ADDRESS TO PLANNING/ASSESSMENT COMMISSION ON WALARAH 2

Wyong  April 5th  2017

Michael Campbell  (QAM)

THE PROCESS

When Alan Hayes, Warwick O’Rourke and myself were battling away on the Wyong Coal Community Liaison Committee a few years ago often the Department officers would get a bit heated with our questioning. Ron Hansen, a consultant on the committee, remonstrated one day.....

“Look...the role of the community members on this committee is to disseminate information to the community, not to analyse reports....there are experts doing that!”

All we can say is that the experts have succeeded in taking this mine application on an 11 year journey of contradiction, ham-fistedness and total lack of concern for the community or the likely result of their actions. They still deny debating the plan in open community forum.

Firstly may I let the Commission know what sort of antics that we have had to endure from the Company beyond their glossy brochure campaign which has permeated the area for the last 11 years.

In the company’s Winter 2006 brochure they state;

“When crossing deep beneath the Dooralong Valley floodplain, which is necessary to access coal reserves within the surrounding State Forest, the mine design has been selected to reduce the subsidence effects. Such subsidence protection zones have been included in both the Yarramalong and Dooralong Valleys as well as the Hue Hue residential area”.

This indicates to the public that they only want to get to the forests yet half of the mine is under 245 properties and road infrastructure. And the subsidence is going to be large and unknown especially now that they have chosen to experiment on chain pillars yielding and second workings of the coal seams as opposed to their original plan of retaining pillars to shore up the valley floors. Experimentation it certainly is.
Some of the subsidence figures from the EIS Appendix H are... 1.75 metre drop for Jilliby Road, 2 metre fall for Little Jilliby Flat, up to 2.3 metres for a home in Beavan's Lane and generally 2.6 metre fall for the forested hills.>2

Yes, so far as Hue Hue Mine Subsidence District is concerned, there was protection established by the then Minister in 1988. We will come to that later. To our knowledge there has not been no protection established over the valley region.

Another example of misinformation was in their brochure of May 2013. I quote:

"The only direct impacts from the Project will occur on suitably zoned land generally owned by W2CP at Buttonderry and Tooheys Road. A ventilation shaft will be constructed after year 10 on a small area of state Forest land."

And then we get other pearls from the Planning department. Their public statement to the media in May 2013 says;

"The mining area is predominantly under Wyong State Forest."

A note on the distribution for the Department’s 2013 Draft Conditions says:

"Please note that the draft conditions are to be kept confidential"...we were always outside waiting to analyse, despite the culture within.

Yet of course we find that the current Conditions applying are also “Draft”.

When the Office of Environment and Heritage in 2013 were dragging their feet especially on the issue of massive damage within side the Jilliby Conservation Area and its effect on various fauna and flora and streams, they said that the longwalls in that area should not form part of this consent as agreed..

"OEH (Office of Environment and Heritage) believes that the location of the unapproved longwalls should not be shown but that the boundary of the area intended for further development should still be indicated".

They were being pushed hard by Howard Reed, Manager of Mining projects at the Department of Planning...he says in his long email to OEH (Office of Environment and Heritage) two weeks later on 18th December 2013 >3
“Planning is unaware of any proposal to amend the nature of the DA in the area of Jilliby SCA (State Conservation Area). If the PAC (Planning and Assessment Commission) does propose any such amendments (however unlikely), then Planning would consult with OEH over their acceptability. (We assume he means acceptable to Planning)

“There are two ways that OEH can progress this matter. Either landowner’s consent from the Minister, or a ‘letter of comfort’, with the matter to be finalised following the PAC’s review”.

“Planning would be pleased if this matter could be progressed by either one of these means prior to Christmas, which will provide a substantial level of comfort to the principals behind WACJV, in particular Kores.”

A month earlier Wallarah 2 Coal Project had been quicker off the mark by writing to the Minister for the Environment Robyn Parker quoting:

“Part of the coal resource that is proposed to be mined by the Project lies beneath the Jilliby SCA. ...Because the underground mining operations will be conducted at a depth in excess of 50m, the Project’s longwall operations do not occur within the Jilliby SCA”.

Anyway W2’s Kenny Barry goes on to say;

“I have taken the indulgence of drafting a template letter of a kind which we need you to sign and forward to your colleague, the Minister for Planning & Infrastructure.”

In all this, Commissioners, I am trying to demonstrate that when the coal mining industry gets together with planning in this state, powerful things happen. More often than not, people, their homes and properties, water resources, streams and natural areas and habitats suffer terminal damage. This collateral damage which happens all over NSW is not factored into the cost/benefit analysis. The communities and the environment can just do for themselves.

The well publicised NSW Aquifer Policy struck by Government soon was gutted by a mass of amendments making the protection of aquifers a secondary thought.
MERIT RIGHTS REVIEW

Legally we have been shut out of the process by the Liberal Government in NSW.

Up until recent times this community had a Right of Appeal process in place wherein we could go to the Land and Environment Court to argue each item within the project EIS. That right was removed from all communities in NSW by the Liberal government.

The Environmental Defenders Office, who do marvellous work for communities in NSW, say in relation to this;

“Recent moves to limit third party (public) merits review...deprive the broader public of the benefits of good decision making in environmental matters and serve to undermine the integrity of the planning system. The consistency, quality and accountability of decision making by merits review undertaken by the Land and Environment Court contrasts with weaker decision-making, poorer outcomes and the inferior processes in public hearings held by the......Planning Assessment Commission.”

MINING THE COAL

John Williams, a principal identity of the former NSW Land and Conservation Department (1999) from his document “Coal Mining and Groundwater Management” says in relation to underground mining;

“Mining the coal resource has potential to result in a number of environmental and social impacts most of which is related to aquifer depressurisation. Groundwater impacts include reversal of flow directions, increased aquifer infiltration, water quality changes, potential impacts on stream baseflow conditions and possibly aquifer collapse due to removal of fluid void pressure”.

From the Mineral Resources Department’s..."Strategic Study of Northern New South Wales Coalfields’ (Nov 1999) we find....
“...mining that is likely to adversely impact upon either the agricultural potential of groundwater integrity to a significant degree, will not be permitted”.

One asks how does this “integrity” fit with the Company’s groundwater assessment. One of the wildest statements from the company’s consultant MER within the EIS says;

“after more than 500 years, water levels in the workings are predicted to have recovered “. That reads like a Jules Verne novel.

PILLARS

As I mentioned earlier...There was a subsidence restriction over the Hue Hue Mine Subsidence Area. In 1988 there was Ministerial policy invoked to directly refer to that area. This is contained in a minute Paper from the CEO of the Mine Subsidence Board in Newcastle, G.J.Cole-Clark in 1995 headed “Policy for Partial Extraction in the Warnervale/Wadalba Area and Hue Hue Mine Subsidence District”. The Ministerial direction says...;

“The Minister directed that only partial extraction take place.” This would be due to the unstable Awaba Tuff sandy claystone existing below.

It then goes on to say that maximum ground strain should be 3mm/metre and max ground tilt of 4mm/m.

The important thing here for the Commission is to verify the currency of that Ministerial direction. It is vitally important to the 140 odd homes in that area that are to be subjected to a fair amount of subsidence, which may not be the case if partial extraction is adhered to. As it stands Stage One of the development, which is the Hue Hue area, is the first to be experimented on with longwall panels and then, as we now know, second workings, which sounds like the removal of the pillars at a later stage.

This is quite critical to the central theme of this application to mine.
YIELDING PILLARS and the concerns of the 2014 PAC

Over all the earlier years including the 10 year BHP Billiton lease ownership (yes this has been going 22 years) the plan was that pillars would remain essentially, we were told, to hold up the valley floors. This was the case right up to at least 2010, as evidenced in the PSM consultancy charts.

I consider that the Chairman of the Commission in 2014, Dr. Shepherd AM, penned a very important and lengthy letter to WACJV seeking clarification and exhibiting substantial concern over the integrity of the ‘yielding pillar’ design, as well as, concerns about water loss, including rejection of

“the subsidence impacts projected for Jilliby Jilliby Creek and Little Jilliby’ Creek (Item 2 Page 4).

Dr. Shepherd states in the letter that..

“..uncertainties associated with use of yielding pillar mine design...may mean that surface deformation is not as predicted (either in extent or timeframe)”.

Dr. Shepherd goes on to say..

“The yielding pillar approach in this mine design has not been attempted in this area previously. The Commission accepts that it is conceptually attractive as a means of achieving a relatively uniform topographical outcome while maximising resource recovery. However the Commission wishes to understand the potential consequences if pillars do not behave as expected in either the short term or long term. Relevant issues include:

“Potential impacts on stream morphology and flow characteristics arising from changes in gradient greater or less than predicted;

“Potential impacts on built infrastructure; and

“Timeframes for reaching surface stability.”

Appendix H of the EIS justifies Pillar Yield quote; >7
...to accommodate the potential soft floor conditions from the Awaba Tuff whereby the chain pillars were designed to yield when isolated in the goaf so as to minimise the risk and impacts of any long term pillar failure).

The same document thus...

"Those soft and weak sections of Awaba Tuff were considered responsible for various unexpected subsidence instabilities...in Newcastle in the mid-1980's and 1990's".

Then also the same consultant, Hanson Bailey in their response to the PAC 2014 (page 39) says;

"If pillar yield does not occur, the impacts on surface features will be similar to or less than the impacts in the Subsidence Predictions and Impacts Assessments (MSEC 2013)"

Page 3 of the same report says...

"The yielding pillar design therefore provides certainty to the operator, MSB, and owners in terms of timeframe from start of the panel until ultimate subsidence effects and impacts are complete".

So clearly we see absolute confusion in all quarters about pillar yield. Nobody really knows what to expect...and amidst this the menacing Awaba Tuff claystone below the Hue Hue Subdivisions...Confusion all at the expense of those living above the mine. The alarm bells must ring for the Planning and Assessment Commission.

The PAC in fact was confused back in 2014..... Page 19 of their report actually says...

"Based on the information of the Proponent, the Commission is now satisfied that the PILLARS WILL YIELD".....yet the following page 40....states;

"...the Commission considers that risks arise from FAILURE OF PILLARS TO YIELD either fully or partially".

**PLEASE NOTE 3 - PAGE REPORT (16)**
DISCONNECT BETWEEN THE PAC 2014 and the DEPARTMENT OF PLANNING AND INFRASTRUCTURE and WALLARAH 2

We see clearly at this point a genuine disconnect between the Commission’s concerns and the DPI exposure of their “Draft Development Consent”.

The DPI, having known the concerns of the Commission as expressed in Dr. Shepherd’s letter to the WACJV for an entire 3 years, do not seem to reflect those critical concerns, particularly about water, stream damage, and the untested yielding pillar design.

At what point does DPI believe that their view of the development overrides that of the Commission, who essentially, will decide to approve or not to approve.

This disconnect is riddled through the Draft Consent highlighted in Schedule 3 under “Mine Workings”.

Firstly, of course, there is no mention of partial extraction (which is described in mining terms as board and pillar construction as apart from longwall) for Hue Hue as required by a previous Ministerial direction.

There is no mention of yielding pillars ...and an amazing Performance Measure for First Workings quoted..

“To remain longterm stable and non-subsiding”.

In fact, a disconnect between the DPI and the Wallarah 2 EIS appears in the Draft Consent document under “Extraction Plan” 6 (d). And it quotes;

“include adequate consideration of mine roof and floor conditions, pillar width to height ratio, final pillar design dimensions and the LONG TERM STABILITY OF Pillars which has been undertaken in consultation with DRE”.

DRE is the Department of Resources and Energy. In other words take all this into account about the value of the resource.
So we go from “yielding pillars” in the EIS, to “long term pillar stability” according to the Draft Consent. No wonder Dr. Shepherd and the Commission are concerned...they must be also utterly confused.

COMMUNITIES

Under Section 3 of Schedule 3 “Privately-owned residences”...Performance Measure reads..

“Serviceability should be maintained wherever practicable”.

Wherever practicable means that DPI says that the company can simply apply that at will, in their own time. Remember this Consent is a legal document.

Further regards to “Public Safety” we are generously afforded under Performance Measures, quote..

“Negligible additional risk”.

In the Draft Consent conditions before us, Commissioners, under Performance Measures – Built Features Section 4 we find the killer blow for those unfortunate enough to suffer subsidence. The edict reads...;

“Any dispute between the Applicant (WACJV) and the owner of any built feature over the interpretation, application or implementation of the performance measures in table 2 is to be settled by the Secretary following consultation with DRE (The resource/value arm of Govt). Any decision by the Secretary shall be final and not subject to further dispute resolution under the consent”. There’s the door!

Who is liable at the end of all this? The Department itself? Kores Resources?, Wyong Area Joint Coal Venture?, Kores Australia P/L or Wyong Coal P/L listed as a $400 company, we assume limited to the value of its assets. The Commission would do well to clarify this for the benefit of the constituents of NSW well before any thought of approval is debated.

In other words the Department of Planning and Infrastructure give this applicant a very wide legal berth. Should this ever get to a Supreme Court or beyond I would like to be a fly on the wall. Are DPI creating a...
legal quagmire, not in fact about community class action challenging mining, which is forbidden under the draconian Mining Act, but about the industry threatening homes and infrastructure, based on their own confused mine design, lack of care and disregard of the final result of their actions?

I wish to finish by mentioning in my written submission...the subject of brine disposal in the Wallarah Creek area where in the EIS Surface Water Impact assessment Section 3.2 they mention the volumes of brine water going into Wallarah Creek and also sediment settles brine water/or mine water to sewer and ultimate disposal to ocean waters. I ask that the Commission please investigate the mechanics of this as well.

Finally, I know that others, including Dr. Whelan will talk on air quality etc that will impact on the Northern Suburbs of Wyong and the 9 storey coal loader, but for the public sake I will also mention a piece from a glossy newsletter prior to 2011 under “Quality Export Market Coal” whereas it is stated that;

“Specific energy largely depends on the percentage of ash in the product coal which ranges from about 14.5% ash for export and greater than 20% for local power station supply”.

Not only does the overseas market get to destroy our living environment here, they also get to leave us with a lot more ash to burn for our own comfort. There is a meeting on this aspect of burning coal..it will be held on the 19th of this month at Wyee Community Hall at 6.30pm. Please come along.

Thank you to the Commission for their due diligence to date and we wish for a just outcome.

Yours faithfully

Michael A. Campbell OAM (for Community Environment Network)
To Robyn Kruk AM

Re Enclosing reference docs re Wyong PAC Hearing 5/4.

Thank you for your invitation to forward ref docs as attached.

To enhance the issue of PILLARS and the problems foreseen, I have unearthed earlier docs from our vast pile from 2007, which, alarmingly, suggests greater subsidence risk. PLEASE REFER TO ITEM 16 in the doc pile.

Thank you once again

Michael Campbell OAM

for the Community Environment Network
The tilts provided in the above table are the maximum predicted values at the completion of any or all proposed longwalls. The curvatures provided in the above table are the maximum predicted values which occur at any time during or after the extraction of the proposed longwalls. The maximum predicted conventional strains, based on applying a factor of 15 to the maximum predicted conventional curvatures, are 4.5 mm/m tensile and compressive.

The groundwater dependent ecosystems are planar features and, therefore, the most relevant distribution of strain is the maximum strains measured along whole monitoring lines from previous longwall mining. The analysis of strains measured along monitoring lines during the mining of previous longwalls in the Newcastle Coalfield is provided in Section 4.3.2.

Non-conventional movements can also occur and have occurred in the NSW Coalfields as a result of, amongst other things, valley upsidence and closure movements and anomalous movements. The analysis of strains provided in Chapter 4 includes those resulting from both conventional and non-conventional anomalous movements.

The potential impacts on the water-related and groundwater dependent ecosystems include surface cracking, changes in surface water drainage and changes in ground water regime.

The surface cracking is expected to be less than that typically observed in the Southern Coalfield, due to the high depth of alluvial deposits above bedrock. Any surface cracking is expected to be very minor and isolated and represent a very small percentage of the mining area.

The potential impacts on the streams, resulting from the extraction of the proposed longwalls, are discussed in Section 5.3 and in the report by GHA (2013). Discussions on the groundwater model and potential impacts on the groundwater regime are provided in the report by Mackie (2013). The potential impacts on the water-related ecosystems within the Study Area are discussed in the report by OzArk (2012a).

5.8. Threatened, Protected Species or Critical Habitats

The greatest potential for impacts on fauna and their habitats will occur where the disturbance of the soils and near surface strate are the greatest. This is more likely to occur where the levels of curvature and ground strain are the highest. The most important changes in the surface relating to subsidence will be changes in the surface water conditions. The potential impacts on fauna and their habitats, resulting from the extraction of the proposed longwalls, are discussed in the report by OzArk (2012a).

5.9. The Local Roads

The locations of the local roads within the Study Area are shown in Drawing No. MSEC515-12. The predictions and impact assessments for roads are provided in the following sections.

5.9.1. Predictions for the Local Roads

A summary of the maximum predicted values of conventional subsidence, tilt and curvatures for the main (i.e. sealed) local roads within the Study Area, resulting from the extraction of the proposed longwalls, is provided in Table 5.7. The predicted profiles of subsidence, tilt and curvature along Jilliby Road, resulting from the extraction of the proposed longwalls, are also illustrated in Fig. E.29, in Appendix E.

<table>
<thead>
<tr>
<th>Location</th>
<th>Maximum Predicted Conventional Subsidence (mm)</th>
<th>Maximum Predicted Conventional Tilt (mm/m)</th>
<th>Maximum Predicted Conventional Hogging Curvature (km²)</th>
<th>Maximum Predicted Conventional Sagging Curvature (km²)</th>
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</thead>
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<tr>
<td>Dickson Road</td>
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<td>7.5</td>
<td>0.09</td>
<td>0.09</td>
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<tr>
<td>Little Jilliby Road</td>
<td>175</td>
<td>1.0</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Parkridge Drive Crestwood Road</td>
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<td>7.0</td>
<td>0.11</td>
<td>0.15</td>
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<tr>
<td>Sandro Street</td>
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Wallarah 2 Coal Project  Environmental Impact Statement: April 2013
As detailed in the Subsidence Prediction Report, a design approach was adopted by WACJV to accommodate the potential soft floor conditions from the Awaba Tuff whereby the chain pillars were designed to yield when isolated in the goaf so as to minimise the risk and impacts of any long-term pillar failure. With this approach pillars are designed to fail and then become confined by goaf material so that any subsequent strength losses due to long-term claystone behaviour would occur as a variation in the residual pillar strength rather than large-scale intact pillar strength losses. The resultant change in subsidence would be largely controlled by the goaf and would be expected to be significantly less than their impacts from long-term failure of intact pillars.

The MSEC IPM model was then calibrated against the results of the SCT numerical model for both the magnitude of subsidence and the shapes of the incremental subsidence profiles at each of these three prediction sites. The calibrated IPM model was then used to predict the subsidence, tilt and strain contours across the Project for all the proposed longwalls, based on the variations in the proposed extracted thicknesses, depths of cover and mining geometry.

After the hybrid approach of predicting subsidence was developed and applied across the Project using the MSEC IPM model, the magnitudes of the predicted mine subsidence movements were noticed to have increased significantly from the initial subsidence predictions. This cautious or conservatively based hybrid study approach now provides predicted subsidence profiles and subsidence parameters at each natural feature and item of infrastructure that are approximately one-and-a-half to two times higher than the magnitude of values that would be predicted using the standard Newcastle Coalfield mine subsidence empirical formula that do not account for the weakening effects of the underlying Awaba Tuff, the deep depths of cover, the lack of massive strata and the relatively thick extracted seam thicknesses. In effect the hybrid approach of predicting subsidence provides a "worst case" scenario and the observed subsidence levels will most likely be less than these cautious or conservatively based predictions.

The outcomes of this hybrid mine subsidence prediction model were then used by the WACJV team to modify and select the appropriate longwall panel widths, interpanel pillar widths and the seam mining heights so that predicted subsidence parameters will be limited to the required pre-determined levels under sensitive surface features. For example, the proposed panel void widths beneath the north-eastern portion of the Hue Hue Mine Subsidence District range from 125 metres to 175 metres and the proposed panel widths beneath the 1 in 100 year flooding zones range from 155 metres to 205 metres, depending on depth of cover. Elsewhere, the proposed longwall panel void widths are 205, 225 or 255 metres to ensure the impacts and consequences of the predicted levels of mine subsidence ground movements on all the natural and built features over these areas were assessed to be manageable and acceptable.

The range of the predicted final subsidence ground movements varies across the Study Area for a number of reasons including the degree of surface constraint and sensitivity that influenced the final mine design. Details of how the WACJV selected the appropriate longwall panel and pillar dimensions and seam thicknesses to be extracted are discussed in the Subsidence Prediction Report (WACJV, 2012).

The maximum predicted total conventional subsidence of 2,600 mm occurs in the western forested hill zones where the seam extraction height and panel widths are greater than those proposed in the floodplain and Hue Hue areas. Similarly, the maximum predicted total conventional tilt of 15 mm/m, the maximum predicted total conventional hogging curvature of 0.28 km⁻¹ and the maximum predicted total conventional sagging curvature of 0.97 km⁻¹ are also predicted to occur in parts of the western forested areas.

After the Subsidence Prediction Report (WACJV) and the Subsidence Impact Report (MSEC) were completed, Hansen Bailey, on behalf of, the WACJV, engaged Prof. Bruce Hebblewhite, Head of School of Mining, University of NSW, to provide an independent peer review of the mine subsidence predictions and impact assessments that were carried out for the Project. Bruce Hebblewhite's report, which is attached to this report as Appendix G, concludes: "I am of the opinion that "best-practice" subsidence prediction techniques have been adopted using innovative hybrid empirical and numerical techniques. These techniques have been rigorously evaluated, and validated as far as possible against available databases. However it will be absolutely essential that some Wollongong site-based validation is carried out once data is collected from subsidence associated with the initial longwall panels to provide an even better level of confidence in the prediction techniques and findings.".

It is also important to note that the conservative modelling undertaken for the Project can be continually updated and revised as the model is validated with observation data that is to be collected throughout the operations. It has been noted that there is always a level of uncertainty associated with any predictive modelling and that the adaptive management approach is an effective tool that can be used to refine, mitigate and manage the long term impacts of mining. Reviews of the hybrid subsidence modelling approach have concluded that it is leading practice, more accurate than alternative techniques and is appropriate for the Project. These reviews recognised the need for the hybrid approach and they identified that the predicted cautious or conservative levels of subsidence will probably be higher than the subsidence values that will be observed.
W2CP EIS now on exhibition

The W2CP Environmental impact Statement (EIS) will be placed on public display from Friday 26 April until 21 June.

This extended display period is twice the normal exhibition period. Interested stakeholders are able to view the EIS at Wyong Council’s main offices as well as at Council’s library and services centres at Tuggerah Mall and Lake Haven Shopping Centre.

The EIS can also be viewed online at www.majorprojects.planning.nsw.gov.au (search for Wallarah 2) or via W2CP’s website at www.wallahar.com.au. Submissions may be made during the exhibition period and can be lodged online at the Department’s website.

More than 30 professional studies on specialist environmental topics have been compiled for the EIS, providing significant new studies in:

+ water management involving revised water treatment proposals & mine water balance
+ subsidence modelling in the western forested hills zone
+ structural geological features & related detailed exploration investigations
+ ecological assessments in the directly affected surface facilities areas, biodiversity offset areas & the valley & western forested hills
+ additional groundwater monitoring & modelling
+ stream characterisation and behaviour

+ noise & air quality (dust) monitoring & modelling
+ economic assessment
+ technical peer reviews on subsidence & groundwater.

In addition to these new studies, dozens of other studies have been updated and revised to address the Director-General’s Requirements for the EIS and reflect recent policy and regulatory initiatives.

The EIS demonstrates that the water supply remains protected, as was confirmed by the independent expert panel of the Planning Assessment Commission, and that noise and dust emissions are stringently managed to maintain residential amenity.

The only direct impacts from the Project will occur on suitably zoned land generally owned by W2CP at Buttonberry and Tooheys Rd. A ventilation shaft will be constructed after Year 10 on a small area of State Forest land.

The new EIS further extends the extensive and stringent assessment of the project. The Chikarovski Inquiry - a strategic assessment into future coal mining in the Wyong LGA was undertaken in 2008 and an independent Water Study and international peer review was completed in 2009.

...read more overleaf
NEW PROPOSAL TABLED FOR WALLARAH 2 COAL MINE

Public comment is being sought on a new proposal for an underground coal mine near Wyong, which will undergo a comprehensive assessment for issues including water and biodiversity impacts.

The Department of Planning and Infrastructure will place the Wallarah 2 coal project's Environmental Impact Statement (EIS) and associated documents on public exhibition. They will remain on public exhibition for an extended period of almost two months, until 21 June 2013.

The applicant, Wyong Areas Coal Joint Venture, proposes to:
- extract up to 5 million tonnes of coal per year for up to 28 years, using underground longwall mining methods;
- construct and operate a range of associated infrastructure, including rail spur, coal stockpiles, ventilation shafts, and a gas drainage and capture system;
- transport of coal from the mine by rail; and
- progressively rehabilitate the site.

The proposed underground mine is around 5 kilometres northwest of Wyong, with surface facilities at Tooneys Road and Hue Hue Road. The mining area is predominantly underneath Wyong State Forest.

Director-General Sam Haddad said the department had required the applicant to thoroughly address a range of key issues, such as the potential impacts of the mine on water resources, biodiversity, heritage, air quality, noise and traffic and transport.

A previous proposal for the Wallarah 2 coal mine was refused in 2011. "While the previous application was refused, the mine company, like any other applicant in NSW, is legally allowed to lodge a new development application and have it considered on its merits," Mr Haddad said.

"The Department's assessment will be very thorough and will closely scrutinise a wide range of issues."

"It is expected that the project will be determined by the independent Planning Assessment Commission (PAC). It will also require approval from the Commonwealth Government.

"I encourage all interested members of the public to review the EIS during the exhibition period.

"I know local residents have already raised a number of concerns, including potential impacts on water resources and biodiversity.

"Now is the chance for local communities to formally have their say on the new proposal.

Public submissions are always a key consideration in the department's assessment and the company will also be required to respond to all the issues raised."

At the conclusion of the public exhibition period, the applicant will need to address all issues raised in the submissions and the proposal will undergo a thorough merit assessment by the department before a recommendation is made to the PAC.

For more information on the project, including where the EIS is being exhibited and how to make a submission, please visit http://majorprojects.planning.nsw.gov.au and search for "Wallarah 2".

The Environmental Impact Statement and other accompanying documents may be viewed on the Department's website (majorprojects.planning.nsw.gov.au), and may also be inspected from Friday 26 April 2013 until Friday 21 June 2013 during business hours at:
- Department of Planning & Infrastructure, Information Centre, 23-33 Bridge Street, Sydney;
- Wyong Shire Council Civic Centre, 2 Hely Street, Wyong;
- Lake Haven Library, Lake Haven Shoping Centre, Gooberabah Avenue;
- Tuggerah Library and Council Services Centre, Westfield Tuggerah, 50 Wyong Road; and
- Nature Conservation Council, Level 2, 5 Wilson Street, Newtown.

Written submissions should be marked "Attention: Director, Mining Projects" and can be:
- made online at www.majorprojects.planning.nsw.gov.au; or
- posted to Major Projects Assessment, Department of Planning & Infrastructure, GPO Box 39, Sydney NSW 2001.

All submissions received will be made public in line with the department's objective to promote an open and transparent planning system.

Before making a submission, please read our privacy statement at www.planning.nsw.gov.au/privacy or call 1300 305 695 to obtain a copy.

NOTE: The Department of Planning and Infrastructure is issuing this media release to encourage the community to take part in the planning process. However, it is the role of the proponent (either through its documents published on our website or otherwise) to provide further specific details about the proposal.

CENTRAL COAST FARMERS ASSOCIATION

AGM
MONDAY May 13th
2013 - 7pm
Mangrove Mountain
Union Church Hall
Corner Blood Tree Rd
and Wisemans Ferry Rd
Members and non-members welcome
Michael Champion

STOP!
Next issue Published
17th May '13
**DEADLINE**
**10th May '13**
Send adverts & copy by email, fax or post.
Phone for enquiries
Figure 2. Conceptual mine plan (after Hansen Bailey, 2011, Fig. 7)

Figure 3. Proposed panel layouts showing extraction heights (after WACJV, 2012, Fig 4.2)
Dear all,

Please find attached a DRAFT set of conditions for the Wallarah 2 Coal Project.

This is a first draft of conditions for your comment, should you wish to do so.

The Department requests any comments be received by the 6th December 2013.

Please note that the draft conditions are to be kept confidential.

Should you have any questions, please contact Clay Preshaw on 9228 6305.

Thanks
Jessie

Jessie Giblett | Planning Officer
Mining Projects | Development Assessment Systems and Approvals
NSW Department of Planning and Infrastructure GPO Box 38 Sydney NSW 2001
T 02 9228 6418 E Jessie.Giblett@planning.nsw.gov.au
Dear Ms Giblett

RE: REVIEW OF THE DRAFT DEVELOPMENT CONSENT FOR THE WALLARAH 2 COAL PROJECT (SSD-4974)

I refer to your email dated 22 November 2013 seeking comment from the Office of Environment and Heritage (OEH) on the draft Development Consent containing the conditions of approval for the Wallarah 2 Coal Project. OEH has reviewed the conditions of approval and provides the following comments in relation to threatened biodiversity, flooding and Aboriginal cultural heritage matters.

Conceptual Mine Plan

Following the discussions between the Department of Planning and Infrastructure (DP&I), the Wyong Areas Joint Venture and as outlined in Schedule 2 (Section 5) of the conditions, OEH understands that mining approval will be for a period of 28 years (i.e. up to 31 March 2041). This does not include undermining the area of Jilliby State Conservation Area (SCA) to the west of LW19N and LW65W (i.e. identified as 'Future Mining Areas' Figure 1). While Wyong Areas Joint Venture may seek a subsequent development application to undertake longwall mining in these western portions underlying Jilliby SCA, OEH request that longwalls not be shown in the 'Future Mining Areas' section of the map as:

(a) there is no certainty that these longwalls will be approved in the future
(b) if longwalls are proposed in the future, their dimensions and location may be different
(c) OEH notes the position taken by DP&I that should mining proceed in the western section, sensitive areas need to be avoided.

Given this position, OEH believes that the location of the unapproved longwalls should not be shown but that the 'boundary' of the area intended for further development should still be indicated.

Schedule 3 – Table 1

Reference is made to Table 1 of Schedule 3, the subsidence performance measures. OEH notes that the performance measure for 'Biodiversity' and 'Heritage sites' is stated as being "Negligible environmental consequences", while the performance measures for 3rd, 4th and 5th order streams states, "Negligible environmental consequences over at least 80 per cent of the stream length subject to vertical subsidence >20mm". Given the threatened biodiversity most at risk from this proposal is found within the watercourses (i.e. Giant Barred Frog, Stuttering Frog and the Lowland Rainforest), it would be impossible to say if the 20 per cent of the stream affected by subsidence does not contain these matters. Therefore, OEH request that the performance criteria for these 3rd, 4th and 5th order streams should also stipulate that there be 'Negligible environmental consequences'.
Howard Reed - Wallarah 2 landowner's consent

From: Howard Reed
To: [redacted]
Date: 18/12/2013 11:42 AM
Subject: Wallarah 2 landowner's consent
CC: Clay Preshaw; David Kitto

Hello Monica,

This email serves to clarify Planning's views regarding the requirement for the WACIV to obtain the consent of the Minister for the Environment, as landowner of the Jilliby SCA, for the WACIV's development application (DA) for the Wallarah 2 Coal Project.

Case law establishes that this consent is required before the DA can be granted over land within the SCA. However, Planning's view is that the earlier landowner's consent can be granted, the better. This is supported by its general requirement for landowner's consents otherwise required to be provided with the DA (ie at the time of lodgement) wherever possible. This is also the general form of construction of the statute (cl. 49 EPAR).

Consequently, Planning's position has always been:
1) to emphasise its view to WACIV that the Minister's consent was in fact required for its proposed activities beneath the SCA (when the company's view had previously been that such consent was not required); and
2) that the earlier WACIV could obtain the Minister's consent, the better.

However, Planning also indicated to OEH some 6 to 8 weeks ago that a "letter of comfort" to WACIV stating that OEH and/or its Minister saw no impediment to the grant of consent would be an appropriate interim position. This was seen as particularly appropriate in order for the Department and WACIV to be able to advise the PAC of the Minister's position regarding the proposed development.

Planning has always indicated that this was an appropriate position.

Even so, Planning is unaware of any proposal to amend the nature of the DA in the area of the Jilliby SCA, either from the WACIV, Planning or OEH. It also seems more than likely that any possible future amendments to the project in this area (whether arising from the PAC or otherwise) would only reduce impacts in the SCA, rather than increase them. If the PAC does propose any such amendments (however unlikely), then Planning would definitely consult with OEH over their acceptability.

Planning's view remains as has been previously and consistently expressed. There are two ways that OEH can progress this matter. Either, landowner's consent from its Minister, or a "letter of comfort", with the matter to be finalised following the PAC's review.

Planning would be pleased if this matter could be progressed by either one of these means prior to Christmas, which will provide a substantial level of comfort to the principals behind the WACIV, in particular Koreans.

Kind regards,

Howard Reed
Manager Mining Projects
Major Project Assessments
Department of Planning & Infrastructure

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5th November 2013

The Hon. Robyn Parker, MP
Minister for Environment and Heritage
Level 32, Governor Macquarie Tower
1 Farrer Place
SYDNEY NSW 2000

Email: office@parker.minister.nsw.gov.au

Dear Ms Parker,

1. Purpose of this letter

I write to you concerning the Wallarah 2 Coal Project State Significant Development Application (SSD 4974) which includes application to mine under sections of the Jilliby State Conservation Area (Jilliby SCA).

In deference to your position as Minister for the Environment and Heritage and pursuant to clause 49 of the EP&A Regulation, I seek written approval from you for the lodgment of the State Significant Development Application for the Wallarah 2 Coal Project (Project).

2. Physical relationship between the Jilliby SCA and the Project

The Jilliby SCA was created on 1 July 2003 by various State Forests being reserved as state conservation area pursuant to sections 4 and 5, and Schedule 1 of the National Park Estate (Reservations) Act 2003.

This reservation of former State forest lands in the Jilliby SCA was subject to the following two restrictions:

- the Jilliby SCA was restricted to the surface of the lands to a depth of 50m only; and

- pursuant to clause 6 in Schedule 5 of the National Parks Estate (Reservations) Act, "access roads" situated within the Jilliby SCA immediately before 1 July 2003 were not reserved as part of the Jilliby SCA and instead were vested in the Minister for an estate in fee simple.

Part of the coal resource that is proposed to be mined by the Project lies beneath the Jilliby SCA. The Project seeks a development consent for an underground mining operation which will extract coal by longwall methods at a depth of between 350m and 690m below land surface. Because the underground mining operations will be conducted at a depth in excess of 50m, the Project's longwall operations do not occur within the Jilliby SCA.
It is also an element of the Project that low impact activities, such as access and subsidence monitoring may be carried out on the surface of the land within the "access roads" which sit within the footprint of the Jilliby SCA but which are excluded from being part of the Jilliby SCA by clause 6 in Schedule 5 of the National Parks Estate (Reservations) Act.

It has been recommended to us by the NSW Department of Planning & Infrastructure (DoPl) that we obtain your written consent to the lodgment of SSD 4974 on the basis that it may be necessary to undertake subsidence monitoring within the Jilliby SCA and to possibly carry out subsidence remediation works within the Jilliby SCA.

Pursuant to the recommendation of the DoPl, we have accordingly decided we should formally seek your written consent to the lodgment of SSD 4974 given that it may be feasible that it is necessary as part of the Project to have access to the surface land of Jilliby SCA for carrying out low impact activities and any subsidence remediation works which may be required by any SSD development consent for the Project.

3. Historical relationship between our activities and the creation of the Jilliby SCA

The Project's proposed longwall layout is located within its current tenements exploration licence (EL) 4911 and Authorisation 405. These mining tenements were granted to the Wyong Areas Coal Joint Venture (WACJV) in 1995.

In the period since 1995, WACJV has undertaken extensive programs of exploration, environmental monitoring, environmental assessment, technical planning and economic analysis of the Project.

The Minister's Second Reading speech on 1 May 2003 in respect of the National Park Estate (Reservations) Bill 2003 made it clear that the intention to transfer certain State forest land to the National Park Estate by the creation of State conservation areas was not intended to detract from the ability to allow for the continuation of timber supplies and the exploitation of the State's mineral reserves. In regard to the latter, the Minister expressly stated:

This Bill revokes the dedication of certain State forests and reserves them as national park, nature reserve, flora reserves and State conservation areas, and declares areas of special management zones on State forests. It is important to firstly draw attention to the new category of State conservation area under the National Parks and Wildlife Act. The Bill creates several new State conservation areas in areas of known or likely mineral potential. In one case, Jilliby State Conservation Area, the reservation is restricted to a depth of 50 metres to facilitate underground coal mining. This new category of reserve was established for the dual purpose: to protect conservation values while permitting mineral and petroleum exploration and production. [Our underlining]

The recognition that underground mining is permitted in the Jilliby SCA is also made clear in the Watagans National Park and Jilliby State Conservation Area Plan of Management (December 2010) adopted pursuant to section 73B of the National Parks
and Wildlife Act 1975 on 10 December 2010. At page 6 of the Plan of Management it is relevantly noted:

Under the Act (section 306), State conservation areas are managed to:
- conserve biodiversity, maintain ecosystems functions, protection natural phenomena and maintain natural landscapes;
- conserve places, objects and features of cultural value;
- provide for the undertaking of uses permitted under other provisions of the NPW Act (including uses permitted under section 479 such as mineral exploration and mining), having regard to the conservation of the natural and cultural values of the State conservation area; 

Further, at pages 52-54 of the Plan of Management:
- it is noted that Kores Australia Pty Ltd on behalf of the WACJV holds EL 4911 and Authority 405 and Mining Lease Application 342 which affect Jilliby SCA;
- the Wallarah 2 Coal Project proposes an area of longwall mining partly under Jilliby SCA; and
- the MOU between NPWS and the then Department of Mineral Resources describes the management and consultative arrangements associated with exploration and mining in SCAs.

4. Economic benefits of the Project

The EIS for the Project indicates that the Project will have the following social and economic benefits:

- during the three year construction period, the Project will employ up to 450 direct construction personnel onsite with a further 590 indirect jobs being generated;

- during the operations phase, the Project will employ approximately 300 full time equivalent personnel with a further 500 indirect jobs being generated;

- during the estimated 28 year operational period, the Project is predicted to provide the following contributions to the NSW economy:
  - $900M in annual direct and indirect output or business turnover;
  - $507M in annual direct and indirect regional value added;
  - $154M in annual direct and indirect household income.
5. Jilliby SCA environmental impact statement summary report

At the suggestion of senior OEH staff, I have commissioned our EIS consultant, Hansen Bailey, to produce a brief document titled Jilliby SCA Environmental Impact Statement Summary Report (October 2013) which gives an overview of the Project and its predicted impacts on the Jilliby SCA. A copy of that Report is attached.

6. Nature of the written consent now sought from you

As stated at the beginning of this letter, WACJV is not seeking your endorsement of the Project at this stage, but merely your written consent to the lodgment of SSD 4974 in order that the Director-General of DoPl can complete his Director-General's Report and the relevant papers may be forwarded to the NSW Planning Assessment Commission (PAC). The PAC as the delegate for the Minister for Planning & Infrastructure has been delegated authority to determine SSD 4974 on its merits.

I have taken the indulgence of drafting a template letter of a kind which we need you to sign and forward to your colleague, the Minister for Planning & Infrastructure. A copy of that draft letter is attached. Consistent with the limited purpose of the letter, it contains a paragraph which states:

This letter constitutes only a consent to the lodgment of the development application and should not be construed as reflecting any view on my part as to whether the subject development application is deserving of a favourable determination.

If you require any further information, please do not hesitate to contact me.

Yours sincerely,

Kenny Barry
Project Manager

Cc
Monica Collins - Director North Branch Regional Operations. Office of Environment & Heritage, Department of Premier & Cabinet.
Merits Review in Planning in NSW

This report demonstrates that merits review is an essential part of the planning system and it is crucial that it continues to be recognised and facilitated in NSW.

In addition, there are clear benefits to allowing third party merits review in relation to major projects in NSW. These benefits relate to improving the consistency, quality and accountability of decision-making in environmental matters. In particular, merits review has facilitated the development of an environmental jurisprudence, enabled better outcomes through conditions, provides scrutiny of decisions and fosters natural justice and fairness. Better environmental and social outcomes and decisions based on ecologically sustainable development is the result.

Merits review has a long history in NSW, being a key element of planning reforms introduced in 1979 to a politicised and overly-complex system in drastic need for reform. The reforms sought to simplify and improve planning in NSW, as well as to depoliticise and take the heat out of decision-making. Fulsome public participation and the establishment of a specialist court – the Land and Environment Court – were key components in this enterprise.

Merits review for developers and third parties in the Land and Environment Court were, in turn, crucial elements in restoring the integrity and legitimacy of planning and decision-making for environmental matters.

Recent moves to limit third party merits review – particularly for resource projects - deprive the broader public of the benefits of good decision-making in environmental matters and serve to undermine the integrity of the planning system. The consistency, quality and accountability of decision-making by merits review undertaken by the Land and Environment Court contrasts with weaker decision-making, poorer outcomes and the inferior processes in public hearings held by the recently established Planning Assessment Commission.

The flow on result is that communities are disempowered and alienated by both the extinguishment of their merits review rights and the weakening of decision-making in environmental matters which, in turn, undermines the integrity of the NSW planning system.

2016 - Download PDF

Read more at our blog by EDO NSW CEO/Principal Solicitor Sue Higginson, The community's right to participate: what happened to merits review?, 7 July 2016.
In relation to subsidence and the potential loss of groundwater and subsequently surface water I refer you to reports by Mr Ray Evans B Sc, Principal Hydrologist, Salient Solutions Aust. P/L and Mr Tim Jones MSC, Principal Hydrogeologist, Northern Geoscience appearing within the report by Mr Ron Sokolowski B Sc, pages 6 and 7 of the Australian Coal Alliance Submission on the Impact of Longwall Coal Mining on the Proclaimed Wyong Water Catchment Valleys. (1)

Further I refer you to the attached statements by John Williams of the former NSW Land and Water Conservation Department (1999) from his document Coal Mining and Groundwater Management (2) including the statement:

"Mining the coal resource has potential to result in a number of environmental and social impacts most of which is related to aquifer depressurisation. Groundwater impacts include reversal of flow directions, increased aquifer infiltration, water quality changes, potential impacts on stream baseflow conditions and possibly aquifer collapse due to removal of fluid void pressure."

It is quite clear that Mr Williams was not the only person in authority inside the relative Government Departments who understood the problems of longwall mining. Please refer to the Mineral Resources Department's own document Strategic Study of Northern New South Wales Coalfields - Executive Summary (Nov 1999) (3) page 10, last paragraph, particularly:

"...mining that is likely to adversely impact upon either the agricultural potential or groundwater integrity to a significant degree, will not be permitted."

Clearly here Mineral Resources at least acknowledges the greater importance of preservation of agriculture and groundwater over mining. This is a revelation in itself so why has the Department persisted with mining proposals over the last 10 or 11 years? The current DPI department have known this is a proclaimed water catchment floodplain and designated rural zoning within the Local Government precinct. Even in these later years as the region's water stores have dwindled to as low as 10% of storage capacity, we have been telling them at the Consultative Committee level that this mining proposal is a disaster, the current Department of Primary Industries and the succession of Ministers remain unmoved.
PLEASE USE THESE FURTHER POINTS TO THE MODEL SUBMISSION FOR WALLARAH 2

SUBMISSIONS MUST BE IN BY 5TH SEPTEMBER

Premier Baird has removed our right to go directly to the Land and Environment Court and argue our case on Merit Appeal. Baird has removed that legal right from every community fighting coal or gas in NSW. Governors are in place to serve the people, not themselves or their own obsolete targets for growth.

Confidential draft conditions circulating through Planning Dept of "second workings" of coal seams meaning further and greater subsidence over time.

Senior Office of Env. And Heritage (OEH) diverted plans to have an air monitor installed at Wyee and placed in an out-of-influence area at Wyong Racecourse thereby distorting air quality readings for the region. Appendix C from the consultants (pages 2 and 3) says

"Fugitive emissions can be expected during operation from loading stockpile to conveyor, wind erosion and maintenance of stockpiles and from upcast ventilation shafts"

5270 cubic metres per year of semi-solid salt waste for at least 14 years into underground storage and capacity and salty brine discharges into the Wallarah Creek system and OEH have grave concerns about the "ultimate fate of the supersaturated salt solution remains unclear"

The consultant's (MER) suggestion that "after more than 500 years, water levels in the workings (in the Jilliby Creek/Wyong creek catchment) are predicted to have recovered (and not be of concern)" reads like a Jules Verne novel.

The Mine Subsidence Board accepts only about a quarter of claims over the last ten years and will fight any great expense claimed by those who suffer subsidence. Also only the house itself is covered, while sheds, fences, pools, etc. are exempt from claims.

Wallarah 2 have failed continually to consult with any of the people directly affected by the proposal. They have failed to hold any open public meeting explaining the project.

Wallarah 2 have failed to bring to the public any concept drawing of the new conveyor system and loading facility near Blue Haven.
Policy for Partial Extraction in the Warnervale/Wadalba Area and Hue Hue Mine Subsidence District

Ministerial policy for the above areas of the Swansea-North Entrance and Hue Hue Mine Subsidence Districts was determined in 1988.

As the desire to develop these areas is increasing, it is appropriate for clarity of guidelines, that the detail of the Ministerial policy is reiterated. Attached for reference are:

(i) A submission from the Department of Mineral Resources and signed by the Manager Coal Resources Administration Branch, Mr A Ramsland, and the Subsidence Engineer, Dr Holla, to the then Minister for Minerals and Energy dated 23rd September 1988. The memorandum makes three recommendations.

(ii) A memo from the Assistant Secretary (Coal), Mr J N Cramtie, and dated 10th October 1988, the then Minister for Minerals and Energy submitting the details contained in Item (i) to the Minister for approval. This memorandum was stamped and approved by the Minister on 31st October 1988.

The important directions are therefore contained in the initial memorandum dated 23rd September 1988 and signed by Mr Ramsland and Dr Holla.

In summary:

(i) The Minister directed that only partial extraction take place.

(ii) Partial extraction only applies to the proclaimed Hue Hue Mine Subsidence District and Precincts 6, 7 and 8 (excluding 6(iii) and 6(iv))
(iii) Partial extraction shall have the definition as proposed in Dr Holla’s report attached as an appendix to the Ministerial Committee report, which will have the following ground movement parameters:

- Maximum ground strain - 3 mm/m
- Maximum ground tilt - 4 mm

These figures are highlighted on Pages 6 and 7 of that report.

Accordingly, surface development in the designated areas should be designed to accommodate subsidence parameters of 3 mm/m strain and 4 mm/m tilt. Should you require any further information regarding this matter, please do not hesitate to contact me.

15th May 1995

Distribution:

District Supervisor Wyong
Subsidence Risk Engineer
Manager Finance and Administration - For information only
Figure 3.2: Proposed Mining Sequence

Area 1: Years 1–10
Area 2: Years 11–20
Area 3: Years 21–30
Area 4: Years 31–40

The proposed mine plan comprises:

- extracted coal height 3 to 4.5m;
- longwall panels 125m to 255m wide by 1415m to 3435m long; and
- solid chain pillars of coal left between longwall panels of 45m to 75m width.
14 April 2014

Mr In-sik Kim
Wyong Areas Coal Joint Venture
PO Box 3039
TUGGERAH NSW 2259

Dear Mr Kim,

Wallarah 2 Coal Project

Following the meeting on 1 April between the Commission and WACJV, the Commission has had the benefit of input from the Public Hearing and has received additional information from other sources. As indicated at the meeting, the Commission has identified a number of concerns that it considers significant. The purpose of this letter is to outline those concerns and give WACJV, as Proponent, an opportunity to address them. The Commission expects that it will receive responses in writing, but is also prepared to meet with the Proponent and any relevant experts on either 28 April or 29 April 2014. Written responses will be received up until COB 2 May 2014.

1. Water Supply
The Commission considers that the most controversial aspect of this project is its potential impact on Central Coast water supplies.

Most of the information available to the Commission regarding water and subsidence is strongly contested. In broad terms the Commission needs to be confident that it has identified: the possible sources of impact; the quantum of impact from each possible source; when each impact might commence; and the likely duration of each impact. At this point the Commission is aware of three possible sources of impact: operational requirements of the mine; subsidence impacts on the alluvial aquifers leading to loss of baseflow to the streams; and (possibly) loss of baseflow to streams as a result of mine-induced groundwater depressurisation. These are discussed further below along with a series of questions in relation to Central Coast water supplies.

Wyong Council and multiple presenters at the Public Hearing raised major concerns about the risk of any loss of water from the Gosford-Wyong Water Supply System (GWWSS). The principal reasons given were the history of severe water restrictions in the Central Coast (in 2007 only 10% supply remaining with doubts about the accessibility of the last 4% of this), the fact that the long-term records show far worse droughts than 2007, and the substantial increases in population forecasts for the area to be supplied by GWWSS (up to 27%).

There are two ‘subsidence-related’ impacts. The first is the impact on the alluvial aquifers and the second is on the deeper aquifers that contribute to mine-water make and the filling of the goaf voids.
Dealing with the first of these, the Department of Planning & Infrastructure’s Preliminary Assessment Report (PAR) states that, as a result of subsidence impacts, 270ML/y will be lost from the Jilliby Jilliby Creek source and 30ML/y from the Central Coast Unregulated Water Source (see p.33). The Department’s PAR does not indicate the likely duration of this subsidence-related impact.

The Proponent contends that the impact of 270ML/y on the Jilliby Jilliby Creek source is the maximum impact and that it occurs in year 10 of mining. It states that in other years the impact will be less, that re-charge of the alluvial aquifer will occur rapidly and implies that there will be no further impact once this occurs. Presumably this can only be correct if there is no connection between the alluvium and the zone of depressurisation caused by extraction of the coal. This is a contested issue and will be discussed further below.

The proposed solution in the PAR to this water loss is the purchase by the Proponent of water licences (‘probably for irrigation or some other farming purpose’) and NOW is stated to have confirmed that sufficient transferable licences exist to cover the deficit. However, Wyong Council and many other submitters have asserted that the purchase of licences as a solution fails to address three issues:

(i) the subsidence-induced loss is not controllable (i.e. it can’t be turned off);
(ii) some of the licences available for purchase will not have been in use (i.e. ‘non-active’) and therefore there will be a loss in real terms from the system; and
(iii) that in dry times there is insufficient water in the system to meet the needs of the existing population (i.e. water restrictions come into force).

The Proponent’s response on the water loss\(^1\) can be summarised as:

(i) the Water Sharing Plans (WSP) are designed to ensure that all licensed users can take their maximum allowance and still maintain ecosystem health (but far less definitive phrases are also used, i.e. ‘satisfy basic landholder rights’, ‘generally consistent with extraction limits’, etc.\(^2\));
(ii) that the distinction between active and non-active licences is immaterial and that it would in fact be detrimental to remove active licences from the system;
(iii) a long-term extraction limit of 36,750ML/y applies to the GWWSS and the availability of water for town supply is therefore governed by the WSP, not the quantity of water in the dams; and
(iv) the subsidence impact on water flow in Jilliby Jilliby Creek would be temporary with the exception of some small areas where flow would be redirected.

At this stage of the review the Commission is not convinced that the purchase of water licences will offset the impacts of the mine on water supply under drought conditions.

The second issue is the deeper groundwater impact associated with voids in the goaf, at least some of which manifests itself as mine-water make (i.e. water predicted to be pumped from the mine daily). This amounts to 2.5ML/d plus possibly another 0.5ML/d from the fractured zone.

The Department’s PAR at p.25 suggests that there would be no direct connection (i.e. no connective cracking) between the surface and the mine and that any indirect connection would not be significant ‘in terms of overall drawdown, groundwater inflow and (most importantly) surface water

\(^1\) Response from Hansen Bailey to DP&I Issues, dated 18 March 2014. This arose from the Commission seeking further information from the Department on a number of issues arising from the Commission’s initial review of the Department’s Preliminary Assessment Report.

\(^2\) Emphasis added
resources’. This is a strongly contested issue. At the public hearing on 2 April 2014 Professor Pells\(^3\) made the following points:

(i) the predicted 2.5ML/d inflow to the mine includes 0.04ML/d from the hard rock aquifer, but the source for the rest of the 2.5ML/d is unstated. It must come from somewhere and that ‘somewhere’ must be in equilibrium with natural recharge and therefore must ultimately affect river flow;

(ii) there will be substantial changes in the groundwater regimes caused by the post-mining zone of depressurisation with substantial drops in bore levels. These changes to groundwater will cause a decrease in base flow to Jilliby Jilliby Creek;

(iii) flows in Jilliby Jilliby Creek vary substantially with seasonal conditions. In dry times the flows are consistently below 1ML/d for long periods and for the time since 1972 the flows for 20% of the time have been below 0.74ML/d.

In relation to potential impacts from the zone of depressurisation there are three issues for the Commission:

- whether there is, in fact, a connection between baseflow to Jilliby Jilliby Creek and the zone of depressurisation;
- what the quantum of that impact might be; and
- when the impact might occur and its duration.

The mine will have a variable operational water requirement (approximately 20ML/y average). The Commission understands that this will be drawn directly from the catchment rather than from the GWWSS. Presumably the Proponent has a water licence for the amount under the WSP.

The Commission has directed a number of questions to other parties concerning the above material. The Commission is also prepared to receive input from the Proponent on any aspect of this material. However, responses to the following specific questions would be appreciated:

1. If the duration of impact on baseflow to the streams depends in part on the effective sealing of fractures beneath the alluvium, what robust evidence does the Proponent have that would convince the Commission that there would not be a continuing impact?

2. In the context of the possible impacts of the zone of depressurisation on groundwater, can the Proponent indicate whether it accepts the drawdown figures indicated on Professor Pell’s diagrams showing hypothetical bores at year 0 and year 20 of mining? If not, why not?

3. Does the Proponent accept that there will be an impact of the zone of depressurisation of the mine on the baseflow to the streams supplying the GWWSS (a) during mining or (b) at any time in the future? If the answer to either (a) or (b) is positive, can the Proponent please provide details of the likely impact and when it might occur?

4. In relation to the operational requirement of 20ML/y, does the Proponent consider that it will be able to draw this water under licence from the catchment under severe drought conditions? If not, how does the Proponent propose to access water for the project under these conditions?

The Commission is inclined at this stage to recommend a nil impact on the water available to GWWSS as a condition of consent. This will involve consideration of all the issues discussed above. It will also involve consideration of possible mechanisms to augment the supply at the Proponent’s cost consistent with any impacts it cannot avoid.

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\(^3\) Professor Pells was the Wyong Shire Council expert on water issues. The presentation at the public hearing was as a representative of the Australian Coal Alliance. The relevant slides from his presentation are included as Annexure 1.
The only possible solution to the risk of impacts on supply that the Commission can identify at this stage is to have the Proponent treat the mine water to an acceptable standard for return to the catchment rather than the currently proposed discharge of treated water to Wallarah Creek. The water for discharge to Wallarah Creek will be processed through a Reverse Osmosis plant and will already be required to meet the water quality guidelines applicable to that creek. Conceptually it should be possible to increase the level of treatment to meet any further requirements of raw water supply. Theoretically there should be 2.5ML/d available if required (i.e. more than enough to offset the predicted losses to GWSS). The options would be to discharge the treated water to the impacted stream(s) or to discharge the water in close proximity to the weir. Does the Proponent have any views as to whether the return of treated water to the catchment would be feasible and whether either of the discharge options suggested could work? If not, what other options could be pursued?

2. **Impacts on Jilliby Jilliby Creek and Little Jilliby Jilliby Creek**

The Department's Preliminary Assessment Report suggests that the subsidence impacts on these steams will be limited to 'negligible' impacts over 80% of the stream length and 'minor' over 20%. This is unenforceable and, although it has been used in some previous approvals, cannot be supported by the Commission in this case.

The Commission considers that applying a single classification of 'negligible impact' to the whole stream length would not be consistent with the predictions and compliance could not be achieved. However, the Commission is not prepared to relax the performance measure to 'minor impact' over the whole stream either, since this would allow an unacceptable level of impact without the need for action by the Proponent to prevent or repair avoidable damage.

What is required is a performance measure (or measures) that require the predictions not to be exceeded at all points along the streams and then require the Proponent to prevent adverse consequences (i.e. headcuts, bank erosion, etc.) in the areas of risk. In this context the Commission notes that changes in gradient as individual longwalls impact the stream will be much greater than the average change in gradient along the stream once subsidence stabilises.

For water quality Impacts, the Commission considers that, given the highly variable nature of flows in the streams and the other non-mine related influences on water quality, a system of assessing mine-related impacts will need to be developed including contemporaneous sampling above and below areas of current mining impact.

The Commission is prepared to consider further submissions from the Proponent on these issues. The Commission recognises that with the mine progressing up-catchment, project-specific solutions may be achievable.

3. **Flooding**

The Commission has four concerns:

(i) that uncertainties associated with use of a yielding pillar mine design in the Project Area geology may mean that surface deformation is not as predicted (either in extent or timeframe). What flood studies have been done that incorporate potential variations in surface topography resulting from possible variations in pillar behaviour? What are the potential consequences compared to those predicted?

(ii) While compensation, modifications, etc., are proposed for potential impacts on existing residences, etc., what is proposed for situations where there is increased risk of flooding on land that would have been suitable for development (e.g. subdivision)? How many properties are in this category (details please)?
(iii) What proposals exist for assessment and compensation for impacts on enterprises such as the turf farm? In this context the Commission notes that impacts may be direct (i.e. loss of production) or indirect (e.g. loss of markets due to failure to supply).

(iv) The Commission notes that there are some 15 roads and bridges that are predicted to have an increased risk of flooding from the project. Has the potential impact on emergency vehicle access been considered and, if so, can the Proponent supply details?

4. Subsidence

The Commission has a number of residual concerns:

(i) The yielding pillar approach in this mine design has not been attempted in this area previously. The Commission accepts that it is conceptually attractive as a means of achieving a relatively uniform topographical outcome while maximising resource recovery. However, the Commission wishes to understand the potential consequences if pillars do not behave as expected in either the short or long term. Relevant issues include:

- Potential impacts on stream morphology and flow characteristics arising from changes in gradient greater or less than those predicted;
- Potential impacts on built infrastructure; and
- Timeframes for reaching surface stability.

(ii) The expected period from initial impact on a feature or built infrastructure to final stability may be affected by the yielding pillar design. Can the Proponent provide estimates of this period of impact for the proposed mining method including the upper bounds.

(iii) Buttonderry WMF. Council has advised this is valued at $1.3bn and will be very difficult to repair/remediate if it is impacted by subsidence. The Commission considers that a nil/negligible impact performance measure may be appropriate combined with a pre-mining dilapidation report and appropriate monitoring thereafter. Does the Proponent wish to comment on this?

The Commission's report is due mid-May so written responses would be needed by 2 May 2014. Please call Mrs Paula Poon on (02) 9383 2101, if you have any questions in relation to this request.

Yours sincerely,

[Signature]

Dr Nell Shepherd AM
Chair, Wallarah 2 Coal Project Review
1.1. Introduction to the Project

Wyong Areas Coal Joint Venture (WACJV), seeks a Development Consent from the Department of Planning and Infrastructure (DP&I) under Division 4.1 in Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the development of the Wallarah 2 Coal Project (the Project), including the development of an underground mine to extract coal using longwall mining techniques.

The Project was initiated following a 1995 tender to the then Department of Mineral Resources for a new coal development north-west of Wyong. Exploration Licence 4911 was granted to the WACJV with conditions that subsidence would not be permitted east of the F3 Freeway nor under the Warnervale Airport. These conditions, including an expectation that coal mined from the WACJV areas would not be transported on public roads, appeared to be a tightening of those arising out of the Clough-Smith Report (1988).

A detailed description of the Project is provided in the Wallarah 2 Coal Project Environmental Impact Statement (Wallarah2 EIS) prepared by Hansen Bailey Environmental Consultants (Hansen Bailey). The extents of the proposed mine plan (Extraction Area) and the extents of the predicted mine subsidence (Study Area) are shown in Drawing No. MSEC615-01, which together with all other drawings is included in Appendix F of this report. Information regarding the key features of the Project is included in the Wallarah2 EIS.

Forty-six (46) longwalls are planned to be extracted within the entire Extraction Area, which is located to the north-west of Wyong and to the west of the F3 Freeway. Geological information is provided in the Wallarah2 Coal Project Geology Report (WACJV 2013) (Geology Report). Over half of the mineable coal resource lies beneath the Wyong State Forest and surrounding ranges, whilst the remainder lies beneath the Dooralong Valley, the Hue Hue area, and to a much lesser extent, the Yarramalong Valley.

All of the Study Area is covered by declared Mine Subsidence Districts. The Hue Hue Mine Subsidence District was proclaimed in 1985 and the Wyong Mine Subsidence District was proclaimed in 1997. Parts of the initial seven longwalls of the Project are located under the Hue Hue Mine Subsidence District, which requires that mining induced ground movements be limited to maximum ground strains of 3 mm/m, and maximum ground tilts of 4 mm/m. The Wyong Mine Subsidence District, which extends over rest of the Extraction Area was proclaimed in recognition of the significant resource underlying the Wyong State Forest, the Dooralong Valley and the Yarramalong Valley and requires that structures are designed to withstand tilt and strain predictions that are generally set to be consistent with the extraction of longwall blocks up to 255 metres wide and working heights of up to 4.5 metres.

The longwalls are planned to be extracted with relatively narrow panel void widths varying from 125 metres to 255 metres and with chain pillar widths ranging from 45 metres to 75 metres. The depths of cover above the Extraction Area range from 345 metres, over the longwalls in the north-eastern area of the Project, to 880 metres, below some steep-sided hills separating the Yarramalong and Dooralong valleys over the longwalls in the south-western area of the Project.

As detailed in the Geology Report, the available seam thicknesses for the coal seams Wallarah and Great Northern Seams within the proposed longwall panels range from 4.2 metres to 6.8 metres. Under this coal seam lies the Warnervale Conglomerate and the Awaba Tuff and both units are banded with limestones that have extremely variable properties, ranging from very soft and weak to hard and competent.

Although these two named units indicate completely different rock types, the WACJV geologists advise that within each of these two named strata units, there are varying limestones of shale, sandstone and tuff. That is, the Awaba Tuff is not comprised entirely of tuffaceous layers, as there are sandstone and conglomerate layers within the Awaba Tuff and, whilst the Warnervale Conglomerate includes a high proportion of conglomerate, there are tuffaceous layers within this Warnervale Conglomerate. These soft and weak sections of the Awaba Tuff were considered responsible for various unexpected subsidence instabilities that affected lake shores in the southern Newcastle area in the mid-1980s and early-1990s. The difficulty for the Project is that even small layers of tuff and, in particular montmorillonite clays, beneath the chain pillars can reduce the load bearing capacity of the roof-pillar-floor system and the WACJV team has allowed for the possible effects of these tuffaceous layers in its mine design.

1.2. Background on Mine Subsidence Prediction Studies

The initial mine subsidence predictions for the Project were requested by the WACJV team in 1999 and preliminary subsidence, tilt and strain predictions were prepared by Waddington Kay & Associates, now Mine Subsidence Engineering Consultants, (MSEC), using a standard version of the Incremental Profile Method (IPM) without calibrations to suite the local site geological conditions.
As shown in Figure 1, some of the areas that are predicted to become flood prone are within the designated flood planning area. Under existing conditions, development in these areas can only be carried out if the conditions in clause 7.2 of the Wyong LEP are satisfied. The same conditions will need to be satisfied after subsidence has occurred. Therefore, the Project will not affect the ability to develop on this land.

However, there is also land outside the designated flood planning area that is predicted to become flood prone. There are multiple properties containing land that is predicted to become flood prone. However, the increase in the flood extent only accounts for a small portion of most of these properties. Accordingly, the Project is unlikely to preclude development on these properties.

There are only two privately owned properties where the increase flood extent accounts for a significant portion of the property area. These are located on low sloping land near the confluence of Jilliby Jilliby Creek and Little Jilliby Jilliby Creek. The Project may affect the potential for future development on these properties. However, both these properties contain existing dwellings. As such, it is less likely that the owners would have intentions of constructing further structures on these properties.

1.2 PILLAR YIELD

1.2.1 Issue

Residents within the Subsidence Impact Limit would be interested in understanding the timeframe for repair of their properties, if any damage arises. What is the Mine Subsidence Board’s (MSB) policy for repair of damage to buildings?

What effect do the yielding pillars have on the time for subsidence movements to fully occur? This would affect the timeframe for the repair of damaged dwellings.

1.2.2 Response

The yielding pillar concept incorporated into the mine plan has been specifically designed to ensure that collapse of the goaf following longwall retreat occurs in a controlled and timely manner. Yielding pillars ensure that following completion of subsequent longwall panels, the final and ultimate extent of subsidence is complete, with no uncertainty associated with possible goaf “hang-up” (i.e. unpredictable delay in goaf collapse) and unexpected events occurring at unknown timeframes into the future.

The yielding pillar design therefore provides certainty to the operator, MSB and property owners in terms of the timeframe from the start of a panel until ultimate subsidence effects and impacts are complete. This certainty also supports a timely and well defined regime for pre-mining surveys (in consultation with individual owners), coincident inspections during mining and the repair of subsidence related impacts to structures.
WALLARAH NO. 2 COAL PROJECT

sustaining energy
for the future

Reference Document for Submission to
Independent Expert Panel
Strategic Inquiry into Potential Coal Mining in Wyong LGA
AUGUST 2007

PLEASE REFER TO "GREATER" SUBSIDENCE INDICATORS Whilst RETAINING 'CHAIN PILLARS'. "YIELDING PILLARS" INDICATE CATASTROPHIC RESULTS
7.1.2 Subsidence Mechanisms

As longwall coal mining takes place, the roof immediately above the seam is allowed to collapse into the void that is left as the face retreats. This void is referred to as the goaf. Miners working along the coalface, operating the machinery, are shielded from the collapsing strata by the canopy of the hydraulic roof supports. As the roof collapses into the goaf behind the roof supports, the fracturing, settlement and sagging of the overlying rocks progresses upward toward the surface to form surface subsidence.

The subsidence of the surface is considerably less than the thickness of coal removed, due to the bulking effect of the collapsed strata. The extent of the settlement at the surface is therefore dependent upon the strength and nature of the rocks overlying the coal seam.

When a panel has a width that is small, relative to the depth of the seam below the surface, the overlying rocks have a tendency to bridge across the goaf by arching between the solid abutments on each side of the panel, thus reducing the amount of subsidence.

As the panel width is increased, however, the overlying rocks are less able to maintain a self-supporting arch across the goaf and a limiting panel width is reached where no support is available and maximum subsidence will occur. This limiting panel width is referred to as the critical width and is usually taken to be approximately 1.4 times the depth of cover.

Where several panels are mined in a series and chain pillars are left between the panels, the maximum subsidence will not occur unless each panel is at least of critical width. The chain pillars may crush or distort as the adjacent panels are extracted, but they do not totally collapse and can therefore provide a considerable amount of support to the overlying strata, thereby reducing the surface subsidence.

Where large super-critical areas are extracted, the maximum possible subsidence is typically 55% to 65% of the extracted seam thickness, but, because chain pillars are normally left in place, and provide some support, this maximum possible subsidence is rarely reached.

Where the width to depth ratios of the panels in a series are sub-critical, which is normally the case in the Southern Coalfield, the amount of subsidence in each panel is also determined by the extent of interaction between panels, which are further influenced by the widths of the chain pillars. In this situation, the first panel in a series will generally exhibit the least subsidence and the second and subsequent panels will exhibit greater subsidence due to disturbance of the strata caused by mining the preceding panels and consequential redistribution of stresses within the strata.

The subsidence at the surface does not occur suddenly but develops progressively as the coal is extracted within the area of influence of the extracted panel.

Consequently when extraction of coal from a panel is commenced, there is no immediate surface subsidence, but as the coal within the panel is extracted and the resulting void increases in size, subsidence develops gradually above the goaf area. As mining continues, a point is reached within the panel where a maximum value of subsidence occurs and despite further extraction of the particular panel this level of subsidence is not increased.

As further adjacent panels are extracted, additional subsidence may occur, above the previously mined panel or panels. However, a point is also reached where a maximum value of subsidence is observed over the series of panels irrespective of whether more panels are later extracted.
to derive incremental tilts, systematic curvatures and systematic strains which could be added to show the values of each parameter as a series of longwalls are mined. Profiles could also be predicted in both the transverse and longitudinal directions, thus allowing the subsidence tilts, systematic curvatures and systematic strains to be predicted at any point on the surface above the mine area. As with previous methods however, the IPM is still requires empirical data from a given area, to adequately reflect the local behaviour of the strata, in the predictions that it provides.

Empirical methods can therefore provide quite accurate and detailed subsidence predictions for a region provided they are underpinned with sufficient observational data to reflect subsidence behaviour in that mining environment. It should be noted however that the larger the area from which the observational data is drawn, the greater the amount of scatter it will contain, and the greater will be the error band associated with the resultant prediction curves.

7.1.6 Integrated Subsidence Prediction Approach for the Wyong LGA

Although well documented empirical relationships between mining and surface subsidence exist for the northern areas of the Wyong LGA where underground coal mines have operated for many decades, no such data exists for the central and southern areas of the LGA where the depth of mining will much greater, and the geology is significantly different.

Proposed mining in these areas involves the mining of longwall blocks in the Newcastle Coalfield, but at depths similar to those experienced in the Southern Coalfield. Since no empirical subsidence data is available that reflects the behaviour of the Newcastle Coalfield strata to longwall extraction at these depths, some of the initial IPM predictions were based on the Newcastle Coalfield subsidence prediction curves, whilst others were undertaken using the Southern Coalfields subsidence prediction curves.

Upon review however it was considered that the use of these empirical data might not be fully representative of the geological response to mining in the Wyong area, and that the predictions may not be realistic.

In February 2003, Strata Control Technology Pty Ltd was engaged to undertake numerical modelling to assess the differences, if any, which may have resulted from Waddington Kay's use of empirical data from the Southern Coalfield to predict subsidence in the Newcastle Coalfield. This modelling suggested that surface subsidence above the then proposed mining layouts under the valley area should be significantly greater than that based on the initial empirical predictions.

The disparity in the amount of subsidence predicted from empirical and numerical modelling led to a series of detailed discussions involving MSEC and SCT aimed at firstly, understanding why these differences should exist, and secondly developing a methodology with an improved predictive capability.

The fundamental conclusions from that review were:

- surface subsidence is heavily dependent on the geological and geotechnical characteristics of the mining area, as well as the depth and geometry of the workings;
- it is the complex interaction of chain pillar and rock mass behaviour that dictates the surface response;
- it is the strength of the roof-pillar-floor system, rather than simply pillar width, that is the controlling factor in pillar stability;
the IPM remains the most advanced empirical method for predicting the likely subsidence across a proposed layout provided it is based on comparative data from that geological environment;

the IPM utilises the surveyed response of the surface to mining regardless of the caving mechanisms and rock mass behaviour that contribute to that subsidence;

the numerical model has the capability to predict the chain pillar and rock mass behaviour;

numerical modelling is unsuited to the generation of subsidence predictions across an entire mine area, however it can provide a basis for the development and calibration of empirical curves that can then be used in the IPM for broader scale predictions; and

the development and use of an empirical model, based on numerical modelling results, would provide the most robust predictive approach for the project in the absence of a history of subsidence behaviour in these geological conditions.

As a result of the critical review of the subsidence predictions initially prepared for the WACJV, a revised approach was formulated by the W2CP team, to develop a mechanistically modified empirical model that would reflect the site-specific rock mass behaviour in satisfactorily predicting the surface subsidence associated with the extraction of Southern Coalfield geometries within a Newcastle Coalfield geological environment. This involved the use of numerical models to simulate the behaviour of particular geological sequences during mining, thereby enabling the development of prediction curves for eventual empirical modelling which would generate more realistic subsidence predictions.

The development of this revised methodology involved a series of key stages:

- Validation, by back analysis, of numerical model’s capacity to satisfactorily reflect the affect of panel geometry and caving behaviour on subsidence development;
- Characterisation of the input data for the W2CP model;
- Formulation of assumptions for the W2CP model;
- Modelling of the ‘Hue Hue case’ and the ‘Valley case’;
- Development of the prediction curves for the W2CP area;
- Subsidence predictions; and
- Incorporation of these predictions of both surface subsidence and rock mass behaviour into the flood studies and detailed hydrological investigations.

To achieve these outcomes WACJV engaged the industry’s leading experts and scientists to provide the solutions necessary to develop this aspect of the project.

It was concluded from the numerical modelling that the incremental subsidence profiles that are likely to result from longwall extraction in the W2CP area will be very similar in shape to those of the Southern Coalfield though greater in magnitude. This is due to the lack of massive units in the study area compared to the rest of the Newcastle Coalfield, combined with the occurrence of a relatively weaker roof-pillar-floor system compared to that of the Southern Coalfield.

This outcome enabled the W2CP team to then engage in an iterative process of layout design to define the optimum balance between panel width, chain pillar size, and extraction height to provide surface subsidence control within the proposed mine area.
The partially yielded pillars case (Figure 18) shows only minor and gradual changes in surface gradient.

Subsidence behaviour is analogous to a beam supported on springs where bending of the beam represents the sagging component and compression of the springs represents the pillar compression component. Non-yielding chain pillars would be analogous to stiffer springs, which reduce the vertical movement along the full length of the beam.

The potential for impacts on natural and built features on the surface are typically governed by the differential movements (i.e. tilt, curvature and strain) rather than the absolute movements (i.e. vertical subsidence). These differential movements are governed by the variations in the subsidence profile across the subsidence bowl, which for subcritical longwall panels, are governed by the sagging component. The potential for increased ponding along the streams is dependent on the absolute vertical subsidence, which is reduced if the pillars do not yield. Hence, the potential impacts on the natural and built features at the surface would not increase as a result of the chain pillars not yielding.

If pillar yield does not occur, the impacts on surface features will be similar to or less than the impacts presented in the Subsidence Predictions and Impact Assessments (MSEC, 2013) including the potential impacts on stream morphology and flow characteristics, and all types of built infrastructure.

The timeframes for the development of subsidence for the non-yielding chain pillar case are similar to those for the yielding pillar case (discussed in Section 5.4).

Experience in deep coal mining, as proposed by the Project, indicates that the likely occurrence of random, non-yielding of pillars is very low. It would be analogous to removing all but one or two piers from beneath a building and expecting those piers not to crush. If random non-yielding were to occur, then the worst case scenario would be the generation of tilts and strains lower than those that would occur at a final longwall goaf edge adjacent to an unmined area. For the Project, the maximum tilts and strains predicted at the boundary of mined and unmined areas are predicted to be 15 mm/m and 4 mm/m respectively. While it could be expected that a structure subjected to these movements would remain “safe, serviceable and repairable”, it would probably fall into Repair Category R3 (Substantial Repair) or R4 (Extensive Repair), as defined in the Subsidence Predictions and Impact Assessments. This categorisation is mainly due to the likely need for the structure to be re-levelled. All repairs would be undertaken by the MSB.
5.3 IMPACTS ON STREAM MORPHOLOGY

Modelling results and past experience indicate that chain pillars will yield to achieve a relatively uniform topographical outcome across the mined area at the end of mining. A chain pillar which has not yielded as expected, would produce a more locally undulating ground surface than expected (as there will be less subsidence above the un-yielded pillar location). Stream morphology impacts of an un-yielded pillar would depend on the location, however expected impacts can be generalised as follows:

- Initially, the un-yielded pillar would cause a decrease in bed slope upstream of its location. There will also be a localised increase in bed slope downstream of the chain pillar. This process is similar to the natural development of a pool and riffle sequence of a stream (see Figure 19). The change in bed slope and the development of a pool and riffle sequence is expected to be indistinguishable from the existing natural pool and riffle sequence.
- For low flows, stream velocities upstream of the non-yielded zone will decrease, forming a pool and potentially a deposition zone. Downstream of the non-yielded zone, stream velocities will locally increase. In locations where the bed is well armoured, it will form a riffle. If it is not armoured, the increased bed slope may cause headward erosion, which will eventually erode the localised undulation caused by the non-yielded pillar.
- For medium and high flows, the change in hydraulic gradient is not significant, as shown in, therefore no significant change in bed and channel erosion is expected.
Details of the site water management strategy are provided below. Further information on proposed mine site storages, including indicative storage sizes and pumping rules are provided in Section 5.

3.2 WATER MANAGEMENT STRATEGY

The proposed water management strategy is based on treatment of mine water for use on site, with releases of treated water to Wallarah Creek as required. Mine water would be treated using a combined reverse osmosis (RO) plant with a capacity of up to 3 ML/day (including backwash recycle). The net capacity (WTP mine water inflow less total backflush volumes) is 2.7 ML/d. At certain times during the operational phase of the Project, a brine water treatment plant will be utilised to produce a partly dried mixed salt solid waste product for disposal underground. It is likely that use of the brine treatment plant will be implemented during the initial years of the Project and continue until at least the end of Project year 14 in parallel with the completion of LW11N. In this period, a salt waste stream from a full brine treatment plant would be transported underground for permanent disposal in a dedicated two-heading development sump at a rate of about 0.76% by volume of waste treatment plant gross input. The period after Year 14 will involve a simplified brine treatment whereby a concentrated brine waste stream would be pumped directly to underground voids for disposal at a rate of about 2.4% of water treatment plant gross input.

This water management strategy outlining brine and salt underground disposal options represents a worst case scenario for assessment purposes in this Water Impact Statement. It provides stakeholders and approval authorities with certainty that the Project will be able to sustainably cater for environmentally sound water management and underground disposal of relevant waste streams.

WACJV is committed to finalising the detailed water management strategy in cooperation with key stakeholders including Wyong Council, the Central Coast Water Authority, NSW Office of Environment and Heritage, NSW Environment Protection Authority and NSW Office of Water.

The final water management strategy may (subject to agreements and relevant approvals) involve mine dewatering and water treatment (mainly to provide sufficient recycled water for underground mining purposes) and to enable a combination of:

- Discharge of suitably treated water to Wallarah Creek under terms of an Environmental Protection Licence, and
- Providing trade waste effluent of sediment settled brine and/or mine water to sewer for ultimate disposal to ocean waters.

WACJV may also be able to be a potential provider of treated clean water for beneficial industrial and non-potable purposes to local authorities and businesses. The final water management strategy would be dependent on agreements and further approvals by external parties.

3.3 WATER TREATMENT INFRASTRUCTURE

3.3.1 Overview

To assist with water (and salt) management for the W2CP, a site specifically designed combined RO and brine water treatment plant with a capacity of up to 3 ML/day (or 2.7 ML/d net) will be installed. The WTP enables production of treated water for beneficial use and/or environmental release. As the raw water extracted from the Mine Operations Dam is a blend of mine-site
Jobs in Coal Mining
Professions and Trades

Many of the professions and almost all of the trades are engaged in the coal mining industry and most of these will be employed at the Wyong Project. Professions and skills required include:

- Business Administration
- Commerce
- Computing and Information Systems
- Economics
- Engineering - Chemical, Civil, Electrical, Mechanical, Mining
- Environmental Science
- Finance
- Geology
- Human Resource Management
- Industrial Relations
- Law
- Marketing
- Metallurgy
- Occupational Health and Safety
- Public Affairs
- Technical Trades and Technicians

In the trades sector electrical, mechanical and environmental skills are needed.

The majority of employees will be miners including those with specialist skills certificates.

The majority of employees in established coal mines prefer to live in the local community and COAL will develop procedures to encourage local residents to apply for the range of positions that will be available in this mine.

A typical longwall underground operation employs between 200 and 300 people and this usually generates a further 900 jobs. Those jobs are created in areas such as machinery manufacture and maintenance, transport, construction, science and technology, education and training, computer equipment, industrial equipment, laboratory analysis, communications equipment, finance, insurance, legal and administration, clerical and materials services.

Education and training needs for the Project are important given the diverse range of occupations required.

It should not be forgotten that jobs are also created and maintained in the public sector where government and local government personnel are required to monitor and manage projects.

It is worth noting that the Department of Primary Industries and Energy reports that 427,000 jobs in the manufacturing industry in Australia are based on minerals and energy inputs.

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The Search for Information

The process of developing a mine plan that can be considered for approval involves research in many of the economic, social and physical components of the area.

Environmentalists, geologists, engineers and many other professionals have been involved. While so much of this work is technical, some is as simple as sight checking that properties are correctly identified in records and that buildings are located where records show them to be.

This will ensure that all possible information is utilised for the assessment process.