NSW GOVERNMENT | Department of Primary Industries

OUT13/36533

Ms Sophie Butcher
Mining Projects
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

Sophie.Butcher@planning.nsw.gov.au

Dear Ms Butcher,

Mandalong Southern Extension Project (SSD_5144)
Response to exhibition of Environmental Impact Statement

I refer to your email dated 28 October 2013 requesting advice from the Department of Primary Industries (DPI) in respect to the above matter.

Comment by Fisheries NSW
Fisheries NSW is responsible for ensuring that fish stocks are conserved and that there is no net loss of key fish habitats upon which they depend. To achieve this, Fisheries NSW ensures that developments comply with the requirements of the *Fisheries Management Act 1994* (namely the aquatic habitat protection and threatened species provisions in Parts 7 and 7A of the Act, respectively), and the associated *Policy and Guidelines for Fish Habitat Conservation and Management (2013).* In addition, Fisheries NSW is responsible for ensuring the sustainable management of commercial and recreational fishing in NSW.

In this regard, Fisheries NSW advise as follows:

(i) there are no significant issues given the majority of the works underlie upper catchments and ridgelines.
(ii) any changes in slope due to subsidence are generally over ridden by the steep grade in the creek beds and water velocity increases are minimal. There may be some beneficial ponding, creating some small areas of aquatic habitat.
(iii) the main waterways within the project area considered as Key Fish Habitat are the upper reaches of Wyee Creek and Moran's Creek.
(iv) the proposal includes a road crossing of Moran's Creek to access the Southern Surface Site. Fisheries NSW would require the inclusion of a condition in relation to tis crossing stating:
    - The construction and design of the Moran's Creek crossing on the access road to the Southern Surface Site must comply with the Fisheries NSW

Policy and Guidelines titled *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Jan 2003)*.

(v) the mining impacts from subsidence include some areas of increased scour and others of increased pondage. Fisheries NSW sees the pondage as an opportunity to increase the availability of aquatic habitat in the area and the issues of scour are a concern due to potential impacts on existing habitats. Fisheries NSW would require the inclusion of a condition stating:

- Rehabilitation and management plans for both scouring of waterways and remnant ponding are to be developed in consultation with Fisheries NSW.

For further information please contact Scott Carter, Senior Conservation Manager(Port Stephens office) on 4916 3931 or a: scott.carter@dpi.nsw.gov.au.

Comment by NSW Office of Water

The NSW Office of Water provides the following key comments, and the detailed comments, recommended conditions for any approval, and licence requirements in Attachment A.

(i) The assessment indicates groundwater inflows are predicted to increase from 712 ML/yr at the existing operation to a maximum of 2158 ML/yr with the southern extension in the years 2035-36. This represents an additional water take of 1446 ML/yr from the porous and fractured rock groundwater source which will require licensing under the *Water Act 1912*. The hydrogeological modelling has predicted no water take from the alluvial groundwater source due to the project.

(ii) The hydrogeological assessment indicates the project meets the Level 1 Minimal Impact Considerations of the Aquifer Interference Policy for both the alluvial groundwater source and the porous rock and fractured rock groundwater sources. These impacts are deemed acceptable.

(iii) Uncertainty exists in the assessment of the ability to predict subsidence impacts. The proponent is reliant on impact verification and adaptive management to manage this uncertainty. The viability of mitigating measures to address potential surface cracking and impacts on water sources needs to be considered.

(iv) The proposed six fold increase in salt load discharge and an increase in metal load discharge at LDP001 are of significant concern due to potential impacts to the downstream aquatic and riparian environment. It is recommended additional assessment be completed prior to project determination to demonstrate an ability to ensure downstream water quality will be consistent with the ANZECC and ARMCANZ (2000) Guidelines and impacts to the downstream environment are acceptable.

(v) As detailed in the EIS the proponent will require licensing under the *Water Act 1912* for works which intercept the groundwater such as ventilation shafts, boreholes and monitoring bores. The proposed transfer of water to the underground operations via boreholes will also require consideration of licensing requirements.

(vi) It is requested the proposed crossing over Morans Creek be designed in accordance with the *Guidelines for Controlled Activities on Waterfront Land (2012)*, including the mitigation of potential flooding impacts on adjacent lands.

(vii) Additional reports are requested to support the understanding of groundwater quality impacts and the independent review of the groundwater model.

(viii) The NSW Office of Water supports the proposal to review the Water Management Plan with specific reference to monitoring and management of impacts to groundwater, surface water, flooding, watercourse stability and remnant ponding.

For further information please contact Tim Baker, Planning and Assessment Coordinator (Dubbo office) on 6841 7403, or at: Tim.Baker@water.nsw.gov.au.

Comment by Crown Lands
Crown Lands advise no issues.

For further information please contact Rebecca Johnson, Coordinator Client Services (Newcastle office) on 4920 5040, or: rebecca.johnson@lands.nsw.gov.au.

Comment by Office of Sustainable Agriculture & Food Security
In accordance with arrangements for mining projects that affect agricultural land, the Office of Sustainable Agriculture & Food Security has responded direct to your Department by letter dated 9 December 2013.

For further information please contact Rob Williamson, Leader Land Use Planning (Orange office) on 6391 3166, or at: rob.williamson@dpi.nsw.gov.au.

Forestry Corporation NSW
It is noted that part of the proposed project underlies State Forest. As of 1 January 2013 Forests NSW, formerly a division of DPI, became Forestry Corporation NSW (FCNSW), a separate State-owned corporation. Contact should be made direct to FCNSW for any comment.

For further information please contact Jude Parr, Land Administration Officer (Wauchope office) on 6586 9718, or at: jude.parr@fcnsw.com.au.

Yours sincerely

Tony Heffernan
Acting Executive Director Business Services

Attachment A

Mandalong Southern Extension Project (SSD_5144)
Response to exhibition of EIS
Additional comment by NSW Office of Water

A. Detailed Comment

1. Water Licensing

- The proponent currently has a licence to take groundwater from the fractured rock and porous rock aquifer under the *Water Act 1912* for 1825 ML/yr. The proposal to increase the maximum groundwater take to 5.9 ML/d (2154 ML/yr) will require an application for additional entitlement under the *Water Act 1912*. If the macro water sharing plan comes in to effect the licence requirements need to be considered under the new regime.
- The assessment indicates water take from the alluvium is unlikely, however the assessment also indicates the geological characteristics may result in higher continuous connectivity and potential water inflows. Water take from the alluvium will require the proponent to hold adequate licensed entitlement within the relevant water sources of the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources and the Water Sharing Plan for the Central Coast Unregulated Water Source.
- Based on the predicted impacts of the project no licensed water users are to be affected. Ongoing monitoring and verification of impacts is recommended to identify any unpredicted impacts and to enable adequate mitigation and contingency responses.

2. Aquifer Interference Policy Assessment

- Predicted impacts have been assessed in the EIS against the relevant minimal impact considerations in the NSW Aquifer Interference Policy (AI Policy). Overall, the predicted impacts of the proposed Mandalong Southern Extension workings and the proposed Mandalong South Surface Site on groundwater sources have been assessed to be less than the Level 1 minimal impact considerations from the NSW Aquifer Interference Policy and are therefore considered to be acceptable.
- Based on existing groundwater quality data for Mandalong Mine, it is not expected that the proposed Mandalong Southern Extension workings would reduce the beneficial use category (i.e. stock watering) of alluvial groundwater or porous and fractured rock groundwater sources within the Southern Extension Area.
- Despite the above there are several points of information noted that collectively can be interpreted to infer a higher risk of breaching the leading to a level 2 aquifer impact and that the monitoring network is insufficient to detect such impacts. These include:
    - The proponent outlines that (i) the depth of mining exceeds 200m from the topographical surface; (ii) that goaf fracturing will not exceed 140m above the mine workings and not within the overlying Triassic geology. However, in contrast to these statements it is noted (i) as shown in Figure 3-3 of the groundwater impact assessment the depth of cover above the coal seam long wall panels is presented to be in part less than 200m (area to the east of pale blue line) (ii) the predicted continuous fracturing zone above a longwall panel is a maximum of 149 – 198 m; and (iii) monitoring bores in the Triassic rocks have shown depressurisation effects with a depth of cover up to 200m but attributed to discontinuous fracturing even though such declines were over the full monitoring period (December 2005 – September 2012).
    - A number of alluvial monitoring bore hydrographs for the Mandalong Mine have shown a rising trend in salinity (eg BH11 and BH03A in Appendix C of Appendix H), whilst other hydrographs demonstrate fluctuating results ranging from fresh to highly saline (eg BH05 and BH13). Without adequate explanation for the fluctuating data, concern is raised with the robustness of the input data for the groundwater model calibration and accepting general statements made on groundwater surface impacts potentially

associated with both the existing and proposed mine. It would be beneficial that the proponent investigate in more detail the nature for the highly variable water quality results. Also, where the salinity data is more stabilised the driver for the rising salinity trends warrants investigation as to whether such trends pose a risk of exceeding the level 1 minimal impact consideration for a water quality change of 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity.

- It is recommended the proponent commit to implement 'make good provisions' to apply to any water supply work where the drawdown impact exceeds the 2 metre criteria as specified in the AI Policy.

3. Groundwater Modelling

- A hydrogeological model has been developed with reference to the *Australian Groundwater Modelling Guidelines* (Barnett et al., 2012) to estimate groundwater seepage into the proposed Mandalong Southern Extension workings and predict drawdown in groundwater sources overlying the proposed workings. The proponent categorises their model as a Class 2 suitable for the prediction of impacts of proposed developments in medium value aquifers.
- The model predicts that inflow of groundwater from the porous and fractured rock groundwater sources into the mine workings is likely to increase over the period of mining from approximately 3 ML/day in 2018 to 5.9 ML/day in 2035-2036 (2154 ML/yr).
- The model software used is MODFLOW-NWT (a version of MODFLOW 2005). The model has 6 layers. The area of the active model covers approximately 580 km² (39.9 km by 23.3 km). The active area has been divided into a grid consisting of 233 columns and 399 rows, generating equally sized cells with dimensions 100 metres × 100 metres totalling 328,655 active cells. The thickness of Layer 4 (Permian Overburden), and hence the height of the modelled fractured zone, has been set at 140 metres and corresponds with the average height of fracturing (both continuous and discontinuous) observed above existing longwalls at Mandalong Mine. Horizontal hydraulic conductivity is ten times the vertical hydraulic conductivity for each hydrogeological unit. This is a typical relationship for essentially horizontal strata.
- Calibration of the hydrogeological model was initially undertaken under steady state conditions. The calibrated steady state heads were used to define initial head conditions for the transient simulation. Approximately 30 steady state model runs were undertaken as part of steady state calibration. The lowest scaled root mean square error (SRMSE) obtained (using realistic material properties) for a converging steady state run was 4.4%. The water balance error for this run was 0.001%. The net recharge coefficient for this run was 0.007 m/yr.

4. Subsidence Assessment

- The subsidence assessment indicates the potential for cracking to surface with cracks of 10 mm to 70 mm wide where shallow rock exists within 5 metres of the surface. If alluvium is present a number of smaller cracks may result. The assessment indicates cracking of watercourses is unlikely, however it is recognised the presence of geological faults may result in higher continuous fracture connectivity and resulting water inflows. The Office of Water recommends this outcome be avoided with the implementation of adequate monitoring and an adaptive management program to identify and avoid unintended impacts.
- Ponding impacts due to the project are predicted to result in increases in ponding depth of up to 0.6 metres and decreases of up to 0.55 metres. The area of remnant ponding is predicted to increase by 3.6 ha which represents an increase of less than 2% from the existing ponding area. The increased ponding is predicted to remain largely within existing watercourses. Potential impacts to aquatic habitat have been identified and these are to be mitigated via drainage works. It is recommended ponding impacts be monitored and the Office of Water be consulted in the event of the requirement for drainage works.

- Minor impacts to channel stability are predicted due to subsidence and resulting changes to long sections. This is due to minimal predicted changes to modelled bankfull velocities and tractive stresses. It is recommended these watercourses be monitored to ensure impacts are acceptable and to identify where mitigation measures may be required.

5. Surface Water Assessment

- The proposal indicates the requirement for water captured in the Sedimentation Basin at the Mandalong South Surface Site to be transferred underground for water treatment and management purposes. An average of 24.2 ML/y is predicted. After transfer underground this water is to be pumped as part of the dewatering operations to the Cooranbong Entry Site and discharged via LDP001.
- Discharge rates at LDP001 are predicted to increase from the existing 1.59 ML/d to approximately 7.1 ML/d. The current operations are approved to discharge up to 5 ML/d. An increase from 5 ML/d to 7.1 ML/d is predicted to represent a 30 millimetre increase in water level in the creek and a 12mm increase in water level in Muddy Lake. The increase in discharge will be a gradual increase to the maximum in 2035-36. Due to the stability of the receiving creek and the natural variation in water level in Muddy Lake the assessment indicated the increase in flows would have no significant impact to geomorphic stability or aquatic habitat.
- The increase in discharge at LDP001 is predicted to result in an increase in loads of metals and salt to the downstream environment. This is predicted to result in the mixing zone extending to Lake Macquarie with potential impacts to aquatic health both within the unnamed watercourse and Lake Muddy. Salt loads are predicted to increase from an existing annual average of 1420 tonnes/yr to 8587 tonnes/yr, which represents a six fold increase. Existing exceedances of ANZECC and ARMCANZ (2000) trigger values for other water quality parameters such as pH, dissolved nickel and nitrogen is also of concern in terms of existing and future impacts to aquatic health. The NSW Office of Water recommends the proponent demonstrate an ability to ensure the downstream water quality will be consistent with the ANZECC and ARMCANZ (2000) guidelines.
- The assessment indicates the flooding depth due to subsidence impacts will result in an increase of between 0.1 and 0.4 metres within the main channels of the watercourse for the 100yr ARI design storm event. No impact to existing road access or dwellings has been identified. There is the potential for the floor levels of 3 dwellings to be reduced due to subsidence which may alter the potential for flood impacts. The certainty of impact however is yet to be confirmed due to the interaction of adjacent subsidence areas. It is therefore recommended that monitoring and mitigation measures be developed to address this issue.
- An emergency spillway is proposed to convey water from the sedimentation basin at the Mandalong South Surface Site to an unnamed watercourse. It is recommended the spillway and associated works be in accordance with the *Guidelines for Controlled Activities on Waterfront Land.*

6. Mitigation and Management

- The NSW Office of Water supports the review of the Water Management Plan for the Mandalong Mine to integrate the monitoring, management and contingency requirements for the project. Key issues to be addressed include but are not limited to development of a Trigger Action Response Plan, development of metering, monitoring and reporting requirements, and a process for revision of model predictions and impacts.
- The proponent outlines within Section 8.2 of Appendix H the proposal to augment the groundwater monitoring network within the Southern Extension Area with nested monitored bores at locations where the depth of cover is less than 250 metres. This is primarily throughout the north—eastern area within the Wyee and Mannering Creek catchments. It is recommended that three monitoring bores (nested) be installed above each proposed longwall where the depth of cover is less than 250 metres. Bores are to be monitored for groundwater levels, pH and EC.

- The existing monitoring network for the southern extension area is relatively sparse and distributed in areas of greatest overburden and thus the lower risk areas for observing any surface related groundwater impacts. Areas of concern that warrant expansion of the network includes the potential Groundwater Dependant Ecosystems (GDEs) identified within areas of less than 200 metres overburden, i.e Wyong Paperbark Swamp Forest and Riparian Swamp Forest. Whilst these GDEs are not currently listed in a Water Sharing Plan, draft mapping of GDEs by Office of Water has identified such communities for priority listing. It is recommended the proponent commit to expand the groundwater monitoring and evaluation program to include monitoring the water table/quality adjacent to mapped potential GDEs where depth of overburden is less than 200 metres.
- The potential for higher continuous fracturing to the alluvium and watercourses highlights the need for rigorous monitoring. In the event impacts exceed modelled outcomes it is expected the proponent would alter the mining plan to avoid further similar impacts and implement mitigating measures where required.
- It is recommended works within watercourses and on the floodplain be carried out in accordance with the *Guidelines for Controlled Activities on Waterfront Land*.

7. Information Requests

The following information is requested prior to project determination:

1. The proponent provide a supplementary report reviewing the drivers for groundwater quality data being observed in the monitoring bore network and whether such trends pose a risk of exceeding the level 1 Aquifer Interference Policy minimal impact consideration for a *'water quality change of 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity"*. To improve the understanding for the rising trends and fluctuating salinity observations, the report should include discussion on field techniques, quality assurance, instrument calibration and bore design.
2. The proponent provide a report of the independent review of the groundwater model, piezometric maps of water levels for the different aquifer layers for different stages of mining project and hydrographs for the observed versus measured water levels used in the model calibration.
3. The proponent provide an assessment to demonstrate the ability to ensure downstream water quality will be consistent with the ANZECC and ARMCANZ (2000) guidelines and impacts to the downstream environment will be acceptable.

B. Recommended Conditions

The NSW Office of Water requests the following conditions be included in any determination issued for the Mandalong Southern Extension Project:

- The proponent must have adequate water licence entitlements to account for water take for all stages of the mining development, and if necessary, reduce the scale of its activity to match the licence entitlements.
- The proponent is required to obtain the necessary water licenses for the project under the *Water Act 1912* or *Water Management Act 2000* prior to commencement of activities.
- The Proponent shall prepare and implement a Water Management Plan for the project. This Plan must be developed in consultation with the Office of Water and include:
  - details of water use, metering and water management on site,
  - details of water licence requirements,
  - Surface Water Management Plan, and
  - Groundwater Management Plan.
- The Surface Water Management Plan must include:
  - a program to monitor:
    - surface water flows and quality,
    - surface water storage and use, and

        - sediment basin operation,
        - subsidence impacts including changes to ponding, flooding, watercourse stability and aquatic habitat.
    - sediment and erosion control plans,
    - surface water impact assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts, and
    - a protocol for the investigation and mitigation of identified exceedences of the surface water impact assessment criteria and the use of an adaptive management framework.
- The Groundwater Management Plan must include:
    - baseline data on groundwater levels and quality,
    - trigger action response plan including adaptive management framework,
    - a program to monitor groundwater levels and quality,
    - a program to report water take via metering and/or modelling,
    - groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts,
    - a protocol for the investigation and mitigation of identified exceedences of the groundwater impact assessment criteria.
    - a protocol for periodic review of groundwater model calibration and verification of groundwater take predictions and groundwater impacts.

C. Water Licence Requirements

Water Act 1912

- Installation of ventilation shafts and service boreholes which will intercept groundwater.
- The proposed transfer of water from the sedimentation basin to the underground operations via a borehole.
- The proposed monitoring bores and vibrating wire piezometers.
- All bores require licensing under Part 5 of the *Water Act 1912* (WA). The definition of a bore is given in s105 of the WA.

Application forms for licences and approvals are available at www.water.nsw.gov.au

***Water Management Act 2000* (WMA)**

- Water Access Licences are required to take water from any water source managed under the WMA.
- A nominated water supply work is required to take water under a water access licence.
- Exemptions for access licences are provided in Clause 18 and the Schedule 5 of the *Water Management (General) Regulation 2011*.
- Section 54 of the WMA provides details on harvestable rights.
- Requirements for access licence dealings are provided in the following documents:
    - Section 71 of WMA
    - *Access Licence Dealing Principles Order 2004* www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+433+2004+cd+0+N
    - Access licence dealing rules of water sharing plan

Application forms for access licence and access licence dealings are available at www.water.nsw.gov.au.

End of Attachment A