Government of Western Australia
Department of Mines, Industry Regulation and Safety

Clearing Permit Decision Report

1. Application details and outcomes

1.1. Permit application details

Permit number:	9573/1
Permit type:	Purpose Permit
Applicant name:	Big Bell Gold Operations Pty Ltd
Application received:	28 January 2022
Application area:	30 hectares
Purpose of clearing:	Dewatering pipeline
Method of clearing:	Mechanical Removal
Tenure:	Mining Lease 51/92
	Miscellaneous Licence 51/51
Location (LGA area/s):	Shire of Cue, Shire of Meekatharra
Colloquial name:	Boomerang Pipeline Corridor

1.2. Description of clearing activities

Big Bell Gold Operations Pty Ltd (BBGO) proposes to clear up to 30 hectares of native vegetation within a boundary of approximately 33.94 hectares, for the purpose of a dewatering pipeline.

BBGO, is proposing to dewater the historical open pits (Kurara and Boomerang) that have filled with hypersaline water, to re-establish mining operations within these pits (Westgold, 2022).

The application is to allow for the installation of a dewatering pipe to dewater the Boomerang Open Pit and adjacent Kurara Pit into the historical Lake Annean discharge area. The dewatering pipeline will be installed across the surface of a previously cleared narrow corridor, which is approximatley eight kilometres in length.

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	24 March 2022
Decision area:	30 hectares within a boundary of approximately 33.94 hectares

1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Mines, Industry Regulation and Safety (DMIRS) on 28 January 2022. DMIRS advertised the application for public comment for a period of 21 days, and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix D), supporting information provided by the applicant including the results of a flora and vegetation survey (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix B), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3.3).

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values;
- potential impacts to waterbird and migratory bird habitats;
- potential land degradation in the form of wind erosion.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined that the impacts of the proposed clearing can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- commence construction no later than three months after undertaking clearing to reduce the risk of erosion; and
- where practicable, avoid clearing riparian vegetation.

2. Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Mining Act 1978* (WA)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values by:

- only clearing areas required for the pipeline corridor, which will be controlled by an internal clearing approval process;
- where practicable, areas of existing disturbance will be utilised to limit additional/new disturbance; and
- where practicable, raised blade mechanical clearing will be utilised to minimise disruption to the ground surface.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix B) identified the impacts of the proposed clearing are limited and able to be managed to be environmentally acceptable with standard management conditions.

3.2.1. Biological values - Clearing Principles (a) and (c)

Assessment

The application area is located within the Western Murchison and Eastern Murchison subregions of the Interim Biogeographic Regionalisation for Australia (IBRA) Murchison Bioregion (GIS Database). The Western Murchison subregion is broadly characterised by Mulga low woodlands, often rich in ephemerals, with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and *Tecticornia* low shrublands on saline alluvia (CALM, 2002). The Eastern Murchison subregion is characterised by internal drainage, and extensive areas of elevated red desert sandplains with minimal dune development. The area consists of broad plains of red-brown soils and breakaway complexes as well as red sandplains. Vegetation is dominated by Mulga woodlands often rich in ephemerals; hummock grasslands, saltbush shrublands and *Tecticornia* shrublands (CALM, 2002).

A flora and fauna reconnaissance survey was completed by Stantec Australia Pty Ltd in November 2021. The survey identified six broad vegetation units within the application area (Stantec, 2022). None of the vegetation communities within the application area have been identified as a Threatened or Priority Ecological Community (TEC/PEC) (GIS Database).

A desktop assessment identified a total of 27 conservation significant flora taxa as occurring within 50 kilometres of the application area (Stantec, 2022; Westgold, 2022). Of these, 13 taxa were considered ‘likely’ or ‘possible’ to occur within the application area, based on preferred habitat and/or soil types. There has been no previous records of Threatened or Priority flora within the application area. The 13 flora taxa of conservation significance that are ‘likely’ or ‘possible’ to occur within the application include:

- *Eremophila rostrata* subsp. *rostrata* (T)
- *Stenanthemum mediale* (P1)
- *Bergia auriculata* (P2)
- *Acacia sclerosperma* subsp. *glaucescens* (P3)
- *Calytrix verruculosa* (P3)
- *Hemigenia virescens* (P3)
- *Prostanthera petrophila* (P3)
- *Ptilotus beardii* (P3)
- *Ptilotus lazaridis* (P3)
- *Ptilotus luteolus* (P3)
- *Tecticornia cymbiformis* (P3)
- *Verticordia jamiesonii* (P3)
- *Goodenia berringbinensis* (P4)

(Stantec, 2022).

The field survey recorded one Priority species, *Tecticornia cymbiformis* (P3), and one flora species of other significance, *Tecticornia* aff. *undulata*, approximately 13 metres west of the application area (Stantec, 2022). Both species were found growing on the gypsiferous dunes on the Lake Annean playa and within the riparian zone of the lake (Stantec, 2022). Neither species were not recorded within the application area. These species are likely to be locally abundant and likely to occur across the broader saline lake margin habitat of Lake Annean (Stantec, 2022).

One Threatened flora species, *Eremophila rostrata* subsp. *rostrata*, has been recorded approximately 35 kilometres from the application area (WAH, 1998-; Stantec, 2022). The preferred habitat for this species is quartzite loams, hill and flats, which is likely to occur within the southern portion of the application area. Targeted searches for this species were conducted during the field survey, which resulted in no recordings within the application area or surrounds. The timing of the field survey (November) was outside of the recommended time frame for the Eremaean Botanical Province (EPA, 2016); however, Stantec noted that the vegetation within the area was flowering at the time of the survey, which is likely due to unseasonal rainfall patterns experienced during recent years (Stantec, 2022). *Eremophila rostrata* subsp. *rostrata* is considered unlikely to occur in the application area.

One introduced flora species (weed) was recorded within the application area during the field survey*; *Rumex vesicarius* (Ruby Dock). Weeds have the potential to alter the biodiversity of an area by competing with native vegetation for available resources.

The application area sits partially within Lake Annean, which is on the Directory of Important Wetlands because it forms an important wetland that supports foraging and breeding habitat for a number of migratory birds and waterbirds after periods of inundation (MWH, 2015).

The desktop assessment conducted by Stantec in 2022, identified a total of 241 terrestrial fauna taxa, including introduced species, which have been recorded and/or have the potential to occur within the application area. Of the 241 terrestrial fauna taxa identified by the desktop assessment, 26 species are listed as being of conservation significance comprising two arthropods, 22 birds, one mammal and one reptile. Of the 26 significant terrestrial fauna taxa, two were considered 'Likely' to occur, 18 were considered 'Possible' to occur and six were considered 'Unlikely' to occur. During the field survey, a total of 19 vertebrate fauna species were recorded during the survey; five mammals (three introduced), three reptiles and 11 birds. No conservation significant fauna were recorded during the survey.

Conclusion

There are no known records of Priority or Threatened flora or fauna within the application area. As the clearing area within Lake Annean is relatively small and the habitat is widely represented, it is considered that the potential impacts on biodiversity within the application are unlikely to be significant.

There is a high likelihood of weeds being present within the application area and the proposed clearing has the potential to exacerbate the spread of weeds.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- Where practicable, avoid clearing riparian vegetation

3.2.2. Biological Values (Fauna) – Clearing Principles (b)

Stantec Australia (2022) completed a Level 1 fauna assessment over the application area. The following four broad fauna habitat types were recorded within the application area:

- Mulga Woodland;
- Samphire Dune Adjacent to Saline Drainage (Samphire Dune);
- Inland Sand Dune; and
- Sandy Plain.

The desktop assessment identified 26 species of conservation significant fauna as occurring within 50 kilometres of the application area. These comprise two arthropods, 22 birds, one mammal and one reptile. Of these, two were considered 'likely' to occur, 18 were considered 'possible' to occur and six were considered 'unlikely' to occur. During the field survey, a total of 19

vertebrate fauna species were recorded during the survey; five mammals (three introduced), three reptiles and 11 birds. No conservation significant fauna were recorded (Stantec, 2022).

Lake Annean is listed in the Directory of Important Wetlands in Australia due to it being an important breeding area for waterbirds and a good example of a seasonal saline lake and marsh system (DAWE, 2022). The application area sits partially within Lake Annean, which contains riparian vegetation and the Samphire Dune habitat (Stantec, 2022). The portion of the application area that falls within Lake Annean is approximately 11 hectares, with parts of this area containing no vegetation (lake bed) and unsuitable breeding habitat for waterbirds. Lake Annean covers approximately 12,000 hectares and is likely fringed by riparian vegetation and samphire dune habitat (DAWE, 2022), providing potential habitats for bird species when the lake is inundated. As such, impacts to bird breeding habitats within the application area are likely to be minimal.

The Mulga Woodland habitat is considered widespread within the local and regional area (MWH, 2017). This habitat type can provide refuge and foraging habitat for various mammal, avifauna and reptiles (Stantec, 2022). The Mulga Woodland habitat comprises a large portion of the application area (approximately 67%) and was in poor condition due to cattle grazing. These habitats are common in the surrounding area and are likely to be used by fauna species as a part of a larger range.

The Samphire Dune habitat is generally widespread within the local and regional area (MWH, 2017). This habitat type can provide refuge and foraging habitat for reptiles and avifauna and breeding habitat for some migratory birds and waterbirds when inundated (Stantec, 2022). This habitat comprises a small portion of the application area (approximately 12 %) and has been reported as in poor condition (Stantec, 2022). This habitat type is common along the fringe of Lake Annean and the surrounding area and is likely to be used by fauna species as a part of a larger range. As such, it is unlikely that fauna species would be specifically reliant on these habitat types within the narrow application area.

The Inland Sand Dune habitat comprises a small portion of the application area (approximately 9%) and has been reported as poor-good condition. Part of the Inland Sand Dune habitat could provide some foraging and roosting habitat for birds and shelter for reptiles where the vegetation is dense, however, the majority of the habitat has been impacted by tracks, clearing, trampling and grazing (Stantec, 2022).

The Sandy Plain habitat comprises areas of minimal vegetation, mainly bare plains and makes up approximately 7% of the application area. The habitat type has been noted as having limited significance (Stantec, 2022) and is unlikely to provide adequate fauna habitat.

There are three species of conservation significance that are likely to occur within the application area based on suitable habitat types (Stantec, 2022; GIS Database);

- Fairy shrimp (*Branchinella simplex*) (P1);
- Peregrine Falcon (*Falco peregrinus*) (OS); and
- West Coast Mulga Slider (*Lerista eupoda*) (P1).

The fairy shrimp has the potential to occur within Lake Annean after periods of inundation (MWH, 2017). However given that Lake Annean is over 12,000 hectares in size, the proposed clearing of approximately 11 hectares of vegetation within Lake Annean is unlikely to significantly impact this species.

The Peregrine Falcon has been recorded numerous times within 50 kilometres of the application area (Stantec, 2022) and may utilise the application area as part of a larger home range; however, there is unlikely to be suitable breeding habitat within the application area, due to the lack of cliffs, gorges, wooded rivers and large tree hollows.

The West Coast Mulga Slider has been recorded within 50 kilometres of the application area (Stantec, 2022). The preferred habitat for this species is open Mulga areas, such as the Mulga Woodland habitat type. The condition of this habitat type is poor within the application area and this habitat is considered widespread within the region.

All of the fauna habitats in the application area are well represented in surrounding areas and the application area does not represent a significant habitat for fauna in local or regional context.

Conclusion
For the reasons set out above, it is considered that the impacts of the proposed clearing of fauna habitat within the application area is not likely to have a significant impact to fauna species in the local area.

Conditions
No specific fauna management conditions are required on the permit to address impacts to fauna.

3.2.3. Land and water resources – Clearing Principles (f) and (g)

There are no permanent waterbodies within the application area (GIS Database). Lake Annean is largely dry and fills every five to ten years (DAWE, 2022). As mentioned above, Lake Annean is listed in the Directory of Important Wetlands in Australia due to it being an important breeding area for waterbirds and a good example of a seasonal saline lake and marsh system (DAWE, 2022). The samphire communities associated with Lake Annean are important as foraging and breeding habitat for migratory birds visiting Lake Annean (Stantec, 2022). The proposed clearing will only impact approximately 11 hectares within Lake Annean, however, a portion of this area is un-vegetated lake bed (Stantec, 2022).

The clearing of riparian vegetation has the potential to cause localised erosion and degrade faunal habitats. However, given the proposed clearing is relatively small area in a local and regional context, it is not anticipated that it will have a significant impact on Lake Annean, which is over 12,000 hectares in size (DAWE, 2022). Provided disturbance to riparian habitats is avoided or

minimised where possible, and weed hygiene procedures are followed, the proposed works are not expected to substantially impact these vegetation units.

The application area lies within the Carnegie and the Yanganoo land systems (GIS Database). These land systems have been mapped and described in technical bulletins produced by the the Department of Primary Industries and Regional Development and are outlined in Appendix C.A.1. Based on these land systems, loss of vegetation has the potential to cause land degradation impacts, particularly during the winter months where ephemeral drainage lines are flowing.

Conclusion

Based on the above assessment, the proposed clearing has the potential to impact land and water resources if avoidance, mitigation and/or management measures are not implemented.

It is considered that the potential impacts of the proposed clearing on land and water resources can be managed with conditions to be environmentally acceptable.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- avoid impacts to riparian vegetation where practicable and maintain surface water flow to minimise the potential for localised erosion and sedimentation, which can have adverse impacts on downstream water quality.

3.3. Relevant planning instruments and other matters

The clearing permit application was advertised on 8 February 2022 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

There are no registered native title claims over the area under application (DPLH, 2022). However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There is one registered Aboriginal Site of Significance within the application area (DPLH, 2022). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

Other relevant authorisations required for the proposed land use include:

- A Mining Proposal / Mine Closure Plan issued under *Mining Act 1978*.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The application is located approximately 50 kilometres south west of Meekatharra, within the Shires of Cue and Meekatharra. The area proposed to be cleared is part of an expansive tract of native vegetation in the extensive land use zone of Western Australia. It is predominantly surrounded by land subject to pastoral, exploration, prospecting and mining activities.
Ecological linkage	According to available databases, there are no formal ecological linkages mapped over the application area. As the vegetation within the application area is within an extensively vegetated local area, the application area is not considered to be functioning as a significant ecological linkage in the local area.
Conservation areas	The application area is not located within any formally listed conservation areas (GIS Database). The nearest DBCA managed land is the former Lakeside pastoral lease, which is approximately 80 kilometres south-west of the application area. Lake Annean, which intersects the north of the application area, is a non-perennial salt lake that is listed in the Directory of Important Wetlands (DAWE, 2022).
Vegetation description	The vegetation of the application area is broadly mapped as the following Beard vegetation associations (GIS Database): 18: Low woodland; mulga (*Acacia aneura*) 1128: Succulent steppe with open scrub; scattered *Acacia sclerosperma* & *bowgada* over saltbush & bluebush/Succulent steppe; samphire The following vegetation types were recorded within the application area during a flora and vegetation survey conducted by Stantec Pty Ltd in November 2021 (Stantec, 2022): **TaffuTibFlAhh** – *Tecticornia* aff. *undulata* and *Tecticornia indica* subsp. *bidens* open samphire over *Frankenia laxiflora* open low shrubland over *Aristida holathera* var. *Holathera (Eragrostis pergacilis)* very open tussock grassland. **MspCsAaTd –** *Melaleuca sp.* tall shrubland over *Cratystylis subspinescens* and *Atriplex amnicola* open low shrubland over *Tecticornia doliiformis* open samplhire. **DvaA?lEcfSahCsA?vMpMt –** *Dodonaea viscosa* subsp*. angustissima* and *Acacia ?ligulata* open shrubland over *Eremophila compacta* subsp*. fecunda, Senna artemisioides* subsp*. helmsii and Cratystylis subspinescens* and *Maireana pyramidata* open low shrubland. **AcA?pEg –** *Acacia craspedocarpa*, *Acacia ?pteraneura* and *Acacia* sp. (aneura complex) tall shrubland over *Eremophila galeata* and *Acacia tetragonophylla* open low shrubland. **AcSas –** *Acacia caesaneura, Acacia sp.* (aneura complex), *Acacia craspedocarpa* and *Acacia ?pteraneura* open scrub over *Ermophila galeata*, *Acacia tetragonophylla* and *Senna artemisioides* subsp*. sturtii* open shrubland. **ApSsp –** *Acacia pruinocarpa* open tall shrubland over *Eremophila galeata, Sclerolaena cornisheana* and *Sclerolena* sp*.* open low shrubland. **Lake Bed** – Bare lake bed.
Vegetation condition	The vegetation survey (Stantec, 2022) indicates that the vegetation within the proposed clearing area is in Excellent to Degraded (Trudgen, 1991) condition, described as: • **TaffuTibFlAhh** - Excellent • **MspCsAaTd –** Very Good • **DvaA?lEcfSahCsA?vMpMt** – Excellent • **AcA?pEg** – Good • **AcSas –** Degraded • **ApSsp –** Degraded The full Trudgen (1991) condition rating scale is provided in Appendix C.
Climate and Landform	The mean annual rainfall in the area is 235 millimetres, which was recorded from the Meekatharra airport (the nearest rainfall station to the application area) (BoM, 2022). The landform within the application area broadly includes a lake bed and almost flat hard pan wash plains (Stantec, 2022).

Characteristic	Details
Land systems	The application area lies within two land systems. These are the Yanganoo System and the Carnegie System (GIS Database). These systems are described as: **Yanganoo System** – Almost flat hardpan wash plains, with or without small wanderrie banks and weak grooving; supporting mulga shrublands and wanderrie grasses on banks. The major unit is locally susceptible to accelerated erosion when severely degraded, but much more susceptible to degradation and water starvation arising from inappropriately maintained roads and tracks (Curry et al., 1994). **Carnegie System** – Salt lakes with fringing saline alluvial plains, kopi dunes and sandy banks, supporting halophytic shrublands and acacia tall shrublands. Erosion susceptibility is generally low (Curry et al., 1994).
Soil description	The soil within the application area is mapped as SV5 and BE6 (GIS Database). The SV5 soil unit is described as saline soils associated with salt lakes; sand and kopi gypsum dunes, and intervening plains: soils are mixed but chief soils are shallow, with various soils, together with saline soils that sometimes overlie red-brown hardpan (Northcote et al., 1960-68). The BE6 soil unit is described as extensive flat and gently sloping plains, which sometimes have a surface cover of gravels and on which redbrown hardpan frequently outcrops: chief soils are shallow earthy loams with associated soils of broad plains with a scatter of surface gravels and extensive flat and gently sloping plains with a scatter of surface gravel (Northcote et al., 1960-68).
Waterbodies	The desktop assessment and aerial imagery indicated that one ephemeral watercourse passes through to the application area and the northern portion of the application area intersects Lake Annean (GIS Database). Lake Annean has a total mapped area of approximately 12,000 hectare and approximately 11 hectares of the application area falls within the mapped extent of Lake Annean (GIS Database).
Hydrogeography	The application is not within any registered surface or groundwater drinking water sources (GIS Database). The application area is within the Eastern Murchison proclaimed groundwater area under the *Rights In Water and Irrigation Act 1914* (GIS Database).The mapped groundwater salinity is 1000-7000 milligrams per litre total dissolved solids.
Flora	One Priority 3 species, *Tecticornia cymbiformis,* and a species of other significance, *Tecticornia* aff*. undulata*, were recorded approximately 13 metres from the application area during the field survey. Both taxa were recorded growing on the gypsiferous dunes on the Lake Annean playa and within the riparian zone of the lake (Stantec, 2022). One introduced flora species (weed) was recorded within the application area *Rumex vesicarius* (Ruby Dock) (Stantec, 2022).
Ecological communities	No known Threatened or Priority Ecological Communities (TEC/PEC) occur within the application area boundary. Two PECs are located approximately 10 kilometres from the application area. These are the Austin Land System (P3) and Polelle calcrete groundwater assemblage type on Murchison palaeodrainage on Polelle Station (P1).
Fauna	From the desktop assessment, no fauna species were identified within the clearing boundary of the application area, while 241 fauna species (including introduced species) were identified within 50 kilometres of the application area. This includes 26 species are of conservation significance; comprising two arthropods, 22 birds, one mammal and one reptile. Of the 26 conservation significant fauna species, two (The West Coast Mulga Slider and the Peregine Falcon) were considered 'likely' to occur in the application area, 18 were considered 'possible' to occur and six were considered 'unlikely' to occur. From the field fauna survey, a total of 19 vertebrate fauna species were recorded within the application area. Of the 19 species recorded, no species were of conservation significance (Stantec, 2022). Four predominant terrestrial fauna habitats were identified within the application area during the fauna survey. These are Mulga Woodland, Samphire Dune Adjacent to Saline Drainage, Inland Sand Dune and Sandy Plain (Stantec, 2022).

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: Priority flora have been identified within proximity to the application area (Stantec, 2022) and the application area contains suitable habitat for the species to exist.	May be at variance	Yes *Refer to Section 3.2.1, above.*
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: Lake Annean contains riparian vegetation and vegetation types that provide habitats for migratory birds and breeding habitats for waterbirds.	May be at variance	Yes *Refer to Section 3.2.2, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: There are no known records of Threatened flora within the application area (GIS Database). The flora survey of the application area did not record any species of Threatened flora (Stantec, 2022). The vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of Threatened (rare) flora.	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: According to available databases, there are no records of any Threatened Ecological Communities (TECs) within the application area boundary (GIS Database). The flora and vegetation surveys of the application area and surroundings did not identify any vegetation communities considered to be a TEC within the application area (MWH, 2015, 2017; Spectrum Ecology, 2020; Stantec, 2022).	Not at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The application area falls within the Murchison Bioregion of the Interim Biogeographic Regionalisation for Australia (GIS Database). Approximately 99.73% of the pre-European vegetation still exists in the Murchison Bioregion	Not at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
(Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation associations 18 and 1128 (GIS Database). These vegetation associations have not been extensively cleared as over 98% of the pre-European extent of these vegetation associations remains uncleared at both the state and bioregional level (Government of Western Australia, 2019). The application area does not contain any remnants of native vegetation, nor does it form part of any remnants in the local area.		
Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."* Assessment: The application area does not lie within, or in the vicinity of, any conservation areas (GIS Database). The nearest DBCA managed land is the former Lakeside pastoral lease, which is approximately 80 kilometres south-west of the application area (GIS Database).	Not likely to be at variance	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: A portion of the application area is situated over part of the non-perennial Lake Annean, which is an important breeding area for waterbirds and a good example of a seasonal saline lake and marsh system (DAWE, 2022).	At variance	Yes *Refer to Section 3.2.2, above.*
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The application area lies within the Carnegie and the Yanganoo land systems (GIS Database). The Carnegie land system has a low susceptibility to erosion (Curry et al., 1994), however, the Yanganoo land system can be susceptible to soil erosion where land has been severely degraded.	May be at variance	Yes *Refer to Section 3.2.2, above.*
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database). The groundwater in the application area is considered to be brackish to saline ranging from 3,000 to 7,000 milligrams/litre total dissolved solids (GIS Database). The proposed clearing is not expected to have any impact on the quality of groundwater in the local area.	Not likely to be at variance	No
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: As the average annual rainfall within the area is 235 millimetres and the average annual evaporation rate is 2,800 millimetres, there is likely to be little surface flow during normal seasonal rains (BoM, 2022; GIS Database). Given	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
the likelihood of low surface flow, the proposed clearing is not likely to cause or increase the incidence or intensity of flooding. The application area sits partially within Lake Annean, where temporary localised flooding may occur briefly following heavy rainfall events, with the whole lake filling from episodic flooding every five to ten years (DAWE, 2022; GIS Database). Given the low average rainfall, high evaporation rate and relatively small clearing area, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.		

Appendix C. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

Condition	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Appendix D. Sources of information

D.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- Aboriginal Heritage Places (DPLH-001)
- Clearing Regulations – Schedule One Areas (DWER-057)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Groundwater Salinity Statewide (DWER-026)
- Hydrographic Catchments – Catchments (DWER-028)
- Hydrography – Inland Waters – Waterlines
- Hydrography, Linear (DWER-031)
- IBRA Vegetation Statistics
- Native Title (ILUA) (LGATE-067)

- Pre-European Vegetation Statistics
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Mapping – Best Available (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery

Restricted GIS Databases used:

- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

D.2. References

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Spectrum Ecology (2020) Nannine Mining area Reconnaissance Flora & Level 1 Fauna Assessment. Prepared for Westgold Resources Limited by Spectrum Ecology Pty Ltd, June 2020.

Stantec (2022) Boomerang Open Pit Dewatering Discharge Pipeline Reconnaissance Flora and Fauna Survey. Prepared for Westgold Resources Limited by Stantec Australia Pty Lrd, January 2022.

Trudgen, M.E. (1991) Vegetation condition scale in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

WAH (1998-) FloraBase - the Western Australian Flora. Department of Biodiversity, Conservation and Attractions, Western Australia. Western Australian Herbarium. https://florabase.dpaw.wa.gov.au/ (Accessed 3 March 2022).

Westgold (2022) Supporting Documentation – Boomerang Pipeline Corridor. Westgold Resources Limited, January 2022.

4. Glossary

Acronyms:

BC Act	*Biodiversity Conservation Act 2016,* Western Australia
BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DAWE	Department of Agriculture, Water and the Environment, Australian Government
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DoEE	Department of the Environment and Energy (now DAWE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)

DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora (now known as Threatened Flora)
DWER	Department of Water and Environmental Regulation, Western Australia
EP Act	*Environmental Protection Act 1986*, Western Australia
EPA	Environmental Protection Authority, Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	*Rights in Water and Irrigation Act 1914*, Western Australia
TEC	Threatened Ecological Community

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

T **Threatened species:**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**
Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**
Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**
Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species:

EX **Extinct species**
Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW **Extinct in the wild species**

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species:

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI **Migratory species**

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD **Species of special conservation interest (conservation dependent fauna)**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS **Other specially protected species**

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P **Priority species:**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1 **Priority One - Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 **Priority Two - Poorly-known species**
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 **Priority Three - Poorly-known species**
Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4 **Priority Four - Rare, Near Threatened and other species in need of monitoring**
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Principles for clearing native vegetation:

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

(j) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.