Referral of proposed action

Project title:	Referral 2: Hunter Valley Operations South - Modification 5 (EPBC 2016/7641)

1 Summary of proposed action

1.1 Short description

Hunter Valley Operations (HVO) is an existing open cut coal mine located approximately 24 kilometres (km) north west of Singleton, New South Wales (NSW) (**Figure 1**). The mining activities at HVO are geographically divided by the Hunter River into HVO North and HVO South (**Figure 2**), which are integrated at an operational level. This provides the ability to move material and associated equipment around HVO including run-of-mine (ROM) coal, product coal, coal rejects, overburden and water as required. While HVO is managed as one operation, HVO North and HVO South have separate NSW planning approvals with approval to mine up to 38 million tonnes per annum (Mtpa). The mine, which first commenced operations over 65 years ago, in 1949, is State significant and has all required State approvals in place. In 2015, HVO produced approximately 13 million tonnes of saleable coal and provided direct employment for approximately 1,500 people.

The HVO South part of the HVO complex operates under project approval PA 06_0261 (PA 06_0261), which was granted by the then Minister for Planning on 24 March 2009, under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Operations are also in accordance with HVO's Environmental Management System, which is discussed in Section 7.1, the HVO Environmental Protection Licence (EPL), and various other approvals, licences, policies and procedures such as mining authorities, Mining Operations Plan, water licences, environmental management plans and dam licences.

The coal mined at HVO South occurs in a number of seams. The existing State project approval (PA 06_0261) authorises mining to certain seams / depth, depending on the location of the mining areas, as follows (refer **Figure 3**):

- Cheshunt Pit (mining to the base of the Bayswater seam);
- Riverview Pit (mining to the base of the Vaux seam); and
- South Lemington Pits 1 and 2 (mining to the base of the Bowfield seam).

The proposal involves continuing mining from the Cheshunt Pit into Riverview Pit to access the deeper Bayswater seam within the Riverview Pit area and mining the deeper Vaux seam below the Bowfield seam in South Lemington Pit 2 (refer **Figure 4**).

Mining of the deeper seams will require an additional volume of overburden material to be mined and disposed. A key feature of the design is to avoid any disturbance beyond the existing State footprint of disturbance. In doing so, this necessitates a change in the overburden emplacement strategy to accommodate this material, and provides the opportunity to develop micro-relief into the post mining landform design. This will result in increases in the existing approved dump height however consistent with nearby overburden emplacements and surrounding topography. The change in the mine design also moves the evaporative basin in the void further from the Hunter River.

The proposed modification also seeks to increase the rate of extraction and processing from 16 Million tonnes per annum (Mtpa) to 20 Mtpa of ROM coal during peak production. This will provide HVO South with flexibility for production interactions with HVO North to meet changing market conditions.

The mining of the deeper seams at HVO South constitute the proposed action. The potential impacts on water resources from the proposed action have been considered in line with the *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments - impacts on water resources* (DoE 2013), as described in Section 3.1(i).

The proposed action does not require an increase in water take or releases over those approved in the current State-approved operations. The proposed action is proposing to access deeper coal seams. These coal seams contain water of an unsuitable quality for domestic, stock or irrigation purposes. Groundwater contained within the shallower alluviums have been previously depressurised under the State-approval and no further changes are

expected for the proposed Action. These water resources are regulated under the *NSW Water Management Act 2000* and *Water Act 1912*. The proponent ensures that appropriate licences are held in the relevant water sources to account for the predicted water take and discharges thus protecting the environmental aspects of the water resource and other water users.

Therefore the potential for significant impact on a water resource is considered unlikely.

Due to the long history of operations at HVO, a significant amount of environmental baseline data has been obtained. Numerous environmental assessments have been undertaken for the activities that have occurred across the site and, as such, the regional and local social, physical and economic environments are well understood. This includes an extensive surface and groundwater monitoring network which has verified that actual impacts from HVO South are within the conservative predictions made in previous assessments.

The HVO South modification proposal would remain within the same footprint of the State-approved areas and is being referred predominantly for consideration under the water trigger. A separate referral has been prepared concurrently for the HVO State-approved mining areas in respect of the recently listed CVHEF.

1.2	**Latitude and longitude**	**Attachment B** includes a plan and coordinates for the proposed action.

1.3 **Locality and property description**

The HVO complex is centrally located approximately 24 km north-west of Singleton, NSW (refer **Figure 1**).

Land uses in the locality include grazing, cropping, rural residential and mining. Neighbouring mining operations include, Ravensworth Operations, Warkworth Mine, Wambo Mine, United Colliery, Bulga Complex and Mt Thorley Mine.

1.4	**Size of the development footprint or work area (hectares)**	The area of the proposed action is located within the HVO South development consent boundary which has an area of 6595 ha (refer **Figure 2**).
1.5	**Street address of the site**	The proposed action is accessed via Lemington Road, Ravensworth, New South Wales 2330.

1.6 **Lot description**

Attachment C includes the lot descriptions for the lands continued within the HVO North and HVO South development consent boundaries.

1.7 **Local Government Area and Council contact (if known)**

The proposed action is located in the Singleton LGA. As the proposed action is regulated by the State and Commonwealth Government under mining law it is not subject to local government planning approvals.

1.8 **Time frame**

The required commencement date for the proposed action is Quarter 1, 2017.

1.9	**Alternatives to proposed action**	✓	No
			Yes
1.10	**Alternative time frames etc**	✓	No
			Yes
1.11	**State assessment**		No
		✓	Yes, you must also complete Section 2.5
1.12	**Component of larger action**		No
		✓	Yes, you must also complete Section 2.7
1.13	**Related actions/proposals**		No
		✓	Yes, Referral 1: Hunter Valley Operations – State-approved mining.
1.14	**Australian Government funding**	✓	No
			Yes, provide details:
1.15	**Great Barrier Reef Marine Park**	✓	No
			Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

2.1 Description of proposed action

As described in Section 1.1, HVO South is an existing open cut coal mine operating under project approval PA 06_0261.

A comprehensive Environmental Assessment (EA), *Hunter Valley Operations South Coal Project EA* (ERM 2008), that accompanied the application for PA 06_0261 provides detailed information on the State-approved development. The State approval was granted on 24 March 2009 and operations have commenced and remain ongoing under this (and associated) State approvals. A link to the EA for background information is below:

http://www.riotinto.com/copperandcoal/documents-10401.aspx?tx=120,7?q=South

The coal mined at HVO South occurs in a number of seams. The current State project approval (PA 06_0261) authorises mining to certain seams / depth, depending on the location of the mining areas, as follows:

- Cheshunt Pit (mining to the base of the Bayswater seam);
- Riverview Pit (mining to the base of the Vaux seam); and
- South Lemington Pits 1 and 2 (mining to the base of the Bowfield seam).

The proposal involves continuing mining from Cheshunt Pit into the Riverview Pit to access the deeper Bayswater seam within the Riverview Pit area and mining the deeper Vaux seam below the Bowfield seam in South Lemington Pit 2.

Mining of the deeper seams will require an additional volume of overburden material to be mine and disposed. A key feature of the design is to avoid any disturbance beyond the existing State footprint of disturbance. In doing so, necessitates a change in the overburden overburden emplacement strategy to accommodation this material, and provides the opportunity to develop micro-relief into the post mining landform design. This will result in increases in the existing approved dump height however consistent with nearby overburden emplacements and surrounding topography.

Indicative mine plans for four stages of mining are presented in **Figure 5**, **Figure 6**, **Figure 7** and **Figure 8**. The indicative mine plans are referred to as Stage 1 (nominally Year 2019), Stage 2 (nominally Year 2022), Stage 3 (nominally Year 2026) and Stage 4 (nominally Year 2028) based on a proposed commencement of the modification in year 2017. An indicative final rehabilitated landform is provided in **Figure 9**.

The proposed action includes the progression of mining of the deeper Bayswater seam from Cheshunt Pit into Riverview Pit and mining the Vaux seam below the Bowfield seam in South Lemington Pit 2. The proposed action excludes the southern rail spur and haul road approved by the State for the HVO South Coal Project as there are no foreseeable plans to develop this infrastructure.

2.2 Alternatives to taking the proposed action

The proposed action will enable the progression of mining in the deeper Bayswater seam from Cheshunt Pit into Riverview Pit, the mining of Vaux seam below the Bowfield seam in South Lemington Pit 2 and the increase in production activities. The proposed action will enable the efficient extraction of a significant State resource and flexibility for production interactions with HVO North to meet changing market conditions. The proposed action avoids impacts on MNES by remaining within the State-approved disturbance footprint and using existing water management system that are in place at HVO.

2.3 Alternative locations, time frames or activities that form part of the referred action

There are no alternative locations, time frames or activities that form part of the referred action.

2.4 Context, planning framework and state/local government requirements

Commonwealth

This proposed action is being referred to the Commonwealth Minister for the Environment for consideration as to whether the action forms a 'controlled action' to which approval is required under the *EPBC Act*.

State

HVO South has all relevant State environmental authorisations in place. Relevant authorisations in place or require changes for the proposed action are detailed below.

NSW Environmental Planning and Assessment Act 1979

HVO South is an existing State approved project. HVO South is a transitional Part 3A project as approved in Schedule 6A of the *EP&A Act* and, therefore, the proposed action will be sought via a modification (ie Modification 5) under the now-repealed section 75w of the *EP&A Act*. As part of this process, an EA will be prepared including surface and groundwater modelling.

NSW Water Management Act 2000

The water resource surrounding the site is defined by the water sharing plans regulated by the NSW *Water Management Act 2000*. The Act requires that water be allocated for the fundamental health of a water source and its dependent ecosystems, such as wetlands, floodplains and estuaries, as a first priority. The WSPs do this by setting aside all water above the long-term average annual extraction limit for environmental needs, thereby, protecting the majority of flows for environmental purposes.

The WSPs relevant to the proposed action are:

1. Hunter Unregulated and Alluvial Water Sources Water Sharing Plan 2009; and
2. Hunter Regulated River Water Sharing Plan 2003.

The *Water Management Act 2010* requires sufficient licences are held for any 'take' from water sources in response to mining operations. This ensures the sustainable yield of each water source is not exceeded.

NSW Water Act 1912

Water resources in NSW are governed under the *Water Act 1912* in areas where a WSP has not yet commenced. For the proposed action this comprises the groundwater resource within the Permian fractured rock water source (coal seams and interburden).

NSW Protection of the Environment Operations Act 1997

The NSW *Protection of the Environment Operations Act 1997* (POEO Act) is the principal NSW environmental protection legislation and is administered by the NSW Environment Protection Authority (EPA). The HVO mining complex (which includes HVO South) has an existing EPL 640 issued under the POEO Act.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

A comprehensive EA that accompanied the application for PA 06_0261 was prepared for the HVO South Coal Project and assessed and approved under Part 3A of the NSW EP&A Act (http://www.riotinto.com/copperandcoal/documents-10401.aspx?tx=120,7?q=South).

A modification application to PA 06_0261 and EA are under preparation to enable the NSW Department of Planning and Environment (DP&E), in consultation with NSW Government authorities, to assess the merits of the proposed action and make a recommendation to the Minister for Planning. The key matters that will be addressed in the EA are water resources, mine rehabilitation, noise and air quality.

A comprehensive groundwater assessment is currently being prepared to assess the change in groundwater impacts when compared to the approved development. The groundwater impacts are being assessed using a contemporary Class 2 numerical model prepared in line with the Australian groundwater modelling guidelines (SKM 2012) and in accordance with the NSW Aquifer Inference Policy (AIP). The groundwater model will be independently peer reviewed as part of the groundwater assessment process.

2.6 Public consultation (including with Indigenous stakeholders)

Public consultation, including consultation with indigenous stakeholders, will be undertaken as part of the State modification process.

2.7 A staged development or component of a larger project

Context – proposed action

Section 523 of the EPBC Act defines an action to include a project, development, an undertaking, an activity or series of activities.

The HVO complex is an existing open cut coal mine that has been in operation since 1949, currently operating under separate development consents for HVO North and HVO South. The proposed action the subject of this referral is to enable the continuation of open cut coal mining at HVO in areas previously approved by the State after the commencement of the EPBC Act and not previously cleared. The CHVEF listing has placed immediate restrictions on clearing in these areas at HVO for existing State-approved mining operations.

Mine planning at HVO North and HVO South is regularly reviewed to respond to market conditions which may necessitate changes to mine plans that require subsequent approvals. One proposal under consideration is a modification of the HVO South State project approval to mine deeper coal seams, referred to as Hunter Valley Operation South – Modification 5. The proposal would remain entirely within the footprint of the existing HVO South State project approval, accessing the Bayswater seam in Cheshunt Pit and Riverview Pit and the Vaux seam at South Lemington Pit 2. Indicative mine plans for four stages of mining are presented in **Figures 8 to 11**. The indicative plans correspond to nominal years 2019, 2022, 2026 and 2028 respectively, each indicating the approximate time after the anticipated commencement date of operations under the proposed modification in 2017.

The Hunter Valley Operations South – Modification 5 project would require a modification of the State project approval which is accompanied by an environmental assessment, including numerical modelling of the potential impacts on water resources. Based on current planning, it is envisaged that the environmental assessment would be available in Quarter 2, 2016 to accompany the State project approval modification. A referral for the Hunter Valley Operations South – Modification 5 component of HVO is required to consider the potential for significant impacts on the water resources MNES given the proposed change to State approval involving coal extraction after the commencement of the water trigger on 22 June 2013. An assessment against the *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (DoE 2013) indicates the proposed action of the Hunter Valley Operations South – Modification 5 is not likely to have a significant impact on a water resource as there are not expected to be any significant changes from current operations.

Should the Minister consider the proposed action for the Hunter Valley Operations South – Modification 5 to be a controlled action, the timeframe for assessment and approval is likely to take in excess of six months. This is because under the assessment pathways available to the Minister to assess the potential impacts on a water resource, an environmental assessment will be required and considered by the Independent Expert Scientific Committee (IESC). As mentioned above, the environmental assessments are not expected to be available until April 2016 and IESC process is known to take greater than three months. Therefore, the shortest possible assessment pathway, if required, for Hunter Valley Operation South – Modification 5 is expected to take until August 2016.

With respect to State-approved mining, clearing of the CHVEF is required within the extension areas in March 2016 to enable the sequential mining processes of topsoil removal, overburden and inter-burden removal to access the coal seam. Any delay in clearing beyond March 2016 has the potential to significantly impact on production volumes. The consequence of not being able to clear to facilitate mining in March 2016 is a loss of production volumes in 2017 and an anticipated impact on planned production levels for up to three years. The lag in timing from March 2016 to the impact in 2017 is because of the sequential nature of large scale mining, which requires clearing of vegetation, followed by topsoil removal, and then overburden and interburden removal to access the coal seam. **Table 7** below provides a summary of potential reduction in volumes due to delays associated with clearing.

Table 7 Potential Impact on Coal Tonnage from Clearing Restrictions

	2017		2018		2019		2020	
Clearing By	**Tonnes Impacted**	**Estimated Coal Loss**	**Tonnes Impacted**	**Estimated Coal Loss**	**Tonnes Impacted**	**Estimated Coal Loss**	**Tonnes Impacted**	**Estimated Coal Loss**
1 May 2016	440,000	220,000	316,002	158,001	210,668	84,267	150,300	30,060
1August 2016	857,000	600,000	615,485	307,743	410,323	164,129	292,635	58,527
1 January 2017	2,381,000	1,600,000	1,710,000	855,000	1,140,000	456,000	812,874	162,575
Planned Total Production		16,259,000		16,013,000		16,075,000		16,039,000

Given the Hunter Valley Operations South – Modification 5 project has the potential to delay the continuation of State-approve mining; the proponent has prepared split referrals as followed:

1. Referral 1 – Hunter Valley Operations State-approved mining (this proposed action); and
2. Referral 2 – Hunter Valley Operations South - Modification 5.

The person taking the proposed action is the same for Referral 1 and Referral 2.

EPBC Act Policy Considerations

The EPBC Act Policy Statement *Stage Developments – Split referrals: Section 74A of the EPBC Act* (referred to as Split Referral Guideline) provides guidance on identifying whether a referred action is a split referral, and, if so, whether the Minister will treat it as part of a larger non-referred action or separately as a component of a larger action.

An assessment against the Split Referral Guidelines has been made for Referral 1 and Referral 2 below. The guideline sets out the process for Departmental officers to follow to ascertain whether an action is a component of a larger action and if Ministerial decision is required under Section 74A to split the referrals.

Step 1: Confirm that the referral is valid

A valid referral must be provided before a split referral decision can be made. Section 72 of the EPBC Act requires the referral to be made in a way and provide the information required by the *Environment Protection Conservation Regulations 2000* (EPBC Regulations). It also outlines that a referral may also include proposals to location, timeframes and activities to be carried out. Regulation 4.02 of the EPBC Regulation requires the referral to be given to the Department in writing or electronically, be of a length, size and form that can be understood by the public and published on the internet and accompanied by the prescribed fee. Regulation 4.03 of the EPBC Regulation requires the referral to provide the information outlined in Schedule 2.

Referral 1 and Referral 2 have been prepared using the latest version of the EPBC Act referral form which addresses the requirements of Section 72 of the EPBC Act and EPBC Regulations. Referral 1 and Referral 2 will be accompanied by the prescribed fee.

Step 2: Determine if there is a larger action

The Minister may decide not to accept a referral if satisfied that a referral is a component of a larger action. This might be the case where a proponent has prepared a lessor referral to avoid triggering the Act, contrary to the objectives of the EPBC Act to accept the lessor referral.

The splitting of Referral 1 and Referral 2 has not been designed to lesson the potential impacts on a MNES that is contrary to the objectives of the Act. A summary of the assessment of the potential for significant impact on a MNES is provided in **Table 8** below.

Table 8: Summary of Potential Impact on a MNES

MNES	Referral 1	Referral 2
World heritage property	Unlikely. More than 3 km away, other mines / residence in between.	Unlikely. More than 3 km away, other mines / residence in between.
National heritage place	Unlikely. More than 3 km away, other mines / residence in between.	Unlikely. Unlikely. More than 3 km away, other mines / residence in between.
Wetlands of international importance	Unlikely. More than 90 km upstream of Hunter River Estuary, no change in water supply or releases from existing mine.	Unlikely. More than 90 km upstream Hunter River Estuary, no change in water supply or releases from existing mine.
Listed threatened species and ecological communities	Likely with respect to the HVEF listed threatened ecological community. Unlikely with respect to listed threatened species.	Unlikely – no direct clearing required. Indirect impacts associated with groundwater drawdown unlikely to significantly impact on Groundwater Dependant Ecosystems (GDEs) and no predicted change to flooding regimes. Therefore it is not likely that listed threatened species using the GDE as habitat would be significantly affected.
Listed migratory species	Unlikely.	Unlikely.

MNES	Referral 1	Referral 2
Nuclear action.	Not applicable. The proposed action is not a nuclear action.	Not applicable. The proposed action is not a nuclear action.
Marine environment.	Unlikely. More than 90 km upstream, no change in water supply or releases from existing mine.	Unlikely. More than 90 km upstream, no change in water supply or releases from existing mine.
The Great Barrier Reef Marine Park	Unlikely. More than 900 km away.	Unlikely. More than 900 km away.
Protection of water resources from coal seam gas and large coal mining developments	Not applicable. All State approvals were in place prior to commencement of the trigger.	Unlikely. Water supply, releases and groundwater drawdown expected to be similar to existing, State-approved mine.

The reason for splitting the referrals is time based clearing of the CHVEF is required within the extension areas in March 2016 to enable the sequential mining processes of topsoil removal, overburden and inter-burden removal to access the coal seam. Any delay in clearing beyond March 2016 has the potential to significantly impact on production volumes. The consequence of not being able to clear to facilitate mining in March 2016 is a loss of production volumes in 2017 and an anticipated impact on planned production levels for up to three years. The lag in timing from March 2016 to the impact in 2017 is because of the sequential nature of large scale mining, which requires clearing of vegetation, followed by topsoil removal, and then overburden and interburden removal to access the coal seam. **Table 7** above provides a summary of potential reduction in volumes due to delays associated with clearing.

What is the larger action?

Referral 1 relates to the HVO complex which includes HVO North and HVO South. Referral 2 relates to HVO South only.

Can the referred action and related action stand alone?

Referral 1 can stand alone in its own right, given that it is required to enable the continuation of existing, State-approved mining for which State environmental offsets are in place. A referral and approval is required because the new listing of the CHVEF places restrictions in State-approved areas granted after the commencement of the EPBC Act. Environmental assessments published for the State approvals processes previously considered the potential for significant impact on a MNES as unlikely and recommended that referral was not necessary.

Referral 2 can also stand alone in its own right for the majority of the proposal, except in the Riverview Pit Extension Area that overlaps Referral 1 (refer **Figures 8 to 11**). Based on the indicative mine plans, it is not expected that the proposed action associated with Referral 2 would enter the area of Referral 1 (Riverview Pit Extension Are) for 10 years.

Are the referred action and related actions co-dependant?

The proposed action of Referral 1 is to enable the continuation of the existing mine and is not co-dependant on Referral 2.

Part of the action associated with Referral 2 overlaps Referral 1 in the Riverview Pit Extension Area. Referral 1 is required to clear and mine coal at depths consistent with the existing State approval and it would not be possible to re-mine these areas to access the deeper seams for Referral 2 if Referral 1 did not proceed. Based on the indicative mine plans (refer **Figures 8 to 11**), it is not expected that the proposed action associated with Referral 2 would enter the area of Referral 1 (Riverview Pit Extension Are) for 10 years.

Referral 1 can be assessed independently and is required regardless of whether or not Referral 2 proceeds.

What is the timeframe between the referred action and the related action?

The timeframe to commence Referral 1 is March 2016. The timeframe to commence Referral 2 is Quarter 2, 2017 insofar as it relates to the water trigger. Based on the indicative mine plans (refer **Figures 8 to 11**), it is not expected that the proposed action associated with Referral 2 would enter the area of Referral 1 (Riverview Pit Extension Are) for 10 years.

What is the geographic relationship between the referred action and the related action?

The geographic location of Referral 1 is the West Pit Extension and Carrington Pit at HVO North and the Riverview Pit Extension and Cheshunt Pit Extension at HVO South. The geographic location of Referral 2 is the Riverview Pit, Cheshunt Pit and South Lemington Pit 2 areas of HVO South. Based on the indicative mine plans (refer **Figures 8 to 11**), it is not expected that the proposed action associated with Referral 2 would enter the area of Referral 1 (Riverview Pit Extension Are) for 10 years.

Is there an overall plan or vision for the larger action and does that plan encompass the referred action?

The plan for Referral 1 is the continuation of existing mining in the West Pit Extension, Carrington Pit, Riverview Pit Extension and Cheshunt Extension Areas. Clearing is required in the West Pit Extension Area and Riverview Pit Extension Area in March 2016 to enable the continuation of mining at planning production levels to meet challenging market conditions.

The plan for Referral 2 is a proposal to improve the productivity of the existing mine to enable access to deeper mining seams.

As discussed above, it is not expected that Referral 2 would intersect Referral 1 in the Riverview Pit Extension Area for 10 years.

Are the actions authorised by a single local government of State/Territory permit, licence or other authorisation?

The proposed action for Referral 1 is authorised under State development consents granted by the now Department of Planning and Environment (DPE) under the EP&A Act. Referral 1 is required because of the new listing of the CHVEF which imposes restrictions on State-approved areas granted after the commencement of the EPBC Act which have not been previously referred or approved under the EPBC Act.

The proposed action for Referral 2 requires a modification of the HVO South project approval under the EP&A Act, to be assessed by the DPE. Given this it is not appropriate to include Referral 1 in it as the NSW planning process may lead to changes to the project and/or it not going ahead.

Will the action be financed from a single funding source?

The proposed action for Referral 1 is an existing operating mine which is required to generate revenue from the sale of product coal to pay for operational costs and sustaining capital.

The proposed action for Referral 2 is a proposal to improve productivity to access deeper coal seams and is required to generate revenue from the sale of product coal to pay for operational costs and sustaining capital.

The proponent for Referral 1 is the same as Referral 2.

Step 3: Determine if the Minister's discretion not to accept the referral should be exercised

The Split Referral Guideline provides further questions to assist the Minister with determining whether splitting the action reduces the ability to achieve the objectives of the Act.

As discussed in Step 2, Referral 1 and Referral 2 have not been split to avoid triggering the Act, contrary to the objectives of the EPBC Act to accept the lessor referral. Rather, they have been split to facilitate a rapid assessment and approval of Referral 1 to enable the continuation of existing mining to avoid the potential for significant impact on the mine due to a loss of production.

Can the impacts of Part 3 matters only be assessed through the consideration of a larger action?

Referral 1 has been referred as a controlled action due to the potential for significant impacts on the CHVEF CEEC. The potential for significant impact on listed threatened and migratory MNES are considered unlikely and the water resource MNES does not apply as all State approvals involving coal extraction were in place prior to commence of the water trigger. No other MNES are raised by Referral 1. The clearing of the CHVEF is likely to be offset as part of the approval of Referral 1 and this would occur regardless of its inclusion in Referral 2.

Referral 2 has been assessed as not likely to have a significant impact on the water resource MNES. It has also been assessed as not likely to have significant impact on a listed threatened species, ecological community or migratory species as no additional clearing will be required. Any indirect cumulative impacts on identified GDEs and their use as habitat by threatened species are considered unlikely. Potential groundwater drawdown within the alluvium under the identified GDEs is predicted for the already approved mining. The impact of Referral 2 may result in additional drawdown in the alluvial

groundwater. Any indirect cumulative impacts on identified GDEs and their use as habitat by threatened species are considered unlikely. Potential groundwater drawdown within the alluvium under the identified GDEs is predicted for the already approved mining. The impact of the proposed mine plan may result in additional drawdown in the alluvial groundwater. It is anticipated however; that the approved or proposed mine plans will not impact the GDE's. The predicted groundwater drawdown would only affect regeneration of the GDE's if it has significant impact on the flooding regime which is not predicted. Referral 2 does not include any clearing of CHVEF.

If the actions of Referral 1 and Referral 2 were considered cumulatively, the combined actions are unlikely to significantly impact on a listed threatened or migratory species. Referral 1 is considered to significantly impact on the listed threatened ecological community HVEF and is independent of Referral 2. Referral 2 is considered unlikely to significantly impact on the water resource MNES which does not apply to Referral 1 as all State approvals involving coal extraction were in place prior to the commencement of the water trigger.

Will the referral of a series of single actions result in the larger action being effectively taken without the need for an approval?

No, Referral 1 is lodged on the basis that it is a controlled action. Referral 2 has not be lodged on this basis but combining it with Referral 1 would not alter this position as outlined above Referral 1 is, in essence only in respect of mining activities that are already approved and require clearing of the CHVEF. There are not elements of a larger action that has not been referred.

Is it preferable to assess and approve the larger action as a whole?

Referral 1 relates to the HVO complex which includes HVO North and HVO South. Referral 2 relates to HVO South only. Referral 1 is therefore considered the larger action and has been referred as a controlled action. Referral 1 and Referral 2 are independent with respect to the water resource MNES which do not apply to Referral 1 on the basis that all State approvals involving coal extraction were in place prior to commencement of the water trigger.

Step 4: Refusing a referral

Under Section 74A(1) of the EPBC Act, if the Minister is satisfied a referral is a component of a larger action, the Minister may decide not to accept the referral.

Given the urgency and unique circumstances of Referral 1, the proponent believes there are strong grounds for the Minister to accept split referrals. The proponent has lodged Referral 1 and Referral 2 at the same time to provide a holistic view to the Minister.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

Wollemi National Park, a listed World Heritage Property for the Greater Blue Mountains area is located approximately 3.3 km from the proposed action as illustrated in **Figure 1**.

Nature and extent of likely impact

The proposed action is not expected to impact on the World Heritage values of the Greater Blue Mountains World Heritage Area. The HVO complex is located to the east of the escarpment in a region that is dominated by mining and agriculture. The edge of the disturbance boundary will be approximately 3.3 km from the nearest edge of the National Park and separated by areas of cleared pasture and disturbed forest and woodland communities on freehold land, rural/residential land and neighbouring mines.

This 3.3 km buffer between the proposed action and the World Heritage Property is considered sufficient to prevent any direct impacts upon the *in-situ* conservation of biological diversity or the maintenance of ecological processes within the Wollemi National Park. A number of adjoining coal mines border the northern tip of the Greater Blue Mountains World Heritage Area, which is itself separated into two sections by a transport (existing road and rail) and urban development corridor.

The buffer is also expected to prevent any indirect impacts from the proposed mine extension. There will be no stormwater run-off or discharges from the proposed action that will enter the National Park boundary due to the catchment alignment draining surface water away from the park. Noise and air emission sources for open cut mining area required to meet strict standards for human health at residential properties located between HVO and the National Park and therefore it is considered unlikely that noise and dust emissions would disturb habitat values within the National Park.

The proposed extension is not expected to have a significant impact upon habitat corridors at a local or regional scale. The proposed extension area is separated from the National Park by a number of natural and artificial barriers including Wollombi Brook and the Hunter River together with land cleared for agriculture and roads and other mines. There are no continuous bands of vegetation that link HVO to the World Heritage Area.

The proposed action is not likely to significantly impact on the World Heritage values of Wollemi National Park.

3.1 (b) National Heritage Places

Description

Wollemi National Park, a listed National Heritage Place for the Greater Blue Mountains World Heritage Area, is located 3.3 km from the proposed action as illustrated in **Figure 1**.

Nature and extent of likely impact

Similar to the assessment in Section 3.1(a), the proposed action is not expected to impact upon the National Heritage values of the Greater Blue Mountains area. The HVO complex is located to the east of the escarpment in a region that is dominated by mining and agriculture and located some 3.3 km from the nearest edge of the National Park and separated by combination of other mines, cleared pasture and disturbed forest and woodland communities on freehold land.

The distance between the proposed action and the National Park is also expected to prevent potential indirect impacts from the proposed extension, such as stormwater runoff and discharges, noise and air impacts from the proposed action.

The proposed action is not likely to significantly impact on the Wollemi National Park Natural Heritage Place.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description
The nearest Wetland of International Importance is the Hunter Estuary Wetlands located at the mouth of the Hunter River near Newcastle, which is approximately 80km to the south east of HVO as illustrated in **Figure 1**.

Nature and extent of likely impact

The existing HVO complex discharges mine water into the Hunter River via a number of licensed points to the Hunter River (refer **Figure 1**) with a comprehensive water quality monitoring and stream gauging network. Releases can only occur when there is sufficient flow in the Hunter River and the water quality is within appropriate standards in accordance with existing Environmental Protection Licence and the rules of the Hunter River Salinity Trading Scheme. The proposed action relates to a continuation of mining in State-approved areas.

Given the existing State controls in place to preserve the water quality of the Hunter River, it is not likely that releases from HVO would have a significant impact on the values of the Hunter Estuary Wetlands.

3.1 (d) Listed threatened species and ecological communities

Description
The proposed action is located within the footprint of State-approved disturbance. All clearing is expected to be completed for the mining of the coal seams under the existing State approvals. By the time the deeper mining would reach the areas yet to be cleared under the State approvals (nominally 2026, refer **Figure 7**), the footprint will be an overburden emplacement as a result of previous mining of the shallower seams.

Known groundwater dependent ecosystems (GDEs) and ecosystems that potentially use groundwater are identified by the National Atlas of Groundwater Dependent Ecosystems. Riverine vegetation along Hunter River has been classified as having a high potential for groundwater interaction, while known GDEs have been identified along Wollombi Brook.

Previous ecology surveys (ERM 2008) also identified GDEs along the Hunter River and Wollombi Brook. The surveys found that there are no known threatened aquatic fauna or flora within HVO South. However, an endangered species under the TSC Act, the River Red Gum (*Eucalyptus camaldulensis*), is known to occur along the Hunter River (i.e. Carrington Billabong) and Wollombi Brook. While River Red Gums utilise groundwater, they rely on flooding regimes for recruitment (ERM 2008). Cumberland Ecology (2014) also identified the Hunter Valley River Oak Forest as a GDE, which is present in a thin riparian zone along Wollombi Brook and likely accesses shallow alluvial groundwater.

River Red Gums were recorded in the alluvial lands approximately 1km north of the Riverview Pit and Cheshunt Pit extension areas. River Red Gums and Hunter Valley River Oak Forest are absent from the extension areas. None of the vegetation types within the proposed action are classified as groundwater dependent ecosystems.

Nature and extent of likely impact

The proposed action is located within the footprint of State-approved disturbance. Therefore the potential for significant impact on listed threatened species and ecological communities is considered unlikely.

The Groundwater Assessment Report (ERM 2008b) concluded that primary drawdown impacts from mining in the Riverview and Cheshunt Pits were likely to be localised to the pit areas and that impacts to shallow groundwater in alluvium would be minimal. Drawdown in the vicinity of the River Red Gums (potentially reliant on groundwater) was predicted to be 1 m. This was not predicted to adversely impact River Red Gums as they are reliant on flooding for germination, and no changes to the flooding or flow regimes were expected to result from mining. As River Red Gums are absent from the extension areas, and none of the vegetation communities are likely to be reliant on groundwater, the proposed action is unlikely to impact vegetation or habitat potentially reliant on groundwater. Any indirect cumulative impacts on identified GDEs and their use as habitat by threatened species are considered unlikely. Potential groundwater drawdown within the alluvium under the identified GDEs is predicted for the already approved mining. The impact of the proposed mine plan may result in additional drawdown in the alluvial groundwater. It is anticipated however; that the approved or proposed mine plans will not impact the GDE's. The predicted groundwater drawdown would only affect regeneration of the GDE's if it has significant impact on the flooding regime which is not predicted.

3.1 (e) Listed migratory species

Description

The proposed action is located within the footprint of State-approved disturbance. All clearing is expected to be completed for the mining of the coal seams under the existing State approvals. By the time the deeper mining would reach the areas yet to be cleared under the State approvals (nominally 2026, refer **Figure 7**), the footprint will be an overburden emplacement as a result of previous mining of the shallower seams.

Nature and extent of likely impact

The proposed action is located within the footprint of State-approved disturbance. Therefore the potential for significant impact on migratory species is considered unlikely.

3.1 (f) Commonwealth marine area

Description

The proposed action is not located within a Commonwealth marine area.

Nature and extent of likely impact

The proposed action is not likely to have a direct or indirect impact on a Commonwealth marine area.

3.1 (g) Commonwealth land

Description

The proposed action is not located on Commonwealth land.

Nature and extent of likely impact

The proposed action is not likely to have a direct or indirect impact on Commonwealth land.

3.1 (h) The Great Barrier Reef Marine Park

Description

The proposed action is approximately 80 km inland (west) from the eastern coastline near Newcastle. Newcastle is located over 900 km to the south of the Great Barrier Reef Marine Park.

Nature and extent of likely impact

The proposed action is located a significant distance away from the Greater Barrier Reef Marine Park. The proposed action is therefore not likely to have a direct or indirect impact on the Great Barrier Reef Marine Park.

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description

Introduction

As noted in Section 1.1, the mine has been operational since 1949, therefore the physical environment, including local and regional surface and groundwater systems, is well understood. Details of surface and groundwater management including water licencing, water quality, mineral processing, tailings disposal and surface water discharges in accordance with the relevant legislation and approvals that relate to HVO can be found in the approved HVO WMP: (http://www.riotinto.com/documents/20150717_HVO_water_management_plan_Approved_Final.pdf). Routine monitoring of all aspects of water management is conducted in accordance with this plan with the results reviewed and reported on an annual basis in the Hunter Valley Operations Annual Environmental Review. The Hunter Valley Operations Annual Environmental Review 2014 (http://www.riotinto.com/documents/_Energy/HVO%20Annual%20Review%202014%20Final%20reduced%20smallest.pdf) also contains the HVO South and Lemington Groundwater Impacts Report which compares actual and predicted impacts.

Surface water

HVO South is close to the confluence of the Hunter River and Wollombi Brook. The NSW Government (DPI Water) collects flow data in the Hunter River and at Wollombi Brook (station 210004) with long-term stream level data available for both of the water courses. The locations of the gauging stations are shown in the HVO WMP.

The Hunter is the largest catchment in NSW with an approximate area of 21,500 km^2. The catchment supports a diverse range of land uses including agriculture, coal mining, heavy industry, tourism, urban and rural residential areas. Flow in the Hunter River is regulated by two major headwater storages, as well as a number of minor dams. Water quality is generally fresh to marginally brackish (ie an electrical conductivity (EC) less than 2,000 µS/cm) with a neutral pH (6.5 to 7.5).

Wollombi Brook has a total catchment area of 403 km^2; the majority of the catchment comprises forested bushland on steep terrain. Longford Creek and several other tributaries drain the area to the south discharging to Wollombi Brook and the Hunter River. Water quality at Wollombi Brook is brackish to saline and alkaline.

Cheshunt and Riverview Pits are adjacent to the Hunter River with a buffer maintained between the associated alluvial aquifer and mining areas. Routine monitoring in the buffer zones is completed to measure any surface water take via baseflow losses (AGE 2014).

Groundwater

The hydrogeological setting at HVO South consists of two main water bearing formations: shallow Quaternary alluvial aquifers; and Permian coal measures. The HVO South groundwater monitoring network described in the HVO WMP includes 85 monitoring bores screened within the alluvium, interburden/overburden and coal measures. Groundwater responses to mining in the alluvium have been realised through previous and current approvals with future proposed extraction below the base of the alluvial deposits in all pits.

The alluvial deposits associated with the Wollombi Brook and the Hunter River has a maximum thickness of 10 to 15 m (AGE 2014). The aquifers are recharged by direct infiltration of rainfall and lateral seepage from surface water flows. The alluvial aquifers are relatively permeable in comparison to the underlying Permian strata with hydraulic conductivities of 0.2 to 1.6 m per day (AGE 2014).

The alluvial groundwater quality is generally fresh to brackish (less than 2,000 µS/cm) with a neutral pH (6.5 to 7.5). AGE (2014) reports average EC's of 1,031 µS/cm and 867 µS/cm in the alluvial barrier between Cheshunt pit and the Hunter River over the 2014 monitoring period. The average EC in the alluvium adjacent to South Lemington pit was 5,348 µS/cm over the same period (AGE 2014).

The Permian coal measures comprise stacked coal seams of variable thickness ranging from 2 to 10 m. The majority of flow in the Permian strata occurs in the coal measures through cleats and fractures. Groundwater quality in the coal measures is saline and unsuitable for domestic, stock or irrigation purposes. AGE (2014) reports an EC range of 800 µS/cm to 23,100 µS/cm in the coal measures over the 2014 monitoring period. The Permian interburden/overburden comprises sandstones, siltstones and conglomerates of very low permeability. The low permeability of these strata confines the individual coal seams and limits the connection with overlying alluvial aquifers.

The ERM (2008) EA identified 63 groundwater works within a 2 km radius of HVO South and, of these, 25 accessed the shallow alluvial aquifers for water supply with the remainder utilised for monitoring purposes. The closest private groundwater users' accessing the aquifer through the use of bores is over 3km from the mining area. These users only accessed the shallow alluvial aquifers with a combination of lower salinities, increased yields and depth when compared with the Permian groundwater source.

Nature and extent of likely impact

Introduction

The nature and extent of likely impacts on the hydrology and/or water quality of a water resource are considered in the sections below. Any impacts on the water resource by the proposed action are not expected to be significant as there is limited change in the intensity, duration, magnitude and geographical extent of the impacts when compared to the approved activities. It is anticipated that the proposed action will not directly or indirectly result in a significant change to the hydrology or the water quality of a water resource. The impacts will not be of a sufficient scale or intensity as to reduce the current or future utility of the water resource for third party users, including environmental and other public benefit outcomes, or to create a material risk of such reduction in utility occurring.

Surface water

Overview

The proposed action will not increase the approved footprint of disturbance and, therefore, no direct or indirect impacts on surface water features are predicted.

Surface water from the Hunter River, Wollombi Brook and associated alluvium is monitored through HVO's extensive monitoring network. Sufficient water entitlements are held to offset the water take from the approved operations.

HVO manages impacts to the water resource by:

- minimising freshwater use from the Hunter River (HVO holds both High and General Security Water Access Licences to withdraw water from the Hunter River. The combined entitlement is 4,665 Units [ML/annum or a share of the available resources] - No freshwater has been sourced from the Hunter River for processing coal in the past eight years);
- preferentially using mine water for coal preparation and dust suppression;
- an emphasis on control of water quality and quality at the source;
- recycling on site water;
- ongoing maintenance and review of the system; and
- disposing of water to the environment in accordance with statutes and regulations.

Water will be required to support the increase in coal processed under the proposed action. Water for processing would continue to be sourced from a number locations including recycled water from processing, dewatering of pits and, if required, using water from licences within the Hunter River. No additional take from surface water resources above existing licence entitlements from the Hunter River and Wollombi Brook and associate alluvium is predicted.

Any additional coal fine rejects from the processing of coal will be disposed in approved tailings facilities at HVO. No additional impacts on the water resources value and quality are expected from this additional processing.

Quality

Sediment laden runoff has potential to impact on water quality in receiving waters. HVO South has established controls in place to manage the potential for these impacts. Management measures include clean water diversions around the pits, contour banks and strict erosion and sediment control (Rio Tinto 2015). These controls work together to divert clean water from pit voids and capture mine water for storage in sediment dams.

Mine water is predominantly saline and incidental discharge therefore has potential to impact on the water quality of receiving waters. The proposed action is predicted to increase the inflow rate of saline water to the pits. HVO South has established controls in place to manage these impacts. In accordance with the PA 06_0261, saline water cannot be released offsite except for opportunity discharges as regulated by the Hunter River Salinity Trading Scheme. This requirement effectively negates the risk of adverse impacts on the water quality of receiving water features.

Surface water management will continue in accordance with HVO's comprehensive water management system under the proposed action. The proposed action will not significantly impact on surface water quality.

The proposed action is considered not likely to significantly impact on a surface water resource.

Groundwater

Overview

Mining at HVO South has progressed below the alluvial aquifers and monitoring shows a localised drawdown response and leakage in accordance with approved predictions (AGE 2014). Predictive groundwater models show strong calibration with monitored responses to mining. As mining has progressed below the alluvial deposits, the proposed action is not predicted to have additional impacts on the alluvial aquifers.

Mining to the base of the Bayswater seam in the Cheshunt Pit is progressing as approved and depressurising the coal seam and the overlying Permian strata as predicted. The proposed action is anticipated to marginally increase the extent of this depressurisation. Studies have shown that the Permian strata have limited hydraulic connection with the overlying alluvial aquifers due, in part, to the low permeability of the Permian overburden (ERM 2008). It is therefore considered unlikely that additional depressurisation of the underlying Permian strata will induce a further response in the overlying alluvial aquifers.

Depressurisation within the Permian strata will alter local groundwater flow pathways. As groundwater levels recover the hydraulic gradient will direct groundwater flow inwards, towards the excavated pit. The water quality of the inflows to the pit will be consistent with groundwater within the Permian coal measures; saline and generally unsuitable for any beneficial use (ERM 2008). The proposed action will increase groundwater inflows to the Riverview Pit. This increase will be quantified by numerical modelling and the proponent will make sure the necessary licence entitlements are held ensuring groundwater extraction is within the sustainable limits.

Shallow groundwater users were considered unlikely to be impacted by operations at HVO South (ERM 2008). This prediction remains valid with the proposed action considered unlikely to impact on the shallow groundwater table.

Groundwater quality

There are no impacts predicted on the groundwater quality within the shallow alluvial aquifers from the proposed action given that mining activities have progressed below the base of the alluvial deposits.

Saline mine water is identified as a potential impact on groundwater quality. Given the final landform will form a groundwater sink, the outward migration of mine water into the Permian strata is considered unlikely. It is further noted that laboratory testing of water within the mine spoil suggested a higher (or better) water quality than the receiving Permian groundwater (ERM 2008).

The proposed action is considered not likely to significantly impact on a groundwater resource.

Assessment against Significant Impact Guidelines

Impacts to the value of a water resource

- Provisioning services - The water resource is managed by the NSW government under the various Water Sharing Plans (WSPs). Other industries (mining, agriculture and power generation) access the water in the Hunter River, the Wollombi Brook and associated alluvium. All access to water is licenced in accordance with the WSPs which allocates water to ensure sustainable water is available. The nearest private third party bore user is over 3km from the mining area and water draw from the modification is not anticipated to impact any third part bore. High security water allocations for drinking water are made available under the WSP direct from Glennies Creek Dam (which has no interaction with HVO) for the major town of Singleton. The proposed action is not anticipated to impact on the use of water by other industries and use as drinking water.

- Regulating services – The proposed action is unlikely to impact on climate regulation or the stabilisation of coastal systems.

- Cultural services – The proposed action is unlikely to result in a change of impact on recreation and tourism. The data collected and modelled during the process is likely to benefit scientific understanding of water hydrology and aid in education.

- Supporting services – The WSP's aim to protect ecosystem functions of the river system. No Groundwater Dependent Ecosystems (GDEs) are expected to be impacted by the modification.

Changes to hydrological characteristics

- Water quality – No additional changes to water quality are anticipated to those currently being successfully managed under the existing HVO WMP.

- Hydrological or hydrogeological connections – The proposed action will remove deeper seams within the approved footprint, however these geological features are already depressurised to some extent by the existing mining operation. The deeper seams are not highly connected to the Hunter River, the Wollombi Brook or the water in the associated alluvium.

- Area or extent of a water resource – There are no changes to the area or extent of the water resource.

State Water Resource Plans

- The water resource is protected by the relevant State WSPs developed under and in accordance with the National Water Initiative (NWI). All water extracted by the proposed action will be licenced under the relevant WSPs.

Changes to water quality

- Ability to achieve relevant water quality objectives – The proposed action will be managed by the HVO WMP. The HVO WMP is prepared to fulfil the requirements of relevant legislation, the project approval conditions (PA 06_0261, as modified), commitments made in environmental assessments, HVO's EPL and relevant standards and guidelines. The HVO WMP addresses risks to human or animal health, human consumption of water, industrial users and environmental uses of the water resource. The plan also addresses any accumulation of harmful substances such as salt through Hunter River Salinity Trading Scheme. No heavy metals or organic chemicals are anticipated. Native species dependent on the water resource are protected by the HVO WMP.

- Avoids worsening the local water quality – No change to the local or regional water quality is anticipated. Saline discharges are effectively managed under the Hunter River Salinity Trading Scheme.

Cumulative impacts

- The proposed action is unlikely to add significant impacts to the water resource when considered cumulatively with other historical, existing and proposed developments. The water resource is managed under the relevant WSPs and any water allocations are accounted for using water licences. All developments which use water require a licence for that use.

Mining to the base of the Bayswater seam in the Cheshunt Pit is progressing as approved and depressurising the coal seam and the overlying Permian strata as predicted. The proposed action is anticipated to marginally increase the extent of this depressurisation. Studies have shown that the Permian strata have limited hydraulic connection with the overlying alluvial aquifers due, in part, to the low permeability of the Permian overburden (ERM 2008). It is therefore considered unlikely that additional depressurisation of the underlying Permian strata will induce a further response in the overlying alluvial aquifers.

Water quality is managed across all mining developments in the area as is water discharges through the HRSTS. The proposed action is unlikely to have a significant impact when considered on its own and when considered cumulatively would cause limited change to the water resource than that are currently occurring and being effectively managed.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

3.3 Other important features of the environment

3.3 (a) Flora and fauna

The proposed action proposes to mine through previously mined areas to access the deeper coal seams.

Remnant native vegetation characteristics within the extension areas are detailed in ERM (2003), EMM (2010), EMM (2013), ERM (2008), ERM (2005a) and ERM (2005b). The majority of the extension areas are characterised by exotic and native pasture. Recent field surveys in the Riverview Pit Extension area identified the occurrence of Narrow-leaved Ironbark Grey Box Woodland as a single large patch (i.e. >5 ha). It is dominated by Narrow-leaved Ironbark, however also contains some Grey Box (*Eucalyptus moluccana*). This area has a good quality native understorey (i.e. >50% of perennial understorey vegetation is native and the patch contains >12 native understorey species). The patch in Carrington Pit is only 0.1 ha, therefore does not represent Central Hunter Valley eucalypt forest and woodland.

None of the remnant native vegetation to be cleared for the proposed action has been identified as a groundwater dependent ecosystem.

3.3 (b) Hydrology, including water flows

The drainage network within the project area has been heavily modified by mine operations with the majority of the local catchment captured by the existing mine water management system. Mine water is stored in Lake James, which is adjacent to the Hunter River on the eastern side of the current mining operations, for release to the Hunter River under Hunter River Salinity Trading Scheme.

3.3 (c) Soil and Vegetation characteristics

The proposed action proposes to mine through previously mined areas to access the deeper coal seams.

3.3 (d) Outstanding natural features

The proposed action proposes to mine through previously mined areas to access the deeper coal seams.

3.3 (e) Remnant native vegetation

The proposed action proposes to mine through previously mined areas to access the deeper coal seams.

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

The proposed action proposes to mine through previously mined areas to access the deeper coal seams.

3.3 (g) Current state of the environment

The proposed action proposes to mine through previously mined areas to access the deeper coal seams.

Existing open cut pits, mine-related infrastructure and rehabilitated former mining areas are located to the north, south-east and south-west of HVO South. Mine operations include HVO North, Ravensworth Operations, Warkworth Mine, Wambo Mine, United Colliery Bulga Complex and Mt Thorley Mine.

Grazing and cropping land are located the north-east and west and vegetated areas are immediately to the south of Riverview Pit and south of South Lemington Pit 1 and further afield to the south of Warkworth village.

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

There are no items or places listed on the Australian Heritage Database (DoE website - accessed 26 October 2015) near the site. The nearest listed place is Murunbin House Group is Broke, approximately 20 km south.

There is no increase in the approved disturbance footprint under the proposed action.

3.3 (i) Indigenous heritage values

The proposed action will not increase the approved footprint of disturbance and there are no predicted impacts on Indigenous heritage values.

3.3 (j) Other important or unique values of the environment

Other landscape features include Wollemi National Park with Brokenback Ranges and Barrington Tops National Park which were established in 1979 in 1969, respectively. These parks form the western and northern edges of the Upper Hunter region and are 6 km and 32 km from the site, respectively.

3.3 (k) Tenure of the action area (eg freehold, leasehold)

The proposed action is located within the footprint of the existing mine where the proponent holds tenure of the lands.

3.3 (l) Existing land/marine uses of area

The proposed action is located on land that is or will be mined under existing State approvals to enable access to deeper coal seams.

3.3 (m) Any proposed land/marine uses of area

The proposed action is located on land that is or will be mined under existing State approvals to enable access to deeper coal seams.

4 Environmental outcomes

The mine has been operational for over 65 years and, therefore, the surrounding physical environment is well understood. Surface and groundwater investigations completed for HVO South are based on extensive baseline data from the HVO surface and groundwater monitoring network.

Past and current surface and groundwater studies completed for HVO South have been prepared by industry leading specialists and peer reviewed as appropriate. Models show strong calibration and have included uncertainty analysis indicating a relatively high degree of certainty with limited error bands around the predictive results. Monitoring has verified that actual impacts are within the conservative predictions in the ERM (2008) EA (see Annual Report 2014).

The proponent ensures that appropriate licences are held in the relevant water sources to account for the predicted water take.

As described in Section 5, HVO South has an approved HVO WMP, prepared in consultation with relevant government agencies, which provides for the management of both surface and groundwater resources. This includes performance criteria and trigger levels and a response protocol should any exceedances be identified. The HVO WMP plan will be updated to incorporate the proposed modification.

As concluded in Section 3.1 (i) of this referral, the proposed modification is not predicted to have a significant impact on water resources. It is further considered that appropriate mechanisms are in place to manage the risk of all potential impact on surface and groundwater systems.

5 Measures to avoid or reduce impacts

The proposed action relates to a modification of an existing open cut mine. Open cut mining projects cannot readily avoid impacts as mineral resources are in fixed locations. However, wherever possible avoidance was applied as a guiding principle for the proposed action and considerable effort has been expended to date in progressing the mine plan design to avoid or minimise adverse environmental impacts.

These include:

- no extension to State-approved mining disturbance areas and utilisation of the approved disturbance footprint by accessing the deeper coal seams;
- micro-relief incorporated into overburden emplacement area design; and
- increased distance between the Hunter River and the evaporative basin in the void.

As noted in Section 4 above, HVO South has an approved HVO WMP, prepared in consultation with relevant government agencies, which provides for the management of both surface and groundwater. Potential impacts on surface and groundwater will continue to be managed in accordance with the HVO WMP, which will be updated to include the proposed action. The HVO WMP includes regular controls such as:

- the minimisation of river extractions by recycling mine affected water;
- diverting clean water around disturbed areas;
- ensuring contaminated water is diverted to mine water storages;
- water quality monitoring at all licence points;
- progressive rehabilitation of mined areas; and
- investigations of all unusual water monitoring results.

6 Conclusion on the likelihood of significant impacts

6.1 Do you THINK your proposed action is a controlled action?

✓	No, complete section 5.2
	Yes, complete section 5.3

6.2 Proposed action IS NOT a controlled action.

This referral considers the *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments - impacts on water resources* and concludes the proposed action will not have a significant impact on water resources as:

- the Water Resource is protected by a State legislated WSP developed under and in accordance with the NWI.
- no additional drawdown is predicted in the alluvial aquifers;
- no additional take from surface water resources above existing licences from the Hunter River and Wollombi Brook and associate alluvium is predicted;
- predicted depressurisation of the Permian strata is considered insignificant given depressurisation to the Bayswater seam is approved at Cheshunt Pit and the low beneficial use value assigned to the Permian water resource;
- no impacts are predicted on groundwater dependent ecosystems and/or groundwater users reliant on the subsurface expression of groundwater within the alluvial aquifers;
- no predicted water quality impacts on receiving surface water resources are predicted; and
- impacts are managed, monitored and reported through the HVO WMP and annual reviews.

The proposed action is not likely to significantly impact on a water resource and is, therefore, not considered to be a controlled action.

6.3 Proposed action IS a controlled action

	Matters likely to be impacted
No	World Heritage values (sections 12 and 15A)
No	National Heritage places (sections 15B and 15C)
No	Wetlands of international importance (sections 16 and 17B)
No	Listed threatened species and communities (sections 18 and 18A)
No	Listed migratory species (sections 20 and 20A)
No	Protection of the environment from nuclear actions (sections 21 and 22A)
No	Commonwealth marine environment (sections 23 and 24A)
No	Great Barrier Reef Marine Park (sections 24B and 24C)
Unlikely	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
No	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
No	Protection of the environment from Commonwealth actions (section 28)
No	Commonwealth Heritage places overseas (sections 27B and 27C)

7 Environmental record of the responsible party

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** All Rio Tinto managed operations and business units are required to have and maintain a certified Environmental Management System conforming to the ISO 14001 international standard, which is certified to the business by an accredited body. ISO 14001 provides a framework for an organisation to identify and manage the environmental impact of its activities, products and services, and to improve its environmental performance continually. In conforming to the adopted international Environmental Management System standard, the following environmental aspects are considered: • Emissions to air; • Greenhouse gas emissions; • Noise and vibration; • Releases to underground and surface waters; • Mineral and non-mineral waste generation and disposal; • Land use; • Use of hazardous materials; • Use of natural resources; • Changes to ecosystems; and • Product life cycle. Monitoring, corrective action and management review is then put in place to ensure environmental management remains at its highest. Procedures throughout Rio Tinto Coal Australia have been put in place to handle non-conformances and sites regularly undergo internal and external audits to ensure they comply with their Environmental Management System, Rio Tinto Environmental Management System standard and ISO 14001.	✓	
7.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** In August of 2013, Coal & Allied Operations Pty Limited as holder of the Environmental Protection Licence at Mt Thorley Operations pleaded guilty to a breach of s120 of the *Pollution of the Environment Act* in respect of a sediment dam water discharge incident.	✓	
7.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** Coal & Allied will undertake the proposed action in accordance with its Health, Safety, Environment and Community Policy which outlines Coal & Allied's commitments, goals, systems and responsibilities for its operations.	✓	
7.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** EPBC Act Referral 2011/5795 was approved with conditions on 29 February 2012 for the Mount Pleasant Project; an approved open cut coal mine located approximately 4 km north-west of Muswellbrook NSW.	✓	

8 Information sources and attachments

8.1 References

Department of Primary Industries – NSW Office of Water, 2012, *NSW Aquifer Interference Policy*

Environmental Resources Management Australia (ERM), 2008, *Hunter Valley Operations South Coal Project, Environmental Assessment,* prepared for Coal & Allied Pty Limited, January 2008 – Available online at http://majorprojects.planning.nsw.gov.au/

Environmental Resources Management Australia (ERM), 2008, *Groundwater Assessment, Hunter Valley Coal Operations: South Coal Project,* prepared for Coal & Allied Pty Limited, January 2008

Australasian Groundwater Consultants (AGE), 2013, *Groundwater Impacts Report*, prepared for Coal & Allied Pty Limited

Australasian Groundwater Consultants (AGE), 2013, *Groundwater Impacts Report*, prepared for Coal & Allied Pty Limited

Mackie Environmental Research (MER), 2005, *Assessment of River Leakage within the Cheshunt Pit Buffer Zone*, Amended Pit, April 2005

Rio Tinto Coal Australia (Rio Tinto), 2015, *Hunter Valley Operations: Water Management Plan*, prepared for the HVO North complex in accordance with project approvals and approved by NSW Planning and Environment on 19 May 2015

Sinclair Knight Merz (SKM), 2012, *Australian groundwater modelling guidelines*, Australian government, National Waters Commission, Waterlines Report Series No. 82, June 2012

8.2 Reliability and date of information

The reference material used in this referral has been developed by industry experts and is subject to high levels of scrutiny. The 2008 environmental assessment (ERM 2008) underwent independent expert reviews and was subsequently approved by the NSW Government.

8.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)	✓	
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)	✓	
	copies of any flora and fauna investigations and surveys (section 3)	✓	
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)	✓	
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)	✓	

9 Contacts, signatures and declarations

Project title:

9.1 Person proposing to take action

1. Name and Title:	Mr Anthony Russo (Manager – Project Approvals)
2. Organisation:	Coal & Allied Operations Pty Limited
3. EPBC Referral Number:	EPBC 2016/7641
4: ACN / ABN:	ABN 16000023656
5. Postal address	123 Albert Street, Brisbane, QUEENSLAND, 4000
6. Telephone:	07 3625 4823
7. Email:	anthony.russo@riotinto.com
8. Name of designated proponent (if not the same person at item 1 above and if applicable):	
9. ACN/ABN of designated proponent (if not the same person named at item 1 above):	

COMPLETE THIS SECTION ONLY IF YOU QUALIFY FOR EXEMPTION FROM THE FEE(S) THAT WOULD OTHERWISE BE PAYABLE

I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:	□ an individual; OR □ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR ✓ not applicable.
If you are small business entity you must provide the Date/Income Year that you became a small business entity:	

Note: You must advise the Department within 10 business days if you cease to be a small business entity. Failure to notify the Secretary of this is an offence punishable on conviction by a fine (regulation 5.23B(3) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth)).

COMPLETE THIS SECTION ONLY IF YOU WOULD LIKE TO APPLY FOR A WAIVER

I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations. 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:	✓ not applicable.

Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence. I agree to be the proponent for this action. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.
Signature	 Date 29/01/2016

9.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name	
Title	
Organisation	Organisation name should match entity identified in ABN/ACN search
ACN / ABN (if applicable)	
Postal address	
Telephone	
Email	
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature	Date

REFERRAL CHECKLIST

HAVE YOU:

- ❑ Completed all required sections of the referral form?
- ❑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ❑ Provided a map showing the location and approximate boundaries of the project area?
- ❑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ❑ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ❑ Provided complete contact details and signed the form?
- ❑ Provided copies of any documents referenced in the referral form?
- ❑ Ensured that all attachments are less than three megabytes (3mb)?
- ❑ Sent the referral to the Department (electronic and hard copy preferred)?

Attachment A

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)