Agenda

Project Description

Proponent and Project Economics and Justification

Advantages over previous Coalpac Proposals

Project Considerations

• Conservation Values

• Rehabilitation

• Biodiversity Assessment

• Groundwater and Surface water

• Traffic and Social/Amenity Impacts
Southern Extension Project

- Much smaller mining area than previously proposed
- Open cut mining only
- Irondale, Lidsdale and Lithgow Seams
- Approximately 2.7Mt ROM coal
- Approximately 288kt Nut Coal remaining in Lithgow Seam. Potentially additional 300kt nut coal resources in Irondale seams
- Part of area has been previously mined (bord and pillar) as part of Ivanhoe No 2
Project Design Considerations

Project has been designed in consideration of key issues raised in relation to previous proposals (including key PAC recommendations, key submission issues and key stakeholder comments)

• No highwall mining
• Geotechnical studies of individual pagoda formations undertaken to conservatively determine appropriate vibration limits to avoid damage
• Project will have no impact on pagoda formations
• Does not include mining in biodiversity rich incised valleys between pagoda formations
• Biodiversity impacts fully assessed and offset in accordance with objective NSW Government policy.
Project Design

Key outcomes include:

• Substantially smaller disturbance area than previous proposals (Only 49 hectares of additional disturbance relative to 152 ha for the Modification Project and 794 hectares for the Consolidation Project)

• Located in area with comparatively lower biodiversity value than northern areas and is already disturbed by powerline, subsidence and forestry activities

• Area located further from private residences (820m) and Cullen Bullen (3km)

• Blasting designed to manage impacts on residences and infrastructure to accepted criteria

• Impacts on pagodas avoided through blast design and incorporation of appropriate setbacks to pagodas taking into account habitat values for key species

• Significant reduction in area of open cut mining within 300m of pagodas (approximately 90% reduction from Coalpac Modification and 99% reduction from Coalpac Consolidation Project)
PROJECT ECONOMICS AND JUSTIFICATION
Castlereagh Coal

• Castlereagh Coal is the trading name of Shoalhaven Coal. Shoalhaven Coal is part of the Manildra Group - an integrated and diverse agribusiness.

• Manildra operate four flour mills throughout NSW and the Shoalhaven Starches plant at Bomaderry

• The Shoalhaven Starches plant is the largest wheat starch and gluten plant of its kind in the world
Shoalhaven Starches use a combination of nut coal, woodchips, gas and electricity for energy. Nut coal accounts for approximately 1/3 of energy costs (85 ktpa).

Energy costs are a major production input and cost and viability of operations is sensitive to energy costs and supply certainty.

Shoalhaven Starches had historically sourced nut coal from Invincible.

Following closure of Invincible, nut coal has been sourced from Clarence Colliery and Whitehaven at a delivered unit cost (average) of around $146/tonne. The Southern Extension Project will enable Shoalhaven Starches to source coal for its operations at significantly reduced costs (approximately $80-$90/tonne).

Integrating Invincible operations into Manildra Group improves reliability and continuity of supply for nut coal for Shoalhaven Starches Plant. This is particularly important given current energy cost and supply constraints in the Eastern Australian market.
Shoalhaven Starches Supply Options

- Purpose of Project is to manage energy supply risk and cost risks for Shoalhaven Starches. Flexibility in supply options is a means of managing these risks by enabling Invincible to minimise cost spikes and potential supply disruptions.
  - Energy is one of the key production inputs in terms of cost. Continued energy supply is also critical to ongoing operations.
  - Reliance on a single supplier is a risk to continued operations if production is delayed for an extended period of time.
  - Nut-coal is a limited demand market in NSW and the comparatively low volumes used by the few operators requiring it (Qenos and Shoalhaven) mean suppliers are at a competitive advantage, particularly given there are relatively few producers.
- The Southern Extension Project provides Shoalhaven Starches with a means of reducing energy costs and also managing supply risks. Continued supply from other operators remains part of this risk management strategy.
Project Benefits

State and Regional Socio-economic benefits

- Estimated economic benefits to NSW of $79.7 Million
- Estimated economic benefits to local region of $8.8 Million
- Approximately 35 direct employees
- Predicted increase in population in local area of 16 people

Benefits for Shoalhaven Starches

- Lower energy supply costs (and greater price certainty)
- Increased certainty in energy supply
- Job security for Shoalhaven Starches’ employees

Environmental Benefits

- Southern Extension Project results the cost effective rehabilitation of the existing Invincible Open Cut disturbance footprint and Ivanhoe No.2 subsidence impacts
- Rehabilitation outcomes under the Project will have improved conservation outcomes relative to the project not proceeding
Proposed Life of Mine

- Approval is being sought for mining to occur up to 8 years to enable flexibility in nut coal supply from the Southern Extension Project. Flexibility options include:
  - Full supply of nut coal from Invincible - Lithgow seam only (approximately 3.5 years LOM)
  - Full supply of nut coal from Invincible utilising Lithgow Seam and Irondale Seam - likely blended product to manage coal quality issues (approximately 8 year LOM)
  - Mixed supply option - Invincible and other coal source (e.g. Clarence) (4-8 years LOM depending on % sourced from alternative suppliers and utilisation of Irondale Seam coal).

- ROM coal and undersize washed coal not suitable for nut coal production would be sold to Mt Piper Power Station. Maximum production rate of 1.2Mt ROM is based on the ROM coal produced in maximum production year to source 85kt nut coal from Lithgow seam alone.

- Castlereagh Coal also investigating potential to produce nut coal from Irondale Seams in Southern Extension Area which would provide the opportunity to continue nut coal supply for up to 8 years. Production rates would be lower if nut coal can be sourced from the Irondale Seam as well as the Lithgow Seam and/or nut coal is also sourced from other operations.

- EA completed on basis of maximum production rate to provide conservative worse case impacts and prescribe required mitigation measures.
ADVANTAGES OVER PREVIOUS COALPAC PROPOSALS
## Comparison between previous proposals and Invincible Southern Extension Project

<table>
<thead>
<tr>
<th></th>
<th>Existing Approved (Invincible)</th>
<th>Previous Coalpac Proposals Consolidation Project</th>
<th>Previous Coalpac Proposals Modification 4</th>
<th>Southern Extension Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resource Tonnes</strong></td>
<td>N/A</td>
<td>68 Mt ROM</td>
<td>9 Mt ROM</td>
<td>2.7Mt ROM</td>
</tr>
<tr>
<td><strong>Mining Methods</strong></td>
<td>Highwall and Open Cut.</td>
<td>Highwall and Open Cut.</td>
<td>Highwall and Open Cut.</td>
<td>Open Cut only.</td>
</tr>
<tr>
<td><strong>Mining Rate</strong></td>
<td>1.2 Mtpa Product Coal.</td>
<td>3.5Mtpa + up to 0.45bcm sand per annum (Combined with Cullen Valley).</td>
<td>1.2 Mtpa Product Coal.</td>
<td>Up to 1.2 Mtpa Product Coal.</td>
</tr>
<tr>
<td><strong>Mining Life</strong></td>
<td>To December 2016 (8 years from date of approval).</td>
<td>Additional 21 years from approval.</td>
<td>Approximately 6 years.</td>
<td>Up to 8 years depending on production rate.</td>
</tr>
<tr>
<td><strong>Operational Workforce</strong></td>
<td>35 full time personnel.</td>
<td>120 full time personnel, plus additional contractors (Combined with Cullen Valley)</td>
<td>80 direct and 165 indirect jobs (Combined with Cullen Valley)</td>
<td>35 full time personnel.</td>
</tr>
<tr>
<td><strong>Hours of operations</strong></td>
<td>7am - 10pm Monday to Saturday (excl. public holidays). Mining in south pits not permitted between 6pm and 10pm.</td>
<td>24 hour operation, 7 days a week.</td>
<td>7am - 10pm Monday to Saturday (excl. public holidays). Mining in south pits not permitted between 6pm and 10pm.</td>
<td>7am-10pm Monday to Saturday (excl. public holidays). Mining and CPP operations 7.00am to 6.00 pm only.</td>
</tr>
<tr>
<td><strong>Blasting</strong></td>
<td>Blasting between 9 am and 5 pm Monday to Saturday, inclusive.</td>
<td>Blasting between 9:00 am and 5:00 pm Monday to Saturday, inclusive.</td>
<td>Blasting between 9:00 am and 5:00 pm Monday to Saturday, inclusive.</td>
<td>Blasting between 9am and 5pm Monday to Saturday, inclusive.</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td>Transport 7 am - 9:30 pm Monday to Saturday, excluding Sundays and public holidays.</td>
<td>Transport 7am - 9.30 pm Monday to Saturday, excluding public holidays.</td>
<td>Transport 7 am - 9:30 pm Monday to Saturday, excluding Sundays and public holidays.</td>
<td>Transport 7 am - 9:30 pm Monday to Saturday, excluding Sundays and public holidays.</td>
</tr>
</tbody>
</table>
### Predicted impacts and comparison to previous proposals

<table>
<thead>
<tr>
<th>Issue</th>
<th>Predicted impacts</th>
<th>Comparison to Coalpac Proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodiversity</td>
<td>• Approximately 50 hectares of disturbance&lt;br&gt;• No impacts on Threatened ecological Communities.&lt;br&gt;• Impacts on threatened species assessed and will be offset in accordance with NSW Policy</td>
<td>• Significantly reduced scale of vegetation disturbance&lt;br&gt;• Reduced scale of predicted impacts on species associated with pagoda formations.</td>
</tr>
<tr>
<td>Air Quality</td>
<td>• Predicted impacts below relevant assessment criteria&lt;br&gt;• Predicted impacts lower than previous operations</td>
<td>• Predicted impacts lower than previous Coalpac Projects</td>
</tr>
<tr>
<td>Noise</td>
<td>• Noise impacts below relevant assessment criteria except ‘Hillview’ Property.&lt;br&gt;• Hillview Property will have rights to mitigation works under VLAMP&lt;br&gt;• Impacts lower than previous operations</td>
<td>• Impacts lower than previous Coalpac Proposals</td>
</tr>
<tr>
<td>Groundwater</td>
<td>• Minimal impacts on groundwater systems</td>
<td>• Reduced impacts relative to previous proposals as smaller mine</td>
</tr>
<tr>
<td>Surface Water</td>
<td>• No change to water management catchment from previously approved operations&lt;br&gt;• Proposed discharge criteria are more stringent than previous operations</td>
<td>• Reduced impacts relative to previous proposals as smaller mine</td>
</tr>
<tr>
<td>Blasting</td>
<td>• Predicted impacts lower than previous operations in Cullen Bullen&lt;br&gt;• Blasts designed to meet relevant impact criteria.&lt;br&gt;• Only one blast per day proposed</td>
<td>• Predicted impacts lower than previous proposals&lt;br&gt;• Mine is further from residences</td>
</tr>
</tbody>
</table>
## Predicted impacts and comparison to previous proposals

<table>
<thead>
<tr>
<th>Issue</th>
<th>Predicted impacts</th>
<th>Comparison to Coalpac Proposals</th>
</tr>
</thead>
</table>
| Traffic                       | • Minimal traffic impacts other than that associated with road closures.  
• Impacts similar to previously approved operations                                                                                                      | • Traffic impacts lower than previous Coal Proposals                                           |
| Visual                        | • Additional disturbance associated with eastern extent of operations will be visible from short section of Castlereagh Highway.                                                                                  | • Impacts the same as or significantly reduced relative to Coalpac proposals depending on viewing location. |
| Aboriginal cultural heritage  | • 6 sites located in Southern Extension Area will be removed.                                                                                                                                                   | • Overall reduced impacts as smaller disturbance footprint.                                   |
| Historic Heritage             | • No heritage items identified as being present in project area                                                                                                                                               | • Previous Coalpac proposals also had limited impact on heritage                               |
| Land Use                      | • Approximately 50 hectares of additional disturbance in Ben Bullen State Forest Limited productivity impacts due to vegetation in area and existing subsidence impacts (offset through licence agreement with State Forests)  
• Some (limited) impacts on recreation values                                                                                                               | • Overall reduced impacts relative to previous Coalpac Projects                                 |
CONSIDERATION OF IMPACTS ON CONSERVATION VALUES
Conservation Values Assessment

• Impacts on conservation values were key reason for previous decision by PAC to refuse larger Coalpac Modification Project

• Previous PAC statements on Conservation Values
  
  o "the pagodas cannot be considered as structures in isolation … they are part of a landform consisting of multiple pagoda structures and intervening sections of cliffs, with steep slopes and dissecting gullies below"

  o "The pagodas are "a unique landform on a world scale … "; have limited distribution, provide critical habitat for some flora species and key habitat features for threatened fauna"; and "contain significant items of Aboriginal cultural heritage"

  o "the pagoda landform should be afforded special significance status and the highest possible level of protection"

• Project has been designed to avoid impacts on pagodas

• Project will have improved long term conservation outcomes relative to the alternatives of no Project or the DPE proposed modified Project.
Impacts on conservation values

• The Project **will not** impact on the pagoda formations.

• The Project has been designed to result in a net benefit for long-term conservation outcomes. Project will result in improved landforms across entire disturbance area (existing and proposed) relative to alternative of project not being approved.

• Southern Extension Project will have a **temporary impact** on areas within the immediate vicinity of the pagoda landform. These temporary impacts do not affect the long term conservation values of either the pagodas or the pagoda landform when rehabilitated.

• Impacts on conservation values must also have regard to impacts associated with existing mining disturbance areas and rehabilitation of that area.

• Existing mined area already impacts on conservation values of the pagoda landform. Existing impacts are temporary however impacts on long term conservation values depend on rehabilitation processes.

• Southern Extension Project (full extent) will have better long term conservation outcomes than either no further mining approved or reduced mining area due to reduced need to disturb existing rehabilitation and improved land form outcomes.
REHABILITATION
Existing Rehabilitation

Image date: 31 October 2016
Rehabilitation Benefits of Southern Extension Project

The rehabilitation outcomes of the Project relative to the other options considered result in:

• Less additional disturbance around the more visually prominent and biodiversity rich areas of the pagoda landscape to the east of the Invincible mine site

• Rehabilitation of the existing and proposed Invincible disturbance area to a landform that is similar to the pre-mining landform

• Earlier establishment of woodland communities in existing Invincible disturbance area

• Improved final landform and landscape outcomes, particularly in relation to areas adjacent to the higher biodiversity and visually prominent pagoda formations to the east of the existing open cut mining disturbance area

• Greater certainty in rehabilitation outcomes through integration with the proposed mining operations as part of the Southern Extension Project.
## Conservation outcomes of alternatives

<table>
<thead>
<tr>
<th>Option</th>
<th>Benefits</th>
<th>Conservation Values</th>
</tr>
</thead>
</table>
| **No Southern Extension Project** | • No additional disturbance in eastern areas of Southern Extension Area | • Requires disturbance of rehabilitation to obtain fill material for voids - likely poorer rehabilitation outcomes in areas where topsoil double handled. 
• Requires additional (approved) disturbance closer to pagodas to improve landform 
• Likely steeper slopes across larger area than would be achieved though other options 
• Delay in rehabilitation of areas already well established. 
• Ongoing subsidence impact in Southern Extension Area 
• Temporary visual and biodiversity impacts associated with disturbed areas. Impacts likely to be longer in existing disturbed areas where rehabilitation required to be re-disturbed. |
| **DPE Reduced Scale Project**     | • Reduces disturbance in eastern parts of Southern Extension Area    | • Additional (temporary) disturbance in Southern Extension Area 
• Requires disturbance of rehabilitation to obtain fill material for voids - likely poorer rehabilitation outcomes in areas where topsoil double handled. 
• May require additional (approved) disturbance closer to pagodas to improve landform 
• Likely steeper slopes across larger area than would be achieved though other options 
• Delay in rehabilitation of areas already well established. |
| **Proposed Project**             | • Limited disturbance of existing rehabilitation                      | • Additional (temporary) disturbance in Southern Extension Area 
• Early rehabilitation of existing disturbance area 
• Removal of ongoing subsidence impacts in Southern Extension Area 
• Improved landform design across disturbed areas, particularly existing disturbance areas 
• Avoids need to disturb areas closer to pagodas adjacent to existing mining areas |

- Benefits: 
  - No additional disturbance in eastern areas of Southern Extension Area
  - Reduces disturbance in eastern parts of Southern Extension Area
  - Limited disturbance of existing rehabilitation

- Downsides: 
  - Requires disturbance of rehabilitation to obtain fill material for voids - likely poorer rehabilitation outcomes in areas where topsoil double handled.
  - Additional (temporary) disturbance in Southern Extension Area
  - Delay in rehabilitation of areas already well established.
Rehabilitation associated with Southern Extension Project

- Progressive rehabilitation undertaken of existing and proposed mining area

- No voids will remain in final landform - overburden from Southern Extension Area used to fill Eastern Void and removed need to disturb existing rehabilitation.

- Landform to be similar to pre-mining landform due to bulking factor associated with overburden removal.

- Revegetation strategy to return disturbed areas to native woodland and forest communities (species composition in existing rehabilitation areas won’t be revisited but infill planting/seed, if necessary, will have regard to updated species lists).

- Southern Extension Project will require only minimal disturbance to existing rehabilitated areas and does not involve further encroachment of mining towards pagodas in existing open cut area (approved under current consent).

Project is not required to rehabilitate existing site but the Project will result in improved rehabilitation outcomes.
Visual Impacts
Visual Impacts
BIODIVERSITY ASSESSMENT
Project designed to avoid/minimise impacts on known threatened species and higher biodiversity areas.

Project assessed under NSW Framework for Biodiversity Assessment (FBA) and all biodiversity impacts associated with the Southern Extension Project and all impacts will be offset in accordance with the FBA.

Impacts on threatened species are specifically addressed through species credit requirements and habitat multiplying factors.

Offset requirements established through OEH administered calculator based on biometric data collected from the site.

The Southern Extension Project will not impact on any threatened ecological communities.

Project not likely to significantly affect threatened species
### Ecosystem Credits

<table>
<thead>
<tr>
<th>Name</th>
<th>Credits Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>CW117 - Brittle Gum - Broad-leaved Peppermint - Red Stringybark open forest in the north-western part (Yass to Orange) of the South Eastern Highlands Bioregion (Moderate/Good)</td>
<td>542</td>
</tr>
<tr>
<td>CW263 - Inland Scribbly Gum grassy open forest on hills in the Mudgee Region, NSW central western slopes (Moderate/Good)</td>
<td>2714</td>
</tr>
<tr>
<td>CW263 - Inland Scribbly Gum grassy open forest on hills in the Mudgee Region, NSW central western slopes (Moderate/Good_High)</td>
<td>30</td>
</tr>
<tr>
<td>CW263 - Inland Scribbly Gum grassy open forest on hills in the Mudgee Region, NSW central western slopes (Moderate/Good_Medium)</td>
<td>99</td>
</tr>
<tr>
<td>CW263 - Inland Scribbly Gum grassy open forest on hills in the Mudgee Region, NSW central western slopes (Moderate/Good_Other)</td>
<td>50</td>
</tr>
</tbody>
</table>

**Total** 3435

### Species Credits

<table>
<thead>
<tr>
<th>Species</th>
<th>Credits Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad-headed snake (<em>Hoplocephalus bungaroides</em>)</td>
<td>388</td>
</tr>
<tr>
<td>Capertee stringybark (<em>Eucalyptus cannonii</em>)</td>
<td>468</td>
</tr>
<tr>
<td>Squirrel glider (<em>Petaurus norfolcensis</em>)</td>
<td>1047</td>
</tr>
<tr>
<td>Bathurst Copper Butterfly (<em>Paralucia spinifera</em>)</td>
<td>15</td>
</tr>
</tbody>
</table>

**Total** 1747
Groundwater Impacts

- Aquifers in the local area been largely depressurised as a result of historical open cut and underground mining. The Southern Extension Project is not predicted to have any discernible impact on any aquifers.

- Seams dip to east and north.

- Groundwater impacts from project associated with transfer of water between workings.

- Detailed calculations of water to be removed from Ivanhoe No. 2 workings and transferred to Invincible. Sufficient storage capacity available.

- Impacts considered to be minimal and slight increase in inflows to Baal Bone will not exceed current Baal Bone groundwater take licences (if dewatering required).

- Inferred take associated with mining of Southern Extension Area is within current Invincible licences.
Surface Water Impacts

• Project does not change the current water management system catchment which already includes clean catchment upstream of the Invincible Mine Water System.

• Water removed from the former Ivanhoe No.2 underground workings will be transferred into the former Invincible underground working and void space associated with the existing Invincible open cut.

• Project has committed to more stringent discharge limits than have previously applied. Water will be managed on site to ensure EPL limits are not exceeded. The Southern Extension Project is not predicted to have a noticeable impact on downstream water users or environment relative to current approved operations.

• Clean water diversions are not currently in place. Terrain means that clean water diversions will be difficult to construct and will have additional vegetation (and potentially Aboriginal heritage) impacts. Safety risks associated with having detention dams located above highwalls.

• Given short duration of Project, the benefits of returning additional flows to downstream catchments are not considered to outweigh the additional impacts associated with diversions.
• Traffic generation consistent with previous approved Invincible operations

• Traffic assessment includes assessment of traffic related impacts against current traffic levels (and assumes approved mine coal haulage from Cullen Valley)

• Demonstrates no significant impacts on road infrastructure, performance or road safety on account of traffic levels and current quality of road infrastructure (Castlereagh Highway)

• Project will require on average 10 coal trucks to Bomaderry per day - insignificant contribution to traffic on state highways

• Discussions with RMS have identified opportunities to reduce delays associated with road closures. RMS not opposed to the project.
END OF PRESENTATION