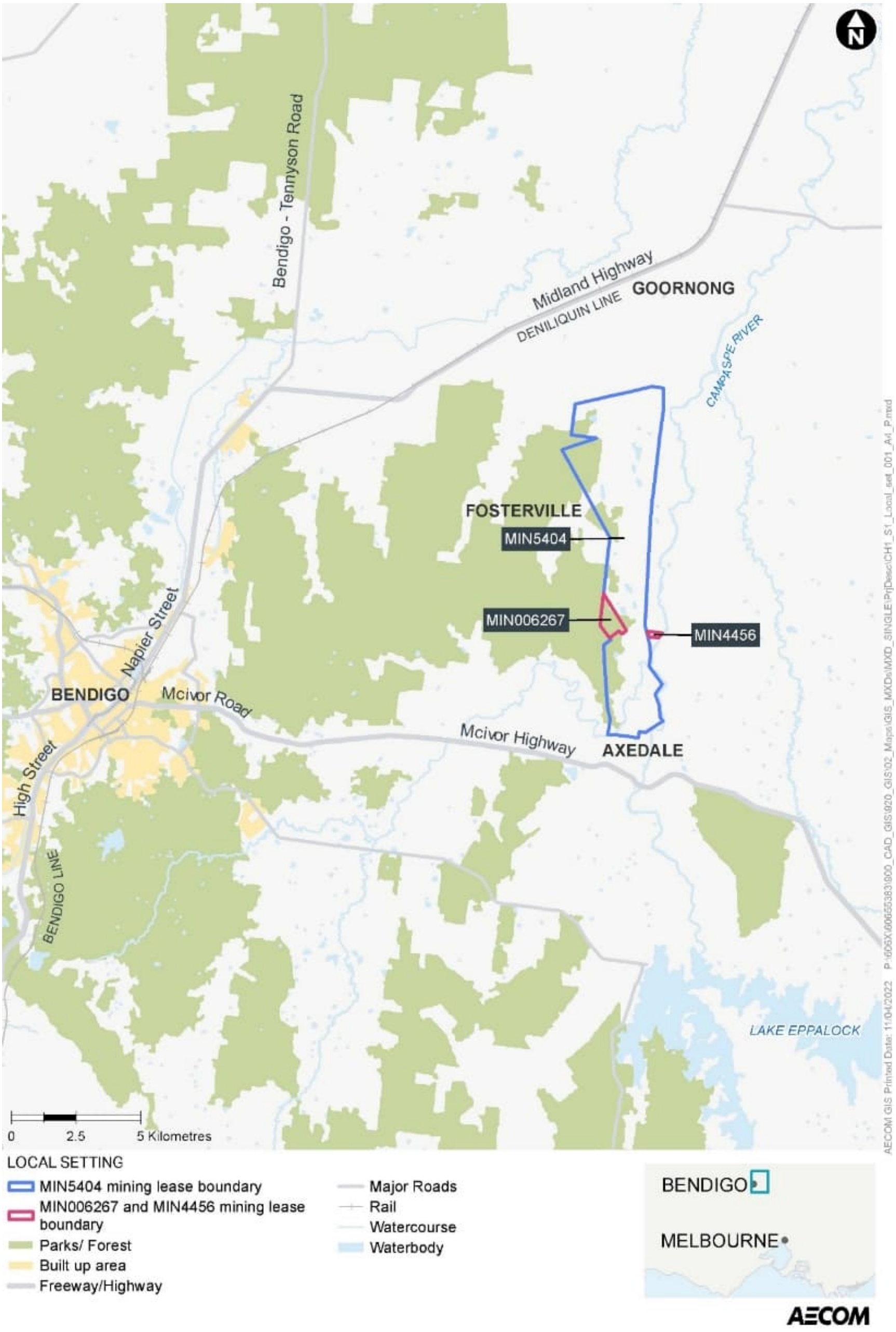

Figure 10-1 Project location

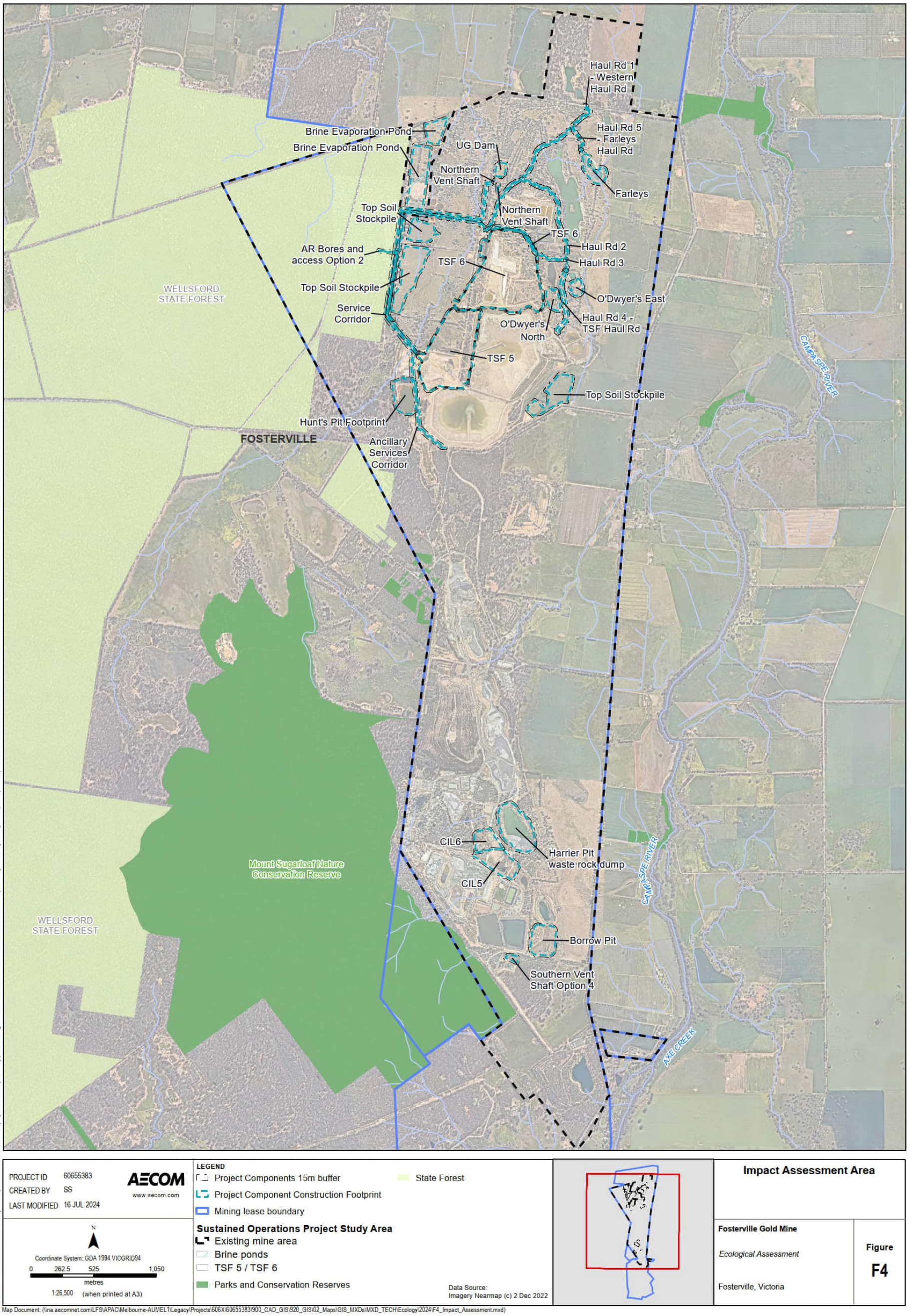

Figure 10-2 Impact assessment area

Table 10-2 Study area components of the Project

Component	Description
Key components	
Open pit cutbacks	• Cutbacks at existing open pits – Farley's Pit, O'Dwyer's North Pit and O'Dwyer's East Pit.
Harrier Waste Rock Dump (WRD)	• An above ground waste rock dump (WRD) at Harrier Pit (at the conclusion of backfilling operations of the existing open pit).
Tailings Storage Facilities – TSF5 & TSF6	• Construction and operation of new tailings storage facilities (TSFs) for flotation and neutralization tailings, including: - TSF5 and TSF6: extension to the existing TSF area in the northern part of MIN5404. - in-pit tailings storage in O'Dwyer's North Pit, O'Dwyer's East Pit and Farley's Pit, following cutback operations (see "Open pit cutbacks" above).
Carbon-in-leach (CIL) tailings hardstands - CILHS 5 and CILHS 6	• Construction and operation of additional carbon-in-leach (CIL) tailings hardstands (CIL hardstand 5 and CIL hardstand 6) as an extension of the existing CIL hardstand area south of the treatment plant.
Brine pond	• Construction and operation of a brine evaporation pond to the north-west of the TSF area.
Northern Infrastructure Precinct	• Water storages for underground mining water located in the Northern Infrastructure Precinct. • Northern vent shaft from the northern underground mine extension of Robbins Hill decline in the Northern Infrastructure Precinct.
Aquifer Recharge	• The Project considered 2 options for the AR component: - Option 1: Five new bores. Two located in cleared paddocks and three in Wellsford State Forest. A pipeline would be installed on the surface linking all five bores. The alignment will seek to use existing clearings and tracks as far as possible within Wellsford State Forest for installing the 3 bores and the pipeline. - Option 2: Three bores. Two new bores located in cleared paddocks (same as Option 1). The 3rd bore utilising an existing bore in Wellsford State Forest. The pipelines connecting to the bore in Wellsford State Forest will follow an alignment parallel with Haul Road 1 and then cross directly west across the rehabilitated Rehe's Pit to the existing bore location. This minimises the extent of native vegetation and TECs that would be impacted by this component. The area assessed was a 5 m wide corridor and 10 m diameter area around each bore location. Discussion of which option was chosen (Option 2) is described in Table 10-12.
Ancillary works	
Southern vent shaft	• A vent shaft to surface (with fans located underground) in the southern half of MIN5404 to support the existing infrastructure. • The study area for this component included an irregular buffer that covered the vent shaft options and a minimum 15 m buffer on each option area. • Initially the Project considered 3 options. A 4th option (Option 4) was ultimately chosen. Refer to Table 10-12 for further discussion.
Hunt's Pit embankment	• Construction of an embankment around Hunt's Pit to provide additional freeboard to accommodate water decanted off TSF5 and TSF6
Haul roads	• The upgrade of existing internal haul roads to replace haul road displaced by TSF5 and TSF6

Component	Description
Borrow pit	• A borrow pit to the east of the CIL storage area to provide additional material for rehabilitation
Topsoil storage areas	• Additional topsoil storage areas
Services corridor	• A combined services corridor for: - Energy supply from the Fosterville Terminal Station (FVTS) in the south-east of MIN5404 to the northern precinct - Pipelines at surface for water, air and paste reticulation.

10.5 Methodology

Details of the methodology employed for describing the existing conditions and impact assessment are provided in Section 4 of Technical Appendix D. A summary is provided here:

- Review of previous ecological assessments – Existing conditions assessments have been undertaken for the study area by Environment and Heritage Partners (EHP), AECOM (2022) and TactEcol (2022).
- Database searches:
  - EPBC Act Protected Matters Search Tool (PMST) administered by the DCCEEW to identity MNES that may occur within 10 km of the study area.
  - Victorian Biodiversity Atlas (VBA) administered by the Victorian Government Department of Energy, Environment and Climate Change Action (DEECA) for records of Victoria's threatened flora and fauna species within 10 km of the study area.
  - NatureKit and Native Vegetation Information Management (NVIM).
  - MapshareVic to identify mapped wetlands on the Current Wetlands Map. Areas of mapped wetlands are regarded as native vegetation under the Guidelines.
  - Ecological Vegetation Class (EVC) benchmarks to use in assessing native vegetation quality using the Vegetation Quality Assessment (VQA) method. (https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks).
  - VicPlan for information on planning zones and environmental overlays.
  - Environmental Systems Modelling Platform Native Vegetation Regulations Tool (EnSym) for native vegetation databases and offset requirements.
  - Illustrated Flora Information System of Victoria (IFLISV) and VicFlora (Flora of Victoria) for assistance with the distribution and identification of flora species.
  - Atlas of Living Australia (ALA) for assistance with the descriptions and distributions of threatened flora and fauna species.
  - Species Profile and Threats Database (SPRAT) administered by DCCEEW for assistance with descriptions and distributions of species listed under the EPBC Act.
  - Birdlife Australia website for detailed descriptions and distributions of birds (both native and exotic).
  - Aerial photography of the study area.
- Field assessments as per Table 9 in EES Technical Appendix D – Ecological Impact Assessment.
- Risk assessment:
  - An initial risk assessment was undertaken by AECOM and FGM in May 2021 to assess potential risks to the environment arising from the project. The results of the initial risk assessment were used as a screening tool to prioritise the key issues for assessment and inform measures to avoid and minimise potential effects (refer to EES Chapter 7: Assessment Framework for details of the initial risk assessment)

  - The Project components considered by the preliminary risk assessment were those deemed more likely to have the most potential impact: underground mining, open pit cutbacks, TSFs, CIL Hardstands, brine pond, aquifer recharge, and Harrier waste rock dump
  - A more detailed risk assessment has since been undertaken as part of the impact assessment process. The risk assessment was based on likelihood, consequence and risk ratings that Earth Resources Regulation (ERR) uses to assess the severity or harm caused by a risk event. The following criteria were extracted from Appendix A in *Preparation of Work Plans and Work Plan Variations: Guidelines for Mining Projects* (ERR 2020).
- Impact assessment considering direct[1], indirect[2] and cumulative[3] impacts of the Project on native flora and fauna, TECs, other protected species and biodiversity values including habitat fragmentation, increased mortality rate of threatened fauna, presence of declared weeds, pathogens, and pest animals. The impacts were defined for the following areas:
  - Impact area defined for each of the project components (shown Figure 10-2 and described in Table 10-2).
  - Buffer area of 15 m assigned to each impact area to account for potential indirect impacts on TPZs.
- Impacts to native vegetation:
  - were calculated using GIS tools, the Assessors Handbook (DELWP, 2018) and advice from DEECA.
- Impacts to threatened species and ecological communities were calculated:
  - by considering the conservation significance of the identified species or community as well as the likely extent and magnitude of the proposed impact.
- Impacts to groundwater dependent ecosystems were assessed with reference to the surface water and groundwater impact assessment report findings.
- The impact assessment considered whether the threatening processes are currently affecting the environment of MIN5404 and whether the Project is likely to exacerbate the processes.
- Cumulative impact assessment was conducted in conjunction with advice from DEECA and with reference to industry guidance (refer to Section 4.5 of EES Technical Appendix D for further details).
- Stakeholder engagement occurred through Open Houses and through the scoping submissions process. Where community concerns about ecological issues were identified in the scoping submissions, this information was provided to the ecological specialist.

10.6 Linkages to other EES technical studies

The ecological impact assessment relies on, or informs, the technical studies listed in Table 10-3.

Table 10-3 Summary of technical reports completed for the project.

Report title	Overview of assessment completed
Technical Appendix K: Surface water impact assessment	An assessment of the existing surface hydrology of the Fosterville Gold mine and surrounding areas including identified surface water impacts as a result of the proposed Project.
Technical Appendix F1: Groundwater existing conditions	Assessment of the existing hydrogeological conditions beneath and surrounding the Fosterville Gold Mine Sustained Operations Project.

[1] Direct (known) impacts refer to those impacts that will occur directly as a result of the project, such as clearance of trees and native vegetation, and are contained entirely within the proposed footprint of works
[2] Indirect impacts refer to those impacts that may occur adjacent to the study area. Indirect impacts may also occur outside of the project as a result of surface water and/or groundwater changes
[3] Cumulative impacts relate to the impacts of the Project when added to other existing, planned and/or reasonably anticipated future projects within a defined spatial and temporal extent.

Report title	Overview of assessment completed
Technical Appendix F2: Groundwater impact assessment	Assess the potential groundwater impacts associated with the Fosterville Gold Mine Sustained Operations Project.
Technical Appendix I: Land Use and Planning Impact Assessment	A summary of the key assets, values or uses potentially affected by the Project from a land use and planning perspective and the associated impacts.
Technical Appendix J: Noise Impact Assessment	Assessment of noise impact on humans and sensitive areas such as Wellsford State Forest and Mount Sugarloaf Range
Technical Appendix G: Ground Vibration Impact Assessment	Assessment of ground vibration impact on humans and fauna
Technical Appendix C: Air Quality/Greenhouse Gas Impact Assessment	Assessment of dust emissions which may have the potential to impact ecological receptors.

10.7 Existing conditions

Table 10-4 provides a summary of the vegetation and habitat values associated with each of the Project components.

The exploration and underground mine extension components in the northern and southern extension areas of the Project are outside the scope of the terrestrial ecology existing conditions and impact assessment as there are no ecological values associated with the underground areas.

10.7.1 Terrestrial vegetation and habitat

Vegetation within the study area is predominantly highly modified, consisting of a mosaic of remnant native vegetation patches, revegetation areas of native and non-indigenous species, planted windrows and areas of pasture. Patches of native vegetation are generally of low to moderate quality and somewhat homogenous in strata and species assemblage. Native vegetation within the study area is representative of 4 EVCs:

- Box Ironbark Forest (EVC 61)
- Plains Grassy Wetland (EVC 125)
- Low Rises Grassy Woodland (EVC 175_61)
- Tall Marsh (EVC 821)

The locations of these EVCs within the study area are shown in Figure 10-3.

The location of these EVCs in relation to specific Project components is shown in a series of Figures (Figures F6-1 to F6-25) in Appendix A of EES Technical Appendix D and are not included in this chapter.

Terrestrial fauna habitat within the study area primarily consists of woodland, scattered trees, and both native and introduced grasslands.

Woodland and scattered remnant trees support an array of hollows, bark fissures and crevices which provide an important resource for hollow-dependent fauna including possums, gliders, microbats and hollow-nesting birds such as parrots and owls. A diversity of woodland bird and bat species were observed in the patches of woodland and scattered trees and Lace Monitor was observed in the north of MIN5404.

Revegetation areas are generally of low habitat quality, as habitat features such as hollows and larger woody debris are lacking. However, these areas still have the potential to support a range of small mammals, reptiles, and woodland birds. Revegetation areas broadly represent native vegetation in the area with specie planted including Grey Box, Yellow Gum, Gold-dust Wattle and Golden Wattle.

Grassland habitat features include both exotic and native grass areas. The exotic grasses may be used as a foraging resource by common generalist bird species which are tolerant of these modified open areas. The derived native grassland areas that are suitable for an array of common native fauna, including snakes, lizards, and grassland birds.

10.7.2 Aquatic habitat

Aquatic fauna habitat comprises open-cut pits that have filled with water, farm dams, drainage channels, creeks, and ephemeral pools.

The open cut pits and artificial dams may support a range of waterbirds and frogs as well as fish and macroinvertebrates, however their modified nature and lack of obvious connections with other aquatic habitats reduces the likelihood that they support significant aquatic fauna.

Low-lying drainage lines, ephemeral depressions, and wetlands may also support a range of aquatic fauna, including the state listed Brown Toadlet, which was recorded along Gunyah Creek.

The Campaspe River is located approximately 1 – 2 km east of FGM. Murray Cod and Macquarie Perch have a moderate likelihood of occurrence in the Campaspe River.

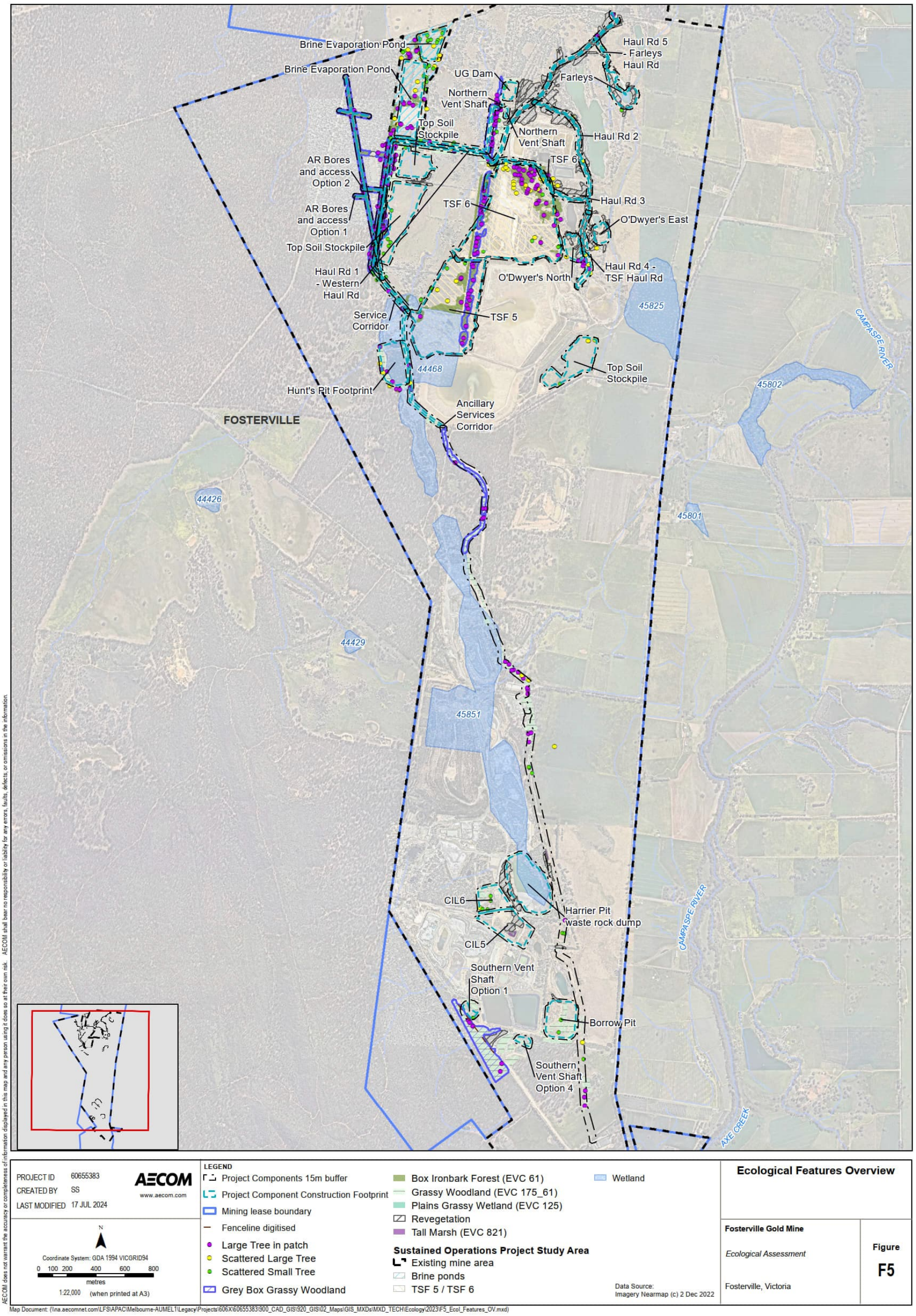

Figure 10-3 Ecological features (overview)

Table 10-4 Vegetation and habitat values associated with each Project component.

Component	Vegetation and habitat values including aquatic habitat values
Open pit cutbacks	• The open pit cutbacks will be extensions of existing open cut pits (Farleys, O'Dwyers north and O'Dwyers east) which are currently filled with water. • The pits are surrounded by a mixture of cleared land, small patches of Grassy Woodland (EVC_175_61), scattered remnant trees and areas that have been planted or revegetated. • Vegetation around the pits does not contribute to a prominent corridor but may function as a stepping stone for more mobile fauna moving through the landscape between extensive woodland of the Wellsford State Forest to the west, and the Campaspe River Streamside Reserve to the east. • Refer to Figure F6-2 in Technical Appendix D (Appendix A) for location of EVC in relation to component.
Harrier Waste Rock Dump	• This is a former pit (Harrier Pit) which is now a large, open expanse of water. • An area of planted vegetation occurs on the western bank between the pit and a haul road. The planted vegetation is not part of a clear corridor of habitat but may make some contribution to movements of more mobile species through the landscape. • Patches of remnant Grassy Woodland (EVC_175_61) are present in the north and the south of the Harrier Waste Rock Dump area. The patches in the south are part of a larger area of native vegetation that extends further south but there is limited linkage from the northern patches to surrounding areas of native vegetation. • Refer to Figure F6-4 in Technical Appendix D (Appendix A) for location of EVCs in relation to component.
TSF 5 and TSF 6	• TSF5 and TSF6 contain patches of native vegetation (EVC_61, EVC_125 and EVC_175_61) and land that has previously been cleared for agricultural use or mining infrastructure. • Land surrounding TSF5 and TSF6 has largely been cleared, although there is some limited and patchy habitat connectivity to large areas of native vegetation to the south-west, in Mount Sugarloaf Nature Conservation Reserve. • Some of the trees are likely to contain hollows and arboreal fauna habitat and several ponds are present. • Refer to Figures F6-5 and F6-6 in Technical Appendix D (Appendix A) for location of EVCs in relation to component.
CILHS 5 and CILHS 6	• The CILHS5 and CILHS6 project component is located in an area that has been previously disturbed however it contains small patches of vegetation (EVC_821), several small, scattered trees, a scattered large tree and a small artificial pond. • Habitat connectivity is low with limited fauna dispersal opportunities to the west interrupted by mining infrastructure and disjointed, patchy connectivity to the east. • Refer to Figures F6-7 and F6-8 in Technical Appendix D (Appendix A) for location of EVCs in relation to component.
Brine Pond	• The proposed brine pond area includes several patches of native vegetation, large trees (both scattered and in patches) and small scattered trees (EVC_61 and EVC_175_61). • Trees within the brine pond area are likely to contain hollows. • Land immediately to the west of the study area contains high quality habitat and provides connectivity to expansive areas of Wellsford State Forest which in turn is connected to Mount Sugarloaf Nature Conservation Reserve. • Gunyah Creek is located approximately 200 m east of the proposed brine pond. Gunyah Creek provides high quality habitat and dispersal for frogs, including Brown Toadlet. • Refer to Figure F6-22 in Technical Appendix D (Appendix A) for location of EVCs in relation to component.

Component	Vegetation and habitat values including aquatic habitat values
Northern Infrastructure Precinct (water storage and northern vent shaft)	• The Northern Infrastructure Precinct includes areas of native vegetation (EVC_175_61) and revegetation with the surrounding land modified for historic or current mining infrastructure and agriculture. • There is some connectivity with other areas of trees in MIN5404 to the north of the precinct through to the Campaspe River to the east and to Wellsford State Forest to the west. • Approximately 50 m to the west of the precinct is Gunyah Creek (described above). • Refer to Figures F6-23 and F6-24 in Technical Appendix D (Appendix A) for location of EVCs in relation to component.
Aquifer Recharge (AR) bores	• Three bores including two located within cleared paddock and one existing bore in Wellsford State Forest. • Wellsford State Forest supports high-quality remnant native vegetation dominated by a canopy of Grey Box with a modified suite of understorey species (EVC_61 and EVC_175_61). • This area provides valuable flora and fauna habitat and may contain areas of suitable habitat for threatened species or ecological communities. • As part of an extensive tract of remnant vegetation, the AR area has a high degree of connectivity. • Refer to Figures F6-9 and F6-10 in Technical Appendix D (Appendix A) for location of EVCs in relation to component.
Southern vent Shaft	• The Southern Vent Shaft (option 4) area includes moderate quality native vegetation. No large trees are located in this areas and understory values are somewhat limited with sparse understory flora over a canopy of Grey box. The trees in this area appear too young to contain hollows and there is some connectivity with other areas of trees in the mining lease. • Mount Sugarloaf Conservation Reserve occurs adjacent to the southern vent shaft component • Refer to Figure F6-12 in Technical Appendix D (Appendix A) for location of EVCs in relation to component.
Hunts Pit embankment	• The Hunts Pit embankment area includes a large dam used as current mining infrastructure. The dam is surrounded by native vegetation patches (EVC_175_61)and scattered trees on the east, south and west sides. Several trees contain hollows. • The habitat is contiguous with vegetation in the west of MIN5404 which is connected to native vegetation in Wellsford State Forest to the west. • Refer to Figures F6-13 in Technical Appendix D (Appendix A) for location of EVC in relation to component.
Topsoil stockpiles	• The topsoil stockpile areas have been historically cleared for agricultural use and contain limited ecological features; a few scattered trees remain. • Refer to Figures F6-25 in Technical Appendix D (Appendix A) for location of EVC in relation to component.
Borrow pit	• The borrow pit includes patches of native vegetation (EVC_175_61) and scattered small trees within a highly modified area. • The patches and trees are linked to a more extensive area of vegetation to the south which is connected to Mount Sugarloaf Nature Conservation Reserve. • Areas to the east of the Borrow Pit have been historically cleared for agricultural use and mine infrastructure is located directly north. • Refer to Figures F6-20 in Technical Appendix D (Appendix A) for location of EVC in relation to component.
Haul Roads 1-5	• Haul Roads 1-5 contain a variety of ecological features and varying degrees of habitat connectivity. • Overall, these linear project components include areas of native vegetation (EVC_61, EVC_175_61 and EVC_125) including large trees, scattered small trees and areas likely to contain tree hollows.

Component	Vegetation and habitat values including aquatic habitat values
	• Where haul roads crossing drainage channels and creeks, they are likely to intersect areas of suitable habitat for amphibian species. • Haul road 1 crosses Gunyah Creek which is suitable habitat for Brown Toadlet and several individuals were heard calling in this location during targeted surveys. There are 2 crossing points for Haul Road 1: - Southern crossing that is in a location not currently traversed by infrastructure. This crossing will also include the service corridor with AR pipeline. Gunyah Creek at this point is in an incised channel with earth banks. - Northern crossing that is an existing haul road and culvert. Gunyah Creek at this location is narrow, shallow channel through former paddocks with some young eucalypt cover. • The haul Road project components will have varying degrees of habitat connectivity and are generally higher in the west of the study area in proximity to the Mount Sugarloaf Conservation Reserve. • Refer to Figures F6-14 to F6-18 in Technical Appendix D (Appendix A) for location of EVC in relation to component.
Service Corridor	• The Service Corridor contains a variety of ecological features and varying degrees of habitat connectivity; connectivity in general is higher in the west and centre of the study area in proximity to the Mount Sugarloaf Conservation Reserve. • These include areas of native vegetation with large trees, scattered small trees, and areas likely to contain tree hollows (EVC_61 and EVC_175_61). • High-quality native vegetation just south of the northern mine area is consistent with the EPBC listed Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. • Native vegetation occurs in the section between the proposed western topsoil stockpile and Wellsford State Forest. • Crossings of drainage channels and creeks are likely to intersect with areas of suitable habitat for amphibian species. Brown Toadlet was recorded at the 2 crossings of Gunyah Creek and at a 3rd location to the west of the alignment south of Fosterville North Road during targeted surveys. • Refer to Figure F6-19 in Technical Appendix D (Appendix A) for location of EVC in relation to component.

Table 10-5 summarises the maximum extent of each EVC within the construction footprint of the project.

Table 10-5 Vegetation and habitat values associated with the construction footprint of the project.

EVC Name	Extent (ha)		
	Goldfields bioregion	Victorian Riverina bioregion	Total
Box Ironbark Forest (EVC 61)	12.604	0.480	13.084
Grassy Woodland (EVC 175_61)	5.349	0.827*	6.176
Plains Grassy Wetland (EVC 125)	0.061*	-	0.061
Tall Marsh (EVC 821)	0.114	-	0.114
Total	**18.128**	**1.307**	**19.435**

Table 10-6 provides a breakdown for each component by EVC.

Table 10-6 Native vegetation extent by EVC and component (total) – construction footprint (CF) and buffer area (BA) ('deemed loss').

Component	Box Ironbark Forest (EVC 61) extent (ha)			Grassy Woodland (EVC 175_61) extent (ha)			Plains Grassy Wetland (EVC 125) extent (ha)			Tall Marsh (EVC 821) extent (ha)		
	CF	BA	Total	CF	BA	Total	CF	BA	Total	CF	BA	Total
Ancillary Services Corridor	0	0	0	0.654	0.482	1.136	0	0	0	0	0	0
AR Bores and access Option 2	0.199	1.734	1.933	0.025	0.155	0.179	0	0	0	0	0	0
Borrow Pit	0	0	0	1.632	0.177	1.809	0	0	0	0	0	0.077
Brine Evaporation Pond	0.777	0.432	1.209	0.164	0.141	0.304	0	0	0	0	0	0
CIL5	0	0	0	0.013	0.009	0.022	0	0	0	0.114	0	0.877
CIL6	0	0	0	0.401	0.105	0.505	0	0	0	0	0	0.033
Farleys	0	0	0	0.014	0.097	0.111	0	0	0	0	0	1.078
Harrier Pit waste rock dump	0	0	0	0.006	0.130	0.136	0	0	0	0	0	1.002
Haul Rd 1 - Western Haul Rd	0.475	1.381	1.857	0.511	2.028	2.539	0	0	0	0	0	2.835
Haul Rd 2	0	0	0	0	0	0	0	0	0	0	0	2.167
Haul Rd 3	0.068	0.190	0.258	0	0.005	0.005	0	0	0	0	0	0.744
Haul Rd 4 - TSF Haul Rd	0	0	0	0.037	0.050	0.088	0	0	0	0	0	1.153
Haul Rd 5 - Farleys Haul Rd	0	0	0	0	0	0	0	0	0	0	0	0.281
Hunt's Pit Footprint	0	0	0	0.951	0.611	1.563	0	0	0	0	0	0
Northern Vent Shaft	0	0	0	0.009	0.180	0.189	0	0	0	0	0	0.004
O'Dwyer's East	0	0	0	0	0.020	0.020	0	0	0	0	0	0.422
O'Dwyer's North	0	0	0	0.099	0.111	0.211	0.061	0.004	0.065	0	0	0.746
Service Corridor	1.327	2.248	3.574	1.276	1.986	3.263	0	0	0	0	0	
Southern Vent Shaft Option 4	0	0	0	0.359	0.294	0.652	0	0	0	0	0	
Top Soil Stockpile	0.001	0.121	0.122	0.035	0.275	0.310	0	0	0	0	0	0.001
TSF 5	4.635	0.092	4.726	0	0.006	0.006	0	0	0	0	0	
TSF 6	5.548	0.921	6.469	0	0	0	0	0	0	0	0	0.344
UG Dam	0	0	0	0.068	0.145	0.212	0	0	0	0	0	0.028

10.7.3 Modification of environment

The long history of mining and agriculture in the Fosterville area has meant that the landscape is highly modified. Large tracts of forest and woodland persist in reserves such as Wellsford State Forest and Mount Sugarloaf Nature Conservation Reserve in the Greater Bendigo area. Outside those reserves, the landscape consists of a mosaic of patches of remnant native vegetation, scattered remnant trees, revegetated areas of indigenous and non-indigenous native species, planted windrows and areas of pasture. Firewood collection in Wellsford State Forest has also affected the habitat values of the reserve.

Weeds and pest animals already occur in the environment surrounding FGM. Rabbits, hares, and deer contribute to land degradation through grazing and creation of warrens. Red Fox are an existing predation risk for local wildlife and feral cats are also likely to occur but were not detected during targeted fauna surveys or general assessments. Honeybees colonise hollows, rendering them uninhabitable for hollow-dependent native fauna. It is unknown whether Cinnamon Fungus or Chytrid Fungus are present in or adjacent the study area.

10.7.4 Key Biodiversity Area of international significance

Part of MIN5404 is within the boundary of an area recognised as a Key Biodiversity Area of international significance by the Key Biodiversity Areas Partnership (KBAP)[4], see **Figure 10-4**.

The Bendigo Box-Ironbark Region KBA (which is also known as the Bendigo-Box Ironbark Region Important Bird Area) is centred on Wellsford State Forest and Mount Sugarloaf Nature Conservation Reserve.

The KBA is recognised as habitat for Swift Parrot, Flame Robin and Diamond Firetail. Other adjacent areas, outside of Wellsford State Forest and Mount Sugarloaf Nature Conservation Reserve are described as being less suitable for the nominated bird species.

[4] The KBAP is comprised of 13 global conservation organisations including BirdLife International (represented by BirdLife Australia in Australia) and the International Union for Conservation of Nature (IUCN). The KBA Programme aims to protect a network of sites that contribute significantly to the global persistence of biodiversity

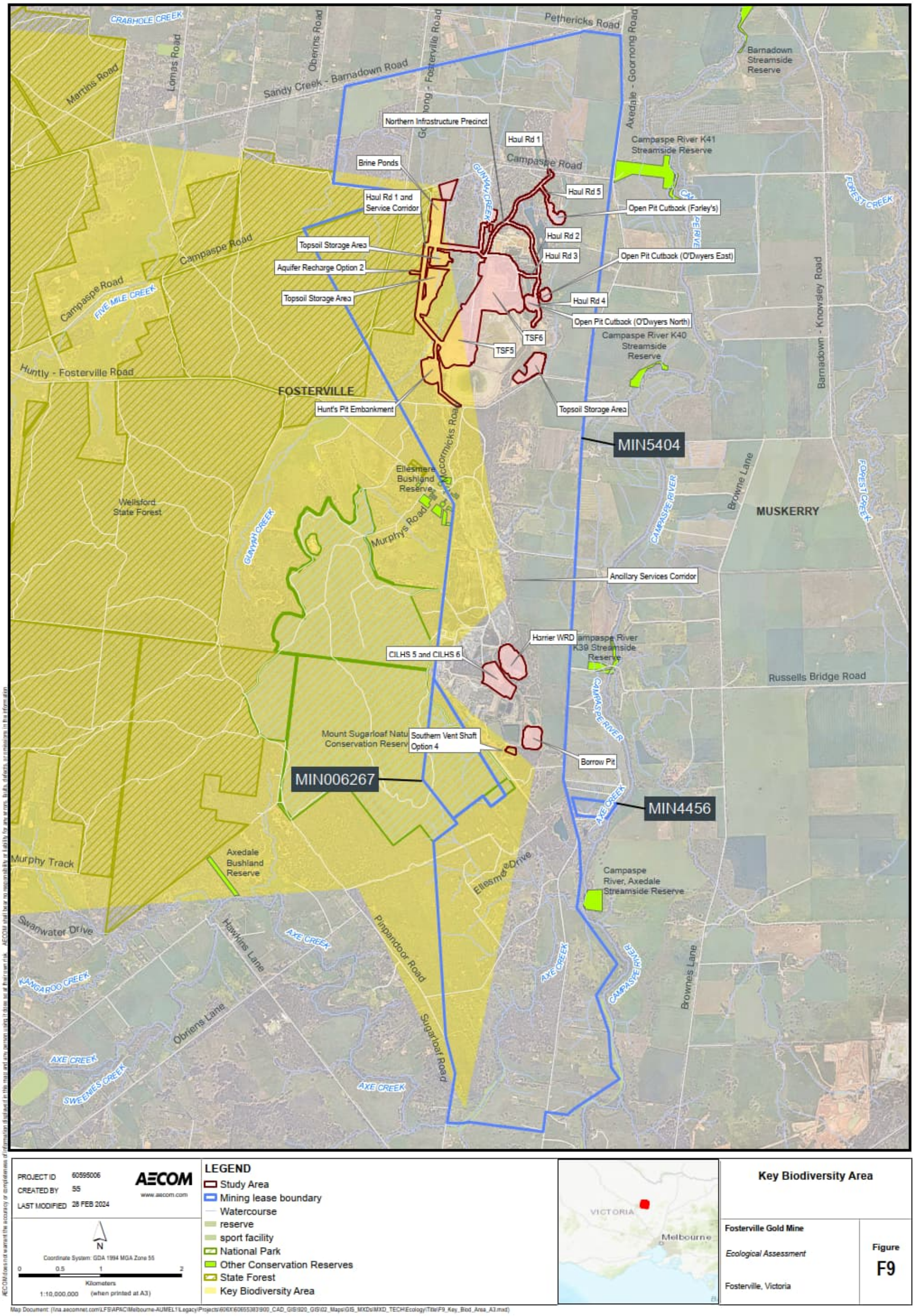

Figure 10-4 Key Biodiversity Area

10.7.5 Matters of National Environmental Significance

10.7.5.1 Threatened ecological communities (TECs)

One EPBC Act listed TEC was recorded within the study area:

- Grey Box Grassy Woodland and Derived Native Grassland of South-eastern Australia (GBGW) – listed as endangered under the EPBC Act.

GBGW community in the study area was generally represented by a mature Grey Box overstorey and a variable understorey with a variety of shrubs, grasses, and herbs, refer to Plate 10-1.

Plate 10-1 Grey Box dominated woodland in Wellsford State Forest

Patches of GBGW occur in association with the following Project components:

- Aquifer recharge area in Wellsford State Forest – the parts of the AR system which are in Wellsford State Forest are GBGW, Figure 10-5.
- TSF5 and TSF6 – GBGW occurs as a linear strip of trees along existing road on the western perimeter of proposed TSF6 and eastern perimeter of proposed TSF5, Figure 10-5.
- Ancillary Services Corridor - GBGW occurs along the northern ancillary services corridor/haul road from the south of the existing TSF4 to the middle of the site, Figure 10-5.
- Southern Vent Shaft – GBGW occurs in Option 4 area, Figure 10-5.
- Realigned section of Haul Road 1 adjacent to Wellsford State Forest, and the parallel services corridor and western topsoil stockpile area – GBGW occurs along the Haul Road and in a small portion of the total proposed western topsoil footprint, Figure 10-5.
- Haul Road 1 and parallel services corridor west of McCormicks Road and just south of the proposed northern vent shaft project component – this is a continuation of the GBGW which occurs along the existing road on the western perimeter of proposed TSF6 and eastern perimeter of proposed TSF5. There is very little overlap between the footprint of the northern vent shaft and the extent of the GBGW.

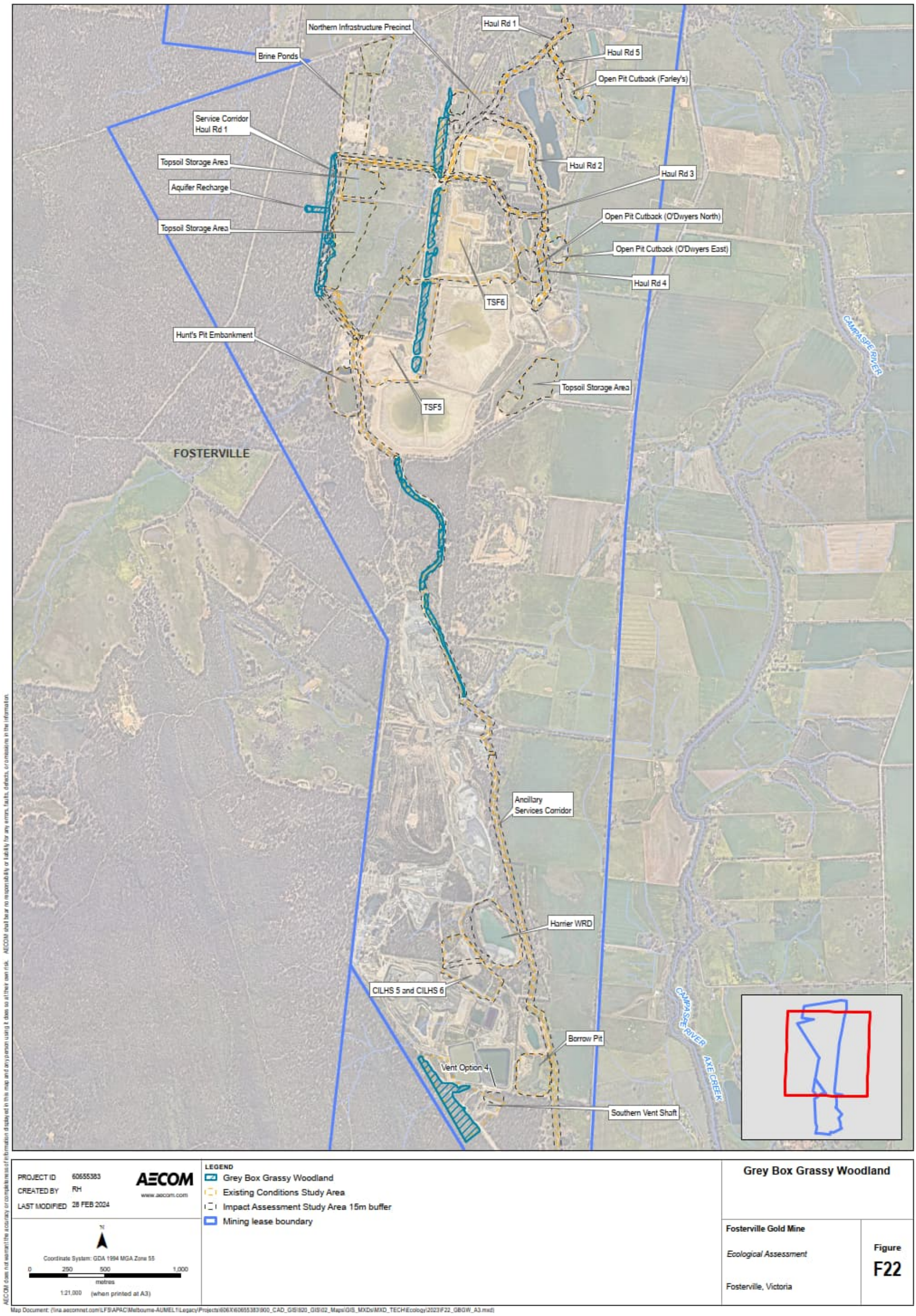

Figure 10-5 Location of patches of Grey Box Grassy Woodland

10.7.5.2 Threatened flora species

Several flora species listed under the EPBC Act were identified to have a moderate or high likelihood of occurrence and suitable habitat within the study area (refer to Appendix C in Technical Appendix D for further details).

High

Four flora species were determined to have the 'highest' likelihood of occurring:

- McIvor Spider-orchid (*Caladenia audasii*)
- Clover Glycine (*Glycine latrobeana*)
- Erect Peppercress (*Lepidium pseudopapillosum*)
- Whipstick Westringia (*Westringia crassifolia*)

Moderate

Three flora species had a moderate likelihood of occurrence:

- Trailing Hop-bush (*Dodonaea procumbens*)
- Spiny Rice-flower (*Pimelea spinescens* subsp. *spinescens*)
- Sturdy Leek-orchid (*Prasophyllum validum*)

The likelihood of Whipstick Westringia (*Westringia crassifolia*) occurring varied between reference reports. For the purposes of the EES, it has been considered to have a high likelihood of occurrence and thus included in the targeted survey (see below) based on a conservative approach to ensure all potential species are evaluated.

AECOM undertook targeted survey for threatened flora species in October, November and December 2022. Targeted survey in areas of potential habitat did not detect the species despite survey being undertaken during the flowering season of the species. The likelihood of the species occurring in the study area is low based not only on the species not being detected but also due to the degree of modification that has occurred in the environment historically and the degraded condition of the understorey in the areas of native vegetation that do persist.

Figures showing the location of the suitable habitat for these species are provided in Appendix A of Technical Appendix D: Ecology existing conditions and impact assessment (Figures F10, F11, F12, F13, F14 and F15).

10.7.5.3 Threatened fauna species

A number of fauna species listed under the EPBC Act were identified to have a moderate or high likelihood of occurrence and suitable habitat within the study area (refer to Appendix C in Technical Appendix D for further details). A summary of the potential for occurrence of these species is provided in Table 10-7.

High

Six fauna species determined to have the 'highest' likelihood of occurring were:

- Pink Tailed Worm Lizard (*Aprasia parapulchella*)
- Swift Parrot (*Lathamus discolor*)
- Painted Honeyeater (*Grantiella picta*)
- White-Throated Needletail (*Hirundapus caudacutus*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*)
- Growling Grass Frog. (*Litoria raniformis*)

Moderate

Three fauna species determined to have a moderate likelihood of occurring in the study area:

- Murray Cod (*Maccullochella peelii*) and Macquarie Perch (*Macquaria australasica*) in association with the Campaspe River and not the Project area.
- Regent Honeyeater (*Anthochaera phygia*)

Low

Superb Parrot is considered to have a low likelihood of occurrence and is not included in this assessment.

Excluded

Diamond Firetail (*Stagonopleura guttata*), Southern Whiteface (*Aphelocephala leucopsis*), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) and Hooded Robin (south-eastern) (*Melandodryas cucullate* cucullate) are not included in this assessment. This is because the listing of the species under the EPBC Act occurred on 31 March 2023 after the controlled action decision on 3 November 2021 which means that those species are disregarded from consideration under the EPBC Act in accordance with Section 158A(4).

Diamond Firetail and Hooded Robin are listed as threatened under the Victorian State FFG Act and are therefore considered under Section 10.7.6.7 of this chapter.

Table 10-7 Commonwealth (EPBC Act listed) threatened fauna species and their occurrence in the study area

Threatened fauna species	Likelihood of occurrence on site
Pink-tailed Worm-lizard	• Subject of a targeted habitat assessment in 2022: - Unlikely to occur in most of the Project components due to the degree of modification and lack of connectivity with larger tracts of remnant vegetation. - Southern vent shaft Option 4 construction footprint avoids areas of habitat. - Moderate likelihood of occurrence in the AR component (Wellsford State Forest) Refer to Figures 16, 17 and 23 in Appendix A in EES Technical Appendix D for location of suitable PTWL habitat at the proposed vent shaft area and in the area surrounding FGM.
Swift Parrot	• The study area and surrounds support moderate to good quality foraging habitat. • Not observed during other surveys conducted at FGM – targeted surveys have not been conducted due to the wide roaming nature of the Swift Parrot and unpredictability of occurrence on any given day. • Recorded previously on the mining lease (1995 and 2005) on the VBA • Likelihood of Swift Parrot foraging in the study area is high. Areas that are connected to or within larger patches of habitat may be more regularly used by Swift Parrot. Use of habitat may vary from year to year depending on availability of resources in the landscape.
Painted Honeyeater	• Previously recorded approximately 10km to the south-west and 13 km south of the study area (VBA), refer to Figure 8 in Appendix A in EES Technical Appendix D. • May utilise woodland habitat within the study area opportunistically for foraging or movement through the landscape. • The likelihood of Painted Honeyeater occurring in the study area is low therefore this species is not considered further in the assessment.
Regent Honeyeater	• Recorded within 10 km of the study area (VBA). • Study area supports suitable feed trees (Yellow Gum) including large trees which are likely to be more important as a foraging resource. • Potential for Regent Honeyeater to forage in the box ironbark forest and woodland habitats in the study area and surrounds cannot be discounted as the species may use different areas in different years depending on food resources and may move large distances to do so. • The likelihood of Regent Honeyeater occurring in the study area is moderate.
White-throated Needle-tail	• White-throated Needle-tail is likely to feed in the airspace over the study area and may roost in trees in the study area on occasion. • There is no important or limiting habitat for the species in the study area. • The likelihood of White-throated Needletail occurring in the study area is moderate.

Threatened fauna species	Likelihood of occurrence on site
Grey-headed Flying-fox	• The nearest Grey-headed Flying-fox (GHFF) camp to the study area is Rosalind Park in the centre of Bendigo approximately 20 km south-west of the study area. • The Bendigo Camp was not recognised as a nationally important camp in the National Recovery Plan for the Grey Headed Flying Fox (DAWE 2021). However the Rosalind Park camp is identified as a nationally important camp in the DCCEEW online national GHFF monitoring viewer. • Grey-headed Flying-fox are likely to visit the study area occasionally or on an opportunistic basis as part of broad foraging movements through the landscape around the colony. • The likelihood of Grey-headed Flying-fox occurring the study area is moderate.
Growling Grass Frog	• Previously recorded at one location within 5 km of the study area (1982) near Sandy Creek, a tributary of Bendigo Creek (VBA). • The closest contemporary records are approximately 17 km to the west in association with the Bendigo Water Reclamation Plant in Epsom and Bendigo Creek in Huntly, north of Bendigo (VBA). • Gunyah Creek is an ephemeral watercourse that is unlikely to provide sufficient permanency to be breeding habitat. • Targeted survey undertaken December 2023 to January 2024to provide greater certainty of potential occurrence of the species in the study area. The survey included sites representative of TSF5, O'Dwyers East, Haul Road 1 and regional sites such as Barnadown Streamside Reserve, Ellesmere Goornong Channel Dam Complex and the K39 Streamside Reserve. No Growling Grass Frog were detected within the Project component areas or waterbodies adjacent to the Campaspe River. Details of the GGF survey are provided in Appendix N of the EES Technical Appendix D. • Findings of the targeted survey suggest the species is unlikely to occur
Murray Cod and Macquarie Perch	• Habitat associated with the Campaspe River which is outside the Project area but may be influenced by change in water. • Unlikely to occur in the study area as there is no suitable habitat.

10.7.6 State significant biodiversity values

10.7.6.1 Native vegetation

Native vegetation occurs within the study area. Given the extensive historical mining activity known to have occurred within and surrounding the study area, native vegetation is highly likely to have been historically disturbed. Four Ecological Vegetation Classes (EVCs) occur in the study area. These EVCs, their conservation status and, for the endangered EVCs, where they are in the FGM, are shown in Table 10-8. Figure 10-6 shows the location of the Ecological Vegetation Classes (EVCs).

Table 10-8 State significant EVCs, their bioregion conservation status and where located in the study area

EVC name	EVC number	Bioregional conservation status		Location in study area
		Goldfields Bioregion	Victorian Riverina Bioregion	
Box-Ironbark Forest	EVC 61	Depleted	Vulnerable	TSF5 and TSF6 (high quality native vegetation)
Plains Grassy Wetland	EVC 125	Endangered	Endangered	O'Dwyer's North
Low Rises Grassy Woodland	EVC 175_61	Vulnerable	Endangered	Northern Infrastructure Precinct Water Storage Haul Road 1 Ancillary Services Corridor North
Tall Marsh	EVC 821	-	Depleted	-

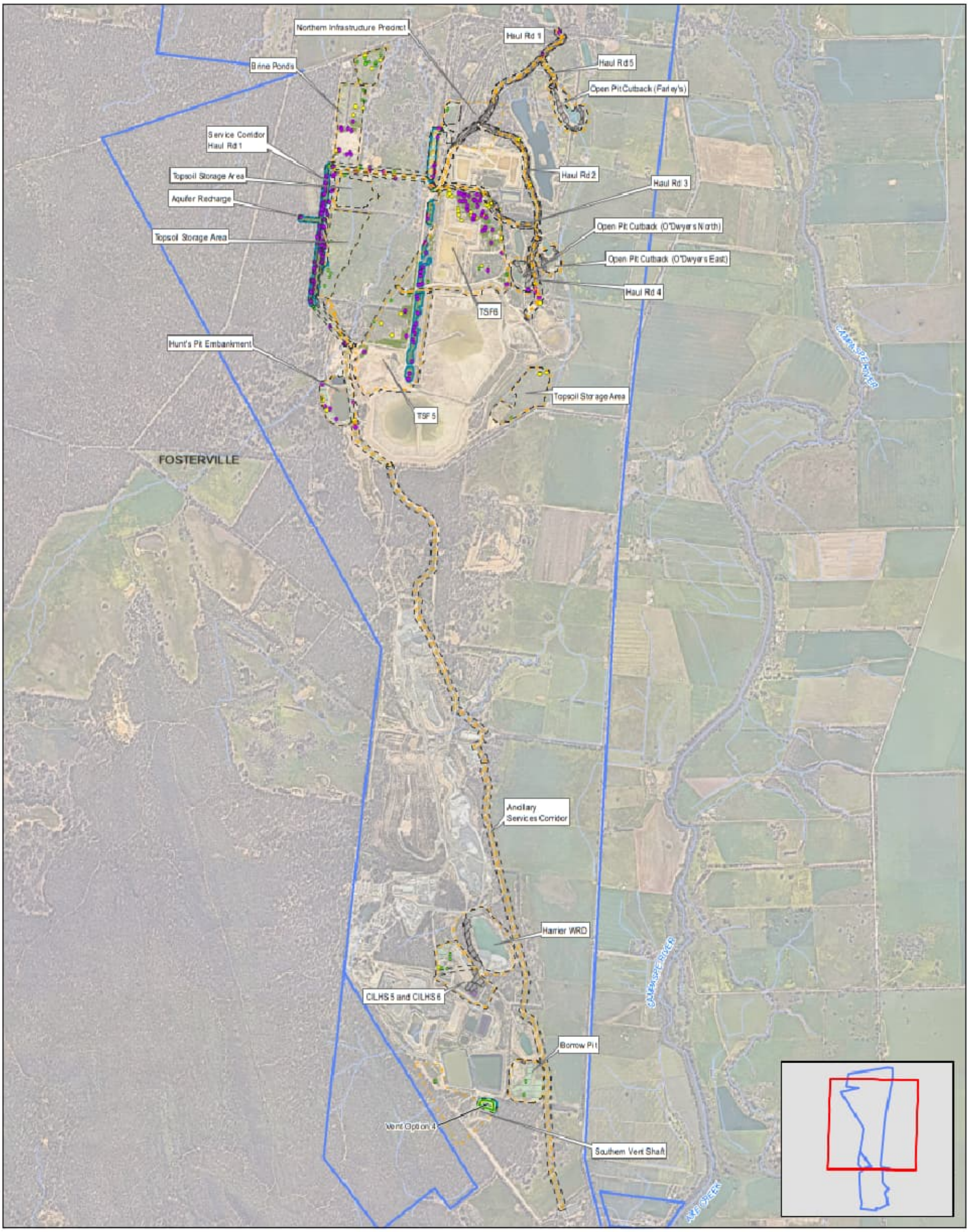

Figure 10-6 Location of EVCs

Further details of the occurrence of these EVCs are provided in Section 5.4.1 of Technical Appendix D.

A summary of occurrence is as follows:

- Box Ironbark Forest (EVC 61) was recorded within the study area in an atypical canopy species diversity in comparison to the benchmark. This is likely due to historic landscape disturbance and timber harvesting of Red Ironbark for use in the historic mining activity. Box Ironbark Forest within the study area was generally dominated by an overstory of Waxy Yellow Gum, Grey Box, and Yellow Box.
- Patches of Plains Grassy Wetland (EVC 125) within the study area were associated with the O'Dwyer's North Cutback Project area and flora species was dominated by Rush and Wallaby Grass.
- Grassy Woodland (EVC 175_61) within the study area is supported by a similar suite of species to other wooded EVCs within the study area including an overstorey dominated by Waxy Yellow Gum, Grey Box and Yellow Box. The understorey was generally sparse, but included Gold-dust Wattle, Sifton Bush, Berry Saltbush, Saloop, Sticky Everlasting, Spear-grasses. and Wallaby-grasses.
- Tall Marsh (EVC 821) vegetation was restricted to artificial waterbodies within the study area and was highly modified, comprised of Cumbungi and Common Reed.

10.7.6.2 Mapped wetlands

Areas of modelled wetlands are included as native vegetation when determining offset requirements. The Current Wetlands Map from MapShareVic identified 3 wetland areas in the FGM (Wetlands 45825, 44468, 45851, totalling 115.53 hectares). Mapped wetlands can include modified areas and waterbodies such as those associated with mines, therefore an application was made to DEECA to exclude portions of the mapped wetland areas that were not mapped as native vegetation during the existing conditions assessment. DEECA agreed to removing a section of wetland 45851 which is the Harrier Pit and a section of 44468 which includes Hunts Pit and the area proposed to be part of the footprint of TSF5, refer to Plate 10-2.

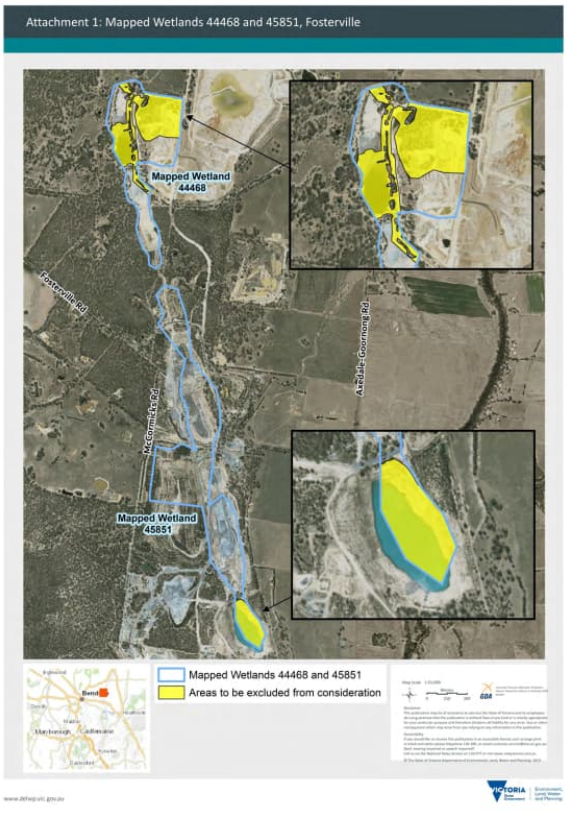

Plate 10-2 Extract of areas approved to be excluded from consideration as mapped wetland (DEECA).

10.7.6.3 High quality native vegetation

Areas of high-quality native vegetation[5] were recorded in the TSF5 and TSF6 component. This high-quality vegetation was classified as Box Ironbark Forest (EVC 61), (Figure 10-6) which has a biodiversity conservation status of Vulnerable in the Victorian Riverina bioregion and Depleted in the Goldfields bioregion.

10.7.6.4 Threatened ecological communities

One FFG Act listed TEC was identified as being present within the study area:

- the Victorian Temperate Woodland Bird Community (VTWBC), which is a group of 24 key avian species considered to be in decline and primarily associated with dry woodland environs located to the north of the Great Dividing Range.

Of the 24 nominated species from the VTWBC key species, the following were identified in the study area during a faunal survey conducted in 2020: Black-chinned Honeyeater, Brown Treecreeper, Brown-headed Honeyeater, Diamond Firetail, Fuscous Honeyeater, Jacky Winter, Little Lorikeet, Yellow-tufted Honeyeater, Dusky Woodswallow, Eastern Yellow Robin.

There are also anecdotal observations from a local landholder of several members of the VTWBC including Brown-headed Honeyeater, Fuscous Honeyeater, Regent Honeyeater, Bush Stone Curlew, Brown Treecreeper and Powerful Owl.

The FFG-listed TEC is conservatively assumed to be present on site:

- Grey Box – Buloke Grassy Woodland Community, which is characterised by a canopy dominated by Grey Box over lower stratum of Buloke

10.7.6.5 Threatened flora species

In addition to EPBC Act listed flora species described in Section 10.7.5.2, a further 14 threatened flora species listed under the FFG Act were identified to have a known or high likelihood of occurrence and suitable habitat within the study area (refer Table 10-9).

Table 10-9 FFG Act listed flora species known or with high likelihood of occurrence

Common Name	Scientific Name	FFG Act status
Ausfeld's Wattle	*Acacia ausfeldii*	Endangered
Bent-leaf Wattle	*Acacia flexifolia*	Endangered
Whirrakee Wattle	*Acacia williamsonii*	Critically endangered
Buloke	*Allocasuarina luehmannii*	Vulnerable
Jericho Wire-grass	*Aristida jerichoensis var. subspinulifera*	Critically endangered
Cane Spear-grass	*Austrostipa breviglumis*	Endangered
Yellow-tongue Daisy	*Brachyscome chrysoglossa*	Endangered
Dwarf Cassinia	*Cassinia diminuta*	Endangered
Cottony Cassinia	*Cassinia ozothamnoides*	Endangered
Late-flower Flax-lily	*Dianella tarda*	Critically endangered
Small-leaf Goodenia	*Goodenia benthamiana*	Endangered
Goldfields Grevillea	*Grevillea dryophylla*	Endangered
Sand Rush	*Juncus psammophilus*	Endangered
Southern Swainson-pea	*Swainsona behriana*	Endangered

[5] High quality native vegetation is vegetation patches which have a habitat hectare score of ≥0.6. Habitat hectare score for native vegetation is calculated as "*number of hectares of native vegetation in a patch x the condition multiplier of the patch*". The guide to determining the condition multiplier is provided in the "*Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectare scoring method V3, DSE 2004*".

Targeted surveys undertaken in October, November and December 2022 did not detect these species and the likelihood of the species occurring in the study area is low.

10.7.6.6 Protected flora

Protected flora includes plants that are listed as threatened under the FFG Act, plants that belong to FFG Act listed TECs, and plants that have been declared to be 'protected' under the FFG Act; the latter being referred to as 'protected flora'. Ten species declared as 'protected flora' under the FFG Act were observed by during field assessments in 2020, refer to Table 10-10.

Table 10-10 Protected flora recorded in study area

Common Name	Scientific name
Gold-dust Wattle	*Acacia acinacea*
Rough Wattle	*Acacia aspera*
Golden Wattle	*Acacia pycnantha*
Varnish Wattle	*Acacia verniciflua*
Cranberry Heath	*Astroloma humifusum*
Drooping Cassinia	*Cassinia arcuata*
Common Beard-heath	*Leucopogon virgatus*
Grey Everlasting	*Ozothamnus obcordatus*
Fuzzy New Holland Daisy	*Vittadinia cuneata*
Shiny Everlasting	*Xerochrysum viscosum*

10.7.6.7 Threatened fauna

In addition to EPBC Act listed fauna species described in Section 10.7.5.3, the following additional fauna species listed under the FFG Act were assigned moderate or high likelihood of occurrence within the study area (refer to Appendix C in Technical Appendix D for further detail).

A summary is provided in Table 10-11 and the reported locations from previous investigations within MIN5404 and the wider area are shown on Figure 10-7.

Table 10-11 FFG Act listed fauna with moderate or greater likelihood of occurrence in the mining lease

Common Name	Scientific Name	FFG Act status	Likely use of the mining lease
Woodland birds			
Barking Owl	*Ninox connivens*	Cr#	Barking Owl are likely to hunt through the mining lease and hollows may provide nesting habitat for this species.
Powerful Owl	*Ninox strenua*	Vu^	There are anecdotal observations from a local landholder of Powerful Owl *Ninox strenua* on their property close to Fosterville Gold Mine. Powerful Owl may hunt through the mining lease and hollows may provide nesting habitat for this species.
Bush Stone-curlew	*Burhinus grallarius*	cr#	There are anecdotal observations from a local landholder of Bush Stone Curlew on their property close to Fosterville Gold Mine. Bush Stone-curlew may occur in areas open forest and woodland with a sparse grassy ground layer and fallen timber which is essential for camouflage.
Crested Bellbird	*Oreoica gutturalis*	en^	These species have been recorded within 10 km of the mining lease and may occur in the forest and woodland of the study area and surrounds.
Speckled Warbler	*Chthonicola sagittata*	en#	
Grey-crowned Babbler	*Pomatostomus temporalis*	vu#	
Diamond Firetail	*Stagonopleura guttata*	vu#	Diamond Firetail were recorded at a survey site located in an area of revegetation between Farley's pit and the Northern Infrastructure Precinct by EHP. Species may therefore also use forest/woodland habitat within the study area.
Hooded Robin	*Melanodryas cucullata*	vu#	Habitat within the study area may support Hooded Robin.
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*	vu	Species may use higher quality forest/woodland areas within the study area, although areas where the understorey is open and sparse may be less suitable for the species.
Diamond Dove	*Geopelia cuneata*	vu	The species may use higher quality forest/woodland areas within the study area.
Purple-gaped Honeyeater	*Lichenostomus cratitius*	vu	Purple-gaped Honeyeater may use higher quality forest/woodland areas within the study area.
Turquoise Parrot	*Neophema pulchella*	vu#	Given the proximity of the Campaspe River, the species may use higher quality forest/woodland areas within the study area.

Common Name	Scientific Name	FFG Act status	Likely use of the mining lease
Little Eagle	*Hieraaetus morphnoides*	vu	These species are likely to hunt in the open areas of the mining lease and roost and/or nest in trees in the study area or immediately adjacent.
Square-tailed Kite	*Lophoictinia isura*	Vu^	
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	en	White-bellied Sea-eagle may forage over the open waterbodies within the mining lease when hunting in the Campaspe River catchment. It is possible the species could nest in tall live or dead trees near water but it is anticipated that the Campaspe River would offer more suitable nesting and foraging opportunities than the operational mine as the species is sensitive to human habitation. No limiting or important habitat for this species is present in the study area.
Waterbirds			
Australasian Shoveler	*Spatula rhynchotis*	vu	Species could occur occasionally in areas of open water associated with the existing open pits and larger dams in the mining lease.
Blue-billed Duck	*Oxyura australis*	vu	Species may occur on occasion on the open water of the large existing pits.
Eastern Great Egret	*Ardea alba modesta*	vu	Although rated with a likelihood of occurrence as low, Eastern Great Egret is included as the species is likely to visit the study area occasionally or opportunistically whilst enroute to more suitable sites, Eastern Great Egret is a species that can occur in association with the dams and Gunyah Creek.
Freckled Duck	*Stictonetta naevosa*	en	Species could occur on occasion in areas of open water associated with the existing open pits and larger dams in the mining lease.
Hardhead	*Aythya australis*	vu	Hardhead was recorded by EHP during fauna surveys. This species prefers deep, fresh open water and is therefore likely to occur on the large expanses of water formed by the existing pits.
Musk Duck	*Biziura lobata*	vu	Species could occur on occasion in areas of open water associated with the existing open pits and larger dams in the mining lease.
Mammals			
Brush-tailed Phascogale	*Phascogale tapoatafa*	vu	There is an anecdotal observation of Brush-tailed Phascogale provided by a local landowner from their property adjacent to Fosterville Gold Mine. Brush-tailed

Common Name	Scientific Name	FFG Act status	Likely use of the mining lease
			Phascogale were not observed during general fauna surveys by EHP. Targeted surveys have not been undertaken and presence of the species has been assumed for all areas of woodland habitat and is likely to be utilising hollows.
Common Dunnart	*Smithopsis murina murina*	vu	Targeted surveys have not been undertaken for Common Dunnart and it has been assumed that Common Dunnart could occur in association with the woodland habitat associated with the AR component in Wellsford State Forest.
Platypus	*Ornithorhynchus anatinus*	vu	Two Platypus individuals were recorded by Aquatica Environmental within the Campaspe River reach adjacent to the mining lease during the autumn 2021 survey as part of the ongoing baseline aquatic macroinvertebrate and river health assessment of the Campaspe River. Platypus is unlikely to occur in the study area as there is no suitable habitat.
Reptiles			
Bearded Dragon	*Pogona barbata*	vu	Bearded Dragon was identified by EHP to have potential to occur in the mining lease (project area) but not specifically for any of the study area components. Bearded Dragon was observed by AECOM during the assessment of the AR study area in Wellsford State Forest in August 2022. TactEcol also observed a Bearded Dragon basking on a log at the northern end of TSF6. Bearded Dragon is likely to occur within the study area for the Project.
Lace Monitor	*Varanus varius*	en	Lace Monitor was observed on the ground and in trees in the north of the study area and one was observed by AECOM during the targeted flora survey in Spring 2022. This species is likely to roam through the mining lease area and could be encountered in all Project component areas.
Murray River Turtle	*Emydura macquarii*	cr	Murray River Turtle was recorded along the Campaspe River within 1 kilometre to the east of the study area. The species is unlikely to occur in the study area due to a lack of suitable habitat and distance from the Campaspe River.
Frogs			

Common Name	Scientific Name	FFG Act status	Likely use of the mining lease
Brown Toadlet	*Pseudophryne bibronii*	en	Brown Toadlet has been recorded by AECOM within the study area.

Notes to table: # also a member of the FFG Act listed Victorian Temperate Woodland Bird Community (see Section **Error! Reference source not found.**). ^species also occur in habitat but n ot included in VTWBC nomination. **Listed as threatened under the EPBC Act in March 2023 after referral decision 3 November 2021 therefore considered under FFG Act only for this EES.

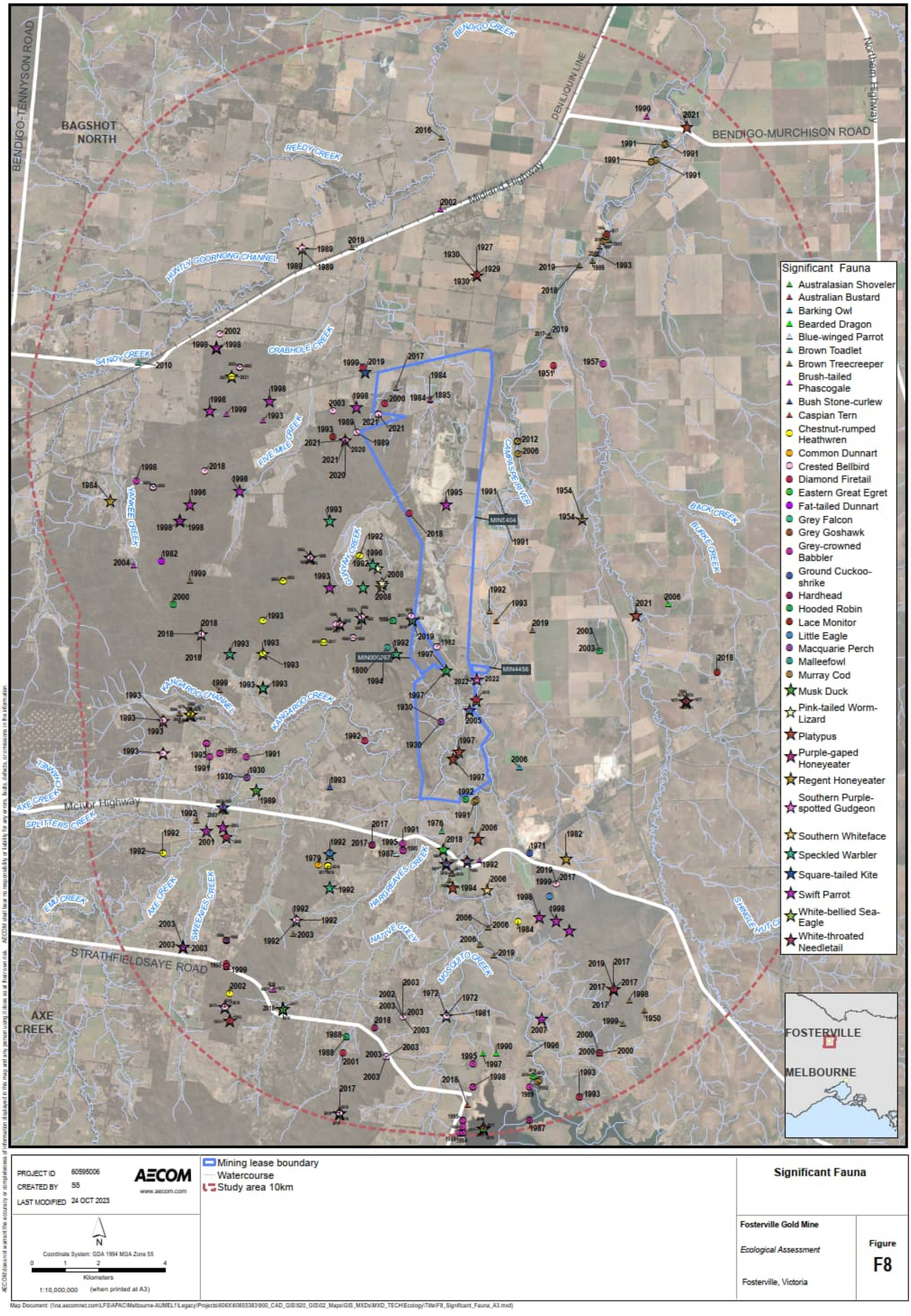

Figure 10-7 Recorded locations of significant fauna within MIN5404 and adjacent areas

10.7.6.8 Hollow-bearing trees

Hollow-bearing trees are recognised in the Greater Bendigo Planning Scheme as being rare in the Bendigo area and vital for fauna conservation. Native vegetation assessments noted hollows where they were visible in scattered remnant trees and large trees in patches. Smaller trees in patches or non-remnant trees were not checked for hollows. Further details are provided in Appendix G of Technical Appendix D.

Several species recorded during surveys at FGM are known to utilise hollows including Sugar Glider, lorikeets, rosellas, corellas, Common Brush-tailed Possum, Common Ringtail Possum, Southern Boobook, Tawny Frogmouth and threatened species including Barking Owl, Brush-tailed Phascogale and Lace Monitor. The White-throated Needletail, although a predominantly aerial species, has been known to roost in trees amongst the canopy or in hollows.

Other species listed as threatened under the EPBC Act and/or FFG Act that have a moderate or greater likelihood of occurrence in the study area that are known to use hollows include Brown Treecreeper, Hooded Robin, Southern Whiteface and Powerful Owl.

Loss of hollow bearing trees is an FFG Act threatening process.

10.7.6.9 Connectivity

The study area occurs in a landscape which has been historically cleared and already varies in habitat connectivity. Areas of habitat on the western side of MIN5404 have greater connectivity to higher quality habitat than habitat on the eastern side where MIN5404 abuts landscape generally dominated by agricultural use.

Patches of native vegetation to the west of the study area exhibit relatively high habitat connectivity values within woodland habitat, with large, contiguous patches adjoining the Mount Sugarloaf Nature Conservation Reserve. Roadside vegetation along the Huntly-Fosterville Road and the Fosterville Road North allows a degree of canopy connectivity enabling arboreal mammals to move easily between trees and provides an important link to the riparian woodland corridor of the Campaspe River.

Axe Creek and Gunyah Creek are the dominant riparian features within the study area. Axe Creek appears to display areas of arboreal canopy connectivity within the riparian corridor. Gunyah Creek is a highly modified ephemeral stream within the northern part of the study area and displayed highly disjointed, patchy arboreal connectivity along its length. Gunyah Creek would be intersected by the haul road and services corridor components of the Project (which are existing features which will be upgraded).

Given the lack of continuous woodland habitat and connecting features (aside from Axe Creek) these aforementioned habitat features within the study area are unlikely to be utilised by fauna that rely on arboreal connectivity.

The ephemeral seasonality of water within the study area is unlikely to provide suitable, continuous aquatic habitat for fish species and fauna that require flowing water within riparian corridors.

Riparian corridors within the study area do provide moderate to high quality habitat connectivity for amphibian species such as the Brown Toadlet which occurs along Gunyah Creek and is likely to rely on the riparian corridor for dispersal.

Landscape connectivity is shown in F17 in Appendix A of EES Technical Appendix D: Ecology existing conditions and impact assessment.

10.7.7 Groundwater dependent ecosystems

GDEs are defined as '*those ecosystems that require access to groundwater to meet all or some of their water requirements so as to maintain the communities of plants and animals and ecological processes they support, and ecosystem services they provide*[6]*"*

[6] Victorian Government, 2015

There are 3 categories of GDEs:

- Aquifer and cave ecosystems (subterranean GDEs) which provide habitat for stygofauna (subterranean animals that spend their entire lives in groundwater);
- Ecosystems that rely on surface expression of groundwater; aquatic GDEs including wetlands, swamps, springs and rivers where groundwater discharge provides a significant baseflow component. These ecosystems in turn provide a source of drinking water for terrestrial fauna; and
- Ecosystems which depend on subsurface availability of groundwater; terrestrial GDEs including vegetation that relies on groundwater within the rooting depth of vegetation (which in turn supports animal communities) and estuarine systems which rely on submarine groundwater discharge.

There are 2 types of aquifer systems beneath the study area (further details on the occurrence of these aquifers can be found in EES Technical Appendix F2 and **EES Chapter 12: Groundwater**):

- The alluvial aquifer systems of the Tertiary Campaspe Deep Lead Aquifer and Shepparton Formation; and
- The underlying Fractured Rock Aquifer (FRA), which is the aquifer where the underground mine areas intersect and is the receiving aquifer for the aquifer recharge (AR) component of the Project.

Changes in groundwater levels and chemistry within these groundwater aquifers could potentially impact the GDEs located within the study area. The alluvial aquifer systems, where present, may be linked to potential terrestrial, aquatic and subterranean GDEs. The Campaspe River, Axe Creek and Gunyah Creek may also support aquatic GDEs. The presence of stygofauna has been recorded in the alluvial aquifer system but not in the fractured rock aquifer system.

10.8 Ecological impacts

This section outlines the potential impacts that the Project may have on the ecological values identified in the preceding sections of this chapter.

Some impacts are certain to occur if the Project proceeds, irrespective of additional avoidance and minimisation.

These are known (or direct) impacts. The known impacts of the Project are:

- Loss of native vegetation (E01)[7]
- Loss of Threatened Ecological Communities (E03)
- Loss of habitat from a Key Biodiversity Area (E04)
- Loss of habitat for threatened fauna (E06)
- Loss of hollow-bearing trees (a threatening process) (E24)

For known impacts, the impact will require offsets and the residual impact remains very high. The known impacts occur due to clearing during Project construction and operation.

Section 10.9 of this chapter provides a description of avoidance and minimisation of known impacts which was undertaken at the Project planning stage (i.e. when the locations of the Project components were chosen). The discussion of alternative Project component locations which were considered at the Project planning stage is provided in **EES Chapter 4: Alternatives**.

Potential ecological impacts are those which may occur due to the Project. Most potential impacts will occur during the Project construction and operation phase. Few potential impacts relate to the rehabilitation phase of the Project – those that do are related to weeds, soil pathogens and pest animals, refer to Table 10-13 for the potential impacts which occur during each stage of the Project (and their mitigation measures).

The Project has sought to avoid and minimise potential impacts using mitigation measures.

[7] Impact pathway identifiers reflect those of the Ecological Assessment Technical Appendix D

Known and potential impacts that remain following avoidance, minimisation and implementation of mitigation are described as residual impacts.

Known and potential impacts are described in the sections below. Avoidance and minimisation of impacts is discussed in Section 10.9. Management and mitigation are described in Section 10.10.

10.8.1 Native vegetation removal (E01)

Native vegetation likely to be impacted by the project includes patches of native vegetation, trees (Large Trees in Patches and both large and small Scattered Trees), and patches of high-quality native vegetation including hollow bearing trees. The known, direct loss of native vegetation removal includes:

- 19.435 ha patches of native vegetation
- 162 large trees in patches
- 68 scattered trees (37 large, 31 small)

Native vegetation is unlikely to regrow so impacts would be critical and would result in a reduction in a permanent reduction in the extent of native vegetation in Victoria.

10.8.2 Works in tree protection zones results in loss of remnant trees (deemed loss) (E02)

This is a potential impact whereby native vegetation outside the actual construction footprint may be indirectly affected (degraded) by the proposed works. Soil compaction or excavation within the Tree Protection Zones (TPZs) of retained native trees may cause structural root damage resulting in the loss of vegetation adjacent to the construction footprint. Soil compaction can occur through mechanisms such as vehicle movements placement of stockpiles or equipment storage.

Encroachment into the TPZ of retained trees is an impact that is considered in relation to Victoria's Native Vegetation Removal Regulations as 'deemed loss'.

The deemed, indirect loss of native vegetation is:

- 9.571 ha patches of native vegetation
- 20 large trees in patches
- 27 scattered trees (11 large, 16 small)

If this potential impact were to occur the impact would be critical and permanent. Mitigation measures (Table 10-13) are proposed to reduce the likelihood of occurrence and therefore the residual impact.

10.8.3 Loss of threatened ecological communities (E03)

Land clearance associated with the project will result in the permanent loss of areas of the following ecological communities listed as threatened under the EPBC Act and/or FFG Act:

Commonwealth (EPBC Act listed)

- Direct loss of 6.325 ha of Grey Box Grassy Woodlands, (as described in Section 10.7.5.1).
- Deemed loss of 4.267 ha of Grey Box Grassy Woodland.

Victorian State (FFG Act listed)

- Direct loss of 19.260 ha of Victorian Temperate Woodland Bird Community, (refer to Section 10.7.6.4).
- Deemed loss of 9.566 ha of Victorian Temperate Woodland Bird Community.
- Direct loss of 0.047 ha of Grey Box – Buloke Woodland Community, (as described in Section 10.7.6.4).
- Deemed loss of 0.413 ha of Grey Box – Buloke Woodland Community.

This is a known impact which would be critical and permanent, Table 10-14. Offsets will be required.

10.8.4 Loss of habitat from a key biodiversity area (E04)

Wellsford State Forest, Mount Sugarloaf Nature Conservation Reserve and portions of FGM form part of a larger area recognised as a Key Biodiversity Area of international significance, refer to Section 10.7.4 and Figure 10-4.

The Project will result in:

- Direct removal of 6.655 ha of native vegetation
- Deemed loss of 5.335 ha of native vegetation

This is a known impact which would be permanent in terms of habitat loss, (Table 10-14) and which is a major residual impact as the loss of habitat is unlikely to result in a permanent reduction of KBA habitat.

10.8.5 Loss of habitat for threatened flora and fauna (E05 and E06)

Commonwealth (EPBC Act listed) – Flora

Patches of Grassy Woodland and Box-Ironbark Forest were identified during the existing conditions assessment as potential habitat for EPBC Act listed Clover Glycine, Erect Peppercress, McIvor Spider-orchid, Sturdy Leek-orchid, and Whipstick Westringia (refer to Section 10.7.5.2 of this chapter).

Targeted surveys for these species were undertaken between October and December 2022. None of the species were detected and, as such, the likelihood of occurrence in the area proposed to be impacted by the project is low, therefore, the potential for the Project to impact on those EPBC Act listed flora species is therefore also low.

Commonwealth (EPBC Act listed) – Fauna

As discussed in Section 10.7.5.3, EPBC Act listed fauna with a moderate or greater likelihood of occurrence in the study area and therefore potential to be impacted are Swift Parrot and Regent Honeyeater, White-throated Needletail, Grey-headed Flying-fox and Pink-tailed Worm-lizard. Targeted Growling Grass Frog survey did not detect the species which suggests Growling Grass Frog is unlikely to occur and is therefore unlikely to be impacted by the Project. Murray Cod and Macquarie Perch are unlikely to be impacted by the Project as the surface water and groundwater impact assessment predict no impacts to the Campaspe River from the Project.

Threatened fauna species with potential to be impacted through loss of habitat associated with the Project are discussed below.

Swift Parrot and Regent Honeyeater

Swift Parrot and Regent Honeyeater may use the forest and woodland habitat within the study area as they move through the landscape following foraging resources. Surveys for these species have not been undertaken, due to their wide roaming nature and thus the unpredictability of occurrence on any given day. Both species are assumed to utilise habitat in the study area with the regularity of use unknown and likely to vary in different years. Potential for the Project to impact on these species relates to the removal of forest and woodland habitat including areas of native revegetation.

White-throated Needletail

White-throated Needle-tail is likely to feed in the airspace over the study area and may roost in trees in the study area on occasion. Potential for the Project to impact on these species relates to the removal of forest and woodland habitat including areas of native revegetation.

Grey-headed Flying-fox

Grey-headed Flying-fox may sporadically use the woodland habitat as they move through the landscape seeking foraging resources in more extensive areas of habitat in Wellsford State Forest and Mount Sugarloaf Nature Conservation Reserve. Surveys for this species have not been undertaken due to their wide roaming nature and therefore unpredictability of occurrence on any given day. A non-detection during survey (if conducted) would not change the conclusions as presence would still be assumed. Presence of Grey-headed Flying-fox has been assumed on an intermittent basis through woodland habitats within the current mine and on a more regular basis in association with Wellsford State Forest (AR component) due to the larger, more extensive nature of the canopy cover.

Potential for the Project to impact on Grey-headed Flying-fox relates to the removal of forest and woodland habitat.

Pink-tailed Worm lizard

Pink-tailed Worm-lizard is unlikely to occur in most of the Project components due to the degree of modification and lack of connectivity with larger tracts of remnant vegetation. It has a low likelihood of occurrence in areas of GBGW associated with the ancillary services corridor south of Fosterville North Road, a moderate likelihood of occurrence in the AR component (Wellsford State Forest).

Option 4 (southern vent shaft) avoids areas of moderate value PTWL habitat. Survey for Pink-tailed Worm-lizard has not been undertaken therefore presence has been assumed in association with the AR components.

Growling Grass Frog

A Growling Grass Frog survey was conducted in December 2023 and January 2024 to provide greater certainty of potential occurrence of the species in the study area. The survey included sites representative of TSF5, O'Dwyers East, Haul Road 1 and regional sites such as Barnadown Streamside Reserve, Ellesmere Goornong Channel Dam Complex and the K39 Streamside Reserve. No Growling Grass Frog were detected within the Project component areas or waterbodies adjacent to the Campaspe River. Details of the GGF survey are provided in Appendix N of the EES Technical Appendix D.

Murray Cod and Macquarie Perch

There is no suitable habitat in the Project area for the Murray Cod and Macquarie Perch. They may occur in the Campaspe River, refer to Table 10-7. These species are unlikely to be impacted by the Project as the surface water and groundwater impact assessment predict no impacts to the Campaspe River from the Project.

Victorian State (FFG Act listed) threatened flora

As described in Section 10.7.6.5, 14 threatened flora species listed under the FFG Act were identified to have a known or high likelihood of occurrence and suitable habitat within the study area. Targeted surveys undertaken in October, November and December 2022 did not detect these species and the likelihood of the species occurring in the study area is low. Therefore, the potential for the Project to impact on those listed species is also low.

Victorian State (FFG Act listed) protected flora

As described in Section 10.7.6.6, 10 species declared as 'protected flora' under the FFG Act were observed in the study area and are likely to be impacted by the Project. Removal of habitat has the potential to impact on individual plants or a population of these species.

Victorian State (FFG Act listed) threatened fauna

As described in Section 10.7.6.7, woodland-dependent fauna including woodland birds, Barking Owl, Brush-tailed Phascogale, Common Dunnart, Bearded Dragon and Lace Monitor may be impacted by loss of native vegetation, loss of hollow-bearing trees and, to a lesser extent, fragmentation. Nesting and hollow-dwelling individuals could be injured or killed during habitat removal.

Waterbirds including Hardhead, Australasian Shoveler and Musk Duck could occur in association with areas of open water including the existing inundated pits (O'Dwyers, Farleys, Hunts) that will be affected by open pit cutback works.

The Brown Toadlet is known to occupy Gunyah Creek and could potentially be impacted by erosion and sedimentation during construction. A bridge will be installed as part of the Project and the AR pipeline will utilise this new infrastructure, which avoids works in Gunyah Creek.

Platypus and Murray River Turtle are unlikely to be impacted by the Project as it is unlikely there will be a reduction in water quality or water availability to aquatic ecosystems associated with the Campaspe River.

Victorian State (FFG Act listed) threatened fauna – Brown Toadlet (E07)

Brown Toadlet occupying Gunyah Creek may be affected during construction of Haul Road 1 by removal of habitat (Gunyah Creek channel and adjacent floodplain), sediment entering the creek, habitat being inadvertently buried, light and noise affecting breeding. As stated above, a bridge will be installed as part of the Project and the AR pipeline will utilise this new infrastructure, which avoids works in Gunyah Creek bed in order to minimise disturbance.

10.8.6 Degradation of retained native vegetation and habitat (E08 and E09)

This is a potential indirect impact whereby, without appropriate controls, construction works have the potential to impact upon vegetation and habitat adjacent to the project area through means such as vehicle movements and soil dumping (E08) or dust, sedimentation and/or chemical spills (E09).

10.8.7 Subsidence due to underground mine collapse (E10)

This is a potential impact whereby surface vegetation features are impacted by subsidence of the ground caused by collapse of voids. This is a very low likelihood potential impact as the existing underground mines (and therefore extensions) are located greater than 300 m underground. Following extraction of the ore, the underground void is approved to be backfilled with either waste rock, cemented rock fill (CRF) or paste fill.

10.8.8 Edge effects (E11)

Edge effects are changes in biological and physical conditions that occur at ecosystem boundaries. They could occur at the edge of patches of remnant vegetation and habitat that may be created by Project clearing. While removal of habitat by the Project has the potential to create new edges, most of the habitat is in an already fragmented, disturbed, and developed environment with extensive edges.

10.8.9 Fire hazards (E12 and E30)

Fire regimes that cause declines in biodiversity are recognised as a key threatening process under the EPBC Act. Fires are a natural ecological process which are a significant disturbance event in terrestrial ecosystems that can maintain or enhance biodiversity or, conversely, cause the loss of biodiversity. MIN5404 and the surrounding area is in a designated Bushfire Prone Area and is overlain by a Bushfire Management Overlay (BMO).

The likelihood of occurrence of bushfire from an offsite source will be unchanged for the Project and is largely outside of FGM's control. Operational and engineering controls for fire management are currently implemented at FGM. The Project avoids Mount Sugarloaf State Conservation Reserve. The AR component is in Wellsford State Forest, however the potential for fire associated with this activity will be managed under FGM's fire management controls.

10.8.10 Displacement, injury, or death of wildlife protected under the Wildlife Act (E15, E16, E17, E18)

Wildlife could be displaced, injured, or killed, particularly during site clearance, leading to increased predation. Open trenches during construction may lead to entrapment of wildlife. Small ground-dwelling animals are most at risk of being killed or injured in trenches by falls, predation, exposure, starvation, and burial. Fencing of temporary construction areas and/or the mine during operation could lead to fauna entanglement. The potential for vehicle-wildlife interactions to increase is low as there is no proposed increase in traffic volumes.

10.8.11 Disturbance of wildlife protected under the Wildlife Act (E19, E20, E21, E22)

Wildlife occupying retained habitat adjacent to the impact area could be disturbed by artificial lighting (E19), noise (E20), vibration (E21) and visible movement of personnel (vehicles and people) (E22) during construction and operation of the mine, particularly areas in Wellsford State Forest adjacent to the AR area and brine pond that are not currently part of the mine operations. Species most at risk are those which are more sedentary or with small home ranges as they are less likely to be able to move away from the source of disturbance.

Operational lighting is not changing as part of the Project and construction will largely be limited to the day period so additional lighting will not be required.

Construction or operational noise levels in Mount Sugarloaf and Wellsford State Forest will exceed the criteria for “quiet enjoyment” according to the Environmental Reference Standard by between 4 and 7 dBA resulting in overall noise levels in these areas of between 40 and 47 dBA. This will not result in an impact to animal species. Similarly, vibration and human activity associated with the Project is unlikely to impact on wildlife.

10.8.12 Habitat fragmentation (E23)

Removal of native vegetation would potentially increase the existing gaps in the canopy cover that already exist between the large remnant patches in Wellsford State Forest and Mount Sugarloaf Nature Conservation Reserve and the Campaspe River corridor.

Species most vulnerable to habitat fragmentation are those with low mobility that are not able to disperse over large distances such as small ground-dwelling species (e.g. frogs, reptiles and small mammals) and species with small, localised populations (e.g. small ground-dwelling species and small, territorial woodland birds such as robins, wrens, firetails). Species least vulnerable to fragmentation are those that are highly mobile and capable of traversing extensive cleared areas or adapted to modified landscape (e.g. birds and larger mammals).

FGM is a highly modified and fragmented environment and therefore the potential impacts from the Project are minor.

10.8.13 Loss of hollow-bearing trees (E24)

Hollow-bearing tree resources in MIN5404 have already been reduced by historic clearing for the existing mine. Any removal of mature hollow-bearing trees will therefore further reduce the number of resources available to hollow-dependent fauna in the study area, which includes arboreal mammals, parrots, owls, and bats. Several species present on site are known to require hollows including Barking Owl, Sugar Glider, Lace Monitor and Brush-tailed Phascogale. EPBC Act listed White-throated Needle-tail, although a predominantly aerial species, have been known to roost in trees canopies or in hollows.

The Project has avoided and minimised loss of native vegetation to the extent possible through the selection of the location of Project components and options.

The Project will protect retained trees that contain hollows through No Go Zones and will implement an artificial hollow program, (including a trial period to assess effectiveness), to compensate for the loss of this critical habitat feature.

10.8.14 Introduction and spread of weeds (E25) and pathogens (E26)

Weeds and soil pathogens (Cinnamon Fungus and/or Chytrid Fungus) may be introduced or spread through the project site due to movements of plant and vehicles, personnel, materials, and through the movement of pest animals, particularly herbivores.

10.8.15 Predation by Red Fox and feral cats (E27)

Foxes and feral cats are introduced species which directly threaten native fauna via predation.

The Project is unlikely to exacerbate this threatening process as Red Fox are already present in the study area and feral cats are likely to occur. The current and future land use is unlikely to further exacerbate the occurrence of Red Fox or feral cats.

10.8.16 Land degradation by grazing by rabbits (E28)

Rabbits and hares can cause indirect impacts through land degradation and can have significant impacts on native vegetation and fauna habitat.

The project is unlikely to exacerbate this threatening process as rabbits are already present in the study area.

10.8.17 Loss of coarse woody debris from Victorian native forests and woodlands (E29)

Coarse woody debris is present within the study area and is generally located within patches of native vegetation associated with woodland and forest EVCs. Construction of Project components will involve clearing of native vegetation and associated coarse woody debris. However, the salvage and post-clearing positioning of woody debris removed from impacted patches of native vegetation represents an opportunity for ecosystem enhancement.

10.8.18 Impacts associated with changes to surface water flows (E31, E32, E33, E36, E37, E38)

Several project components are located in overland flow paths, particularly in the north of the Project area (Gunyah Creek).

Potential ecological impacts related to changes in surface water flows are:

- Alteration of flow regimes – the surface water assessment (**EES Chapter 18: Surface Water**) concluded that:
    - Portions of native vegetation in Wellsford State Forest to the north-west of the brine pond and south of the western topsoil stockpile which support native vegetation will be subject to levels >30 cm higher and change from dry to wet during a 1% AEP event.
    - Gunyah Creek valley will experience 1% AEP level increases ranging from +/- 2 cm to >30 cm higher, and small areas that were dry will now be wet. This may affect areas of native vegetation and habitat for the FFG Act listed Brown Toadlet.
    - An area south and east of the borrow pit will change from dry to wet during a 1% AEP event.
- Degradation of riparian vegetation along Victorian rivers and streams.
- Increasing sediment into Victorian rivers and streams.

Alterations of the flow regime are only likely to occur at a recurrence of 1% and therefore will have no residual impact on ecological receptors.

Riparian vegetation associated with Gunyah Creek will not be removed as part of the Project. Riparian vegetation along the Campaspe is outside of the Project area and will not be impacted.

FGM operates as a zero discharge site, therefore all site runoff is captured from disturbed areas and will not impact ecological receptors. This will continue for the Project.

10.8.19 Impacts associated with changes to groundwater (E34)

As discussed in Section 10.7.7, GDEs which may exist in the vicinity of the study area include aquatic ecosystems associated with the Campaspe River and Axe Creek and groundwater dependent terrestrial vegetation in areas where the water is near the surface along the Campaspe River. Stygofauna are known to occur in 3 bores in the alluvial Campaspe Deep Lead Aquifer associated with the Campaspe River alluvium on the eastern perimeter of MIN5404.

GDEs rely on shallow groundwater to meet some or all of their water needs. As such, they can be susceptible to impacts associated with groundwater level changes. The dependency of a GDE on groundwater determines the nature of impact that changes in groundwater may have on the system.

The Project has the potential to affect groundwater due to:

- Groundwater level change (decrease) due to mine dewatering
- Groundwater level change (rise) through the injection of treated water into the fractured rock aquifer at the aquifer recharge component
- Groundwater quality change due to injection of AR water into the fractured rock aquifer and/or seepage from the proposed in-pit tailing storage facilities (TSFs) into the fractured rock aquifer.
- Changes in baseflow (groundwater) contribution to the Campaspe River thereby reducing the availability of water to aquatic ecosystems.
- Discharge of groundwater from the fractured rock aquifer to the Campaspe, thereby impacting water quality in the Campaspe.

The potential ecological impacts of these predicted groundwater level/quality changes are:

- Groundwater level change (decrease) in the alluvial aquifers will not impact the areas of potential terrestrial GDEs on or just inside the eastern MIN5404 boundary. Current groundwater level in the alluvial aquifer ranges from between 13 m to 20 m below ground level and the known rooting depth

for Eucalyptus species is 10 m, therefore it is unlikely that the flora within the areas of predicted drawdown is relying on groundwater.

- Groundwater level change (decrease) in the alluvial aquifers has the potential to impact stygofauna. The impacts of groundwater level changes on stygofauna are not well understood and may be impacted by long term drought conditions and the type of aquifer material. Because the potential for impact remains, monitoring of stygofauna in the alluvial aquifer will be conducted.
- Groundwater level change (decrease) in the fractured rock aquifer beneath Axe Creek will not impact any aquatic ecosystems associated with Axe Creek as the groundwater level beneath the creek is too deep (~45 m below ground level) to provide baseflows to any aquatic ecosystems.
- Groundwater quality change, in the fractured rock aquifer, due to AR and in-pit TSFs will not impact water dependent GDEs in the Campaspe River as modelling has shown that concentrations of arsenic, antimony and nitrate (the main chemicals of concern from these activities) will reduce to below the water dependent ecosystems criteria within 800 m and 200 m of the AR system and in-pit TSFs, respectively.
- Stygofauna are not known to be present in the fractured rock aquifer, due to the high salinity. Therefore, no impacts are predicted due to potential changes in water quality in the fractured rock aquifer as a result of the AR or in-pit TSFs.
- Groundwater level change (rise) through the injection of treated water into the fractured rock aquifer (at depths of greater than ~60 m below ground level) at the aquifer recharge component would only occur in the actual injection bores and not in the surrounding aquifer. Therefore, there is no impact possible from upward leakage from the fractured rock aquifer into the soil beneath terrestrial ecosystems in Wellsford State Forest.
- Groundwater quality changes in the alluvial aquifers are not predicted and therefore there will be no impacts on GDEs from changes in water quality.
- The groundwater impact assessment predicts a negligible reduction in baseflow to the Campaspe River. Therefore, water availability to aquatic ecosystems associated with the Campaspe River will not be reduced and no impacts are predicted.
- Discharge of groundwater from the fractured rock aquifer to the Campaspe is not predicted during operations or post rehabilitation (i.e. on groundwater level recovery). Therefore, no impacts to GDEs in the Campaspe River are predicted.

10.8.20 Indirect impacts on EPBC Act Listed GDEs associated with changes to surface water (E35)

Surface runoff from disturbed areas captured by the Project area may reduce water contributions to downstream receptors such as Campaspe River which is habitat for Murray Cod. The decrease in water availability has been deemed to be relatively minor with a maximum 5 cm reduction in depth in a 1% AEP event (or 1 in 100 year flood event) and less than a 10% decrease in peak flow.

Accumulation of water upstream of bunds may lead to portions of GBGW in Wellsford State Forest to the north-west of the brine pond and south of the western topsoil stockpile being subject to inundation levels >30 cm higher and change from dry to wet during a 1% AEP event without mitigation.

10.8.21 Impacts associated with failure of TSF (E39)

The quantification of impacts to ecological receptors related to TSF failure has not been conducted. This is because these structures will be designed such that the likelihood for failure is rare (1:10,000 to 1:1,000,000). It is acknowledged that the consequences of failure may be critical, which results in a very high potential impact. The design of the TSFs is the mitigation measure which will ensure the likelihood of failure is rare.

10.8.22 Impacts associated with failure of brine pond (E40)

The quantification of impacts to ecological receptors related to brine failure has not been conducted as the brine pond will be designed such that the potential for failure is rare (1:10,000 to 1:1,000,000). It is

acknowledged that consequences of failure may be major, which results in a high potential impact. The design of the brine pond is the mitigation measure which will ensure the likelihood of failure is rare.

10.9 Avoidance and minimisation of impacts

Avoidance of impacts is the first step of the mitigation hierarchy which a project must take in seeking to reduce potential impacts on ecological values.

Project components, where possible, have been selected to incorporate previously disturbed areas, in order to reduce the disturbance footprint. Other Project components, including the linear infrastructure (i.e., haul roads and combined services corridor) and vent shaft for the northern underground mining extension have been located to minimise vegetation impacts as much as practicable by using existing easements and infrastructure corridors and previously cleared areas.

This section describes the measures proposed by the Project to avoid and minimise impacts on the ecological values as outlined in Table 10-12.

Table 10-12 Avoidance and minimisation adopted for each component

Component	Avoidance and minimisation
Key components	
Open pit cutbacks	• Four cutbacks were originally planned but this was reduced to 3 locations • Opportunities to further avoid and minimise impacts on ecological values limited as requires existing open pit cutbacks
Harrier Waste Rock Dump (WRD)	• Waste rock dumping will be contained within the perimeter of the existing Harrier Pit • Works associated with the WRD will be restricted to daytime operations, so night-time work is avoided.
Tailings Storage Facilities – TSF5 & TSF6	• Options assessment identified optimal site (**EES Chapter 4: Alternatives**) • Located in existing precinct to reduce disturbance footprint • To reduce the footprint required for flotation tailings storage, a paste plant was built by Fosterville Gold Mine Pty Ltd in 2019 to convert flotation tailings into a paste that is stored in underground voids rather than aboveground
CILHS 5 and CILHS 6	• Located in existing precinct to reduce disturbance footprint • Shape of construction footprint chosen to limit impact on existing native vegetation
Brine Pond	• Located in an area with a long history of rural residential and agricultural use to minimise impacts on vegetation as well as on company-owned land, close to existing haul routes.
Northern Infrastructure Precinct	• Opportunities to avoid and minimise impacts on ecological values not identified at this stage due to the need to locate the infrastructure relative to the underground infrastructure which it relates to. • FGM will conduct further micro-siting of this location closer to the time of construction (i.e. during detailed design) and will identify further opportunities to avoid and minimise.
Aquifer recharge (AR)	• The Project initially considered 2 options for the AR component: - Option 1: Five new bores. Two located in cleared areas in paddocks and 3 in Wellsford State Forest. - Option 2: Three bores. Two new bores located in cleared paddocks (same as Option 1). The 3rd bore utilising an existing bore in Wellsford State Forest. • Fosterville Gold Mine Pty Ltd has selected Option 2 to reduce the area of impact in Wellsford State Forest. Selection of this option better aligns with Clause 12.01-1L of the Greater Bendigo Planning Scheme to protect key environmental areas in the Greater Bendigo area and minimise development close to native vegetation reserves.

Component	Avoidance and minimisation
	• A bridge will be installed for the AR pipeline to span Gunyah Creek to reduce impacts on the creek and a known population of FFG Act listed threatened Brown Toadlet. Footings will be placed back from the top of bank to minimise disturbance. • The pipeline will be placed on the surface to avoid trenching earthworks. • The Project has committed to not removing trees in Wellsford State Forest.
Ancillary works	
Southern vent shaft	• Initially 3 options were considered for the location of the vent shaft (Options 1, 2 and 3). Option 3 was discounted early in the EES process due to potential loss of native vegetation. • Ultimately, a 4th option (Option 4) was investigated and selected for the southern vent shaft location on the basis of selecting a site with suitable sub-surface geological conditions which is positioned to minimise impacts to ecological values, in particular PTWL habitat, large trees and tree hollows. • Fosterville Gold Mine Pty Ltd has committed to micro siting the vent shaft to further minimise loss of native vegetation by setting back a minimum of 15 m from the boundary fence to avoid impacting Tree Protection Zones of native vegetation in the adjacent road reservation that is contiguous with Mount Sugarloaf Nature Conservation Reserve. • The southern vent shaft will extend above the surface (with fans located underground) and will therefore not be accessible to wildlife at ground level. The vent shaft outlet will be installed on a 10x10 m concrete pad with a perimeter fence that will also restrict access.
Hunt's Pit embankment	• Location choice limited as associated with existing structure
Haul roads	• No new haul roads are proposed apart from a new portion of Haul Road 1 which is required due to the existing portion being displaced by TSF 5 and 6. The remainder of Haul Road 1 will be upgraded. Other existing haul roads (2 – 5) will be utilised and will receive upgrades. • A bridge will be installed for the Haul Road to span Gunyah Creek to avoid works in the Creek. • The bridge will avoid impacts on the creek and a known population of the state listed Brown Toadlet. • Footings will be placed back from the top of bank to minimise disturbance. • The existing culvert where Haul Road 1 crosses Gunyah Creek may be replaced – no new culverts will be installed.
Borrow pit	• Fosterville Gold Mine Pty Ltd has committed that detailed design must minimise native vegetation removal, and it is proposed to 'borrow' the materials in a manner which enables the borrow pit area to be converted to a wetland. • Traditional Owners of the land (Dja Dja Wurrung) will be consulted with. • The borrow pit will not be required for at least 10 years (and may never be required), which provides FGM with opportunities to design in a manner which avoids and minimises impacts on ecological values and maximises habitat values
Topsoil storage areas	• Stockpiles of topsoil will be no greater than 2 m in height in 2 locations chosen based on land availability of sufficient area of land not subject to flooding away from waterways and vegetation, and close to haul roads to reduce dust and noise impacts associated with increased haulage distances
Services corridor	**North of Fosterville North Road** • Maintenance works will be undertaken along existing disturbed areas to remove vegetation that poses a risk to the existing pipeline network (strangulation). **South of Fosterville North Road** • No upgrades are planned which means ecological values will not be impacted.

10.10 Management and mitigation measures

Fosterville Gold Mine has a general environmental duty (GED) under the *Environmental Protection Act 2017* (EP Act) to eliminate or minimise the risk of harm from construction, operation activities, pollution and waste to human health and the environment. This includes biodiversity and ecological values.

Detailed design of the Project will be undertaken in accordance with an approved work plan variation and in accordance with the environmental management framework (EMF) for the Project to avoid or minimise impacts to native vegetation and habitat to the extent practicable.

The Project will be undertaken in accordance with an approved work plan variation (WPV) issued under the MRSD Act and in accordance with the environmental management framework (EMF) for the Project. Both the WPV and EMF will require the detailed design of the Project to avoid or minimise impacts to native vegetation and habitat to the extent practicable within the construction footprint. Any such adjustments during detailed design and the works approval application process will be contained within the construction footprint that has been subject to the impact assessment under the EES. Any changes to design will not entail additional impacts from those already identified by the EES.
The key mitigation and management measures that will be implemented via the work plan variations which will be submitted for each component, and which are also documented in **EES Chapter 24: Environmental Management Framework**. Further details can be found in Section 8 of Technical Report D.

Table 10-13 Management and mitigation measures

MM ID	Mitigation measure	Potential impact being mitigated	Stage
MM – E01	Induct all employees and contract staff on the presence and location of significant ecological values and inform them of all relevant protective measures and obligations.	E08 E13 E14	Construction Operation
MM – E02	Establish No Go Zones (NGZs) for the duration of the Project construction, where Project components are in close proximity to areas of sensitive ecological value (Wellsford State Forest and Gunyah Creek). Clearly identify NGZ to protect native vegetation / habitat on all site risk management plans for the Project. Confirm that native vegetation and trees to be retained have been adequately protected from impact prior to works. This inspection will be undertaken by an appropriately qualified person or similar. Conduct regular inspections and maintenance of fencing throughout construction and operation to ensure continued integrity. Further details are provided in Technical Appendix D, Ecology Impact Assessment, Section 8.1.2	E02 E08 E13 E14 E22 E23 E32	Construction Operation
MM – E03	Implement hygiene measures to ensure opportunities for the introduction and spread of weeds (importation of seeds and other vegetative material to the site) and pathogens are limited. • No importation of soil and fill material to site to prevent materials potentially infected by weeds being introduced to site. • Establish and maintain wash-down locations for machinery, vehicles, tools and footwear. Wash-down locations will:	E25 E26	Construction Operation Rehabilitation

MM ID	Mitigation measure	Potential impact being mitigated	Stage
	- Be located at least 30 m from waterways and drains. - Be sited close to site entry and exit points. - Collect wastewater and sediment to be disposed of appropriately. - Include signage to advise personnel of the methods to use. • Identify known areas of significant weed infestations on site plans and in contractor induction material. • Drive on surfaced or defined roads and tracks. • Avoid driving through highly infested areas of weeds, in water or areas of wet soil, where possible. • Stockpile topsoil (including the top 2 cm of soil along with vegetative material) separately to sub-surface material (sub 2 cm) as the topsoil possesses the greatest risk of weed seed spread from the Project area. • Retain topsoil within the Project area to prevent the spread of weeds outside the Project area. Assess suitability of cleared vegetation for mulching/erosion protection on a site-by-site basis. Cleared vegetated material containing or with the potential to contain weed seed material will not be used. Continue to implement weed control as per existing licence conditions.		
MM – E04	Implement weed controls including: • Treat high risk weeds prior to works commencing. • Engage experienced land management contractor/s familiar with native plant and weed identification and possess a detailed working knowledge of herbicide selection and use and mechanical removal techniques to undertake weed control. • Implement a monitoring and control program for noxious weed species. • Conduct inspections to check for evidence of weed invasion, degradation, or erosion near work areas. • Manage any outbreak of CALP Act and/or Weeds or National Environmental Significance (WoNS) that occurs due to construction activity. Prevent spread into adjacent land. Ensure induction of all contract staff details the requirements for vehicles and equipment to be free of mud and plant material prior to entering work sites.	E25 E26	Construction Operation Rehabilitation
MM – E05	Place stockpiles, machinery, infrastructure away from waterways, dams and areas supporting native vegetation to reduce risk of disturbance.	E15 E32	Construction Operation
MM – E06	Implement appropriate sediment and erosion control measures prior to any ground-disturbance works and throughout construction and operation to protect retained native vegetation, Brown Toadlet habitat (Gunyah Creek and floodplain) and potential Growling Grass Frog habitat (Gunyah Creek and dams). Construction phase sediment control in Gunyah Creek will be developed in consultation with North Central CMA.	E07 E09 E11 E15 E32 E33	Construction Operation

MM ID	Mitigation measure	Potential impact being mitigated	Stage
MM – E07	Implement sediment and erosion mitigation measures as specified in the **EES Chapter 24: Environmental Management Framework**.	E07 E15	Construction Operation
MM – E08	Implement air quality mitigation measures as specified in the **EES Chapter 24: Environmental Management Framework**.	E09	Construction Operation
MM – E09	Implement the following to minimise impacts on Gunyah Creek and the known population of FFG Act listed Brown Toadlet: • Southern crossing: o Install a bridge for the Haul Road to span Gunyah Creek; the AR pipeline and services corridor can utilise the new infrastructure. o Place footings back from the top of bank so that disturbance is minimised. o Restrict the construction footprint to also minimise disturbance to the riparian corridor. • Northern crossing (if the existing culvert is to be replaced): o Limit work within the footprint of the existing culvert and road area. o Design a replacement culvert that facilitates infrastructure with positive conservation outcomes for Brown Toadlet, in particular the need to maintain connectivity between populations. In lieu of specific design standards for the species modify design standards in Growling Grass Frog Crossing Design Standards Melbourne Strategic Assessment (DELWP 2017d) with the advice of a professional ecologist. o Install sedimentation and erosion controls surrounding the works area before culvert works are undertaken (MM06). • Floodplain: Restrict construction footprint to 20 m width Further details are provided in Technical Appendix D, Ecology Impact Assessment, Section 8.3.4	E07 E09 E11	Construction Operation
MM – E10	Conduct any works potentially occurring within riverbeds or banks of a designated waterway in accordance with a works on waterways from the North Central CMA and native vegetation permits.	E07, E09, E11, E31 E32, E33 E36, E37	Construction Operation
MM – E11	Implement spill control (surface water) and waste management mitigation measures as specified in the **EES Chapter 24: Environmental Management Framework**.	E07, E09, E31, E32,	Construction Operation
MM – E12	Implement surface water mitigation measures as specified in the **EES Chapter 24: Environmental Management Framework**.	E33, E36, E37	Construction Operation
MM – E13	Implement measures to manage artesian conditions that may develop under Wellsford State Forest due to aquifer recharge: • Optimise management of groundwater to maximise reuse (MM-GW04). • Update groundwater monitoring plan to include groundwater level monitoring in AR area to detect artesian extent and risk of upward leakage (MM-GW07).	E35	Operation

MM ID	Mitigation measure	Potential impact being mitigated	Stage
	• Develop and implement Trigger Action Response Plan (TARP) for groundwater levels including triggers for groundwater levels in the alluvial aquifer at the N boundary of MIN5404 (MM-GW07) • Cap all bores within Wellsford State Forest which extend into the FRA in a manner which prevents leakage in the event the pressure head of the FRA increases with recharge and groundwater level rises in the bores. • Protect the high-pressure AR pipelines and bore heads within the public areas of Wellsford State Forest from tampering and/or accidental impact.		
MM-E14	Continue to implement pest animal control program as per existing licence conditions. The current pest animal contractor is experienced in working in ecological sensitive environments and is trained in tracking native and non-native species to ensure off-target animal species are not exposed to poisoned baits during baiting programs.	E27 E28	Construction Operation Rehabilitation
MM – E15	In areas of potential disturbance to sensitive fauna species the following measures will be implemented: • Use of lighting technology that can limit the spread of light outside of the works area and into sensitive habitat (i.e. adjacent woodlands) • Using a light beam that is minimally attractive to flying insects. Facilities established within or close to sensitive habitats will incorporate use of low intensity and longer wavelength lighting such as red/orange (when not conflicting with safety requirements).	E19	Construction Operation
MM – E16	Implement noise mitigation measures as specified in the **EES Chapter 24: Environmental Management Framework**.	E14 E20 E22	Construction Operation Rehabilitation
MM – E17	Install earth ramps at intervals along the surface pipeline of the AR to facilitate ground-dwelling fauna crossing the pipeline. Further details are provided in Technical Appendix D, Ecology Impact Assessment, Section 8.3.4	E14	Construction Operation
MM – E18	Conduct pre-clearing survey at all sites where vegetation is being removed to assess presence of fauna. Develop a pre-clearance survey and salvage protocol in consultation with DEECA.	E15	Construction Operation
MM – E19	Prepare a wildlife salvage plan in consultation with appropriate regulator/s. Engage a suitably qualified wildlife handler ('wildlife spotter') holding a relevant and current authorisation under the *Wildlife Act* 1975, to salvage any wildlife encountered during site clearance works. Prepare Translocation Plan for salvage of threatened species (Brush-tailed Phascogale) and submit to DEECA Translocation Evaluation Panel for approval.	E19	Construction Operation
MM – E20	Remove habitat trees or shrubs (particularly hollow-bearing trees) between February and September, where practicable. Habitat trees or shrubs will not be removed between October and January	E14	Construction Operation

MM ID	Mitigation measure	Potential impact being mitigated	Stage
	(inclusive) to avoid the breeding season of most nesting birds and mammals or in accordance with the Biodiversity Management Plan (or equivalent).		
MM – E21	Trenching works will manage any open pits or trenches to reduce potential for fauna entrapment in accordance with the *APGA Code of Environmental Practice: Onshore Pipelines* (AGPA, 2017) through measures such as: • Minimising the length of trench open at a time. • Minimising the amount of time trenches and other excavations are open. • Constructing trench plugs (short section of trench left unexcavated to allow passage of stock or wildlife across the trench) with slopes less than 45º to provide exit ramps for fauna. Provide other exit ramps where practicable and safe to do so. Exit ramps to be installed at the ends of cable trenches. • Creating 'ladders' to enable fauna to exit the excavations (e.g. branches, ropes, planks, floats). • Daily inspections of open trenches by appropriately certified personnel to remove trapped fauna as required. • Checking for fauna prior to backfilling trenches. • Ensuring fauna are discouraged from work areas by erecting barriers where practicable. • Considering installing signage along access routes through conservation reserves to raise awareness of presence of wildlife crossing roads and reduce incidence of wildlife collision. Developing and implementing a procedure for finding trapped fauna.	E16	Construction Operation
MM – E22	Establish permanent No Go Zone fencing using post and wire fencing (without barbed wire), or chain mesh fencing 1.8 m high if required. Add a white wire strand at the top of the fence to make it more visible to wildlife. Establish short-term, more temporary NGZs or other fenced areas with a single wire strand with bunting flags rather than orange mesh parawebbing to reduce risk of entanglement. Establish a new boundary fence around the Brine Ponds designed in a manner to exclude wildlife and unauthorised human access for safety purposes. Retain existing post and wire boundary fence between the existing mine and Wellsford State Forest.	E17	Construction Operation
MM – E23	Measures to reduce the risk of wildlife-vehicle interactions will be implemented, including: • Maintain agreed speed limit on access roads to the site as per occupational health and safety requirements. • Install signage warning of the presence of wildlife and ensuring signage is maintained. • Record vehicle-wildlife interactions to inform review of management measures.	E18	Construction Operation
MM – E24	Develop and implement an Injured Wildlife Protocol in consultation with ERR and wildlife carers which outlines steps to take in the	E15	Construction

MM ID	Mitigation measure	Potential impact being mitigated	Stage
	event of injured wildlife being encountered and provides contact details for local wildlife carers.		Operation
MM – E25	Implement operational and engineering controls for fire management currently in place at FGM for the construction and operation of the Project and continue into the active rehabilitation phase (where applicable, considering mining and processing will have ceased at that point).	E29	Construction Operation
MM – E26	Conduct a trial artificial hollow program in consultation with experts and relevant regulators to ascertain the most effective solution for FGM (or investigate other programs that may be occurring in the local area). Develop a replacement hollow program based on the outcomes of the trial.	E24	Construction Operation
MM – E27	Collect local seed for use in revegetation and rehabilitation.	E11	Construction Operation Rehabilitation
MM – E28	Progressively revegetate areas disturbed by the Project with local indigenous species	E11	Operation Rehabilitation
MM – E29	Collect stumps from cleared areas and spread them out during rehabilitation to provide habitat. Retain sections of trees felled as part of clearance of native vegetation to reuse during rehabilitation works as additional habitat.	E11	Rehabilitation
MM – E30	Retain rocks and relocate to suitable areas to provide habitat for fauna species such as reptiles.	E11	Construction Operation
MM – E31	Prioritise revegetation and enhancement of areas of habitat within MIN5404 that facilitate movement of fauna through the local landscape, particularly for the woodland birds and arboreal mammals which may be impacted by the Project.	E23	Rehabilitation
MM – E32	Explore opportunity to create wetland habitat in the location of the Borrow Pit (if it is required).	E11	Rehabilitation
MM – E33	Continue to use mulch to assist in water retention, vegetation growth and invertebrate habitat formation.	E11	Operation Rehabilitation
MM – E34	Continue to explore opportunities to ‘do more’ in relation to restoration of the local environment. Refence 8.9.8	All	Operation Rehabilitation
MM – E35	Prepare and implement a site risk management plan as part of each work plan variation to be submitted to ERR for approval for each EES Project component.	All	Construction Operation Rehabilitation
MM – E36	Prepare and implement a Biodiversity Management Plan (or equivalent) which will: • outline control measures to protect ecological values and reduce ecological impacts • define the objectives and targets, roles, and responsibilities for management actions • include measures to manage and control impacts on biodiversity from biosecurity threats (weeds, pathogens, and pest animals).	All	Construction Operation Rehabilitation

MM ID	Mitigation measure	Potential impact being mitigated	Stage
MM – E37	Implement rehabilitation measures as specified in the **EES Chapter 24: Environmental Management Framework and Chapter 21: Rehabilitation**. Further details are provided in Technical Appendix D, Ecology Impact Assessment, Section 8.10.3	All	Construction Operation Rehabilitation
MM – E38	Develop and implement the Environmental Management Framework (EMF) for the Project to set out accountabilities and systems to manage and monitoring environmental effects and the approach to evaluating and reporting environmental outcomes and performance. Further details are provided in Technical Appendix D, Ecology Impact Assessment, Section 8.11	All	Construction Operation Rehabilitation

10.11 Offsets

The Project will result in known losses of native vegetation. These known losses have been described in Section 10.8.

These known impacts are automatically 'residual impacts' as they remain after avoidance and mitigation measures are applied. Offsets are measures that compensate for residual adverse impacts but are not a mitigation.

Offsets for the loss of native vegetation and TECs will be required in accordance with the EPBC Act Environmental Offsets Policy and the Victorian Native Vegetation Removal Regulations. These are discussed below.

10.11.1 Native vegetation offsets

The Project will obtain a formal Native Vegetation Removal report from DEECA. Indicative offset requirements are 13.778 General Habitat Units within a minimum strategic score of 0.365 in the North Central Catchment Management Area or Greater Bendigo City Council area. 214 large trees need to be protected.

First party offsets under Victorian Native Vegetation Removal Regulations are proposed to be secured on Fosterville Gold Mine Pty Ltd owned land and if required via third party offset on land owned by another party (a native vegetation credit owner). It is unlikely that the offset site will meet 100% of the State offset requirements, as such residual offsets will be achieved via a third party offset. The first party offset adjacent to the mine will achieve a better ecological outcome than a third party offset further away from the area of impact.

Details on how offsets are calculated are provided in Section 10 of Technical Appendix D.

10.11.2 EPBC Act Offsets

The Project has prepared an EPBC Act Offset Strategy that outlines a proposed GBGW offset for direct (6.344 ha) and deemed (4.245 ha) losses (total loss of 10.589 ha). Offset Management Plans have been prepared that outline management actions required to improve the ecological condition of the two chosen sites (Charlton and Carapooee).

The offset sites satisfy EPBC Act offset obligations for impacts on GBGW.

Additionally, the Project has prepared an EPBC Act Offset Strategy that outlines the proposed offset for Swift Parrot and Regent Honeyeater. The primary offset site is on Fosterville Gold Mine Pty Ltd owned land contiguous with existing conservation areas (Mount Sugarloaf Nature Conservation Reserve, Wellford State Forest and Ellesmere Bushland Reserve) that will achieve a better ecological and conservation outcome than a third party offset elsewhere. Habitat in the proposed offset area has better context (more contiguous, outside an operational mine area) than the loss that is occurring and is likely to support other threatened species and ecological communities. The offset will also achieve offsets for native vegetation under the Victorian Native Vegetation Removal Regulations. The secondary offset site

is the Carapooee offset site that will be secured for GBGW and habitat for Swift Parrot and Regent Honeyeater.

An offset Management Plan is being prepared for the FGM offset site.

Details on how offsets are calculated are provided in Section 10 of Technical Appendix D and the management plans are available in Appendix O of the report.

10.12 Residual impacts

Residual impacts due to land clearance will be unavoidable and will result in a residual impact on native vegetation, TECs and habitat for threatened species. The Project will seek to refine the design of each component during detailed design, where possible.

It is conservatively assumed that all vegetation and habitat would be removed within the impact area to facilitate the Project and that all treed vegetation within the buffer area would be 'deemed lost'.

The Project will seek to refine the design of each component during detailed design where possible within the construction footprint, although it is acknowledged that there may be limited opportunities to further reduce impacts as the Project has already selected the locations required for the Project components.

Most of the residual impacts on ecological values will eventuate during the construction phase of the Project and as detailed in the tables below, most are permanent.

The residual ecological impacts of the Project and their implications on MNES are summarised in Table 10-14 and for State significant biodiversity objectives in Table 10-15.

The residual impact consequence is described in accordance with the ERR 2020 guidance. Details of the decision-making process for significant impact is provided in Appendix H of Technical Appendix D.

Table 10-14 Residual ecological impacts of the Project – EPBC Act Matters of National Environmental Significance

Ecological value	Residual impact extent	EPBC Act Significant impact likely?	Magnitude	Duration
Threatened Ecological Community – Grey Box Grassy Woodland	Loss of 10.592 ha of GBGW: • 6.325 ha direct removal. • 4.267 ha deemed loss.	Yes	Critical (harm to >1 ha listed community)	Permanent Offsets required
Threatened flora – Clover Glycine, Erect Peppercress, McIvor Spider-orchid, Sturdy Leek-orchid, Whipstick Westringia, Trailing Hop Bush, Spiny Rice Flower, Sturdy Leek Orchid	No residual impact. Targeted survey did not detect any of the EPBC Act listed threatened flora species and, as such, the likelihood of the species occurring is low.	No	No residual impact	None No offsets required
Threatened fauna – Swift Parrot, Regent Honeyeater	Loss of woodland habitat: • Direct removal (construction footprint) o 9.260 ha Grassy Woodland and Box Ironbark Forest o 68 scattered trees (37 large, 31 small) o 4.767 ha revegetation • Deemed loss (due to potential impacts on Tree Protection Zone of retained trees within 15 m of the construction footprint): o 9.567 ha woodland canopy cover o 27 scattered trees (11 large, 16 small) o 6.322 ha revegetation This removal is likely to be a significant impact for Swift Parrot and Regent Honeyeater under the EPBC Act.	Yes	Minor (no deaths of individuals)	Permanent Offsets required
Threatened fauna – Painted Honeyeater	Residual impact not anticipated. The likelihood of Painted Honeyeater occurring in the study area is low due to absence of abundance of mistletoes (key resource).	No	Minor (no deaths of individuals)	Offsets not required
Threatened fauna – White-throated Needletail and Grey-headed Flying-fox	Loss of woodland habitat: • Direct removal (construction footprint) o 9.260 ha Grassy Woodland and Box Ironbark Forest o 68 scattered trees (37 large, 31 small) o 4.767 ha revegetation • Deemed loss (due to potential impacts on Tree Protection Zone of retained trees within 15 m of the construction footprint): o 9.567 ha woodland canopy cover	No	Minor (no deaths of individuals)	Permanent Offsets not required

Ecological value	Residual impact extent	EPBC Act Significant impact likely?	Magnitude	Duration
	○ 27 scattered trees (11 large, 16 small) ○ 6.322 ha revegetation Removal of 113 hollow-bearing trees (possible roost for White-throated Needletail). This removal is unlikely to be a significant impact for White-throated Needletail or Grey-headed Flying-fox under the EPBC Act as they are likely to use the woodland only sporadically within the study area as they move through the landscape seeking foraging resources in more extensive areas of habitat.			
Threatened fauna – Pink-Tailed Worm-lizard	Removal of 0.047 ha potential habitat in Wellsford State Forest for the AR component construction footprint and Southern Vent Shaft Option 4 will remove low quality habitat. Project is unlikely to constitute a significant impact on the species.	No	Moderate	Habitat removal permanent. Offsets not required
Threatened fauna – Growling Grass Frog	No residual impact as species unlikely to occur.	No residual impact	No residual impact	No residual impact
Threatened fauna - Murray Cod and Macquarie Perch	No residual impact.	No residual impact	No residual impact	No residual impact
Key Biodiversity Area	The Project will result in: • Direct removal of 6.655 ha of native vegetation within the KBA. • Deemed loss of 5.335 ha of native vegetation within the KBA • Not likely to affect status as KBA.	n/a	Major	Permanent reduction of habitat Not likely to affect status as a KBA

Table 10-15 Residual ecological impacts of the Project– State significant biodiversity values

Ecological value	Residual impact	Magnitude	Duration
Native vegetation	Direct loss of • 19.435 ha patches (see Table 10-16 for breakdown by EVC) • 102 large trees in patches • 68 scattered trees (37 large, 31 small) Deemed loss of: • 9.571 ha patches (see Table 10-17 for breakdown by EVC) • 60 large trees in patches • 27 scattered trees (11 large, 16 small)	Critical	Permanent Offsets required
		Critical (if occurs)	Permanent Offsets required
Endangered EVCs	Direct loss of up to 2.847 ha of endangered EVCs: • 0.888 ha from the impact area. • 1.959 ha deemed loss. • Endangered EVC extent is contracted to less than 10% of former range, less than 10% pre-European extent remains or a combination of depletion, degradation, current threats and rarity. • The removal of Endangered EVCs further reduces the already contracted, depleted and degraded EVC.	Major	Permanent Offsets required
High-quality native vegetation	• Direct loss of one patch of high-quality native vegetation in the TSF5 & TSF6 study area • The extent of High-quality native vegetation within Victoria is limited and removal is likely to be permanent. • The removal of High-quality native vegetation represents areas with high biodiversity values including (but not limited to) species diversity, habitat features such as hollow trees and logs, few weeds, other lifeforms such as fungi and connectivity to other patches of native vegetation.	Moderate	Permanent Offsets required
Mapped wetlands	• No residual impact. • DEECA has approved the exclusion of sections of mapped wetland from offset requirements for native vegetation loss due to the artificial and permanent inundation of the areas and the inability of the areas to support wetland-associated native vegetation.	No residual impact	No residual impact

Ecological value	Residual impact	Magnitude	Duration
Threatened ecological community	**FFG Listed Victorian Temperate Woodland Bird Community** • Direct loss of 19.260 ha of habitat from impact area (Grassy Woodland and Box Ironbark Forest) • Deemed loss of 9.567 ha canopy cover **FFG Listed Grey Box – Buloke Grassy Woodland Community** • Direct removal of 0.047 ha from the impact area • Deemed loss of 0.413 ha	Critical	Permanent Offsets required for Grey Box
Threatened flora species	• No residual impact - targeted survey did not detect any of the threatened flora species and, as such, the likelihood of the species occurring is low.	No residual impact	No residual impact
Threatened fauna - waterbirds	• Waterbirds (Hardhead, Australasian Shoveler, Musk Duck) will be impacted by open pit cutbacks (O'Dwyers, Farleys, Hunts). • Habitat is artificial and not likely to be important or limiting for these species.	Minor	Habitat is artificial and not likely to be important or limiting for these species.
Threatened fauna – woodland species	• Direct removal of 19.260 ha of woodland habitat from construction footprint (Grassy Woodland and Box Ironbark Forest). • A further 9.567 ha canopy cover 'deemed loss' based on extent of Grassy Woodland and Box Ironbark Forest within the 15 m buffer area. • Removal of 113 hollow-bearing trees (considered as a standalone impact below). • Some animals may be overlooked during salvage and therefore injured or killed.	Moderate	Permanent
Threatened fauna – Brown Toadlet	• Removal of a small extent of potential floodplain habitat west side of the southern crossing (0.24 ha). • Southern crossing of Haul Road 1 and services corridor will require no new infrastructure works in Gunyah Creek (MM-E9 & MM-E10) and sediment and spill control measures (MM-E06 & E07 and MM-E09) will be implemented. • Northern crossing of Haul Road 1 may require replacement of culvert, subject to specific mitigation measures, erosion, sedimentation control measures and the extent of the works will not extend beyond the footprint of the existing culvert. • Connectivity will be maintained along Gunyah Creek.	No residual impact	No residual impact
Threatened fauna – Platypus and Murray River Turtle	• No residual impact as species not located in Project area and Campaspe River will not be impacted by Project.	• No residual impact	• No residual impact

Ecological value	Residual impact	Magnitude	Duration
Hollow-bearing trees	• Direct removal of 113 trees known to contain hollows or potential hollows. • Loss of hollow-bearing trees impact on hollow-dependent fauna including threatened species and members of the Victorian Temperate Woodland Bird Community and the EPBC Act White-throated Needle-tail which may roost on occasion in hollows when foraging in the area.	Major	Permanent if replacement hollows do not work Offset for native vegetation loss (those trees identified as 'large') will be required
Habitat connectivity	• Removal of native vegetation, particularly associated with the TSFs, will increase existing gaps in continuity of canopy cover that are already present between the large remnant patches in Wellsford State Forest and Mount Sugarloaf Nature Conservation Reserve to the west and the Campaspe River corridor to the west.	Minor	Temporary – reinstatement works as part of rehabilitation will restore habitat
Protected wildlife	• Loss of habitat for non-threatened wildlife is unavoidable. • Some animals may be overlooked during salvage and therefore injured or killed.	Moderate	Permanent
Groundwater Dependent Ecosystems	No residual impact. • Terrestrial GDEs that may support native vegetation and/or threatened species are unlikely to be impacted by the project. • Subterranean GDEs (stygofauna) not recorded in the FRA.	No residual impact	No residual impact
Downstream impacts	No residual impact. • No impact to Campaspe River. • Gunyah Creek impacts mitigated provided control measures are implemented.	No residual impact	No residual impact

Table 10-16 summarises the maximum extent of each native vegetation EVC that will be affected by the Project.

Table 10-16 Known impacts by EVC – direct loss

EVC Name	Extent (ha)		
	Goldfields bioregion	Victorian Riverina bioregion	Total
Box Ironbark Forest (EVC 61)	12.604	0.480	13.084
Grassy Woodland (EVC 175_61)	5.349	0.827*	6.176
Plains Grassy Wetland (EVC 125)	0.061*	-	0.061
Tall Marsh (EVC 821)	0.114	-	0.114
Total	**18.128**	**1.307**	**19.435**

Table 10-17 Potential Impacts by EVC – 15m buffer area ('deemed loss')

EVC Name	Extent (ha)		
	Goldfields bioregion	Victorian Riverina bioregion	Total
Box Ironbark Forest (EVC 61)	3.597	0.376	3.973
Grassy Woodland (EVC 175_61)	3.639	1.955*	5.594
Plains Grassy Wetland (EVC 125)	0.004*	-	0.004
Tall Marsh (EVC 821)	-	-	-
Total	**7.240**	**2.331**	**9.571**

*endangered EVC

10.13 Cumulative impacts

Four other projects within 50 km of the Fosterville Project may have potential for cumulative impacts. Impacts from the ongoing operations at FGM are included in the cumulative impact assessment. Details on how cumulative impact is assessed are provided in Section 11 of Technical Appendix D and a summary is provided in Table 10-18.

Table 10-18 Projects considered for cumulative impacts in combination with the Project

Project	Project Summary	Spatial overlap
Bendigo Creek Reclamation and Rehabilitation Project	Currently being scoped for an EES. Decision for EES made based on potential for significant environmental effects including impacts on native vegetation and associated biodiversity values including listed threatened species and communities.	Huntly Common; no spatial overlap with the Fosterville Gold Mine
Girgarre Solar Farm	Plans to develop and operate a major grid-connected solar farm in Girgarre, 75 km north-east from Bendigo.	No spatial overlap with the Fosterville Gold Mine
Axedale Solar Farm	Proposal to develop and operate a major grid-connected solar farm near Axedale, 25 km east of Bendigo.	No spatial overlap with the Fosterville Gold Mine.
Fosterville Solar Farm	Proposal to develop and operate a major grid-connected solar farm near Axedale, 25 km east of Bendigo.	No spatial overlap with the Fosterville Gold Mine.

The following cumulative impacts on MNES are possible:

- Cumulative impacts are likely to occur to the Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia TEC due to the native vegetation clearing required by the initial phase of the Project and the current proposed development. The extent of clearing within this community is estimated to be 10.592 ha total. This is composed of 6.325 ha of direct removal and 4.267 ha of 'deemed loss' due to impacts on Tree Protection Zones (TPZ).
- Threatened fauna species (Swift Parrot, Painted Honeyeater, White-throated Needle-tail, Grey-headed Flying-fox due to the cumulative loss of the above Grey Box and associated foraging habitat. The exact quantum of cumulative impact on threatened fauna species cannot be stated due to the limits in available data.

No cumulative impact is estimated for EPBC Act listed threatened flora species (Clover Glycine, Erect Peppercress, McIvor Spider-orchid, Sturdy Leek-orchid, Whipstick Westringia, River Swamp Wallaby-grass, Spiny Rice-flower or for EPBC Act listed threatened fauna species (Pink-tailed worm-lizard and Growling Grass Frog).

Potential cumulative loss of native vegetation as a result of the Project (based on assumed complete loss) includes:

- Removal of 44 ha of patches of native vegetation. This includes 19.435 ha of direct removal and 9.571 ha 'deemed lost' as a result of clearings for the EES Project.
- Removal of 48 Large Scattered Trees and 47 Small Scattered Trees. This includes 16 small and 11 large trees which will are 'deemed lost' due to impacts on TPZs.
- Clearing of 28.826 ha of Victorian Temperate Woodland Bird Community Threatened ecological community.
- Removal of 17.057 ha of Box Ironbark Forest (EVC 61). This is an assumed cumulative impact as the initial 1996 investigations identified Box Ironbark Forest but did not record the quantity required for removal.
- Potential impacts to threatened fauna (Brush-tailed Phascogale, Lace Monitor, Barking Owl, FFG Act -listed Woodland Birds), with a number of these species being highly likely of recorded during general site assessments.
- Hollow-bearing trees - at least 113 hollow-bearing trees are known from the projects considered by the assessment.

No cumulative impact is estimated for the following State significant biodiversity values:

- Large trees in patches
- Grassy Woodland (EVC175_61), Plains Grassy Wetland (EVC 125) and Tall Marsh (EVC 821)
- Threatened ecological communities (Grey Box Buloke Woodland)
- Threatened fauna (Brown Toadlet)
- Threatened flora (Ausfeld's Wattle, Bent-leaf Wattle Buloke Cane Spear-grass Cottony Cassinia Dwarf Cassinia Goldfields Grevillea Jericho Wire-grass Late-flower Flax-lily Sand Rush Small-leaf Goodenia Southern Swainson-pea Whirrakee Wattle Yellow-tongue Daisy).

10.14 Conclusions

- A long history of mining and agriculture in the Fosterville area has meant that much of the landscape is now modified. Large parts of the Fosterville Gold Mine have been previously cleared for agriculture and mining activity (both current and historic).
- Native vegetation within the study area is representative of 4 Ecological Vegetation Classes: Box-Ironbark Forest (EVC 61), Plains Grassy Wetland (EVC 125), Low Rises Grassy Woodland (EVC 175_61) and Tall Marsh (EVC 821).

- Some of the patches of Box-Ironbark Forest and Grassy Woodland represent Grey Box Grassy Woodland and Derived Native Grassland of South-eastern Australia which is listed as threatened under the EPBC Act and provides habitat for threatened species. Woodland and forest vegetation supports the Victorian Temperate Woodland Bird Community listed as threatened under the FFG Act and provides habitat for other threatened woodland fauna.
- The Project has sought to avoid and minimise impacts on Grey Box Grassy Woodland and Derived Native Grassland of South-eastern Australia as much as practicable by using existing easements and incorporating previously disturbed areas where possible.
- The Project will continue to seek opportunities to avoid and minimise impacts and will implement mitigation measures identified in this report and other mitigation relevant mitigation measures detailed in the **EES Chapter 24: Environmental Management Framework**.
- The Project will result in significant residual impacts on three EPBC Act listed MNES:
  - Grey Box Grassy Woodland TEC
    - Direct permanent loss of 6.325 ha from the construction footprint.
    - Deemed loss of 4.267 ha from the buffer area.
  - Swift Parrot and Regent Honeyeater
    - Direct removal of 19.260 ha of woodland habitat from construction footprint (Grassy Woodland and Box Ironbark Forest) and removal of 68 scattered trees (37 large, 31 small). Removal of 4.767 ha of revegetation.
    - A further 9.567 ha canopy cover 'deemed loss' based on extent of Grassy Woodland and Box Ironbark Forest within the 15 m buffer area and may affect 27 scattered trees (11 large, 16 small). Deemed loss of 6.322 ha revegetation.
- The Project is unlikely to have a significant impact on the following MNES:
  - EPBC Act listed flora species are unlikely to be impacted as the likelihood of occurrence of these species is low. No threatened species were detected during targeted survey.
  - Minor residual impact on habitat for EPBC Act listed White-throated Needle-tail and Grey-headed Flying Fox is unlikely to be a significant impact.
  - Painted Honeyeater has low likelihood of occurrence and therefore unlikely to be impacted.
  - Pink-tailed Worm-lizard is unlikely to be significantly impacted. The Project has avoided impacts on potential habitat by selection of Option 2 for the AR component and selection of Option 4 for the southern vent shaft component.
  - Growling Grass Frog is unlikely to occur and therefore be impacted by the Project. Targeted survey was conducted in December 2023 and January 2024. The species was not recorded. There is no residual impact anticipated as the species is unlikely to occur.
  - Murray Cod unlikely to be impacted. No suitable habitat in the study area and no impacts to GDEs in the Campaspe River are predicted.
- A major residual impact on a Key Biodiversity Area of national significance will occur as a result of the Project.
- The Project will result in residual impacts to the following on state biodiversity values:
  - Native vegetation
    - Direct loss from the construction footprint of 19.435 ha patches of native vegetation (including one high-quality patch in the TSF5 & TSF6 area and 2.847 ha of endangered EVCs), 102 large trees in patches and 68 scattered trees (37 large, 31 small).
    - Deemed loss from the 15m buffer area due to potential impacts on Tree Protection Zones of 9.566 ha patches of native vegetation, 60 large trees in patches and 27 scattered trees (11 large, 16 small).

- FFG Act listed communities:
  - Direct loss of 19.260 ha and deemed loss of 9.566 ha of habitat which could be suitable habitat for the FFG listed Victorian Temperate Woodland Bird Community threatened ecological community.
  - Direct loss of 0.047 ha and deemed loss of 0.413 ha of the FFG listed Grey Box Buloke Grassy Woodland Community threatened ecological community.
- FFG Act listed fauna species
  - Brown Toadlet. Removal of a small extent of potential Gunyah Creek floodplain habitat on the west side of the southern crossing representing a minor residual impact. Southern crossing of Haul Road 1 will be via a bridge span. Northern crossing may require replacement of existing culver which, if required, will be subject to specific mitigation measures and not extend beyond the existing footprint.
  - Woodland birds. Removal of woodland habitat from the construction footprint and potential loss of a further 9.567 ha of canopy cover (deemed loss) and removal of 113 hollow-bearing trees. The residual impact will be permanent and of moderate severity.
  - Waterbirds. Removal of farm dams that may be used for foraging by Eastern Great Egret on occasion. Species unlikely to rely on this habitat therefore residual impact is minor.
- Hollow-bearing trees. Loss of 113 hollow bearing trees which represents a major residual impact. Loss of hollow-bearing trees is an FFG Act threatening process and any removal of mature hollow-bearing trees will further reduce the number of resources available to hollow-dependent fauna in the study area, which includes arboreal mammals, parrots, owls, and bats. The Project will protect retained trees that contain hollows through No Go Zones and will implement an artificial hollow program, (including a trial period to assess effectiveness), to compensate for the loss of this critical habitat feature.

- No residual impact is predicted to mapped wetlands, FFG Act listed threatened flora species or GDEs.
- The Project will contribute to cumulative impacts on native vegetation, hollow-bearing trees, Grey Box Grassy Woodland and the Victorian Temperate Woodland Bird Community which includes threatened fauna species. There may be cumulative impacts to threatened flora based on assumed presence.
- As the Project will result in unavoidable losses, offsets will be required in accordance with the EPBC Act Environmental Offsets Policy and the Victorian Native Vegetation Removal Regulations.