Australian Government
Department of the Environment and Energy

Title of Proposal - Yalyalup Mineral Sands Project

Section 1 - Summary of your proposed action

Provide a summary of your proposed action, including any consultations undertaken.

1.1 Project Industry Type

Mining

1.2 Provide a detailed description of the proposed action, including all proposed activities.

Doral Mineral Sands Pty Ltd (Doral) proposes to extract ore from the Yalyalup Mineral Sands Deposit (i.e. the Proposal) which is located ~11km southeast of Busselton, Western Australia. The Proposal is situated within the Perth Coastal Plain (SWA2) sub-region of the Swan Coastal Plain biogeographic region, as defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Australian Government, 2013).
The Proposal has a total disturbance area of ~372.67ha within a Development Envelope of 894.17ha. The proposed mine pits have a disturbance area of ~334.32ha and associated infrastructure has a disturbance of ~38.35ha. The majority of the disturbance area (~371ha) is located on previously cleared farmland currently used for beef cattle, dairy cattle and pasture, with the remaining ~1.67ha occurring within degraded native vegetation. The City of Busselton's Town Planning Scheme (TPS) No. 21 (TPS 21) shows the Development Envelope as being zoned as 'Agriculture'.
Approximately 12-16 million tonnes (t) will be extracted from the deposit to produce ~500-700,000t of heavy mineral concentrate (HMC). The HMC product to be generated from mining the deposit includes zircon, ilmenite, leucoxene and rutile. The life of mine is expected to be ~4.5 to 5.5 years. Rehabilitation and mine closure will be implemented at the cessation of mining, which is likely to take up to five years.
Ore from the deposit will be mined progressively via a series of open-cut pits using dry mining techniques. Dewatering of groundwater inflows into the pit will be required to enable dry mining to occur. Mining will be staged in order to minimise the area of disturbance (at any one time) with the aim of achieving focussed and effective management of the environmental factors at each pit location, prior to moving onto the next pit location.
Processing of ore will commence in-pit and then slurry will be pumped from the feed preparation plant to the wet concentration plant for further processing. Waste clay and sand materials from processing of this ore will be combined and backfilled into the mine voids using co-flocculation (co-disposal system) where possible. Some material will be initially placed in a Tailing Storage Facility, herein referred to as Solar Evaporation Ponds (SEPs), to allow drying of the clay and recycling of water back to the process water pond (PWP) (return water), prior to being co–disposed into mine voids. The mined area will be rehabilitated back to pasture and/or native vegetation, depending on pre-mining conditions, consistent with the post-mine land use requirements.
HMC produced at the wet concentrator plant will be stockpiled on site prior to transport to Doral's Picton Dry Separation Plant, located ~60km northeast of the mine, for separation using

electrostatic processes. The Picton Dry Separation Plant has a licence to process HMC sourced from Doral's Yoongarillup Mine. Processing of HMC into products of zircon, ilmenite, and leucoxene has occurred since the Picton Dry Separation Plant was approved by Ministerial Statement No. 484 in 1998. Once processed, HMC products are hauled by truck to either the Bunbury Port or Fremantle Port for export or to Domestic customers. Processing activities at the Picton Dry Separation Plant and exporting of product are not part of this Proposal and are not further described in this referral document.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action.

Area	Point	Latitude	Longitude
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	1	-33.683633676287	115.44108771536
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	2	-33.683792943118	115.44102334235
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	3	-33.683792943118	115.44102334235
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	4	-33.683792943118	115.44102334235
894ha Development Evelope, comprising 36ha of degraded	5	-33.683739377604	115.44108771536

Area	Point	Latitude	Longitude
native vegetation (mainly scattered trees) with the remaining area cleared farmland.			
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	6	-33.683472979347	115.48419531689
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	7	-33.687363902099	115.48259371854
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	8	-33.692266588847	115.48246583166
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	9	-33.692480114615	115.48765343868
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	10	-33.703137905883	115.48778218471
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	11	-33.707454209938	115.47119196758

Area	Point	Latitude	Longitude
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	12	-33.707614147329	115.45300101387
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	13	-33.700101732161	115.45011881789
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	14	-33.692534389513	115.449990931
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	15	-33.692534389513	115.44749240092
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	16	-33.685179209452	115.44108771536
894ha Development Evelope, comprising 36ha of degraded native vegetation (mainly scattered trees) with the remaining area cleared farmland.	17	-33.683633676287	115.44108771536

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The Proposal is located ~11km southeast of Busselton WA within the Swan Coastal Plain. The Proposal has a total disturbance area of ~372.67ha within a Development Envelope of 894.17ha. The proposed mine pits have a disturbance area of ~334.32ha and associated infrastructure has a disturbance of ~38.35ha. The majority of the disturbance area (~371ha) is located on previously cleared farmland currently used for beef cattle, dairy cattle and pasture, with the remaining ~1.67ha occurring within degraded native vegetation.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

Development Envelope - 894.17ha, disturbance area 372.67ha

1.7 Is the proposed action a street address or lot?

Lot

1.7.2 Describe the lot number and title.22 individual lots are present within the Development Envelope.

1.8 Primary Jurisdiction.

Western Australia

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

No

1.10 Is the proposed action subject to local government planning approval?

No

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date 01/2021

End date 01/2026

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

The City of Busselton’s Town Planning Scheme (TPS) No. 21 (TPS 21) shows the

Development Envelope as being zoned as ‘Agriculture’.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders.

Stakeholder consultation has initially comprised meetings, telephone calls and emails with affected landowners discussing preliminary details of the Proposal. To date one to two events has been undertaken as detailed below.

EVENT 1

Overview of the mining tenure on affected properties

Results of drilling programs undertaken by Doral to date;

Pre-feasibility study indicates a Proposal could potentially sustain a 4.5-5.5 year operation;

Feasibility study scheduled for completion in late 2017;

Scope and purpose of planned environmental technical studies such as flora/vegetation, fauna and water;

Access arrangements for affected properties to complete non-intrusive environmental technical studies;

Approximate commencement timeframe for proposal depending on approval timeframes;

Simplified mine plan and possible locations for key infrastructure such as concentrator, power, water and haulage access.

EVENT 2

Process by which Doral develops their mining tenements from acquisition to operations to clarify landowners rights;

Preliminary mine plans were described, indicating that the Proposal may be a 24 hour continuous operation and had a proposed mine life of between 4.5 to 5.5 years;

Water, power and access services were further discussed (following on from Event 1);

Environmental technical studies including flora/vegetation, fauna, water and ethnographic were discussed;

It was indicated that one of the potential impacts of the Proposal was in relation to groundwater drawdown and the presence of potential acid sulfate soils in the deeper strand ore;

Submission of an EPA referral under section 38 of the EP Act to determine the level of assessment for the Proposal. This referral will include an environmental impact assessment of the Proposal based on the technical studies;

Groundwater and surface water monitoring programs would be continued and towards the end of 2017, additional groundwater bores more specific to the proposal would be installed;

The feasibility study was generally on schedule to be completed by the end of 2017.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project.

The Proposal was referred to the Western Australian EPA on 25 October 2017 under Section 38 of the Environmental Protection Act 1986.

1.15 Is this action part of a staged development (or a component of a larger project)?

No

1.16 Is the proposed action related to other actions or proposals in the region?

No

Section 2 - Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

• Profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;

• Significant Impact Guidelines 1.1 – Matters of National Environmental Significance;

• Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies.

2.1 Is the proposed action likely to have ANY direct or indirect impact on the values of any World Heritage properties?

No

2.2 Is the proposed action likely to have ANY direct or indirect impact on the values of any National Heritage places?

No

2.3 Is the proposed action likely to have ANY direct or indirect impact on the ecological character of a Ramsar wetland?

Yes

2.3.1 Impact table

Wetlands	Impact
The RAMSAR listed Vasse-Wonnerup wetland, ~4.6km to the northwest of the Site (Figure 1-1), receive inflow from the Vasse, Sabina, Abba and Ludlow rivers, a total catchment area of approximately 961km2. The Vasse-Wonnerup system is already highly	Hydrological impacts to the RAMSAR listed Vasse-Wonnerup wetland, located ~4.6km northwest of the Site are unlikely to occur as a result of implementing the Proposal. However the following impacts have the potential to occur : Reduction in the Vasse-Wonnerup

Wetlands	Impact
hydrologically and chemically altered due to extensive clearing, agricultural practices occurring over most of the Geographe catchment, and other commercial and residential developments in the area. Clearing and agricultural practices contribute to altered water regimes and increases in nutrients, sedimentation and pollution (DoW, 2010). The system is highly modified, with diversion of flow from several of the rivers into the ocean that historically flowed into the Vasse and Wonnerup estuaries, which has accounted for a significant decrease in water entering the system. The floodgates were installed in the early 1900s to mitigate flooding of adjoining agricultural land during high river flows in winter and to prevent seawater inundation caused by storm surges. The gates effectively transformed the estuaries in to shallow, winter fresh/ summer saline lagoons, unique in Western Australia (Department of Environment, 2007). DWER estimated a 60% decrease in flow from the Sabina River and a 90% decrease from the Vasse River into the Wonnerup estuary as a result of these diversions (DoW, 2010). The wetlands are listed as a wetland of International importance under the RAMSAR Convention. The high ecological values of the wetlands are coupled with extremely poor water quality in late summer that lead to fish kills and declines in visual amenity. The wetlands are managed for multiple purposes including water bird habitat, flood and storm surge mitigation, visual amenity and the prevention of fish kills. Department of Environment (2007) reported that the wetlands are subject to poor water quality issues, with the floodgates acting to reduce flushing flows that may otherwise help to ameliorate high nutrient concentrations from catchment runoff, while excessive algal blooms, blooms of potentially toxic cyanobacteria and fish deaths are not uncommon (and) increased salinisation of adjoining pastoral lands and death of colonising native vegetation.	wetland catchment area (961km2) by a maximum of 0.1km2 (0.01%) based on the maximum area of mine pits open at any one time. Initial drawdown modelling indicates that the maximum extent of mining related drawdown (0.1m contour) may extend up to 1,083m from the mine pits. As the Vasse-Wonnerup wetland is located ~4.6km northwest of the Site, no impacts from drawdown are expected. Emergency discharge of water from Site into the Lower Sabina River which is a tributary of the Vasse-Wonnerup wetland.The discharged water will mix with other water in the Lower Sabina River prior to reaching the Vasse Wonnerup Wetland which also receives water from other tributaries. Given that water will only be discharged from the mine site during periods of heavy rainfall when all water storages are full (i.e. emergency situations only), discharge is likely to coincide with seasonal higher flows of water in the Lower Sabina River. Any discharge from the mine site is likely to be only a very small percentage of this volume and will be managed in accordance with the Site DWER licence (for quality/quantity).

2.3.2 Do you consider this impact to be significant?

No

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Yes

2.4.1 Impact table

Species	Impact
TEC SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)	Indirect impact resulting from localised groundwater drawdown. No direct impact (will not be cleared)
Banksia squarrosa subsp. Argillacea	Indirect impact resulting from localised groundwater drawdown. No direct impact (will not be cleared)
Verticordia plumosa var. vassensis	Indirect impact resulting from localised groundwater drawdown. No direct impact (will not be cleared)
Western Ringtail Possum Pseudocheirus occidentalis	No direct impact to any individual or habitat. Based on available information, any clearing for the Proposal will be limited to a small number of paddock trees in paddock areas. This vegetation does not represent WRP habitat and therefore none of the DoEE criteria listed in Significant Impact Guidelines for the vulnerable Western Ringtail Possum (Pseudocheirus occidentalis) in the southern Swan Coastal Plain, Western Australia (DEWHA, 2009) will be compromised.

2.4.2 Do you consider this impact to be significant?

No

2.5 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed migratory species, or their habitat?

No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

No

2.7 Is the proposed action to be taken on or near Commonwealth land?

No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

2.10 Is the proposed action a nuclear action?

No

2.11 Is the proposed action to be taken by the Commonwealth agency?

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No

2.13 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

Section 3 - Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area.

FLORA

One hundred and forty-nine taxa of vascular plants were identified during the Ecoedge (2016) survey, of which 57 taxa (38%) were introduced species. The relatively low number of native species found within the ~78 ha of native vegetation in the wider survey area is a result of many years of degradation of the small fragments of native bush. The largest single area of native vegetation is only 6.5ha in size and has been subject to many years of livestock grazing. As a consequence, all native species have been removed from the understorey.

The dominant genera were the Fabaceae with 23 taxa (including 10 introduced species), Proteaceae with 16 taxa, Myrtaceae with 16 taxa (2 introduced species) and Poaceae with 15 taxa (14 introduced species).

FLORA OF CONSERVATION SIGNIFICANCE

Two Declared Rare Flora (DRF) species, Banksia squarrosa subsp. Argillacea and Verticordia plumosa var. vassensis, were recorded within the survey area. Both of these species are listed as Threatened pursuant to subsection (2) of Section 23F of the WC Act and Endangered pursuant to section 179 of the EPBC Act.

The population of B. squarrosa subsp. argillacea within the Development Envelope occurs on McGibbon Track within a small occurrence of Vegetation Unit B1 which is recognised as the TEC SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)" (Gibson, et al., 2000) (Meissner & English, 2005). A total of nine individuals were identified during the survey which is a decline in population since 2003 by five individuals.

The population of V. plumosa var. vassensis is located outside of the Development Envelope and is situated on the verge of Princefield Road, 2.1km west of Ludlow-Hithergreen Road. The population size was estimated at 200+ plants in 1996, and 100+ in 2006 (Williams, et al., 2001) (DoEE, 2016f, cited in Ecoedge, 2016). The population size was difficult to estimate during the Ecoedge (2016) survey as the plants are situated within an area of thick wet shrubland, however approximately 30 individuals were recorded.

Two Priority listed species pursuant to subsection (2) of section 23F of the WC Act; Loxocarya

magna (P3) and Calothamnus quadrifidus subsp. teretifolius (P4) were also recorded within the survey area.

DECLARED PLANTS

Two weeds were found within the Development Envelope, Asparagus asparagoides and Zantedeschia aethiopica. Both are listed as Pest Plants by the Department of Agriculture and Food (DAF, 2014) and are in the C3 (management) category for the whole of the State. A. asparagoides (Bridal Creeper) was only found in four locations, but Z. aethiopica (Arum Lily) is widespread within the Development Envelope, particularly along creeklines.

FAUNA

A review of the EPBC Act threatened fauna list, DBCA's threatened fauna database and priority list, unpublished reports and scientific publications by Harewood (2017) identified a number of specially protected, priority or migratory vertebrate fauna species as potentially occurring in the general vicinity of the Development Envelope. Harewood (2017) notes that of these species, most have no potential whatsoever to utilise the Development envelopment for any purpose and have been omitted from the potential list (Appendix B of Harewood, 2017), principally due to lack of suitable habitat (including extent and/or quality) or known local extinction.

One vertebrate fauna species of conservation significance, the Western Ringtail Possum Pseudocheirus occidentalis - S1 (WC Act), Vulnerable (EPBC Act), however was positively identified as utilising the Development Envelopment for some purpose during the Harewood (2017) survey. Five individuals were recorded along McGibbon Track during the night survey.

Based on the habitats present and current documented distributions it is considered possible that the following additional species of conservation significance may use the Development Envelope for some purpose at times, though, as no evidence of any using the Development Envelope at the time of the field survey was found, the status of some in the area remains uncertain.

These species are:

Eastern Great Egret Ardea alba (modesta) – S5 (WC Act), Migratory (EPBC Act). This species potentially utilises creek lines, drains and paddocks when inundated during the wetter months of the year in small numbers. Unlikely to breed onsite. Suitable adjacent habitat;

Peregrine Falcon Falco peregrinus – S7 (WC Act). This species potentially utilises some sections of the Development Envelope as part of a much larger home range. No evidence of nesting seen and the probability of this species breeding within the Development Envelope can be considered to be very low. Suitable adjacent habitat;

Rainbow Bee-eater Merops ornatus – S5 (WC Act), Migratory (EPBC Act). This species is a common seasonal visitor to south west. Possibly breeds in some sections of the Development Envelope where ground conditions permit (e.g. sandy areas) though population levels would not be significant as it usually breeds in pairs, rarely in small colonies (Johnstone & Storr, 1998);

Carnaby`s Black-Cockatoo Calyptorhynchus latirostris – S2 (WC Act), Endangered (EPBC Act). Not observed during the survey period but known to frequent the general area. Small areas of favoured foraging habitat (i.e. marri, jarrah and banksia) present. Larger trees (>50cm DBH) can be considered potential breeding habitat. No roosting sites identified within the Development Envelope;

Forest Red-tailed Black-Cockatoo Calyptorhynchus banksii naso – S3 (WC Act), Vulnerable (EPBC Act). Not observed during the survey period but known to frequent the general area. Small areas of favoured foraging habitat (i.e. marri, jarrah and banksia) present. Larger trees (>50cm DBH) can be considered potential breeding habitat. No roosting sites identified within the Development Envelope;

Baudin’s Black-Cockatoo Calyptorhynchus baudinii – S2 (WC Act), Vulnerable (EPBC Act). Not observed during the survey period but known to frequent the general area. Small areas of favoured foraging habitat (i.e. marri and banksia) present. Larger trees (>50cm DBH) can be considered potential breeding habitat. No roosting sites identified within the Development Envelope.

As indicated for some species, habitat within the Development Envelope, while considered possibly suitable, may be marginal in extent/quality and species listed may only visit the area for short periods, or as rare/uncommon vagrants/transients. Harewood (2017) notes that due to the relatively small extent of natural fauna habitat within the Development Envelope and the remnants present are generally highly degraded and fragmented, the overall value to fauna can be regarded as low when compared to other nearby areas such as the Whicher range and Ludlow Tuart Forest.

A number of other species of conservation significance, while possibly present in the wider area (e.g. Whicher Range), are not listed as potential species due to known localised extinction (and no subsequent recruitment from adjoining areas), lack of suitable habitat and/or the presence of feral predators.

3.2 Describe the hydrology relevant to the project area (including water flows).

CLIMATE AND RAINFALL

Meteorological data has been sourced from the Bureau of Meteorology Station 9603 (Busselton Aero). The Busselton Area experiences a Mediterranean climate with warm to hot dry summers, and mild wet winters. High pressure cells dominate climatic patterns during summer and the passage of cold fronts and associated low pressure cells dominate during winter. Strong sea breezes occur from late November to early March. The annual rainfall generally falls within the 800mm and 1000mm range, peaking in June and July. In summer, the average maximum temperature is 29°C with an average minimum temperature of 12°C. In winter, the average maximum temperature is 17°C with an average minimum temperature of 5°C.

Annual mean rainfall for the previous 10 years (2007-2017) is 677mm, which is substantially lower than the long-term average for Busselton of 811mm. The majority of precipitation occurs between the months of May and September, with minimal rainfall (<25mm) in the summer months. Potential average annual evapotranspiration in the region is approximately 1200mm, which therefore is likely to exceed precipitation during summer months.

GROUNDWATER MANAGEMENT AREA

The Development Envelope is wholly within the Busselton-Capel Groundwater Area (BCGA). The Busselton-Capel sub-area covers 757.3km2 and is predominantly used by the service sector, mining and industry, and horticulture. Currently the Superficial and Leederville aquifers in the subarea are fully allocated (DoW, 2009).

The Development Envelope is also within the Busselton-Yarragadee Groundwater Area (Yarragadee aquifer). The Busselton-Yarragadee subarea covers 2,021.4km2 and is fully allocated. The predominant use of this aquifer is for public water supply, mining and industry (DoW, 2009).

HYDROGEOLOGY

Groundwater is present in the area within a multi-layered aquifer system. The superficial deposits contain an unconfined aquifer with saturated thicknesses of generally less than 15m,

whereas the Leederville and Yarragadee Formations contain multiple regional-scale confined and semi-confined aquifers.

Superficial Aquifer

Unconfined groundwater in the Superficial formations occurs at approximately 1-3mBGL, with a consequent saturated thickness of approximately 10-14m, based on water levels obtained from local bores during initial groundwater monitoring in May-June 2017. Seasonal variation in the water table, derived from existing DWER hydrographs in the area, is in the range of approximately 1-2m.

Regional groundwater flow is expected to occur to the northwest in the vicinity of the Site, which also indicates a hydraulic gradient within the superficial aquifer of approximately 0.0037 (HydroSolutions, 2017). The ultimate discharge point is likely to be Geographe Bay and the Vasse – Wonnerup RAMSAR wetland, approximately 4.6km to the north-northwest. Recharge occurs by rainfall, although a large proportion of this infiltration is likely to be lost due to evapotranspiration due to the shallow water table.

The Superficial formations are variable across the region and hydraulic conductivities are site-specific. However, in general, hydraulic conductivities have been estimated to be in the range of 0.5-50m/d (Davidson, 1995) (Hirschberg, 1989), with an average of 15m/d, partially dependent on the percentage sand content. The Superficial Aquifer is underlain by a clay-dominated aquitard unit, which also forms a confining layer for the underlying Leederville aquifer; the two aquifers are not expected to be in hydraulic continuity with each other in the Site vicinity (HydroSolutions, 2017).

Leederville Aquifer

The Leederville aquifer is a multi-layered confined aquifer system comprising discontinuous interbedded sequences of sandstone and clay. The various sub-aquifers within the Leederville formation are generally in hydrogeological continuity with each other. Its average thickness regionally is between 150 and 200m over most of the Hirschberg (1987) study area. The horizontal hydraulic conductivity of sandstone beds in the Leederville aquifer, derived from pumping tests (Davidson, 1995), is about 10m/d, and that of the siltstone and shale beds is assumed to be about 1 x 10-6 m/d. If the interbedded sandstones, siltstones and shales are laterally extensive, the average horizontal hydraulic conductivity of the aquifer will approach 5m/d (as the sandstones constitute approximately half the aquifer thickness). Sandy beds that comprise the Vasse Member constitute the main aquifer. The sandy beds underlie the Mowen Member which comprises an aquitard. Hirschberg (1989) reports that upward leakage occurs into the superficial aquifer from the confined aquifers in the vicinity of the Site, although later studies suggest that downward flows have also been occurring since that time, potentially due to ongoing regional abstraction from the Leederville Aquifer (Schafer, et al., 2008). The Leederville Aquifer extensively outcrops throughout the Blackwood Plateau (Schafer, et al.,

2008). The seasonal fluctuation of the potentiometric heads in the Leederville aquifer is generally in the range of 1 to 2m (Hirschberg, 1989). Discharge occurs offshore and, over an area of upward hydraulic gradient that extends several km inland, by upward leakage into the Superficial Aquifers (Hirschberg, 1989). Hirschberg (1987) notes that salinity in the upper 100m of the Leederville aquifer is generally less than 500mg/L TDS and is again dominated by sodium and chloride ions. Silica is also noted as being generally greater than normal background concentrations, with a maximum of 50mg/L recorded by Hirschberg (1987) during his study. Water from the Leederville Aquifer is used extensively for private and municipal water supplies.

Based on measured groundwater levels for the Superficial and Leederville aquifers, there is generally a 2m or greater difference in equipotentials between the groundwater systems at the Site, with lower elevations recorded within the Leederville Aquifer (HydroSolutions, 2017). There are also some instances of upward hydraulic heads and artesian flows in the vicinity of the Site.

Water levels obtained from initial groundwater monitoring of local bores indicate a large variation in heads across the Site, with a range from 0.8 to 11.27mBGL, reflecting differences between static water levels (SWL) and pumping water levels (PWL) in bores with active abstractions. Minor uncertainty is attached to the location, condition and elevation reference level of these bores, although these bores will be re-surveyed to millimeter accuracy in late 2017.

Yarragadee Aquifer

The Yarragadee aquifer is composed primarily of non-marine fluvial feldspathic, poorly sorted sandstones which are porous and poorly cemented and, hence, allow for considerable groundwater reserves. It grades from a shale-siltstone dominated base to a cleaner sandstone in the upper portions of the Formation, probably representing increased subsidence or filling of the basin during the late Jurassic (Varma, 2009). Individual sandstone sections are typically 20m or more thick, and are separated by shale beds generally up to 10m thick (Hirschberg, 1989). The Yarragadee Formation is divided into four units. Unit 3, which underlays the Vasse Member in the proposed mining area is reported to be the most transmissive unit (Baddock, et al., 2005). However, isotopic dating of groundwater indicates an average hydraulic conductivity of 8m/d. Salinity in the Yarragadee aquifer is in the range of 230 to 900mg/L TDS and percentages of the major ions are similar to those in the Leederville aquifer, suggesting a close relationship between the two aquifers. Water from the Yarragadee aquifer is primarily for use in town drinking water and for heavy mineral sand processing in the area.

SURFACE WATER

Local Rivers

The Site is within the Wonnerup (Busselton Coast) Surface Water Management subarea and is not within a proclaimed area for surface water management (DoW, 2009).

The Sabina and Abba Rivers are located within 1km of the Site to the southwest and northeast, respectively. The Sabina River has been heavily modified, with flow from the upper reaches of the Sabina River (i.e. Upper Sabina River) being diverted to the Sabina River Diversion Drain, approximately 1.5km west of the Site. The Sabina River Diversion drain joins the Vasse Diversion drain to the northwest of the Site, which was constructed in 1927 to divert ~65% of flow from the Sabina River and 90% of flow from the Vasse River away from the Lower Vasse River and the Vasse Wonnerup wetlands.

The Lower Sabina River (i.e. below the diversion) and Abba River flow generally to the northwest of the Site and discharge into the Vasse-Wonnerup wetlands, approximately ~4.6km to the north-northwest of the Site. The Lower Sabina River has a total catchment area of 49km2, while the Abba River has a total catchment area of 261km2.

The major drainage features and catchment areas relevant to the Site show that the Site is likely to be located wholly within the Sabina River catchment area, however, available regional mapping indicates that the north-eastern corner may straddle the catchment divide with the Abba River, although no evidence of surface water flows draining towards the Abba River were observed during the HydroSolutions (2017) site visit. Furthermore, the Princefield Road drain diverts runoff towards the Woddidup Creek and eventually to the Lower Sabina River. Previous high rainfall had led to surface water run-off observed within the shallow field drains on the western and northern Site boundaries, with flow observed to be occurring to the north and west respectively towards the tributary of the Lower Sabina River.

There is no river gauging station within the Lower Sabina River, however DWER has modelled monthly flows based on average monthly rainfall from 1980-2006 (DoW, 2010). Flow in the Lower Sabina River is seasonal, typically occurring between May and October and based on the flow modelling, has an average annual discharge of approximately 11GL (DoW, 2010). The Whicher Area Surface Water Management Plan (DoW, 2009) does not list the Sabina or Abba Rivers as connected to the groundwater system (as opposed to the Capel or Margaret Rivers). Hydrographs for the Abba River (refer to Appendix 3 of HydroSolutions, 2017) and DWER modelling for the Lower Sabina (DoW, 2010) indicate a clear cease to flow levels during a substantial part of the summer low-rainfall period, which suggests that there is limited or no groundwater contribution to surface water flow (i.e. as baseflow discharge) in the rivers. The surface water flow regime is therefore likely to be dominated by high-rainfall periods generating surface water run-off, rather than any substantial groundwater flow component.

<u>On-Site Drainage</u>

Numerous farm/field drains exist on Site, with three main drains identified in June 2017 to assist with background surface water sampling. These include one drain extending along the western boundary of the Site (‘Wonnerup South Road Drain’) and a further two located in the western-central parts of the Site (Woddidup Creek/Drain), which are adapted from ephemeral creeks. These flow generally towards the north and northwest, and join the Lower Sabina River approximately 2km downstream at Wonnerup South Road. A discontinuous road-side drain is located along the northern boundary of the Site following Princefield Road, which flows to the

west to join the Woddidup Creek/Drain draining to the north towards the Lower Sabina River.

Inspection of the Site by HydroSolutions (2017) confirmed that these drains have maximum depths of <1 m across the Site. Given that some static groundwater levels on Site have been reported to be very shallow (i.e. eight wells in the area contained water levels at <2mBGL), it is possible that these drains are connected to groundwater periodically. However, it should be noted that groundwater levels in the vicinity of the drains are generally >2mBGL except in the far southeast corner of the Site, and that any groundwater baseflow discharge to surface water flow in the drains would therefore be expected to be limited (or periodically absent).

VASSE – WONNERUP RAMSAR WETLAND

The RAMSAR listed Vasse-Wonnerup wetland, ~4.6km to the northwest of the Site, receive inflow from the Vasse, Sabina, Abba and Ludlow rivers, a total catchment area of approximately 961km2. The Vasse-Wonnerup system is already highly hydrologically and chemically altered due to extensive clearing, agricultural practices occurring over most of the Geographe catchment, and other commercial and residential developments in the area. Clearing and agricultural practices contribute to altered water regimes and increases in nutrients, sedimentation and pollution (DoW, 2010). The system is highly modified, with diversion of flow from several of the rivers into the ocean that historically flowed into the Vasse and Wonnerup estuaries, which has accounted for a significant decrease in water entering the system. The floodgates were installed in the early 1900s to mitigate flooding of adjoining agricultural land during high river flows in winter and to prevent seawater inundation caused by storm surges. The gates effectively transformed the estuaries in to shallow, winter fresh/ summer saline lagoons, unique in Western Australia (Department of Environment, 2007). DWER estimated a 60% decrease in flow from the Sabina River and a 90% decrease from the Vasse River into the Wonnerup estuary as a result of these diversions (DoW, 2010).

The wetlands are listed as a wetland of International importance under the RAMSAR Convention. The high ecological values of the wetlands are coupled with extremely poor water quality in late summer that lead to fish kills and declines in visual amenity. The wetlands are managed for multiple purposes including water bird habitat, flood and storm surge mitigation, visual amenity and the prevention of fish kills.

Department of Environment (2007) reported that the wetlands are subject to poor water quality issues, with the floodgates acting to reduce flushing flows that may otherwise help to ameliorate high nutrient concentrations from catchment runoff, while excessive algal blooms, blooms of potentially toxic cyanobacteria and fish deaths are not uncommon (and) increased salinisation of adjoining pastoral lands and death of colonising native vegetation.

3.3 Describe the soil and vegetation characteristics relevant to the project area.

GEOLOGY

The Southern Perth Basin in Western Australia comprises of Permian to Recent sediments. Erosion of pre-Cambrian igneous rocks (Yilgarn Craton in the East, Leeuwin Naturaliste Block in the West) has contributed to the deposition of sediments bearing heavy minerals in the Yalyalup Road area. Heavy minerals have accumulated into economically viable strandlines and dunal systems due to the action of wind and waves on coastal shoreline areas.

The well-defined strandlines in the Yalyalup Deposit are largely contained within the Pleistocene aged Yoganup Formation. These strandlines generally run parallel to the present-day coastline of Geographe Bay. Strandlines typically form on wavecut platforms at recognised elevations over wide areas. On the down slope areas of these platforms, lower grade heavy mineral accumulation can also occur within the Yoganup formation. The Cretaceous aged Leederville Formation usually forms the ‘basement’ below the wave cut platform areas.

Dunal heavy mineral deposits are typically present above and inland from the main strandline locations. Aeolian deposits are found in various sections on top of the Guildford Formation and/or the Leederville basement within the two Yalyalup tenements. These are shown in Figure 3 and annotated as Ed4 (Degraded surface of Eolian origin, Bassendean Dunes). Dunal sands are often heavily altered and feature elevated levels of leucoxene and zircon.

Groundwater movements have allowed the formation of iron rich cementation horizons in some of the deposit. The cementation presents as pisolitic to massive iron oxide cemented sandstone. Within this cemented layer and above it, the heavy mineral assemblage is enriched in the alteration products of ilmenite (leucoxene and altered ilmenite). In this upper zone the ilmenite chemistry is often enriched in Al2O3. Below the cemented layer, the heavy mineral assemblage is more typical of the Yoganup Formation with a greater proportion of unaltered ilmenite with low Al2O3 content.

SOILS

Doral undertook a targeted ASS investigation in conjunction with resource definition drilling at the Site in mid-December 2014 to assist in determining the presence and distribution of acid sulfate soils (ASS) at the Site and also to characterise the various geological/geomorphological units.

The Site occurs in an area depicted on an ASS risk map as Class II ‘moderate to low risk of ASS occurring within 3m of natural soil surface’ and is shown as being underlain by Pliocene to Quarternary sands and silts, which comprise the Superficial Formations. Identified units within the Superficial formations include Bassendean Sand (aeolian quartz sand), the Guildford Formation (dominated by interbedded sandy silt in the area) and the Yoganup Formation (fine to medium quartz sand). The total depth of the superficial formations at the Site is approximately 12-15m.

Field results of the ASS investigation indicate that Site soils are generally slightly acidic to neutral as a large proportion of pHF results are within the pH6.0 to pH7.0 range. This indicates that there is very little actual acidity present in the soil profile, which is confirmed by the

laboratory results, which show very little acidity is present as s-TAA (i.e. actual acidity). However, field results also show a high proportion of samples with pHFOX <3 and a change in pH of greater than 3.0pH units, indicating that there is additional potential acidity within the soil profile. This is also confirmed by the laboratory chromium reducible sulfur (CRS) results which show 49 of the 75 samples analysed, contain net acidity (NA) as SCR above the DWER action criterion (0.03%S).

Elevated NA above the action criterion was generally identified at depth (i.e. greater than ~5mBGL) from 10 of the 11 locations and at three of these locations elevated NA was also identified in surface and near surface soils. It should be noted however that 41 of the 75 samples analysed by CRS were located >1m below the maximum depth of mine pits, of which 33 exceed the action criterion. The remaining 34 samples analysed for NA were located from soils within the ore zone of the proposed mine pits, of which 16 exceeded the NA action criterion. Limited sampling was undertaken within the top 5m of the soil profile. Further investigations (predominantly of surface and overburden soils) are planned for late 2017.

Vegetation

Ecoedge (2016) identified and mapped eight vegetation units within the survey area, totaling 36.37ha. Most areas of remnant vegetation are in Degraded or Completely Degraded condition and consequently had low species diversity. As such, it was generally only possible to separate vegetation types based on overstorey composition and to a lesser extent soil type. Vegetation units are described as follows:

UNIT A1 - Woodland of Corymbia calophylla and Eucalyptus marginata, with scattered Agonis flexuosa, Banksia attenuata, B. grandis, Melaleuca preissiana, Nuytsia floribunda, Persoonia longifolia or Xylomelum occidentale over Xanthorrhoea preissii over weeds on grey-brown or grey loamy sand or sand (on farmland usually only C. calophylla and E. marginata are present). Degraded form of SWAFCT01b - Southern Corymbia calophylla woodlands on heavy soils (Gibson, et al., 2000) which is listed as a Threatened Ecological Community (TEC), with threat status of “Vulnerable” by DBCA. Mostly in Degraded or Completely Degraded Condition. Only area of Unit A1 of sufficient size and in good enough condition to be inferred as an occurrence of TEC SWAFCT01b is on McGibbon Track. 10.39ha within Development Envelope.

UNIT A2 - Woodland of Corymbia calophylla (sometimes with Eucalyptus marginata or E. rudis) with scattered Melaleuca preissiana or Banksia littoralis over open shrubland that may include Acacia extensa, A. saligna, Hakea ceratophylla, H. lissocarpha, H. prostrata, H. varia, Kingia australis, Melaleuca viminea and Xanthorrhoea preissii over weeds on seasonally wet grey loamy sand. Similar to both SWAFCT01b and SWAFCT02 - Southern wet shrublands, however the predominance of wetland-adapted species characteristics makes it floristically much closer to SWAFCT02. SWAFCT02 is listed as a TEC, with threat status of “Endangered” by DBCA.

The occurrence of Unit A2 at the northern end of McGibbon Track in Good Condition is inferred to be an occurrence of TEC SWAFCT02. 4.03ha within Development Envelope.

UNIT B1 - Tall shrubland of Acacia saligna, Banksia squarrosa subsp. argillacea, Calothamnus quadrifidus subsp. teretifolius, Hakea oldfieldii and Kunzea micrantha (with scattered emergent Eucalyptus rudis) over scattered native herbs including Drosera glanduligera and Sowerbaea laxiflora, the sedge Loxocarya magna, and weeds on shallow red sandy clay on massive ironstone. Vegetation Unit B1 is recognised as the TEC SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)" (Gibson, et al., 2000); (Meissner & English, 2005). This TEC has a threat status of "Critically Endangered" by DBCA and Endangered under the EPBC Act. The largest occurrence of B1, that on the McGibbon Track (0.34ha) is recognised as an occurrence of Busselton Ironstones community (Webb, 2004) but unaccountably is yet to be added to the DBCA threatened communities' database (A, Webb, DBCA Bunbury, pers. Comm. 22/02/2016, cited in Ecoedge, 2016). Except on McGibbon Track where it is classed as Good condition the small fragments of this unit are Degraded/Good or Degraded condition. 0.5ha within Development Envelope.

UNIT B2 - Woodland of Eucalyptus rudis and (in some areas) Melaleuca rhaphiophylla over weeds on massive ironstone. Severely degraded form of SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area) recognisable only by the presence of massive ironstone and lateritic boulders at or near surface. Completely Degraded with only the overstory remaining. 2.93ha within Development Envelope.

UNIT C1 - Woodland of Eucalyptus rudis (and sometimes Corymbia calophylla) over scattered Agonis flexuosa and Melaleuca rhaphiophylla over weeds on grey-brown clayey loams in drainage lines. Riverine Jindong Plant Communities (Webb, et al., 2009). All in Completely Degraded condition. 17.97ha within the Development Envelope.

UNIT C2 - Open woodland of Melaleuca preissiana over weeds on seasonally wet brown clay-loam. SWAFCT04 - Melaleuca preissiana damplands. Small area on farmland – Completely Degraded. Not within Development Envelope.

UNIT C3 - Tall Open Shrubland that may include Acacia saligna, Jacksonia furcellata, Kingia australis, Melaleuca osullivanii, M. preissiana, M. viminea and Xanthorrhoea preissii on seasonally wet grey-brown sandy loam. Similarities to the TEC SWAFCT09 - Dense shrublands on clay flats (TEC). However, the occurrence is considered to be too small and badly degraded to be inferred as an example of this TEC. A small area in Degraded/Good or Good condition on

the verge of Princefield Road. 0.55ha within the Development Envelope.

UNIT D - Woodland of Agonis flexuosa with scattered Banksia attenuata over weeds on grey sand on low dunes. Resemblance to the Priority 3 Ecological Community (PEC) SWAFCT21b - Southern Banksia attenuata woodlands" (Gibson, et al., 2000) but has been Completely Degraded by livestock grazing. Situated on farmland – all in Completely Degraded condition. Not within Development Envelope.

PL – Planted non-endemic and exotic trees. 4.92ha within Development Envelope.

CL – Cleared pasture. Existing cleared/highly degraded areas (e.g. paddocks/road verges) with scattered trees/shrubs. Some areas seasonally inundated/waterlogged. 685.45ha within Development Envelope.

Not surveyed - Majority of non-surveyed areas are cleared farmland with some areas of native vegetation. No vegetation within the non-surveyed areas will be cleared.

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area.

n/a

3.5 Describe the status of native vegetation relevant to the project area.

Vegetation condition was assessed against the method detailed in (Keighery, 1994). Most remnant native vegetation within the survey area, and all mapped remnant vegetation on farmland, is in "Completely Degraded" condition. The only vegetation deemed to be in "Good" condition is at the northern end of McGibbon Track and a small area on Princefield Road. A few other small areas were rated by Ecoedge (2016) as "Degraded/Good" condition on McGibbon Track, Princefield Road and Yalyalup Road.

Good Condition - 2.31ha

Degraded/Good - 2.43

Degraded - 1.31ha

Completely Degraded - 30.33

TOTAL VEGETATION - 36.37ha

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

na

3.7 Describe the current condition of the environment relevant to the project area.

Almost all of the 894.17ha Development Envelope is cleared pasture comprising existing cleared/highly degraded areas (e.g. paddocks/road verges) with scattered trees/shrubs.

Approximately 808ha (~90%) of the Development Envelope is mapped as a wetland in the Geomorphic Wetlands of the Swan Coastal Plain dataset (DEC, 2008), all of which has been assessed as being in the 'Multiple Use' management category, which is described as wetlands with few ecological attributes and functions remaining. The majority of the wetland area within the Development Envelope (~624ha or 77%) is mapped as Palusplain (seasonally waterlogged flat), with small areas of Sumpland (seasonally inundated basin, ~30ha or 3%) and floodplain (seasonally inundated flats, ~155ha or 17%). No wetlands of environmental significance are present within the Development Envelope.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the project area.

na

3.9 Describe any Indigenous heritage values relevant to the project area.

No Registered Aboriginal Sites are present within the Development Envelope

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area.

Freehold

3.11 Describe any existing or any proposed uses relevant to the project area.

Agriculture

Section 4 - Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action.

MITIGATION MEASURES

The following actions will be implemented to avoid and mitigate potential impacts to Matters of NES.

FLORA AND VEGETATION

Doral's overall principles for mitigating potential impacts to flora and vegetation are to:

Design the Site to avoid and/or minimise native vegetation clearing and land disturbance, as far as practicable (only 1.67ha is proposed to be cleared);

Minimise the timeframe between disturbance and rehabilitation;

Implement a Flora and Vegetation Management Plan.

Doral will develop and implement a Flora and Vegetation Management Plan to address potential impacts to flora and vegetation. The Flora and Vegetation Management Plan will include the following key management actions:

Development and implementation of specific clearing procedures to minimise impacts to flora and vegetation. This will include demarcation of cleared areas and authorisation requirements;

Establishment of specific stockpile management procedures to store and manage crushed vegetation, topsoil and subsoil;

Any DRF and priority flora species located within the Development Envelope will be avoided

and fenced to exclude access;

Monitor vegetation health, soil moisture and groundwater levels for potential GDEs within the Development Envelope;

Declared Plants Asparagus asparagoides and Zantedeschia aethiopica ragoides will be managed in accordance with the Biosecurity and Agricultural Management Act 2007;

Weed and dust management measures will be incorporated into the ongoing management of flora and vegetation for the Proposal.

FAUNA

Doral will develop and implement a Fauna Management Plan to address potential impacts to fauna of conservation significance and their associated habitat. The Fauna Management Plan will include the following key management actions:

Avoid clearing of native vegetation/fauna habitat within the Development Envelope as far as practical (only 1.67ha is proposed to be cleared);

Development and implementation of specific clearing procedures to minimise impacts to fauna and fauna habitats. This will include demarcation of cleared areas, pre-clearing surveys and authorisation requirements;

Where possible (if habitat trees are identified), clearing activities will be conducted within the months of January and February to avoid the documented breeding season of fauna of conservation significance, particularly Black-Cockatoos. If clearing is required outside of this preferred timeframe, any trees with potential nest hollows will be inspected for any evidence of nesting activity. If any are found to be in use, clearing in this area will be postponed until such a time that the tree is vacated.

A suitably qualified fauna spotter/carer will be on site during clearing operations to conduct daily checks of vegetation to be cleared and retrieve fauna if necessary. The fauna spotter will be responsible for all activities related to the protection and welfare of individual fauna.

Vehicle speeds on site will be restricted. All collisions with fauna are to be reported and recorded through Doral's Hazard and Incident Management System (DHIMS);

Native fauna injured during clearing or normal site operations should be taken to a designated veterinary clinic or a nominated wildlife carer;

No dead, standing or fallen timber will be removed from site unnecessarily. Logs and other debris resulting from land clearing will be used to enhance fauna habitat in untouched and rehabilitated areas;

All staff working on site will be educated with regards to protected fauna;

Weapons and pets will not be permitted on site;

Wastes will be managed appropriately to ensure that fauna have no access to scraps or rubbish

Contribute to feral species removal such as fox/cat;

Lights at night will be directed towards construction and operation activities and will be in accordance with AS4282-1997 Control of the obtrusive effects of outdoor lighting.

HYDROLOGICAL PROCESSES

The key mitigation measures to reduce impacts to hydrological processes are:

Preparation and implementation of plans and procedures relevant to the management of groundwater and surface water (including monitoring programs, trigger criteria, management responses and contingencies);

Preparation and implementation of an acid sulfate soil management plan (ASSMP) in consultation with DWER;

Supply affected bore owners with supplementary water (where required);

Pits will be backfilled as soon as possible following cessation of mining to assist in recovery of groundwater levels as soon as possible;

Groundwater monitoring bores and soil moisture bores will be installed around conservation significant GDE’s and monitored for changes in groundwater levels and soil moisture content.

Placement of production bores to avoid impacts to other Yarragadee aquifer users as far as practicable;

Volumes of water abstracted from the Yarragadee aquifer will be recorded monthly;

Reporting in accordance with conditions of the approvals documents (Ministerial Statement, RIWI Act licences, DWER Licence to Operate etc.).

Volumes and quality of water discharged from the mine site will be recorded during emergency discharge events and managed in accordance with the Site’s DWER Licence;

Prevention/minimisation of erosion at the point of discharge from Site.

ACID SULFATE SOILS

The key mitigation measure to reduce impacts to terrestrial environmental quality is to prepare and implement an ASSMP in consultation with DWER. The ASSMP includes specific treatment strategies designed to manage impacts to soil, groundwater and surface water receptors. A summary of the key management measures documented in the ASSMP is provided as follows:

Mining activities will be scheduled to be undertaken on a campaign basis, with a portion of the ore body being mined and processed in a discrete time period to assist in minimising the area of groundwater drawdown at any one time;

Topsoil/subsoil will be stripped to a depth of ~100mm, stockpiled for rehabilitation and neutralised if pH is <4.0pH;

Overburden identified as ASS (i.e. NA > 0.03%S) will be reburied as soon as possible below the natural groundwater level into a mine void that is being actively backfilled with sand tails and/or clay fines resulting from ore processing. The sand tails and/or clay fines will be hydraulically returned over the overburden, maintaining the overburden material to anoxic conditions and providing additional buffering capacity, as a result of the addition of lime sand during the excavation and processing of ore;

Excavated ore identified as ASS will be processed through the wet concentration plant as soon as possible. As this material is maintained in the form of a wet slurry (i.e. saturated), the risk of sulfide oxidation is greatly reduced. The process slurry is maintained at pH5.5 to assist with the mineral separation process. As such, alkaline (lime sand) material will be added into the in-pit hopper during the excavation of ore to maintain pH5.5 and increase buffering capacity within the wet concentration process;

Processing of ore results in three streams of material, HMC, clay fines and sand tails. These will be managed as follows:

HMC will be stockpiled and stored on a bunded alkaline pad. Leachate emanating from the stockpiled HMC will be captured and returned to the ore processing circuit, which is maintained at pH5.5;

Sand tails will be hydraulically returned to pit voids as a single waste stream and/or co-disposed with clay fines into pit voids. This material will have been maintained in a saturated state and with conditions maintained at pH5.5throughout the process. Furthermore, the unused (unreacted) lime sand that was added to the process at commencement of the ore processing sequence (i.e. at the in-pit hopper) will form part of this process stream, resulting in the addition of buffering capacity to the locations where this material is hydraulically returned. Sand tails will be regularly tested to ensure that the inherent acid neutralising capacity of this waste stream exceeds the acidity present. If necessary, additional lime sands will be incorporated during hydraulic disposal;

Clay fines will be managed by either:

Immediate co-disposal with sand tails by hydraulic return in existing mine voids; or

Directed to a SEP for storage and future use as void backfill.

Clay fines that are immediately co-disposed with sand tails will be maintained in a saturated state prior to disposal and will include additional buffering capacity provided by the unused (unreacted) lime sands within the sand tails material. This material will be regularly tested to ensure that the acid neutralising capacity exceeds the acidity present in this waste stream.

Clay fines material that are directed to the SEPs will also be regularly tested to ensure the acid neutralising capacity exceeds acidity of the waste stream. If insufficient buffering capacity is identified, additional neutralising material (lime sand) will be added prior to being discharged into a SEP. In addition to regular testing during discharge, this material will be re-tested following consolidation and drying within the SEP, prior to final disposal.

Overburden and non-processed material identified as ASS, that will be used for site construction purposes (i.e. roads, pads, bunds etc) will either be:

Neutralised for re-use within 70 hours of excavation; or

Stockpiled on a treatment pad for up to 21 days prior to neutralisation and re-use.

Water quality of the process water pond will be maintained by the addition of a suitable alkaline material to the in-pit hopper at the commencement of the ore processing sequence (where required) to ensure:

Field pH >5.5; or

TTA <40 mgCaCO3/L; and

Total Alkalinity >30 mgCaCO3/L.

Preparation and implementation of plans and procedures relevant to the management of groundwater and surface water (including monitoring programs, trigger criteria, management responses and contingencies).

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved.

Doral is confident that with the implementation of the mitigation measures described above that no impacts to the identified Matters of NES will occur.

No direct impact will occur to any listed flora species and TEC or to the Vasse-Wonnerup RAMSAR wetland.The proposal has been designed to avoid as much clearing of native

vegetation as possible. No flora or TEC will be directly cleared for the Proposal. All indirect impacts associated with groundwater drawdown will be managed to avoid impacts to Matters of NES.

Section 5 – Conclusion on the likelihood of significant impacts

A checkbox tick identifies each of the matters of National Environmental Significance you identified in section 2 of this application as likely to be a significant impact.

Review the matters you have identified below. If a matter ticked below has been incorrectly identified you will need to return to Section 2 to edit.

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

No

5.1.4 Listed threatened species or any threatened ecological community

No

5.1.5 Listed migratory species

No

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

No

5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action.

Listed Threatened Species and Communities (Flora and Vegetation)

No DRF or TEC listed under the EPBC Act will be cleared or directly impacted by the Proposal.

Indirect impacts associated with temporary groundwater drawdowns to EPBC listed flora species and vegetation communities will be managed by the implementation of a Flora and Vegetation Management Plan, and Groundwater and Surface Water Management Plan.

Listed Threatened Species and Habitat (Fauna Species and Habitat)

Using the published DoEE criteria no “significant impact“ is likely to occur to any of the four species listed under the EPBC Act known to or likely to utilise the area, primarily given the small area of degraded vegetation likely to be affected. No Western Ringtail Possum drey will be disturbed and the area of vegetation (along McGibbon Track) where 5 individuals were identified will not be cleared for the Proposal.

Based on available information, no substantial impacts on any fauna species or overall biodiversity values are anticipated as a consequence of implementing the Proposal. In cases where some impacts are anticipated, the degree of the impact is only expected to be very low and relates to the loss of very small areas of habitat, primarily in the form of a small number of scattered, isolated paddock trees and/or overstory species. This coupled with the fact that most of the species known to or likely to occur are common and widespread, no overall change in their conservation status is anticipated, despite a possible, very localised/small reduction in habitat extent.

Wetlands of Internation Importance Vasse-Wonnerup Wetland

No impacts are expected to the Vasse-Wonnerup RAMSAR wetland after the application of mitigation measures for the following reasons:

Groundwater drawdown will not extend more than 1,000m (0.1m drawdown) from mine pits. The 1m drawdown will not extend more than 670m from mine pits. These dewatering estimates are also based on preliminary modelling only and represent a worse case (i.e. due to not accounting for hydraulic backfilling of sand tails which has been shown by Doral at other sites to rapidly recharge the groundwater table within weeks).

Minimal to no reduction in surface water inflows to the Vasse-Wonnerup RAMSAR wetland system will occur as a maximum of 0.1km2 (area of mine pits open at any one time) will intercept the 961km2 catchment area of the Vasse-Wonnerup wetlands (estimated reduction of 0.01%).

Any emergency discharge of water from the mine site will be managed via DWER site licence conditions (quality/volume). Discharge of water will only occur when all storages on site are at full capacity (the site is a closed system) and will only occur during significant rainfall events, mainly in winter when the Lower Sabina River is flowing. Modelling by DoW (2009) shows that no flows are prersent during the summer months in the Lower Sabina River and it is unlikely to be connected to groundwater. The discharge water will also mix will other water from the Lower Sabina River and other tributaries entering the Vasse-Wonnerup wetland.

Section 6 – Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

Doral is committed to its environmental performance and has developed, implemented and continually improved its Environmental Management System (EMS). Doral's EMS is in accordance with the requirements of the Australian/New Zealand Standard AS/NZS ISO 14001:1996 (ISO 14001).

A Performance Compliance Report was prepared to audit compliance with environmental commitments and conditions at the Dardanup Mine and Picton Dry Separation Plan for the first four years of mining operations. Audit items included the DEC Audit Table 484, (Ministerial Condition) the EMP's, the EMS and the DEC Licences to operate the mine and the dry separation plant. Compliance with these items was demonstrated in this Performance Compliance Report.

A Performance Review Report was prepared by Doral in March 2013 as required by Ministerial Condition 789:5-1, to demonstrate compliance of implementation of the Burekup West amendment to the original Dardanup Mineral Sands Project. This report addressed the results of monitoring related to the major environmental risks and impacts, the performance objectives, success of risk reduction measures and progress in achieving sound environmental performance. Doral continues to provide annual Compliance Assessment Report's for Burekup West in accordance with MS789:4-6.

Doral prepared a Compliance Assessment Report in September 2017 as required by Ministerial Condition 1030:4-6. This report provided details of the implementation status of the Yoongarillup Mine for the reporting period, a statement of compliance and details of declared compliance status for each implementation condition of Ministerial Statement 1030.

Doral's Annual Environmental Review (AER) discusses compliance of the Dardanup Mine and Yoongarillup Mine for all environmental legislative commitments and conditions.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application.

n/a

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes

6.3.1 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework.

Doral is committed to its environmental performance and has developed, implemented and continually improved its Environmental Management System (EMS). Doral's EMS is in accordance with the requirements of the Australian/New Zealand Standard AS/NZS ISO 14001:1996 (ISO 14001).

Doral have developed an environmental policy that outlines the Company's intentions and commitment to environmental performance. The environmental policy is the foundation of the EMS and provides the framework for setting and reviewing objectives and targets. The proposed Yalyalup project is in line with Doral's current environmental policy.

Doral will review the EMS to ensure that all impacts on environmental aspects of the Yalyalup Project are identified and managed appropriately.

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

Yes

6.4.1 EPBC Act No and/or Name of Proposal.

Dardanup Mine Expansion Southern Extension, Henty WA. (EPBC 2011/6087)

Waterloo Heavy Mineral Mining Project, Henty WA. (EPBC 2013/6879)

Yoongarillup Mineral Sands Project, WA. (EPBC 2012/6521)

Section 7 – Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source).

Reference Source	Reliability	Uncertainties
Baddock, L., Vine, J. & Leathersich, M., 2005. South West Yarragadee Hydrogeological Investigations and Evaluation, Southern Perth Basin. Infrastructure Planning Branch.Water Corporation. Davidson, 1995. Hydrogeology and Groundwater Resources of the Perth Region. Geol. Soc. WA Bulletin 142. DEC, 2008. Geomorphic Wetlands of the Swan Coastal Plain GIS Mapping dataset. Department of Environment and Conservation. Perth, Western Australia. DEC, 2010. Definitions, categories and criteria for threatened and priority ecological communities. Department of Environment and Conservation, Perth, Western Australia. Department of Environment, 2007. Ecological Character description, Vasse-Wonnerup RAMSAR wetlands site in south-west western Australia. DEWHA, 2009. Significant impact guidelines for the vulnerable western ringtail possum (Pseudocheirus occidentalis) in the southern swan Coastal Plain, Western Australia.Australian Government. DoW, 2009b. A	All sources are reliable	Groundwater drawdown modelling provided in HydroSolutions (2017) is preliminary only and represents a worst case scenario as inputs to the model such as hydraulical backfilling of mine voids with sand tails is not accounted for.

Reference Source	Reliability	Uncertainties

draft water quality improvement plan for the Vasse Wonnerup Wetlands and Geographe Bay, s.l.: Department of Water. DoW, 2009a. Whicher Area Surface Water Allocation Plan. Water resource and planning series Report 19. Department of Water, Western Australia. DoW, 2010. Vasse-Wonnerup Wetlands and Geographe Bay Water Quality improvement Plan. Government of Western Australia. DSEWPaC, 2012. EPBC Act Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) Calyptorhynchus latirostris, Baudin's cockatoo (vulnerable) Calyptorhynchus baudinii, Forest red-tailed black cockatoo (vulnerable) Calyptorhynchus banksii: Australian Government. Ecoedge, 2016. Report of a Level 1 Flora and Vegetation Survey at the Yalyalup Proposed Mine Area. Gibson, N., Keighery, G. & Keighery, B., 2000. Threatened plant Communities of Western Australia. 1 The Ironstone Communities of the Swan and Scott Coastal Plains. Journal of the Royal Society of Western Australia, Volume 83, pp. 1-11. Harewood, 2017. Fauna Assessment - Yalyalup Project Area. August 2017 V1. Hirschberg, 1989. Busselton shallow-drilling groundwater investigation: Western Australia Geological Survey, Professional Papers, Report 25, p. 17-37. HydroSolutions, 2017. Initial Hydrogeological Assessment:

Reference Source	Reliability	Uncertainties
Proposed Yalyalup Mineral Sands Mine. Unpublished report prepared for Doral Mineral Sands Pty Ltd. Johnstone, R. & Storr, G., 1998. Handbook of Western Australian Birds: Volume 1 - Non-passerines (Emu to Dollarbird). , s.l.: Western Australian Museum, Perth, Western Australia. Meissner, R. & English, V., 2005. VShrubland Association on Souther Swan Coastal Plan Iron stone (Busslton area) (Souther Ironston Association) Interim recovery plan no. 215, s.l.: Department of Environment and Conservation, Species and Communties Branch. Schafer, D., Johnson, S. & Kern, A., 2008. Hydrogeology of the leederville aquifer in the western Busselton-Capel Groundwater Area. Hydrogeological record series Report HG31: Department of Water. Williams, K., Horan, S. & Webb, A., 2001. Declared Rare and Poorly Known Flora in the Central Forest Region, s.l.: Department of Conservation and Land Management, State Species Management Plan.		

Section 8 – Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.0 Provide a description of the feasible alternative?

Justification

Doral is a global supplier of the products of mineral sands mining (ilmenite, leucoxene, rutile and zircon). Continuation of mining is core to Doral's business and crucial to continue to deliver to a global market.

Doral have operated in the southwest region of Western Australia since 2002, from one previously operating mine (Dardanup Mine) which extracted ore from the Dardanup and Burekup Mineral Sands Deposits, located approximately 20km east of Bunbury. Operations ceased at the Dardanup Mine in December 2015 and the site is now under decommissioning and closure.

Doral commenced mining the Yoongarillup Mineral Sands Deposit (Yoongarillup Mine), located 17km southeast of Busselton, in January 2017 in accordance with Ministerial Statement No. 1030. Doral also operates a Dry Separation Plant at Picton, 10km east of Bunbury, which receives HMC from Doral's Yoongarillup Mine.

Employing approximately 100 staff and contractors, Doral's business is a source of employment locally and provides business for suppliers, distributors and local services (e.g. mechanics, contractors, consultants). Doral contributes financial support to local schools, sporting groups, various volunteer groups, and annual local festivals and is considered a valuable member of the local community.

Mining operations at Doral's Yoongarillup Mine are anticipated to be completed in 2020. An alternative ore source is therefore required to continue to meet global demand and to ensure the continued employment of Doral's employees and contractors. Commencement of mining operations at the Yalyalup Mineral Sands Project at the commencement of 2021 will enable Doral to continue operating in the southwest of Western Australia and ensure employees and contractors are retained in the southwest and local support to communities continues.

ALTERNATIVES

Doral have analysed the alternatives to mining the Yalyalup Mineral Sands Deposit. A discussion of the alternatives is provided as follows.

IS THIS PROPOSAL NEEDED

Doral is a global supplier of the products of mineral sands mining (ilmenite, leucoxene, rutile and zircon). Continuation of mining is core to Doral's business and crucial to continue to deliver to a global market.

Ilmenite, rutile, leucoxene (an alteration product of ilmenite) and HITI (which is a blend of ilmenite and leucoxene) are mainly used to make pure white, highly light refractive and ultra-violet light absorbing, Titanium Dioxide pigment for use in protective house and car paints; paper; plastics; ink; rubber; textiles; cosmetics; sun screens; leather and ceramics. Because titanium dioxide is non-toxic and biologically inert, it can be safely used in foodstuffs and pharmaceuticals. Super strong, lightweight and corrosion resistant titanium metals are also used in the construction of aircraft, spacecraft and motor vehicles, and for medical implants. Again, its non-reactive properties make titanium one of the few materials the human body will not reject; consequently, it is widely used in such medical operations as hip replacements and the installation of heart pacemakers. This super metal is also being increasingly used in the manufacture of strong, lightweight sports equipment, jewellery and other advanced engineering applications.

Zircon is used in ceramics, specialty castings and various refractory applications, where its resistance to high temperature and abrasion make it extremely valuable in the manufacturing processes as well as ceramics such as glazes for tiles and sanitary wear. In industry, it is mainly used as a raw material in making refractory bricks, furnace linings and producing pigments in the ceramic industry; where its opacity and hardness gives a whiteness and durability to tiles, sanitary ware and tableware. It is also utilized in a range of other high-tech industrial and chemical applications.

Doral's operations meet a global need for ilmenite, rutile and zircon and provide West Australian people with employment. Doral currently sources ore to produce these products from its Yoongarillup Mine, which is scheduled for closure in 2020. An alternative ore source is required to continue to meet global demand and to ensure the continued employment of Doral's employees.

OTHER TECHNOLOGIES OR OPTIONS

Open cut mining of mineral sands is standard practise in Western Australia due to the shallow

nature of the deposits, which generally occur between 5 to 10m deep in the region. Deposits are usually strand-like and occur at the location of ancient shorelines. Disturbance occurs only on the surface layers and not at depth compared to other forms of mining (e.g. iron ore mining can have pit depths of greater than 60m deep). The use of alternative technologies can be more expensive (e.g. horizontal drilling) and have their own associated impacts and may not result in fewer disturbances to the environment.

LOCATION OPTIONS

Doral are constrained spatially, as the location of mineral sands deposits are the targeted location, and in the southwest region these are largely associated with the foothills of the Whicher Scarp. The grade of HMC discovered through exploration drilling largely determines the areas that are viable and can be extracted for sale. In this case Doral have conducted extensive exploration drilling, and the results of aircore testing indicate the area contains viable mineral resources. Doral hold other tenements in the southwest however economic resources have yet to be defined for these. As such no sufficiently details environmental or technical studies have been undertaken on these tenements.

OPTIMISATION OF PROPOSAL TO MINIMISE ENVIRONMENTAL IMPACTS

The design of the Proposal and placement of mine pits is continually evaluated through exploration drilling. Exploration drilling commenced in 2012 and since that time Doral have designed a series of mine pit configurations, resulting in the layout presented in this ERD for referral to the EPA. Further exploration drilling is planned for late 2017 and as such further modifications to the Proposal layout are possible.

Due to the early stage of the Proposal, the only design optimisation that has been incorporated into the layout of the mine pits to minimise environmental impacts is:

Areas containing native vegetation have been avoided where possible (McGibbon Track) to minimise the need to clear vegetation.

Other design optimisations that will be incorporated into the layout of the Proposal will likely include:

Utilising mine voids where possible for ponds and location of mine infrastructure to reduce the total area disturbed;

Location of processing equipment in-pit (e.g. hopper) to minimise noise emissions to sensitive receptors;

Incorporation of noise bunds to minimise potential noise impacts under certain wind conditions on nearby residences;

Incorporation of several options for emergency discharge of water in the event of heavy rainfall.

8.1 Select the relevant alternatives related to your proposed action.

8.27 Do you have another alternative?

No

Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

General Manager

9.2.2 First Name

Andrew

9.2.3 Last Name

Templeman

9.2.4 E-mail

andrew.templeman@doral.com.au

9.2.5 Postal Address

PO BOX 9155
PICTON WA 6229
Australia

9.2.6 ABN/ACN

ACN

096342451 - DORAL MINERAL SANDS PTY LTD

9.2.7 Organisation Telephone

08 9725 5444

Australian Government
Department of the Environment and Energy

Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

General Manager

9.2.2 First Name

Andrew

9.2.3 Last Name

Templeman

9.2.4 E-mail

andrew.templeman@doral.com.au

9.2.5 Postal Address

PO BOX 9155
PICTON WA 6229
Australia

9.2.6 ABN/ACN

ACN

096342451 - DORAL MINERAL SANDS PTY LTD

9.2.7 Organisation Telephone

08 9725 5444

9.2.8 Organisation E-mail

andrew.templeman@doral.com.au

9.2.9 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable

Small Business Declaration

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small a business entity and confirm that I qualify for a small business exemption.

Signature:..... Date: .....

9.2.9.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.2.9.3 Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made

Person proposing the action - Declaration

I, ANDREW TEMPLEMAN, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature:..... Date: 01/11/17

I, _____, the person proposing the action, consent to the designation of _____ as the proponent of the purposes of the action describe in this EPBC Act Referral.

Signature:..... Date: .....

9.3 Is the Proposed Designated Proponent an Organisation or Individual?

Australian Government
Department of the Environment and Energy

Organisation

9.5 Organisation

9.5.1 Job Title

General Manager

9.5.2 First Name

Andrew

9.5.3 Last Name

Templeman

9.5.4 E-mail

andrew.templeman@doral.com.au

9.5.5 Postal Address

PO BOX 9155
PICTON WA 6281
Australia

9.5.6 ABN/ACN

ACN

096342451 - DORAL MINERAL SANDS PTY LTD

9.5.7 Organisation Telephone

08 9725 5444

9.5.8 Organisation E-mail

andrew.templeman@doral.com.au

Proposed designated proponent - Declaration

I, ANDREW TEMPLEMAN, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Australian Government
Department of the Environment and Energy

Signature:..... Date: 01/11/2017

9.6 Is the Referring Party an Organisation or Individual?

Organisation

9.8 Organisation

9.8.1 Job Title

General Manager

9.8.2 First Name

Andrew

9.8.3 Last Name

Templeman

9.8.4 E-mail

andrew.templeman@doral.com.au

9.8.5 Postal Address

PO BOX 9155
PICTON WA 6229
Australia

9.8.6 ABN/ACN

ACN

096342451 - DORAL MINERAL SANDS PTY LTD

9.8.7 Organisation Telephone

08 9725 5444

9.8.8 Organisation E-mail

andrew.templeman@doral.com.au

Referring Party - Declaration

Australian Government
Department of the Environment and Energy

I, _____, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature:..... Date: 01/11/2017

Appendix A - Attachments

The following attachments have been supplied with this EPBC Act Referral:

1. appendix_1_-_flora_and_vegetation.pdf
2. appendix_2_-_hydrogeological_assessment.pdf
3. appendix_4_-_level_1_fauna_assessment.pdf
4. appendix_19_-_doral_environment_policy.pdf
5. fig_1_1_nes_map_1.pdf
6. fig_1_1_nes_map_2.pdf