WOLLONGONG COAL

Russell Vale Colliery
Revised Underground Expansion Project (UEP)

IPC Presentation
13 October 2020

Outline

- Introduction and Background
- Overview of Revised Underground Expansion Project
- Mine design features
- How the mine design addresses previous PAC and IESC issues
- Peer review process
- Summary of key impacts, proposed mitigation and monitoring:
  - Underground mining
  - Surface facilities and other issues
- Questions

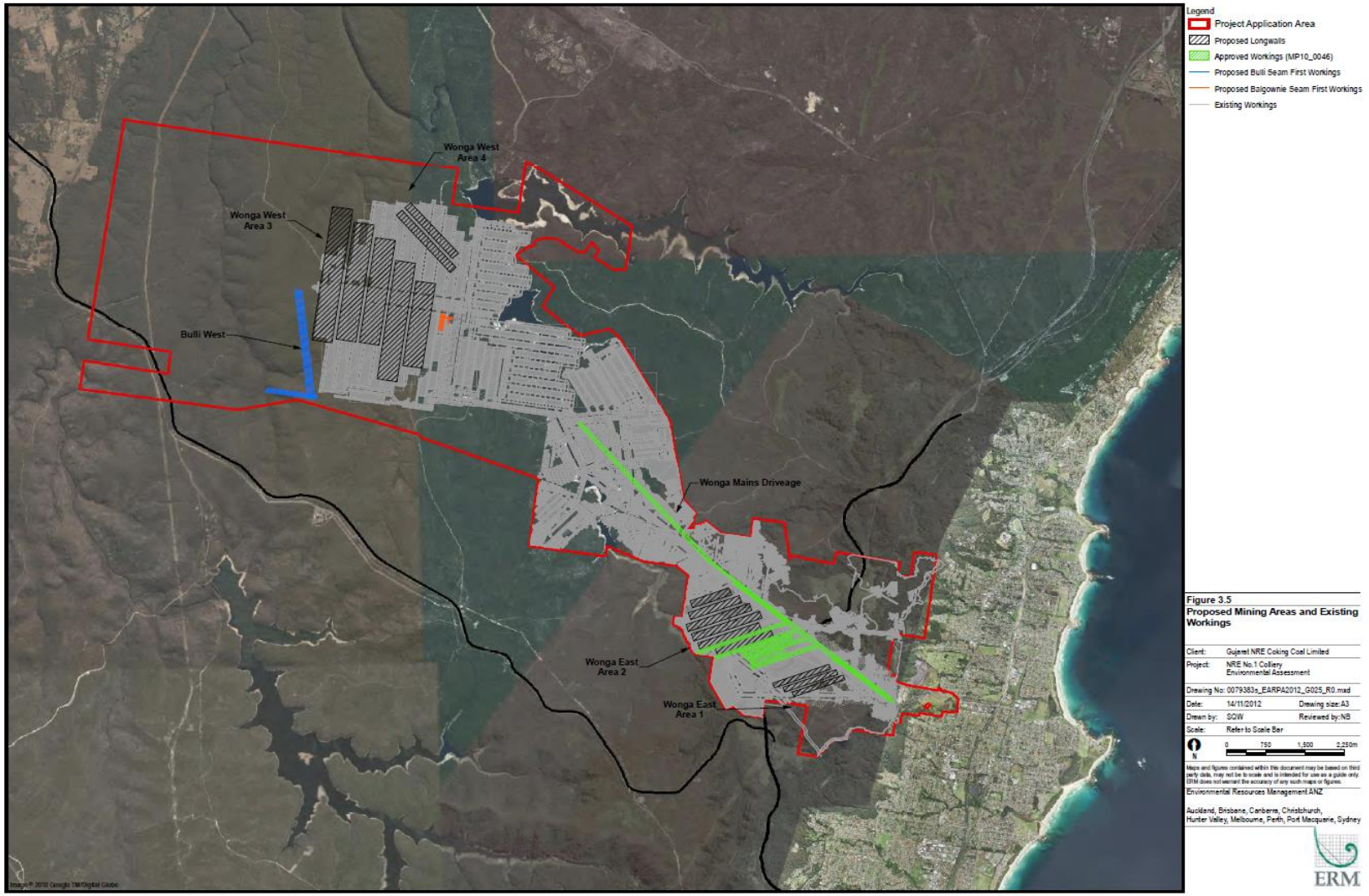
Background

Original Underground Expansion Project (UEP)

Original EA publicly exhibited in early 2013:

- Longwall mining in Wonga East (9 additional longwalls) and Wonga West (7 longwalls) areas.
- Development works in Balgownie Seam and Bulli Seam in Wonga West area.
- 18 Year LOM.
- Approx 32 Mt ROM.
- Up to 3Mtpa ROM.

Original UEP Mine Plan



Previous Issues

The original project and subsequent Preferred Projects raised significant agency and community concerns, with key residual issues following two PACs relating to:

- Uncertainty of water and subsidence impacts in multi seam environment, potential impacts on Upland Swamps, the Cataract Reservoir and catchment.
- Impacts associated with continued operation of the surface facility, including Noise, Bellambi Creek Flood Management, Traffic and Transport

Revised Project Focus

- **Wonga East Area**
- **Multi seam mining environment**
  - Bulli Seam and Balgownie Seam and 2 ½ longwall panels in Wongawilli Seam mined previously.
  - Target seam for UEP is Wongawilli Seam.
  - Depth of cover between 250m and 360m

Development of Revised Project

Umwelt engaged in 2016 to conduct a further environment and community constraints analysis and work with WCL and their mine design consultant to advise on any necessary project revisions/additional assessment required to address the key concerns.

Key mine plan/assessment considerations:

- A revised project design which addressed key concerns
- LOM of at least 5 years to provide sufficient time for necessary studies and approval process for mining in Wonga Central and Wonga/Bulli West areas.
- Financial viability

Consultation Program

- Comprehensive consultation to inform revised project design, scope of further studies, and to gain feedback on updated assessment and proposed management:
- WaterNSW, DP&E - DRAM, DPI Water, OEH, EPA
- Wollongong Council
- CCC
- DAWE
- Near neighbours to Pit Top and Bellambi Lane:
  - One on one meetings
  - Newsletters
  - Community Information Day

Key Outcomes

- Revised Project has addressed the issues of previous PAC and IESC reviews through a fundamental change to mine design
- Revised Project has been designed to avoid subsidence and subsidence related impacts - long term stable mine plan.
- Revised mine plan eliminates potential for significant impacts on groundwater, surface water, and biodiversity and provides far greater certainty of impact prediction.

Key Outcomes

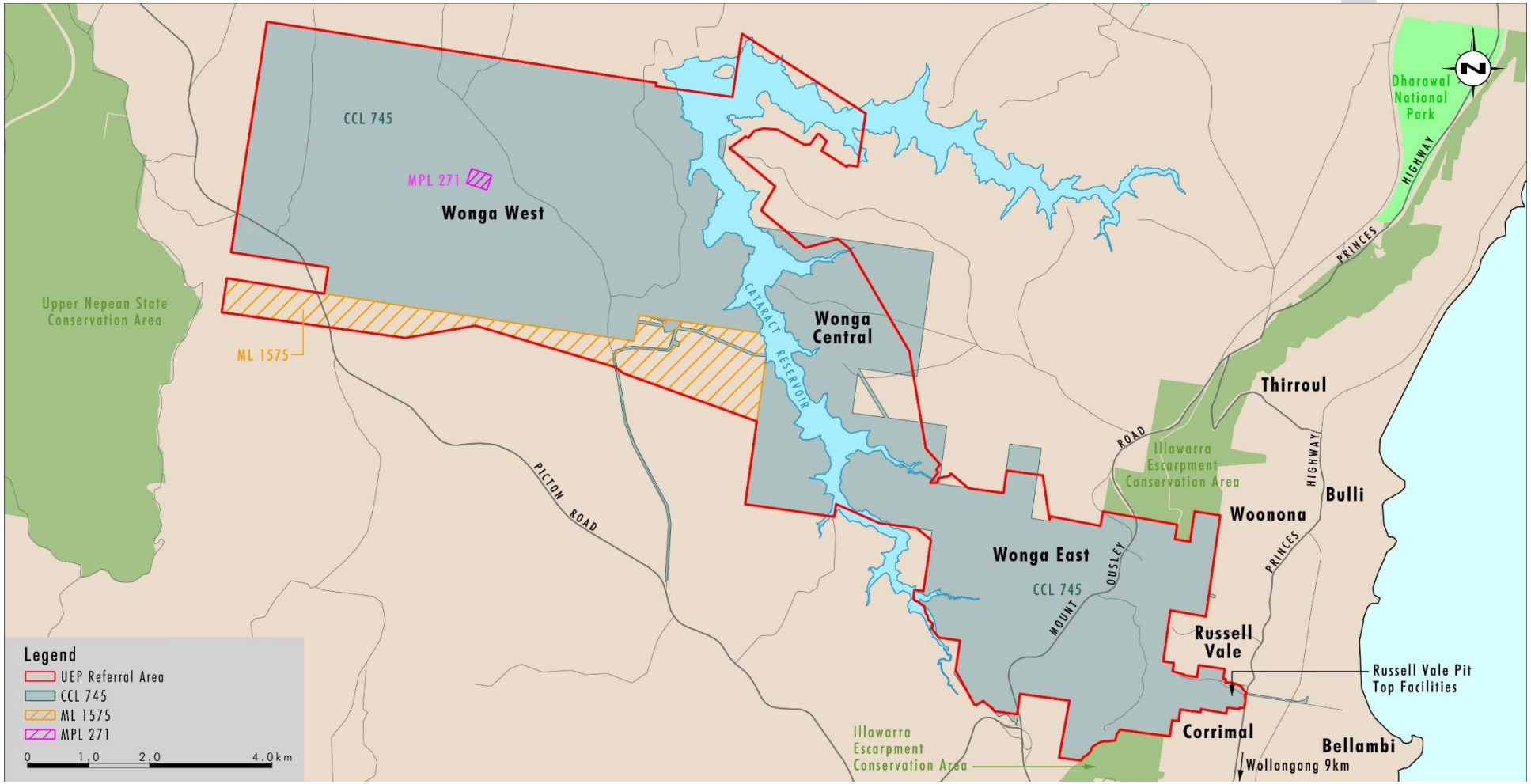
- Peer reviewed impact assessments confirm imperceptible subsidence and imperceptible subsidence impacts on groundwater, surface water, biodiversity and surface features (including swamps, cliffs, creeks, drainage lines & Cataract Reservoir).
- Peer reviewed risk assessment confirms negligible risk of pillar failure beneath any upland swamps and that the risk of loss of any upland swamp is very rare to negligible (this being an existing risk associated with previous mining that is unlikely to be changed by the project)
- Revised Project addresses the WaterNSW Mining Principles for protection of the catchment and satisfies the “Neutral or Beneficial Effects” test
- Revised Project provides a net benefit to NSW of $174.3 million, 205 full time operational jobs and 22 construction jobs

Revised Underground Expansion Project

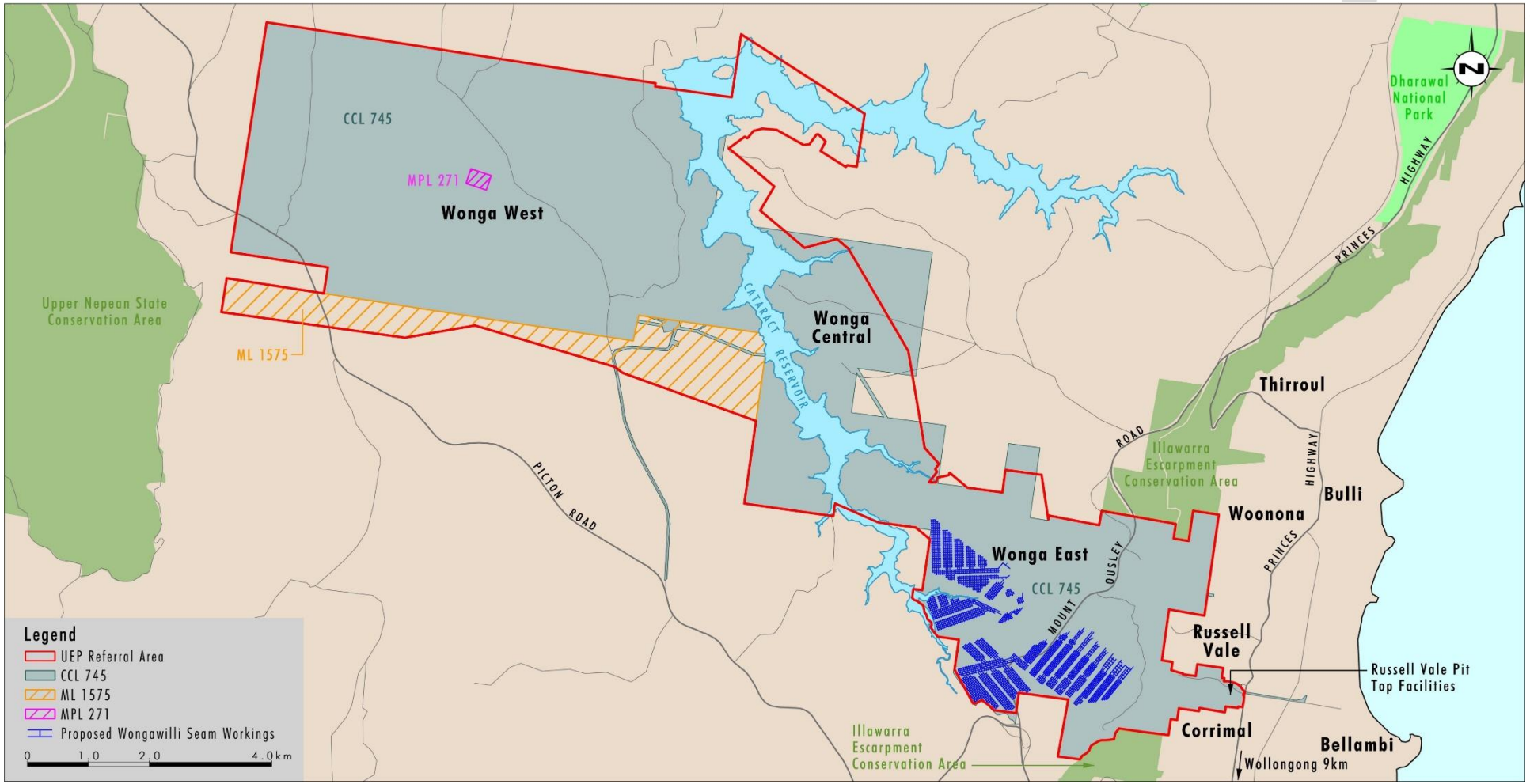
Current Status of Russell Vale Colliery

- Long history - operating since 1880s
- Three Seams – all accessed via adits into the seams from the current surface facilities site:
  - Bulli Seam (Bord and Pillar, Pillar Extraction)
  - Balgownie Seam (Longwall and Bord and Pillar)
  - Wongawilli Seam (Longwall)
- Current surface facilities have been part of the community for many decades
- Mining in Wongawilli seam ceased in 2015. Currently in care and maintenance with the site being managed in accordance with Preliminary Works Approval consent

Russell Vale Project Area



Russell Vale Project Area



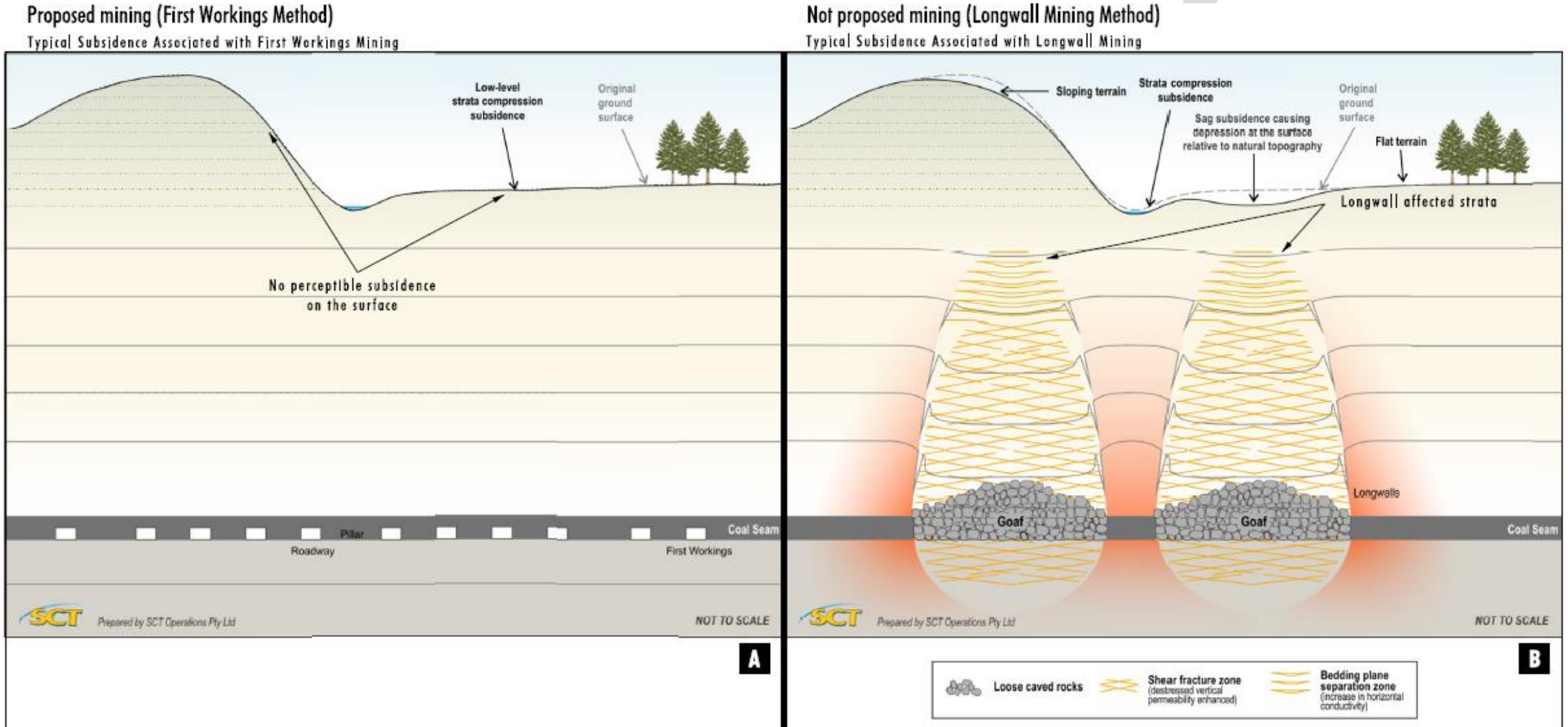
Future of Russell Vale Colliery

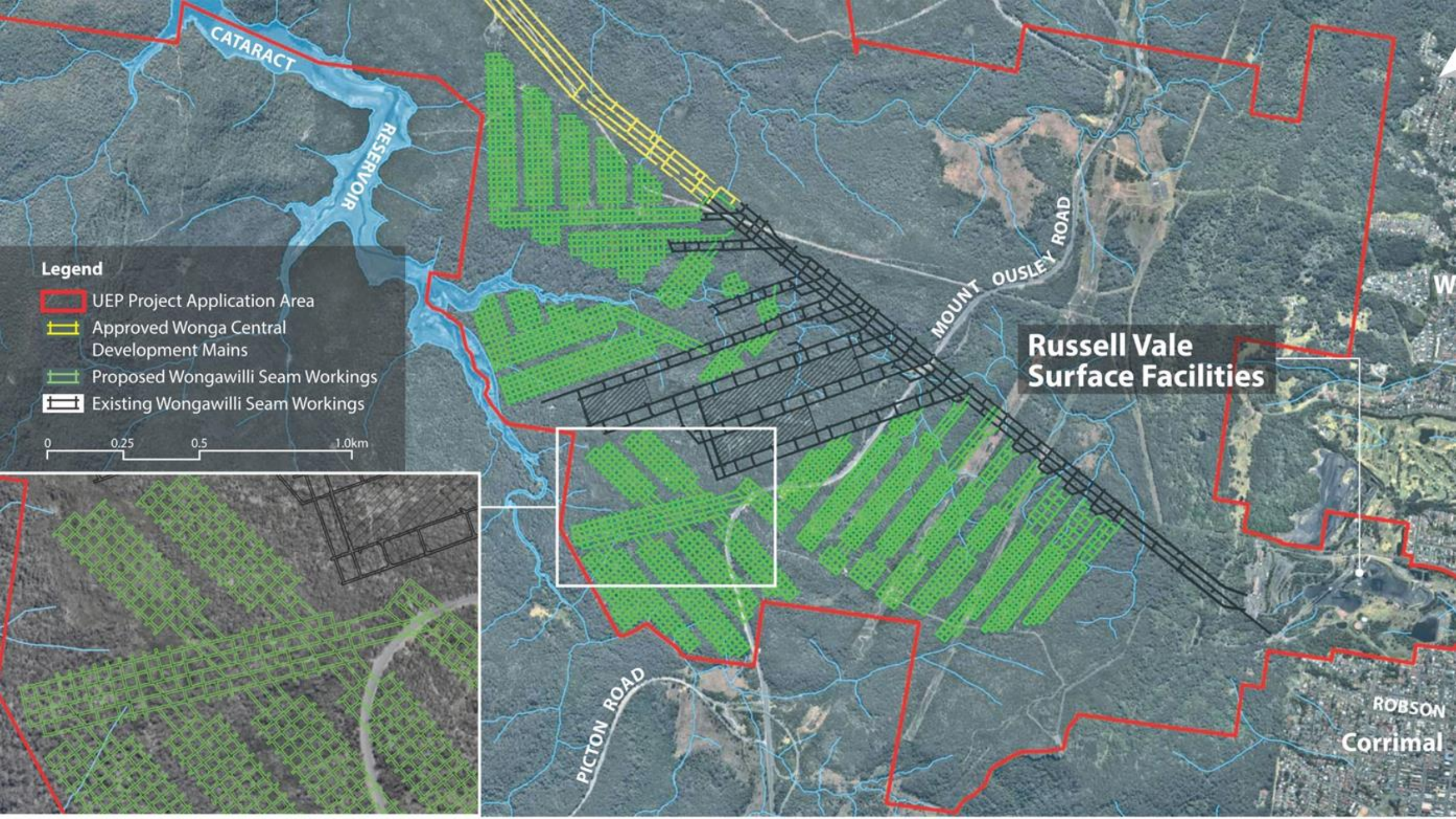
- Large volumes of economically viable coal remain un-extracted within the central and western portions of the Russell Vale lease holding (estimated at ~295Mt JORC). High quality - prime hard coking coal.
- WCL is committed to recovering this resource in an environmentally and socially acceptable manner.
- Exploration and feasibility studies, including baseline studies, are ongoing for this purpose.
- Revised Project will enable mining to continue while undertaking further detailed environmental and social impact studies to progress further planning approvals for this resource
- WCL has committed that all future mine planning within the Russell Vale Colliery lease holding will be based on long term stable first workings mining methods (bord and pillar) in order to limit the potential for subsidence related impacts to surface features or water resources.

Key Features of Revised Project

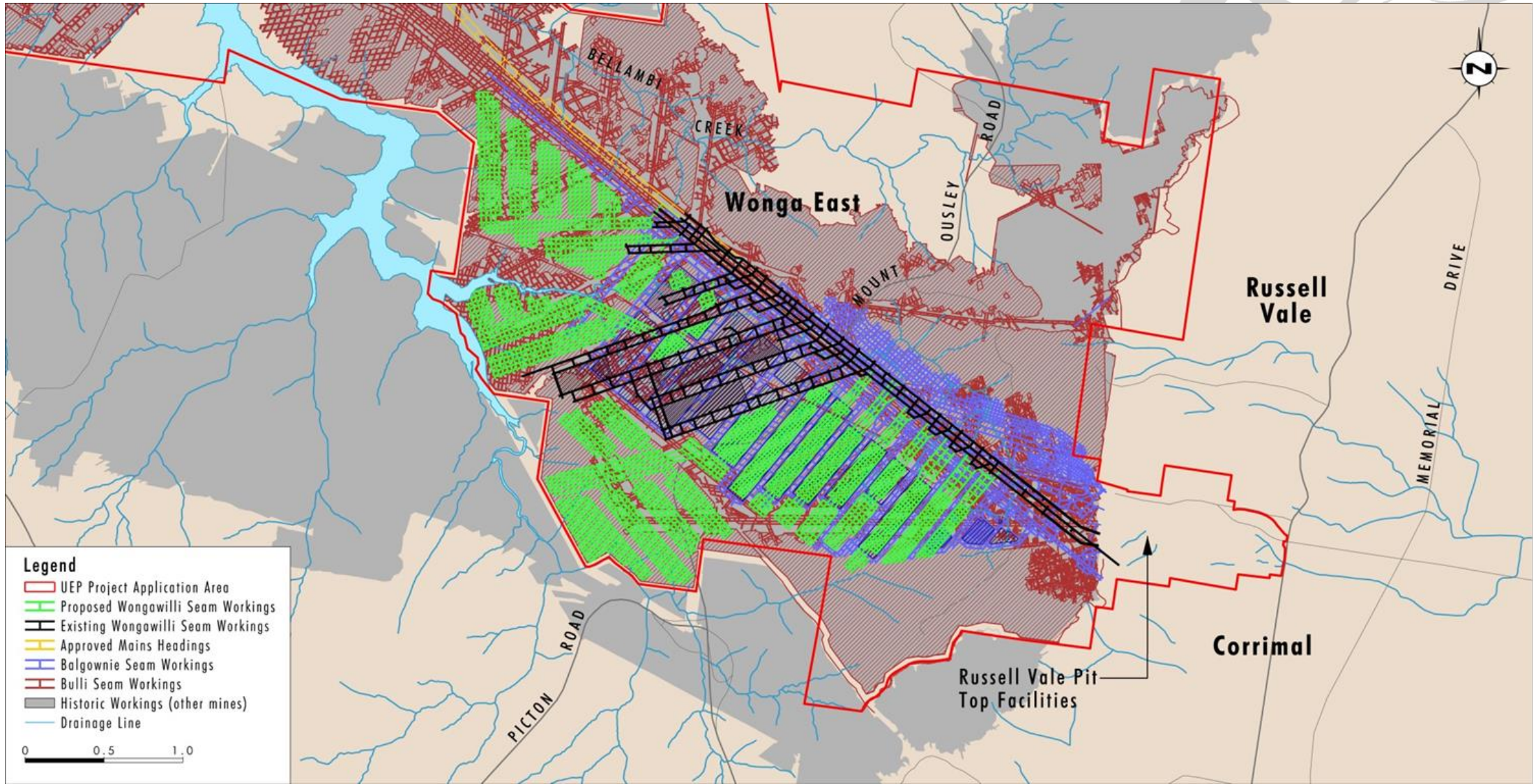
- Non-caving first working mining method and stable pillar design with imperceptible subsidence impacts.
- No new longwall mining proposed for this project or future mining at Russell Vale Colliery. Existing longwall equipment to be removed from underground.
- Wongawilli Seam in Wonga East area
- Production rate of up to approx 1.2Mtpa ROM / 1Mtpa product coal over 5 years
- Total resource recovered approx 3.7 Mt
- Substantial noise reductions from redesign of Pit Top
- Reduced hours for surface operations and trucking + reduced product trucking rates

General Subsidence Behaviour




CATARACT RESERVOIR
MOUNT OUSLEY ROAD
Russell Vale Surface Facilities
PICTON ROAD
ROBSON
Corrimal
Legend
UEP Project Application Area
Approved Wonga Central Development Mains
Proposed Wongawilli Seam Workings
Existing Wongawilli Seam Workings
0 0.25 0.5 1.0km

Existing and Proposed Workings



Mining Method Selection

- Longwall mining and secondary extraction discarded as an option – these methods do not meet the key design parameters required to avoid impacts on the environment.
- Selection Criteria:
  - Long term stable coal pillars delivering no perceptible subsidence from the Wongawilli Seam workings – no secondary extraction considered
  - Minimise stress influences from the upper seams (e.g. aligned under Balgownie LW Blocks)
  - Suitable for Quality Controls to comply with panel design – survey, geological and geotechnical mapping.
  - Able to manage interactions with faults and dykes (reduced no. of headings)
  - Proven mining system maximising safety and productivity in the conditions – Bord and Pillar methods utilising continuous miners
- Selected Method – 'Place Change' Mining (also called Cut and Flit). Simple and well understood bord and pillar mining method that addresses selection criteria and provides certainty to impact predictions.

Mine Plan Features

Mining Operations

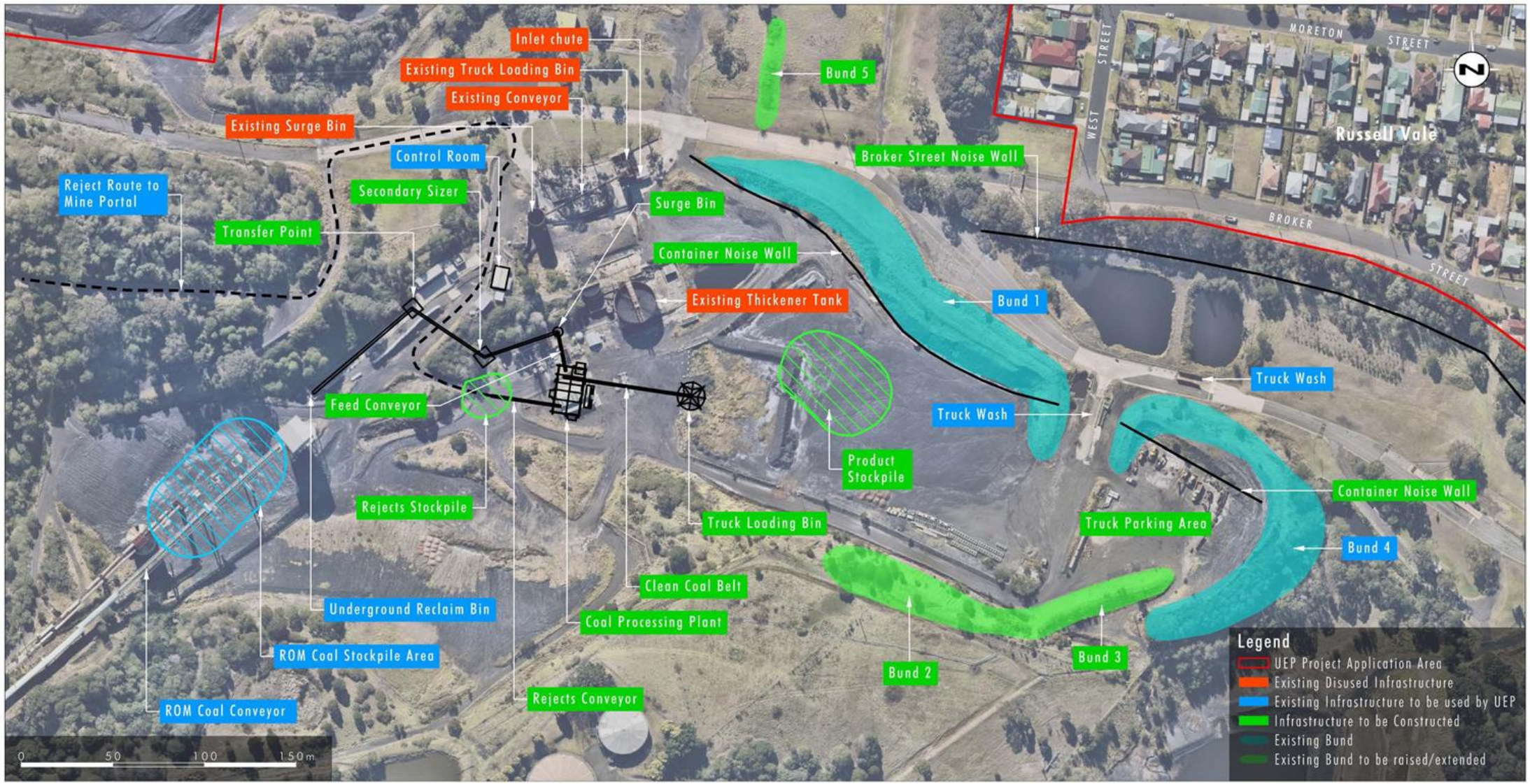
- Long term stable first workings (bord and pillar) mining method
- Pillar and mine plan designed to avoid subsidence impacts
    - Long term stable pillar design – avoids cracking above the seam
    - No perceptible subsidence
    - Dykes and faults avoided where possible
    - No mining under Full Supply Level of Cataract Reservoir

Surface Operations Features

Surface Operations

- Reduced production rate – From 3Mtpa to 1Mtpa Product Coal
- Coal Processing Plant to improve coal quality – designed to minimise noise impacts to residences
- Redesign pit top layout to improve noise mitigation
- Limited hours of operation:
    - Run out of ROM coal onto ROM stockpile 24hrs
    - Remaining surface facilities and coal transport limited to day-time only (with allowance to extend into evening hours in emergency situations, e.g. unexpected Port closure or interruptions)
- Reduced stockpile size (14,000t product; 1,500t reject; 30,000t ROM)
- Rejects emplaced underground or sold as VENM (trucked offsite)

Pit Top Layout



Addressing Previous PAC & IESC Concerns Through Mine Design

Previous PAC Issues

2 previous PAC reviews on previous longwall mine plans (2015 & 2016) raised the following key issues:

- Uncertainty relating to Water and Subsidence impacts in multi seam environment
- Impacts on Upland Swamps
- Ability to satisfy State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 neutral or beneficial effect (NorBE) on water quality requirements

Previous IESC Issues

IESC Advice – 12 August 2014

Identified the following key potential impacts associated with previous longwall mine plan:

- Impacts to EPBC listed Coastal Upland Swamps caused by surface and shallow cracking and subsequent loss of water holding capacity within swamps.
- Impacts to instream and riparian ecosystems caused by loss of stream flow and baseflow in Cataract Creek.
- Impacts to water storage in Cataract Reservoir caused by:
    - loss of stream flow and baseflow in its contributing catchment,
    - subsidence induced cracking
    - potential connectivity and drainage between the Cataract Reservoir and mine workings.

Mine Design Addresses Key PAC Issues

Key issues of concern addressed through **mine design** to **avoid subsidence and water impacts** and **provide certainty**.

Specifically, through:

- Use of non-caving first working mining techniques - designed to be **long term stable** with **no perceptible subsidence**
- Stable pillar design **avoids strata deformation or cracking impacts above the coal seam** that could affect surface flow and groundwater interactions. Avoids cracking above coal seam therefore no connective cracking within catchment.
- Stable pillar design **avoids further destabilising overlying workings**
- Imperceptible subsidence **avoids potential impacts on surface features** such as swamps and creeks and improves certainty in groundwater modelling
- No mining under high water mark of Cataract Reservoir

Mine design has a high degree of risk control effectiveness and provides certainty to impact predictions. Confirmed through groundwater uncertainty analysis and geotechnical risk assessment and peer review processes.

Mine Design Addresses Key PAC Issues

PAC Issue	Addressed by Revised Project
Uncertainty re loss of surface water flow due to subsidence and cracking	**Resolved. Potential impacts avoided through mine design.** **Confirmed by Peer Reviewers.** Long term stable first workings mine plan will not result in strata deformation or cracking impacts above the coal seam that could affect surface flow and groundwater interactions. Mine plan provides significantly greater certainty in relation to negligible subsidence and groundwater impacts.
WaterNSW objects to the project due to risk of water loss and water quality impacts	**Resolved. Potential impacts avoided through mine design.** **Confirmed by Peer Reviewers.** WaterNSW submission on the Revised Project confirms the project addresses the issues raised in the Second PAC review, and considers both WaterNSW Mining Principles and the recommendations of the 2018 IEPMC Initial Report.
Not satisfied that the project would have a neutral or beneficial effect on water quality	**Resolved and confirmed by Peer reviewer.** Long term stable first workings mine plan has negligible risk of impact to surface or groundwater resources and is considered to satisfy NorBE requirements. WaterNSW submission on the Revised Project confirms it considers that the Revised Project can satisfy NorBE requirements subject to imposition of, and compliance with, suitable performance and management measures.

Mine Design Addresses Key PAC Issues

PAC Issue	Addressed by Revised Project
Project's reliance on mitigation measures to deal with residual impacts and the uncertainty of effectiveness of these measures	**Resolved. Project design has high degree of risk control effectiveness and provide certainty to impact predictions**. **Confirmed through geotechnical risk assessment and peer review processes.** Revised Project has avoided residual water and subsidence-related impacts through a fundamental change in mine design. Revised Project is **not reliant on mitigation measures to achieve predicted imperceptible subsidence-related impacts**.
Potential noise impacts on residents surrounding Pit Top and along Bellambi Lane	**Resolved through project design and operational controls.** Revised Project proposes a range of structural and operational noise mitigation measures at the Pit Top to achieve compliance with operational noise trigger levels. Noise from trucks transporting coal complies with Road Traffic Noise Policy at residences along Bellambi Lane.

Mine Design Addresses Key IESC Issues

IESC Issue	Addressed by Revised Project
Irreversible impacts to coastal upland swamps caused by surface and shallow cracking.	**Resolved. Mine design avoids subsidence impacts and associated surface and groundwater impacts.** **Confirmed by Peer Reviewers.** Long term stable first workings mine plan assessed as having imperceptible subsidence and subsidence-related impacts on upland swamps. Peer reviewed risk assessment confirms there is a negligible risk of pillar failure beneath any upland swamps and that the risk of loss of any upland swamp due to pillar failure in overlying seams is very rare to negligible (noting this is an existing risk associated with previous mining and is unlikely to be changed by the Project)
Impacts on instream and riparian ecosystems caused by loss of stream flow and baseflow.	**Resolved. Mine design avoids subsidence induced cracking above coal seam and associated groundwater and surface water impacts.** **Confirmed by Peer Reviewers.** **Long term stable first workings mine plan assessed as having no perceptible impact on stream flow or base flow**. The potential for pillar failure destabilising historical workings and resulting in further impact to water resources, including on Cataract Reservoir, surface water and groundwater has been avoided through mine design and residual impacts are assessed as negligible. Long term stable mine plan will not result in cracking impacts above the coal seam that could affect surface flow and groundwater interactions. **No credible risk of water flow along major structures from Cataract Reservoir**.
Impacts to water storage in Cataract Reservoir	

Peer Review Process

Peer Reviews

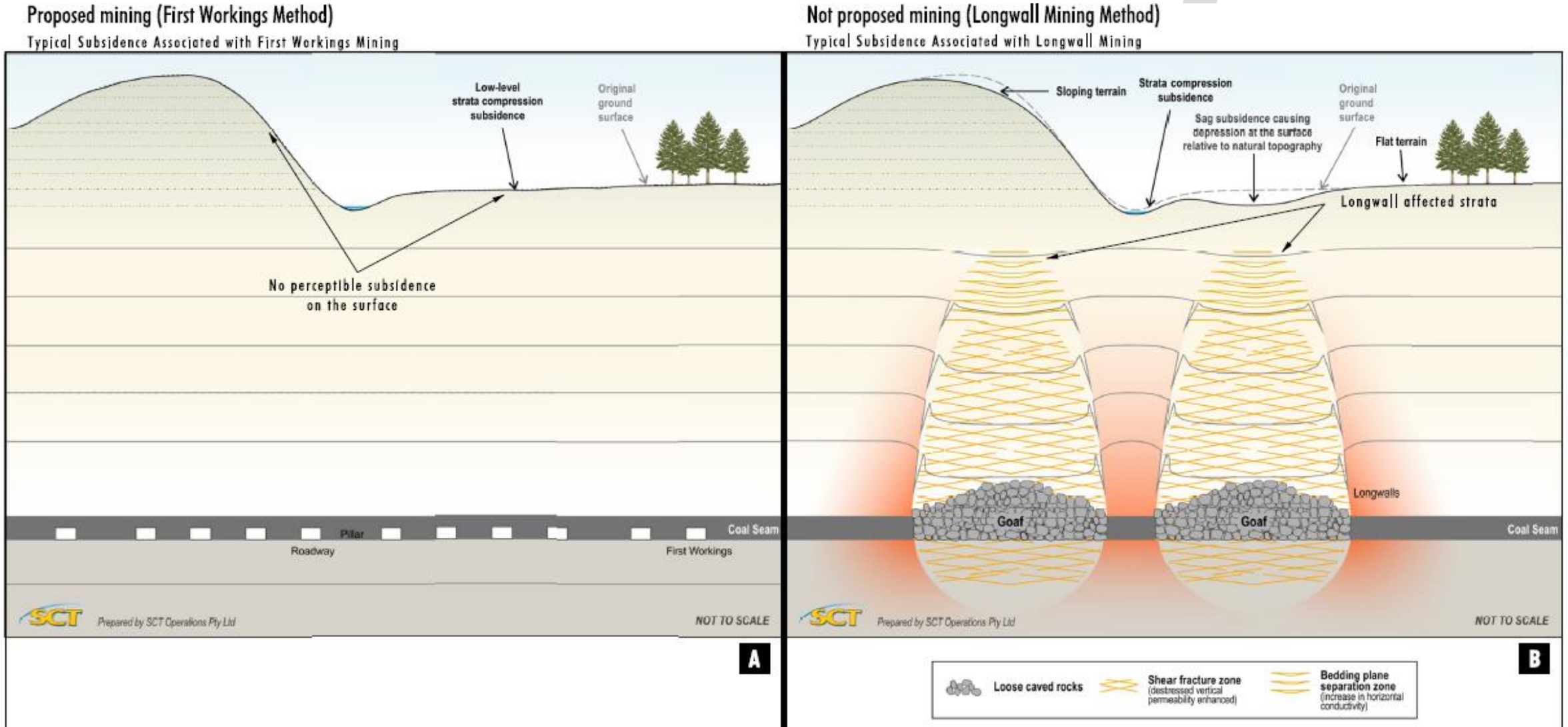
To provide greater certainty in the assessed impacts of the Revised Project, peer reviews of key subsidence and groundwater studies were undertaken.

Study	Peer Reviewer
Subsidence Assessment (SCT)	Dr Bruce Hebblewhite
Pillar Failure Risk Assessment (SCT)	Dr Bruce Hebblewhite
Groundwater Assessment (GeoTerra & GES)	Dr Noel Merrick
Uncertainty Analysis (HydroAlgorithmics)	Dr Frans Kalf

Summary of Key Impacts, Proposed Management and Monitoring

Underground Mining

General Subsidence Behaviour



Subsidence

- SCT Subsidence Assessment confirms revised mine plan will be long-term stable with minimal risk of subsidence and pillar failure
- No perceptible surface subsidence or significant interaction with surface or sub-surface groundwater systems predicted
- No significant interaction with overlying seams or significant impact on the stability of pillars in these overlying seams predicted
- No credible risk of water flow along major structures from Cataract Reservoir.
- **Imperceptible subsidence-related impacts** to natural surface features including upland swamps, cliffs including the Illawarra Escarpment, steep slopes, drainage lines, creeks, Cataract Creek and Cataract Reservoir.
- No perceptible impacts on listed threatened species or communities.
- No perceptible impact on Aboriginal sites or heritage
- Subsidence & pillar stability monitoring to confirm predicted imperceptible impacts

Subsidence Peer Review

Peer review confirmed findings, specifically:

- Pillar design provides **acceptable level of stability**
- **No significant subsidence impacts** on surface or groundwater regimes
- Assessment **conclusions are appropriate and valid**

Pillar Failure Risk Assessment

- Quantitative assessment of the risk of pillar failure completed and peer reviewed.
- Assessment considers risk of catastrophic loss of any coastal upland swamps as a result of the Revised Project and considers risk associated with ongoing instability in the overlying Balgownie and Bulli seams.
- Highly conservative assumptions applied to risk of catastrophic loss of swamps. For context, there has been no catastrophic loss of swamps to date from historical mining despite experiencing subsidence of:
  - Up to 1m from the Bulli Seam, in addition to
  - Up to 0.6-1m from the Balgownie Seam, and a further
  - Up to 1.7m from recent longwall mining in the Wongawilli Seam.
- Based on this experience alone, the risk of catastrophic loss of any of the swamps located in Russell Vale East due to the proposed mining is assessed as “extremely rare”

Pillar Failure Risk Assessment

Wongawilli Seam Pillars

- The majority of the proposed Wongawilli seam pillars are assessed as having a probability of failure of well below 1 in 100,000 (or “Extremely Rare”/ “Negligible”). This includes all mining areas located beneath coastal upland swamps.
- Two panels of first workings located outside the overlying Balgownie Seam goaf area have been assessed to have a risk of failure of less than 1 in 1,000 (borderline between "Rare" and “Very Rare”). These two panels are not located beneath coastal upland swamps and would not result in significant subsidence should failure occur (maximum subsidence would be less than 100mm and likely less than 30mm – consistent with the predictions for imperceptible levels of subsidence across the proposed mining area).
- **Probability of a pillar failure in the Wongawilli Seam causing loss of a swamp assessed as negligible** (0.0000003% across majority of mining area and 0.00001% for the two panels outside the Balgownie Seam goaf area). **This is consistent with IESC “negligible risk scenario”**

Pillar Failure Risk Assessment

Overlying Seams

- The only possible source of further subsidence impacting swamps is from Bulli Seam goaf areas that are yet to be confirmed as fully subsided (although it is likely that these areas have in fact fully subsided, there just isn't the records to prove this is the case).
- Proposed mining **will not change** the potential for further subsidence from the Bulli Seam. **This risk exists regardless of whether further mining proceeds in the Wongawilli seam**.
- Risk of a catastrophic loss of any coastal upland swamp is assessed as "Extremely Rare" (less than 0.01%) over more than 95% of mining area, and conservatively assessed as "Very Rare" (0.028%) in areas where Bulli Seam goaf is yet to be confirmed as fully collapsed. It is likely that these areas are fully collapsed and, once confirmed, risk reverts to "Extremely Rare".
- Again, this risk exists whether the proposed mining proceeds or not, and the Revised Project is unlikely to change this existing risk.

Pillar Failure Risk Assessment

Risk to Water Resources from Pillar Failure

- Potential for further impact to water resources is assessed as zero if, as expected there is no further significant subsidence.
- The risk of impact on water resources including impacts on Cataract Reservoir, surface water and groundwater has been assessed as “Negligible”.
- The groundwater assessment has conservatively assumed that all Bulli Seam goaf areas has been fully collapsed with associated goafing incorporated into the model. The groundwater impacts (mine inflows and baseflows impacts) associated with the historical Bulli Seam mining is included in the cumulative impact assessment.

Pillar Failure Risk Assessment – Peer Review

- Peer review confirmed risk assessment conclusions are **appropriate and valid**.
- In relation to the "very rare" assessed risk of pillar failures in the overlying Bulli Seam causing a catastrophic loss of a swamp, the Peer Reviewer commented:

> *"It is noted that the risk of Bulli Seam pillar failures impacting on surface swamps does exist albeit considered rare, independent of any proposed future mining. However, it is noted that the proposed Wongawilli Seam mining is unlikely to change this risk – a proposition which is accepted."*

Subsidence Monitoring

- Existing subsidence monitoring associated with LW4-6 will continue in accordance with current approved Extraction Plans.
- An Extraction Plan will be prepared for the Revised Project in consultation with all relevant agencies. This plan will outline the performance measures and monitoring and management requirements related to subsidence, surface water, groundwater, upland swamps, biodiversity, built features and public safety.
- The Extraction Plan will include updated Trigger Action Response Plans (TARPs) relevant to the Revised Project impact predictions. TARPS will be prepared in consultation with relevant agencies.
- 2 Tier monitoring system used – measuring source (in-seam) and surface conditions
  - The Wongawilli mine workings are monitored for compliance to the design criteria (pillar dimensions, roadway support), strata conditions, geotechnical influences and geological abnormalities under the Strata Control Management Plan. Deviations, if any, are addressed by remedial work programs and the design is subject to periodic review and change management processes.
  - Surface Monitoring (LIDAR) will establish the baseline surface references to identify any subsidence behaviour, mapped against the underground monitoring.

IPC clarifications – Mining Method

Matter	Clarification
Whether other mining methods were considered	Longwall mining and secondary extraction discarded as an option – these methods do not meet the key design parameters for long term stable pillars with a high factor of safety and minimal subsidence. The selected first workings mining method ('place change') is simple and well understood. It can achieve the pillar design criteria and provides certainty to impact predictions. Other first workings mining methods could also be designed to achieve the pillar design criteria, however 'place change' was selected due to its simplicity and suitability in achieving the pillar design criteria with a high degree of risk control.
Monitoring methods in areas where it is uncertain if the ground overlying existing workings has subsided	Consistent with existing practice – surface subsidence monitoring, supported by continuous monitoring of underground conditions. SCT confirm that the status of pillars in the 7 panels where status is unknown can be confirmed by observing roadway conditions under the goaf edge where abutment loads are present.

IPC clarifications – Subsidence

Matter	Clarification
Impact on subsidence if pillars in overlying seams have not collapsed	While all pillars in the Bulli Seam are expected to have already subsided because the same or similar mining systems were used across all Bulli Seam goaf areas, there remains 7 goaf areas where full subsidence cannot be confirmed due to an inability to access these areas. In the unlikely event that these pillars are still standing, SCT estimate maximum resulting subsidence from their collapse to be in the order of 0.85m. This risk exists regardless of whether the Revised Project proceeds and is unlikely to be changed by the project. This risk is considered as part of the Pillar Failure Risk Assessment.
Are there other hazards that could prejudice the stability of the proposed workings & therefore increase subsidence risk	Other hazards relate to geology which are accounted for in the mine plan design and managed through a process of ongoing exploration and investigation (including inseam drilling – gas, water bearing stats or voids and structures)
Risk of connective cracking within the catchment area	Stable pillar design avoids strata deformation or cracking impacts above the coal seam that could affect surface flow and groundwater interactions. No cracking above coal seam therefore no connective cracking within catchment.
Number of swamps predicted to be impacted by subsidence	The Revised Project will not result in any perceptible subsidence related impacts to swamps. No swamps are predicted to be adversely impacted by subsidence.

IPC clarifications - Subsidence

Matter	Clarification
Risk of subsidence associated with mining to recover longwall equipment	The additional 25 metres of mining associated with the recovery of longwall equipment is approved under the current Major Project approval (MP10_0046), LW6 Extraction Plan approval and EPBC Act approval (2014/7259). The works represents the panel retreat between 340 – 365m of LW6, as approved by each of these consents. This 25m is within the rundown area at the end of the longwall panel. The roof of this area will need to be fully supported to prevent collapse in order to allow safe extraction of longwall equipment, therefore minimising subsidence. The subsidence impacts of this mining were fully assessed and considered as part of the existing Major Project, Extraction Plan and EPBC Act approval processes, with the panel intentionally shortened as part of that approval process from the originally proposed 400m to 365m to avoid impacting on swamp CCUS4.

Groundwater

- Groundwater Assessment undertaken by Geoterra and GES. Comments from Dr Mackie in PAC considered in groundwater model set-up and model calibrated to most recent data collected
  - Review of model by WaterNSW (Pete Dupan)
  - Review of model prior to being run (Will Minchin)
  - Peer Review of model outcomes and assessment (Dr Noel Merrick)
  - Peer Review of uncertainty analysis (Dr Frans Kalf)
- Significant existing depressurisation of Wongawilli, Balgownie and Bulli Seam in proposed mining area associated with past mining at Russell Vale and other operations
- Groundwater impacts associated with Revised Project mine plan are limited to impacts associated with further depressurisation of Wongawilli Seam
- Existing Adit in Wongawilli Seam and outcropping in escarpment constrains groundwater level recovery within Wongawilli seam

Groundwater

- Modelling results indicate:
  - There is unlikely to be any observable groundwater drawdown effect
  - no observable impact on overall groundwater quality
  - no strata deformation or cracking above coal seam
  - no perceptible reduction in stream baseflow or stream water quality
  - no perceptible impact to upland swamps.

No adverse impact on stored water quantity or quality in the Cataract Reservoir

Revised Project satisfies the Neutral or Beneficial Effect test for the Sydney Drinking Water Catchment.

Groundwater Peer Review

Peer review confirms findings, specifically:

- The groundwater model has been developed competently and is **“fit for purpose”**
- The relevant **minimal impact considerations** of the NSW Aquifer Interference Policy have been **addressed in full**
- Due to the substantial depressurisation caused by historical mining, the additional effects of mining the Wongawilli Seam with non-caving first workings are **considered minor**.

Uncertainty Analysis & Peer Review

- Uncertainty Analysis undertaken by HydroAlgorithimics.
- Uncertainty Analysis confirms negligible drawdown predicted, even at the 90th percentile, of the water table in surficial layers in contact with local streams and Cataract Reservoir – these are the key layers relevant to impacts on swamps, surface water flows and Cataract Reservoir.
- Even at the "very unlikely to be exceeded" level, the worst-case impact attributable to the proposed mining is approximately 3.4 ML/year at Cataract Creek.
- The worst-case predicted impact on Cataract Reservoir via a transfer of water from the storage to depressurised strata below the reservoir is less than 1 ML/year.

Peer review confirms findings, specifically:

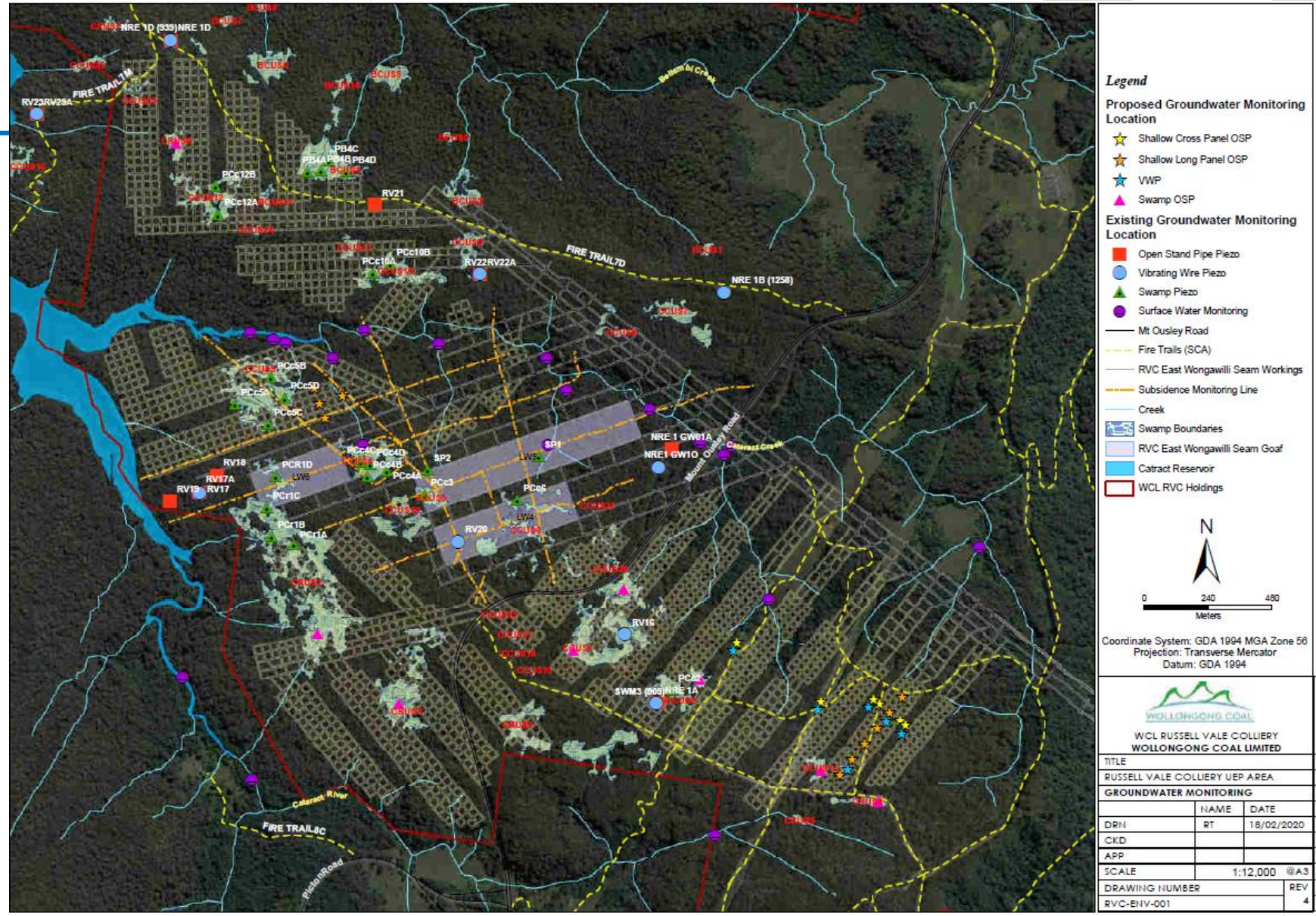
- *'the analysis presented by HydroAlgorithmics (HA) is considered to be **suitable and valid**'*.

Groundwater Monitoring

Existing monitoring network will be reviewed and additional monitoring proposed, including:

- Groundwater monitoring – level, quality, pumping volumes
- Swamp moisture
- Swamp water level and quality
- Surface water monitoring

Monitoring program will be reviewed in consultation with relevant agencies and outlined in Extraction Plan.



IPC clarifications - Water

Matter	Clarification
Risk of groundwater inflow to the proposed Wongawilli workings from overlying seams, including long term consequences on groundwater modelling and licensing	Groundwater inflows from overlying seams into the existing Wongawilli Seam workings already occur due to previous longwall mining in the Wongawilli Seam. These inflow have been accounted for in the groundwater model and calculations of licensing requirements.

Surface Water

Mining Area

- No mining beneath the Cataract Reservoir.
- No perceptible surface subsidence or significant interaction with surface water systems.
- **No perceptible subsidence-related impacts** to natural surface features including upland swamps, drainage lines, creeks, Cataract Creek and Cataract Reservoir.
- Impacts on surface flows associated with groundwater recovery are unlikely to be perceptible

Pit Top

- Pit Top surface water management system being upgraded to construct the approved Bellambi Gully Creek Diversion.
- Bellambi Gully Creek Diversion does not form part of the Revised Project, however the Revised Project will utilise this upgraded water management system.

Monitoring

- Water quality will be monitored on a regular basis and results shared with the public.

Adit Outflows

- No new adits proposed
- Existing approved operations will result in workings progressively flooding and spilling via adit even if Revised Project not approved. This will take some decades to occur.
- No change to adit outflows relative to existing approved operations other than a delay in the time until groundwater levels recover to the point of discharge from the existing adit.
- Modelled Adit outflow predicted to be up to 0.3ML/day.
- No change to the quality of water which will flow from the adit relative to existing approved operations (and existing mine water which is treated prior to discharge).
- Existing mine inflows are currently pumped from the Wongawilli seam workings, treated and discharged (if required) to Bellambi Gully Creek in accordance with the existing Environment Protection Licence. This will continue under the Revised Project.

Adit Outflows

- Following closure, it will be reasonable and feasible to treat water from the adit for discharge to the environment or beneficial re-use (Predicted outflows modelled at approximately 0.3ML/day or 110ML/year).
- Modelled outflow rates are lower than has historically been treated and discharged at Russell Vale during mining of LWs 4, 5 and 6 (average of 0.6ML/day and 1.1ML/day at peak).
- Due to the Revised Project not having any impact on groundwater quality relative to existing approved operations, there is no reason to suspect that the Revised Preferred Project will result in any change to adit outflow water quality relative to what is currently approved.
- Given the ability to treat adit discharge water, any future discharges of water into Bellambi Gully Creek can be managed to avoid adverse environmental risks.
- Proposed Consent condition requiring Adit Water Discharge Management Plan is appropriate.

Biodiversity

- Updated ecological assessment undertaken by Biosis.
- Assessment concludes that due to the change in mining method, **the risk of subsidence-related impacts to sensitive environmental features has been removed**. This includes negligible risk of impacts on upland swamps, cliffs, steep slopes, drainage lines, creeks, Cataract Creek and Cataract Reservoir.
- Threatened species occupying these sensitive environments (including Prickly Bush-Pea, Giant Burrowing Frog, Red Crowned Toadlet and the Giant Dragonfly) are therefore considered at **negligible risk of impact**.

Monitoring

- A program of ecological, surface water and groundwater monitoring has been undertaken at a number of impact and control sites since 2011/2012 aimed at identifying any potential impacts on swamps from the mining of LW4-6.
- This program will be reviewed in consultation with relevant agencies and included in an updated Upland Swamp Monitoring Program.

Biodiversity

- It is noted that most of the swamps recorded in the Wonga East area have previously been undermined in the Bulli, Balgownie and/or Wongawilli Seam and have experienced significant cumulative subsidence (up to 3.7m in some areas).
- Ongoing monitoring of these swamps has not identified any significant adverse impacts on these swamps attributable to mining.

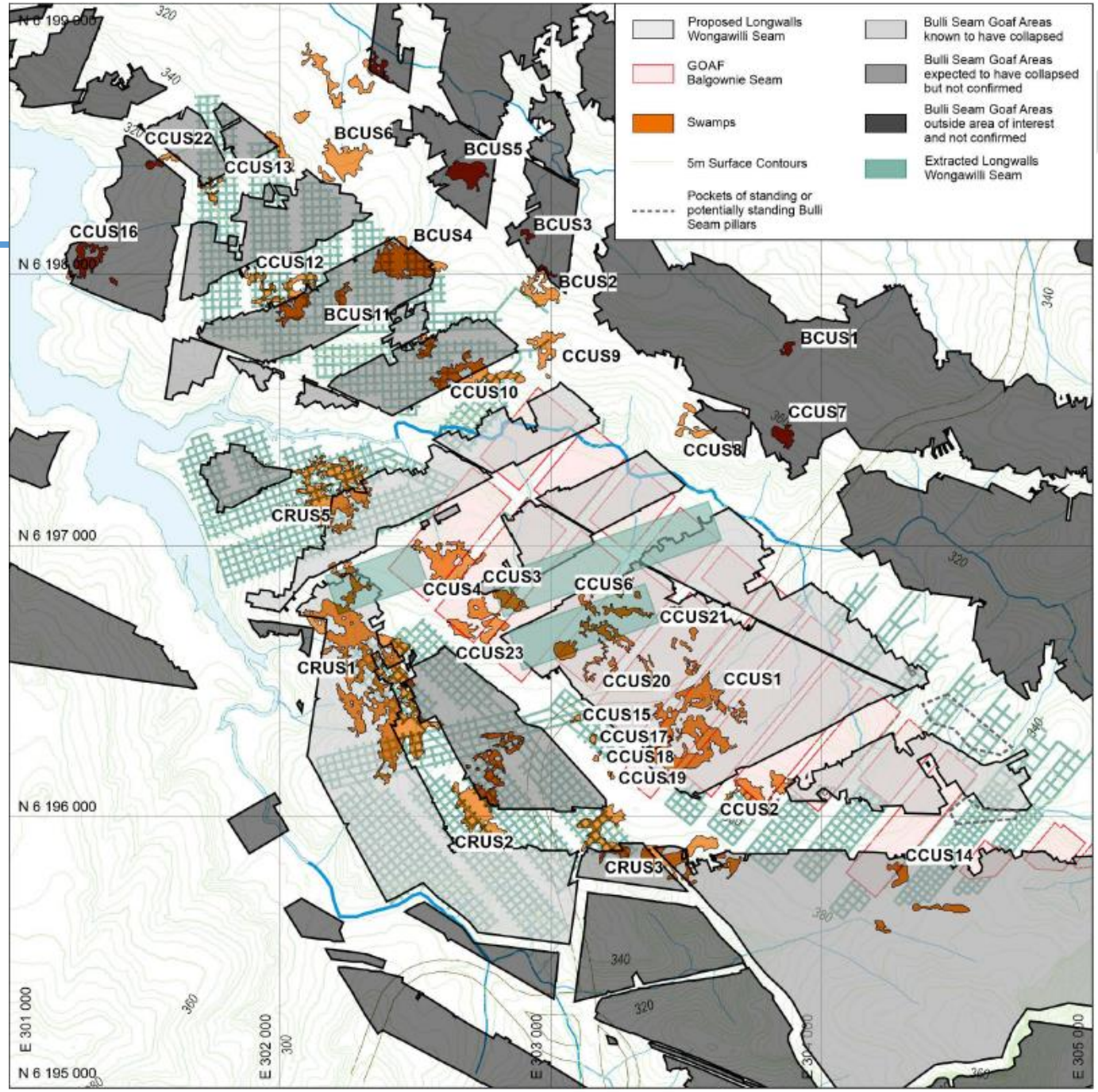


Figure 2: Location of Upland Swamps relative to historic and proposed mining.

Summary of Key Impacts, Proposed Management and Monitoring

Surface Facilities & Other Issues

Noise

- Noise assessment undertaken by Wilkinson Murray in accordance with Noise Policy for Industry (NPfI).
- The EPA has confirmed that the revised noise impact assessment **satisfactorily meets the EPA's guidelines** for consideration of environmental impacts from the proposal.
- Assessment explored all feasible and reasonable noise mitigation measures to achieve compliance with appropriate noise targets under NPfI.

Key design features to minimise noise impacts:

- Major redesign of the Pit Top has significantly reduced the predicted noise levels of the Revised Project in comparison to historical operations. This includes:
  - Relocation of infrastructure to more shielded locations
  - New noise barriers and extending bunds around the Pit Top
  - Acoustic treatment of new plant and equipment:
    - Enclosure of coal processing plant and secondary sizer within acoustically treated building
    - Acoustic treatment of surge bin and conveyors
    - Attenuation of engine and grouser on dozer

Noise

Key design features to minimise noise impacts (continued):

- Restricted hours of operation:
  - Surface facilities and product transport – 7am-6pm Monday to Friday, 8am-6pm Saturday
  - No Sundays or public holidays
  - ROM coal runout 24hrs
  - Provision for occasional operation until 10pm Monday to Friday under exceptional circumstances such as Port closures or interruptions. This would be rare and only as a result of unexpected events (assessed as part of noise assessment).
  - Operation of noisier mobile plant during day time only.
- Onsite truck parking area for early morning arrivals (no parking on local streets).
- Voluntary speed limits for trucks onsite (40km/hr) and on Bellambi Lane (50km/hr)

Noise

Operational Noise

- With additional noise controls in place, the Revised Project will **comply with operational noise trigger levels** at all surrounding residences during the day, evening and early morning shoulder period.
- Under adverse weather conditions, there is the potential for **minor exceedances (1-2dB)** of the criteria during **2-3% of winter nights** at 15 residences immediately adjacent to the site.
- NPfI and Voluntary Land Acquisition and Mitigation Policy (2018) defines a 1-2 dB exceedance as a **negligible** residual noise impact indiscernible by the average listener

Traffic Noise

- Noise from trucks transporting coal predicted to comply with NSW Road Traffic Noise Policy at residences along Bellambi Lane and surrounds.

Noise

Construction Noise

- Short periods during construction when noise levels trigger the need for additional noise management practices such as:
  - Scheduling activities to minimise noise impacts,
  - Notifying impacted residences of the nature and duration of works,
  - Using quieter equipment and methods where possible,
  - Implementing a complaints handling procedure, and
  - Monitoring
- To be addressed as part of proposed Construction Noise Management Plan

Monitoring

- Two long term noise monitors located onsite and will continue to monitor operational noise
- Attended monitoring proposed when construction occurring within 200m of a residence

IPC clarifications – Noise

Matter	Clarification
Whether the Project reflects contemporary noise mitigation measures	WCL, in consultation with the noise expert, explored all feasible and reasonable noise mitigation measures to achieve compliance with appropriate noise targets under NPfI. A comprehensive suite of design and operational control measures have been adopted for the Project including relocating plant and equipment, use of acoustic treatments such as bunds, enclosures and attenuation packs, and restricting operating hours. It is noted that in submissions on the Revised Project, the EPA raised concerns regarding extended timeframe for bund construction works. To address this concern, WCL amended the barrier and bund arrangement to reduce construction timeframes and ensure substantial barriers are in place prior to operations commencing. The EPA subsequently confirmed that the revised noise impact assessment satisfactorily met the EPA's guidelines for consideration of environmental impacts from the proposal.

Air Quality

Air quality assessment undertaken by ERM.

The EPA has confirmed that the air impact assessment **satisfactorily meets the EPA's guidelines** for consideration of environmental impacts from the proposal.

Assessment predicts **no exceedances of EPA air quality criteria** at any sensitive receptors off site.

Air Quality

Air quality control measures:

- Enclosed conveyors and coal transfer points
- Enclosed new Coal Processing Plant
- Automated water sprays (triggered by weather) on stockpiles and exposed areas
- Water sprays on noise bunds during construction
- Water cart on unsealed haul routes
- Revegetation/rehabilitation of disturbed areas
- Modifying or suspending activities during adverse weather conditions (e.g. high winds)

Monitoring

- Daily real time monitoring of air quality and local weather conditions using:
  - Two continuous air quality monitors located onsite – PM_{10} and $PM_{2.5}$
  - Onsite weather station

Traffic and Transport

- Traffic and transport impact assessment undertaken by Transport & Urban Planning.
- The Revised Project will generate traffic at levels similar to the previously approved operations.
- The Revised Project is unlikely to result in an adverse impact on the performance of the road network (including at key intersections), or on road safety or road users.
- Traffic conditions on the road network are predicted to remain satisfactory with the Revised Project operating at full capacity.

Traffic Control Measures

- Trucks restricted to 7am – 6pm Monday to Friday and 8am – 6pm Saturday. No Sundays or public holidays. Coal transport may occasionally be required until 10pm Monday to Friday in exceptional circumstances (e.g Port closures or interruptions)
- Voluntarily restricting truck speed to 50km/hr on Bellambi Lane and monitoring speeds.
- Road maintenance contribution to Council for ongoing maintenance of Bellambi Lane.
- Washing of trucks before leaving site.
- On-site truck parking area for early morning truck arrivals.

Reject management

- Revised Project will produce up to approximately 200,000 tonnes per annum of reject material.
- This reject material is rock that is located within the Wongawilli seam that is being mined. It is separated during coal processing via dry separation. No chemical treatment or wet processing.
- This material is proposed to be either sold for beneficial use or emplaced underground in disused workings. No above ground emplacement is proposed.
- Groundwater inflows to the workings are currently in permanent contact with this material while in-situ and the chemistry of the groundwater in part reflects the ongoing contact and saturation of this material.
- Geochemical testing of reject material located within the current Russell Vale Reject Emplacement Area indicates that the material is likely to be non-acid forming (NAF) and have a high factor of safety with respect to potential acid generation. Testing of total sulphur and metal concentrations also indicate the reject material is unlikely to adversely impact water quality. The reject material is also capable of meeting EPA standards for beneficial use.
- Ongoing monitoring of reject material will be undertaken during the course of the Project to identify any reject material which may not be suitable for underground disposal and appropriate measures implemented for its disposal in the unlikely event that the testing indicated a geochemical risk.

IPC clarifications – Waste

Matter	Clarification
Clarification on waste management, stockpiling and underground placement requirements	Reject, or waste rock, will be separated during coal processing and loaded to a temporary rejects stockpile (capacity 1,500 t). This material will preferentially be sold for beneficial use or emplaced underground. No above ground emplacement is proposed. As noted on the previous slide, this is material that is located within the Wongawilli Seam. Groundwater inflows have been in permanent contact with this material while in-situ and the chemistry of the groundwater in part reflects the ongoing contact and saturation of this material. Geochemical testing of existing rejects indicates that the material is likely to be non-acid forming and unlikely to adversely impact water quality within the seam. Ongoing monitoring of reject material is proposed to confirm its suitability for emplacement underground.

Social Impact & Opportunities

- Social Impact and Opportunities Assessment undertaken by Umwelt
- Assessment based on an extensive consultation program and environmental assessment outcomes.
- Engagement mechanisms included:
  - Personal interviews with near neighbours and landholders
  - Meetings with key regional community service sector stakeholders
  - Project briefings to interest groups
  - Project briefings to CCC
  - Community information sheets
  - Meetings with relevant local, State and Commonwealth agencies
  - Community Information Drop-in Session
  - Publication of Revised Project information on WCL website

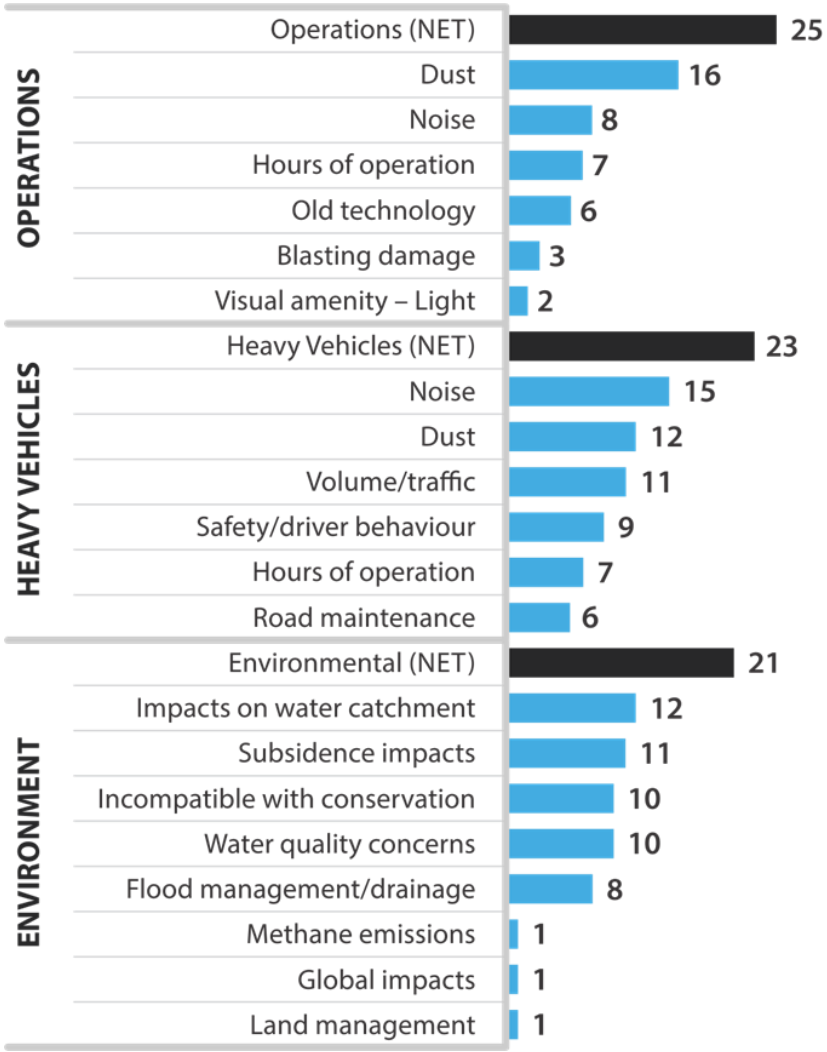
Social Impact & Opportunities

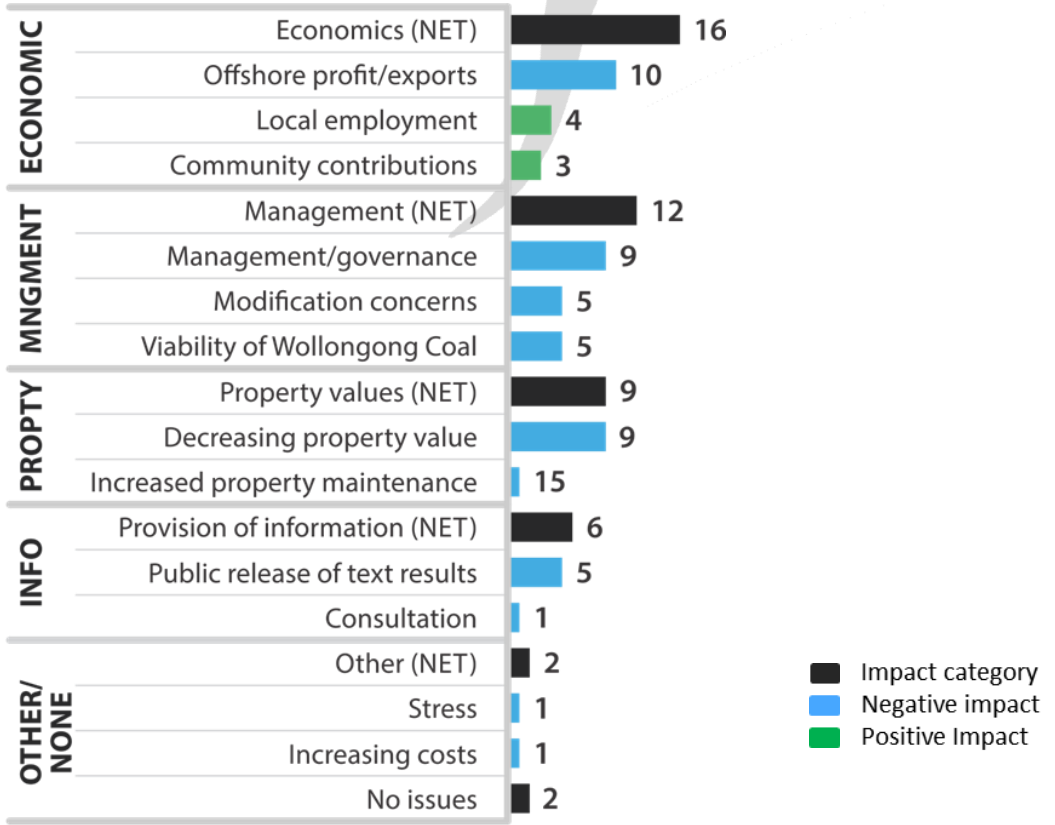
Consultation

- Phase 1 - Issue scoping in April/May 2017 to understand the issues and concerns of community and key stakeholders:
  - Project Information Sheet 1 (distributed to around 1,200 surrounding properties)
  - Direct contact with 158 stakeholders
  - 34 interviews conducted.

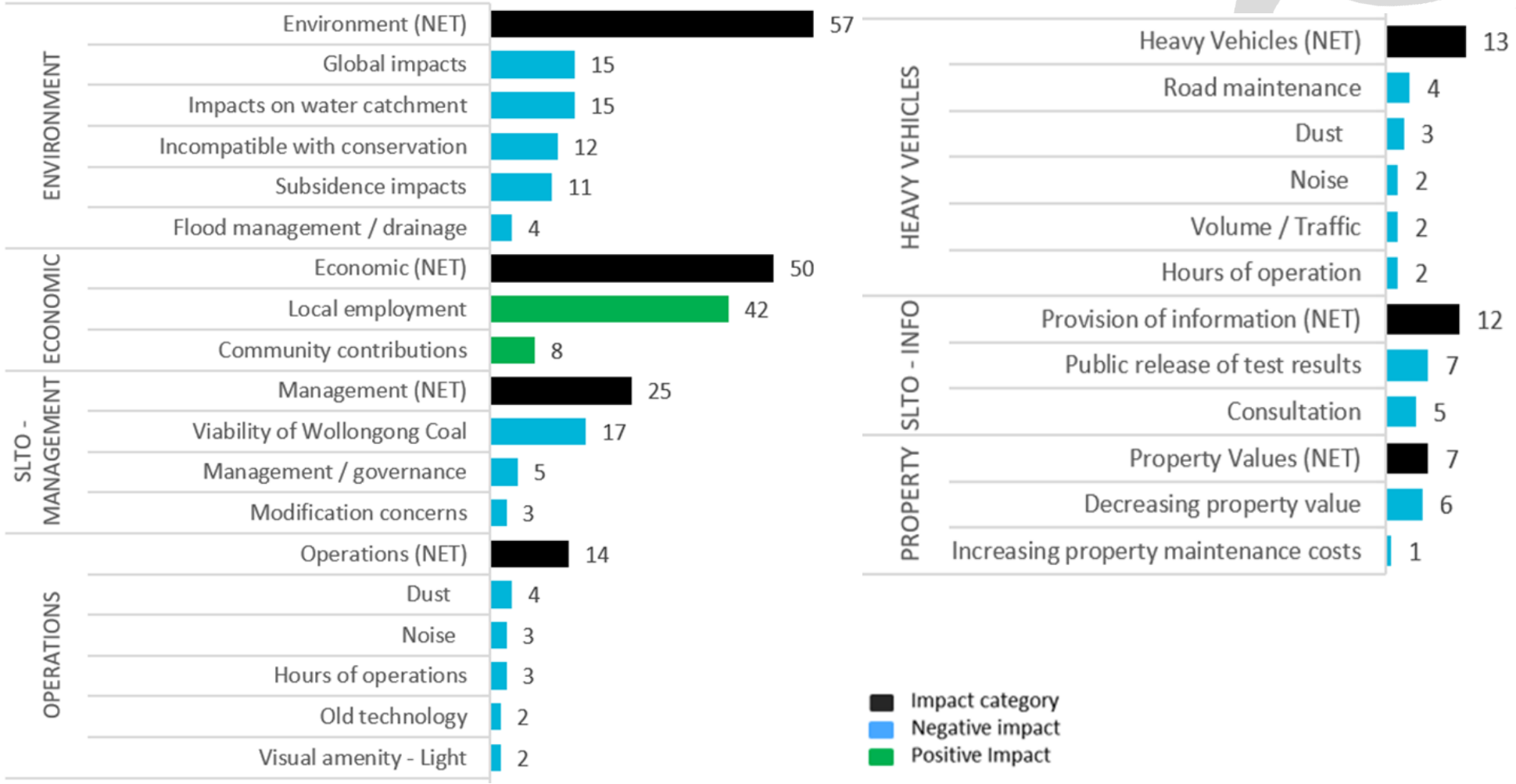
- Phase 2 - May 2019 to report on findings of detailed assessments and seek feedback on mitigation measures:
  - Project Information Sheet 2 (distributed to around 1,500 surrounding properties)
  - Meetings with key agency and community stakeholders
  - Community Information Session 25 May 2019 (advertised in local newspaper and invitation mailed to around 1,500 surrounding residences).

Engagement – Phase 1: Issues Identification





Engagement - Phase 2: Feedback



Economics

- An economic assessment was undertaken by Cadence Economics, which estimates the net economic benefits to both the State and Wollongong local area.
- The Revised Project will result in a substantial net benefit to the local community in the Wollongong area and NSW.
  - **Capital expenditure** of approximately $35.3 million over five years
  - **Jobs** – Up to 22 construction jobs and 205 full time operational jobs
  - **Royalties / Taxes paid to NSW** - $33.2 million in royalties and $3.4 million in payroll tax
  - **Council revenue** – $2.1 million in Council rates and land taxes
  - **Local Economy** – Net benefit of $17 million to the Wollongong region, associated with local employment and local suppliers.
  - **State Economy** - Net benefit of $174.3 million to NSW ($117m direct benefit; $57m indirect benefit)

IPC clarifications – Other matters

Matter	Clarification
EPBC Referral	An updated EPBC Act referral has been lodged. The Revised Project has been determined to be a controlled action and will be assessed by Public Environment Report. WCL is currently consulting with DAWE regarding the PER Guidelines. It is noted that the determination of controlled action and assessment method was made without the benefit of the peer reviewed Pillar Failure Risk Assessment. Peer reviewed assessments predict imperceptible impacts on Matters of National Environmental Significance.
Mine closure plans, rehabilitation and business closure costs	Substantial further prime hard coking coal will remain un-extracted within the central and western portions of the Russell Vale lease holding (estimated at ~295Mt JORC). Further exploration and feasibility studies being undertaken in these areas for a future extension of mining in this area. No immediate plans for closure. Rehabilitation objectives have been proposed and a Rehabilitation Management Plan will be prepared, as per requirements of draft conditions. Updated closure cost estimates have been prepared and are reflected in an updated rehabilitation security deposit.
Consultation regarding recommended conditions of consent	WCL was consulted in relation to draft conditions. No significant issues were raised, recommended conditions considered appropriate.

Conclusion

Conclusion

- Revised Project has addressed the issues of previous PAC and IESC reviews through a fundamental change to mine design
- Revised Project has been designed to avoid subsidence and subsidence related impacts - long term stable mine plan.
- Revised mine plan eliminates potential for significant impacts on groundwater, surface water, and biodiversity and provides far greater certainty of impact prediction.
- Peer reviewed impact assessments confirm imperceptible subsidence and imperceptible subsidence impacts on groundwater, surface water, biodiversity and surface features (including swamps, cliffs, creeks, drainage lines & Cataract Reservoir).
- Peer reviewed risk assessment confirms negligible risk of pillar failure beneath any upland swamps and that the risk of loss of any upland swamp is very rare to negligible (this being an existing risk associated with previous mining that is unlikely to be changed by the project)
- Revised Project addresses the WaterNSW Mining Principles for protection of the catchment and satisfies the “Neutral or Beneficial Effects” test
- Revised Project provides a net benefit to NSW of $174.3 million, 205 full time operational jobs and 22 construction jobs

Questions