Title of Proposal - Worsley Mine Expansion

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.

South32 Worsley Alumina Pty Ltd (Worsley) operates the Worsley Bauxite-Alumina Project (the Project) in the southwest of Western Australia (WA). The Project is one of the largest bauxite mining and alumina refining operations in the world, comprising the Boddington Bauxite Mine (BBM), an overland bauxite conveyor, the Worsley Refinery (the Refinery) near Collie and port operations at Bunbury Port. Worsley began production in 1984 and has since produced more than 71 million tonnes of alumina.

Existing Worsley Alumina Project activities are the subject of existing State environmental approvals, an EPBC Act exemption, and EPBC Act expansion approval 2004/1566. The Worsley Mining Expansion Proposed Action the subject of this referral primarily proposes to expand and revise/amend existing Worsley Alumina Project mining and transport activities, and other activities associated with the expansion and revisions/amendments.

Key activities are:

• Expansion of the existing mining envelope from 22,102 ha to 27,796 ha to incorporate new and expanded mining resource areas within a consolidated area referred to as the WMDE (Figure 2 of the Supporting Document.) This expansion will involve accessing additional resource areas and mining activities inside and adjacent to current operational and already approved mining areas at BBM. Without this expansion, the existing EPBC Act exemption to clear native vegetation in mining areas within the WMDE would be exhausted in approximately 3 years.

• Expansion of mining activities at the BBM with a footprint of 8,662 ha within the WMDE including the clearing of up to 5,925 ha of native vegetation for mining activities (not including continuation of existing approved mining in the Pre-existing Approval Area);

• Access to existing (already approved under EPBC No. 2012/6370 and MS971) bauxite stockpiles within the BGM mining area (Figure 2);

• The establishment of a Bauxite Transport Corridor (with transport optionality) linking existing mining areas at Saddleback and Marradong to new and future mining areas (Figure 3) including up to two crossings of the Hotham River;

• Contingency bauxite mining activities within the Refinery Lease Area (Figure 4);

• Construction activities and temporary support facilities associated with the Proposal as required; and

• Additional clearing within the Refinery Lease Area for maintenance purposes (Figure 5).

The referral expansion and revision/amendment components primarily comprise expansion of mining activities at Boddington Bauxite Mine (BBM) within the Worsley Mining Development Envelope (WMDE). These mining activities will involve accessing additional resource areas and mining activity which have been confirmed inside and adjacent to current operations at BBM (current mining operations are the subject of an EPBC Act exemption). Mining activities are detailed further in section 2 of the Referral Supporting Document.

Expansion and revision/amendment components also include construction and operation of revised transport routes and infrastructure, with optionality for conveyor and/or road, within the Bauxite Transport Corridor for the transport of mined ore. Other expansion and revision/amendment components include access to (already approved) bauxite stockpiles at the Boddington Gold Mine (BGM), the inclusion of contingency bauxite mining and other maintenance activities at the Refinery, construction activities, temporary support facilities and other activities associated with the expansion and revision/amendment as required.

Existing Project components which will be used if expansion and revision/amendment components are approved.

Existing Projects elements will be used for the Project expansions and revisions/amendments from the date, if and when, any approval is issued for the Proposed Action. This referral therefore includes the ongoing use of the following existing Project activities but only from the date, if and when, the expansions and revisions/amendments are approved:

• Mining activities in the Pre-existing Approval Area (Figure 2 of the Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (Referral Supporting Document)), up to the extent of existing approvals and exemptions. This includes the clearing of up to 942 ha of native vegetation and mining activities on already disturbed land (refer to Section 2.1.1.1 of the Referral Supporting Document).
• Alumina refining activities up to 4.7 Mtpa (dry) (the current approved license capacity under the EP Act) and ongoing related refinery activities and maintenance;
• Ore transport activities and use of existing transport infrastructure, including operation of the existing conveyor;
• Alumina transport activities to the Port of Bunbury;
• Exploration activities identified in the annual Plan of Bauxite Mining Operations (10 Year Mine Plan); and
• Construction and operation of other minor infrastructure activities, such as fencing, access tracks, firebreaks, bores and associated water infrastructure, that are required for the Project.

This referral does not make any modifications to the above existing Project activities, which are already primarily subject to MS719, EPBC Act exemption or EPBC Act approval 2004/1566. However, the referral is required to include ongoing use of existing activities, but from the time post approval of the Project expansion and amendment/revision activities (only), because:

• if the Project expansion and amendment/revision activities are approved, the EPBC Act exemption which many existing Project activities are currently subject to will lapse due to the scope and nature of the changes made by the Worsley Mining Expansion. New EPBC Act referral and decision making for any post expansion approval ongoing use these existing activities is therefore required;
• if expansion and revision activities are approved, all existing Project facilities will be utilized, expanded, and revised/amended etc. as approved, and it will then no longer be practical or possible to differentiate between existing and expansion activities, impacts, management practises, monitoring results, etc.; and
• the referral of expansion/revision activities with (post approval only) ongoing use of existing activities will also ensure appropriate cumulative impact assessment is carried out of whole of operations impacts.

Existing Project activities, which are the subject of existing approvals and/or an EPBC Act exemption, will continue in the meantime up to the date of any approval for the Worsley Mining Expansion Proposed Action and are not within the scope of the referral.

Extended mining areas

Mining and transport corridor activities have not commenced in the Extended Mining Areas (Figure 1). These activities are already approved under EPBC Act approval 2004/1566 (subject to conditions 1 and 2 of that approval) and Part B conditions of State Approval MS719. The mining of these areas is not expected for some time. Although mining in these areas forms part of the overall Project, no changes are currently proposed to activities in these areas as part of this Proposal. The Extended Mining Areas will remain regulated by EPBC approval 2004/1566. (See Section 1.3, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019)).

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
WDME	1	-32.664697825823	116.35892018638
WDME	2	-32.662819149923	116.35703191124
WDME	3	-32.664553313694	116.35840520225
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WDME	5	-32.653569708201	116.35909184776
WDME	6	-32.655882158355	116.36801823936
WDME	7	-32.657038361001	116.37351140343
WDME	8	-32.663975262843	116.37419804893
WDME	9	-32.669755603106	116.379691213
WDME	10	-32.684782737756	116.40166386925
WDME	11	-32.696918193107	116.41883000694
WDME	12	-32.696918193107	116.41951665245
WDME	13	-32.706163147059	116.42638310753

Area	Point	Latitude	Longitude
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WDME	19	-32.795674034652	116.44045934044
WDME	20	-32.809525740271	116.44732579552
WDME	21	-32.812988329416	116.43530949913
WDME	22	-32.819047535768	116.43187627159
WDME	23	-32.823663796583	116.43427953087
WDME	24	-32.834337980871	116.43805608116
WDME	25	-32.836357276811	116.43427953087
WDME	26	-32.836934210073	116.42638310753
WDME	27	-32.838376526825	116.4236365255
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WDME	32	-32.848327873725	116.43204793297
WDME	33	-32.854673077534	116.43410786949
WDME	34	-32.862459752924	116.434794515
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WDME	37	-32.86563190619	116.42861470543
WDME	38	-32.866785388337	116.42861470543
WDME	39	-32.868227219922	116.42861470543
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WDME	41	-32.872264223637	116.4303313192
WDME	42	-32.872840923449	116.43136128746
WDME	43	-32.873129271948	116.43170461021
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WDME	53	-32.879472701653	116.44921407066
WDME	54	-32.875724366238	116.44784077965
WDME	55	-32.87543602618	116.44921407066
WDME	56	-32.876301043542	116.44990071617
WDME	57	-32.878319384561	116.45127400719
WDME	58	-32.879184373787	116.4526472982
WDME	59	-32.880337679624	116.4526472982
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Area	Point	Latitude	Longitude
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Area	Point	Latitude	Longitude
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WDME	125	-33.027548990867	116.55598744713
WDME	126	-33.028412520882	116.5583907064
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WDME	134	-33.040501052648	116.51581868492
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WDME	146	-33.007397555494	116.45161732994
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WDME	148	-32.99904775454	116.44200429283
WDME	149	-32.998183936922	116.43376454674
WDME	150	-32.994440629518	116.4303313192
WDME	151	-32.993576766798	116.4265547689
WDME	152	-32.988393412894	116.42552480064
WDME	153	-32.986953538342	116.4220915731
WDME	154	-32.988681384986	116.41831502281
WDME	155	-32.986089602336	116.41522511803
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WDME	157	-32.981769795482	116.40801534019

Area	Point	Latitude	Longitude
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WDME	162	-32.973129547681	116.39943227135
WDME	163	-32.970825338823	116.39908894859
WDME	164	-32.969097142731	116.39908894859
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WDME	167	-32.95959145985	116.3997755941
WDME	168	-32.957574971397	116.39908894859
WDME	169	-32.956998823387	116.39771565758
WDME	170	-32.957286897862	116.39668568931
WDME	171	-32.95613459433	116.39874562584
WDME	172	-32.951237136704	116.39805898033
WDME	173	-32.949796656346	116.39496907554
WDME	174	-32.946627516931	116.3953123983
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WDME	184	-32.925016720519	116.39359578453
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WDME	194	-32.864766784733	116.39840230308
WDME	195	-32.862459752924	116.40011891685
WDME	196	-32.859864270408	116.39325246178
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WDME	198	-32.853519437865	116.39462575279
WDME	199	-32.849481580894	116.39290913902
WDME	200	-32.848616301923	116.39428243004
WDME	201	-32.846308850085	116.39805898033
WDME	202	-32.844001338252	116.39771565758
WDME	203	-32.841116864096	116.39359578453
WDME	204	-32.83794383426	116.39290913902
WDME	205	-32.834482217818	116.39428243004

Area	Point	Latitude	Longitude
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WDME	211	-32.820057363319	116.39016255699
WDME	212	-32.811978421519	116.3736830648
WDME	213	-32.80418731769	116.3781462606
WDME	214	-32.78715993647	116.3774596151
WDME	215	-32.784850888001	116.37436971031
WDME	216	-32.78225313683	116.36304005943
WDME	217	-32.780521260574	116.3602934774
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WDME	219	-32.664697825823	116.34415730797
WDME	220	-32.664697825823	116.35892018638
Bauxite Transport Corridor	1	-32.686805428197	116.40441045128
Bauxite Transport Corridor	2	-32.708474235897	116.43187627159
Bauxite Transport Corridor	3	-32.746887315559	116.41024693809
Bauxite Transport Corridor	4	-32.787881501824	116.39102086387
Bauxite Transport Corridor	5	-32.81356541449	116.40990361534
Bauxite Transport Corridor	6	-32.819913102943	116.4191733297
Bauxite Transport Corridor	7	-32.829145294717	116.43221959434
Bauxite Transport Corridor	8	-32.836645743911	116.42260655723
Bauxite Transport Corridor	9	-32.831741675751	116.40784367882
Bauxite Transport Corridor	10	-32.831164708748	116.40338048302
Bauxite Transport Corridor	11	-32.831164708748	116.38312444054
Bauxite Transport Corridor	12	-32.829145294717	116.37316808067
Bauxite Transport Corridor	13	-32.812411240594	116.37351140343
Bauxite Transport Corridor	14	-32.808948628964	116.37454137169
Bauxite Transport Corridor	15	-32.804908744883	116.3759146627
Bauxite Transport Corridor	16	-32.798848574487	116.37660130821

Area	Point	Latitude	Longitude
Bauxite Transport Corridor	17	-32.793653813927	116.37660130821
Bauxite Transport Corridor	18	-32.787881501824	116.37660130821
Bauxite Transport Corridor	19	-32.787304250009	116.37660130821
Bauxite Transport Corridor	20	-32.76161275216	116.38140782677
Bauxite Transport Corridor	21	-32.735625044943	116.38381108604
Bauxite Transport Corridor	22	-32.732737053969	116.38552769981
Bauxite Transport Corridor	23	-32.692873224608	116.41230687462
Bauxite Transport Corridor	24	-32.686805428197	116.40441045128
Existing Conveyor	1	-32.828937879971	116.42930135094
Existing Conveyor	2	-32.861243068374	116.40629872642
Existing Conveyor	3	-32.864992016018	116.40629872642
Existing Conveyor	4	-32.877679585951	116.41213521324
Existing Conveyor	5	-32.884311002158	116.41797170006
Existing Conveyor	6	-32.890653631617	116.42277821861
Existing Conveyor	7	-32.951750240647	116.47187337242
Existing Conveyor	8	-32.953190689168	116.47324666344
Existing Conveyor	9	-32.877391252252	116.41179189049
Existing Conveyor	10	-32.864703641056	116.40561208092
Existing Conveyor	11	-32.860377904107	116.40664204918
Existing Conveyor	12	-32.828937879971	116.42895802818
Existing Conveyor	13	-32.828937879971	116.42930135094
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Existing Conveyor	2	-32.957799966684	116.47324666344
Existing Conveyor	3	-33.060294178425	116.19652852379
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Existing Conveyor	7	-33.059718701029	116.19584187828
Existing Conveyor	8	-32.957223820141	116.47461995445
Indicative Bauxite Transport Corridor	1	-32.696856312811	116.41666747592
Indicative Bauxite Transport Corridor	2	-32.717078419584	116.39572478793
Indicative Bauxite Transport Corridor	3	-32.737295942365	116.38679839633
Indicative Bauxite Transport Corridor	4	-32.802826927264	116.38508178256

Area	Point	Latitude	Longitude
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Indicative Bauxite Transport Corridor	6	-32.821870933411	116.42834044956
Indicative Bauxite Transport Corridor	7	-32.80311550326	116.38473845981
Indicative Bauxite Transport Corridor	8	-32.737295942365	116.38679839633
Indicative Bauxite Transport Corridor	9	-32.716500708712	116.39641143344
Indicative Bauxite Transport Corridor	10	-32.696856312811	116.41701079868
Indicative Bauxite Transport Corridor	11	-32.696856312811	116.41666747592
CBME	1	-33.223898433363	116.01874142227
CBME	2	-33.212122367438	116.03230267105
CBME	3	-33.212553227049	116.05170040665
CBME	4	-33.227057596019	116.0587385231
CBME	5	-33.236390819101	116.05444698868
CBME	6	-33.236390819101	116.04826717911
CBME	7	-33.238400921385	116.04037075577
CBME	8	-33.244718084839	116.03607922135
CBME	9	-33.232514062766	116.02577953873
CBME	10	-33.223898433363	116.01839809952
CBME	11	-33.223898433363	116.01874142227
Refinery	1	-33.244574518012	116.03590755997
Refinery	2	-33.212409607415	116.05170040665
Refinery	3	-33.212122367438	116.05324535904
Refinery	4	-33.205659218735	116.06079845963
Refinery	5	-33.205659218735	116.06886654434
Refinery	6	-33.215425570247	116.07985287247
Refinery	7	-33.221313579054	116.08774929581
Refinery	8	-33.225334430533	116.08809261856
Refinery	9	-33.236103657859	116.09907894669
Refinery	10	-33.251034791773	116.08019619522
Refinery	11	-33.251034791773	116.0736730629
Refinery	12	-33.253331662917	116.07075481949
Refinery	13	-33.253618767565	116.04054241715
Refinery	14	-33.244574518012	116.03590755997
Broad Land Area - DoEE only	1	-32.650394541872	116.35800396731
Broad Land Area - DoEE only	2	-32.649238253306	116.35663067629
Broad Land Area - DoEE only	3	-32.653863317858	116.37997662356

Area	Point	Latitude	Longitude
Broad Land Area - DoEE only	4	-32.705878804213	116.44177471926
Broad Land Area - DoEE only	5	-32.742849158545	116.41980206301
Broad Land Area - DoEE only	6	-32.785577015488	116.43078839113
Broad Land Area - DoEE only	7	-32.790195014788	116.44452130129
Broad Land Area - DoEE only	8	-32.817897974832	116.45276104738
Broad Land Area - DoEE only	9	-32.934386583067	116.50769268801
Broad Land Area - DoEE only	10	-32.948216635917	116.55575787356
Broad Land Area - DoEE only	11	-32.97702229741	116.55713116457
Broad Land Area - DoEE only	12	-33.036907979208	116.57361065676
Broad Land Area - DoEE only	13	-33.059930104427	116.5241721802
Broad Land Area - DoEE only	14	-32.993149365036	116.40606915285
Broad Land Area - DoEE only	15	-33.06453380719	116.20968853762
Broad Land Area - DoEE only	16	-33.2151718931	116.09982525637
Broad Land Area - DoEE only	17	-33.233552710126	116.11493145754
Broad Land Area - DoEE only	18	-33.257671670207	116.08059918215
Broad Land Area - DoEE only	19	-33.257671670207	116.03528057863
Broad Land Area - DoEE only	20	-33.223213975785	116.00781475832
Broad Land Area - DoEE only	21	-33.196787214359	116.04626690676
Broad Land Area - DoEE only	22	-33.207129071259	116.08059918215
Broad Land Area - DoEE only	23	-33.049570892873	116.18908917238
Broad Land Area - DoEE only	24	-33.001211793943	116.33740460207
Broad Land Area - DoEE only	25	-32.653863317858	116.33191143801
Broad Land Area - DoEE only	26	-32.650394541872	116.35800396731

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 Boddington Bauxite Mine (BBM) is located 5 km from the town of Boddington in the Hotham River catchment. Crushed bauxite is transported by a conveyor system approximately 60 km in length from the BBM to the Refinery at Worsley, which is located on the western edge of the Darling Plateau approximately 21 km northwest of Collie and 20 km southeast of Harvey. Raw materials and alumina products are transported via train or road to the Port of Bunbury, 45 km to the south-west of the Refinery. Activities associated with the Project are primarily located at the BBM, Refinery and existing conveyors.

See Section 2.3, 2.4, 2.5, and Figures 1 - 4, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

29,362

1.7 Is the proposed action a street address or lot?

Street Address

Pinjarra Williams Road
Marradong WA 6390
Australia

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 02/2020

End date 12/2053

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

EP Act and EPBC Act Project approvals are being sought.

For information about previous assessments of existing Project, and new approvals needed for the expansion/revisions/amendments, see Sections 1.1.1 and 1.5, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

Worsley has undertaken significant and ongoing engagement with stakeholders and community members throughout the evolution of this Proposal. Whilst engagement continues, some of the key stakeholders have included:

· State Government agencies including the Environment Protection Agency (EPA), Department of Water and Environment Regulation (DWER), Department of Biodiversity,

· Conservation and Attractions (DBCA), Department of Mines, Industry Regulation and Safety (DMIRS), Department of Planning, Lands and Heritage, and the Department of Jobs,

Tourism, Science and Innovation;

· The Commonwealth Department of Environment and Energy (DoEE);

· Local Government agencies including the Shires of Boddington, Collie, Harvey, Williams and Wandering;

· Traditional Owners and Heritage representative groups including the Gnaala Karla Booja (GKB) and the South West Aboriginal Land and Sea Council (SWALSC);

· Individual landowners in the area surrounding BBM;

· Other mining companies operating in and around the southwest;

· Environmental groups including the Friends of Reserves Boddington; and

· Community representatives.

The Project is located within the South West Native Title Settlement Area (Settlement Area). The Settlement Area is the area subject to the South West Native Title Settlement (Settlement), a comprehensive native title agreement negotiated between six Noongar Agreement Groups represented by the South West Aboriginal Land and Sea Council (SWALSC) and the

Government of Western Australia. The Project is specifically located within the Gnaala Karla Booja Agreement area. In October 2018, all six Indigenous Land Use Agreements (ILUAs) were formally registered.

Worsley is currently in discussion with SWALSC to formalize a Noongar Heritage Agreement. Previous meetings have taken place with SWALSC, 10 December 2018 and 8 March 2019, to discuss the Noongar Heritage Agreement. Worsley participated in the GKB Working Party Meeting on 17 March 2017 to present the proposed action and approach to the heritage assessment. The Cultural Heritage Management Plan will manage agreement and engagement requirements under the heritage agreement once the agreement is finalized.

See Sections 3.1 and 3.2, and Table 4, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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.

A referral under Section 38, Part IV of the Environmental Protection Act 1986 (EP Act) in respect of the same proposal will be submitted to the Environmental Protection Authority (EPA).

It is expected that the environmental impact assessment process for this Proposal will involve:

· Referral under Section 38(1) of the EP Act with the expectation that the Proposal will be set at a Public Environmental Review level of assessment; and

· Referral under the EPBC Act with the expectation that the Proposal will be determined to be a Controlled Action (and assessed under an Accredited Assessment approach).

See Section 1.5, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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?

Yes

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation).

Existing Worsley Alumina Project activities are the subject of existing State environmental approvals, an EPBC Act exemption, and EPBC Act expansion approval 2004/1566. The Worsley Mining Expansion Proposed Action the subject of this referral primarily proposes to expand and revise/amend existing Worsley Alumina Project mining and transport activities, and

other activities associated with the expansion and revisions/amendments.

See Sections 1.3, 2.1 - 2.6, and Figures 1 – 5, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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?

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
Forest Red-tailed Black-Cockatoo (FRTBC) Calyptorhynchus banksii naso EPBC Conservation Status: Vulnerable Carnaby's	Forest Red-tailed Black-Cockatoo (FRTBC): Temporary to medium term loss of foraging and potential breeding habitat Short-term reduction

Species	Impact
Black-Cockatoo Calyptorhynchus latirostris EPBC Conservation Status: Endangered Baudin's Black-Cockatoo Calyptorhynchus baudinii EPBC Conservation Status: Endangered Chuditch Dasyurus geoffroii EPBC Conservation Status: Vulnerable Red-tailed Phascogale calura EPBC Conservation Status: Vulnerable Woylie Bettongia penicillata ogilbyi EPBC Conservation Status: Endangered Western Ringtailed Possum Pseudocheirus occidentalis EPBC Conservation Status: Critically Endangered Quokka Setonix brachyurus EPBC Conservation Status: Vulnerable Carter's Freshwater Mussel Westralunio carteri EPBC Conservation Status: Vulnerable Caladenia hopperiana EPBC Conservation Status: Endangered Refer to Appendix I, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).	in foraging habitat prior to rehabilitation Temporary impact on breeding cycles Carnaby's Black-Cockatoo Calyptorhynchus latirostris: Temporary to medium term loss of foraging and potential breeding habitat Short-term reduction in foraging habitat prior to rehabilitation Temporary impact on breeding cycles Baudin's Black-Cockatoo Calyptorhynchus baudinii: Temporary loss of foraging and potential breeding habitat Short-term reduction in foraging habitat prior to rehabilitation Temporary impact on breeding cycles Chuditch Dasyurus geoffroii: Short to mid-term impact on the Chuditch populations Temporary fragmentation, loss and quality of habitat Temporary reduction in area of occupancy until rehabilitation Temporarily displacement of individuals of the local population Disruption of breeding cycles Red-tailed Phascogale calura: Tempory short to meduim term reduction in area of occupancy Habitat fragmentation Loss of breeding habitat Woylie Bettongia penicillata ogilbyi: Decreases in population size Reduction in the area of occupancy Fragmentation of existing populations Reduction in quantity, quality and extent of habitat Western Ringtailed Possum Pseudocheirus occidentalis: Reduction in the area of occupancy Reduction in habitat quality Fragmentation of existing populations Quokka Setonix brachyurus: Fragmentation of existing populations in the CBME Carter's Freshwater Mussel Westralunio carteri: Unlikely to be impacted as the proposal area is no longer considered suitable habitate for this species Caladenia hopperiana: Disruption of breeding cycles Reduction in habitat Refer to Appendix I, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019) for a detailed discussion of impacts.

2.4.2 Do you consider this impact to be significant?

Yes

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?

Yes

2.5.1 Impact table

Species	Impact
Rainbow Bee-eater Merops ornata EPBC Conservation Status: Marine/Migratory Refer to Appendix I, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).	Rainbow Bee-eater Merops ornata: Low to moderate potential to substantially modify, destroy or isolate important habitat for the species. Refer to Appendix I, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

2.5.2 Do you consider this impact to be significant?

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 any part of the environment in the Commonwealth marine area?

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.

Regional Biogeography

The Project is located in the Jarrah Forest bioregion and Northern Jarrah Forest subregion as described by the Interim Biogeographic Regionalisation for Australia (IBRA). This subregion is characterised by Jarrah-Marri forest on laterite gravels, and in the eastern part, by woodlands of Wandoo-Marri on clayey soils. Eluvial and alluvial deposits support Agonis shrublands and in areas of Mesozoic sediments, Jarrah forests occur in mosaic with a variety of species-rich shrublands (Williams and Mitchell 2001).

The Primary Assessment Area supports land uses including mining, agriculture, native vegetation, plantation vegetation, water bodies such as dams and the Hotham and Williams Rivers, and extensively cleared pasture land.

Vegetation Association

Beard (1990) described the Jarrah forest as one of only two forest formations in Western Australia. Jarrah (Eucalyptus marginata) is the dominant tree species within this area and is commonly found in association with the Marri (Corymbia calophylla) in varying proportions. The WMDE entirely located within the Beard vegetation unit 17 – Eucalyptus woodland (Woodland; Jarrah, Forest; Jarrah).

Flora Diversity

A total of 680 plant taxa from 72 families and 260 genera have been recorded in the main baseline studies undertaken on the WMDE and Bauxite Transport Corridor in the Boddington area and 289 vascular plant species from 54 plant families and 149 genera were recorded in the main baseline studies undertaken on the Collie area (Mattiske C, 2019). Recent surveying recorded 149 plant taxa from 42 families and 94 genera and as such reflect the largely degraded and cleared nature of substantial areas within the WMDE and Bauxite Transport Corridor.

Conservation Significant Flora

Desktop searches of the EPBC Act Protected Matters database, the DBCA.

NatureMap database, the Western Australian Herbarium (WAH) and Threatened and Priority Flora (TPFL) databases have identified the potential occurrence of 80 conservation significant flora species within 20 km of the WMDE and the Bauxite Transport Corridor, and 32

conservation significant flora species within 20 km of the Contingency Bauxite Mining Envelope (CBME). Of these potential conservation significant species, 15 (one Threatened and 14 Priority flora species) conservation significant species have been recorded within the WMDE and the Bauxite Transport Corridor, and one conservation significant species has been recorded within the CBME.

A summary of the conservation significant flora species previously recorded within the WMDE and the Bauxite Transport Corridor can be found in section 4.1 and Appendix I, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

Fauna Habitat

The fauna habitats present in the Primary Assessment Area are typical for the bioregion and Northern Jarrah Forest subregion, representing and dominated by varying forms of forest and woodland communities.

WMDE and Bauxite Transport Corridor

The WMDE is comprised of a mosaic of forested areas, agricultural and cleared areas within a primarily wheat and crop farming district. The cleared lands represent highly homogenous landscape types with generally poor values for native fauna. Fauna habitats within the WMDE and the Bauxite Transport Corridor include Jarrah-Marri communities, Wandoo communities, heath communities, mallee woodlands and riparian communities along the length of the Hotham River. Riparian communities include Melaleuca woodlands, Melaleuca heaths, low sedge heaths and Flooded Gum woodlands. The remnant native vegetation communities of relatively high quality are present in the northern and western portion of the WMDE. In some cases, these form contiguous tracts of native forests and woodlands, for example, the northern area of the BGM.

Combined these woodland habitats represent large but fragmented areas within the WMDE. In this type of landscape, they provide refuge for fauna as breeding, denning/roosting and foraging habitats. They also provide a means for movements across the fragmented landscape. Heaths and perched heaths occur infrequently in the landscape. Heaths tend to occur on shallow soils usually over granite cap-rock. They offer a distinct habitat type within the landscape. The high diversity of flowering plant species in such habitats is favoured by such fauna as Honey Possum, Tarsipes rostratus, as well as other nectarivores and insectivores (e.g., Honeyeaters, Sminthopsis sp, Chiropterans).

Riparian communities are a focal point for fauna including species not commonly associated with these habitats. The systems provide substantial connectivity in the landscape with the Hotham River (the dominant river flowing through the WMDE) travelling through areas of State Forest and parts of agricultural areas (Biostat, 2019).

Rehabilitated areas form an important component of the landscape with approximately 2,997 ha (including 27 ha of rehabilitated areas on agricultural landscapes) completed in 2018.

Contingency Bauxite Mining Envelope

The CBME is part of a State Forest area that was logged prior to the establishment of the

Refinery in the 1980s.

The native vegetation associated with the lower landscapes in the area, include minor drainage systems including the Augustus River at the north west of the freshwater dam, comprising the more mesic woodlands and forests characterised by Blackbutt (Eucalyptus patens). The most abundant habitat type is a mosaic of Jarrah-Marri communities. The variations in this habitat include Marri-Jarrah forests on moister lower slopes (DL) although the more dominant habitat type are the Jarrah-Marri forests of the slopes and ridges with Bull Banksia and Western Sheoak (JC). Smaller stands dominated by Jarrah/Marri woodlands (JM) form the interface between BB/DL and JC.

The quality of remnant forest areas in the CBME is relatively high resulting primarily from the exclusion of logging within the area.

Aquatic Fauna

The following is a summary of the fauna ecology of the Hotham River and a larger tributary of the Hotham River, Thirty-Four Mile Brook conducted by Wetland Research and Management (WRM, 2011) most representative of the aquatic fauna relevant to the WMDE. Drainage lines are located within the WMDE. The study identified a total of 111 macroinvertebrate taxa.

Taxa richness varied between site and season (Spring and Autumn). Of these taxa 9% (10 taxa were endemic to the southwest, 4 % restricted to Western Australia, 20% from the Australian continent, 4% across southern Australia, 13% Australasian, 23% Cosmopolitan occurring widely across Australia and international and 27% indeterminate due to insufficient taxonomy. None of the species recorded are listed on Threatened or Priority lists. Locally endemic species included the freshwater crayfish Cherax quinquecarinatus and Cherax preisii, the dragonflies Austrogomphus lateralis, Austroaeschna anacantha and Procordula affinis and the damselfly Austrolestes aleison. No introduced species were recorded.

The WMDE is located at the eastern edge of the current distribution of Carter’s Freshwater Mussel Westralunio carteri (Department of the Environment and Energy, 2019c). This species is listed as ‘Vulnerable’ under the EPBC Act and BC Act. Formerly its distribution extended into the interior of the southwest, but now it rarely occurs more than 50 km inland (Klunzinger et al, 2012; GHD, 2019). The decline of Carter’s Freshwater Mussel in the southwest region has been due to increased salinity within the river systems (Klunzinger et.al, 2015; GHD, 2019). A review of database records by GHD (2019) identify a single record (record collected in 1969) of Carter’s Freshwater Mussel to the south-west of the WMDE on a tributary of the Hotham River. There are no recent records available and the species has not been recorded in any of the recent systematic aquatic ecology surveys of the Hotham River and tributary surveys available for review in proximity to the WMDE.

Contingency Bauxite Mining Envelope

WRM (2005) identified a total of 68 taxa of aquatic macroinvertebrate from the Augustus River survey. From a macroinvertebrate perspective, the Augustus River was concluded to be of high ecological value due to the considerable number of endemic, rare and indicator species present. For example, a number of endemic trichopteran (caddis fly) species, Gondwanic gripopterygid plecopterans (stoneflies) and sythemistid dragonfly which are essentially restricted

in distribution and endemic to the south-west of Western Australia were identified. Two species of indigenous freshwater crayfish marron Cherax cainii and gilgies C. quinquecarinatus. were also recorded.

The Carter's freshwater mussel Westralunio carteri was recorded during the WRM (2005) aquatic fauna surveys of the Augustus River and Hale et al (1999) surveys of the Augustus River and Freshwater Lake of the Refinery. A review of records from the DBCA Naturemap database undertaken by GHD (2019), identify several recent records in the vicinity of the CBME (Augustus River recorded in 2017 approximately 4 km east north east of the CBME; 8.5 km west of the CBME in 2010, and records from the Collie River and Wellington Dam catchment area approximately 10 km south of the CBME in 2009 to 2011).

Carter's Freshwater Mussel rely on freshwater fish species in their larval lifecycle. The larvae attach to host fish gills enabling the mussel larvae to disperse upstream. After several weeks the juvenile mussels detach from the host fish and settle into the creek bed sediment or other suitable river bed substrate where they begin filter-feeding and growing (Klunzinger et al, 2012; GHD, 2019).

Refer to Sections 4.1.3 and 4.2.3, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

The WMDE and Bauxite Transport Corridor fall within the Murray River and Tributaries Surface Water Management Area, and over two Sub-areas (Hotham and Williams River). The Refinery is entirely contained within the Augustus River catchment. Surface water quality is monitored at the Freshwater Lake and Augustus River gauging station, and an annual review is conducted of the results.

Groundwater flows at the Refinery generally follow the topography and levels generally range from about 15 m to 0 m below the ground surface.

Refer to Sections 4.1.3 and 4.2.3, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

Vegetation

The Project is located in the Jarrah Forest bioregion and Northern Jarrah Forest subregion. This subregion is characterised by Jarrah-Marri forest on laterite gravels, and in the eastern part, by woodlands of Wandoo-Marri on clayey soils. Eluvial and alluvial deposits support Agonis shrublands and in areas of Mesozoic sediments, Jarrah forests occur in mosaic with a variety of species-rich shrublands (Williams and Mitchell 2001).

Soils

Soil-landscape mapping of Western Australia indicates that the Primary Assessment Area is primarily located within the following soil systems:

· The Marradong Upland System, with soils described as sandy gravel, loamy gravel, grey deep sandy duplex and loamy duplex;

· Quindanning System, with soils described as deep sandy duplex soils, shallow sand, loamy duplex and bare rock;

· Darling Plateau System, with soils described as duplex sandy gravels, loamy gravels and wet soils.

A review of the Australian Soil Resource Information System (ASRIS) indicates that there is an extremely low probability of acid sulphate soils (ASS) in the majority of the Primary Assessment Area. The banks of the Hotham River have a high probability of occurrence (ASRIS, 2017). Therefore, there is a high likelihood of ASS occurrence on the banks of the Hotham River, within and adjacent to the WMDE and the Bauxite Transport Corridor.

See Sections 4.1.3 and 4.3.3, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

Database searches have been undertaken to determine the presence of World Heritage Sites and Commonwealth Heritage Sites. No sites have been identified within areas the subject of the Proposal.

Visual Amenity

The Darling Plateau is characterised by an expansive undulating landscape with green forest vegetation and occasional rocky outcrops and peaks. Changes to amenity are greatest in areas with a high perceived scenic amenity value and are visible from public locations, such as roads, walk trails and lookouts (Strategen, 2013).

The existing operation is visible from public roads, the Bibbulmun Track and a number of elevated locations. Bibbulmun Track users generally experience an enclosed view, with the exception of high points along the track where the canopy vegetation reduces and views extend across the landscape (Strategen, 2013). The Project will become a more dominant feature of the landscape when viewed from high points, however a significant portion of the Proposal is located in agricultural land that does not have a high perceived amenity.

A Visual Impact Assessment was carried out by ERM in 2018 for the purpose of determining potential landscape and visual impacts for the previous Hotham Mining Extension proposal, based on the difference of impacts to what is already approved. Overall visual impact from Boddington, the Boddington Cemetery, the Quindanning township and the Quindanning Cemetery, as well as the major road network, were assessed as Nil to Negligible (ERM, 2018).

There are no significant landforms located within the Primary Assessment Area.

See Sections 4.6.3 and 4.7, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

The condition of the vegetation ranges within the Primary Assessment Area from Excellent to Completely Degraded based on the Keighery (1994) vegetation condition scale as reported in Mattiske (2019).

See Section 4.1.3, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

Not applicable.

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

Vegetation condition has been mapped for the WMDE, Bauxite Transport Corridor and CBME in Figure 9 and Figure 10 of the Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019). The vegetation condition in the WMDE includes excellent (9,889.68 ha), very good (729.25 ha), good (119.59), degraded (4,024.13 ha) and completely degraded (13,033.55 ha). The vegetation condition in the Bauxite Transport Corridor includes excellent (2,625.4 ha), very good (179.52 ha), good (4.50), degraded (157.95 ha) and completely degraded (1,178.33 ha). The vegetation condition in the CBME includes excellent (506.61 ha) and completely degraded vegetation (240.45 ha).

The extent of the site vegetation types within the Primary Assessment Area and their indicative extents to be cleared are provided in Table 9 – 14 of the Revised Proposal Referral Supporting Document. Site Vegetation types have also been mapped in Figures 9 and 10 of the Revised Proposal Referral Supporting Document.

See Sections 4.1.3, 4.2.3, 4.3.3, 4.4.3, 4.5.3, 4.6.3, 4.7 and 4.8, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

Database searches have been undertaken to determine the presence of World Heritage Sites and Commonwealth Heritage Sites. No sites have been identified within areas the subject of the Proposal.

A search on the inHerit Western Australia database in December 2018 has identified two State Registered Places within the Primary Assessment Area; the Quindanning Hotel and the Quindanning Inn. These sites are not expected to be impacted by the Proposal.

The search identified 19 sites within the Primary Assessment Area listed as ‘Other Heritage Listings’ within the Primary Assessment Area, which include:

· Tullis Bridge – Municipal Inventory Adopted 18 Jul 2001 (Shire of Boddington).

· Tullis Mill – Municipal Inventory Adopted 18 Jul 2001 (Shire of Boddington).

· St Alban’s Church and Marradong Graveyard – Municipal Inventory Adopted 15 November 1995 (Shire of Boddington).

· Jarrah Tree – Municipal Inventory Adopted 18 Jul 2001 (Shire of Boddington).

· Railway Line Precinct – Boddington to Dwellingup – Municipal Inventory Adopted 18 July 2001 (Shire of Boddington).

· Munday’s Store Site – Municipal Inventory Adopted 5 April 2011 (Shire of Boddington).

· Mud Brick Homestead – Municipal Inventory Adopted 5 April 2011 (Shire of Boddington).

· Marradong School – Municipal Inventory Adopted 18 July 2001 (Shire of Boddington).

· Camballing Marradong School – Municipal Inventory Adopted 5 April 2011 (Shire of

· Boddington).

· First meeting of the Road Board – Municipal Inventory Adopted 18 July 2001 (Shire of Boddington).

· Boddington Public Buildings Group – to be assessed 23 March 2007 (Shire of Boddington).

· Red Hill Homestead – Municipal Inventory Adopted 15 Nov 1995 (Shire of Boddington).

· Marradong Hall – Municipal Inventory Adopted 15 Nov 1995 (Shire of Boddington).

· Mokine – Municipal Inventory Adopted 15 Nov 1995 (Shire of Boddington).

· Laura Hotel – Municipal Inventory Adopted 18 Jul 2001 (Shire of Boddington).

· Dilyan’s Grave – Municipal Inventory Adopted 15 Nov 1995 (Shire of Boddington).

· Lavender’s Track – Municipal Inventory Adopted 30 June 2000 (Shire of Williams).

· Quindanning Bridge over Williams River – Municipal Inventory Adopted 30 June 2000 (Shire of Williams).

· Wilson's House – Municipal Inventory Adopted 30 June 2000 (Shire of Williams).

See Section 4.6.3, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

A search of the Aboriginal Heritage Inquiry System on 30 November 2018 identified 11 'Registered' sites of Aboriginal heritage significance, and 122 sites lodged as 'Other Heritage

Places' that intersect with the Primary Assessment Area.

WARU Consulting Pty Ltd (WARU) (2012) was commissioned to confirm the locations of 15 Aboriginal heritage sites known within the active mine tenements and activities. Based on the outcome of the archaeological assessment 8 of the 15 Registered Sites' existence and position were verified including Site No. 4049, 4052, 4054, 4057, 4060, 4063, 4138 and 4230.

Brad Goode and Associates Consulting Anthropologists and Archaeologists (Brad Goode) (2015) was commissioned to undertake a Site Identification Ethnographic Aboriginal Heritage Survey. Brad Goode confirmed the location and extent of Mt Saddleback (Mokine) Aboriginal Registered Site (No. 17214). In addition, the Gnaala Karla Booja WC1998/058 Native Title Claim group (GKB) advised Brad Goode that this Site was of special importance and any disturbances within the buffer should be avoided. The GKB also reported a male initiation site, corroboree site and ochre deposit within the vicinity of the Mokine Site located east of Fletcher Road, however this Site could not be located. Based on the outcomes of the report, Brad Goode recommended further consultations with the GKB, ethnographic consultation and an archaeological inspection for a site east of Fletcher Road.

In 2017, Brad Goode was commissioned to conduct a Site Identification Aboriginal Heritage survey for the proposed extension of the BBM into Hotham West. The survey area covered areas to the north and west of the Marradong Timber Reserve and Saddleback Timber Reserve mostly on private farmland, the western portion of the Marradong Timber Reserve and three areas at the Hotham River (Site ID 27935) associated with potential river crossing locations (Brad Goode, 2017). A Section 18 application under the AHA will be made for consent to use the land within the Hotham River for the required purpose once the locations of the river crossing are determined.

See Section 4.6.3, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

The majority of area (94.21%) covered by this Proposal is covered by land/tenure held, owned or managed by the WJVs, including:

· Mining Lease 258SA (M258SA) granted pursuant to the Alumina Refinery (Worsley)

Agreement Act

1973 (Worsley State Agreement);

· Mining Leases granted pursuant to the Mining Act 1978, specifically:

- Mining Leases 70/110 to 70/116 and M70/554 held by WJVs and managed by Worsley, and

- Mining Leases 70/21 to 70/26, M70/564, M70/799 held by WJVs and managed by Newmont Boddington Gold Pty Ltd (NBG).

· Sublease agreements with Alcoa of Australia Ltd give the WJVs the right to access and mine within those areas of ML1SA granted pursuant to Alumina Refinery Agreement Act

1961 (Alcoa State Agreement), as approved by the Minister/s responsible for the Alcoa State Agreement, Worsley State Agreement and the Mining Act 1978;

· WJV Refinery Crown Land Title LR3080/471, subject to the Crown Lease I150306;

· WJV Bauxite Residue Disposal Area Crown Land Titles LR3080/472 to 474, subject to the Crown Lease I154246; and

· Multiple parcels of Freehold Land (Private Property) owned by WJVs (WJV Land).

In other areas covered by the Proposal where the WJVs do not have current access of, the WJVs will secure tenure or access arrangements before commencing works in those areas.

At present, Worsley does not hold mining tenure and/or have land access over the entirety of the WMDE, however Worsley will apply for appropriate mining tenure and seek land access as and when required as the Project progresses. Worsley will not undertake any mining or mining-related development within any area of the WMDE without securing mining tenure, land access, landholder agreements or relevant legislative approvals.

A summary of tenure arrangements is provided in Section 2.4, Figure 7 and Figure 8, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

The WMDE and the Bauxite Transport Corridor cover private property and Crown Land. Crown Land includes part of the Marradong and Saddleback Timber Reserves. The DBCA manages the Timber Reserves for timber production, recreation and biodiversity conservation. The WMDE also includes part of a State managed Forest Products Commission plantation of Eucalyptus saligna. The private property is used for x. The Bibbulmun walking trail is located within, and to the northern extent of the WMDE and under the existing Overland Bauxite Conveyor.

The CBME is located within the Refinery Crown Lease, which is an existing Crown Lease and is used for the purpose of refining and associated activities.

The existing conveyor associated infrastructure and Boddington Bauxite Mine are used for transport and mining purposes respectively.

The WMDE covers an area of 27,796 ha over varying land uses. The Bauxite Transport Corridor referral area covers 4,146 ha (including 3,332 ha which is overlapped with the WMDE)

The CBME referral area within the Refinery Crown Lease comprises 747 ha, and the Refinery Crown Lease covers 2,500 ha.

The existing conveyor covers 236.24 ha.

Refer to section 1.2 of this referral and sections 1.3, 2.1, 2.2 and 2.3, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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.

Worsley has applied the mitigation hierarchy (avoid, minimise, rehabilitate, offset) to reduce the potential environmental impacts of the action including:

· Avoid – avoiding the adverse environmental impact;

· Minimise – limit the degree or magnitude of the adverse impact;

· Rehabilitate – restore the maximum environmental value that is reasonably practicable; and

· Offset – offset likely to be proposed to provide environmental benefits to counterbalance significant residual environmental impacts or risks if any are assessed to remain after the

above measures have been adopted.

Potential impacts to associated with the action are proposed to be managed by Worsley in respect of MNES consistently with existing environmental management practices such as the following:

Flora Mitigation

The proposed mining footprint for this proposal has been designed to avoid, wherever practicable, the areas of high environmental value as shown in Figure 6 (protected areas in this figure are indicative only and will be ground-truthed in Environmental Review Document technical studies) in accordance with the Protected Areas Procedure in the Biodiversity and Forest Management Plan (Appendix H). These areas include Threatened or Priority flora, TECs and PECs, poorly represented (less than 30% of pre-European extent) vegetation complexes, Aboriginal heritage sites, high value areas such as caves and breakaways, and river protection buffers.

Potential impacts to flora and vegetation associated with the proposal are proposed to be managed by Worsley consistently with existing management practices such as the following:

· Map and avoid the location of populations of the Threatened flora species (i.e. Caladenia hopperiana (T));

· Avoid wherever possible and minimise the direct and indirect impacts to the Priority flora species, in particular the Priority species Gastrolobium sp. Prostrate Boddington (M. Hislop

2130) (P1) as the species is geographically restricted to the Boddington area;

· Where disturbance has not already occurred prior to the identification of the PEC, avoid wherever possible and minimise direct and indirect impacts on the PECs – Mt Saddleback

Heath Communities for any mining or transport activity within the WMDE or the Bauxite Transport Corridor;

· Design and engineer mining, construction and rehabilitation for maintenance of natural surface water flows across the Primary Assessment Area;

· Development and implementation of a CEMP for all construction activities relating to this proposal;

· Avoidance of areas of potential high conservation value wherever practicable utilizing the Protected Areas Procedure in the Biodiversity and Forest Management Plan (Appendix H);

· Avoidance and minimisation of clearing of native vegetation within the design phase to reduce the footprint of mine pits, mine haul and trunk roads, bauxite corridor road haulage

and conveyor routes, and construction infrastructure support areas, wherever practicable;

· Continued implementation of the existing Biodiversity and Forest Management Plan (Appendix H), which includes the rehabilitation prescription for topsoil and overburden,

compliance reporting and review;

· Continued implementation of internal clearing procedures and standards including the Native Vegetation Clearing Planning Procedure (Worsley, 2012), Mine Clearing Procedure

(Worsley, 2015d), Mine Clearing Standard (Worsley, 2015e);

· Continued implementation of the Forest Hygiene Management Procedure (Worsley, 2014a), which sets out procedures for the management of weeds and forest disease, including

Dieback;

· Progressive rehabilitation activities completed in accordance with internal rehabilitation procedures and standards, including the Rehabilitation Standard (Worsley, 2013c) that sets

out the minimum standard for all rehabilitation activities for the Project (including rehabilitation planning, landholder communication and KPIs for rehabilitation success). Worsley will

also continue to implement the Mine Rehabilitation Operations Procedure (Worsley, 2015f), the Private Land Rehabilitation Management Procedure (Worsley, 2015g), and BBM

Revegetation Management Procedure (Worsley, 2015a); and

· Continued review, update and improvement of all relevant management plans and procedures for the Project.

Terrestrial Fauna Mitigation

Potential impacts to terrestrial fauna associated with the proposal are proposed to be managed by Worsley consistently with existing management practices such as the following:

· Avoidance of areas of potential high conservation value wherever practicable in accordance with the Protected Areas Procedure in the Biodiversity and Forest Management Plan

(Appendix H);

· Biodiversity and Forest Management Plan (Appendix H), which includes the rehabilitation prescription for topsoil and overburden, compliance reporting and review;

· Internal clearing procedures and standards including the Native Vegetation Clearing Planning Procedure (Worsley, 2012), Mine Clearing Procedure (Worsley, 2015d), Mine

Clearing Standard (Worsley, 2015e);

· Minimising the mining footprint where possible;

· Fauna Management – Pre-clearance Black-Cockatoo Surveys (Worsley, 2018a) and Animal Handling Procedure (Worsley, 2010);

· Feral and invasive species management in accordance with the BFMP (Appendix H);

· Continued implementation of the Forest Hygiene Management Procedure (Worsley, 2014a), which sets out procedures for the management of weeds and forest disease, including

Dieback;

· Development and implementation of ecological linkages/corridors for the proposal area in accordance with the BFMP (Appendix H);

· Development and implementation of a CEMP for all construction activities relating to this proposal;

· Construction works within river crossings areas will be managed to ensure the duration and extent of any impacts are minimised;

· Site Drainage Standard (Worsley, 2015h) and Trunk Haul Road Design and Construction

specifications;

· Development and implementation of appropriate fauna linkage structures promoting habitat connectivity, for example, fauna underpasses and overpasses for mid and long-term infrastructure;

· Progressive rehabilitation activities utilising internal rehabilitation procedures and standards including the Rehabilitation Standard (Worsley, 2013c) which sets out the minimum standard for all rehabilitation activities for the Project including rehabilitation planning, landholder communication and KPIs for rehabilitation success. Worsley also utilises the Mine Rehabilitation Operations Procedure (Worsley, 2015f), the Private Land Rehabilitation Management Procedure (Worsley, 2015g), and BBM Revegetation Management Procedure (Worsley, 2015a); and

· Continued review, update and improvement of all relevant management plans and procedures for the Project.

Terrestrial Environmental Quality Mitigation

Potential impacts to terrestrial environmental quality associated with the proposal are proposed to be managed by Worsley consistent with current environmental management practices such as the following:

· Avoidance of areas of potential high conservation value wherever practicable utilising the Protected Areas Procedure in the Biodiversity and Forest Management Plan (Appendix H);

· Avoidance and minimisation of clearing of native vegetation within the design phase to reduce the footprint of mine pits, mine haul and trunk roads, bauxite corridor road haulage and conveyor routes, and construction infrastructure support areas, wherever practicable, which will reduce the potential development of dryland salinity;

· Biodiversity and Forest Management Plan (Appendix H), which includes the rehabilitation prescription for topsoil and overburden including the Topsoil and Overburden Handling procedures (Worsley, 2013d);

· Implementation of appropriate methods to avoid, manage and remediate potential ASS within river crossing areas;

· Development and implementation of a CEMP for all construction activities relating to this proposal including management of PASS;

· Biodiversity and Forest Management Plan (Appendix H), which includes the rehabilitation prescription for topsoil and overburden, compliance reporting and review;

· Progressive rehabilitation activities utilising internal rehabilitation procedures and standards including the Rehabilitation Standard (Worsley, 2013c) which sets out the minimum

standard for all rehabilitation activities for the Project including rehabilitation planning, landholder communication and KPIs for rehabilitation success. Worsley also proposes to

utilise the Mine Rehabilitation Operations Procedure (Worsley, 2015f), the Private Land Rehabilitation Management Procedure (Worsley, 2015g), and BBM Revegetation

Management Procedure (Worsley, 2015a); and

· Continued review, update and improvement of all relevant management plans and procedures for the Project.

See Sections 4.1.6, 4.2.6 and 4.3.6, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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.

Potential impacts to MNES will be considered during project design and minimised as far as practical.

The Environmental Review Document will include assessment of the application of the mitigation hierarchy to avoid impacts, minimise impacts (where avoidance is not possible) and rehabilitate impacts.

If the Environmental Review Document determines that a significant residual impact will remain, Worsley will propose a strategic biodiversity offsets package to be considered as part of the Proposal.

Any strategic biodiversity offsets package will be developed in consultation with the EPA, DBCA and DoEE based on the principles as set out in WA Environmental Offsets Policy September 2011 (Government of Western Australia, 2011) (WA Policy) and the Australian Government Environmental Offsets Policy (DSEWPaC, 2012) (Cth Policy), to provide environmental offsets if there are expected significant residual impacts of the Proposal.

See Section 5 and Appendix I, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

Listed threatened species and communities - Yes

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.

Not applicable.

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.

Yes.

South32 has a comprehensive environmental management system, which includes our internal standards and reporting framework, and is assured through governance processes. South32 is seriously committed to reducing our emissions and are actively planning and implementing energy efficiency and emission reduction projects. Further information on our Climate Change Strategy can be found in our report, Our Approach to Climate Change, which is available at https://www.south32.net/sustainability/sustainability-reports.

South32's environment-related data and management systems are subject to both internal and external assurance processes. These processes assist us to evaluate the efficacy of our management approach and findings are used for continuous improvement. Within South32, responsibility for the environment sits in both functional and operational roles.

South32 collaboratively works with our host communities to deliver enduring environmental, social and economic benefits. We are committed to sustainable development and our sustainability information is reported in accordance with the Global Reporting Initiative Standards 'Core'. As a member of the International Council on Mining and Metals, we have committed to improving social, economic and environmental conditions globally and to contribute to specific targets of the United Nations Sustainability Development Goal. A copy of South32's Sustainability Policy has been attached to this submission.

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.

Not applicable.

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.

South32 has a Sustainability Policy which documents the company's commitments to Sustainable Development including commitments to:

- Achieve positive social, environmental and economic outcomes as a result of its decisions

- Continually improve safety, health, environmental practice, management systems and controls to ensure we avoid, mitigate and manage impact.

- Practice responsible stewardship for the commodities we extract as well as the natural resources we consume.

- Actively initiate and partake in conservation and rehabilitation activities to ensure ecosystems continue providing value to future generations.

- Meet the challenge of climate change, we work to reduce our greenhouse gas emissions and improve the resilience of ecosystem services and communities in the regions we operate.

- Uphold stringent health, safety, environment and governance standards in all jurisdictions in which we operate.

Subsequent to the Sustainability Policy the company has also developed an Environment Standard which describes the minimum acceptable environmental requirements for all operations. This includes identification, assessment and control of all environmental risks taking into account the mitigation hierarchy to ensure that environmental impacts are minimised. South32 has developed a Planning Standard which describes our business planning processes.

A Life of Operation Plan (LoOP) is maintained for each operations and is updated annually which incorporates key priority actions required to achieve the plan including submission of environmental approvals and completion of environmental studies. At Worsley a 10 Year Mine Plan is also developed (reviewed annually). This plan is presented to an Environmental Management Liaison Group (consisting of representatives from key regulatory authorities including the Environmental Protection Authority, Department of Environment Regulation, Department of Parks and Wildlife, Department of State Development and Department of Agriculture and Food Western Australia annually for endorsement of proposed mining and exploration activities.

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.

EPBC Act Ref: 2004/1566. Worsley Alumina Expansion Project.

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
Allen, G.R., Midgley, S.H. and Allen, M. (2002). Field Guide to the Freshwater Fishes of Australia. Perth, WA.	Reliable. Peer reviewed guideline.	None
Anderson, P., Brundrett, M., Grierson, P. and Robinson, R. (2010). Impact of severe forest dieback caused by Phytophthora cinnamomi on macrofungal diversity in the northern jarrah forest of Western Australia. Forest Ecology and Management 259: 1033-1040.	Reliable. Published paper.	None
ANZECC/ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australia and New Zealand Environment and Conservation Council and the Agriculture and Resource Management Council of Australia and New Zealand. Paper No. 4. Canberra.	Reliable. Published guidance.	None
Athington, A.H., Bunn S.E., Gray M. (1993). Stream Hydrology and Flow Management in the Tully Millstream Hydro-electric Scheme Area. Report to the Wet Tropics Management Agency, Queensland (Qld).	Reliable. Government publication peer reviewed guideline.	None
Australian Soil Resource Information System (ASRIS) (2017). Australian Soil Resource Information Viewer, retrieved March 2017, from http	Reliable. Government database.	None.

Reference Source	Reliability	Uncertainties
://www.asris.csiro.au/index_ie.html.		
Australian Bureau of Statistics (ABS) (2017). Australian Demographic Statistics. Retrieved March 2017. Available from www.abs.gov.au.	Reliable. Government database.	None
Bain, K, Wayne, A & Bencini, R 2014. 'Overcoming the challenges of measuring the abundance of a cryptic macropod: is a qualitative approach good enough?', Wildlife Research, vol. 41, no. 1, pp. 84–93.	Reliable. Published paper.	
Beard, J.S. (1979). The Vegetation of the Pinjarra Area, Western Australia. Map and Explanatory Memoir, 1:250,000 Series, Vegmap Publications, Perth.	Reliable. Published paper.	None
Beard, J. S. (1990). Plant Life of Western Australia. Kangaroo Press, Kenthurst NSW.	Reliable. Peer reviewed report.	None
Beard, J.S., Beeston, G.R., Harvey, J.M., Hopkins, A.J.M. and Shepherd, D.P. (2013). 'The Vegetation of Western Australia at the 1:3000000 scale Explanatory Memoir Second Edition' In: Conservation Science Western Australia, vol 9.	Reliable. Published paper.	None
Bennett, Environmental Consulting Pty Ltd (2004). Vegetation and Flora Survey of Mining Lease ML258SA. Unpublished report prepared for Worsley Alumina Pty Ltd, 2004.	Reliable. Environmental survey undertaken using guidelines specifications.	None
BIOSTAT Pty Ltd (Biostat) (2019). Worsley Alumina Mining Expansion Desktop Fauna Assessment (Draft). Prepared for South32 Worsley Alumina Pty Ltd, February 2019.	Moderate Reliability. Environmental desktop study undertaken using guideline specifications.	None
Brad Goode and Associates Consulting Anthropologists and	Reliable. Heritage survey undertaken using guideline	None

Reference Source	Reliability	Uncertainties
Archaeologists (Brad Goode) (2015). An Ethnographic Aboriginal Heritage Survey of Mt Saddleback (Mokine) in the Shire of Boddington Western Australia. Prepared for South32 Worsley Alumina Pty Ltd.	specifications.	
Brad Goode and Associates Consulting Anthropologists and Archaeologists (Brad Goode) (2017). Report of an Aboriginal Heritage Survey for the Proposed Extensions to the Boddington Bauxite Mine at Hotham and Marradong in the Shire of Boddington, Western Australia. Prepared for South32 Worsley Alumina Pty Ltd.	Reliable. Heritage report/survey undertaken using guideline specifications.	None
Bunn, S.E. & Davies, P.M. (1992). Community structure of the macroinvertebrate fauna and water quality of a saline river system in south-western Australia. Hydrobiologia. 248:143.	Reliable. Published paper.	None
Carter, A. & Luck, G.W. (2013). Fox baiting in agricultural landscapes: preliminary findings on the importance of bait-site selection. Wildlife Research, Vol. 40, No. 3, pp. 184-195.	Reliable. Published paper.	None
Churchward, H.M and W.M. McArthur (1980). Landforms and Soils of the Darling System, Western Australia. In: Department of Conservation and Environment (1980) Atlas of Natural Resources Darling System, Western Australia. Published by the Department of Conservation and Environment, Perth, 1980.	Reliable. Government publication.	None
Commonwealth of Australia (2015). 'Draft referral guideline for 14 birds listed as migratory species under the EPBC Act'. Commonwealth of	Reliable. Government database.	None

Reference Source	Reliability	Uncertainties
Australia.Conservation Commission (2003). Forest Management Plan 2004-2013. Data extracted for representation of Vegetation Complexes from former Department of Conservation and Land Management.		
Croton, JT & Dalton, JA (2007). Summary of soil salt storages for Boddington bauxite mine, Water & Environmental Consultant reports to Worsley Alumina Pty Ltd.	Reliable. Environmental report/survey undertaken using guideline specifications.	None
Dames and Moore (1981). Worsley Alumina Project. Flora and Fauna Studies, Phase One. Prepared for Worsley Alumina Pty. Ltd.	Reliable. Peer reviewed report.	None
Department of Agriculture and Food (DAFWA) (2018). Western Australian Organism List (WAOL) http://www.biosecurity.wa.gov.au/western-australian-organism-list-waol. Accessed 15 December 2018. Department of Biodiversity, Conservation and Attractions (2018a). Wildlife conservation (rare flora) notice 2017, 16 January 2018, Minister for the Environment under section 23F (2) of the WC Act. Available from: http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants.	Reliable. Government database.	None
Department of Biodiversity, Conservation and Attractions (DBCA) (2018b), FloraBase – the Western Australian Flora, Department of Parks and Wildlife. Available from: https://florabase.dpaw.wa.gov.au.	Reliable. Government publication.	None
Department of Biodiversity, Conservation and Attractions (DBCA) (2018bc). List of threatened ecological	Reliable. Government publication.	None

Reference Source	Reliability	Uncertainties
communities endorsed by the Western Australia Minister for Environment, 28 June 2018, Species and Communities Branch, Government of Western Australia. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities.		
Department of Biodiversity, Conservation and Attractions (DBCA) (2018d). Priority ecological communities for Western Australia version 27, 30 June 2017, Species and Communities Branch, Department of Biodiversity, Conservation and Attractions. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities.	Reliable. Government publication.	None
Department of the Environment (2019). Merops ornatus in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 5 Mar 2019.	Reliable. Government database.	None
Department of the Environment (2019a). Setonix brachyurus in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 5 Mar 2019.	Reliable. Government database.	None
Department of Environment and Conservation (DEC) (2007). Records held in DEC's Threatened Fauna Database and rare fauna files. Department of Environment and Conservation, Perth, WA.	Reliable. Government database.	None

Reference Source	Reliability	Uncertainties
Department of Environment and Conservation (DEC) (2008). Forest Black Cockatoo (Baudin's Cockatoo Calyptorhynchus baudinii and Forest Red-tailed Black Cockatoo Calyptorhynchus banksii naso) Recovery Plan. Department of Environment and Conservation, Perth, WA.	Reliable. Government publication.	None
Department of Environment and Conservation (DEC) (2012a). Boddington Spider Orchid (Caladenia sp. Quindanning) Interim Recovery Plan 2013–2017. Interim Recovery Plan No. 332. Department of Environment and Conservation, Western Australia.	Reliable. Government publication.	None
Department of Environment and Conservation (DEC) (2012b). Chuditch (Dasyurus geoffroii) Recovery Plan. Wildlife Management Program No. 54. Department of Environment and Conservation, Perth, Western Australia.	Reliable. Government publication.	None
Department of Environment and Conservation (DEC) (2013). Quokka (Setonix brachyurus) Recovery Plan. Wildlife Management Program No. 56. Department of Environment and Conservation, Perth, WA.	Reliable. Government publication.	None
Department of Environment and Energy (2017). Revised 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 naso, Department of Environment and Energy, Canberra, ACT.	Reliable. Government publication.	None
Department of the Environment	Reliable. Government	None

Reference Source	Reliability	Uncertainties
and Energy (2019a). Dasyurus geoffroii in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 5 Mar 2019 21:05:03 +1100.	database.	
Department of the Environment and Energy (2019b). Phascogale calura in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Tue, 5 Mar 2019 21:22:00 +1100.	Reliable. Government database.	None
Department of the Environment and Energy (DoEE) (2019c). Westralunio carteri in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed 15 Jan 2019.	Reliable. Government database.	None
Department of Parks and Wildlife (DPW) (2007). NatureMap: Mapping Western Australia's biodiversity, Government of Western Australia. Available from: https://naturemap.dpaw.wa.gov.au.	Reliable. Government database.	None
Department of Parks and Wildlife (DPW) (2013). Carnaby's cockatoo (Calyptorhynchus latirostris) Recovery Plan. Department of Parks and Wildlife, Perth, WA.	Reliable. Government publication.	None
Department of Parks and Wildlife (DPW) (2017). Western Ringtail Possum (Pseudocheirus occidentalis) Recovery Plan. Wildlife Management Program No. 58. Department of Parks and Wildlife, Perth, WA.	Reliable. Government publication.	None
Department of Primary Industries and Regional	Reliable. Government publication.	None

Reference Source	Reliability	Uncertainties
Development (2018). Western Australian Organism List, Government of Western Australia. Available from: https://www.agric.wa.gov.au/bam/western-australian-organism-list-waol.		
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Worsley (2015c). Environmental Noise Management, WAPL Technical Standard, Deployed November 2015.	Reliable. Peer reviewed standard.	None.
Worsley (2015d). Mine Clearing, BWAPL Procedure, Deployed February 2015.	Reliable. Peer reviewed procedure.	None.
Worsley (2015e). Mine Clearing, BWAPL Standard (STA.401), Deployed February 2015.	Reliable. Peer reviewed standard.	None.
Worsley (2015f). Mine Rehabilitation Operations, WAPL Procedure, Version 4.0, Deployed August 2015.	Reliable. Peer reviewed procedure.	None.
Worsley (2015g). Private Land Rehabilitation Management, BWAPL Procedure, Deployed March 2015.	Reliable. Peer reviewed procedure.	None.
Worsley (2015h). Site Drainage – Boddington Bauxite Mine, BWAPL Standard (STA.402), Deployed February 2015.	Reliable. Peer reviewed standard.	None.
Worsley (2016). Worsley Refinery, Port, OBC Closure Plan, 2016. Version 1.0.	Reliable. Peer reviewed report.	None.
Worsley (2017a), MS719 Management Plan – Water Management Plan, Business Blueprint, Version 3.0.	Reliable. Peer reviewed report.	None.
Worsley (2017b). WAPL Standard 00111927 Fauna Habitat Construction – Standard Operating Procedure.	Reliable. Peer reviewed procedure.	None.

Reference Source	Reliability	Uncertainties
Unpublished document.		
Worsley (2018a). Black Cockatoo Habitat Survey Procedure. Internal document in draft 2018.	Reliable. Peer reviewed procedure.	None.
Worsley (2018b). Plan of Bauxite Mining Operations 2019 - 2018.	Reliable. Peer reviewed report.	None.
Wetland Research and Management (WRM) (2005). Ecological Water Requirements of Augustus River – Intermediary Assessment. Unpublished report by Wetland Research and Management to Worsley Alumina Pty. Ltd. March 2005.	Reliable. Peer reviewed report.	None.
Wetland Research and Management (WRM) (2011). Hotham River - Ecological Water Requirements and Ecological Sustainable Yield Downstream of Tullis Bridge. Unpublished report by Wetland Research & Management to Newmont Boddington Gold. January 2011.	Reliable. Peer reviewed report.	None.
Wetland Research and Management (WRM) (2012). Thirty-Four Mile Brook Ecological Monitoring. Unpublished report by Wetland Research & Management prepared for Newmont Boddington Gold. August 2012.	Reliable. Peer reviewed report.	None.
Yeatman, G.J. & C.J. Groom (2012). National Recovery Plan for the woylie Bettongia penicillata. Wildlife Management Program No. 51. Department of Environment and Conservation, Perth. Available from: http://www.environment.gov.au/biodiversity/threatened/recovery-plans/national-recovery-plan-woylie-bettongia-penicillata-ogilbyi. In effect under the EPBC Act from	Reliable. Government publication.	None.

Reference Source	Reliability	Uncertainties
24-Jul-2012.		

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?

Worsley has considered a number of alternative designs and approaches throughout the planning and development of this Proposal. All options consider environmental, social and financial aspects together with operational efficiencies and the 10 Year Mine Plan. Some of the key considerations still being evaluated include the routes for truck haulage and the long-term conveyor within the Bauxite Transport Corridor. Environmental and social factors comprise critical components of the consideration of these routes and are incorporated into internal mine and asset planning processes at Worsley.

Worsley has considered a ‘no development alternative’ for the Proposal. The impacts to environmental values, described in Section 4 of the Revised Proposal Referral Supporting Document, under ‘no development alternative’ would be retained lower within the proposed mine expansion areas, as the Worsley’s Pre-existing Approval Area would not be expanded.

The social and economic values under ‘no development alternative’ would result in a loss of taxation and mining royalties for both the State and Commonwealth Governments, as Worsley is a long-term operation. Under this alternative, there would be fewer employment opportunities and reduced economic growth within both the local and broader region including the Shires of Boddington, Dardanup, Harvey and Collie, and the City of Bunbury.

Although this Proposal will have a greater environmental impact than current operations, it will also allow mining to proceed in and adjacent to already disturbed areas (including farmland) and be progressively rehabilitated in a way that has the potential to reduce overall impact from having many areas open at one time.

This Proposal will allow for the expansion and the continuation of existing activities at the already approved refinery production capacity of 4.7 Mtpa (dry), while allowing impacts to be more holistically assessed and increasing the efficiency and effectiveness of environmental management.

See Section 2.7, Worsley Mine Expansion (Revised Proposal) Referral Supporting Document (April 2019).

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

Vice President Operations

9.2.2 First Name

Noel

9.2.3 Last Name

Pillay

9.2.4 E-mail

Noel.Pillay@south32.net

9.2.5 Postal Address

PO Box 344
Collie WA 6225
Australia

9.2.6 ABN/ACN

ACN

008905155 - SOUTH32 WORSLEY ALUMINA PTY LTD

9.2.7 Organisation Telephone

61 8 9324 9000

9.2.8 Organisation E-mail

contact@south32.net

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, Noel Pillay, 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: 22/05/2019

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?

Organisation

9.5 Organisation

9.5.1 Job Title

Vice President Operations

9.5.2 First Name

Noel

9.5.3 Last Name

Pillay

9.5.4 E-mail

Noel.Pillay@south32.net

9.5.5 Postal Address

PO Box 344
Collie WA 6225
Australia

9.5.6 ABN/ACN

ACN

008905155 - SOUTH32 WORSLEY ALUMINA PTY LTD

9.5.7 Organisation Telephone

61 8 9324 9000

9.5.8 Organisation E-mail

contact@south32.net

Proposed designated proponent - Declaration

I, Noel Pillay, 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.

Signature:…Noel Pillay…… Date: …22/05/2019……

9.6 Is the Referring Party an Organisation or Individual?

Organisation

9.8 Organisation

9.8.1 Job Title

Lead Environment

9.8.2 First Name

Dennis

9.8.3 Last Name

Lindgren

9.8.4 E-mail

Dennis.Lindgren@south32.net

9.8.5 Postal Address

Level 37

108 St. George's Terrace
Perth WA 6000
Australia

9.8.6 ABN/ACN

ACN

008905155 - SOUTH32 WORSLEY ALUMINA PTY LTD

9.8.7 Organisation Telephone

61 8 9324 9000

9.8.8 Organisation E-mail

contact@south32.net

Referring Party - Declaration

I, DENNIS LINDGREN, 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: 22/05/2019

Appendix A - Attachments

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

1. Appendix A Final_Flora and Vegetation Report_Part 1.pdf
2. Appendix A Final_Flora and Vegetation Report_Part 2.pdf
3. Appendix A Final_Flora and Vegetation Report_Part 3.pdf
4. Appendix A Final_Flora and Vegetation Report_Part 4.pdf
5. Appendix A Final_Flora and Vegetation Report_Part 5.pdf
6. Appendix A Final_Flora and Vegetation Report_Part 6.pdf
7. Appendix A Final_Flora and Vegetation Report_Part 7.pdf
8. Appendix A Final_Flora and Vegetation Report_Part 8.pdf
9. Appendix A_Flora and Vegetation Report_Part 1.pdf
10. Appendix A_Flora and Vegetation Report_Part 2.pdf
11. Appendix A_Flora and Vegetation Report_Part 3.pdf
12. Appendix A_Flora and Vegetation Report_Part 4.pdf
13. Appendix A_Flora and Vegetation Report_Part 5.pdf
14. Appendix B Final_WME_Fauna_Assessment_Part1.pdf
15. Appendix B Final_WME_Fauna_Assessment_Part2.pdf
16. Appendix B Final_WME_Fauna_Assessment_Part3.pdf
17. Appendix B Final_WME_Fauna_Assessment_Part4.pdf
18. Appendix B Final_WME_Fauna_Assessment_Part5.pdf
19. Appendix B Final_WME_Fauna_Assessment_Part6.pdf
20. Appendix B Final_WME_Fauna_Assessment_Part7.pdf
21. Appendix B Final_WME_Fauna_Assessment_Part8.pdf
22. Appendix B Final_WME_Fauna_Assessment_Part9.pdf
23. Appendix B Final_WME_Fauna_Assessment_Part10.pdf
24. Appendix B Final_WME_Fauna_Assessment_Part11.pdf
25. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 1.pdf
26. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 1A.pdf
27. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 1B.pdf
28. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 2.pdf
29. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 2A.pdf
30. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 2B.pdf
31. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 2C.pdf
32. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 3.pdf
33. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 4.pdf
34. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 4A.pdf
35. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 4B.pdf
36. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 4C.pdf
37. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 5.pdf
38. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 5A.pdf
39. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 5B.pdf
40. Appendix B_WME_Fauna_Assessment_Desktop_Study_Part 6.pdf
41. Appendix C Final_WMDE_SRE_Assessment.pdf
42. Appendix C_WMDE_SRE_Assessment.pdf
43. Appendix D Final_CBME_SRE_Assessment.pdf
44. Appendix D_CBME_SRE_Assessment.pdf
45. Appendix E Final_WMDE Subterranenan Fauna Review.pdf

46. Appendix E_WMDE_SubterraneanFaunaReview.pdf
47. Appendix F Final_CBME_Subterranean Fauna Review.pdf
48. Appendix F_CBME_Subterranean FaunaReview.pdf
49. Appendix G_Aboriginal Heritage Survey Rpt.pdf
50. Appendix H_Biodiversity and Forest Management Plan.pdf
51. Appendix I Final_Matters of National Environmental Significance.pdf
52. Appendix I_Matters of National Environmental Significance.pdf
53. EPBC Form Signature Page_Dennis LIndgreen.pdf
54. EPBC Form Signature Page_Noel PIllay.pdf
55. Environment Standard (Nov18).pdf
56. Figure 1.pdf
57. Figure 1_Project Location.pdf
58. Figure 2.pdf
59. Figure 2_Proposal Overview.pdf
60. Figure 3.pdf
61. Figure 3_Bauxite Transport Corridor.pdf
62. Figure 4.pdf
63. Figure 4_CBME.pdf
64. Figure 5.pdf
65. Figure 6.pdf
66. Figure 7.pdf
67. Figure 8.pdf
68. Figure 9.pdf
69. Figure 10.pdf
70. Figure 11.pdf
71. Figure 12.pdf
72. Figure 13.pdf
73. Figure 14.pdf
74. Figure 15.pdf
75. Ministerial Statement 719.pdf
76. Ministerial Statement 751.pdf
77. South32 Worsley Alumina_Worsley Support Doc.pdf
78. South32 Worsley Alumina_Worsley Support Doc_Final.pdf
79. South32 Worsley Alumina_Worsley Support Doc_Final_22May2019.pdf
80. Spatial Data.zip
81. Sustainability Policy.pdf
82. Worsley_EPBC Act Approval 2004_1566.pdf
83. Worsley_EPBC Act Approval 2004_1566_Corrected Decision.pdf
84. Worsley_Environmental License L4504.pdf
85. Worsley_Environmental License L5960 BBM Amendment Notice 2018.pdf
86. Worsley_Environmental License L5960 for BBM_Part 1.pdf
87. Worsley_Environmental License L5960 for BBM_Part 1A.pdf
88. Worsley_Environmental License L5960 for BBM_Part 1B.pdf
89. Worsley_Environmental License L5960 for BBM_Part 1C.pdf
90. Worsley_Environmental License L5960 for BBM_Part 1D.pdf
91. Worsley_Environmental License L5960 for BBM_Part 1E.pdf