

Surface Water Assessment Pit 8 Extension Modification Wilpinjong Coal Mine Wilpinjong Coal Pty Ltd 8 August 2025 1052-15-D4 - Comments

Executive Summary

Australia is the world's driest inhabited continent with highly variable climate patterns, rainfall and water supply with recurrent droughts and floods (Productivity Commission 2021). Droughts (and floods) can have devastating environmental consequences such as algal blooms and fish death events (Vertessy et al. 2019). The larger streams in NSW are usually defined by DPI-Fisheries as '*Key Fish Habitats*'. *Key Fish Habitat* was defined by DPI-Fisheries to include all marine and estuarine habitats up to the highest astronomical tide level (that reached by 'king' tides) and most permanent and semipermanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank.

Wollar Creek commences in the hilly areas east of the Great Dividing Range at the southern end of the Totnes Valley, NSW. It is subsequently joined by Dry Creek, Spring Creek, and then Barigan Creek, with the Barigan Creek confluence located approximately 6.5 km upstream of the Wollar township. Wollar Creek is a very important stream in this area and one which is identified as its own water source (*Wollar Creek Water Source*) in the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources (NSW Department of Primary Industries, Water 2016). Wollar Creek is a 7th order stream under the Strahler categorization (Strahler 1952) as it flows past the proposed Pit 8 Extension area, being joined by the 6th order Wilpinjong Creek approximately 3.5km downstream of the Wollar township.

Existing open cut mining at Wilpinjong Mine has already permanently altered the connectivity and hydrological processes of the following streams: Planters Creek (2nd order stream); Spring Creek (4th order stream); Narrow Creek (2nd order stream); Ben's Creek (3rd order stream); Slate Gully Creek (2nd order stream); as well as a number of smaller unnamed 1st order streams. Whilst the Cumbo Creek (5th order stream) drainage line is still largely intact¹, actual gauged flow and stage data for the Cumbo Creek downstream gauge were not presented in the Pit 8 Extension Modification assessment. It appears likely that Cumbo Creek no longer provides flows to Wilpinjong Creek except perhaps after exceptionally high rainfall events.

Ulan Seam aquifers that were previously described as artesian and connected to Wilpinjong Creek, have now been demonstrated to be impacted and in many areas both alluvial and coal seam aquifers have not recovered to their baseline levels. In many cases there was no adequate baseline data collected on alluvial and coal seam aquifers to even be able to make such an assessment. This situation continues to occur with no new bores identified in either the alluvium or coal seam close to the Wilpinjong Pit 8 Extension Proposal and Wollar Creek. It is noted that none of the existing monitoring bores are actually located in the *Highly Productive Alluvium* of the Wollar Creek Water

¹ Despite previous approvals allowing direct mining.

Source² and there is currently no monitoring of identified/mapped groundwater dependent ecosystems (GDE's) at risk of impact from the Wilpinjong Pit 8 Extension.

One of the most important features of the current Pit 8 Extension Plan is that it is now proposes to move open cut mining outside of the Wilpinjong Creek local catchment and into the Wollar Creek catchment, immediately adjacent to an area designated as a *Highly Productive Wollar Creek Water Source*. There is currently no flow gauge in Wollar Creek and there hasn't been any gauged flow measurements in Wollar Creek since the DIPNR gauge ceased recording in 1997 (before the Wilpinjong Coal Mine was approved). As a result, Wilpinjong Coal are in a very poor position to quantify the actual impact of the Pit 8 Extension on flows in Wollar Creek. The use of poorly calibrated and unvalidated surface water model outputs in the Surface Water Assessment provides little confidence in the resulting conclusions. At this point in time and without further supporting evidence, little faith is placed in the predictions from the AWBM model.

The current Pit 8 Extension Plan will likely permanently alter the connectivity and hydrological processes of one unnamed secondary tributary and two unnamed 1st order tributaries of Wollar Creek. Since it is difficult to accurately define the southern boundary of the proposed Pit 8 Extension, another 1st order tributary to Wollar Creek may also be at risk of permanent alteration. Whilst these tributaries are currently likely to be ephemeral in nature, it is noted that they have very limited if any baseline data collected and these streams have not been adequately described nor assessed in the MOD3 Pit 8 Extension Surface Water Assessment.

It is well known that many groundwater and surface water systems are connected to some degree and many ecosystems rely on groundwater for their survival (NWC 2012; Commonwealth of Australia 2013). Connectivity between groundwater and surface water largely occurs via alluvial aquifers and can vary in space and time (see Commonwealth of Australia Bioregional Assessments).

Based on past experience at Wilpinjong mine, it is highly likely that the Pit 8 Extension Plan will also significantly alter the groundwater levels in the coal seam and alluvial aquifers adjacent to Wollar Creek. The degree of connectivity and the rate of water flow between aquifers and surface water systems are strongly influenced by local and regional hydraulic pressures. This connectivity has not been well studied for Wollar Creek and is not rigorously addressed in the Surface Water or Groundwater Assessments.

There are insufficient coal seam and alluvial aquifer monitoring bores adjacent to Wollar Creek and insufficient baseline monitoring of flows in Wollar Creek to be able to assess the full extent of drawdown and impacts to surface waters as a result of the proposed Pit 8 Extension. As a result, there is significant uncertainty as to whether the important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 proposal is approved.

It is also highly likely that discharges to Wilpinjong Creek will increase further, further altering the natural flows in this system; as well as in Wollar Creek downstream of the Wilpinjong Creek confluence. The potential effects on Wollar Creek within Goulburn River National Park are largely unknown as these areas are not currently monitored. The likely increases in discharges will also lead to an increased salt load to the Wollar Creek (and Hunter River) catchment.

It is noted that the June and September 2025 CCC Minutes identify that Wilpinjong Coal are negotiating with the EPA to increase the discharge volume for LDP24 (from 6.5 ML/day to 20 ML/day). The September 2025 CCC minutes stated: *Application to NSW EPA to increase water*

² Or *Highly Productive Alluvium* in Wilpinjong Creek.

discharge is due to be submitted in the coming weeks. The proposed increase in discharge volume for LDP24 (to 20 ML/day) was neither identified nor assessed in the WRM (2025) Surface Water Assessment report.

Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands is recognised as a major factor contributing to loss of biological diversity and ecological function in aquatic ecosystems, including floodplains. *Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands* is also listed under Schedule 4 of the *Biodiversity Conservation Act* as a **key threatening process**.

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Environmental Data Analysis Pty Ltd*

29 October 2025

*** Disclaimer**

Environmental Data Analysis Pty Ltd (EDA) has compiled this review for the benefit of the Wollar Progress Association in good faith, exercising all due care and attention. No representation is made about the accuracy, completeness or suitability of the information in this publication for any particular purpose. EDA shall not be liable for any damage which may occur to any person or organisation acting or not based on this review. EDA accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report and its supporting material by any third party. Readers should seek appropriate advice when applying the information to their specific needs.

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Introduction

The Wilpinjong Coal Mine originally operated under Project Approval (PA 05-0021) that was granted by the Minister for Planning under Part 3A of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) on 1 February 2006.

On 24 April 2017, WCPL was granted Development Consent (SSD-6764) for the Wilpinjong Extension Project (WEP) that included continuation of operations to 2033 at rates of up to 16 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal.

WCPL is seeking to modify Development Consent (SSD-6764) to facilitate an extension of the existing Pit 8 (the *Pit 8 Extension*) within Exploration Licence (EL) 9399 and development of associated supporting infrastructure and facilities (the Modification).

On 8 October 2025, the Wollar Progress Association wrote to Environmental Data Analysis Pty Ltd (EDA) requesting an independent review of the Wilpinjong MOD3 proposal, focussing on the Surface Water Assessment (Appendix E). In particular, the Wollar Progress Association asked for the provision of information on the following:

1. Your position on the findings/conclusions
2. A brief overview of likely impacts to streams, including Wilpinjong and Wollar Creeks, from the Wilpinjong MOD3 proposal.
3. Any areas relevant to the Wilpinjong MOD3 Surface Water Assessment which, in your view, have not been adequately covered
4. Recommendations on any matters that should be referred to the Independent Expert Advisory Panel for Mining (IEAPM)
5. Recommendations on any ways to avoid impacts, e.g. Redesign of pit geometry to avoid/minimise impacts to Wilpinjong and Wollar Creeks.
6. Any other matters that you consider relevant to a better understanding and assessment of Surface Water impacts from the proposed mine expansion.

The current report has been written to try and address the questions raised by the Wollar Progress Association. Sections 1-6 of this report address the specific information requests from the Wollar Progress Association; while Sections 7-12 provide supporting evidence for these conclusions. References cited are included in Section 13.

1. Position on the findings/conclusions

In my opinion the Surface Water Assessment understates the potential impacts of the proposal on the surface water hydrology and aquatic habitat of the area.

It is well known that many groundwater and surface water systems are connected to some degree and many ecosystems rely on groundwater for their survival (NWC 2012³; Commonwealth of Australia 2013⁴). Connectivity between groundwater and surface water largely occurs via alluvial aquifers and can vary in space and time (Commonwealth of Australia Bioregional Assessments⁵).

Up until the current proposal, the impacts of the mining have largely been restricted to the Wilpinjong Creek catchment. One of the most important features of the current Pit 8 Extension Plan is that it now proposes to move open cut mining outside of the Wilpinjong Creek local catchment and into the Wollar Creek catchment, immediately adjacent to an area designated as a *Highly Productive Wollar Creek Water Source*. Very little sampling and/or monitoring has occurred in these areas to establish baseline conditions. There is significant uncertainty as to whether these important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 proposal is approved.

WRM's (2025) Surface Water Assessment addresses the likely impacts of the Pit 8 Extension Modification proposal on flows in Wollar Creek primarily using Numerical Modelling. Recent surface water assessments (e.g. WRM 2015 and WRM 2025) have not provided graphs of modelled and observed data and so the reliability and veracity of the conclusions from the model cannot be appropriately assessed. Where "modelled" flow exceedance curves have been provided, they do not appear to match 'real' gauged flow data; in some cases, seriously underestimating the percentiles for flow in these areas. This effect is compounded by a lack of public access to the daily flow data and, for Wollar Creek, the complete lack of any contemporary gauged flow monitoring.

There is currently no flow gauge in Wollar Creek and there hasn't been any gauged flow measurements since the DIPNR gauge ceased recording in 1997 (before the Wilpinjong Coal Mine was approved). Moreover there appear to be no plans by WCPL to introduce daily gauged flow monitoring to Wollar Creek so that the actual impacts to flows from the Pit 8 Extension Modification can be assessed/quantified.

WRM (2025) do not illustrate flow records for Wilpinjong Creek prior to 2012 (which would include baseline flow data for Wilpinjong Creek). There has also been no rigorous investigation of the impacts of Wilpinjong mining on flows, especially at WILSGD which now consistently receives ~4.5 ML/day of water from the RO Plant. It is noted that alteration to the natural flow regime of rivers is listed as a **key threatening process**⁶ under Schedule 4 of the *Biodiversity Conservation Act*.

³ NWC 2012, Groundwater essentials, National Water Commission, Canberra.

⁴ Commonwealth of Australia 2013. Guidelines for groundwater quality protection in Australia National Water Quality Management Strategy

⁵ <https://www.bioregionalassessments.gov.au/assessments/11-context-statement-central-west-subregion/1161-connectivity-between-groundwater-and-surface-water>

⁶ <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2000-2003/alteration-to-the-natural-flow-regimes-key-threatening-process-listing>

The groundwater assessment identifies the potential connection of the Ulan Coal seam aquifer to Wilpinjong Creek and obvious impacts have now been documented to both the coal seam and alluvial aquifers adjacent to Wilpinjong Creek (SLR 2024; SLR 2025; Wilpinjong Mine Annual Groundwater Reviews). Where there were once artesian connections between the coal measures and Wilpinjong Creek (see AGE 2005), these connections have now potentially been permanently altered as a result of mining. No allowance has been made for similar effects of the Wilpinjong Pit 8 Extension Proposal on the Wollar Creek alluvium and there are currently insufficient coal seam and alluvial aquifer monitoring bores adjacent to Wollar Creek (or in the *Highly Productive Wollar Creek Water Source* areas).

The Hunter River valley is generally considered to be saline due to the marine origin of some of its Permian sediments (EPA 2013). There is a strong correlation between the areas of Permian sediments and areas of known or predicted dryland salinity risk (EPA 2013). Dryland salinity is one of the most intractable threats to the health and utility of Australia's rivers, soil and vegetation (Williams et al 2002)⁷. The 1998 report to the Prime Minister's Science Engineering and Innovation Council (PMSEIC) on dryland salinity noted that the time scales over which salinity establishes itself, spreads, and has its effects can be long, but once established, it can be very difficult or impossible to contain or reverse.

The NSW EPA licences discharges from Wilpinjong Mine via EPL12425. EPL12425 currently identifies two licensed discharges to waters: LDP24 - Surface water discharge downstream of the outlet from the reverse osmosis plant; and LDP30 - Surface water discharge downstream from clean water dam. LDP24 has a maximum volumetric limit of 6.5 ML/day⁸ (approximately 2.7 Olympic swimming pools per day). There are also licence limits for LDP24 on conductivity, pH, suspended solids and oil and grease. LDP30 has no volumetric limit.

The surface water assessment has not teased out the contribution of RO water from LDP24 to the current flow hydrograph at WILGSD⁹ and, as a result, does not fully assess the impact of the LDP24 discharge on Wilpinjong Creek (or Wollar Creek downstream of the Wilpinjong Creek confluence).

It is unclear how the current flow rates from LDP24 (and its variability) can be reconciled with the EPL 12425 condition that: *All water discharged from the premises must have a flow regime which is variable and consistent with the ephemeral nature of the flows in Wilpinjong and Cumbo Creeks.*

WRM (2025) did not address this EPL condition in their assessment, nor have they mentioned/assessed a projected increase in flow from LDP24 (to 20 ML/day; see WCPL June 2025 CCC Minutes). It appears likely that the identified need to increase the EPL24 discharge to 20 ML/day is primarily generated by the Modification proposal to develop Pit 8¹⁰. There is no proposed increase of the size of on-site storages to accommodate the additional water potentially generated by the Wilpinjong Pit 8 Extension.

The current discharge rates from the RO plant are significantly altering the natural flow regimes of Wilpinjong Creek. Since there has been no flow monitoring of Wollar Creek since the DIPNR

⁷ Williams, J., Walker, G.R. and Hatton, T.J. 2002. Dryland salinization: a challenge for land and water management in the Australian landscape. Agriculture, hydrology and water quality pp. 457-475 <https://doi.org/10.1079/9780851995458.0457>

⁸ Originally the volume limit on EPL12425 was 5 ML/day but it has been varied a number of times in the past, including an increase to 15 ML/day at one stage to enable emergency discharges from Wilpinjong Coal dams.

⁹ For example, by subtracting LDP24 discharges from the WILGSD gauged flows to identify 'natural flows' at the downstream gauging station

¹⁰ And potentially Pits 9 & 10 in the future. See *Cumulative Impact* Section below.

monitoring ceased in 1997, there is also no rigorous assessment of the effect of the increased flows on Wollar Creek downstream of the Wilpinjong Creek confluence.

Emergency discharges from Wilpinjong Coal Mine also occurred in 2022- January 2023. For the first Emergency Discharge 1,287 ML was discharged with an EC level between 3,500 and 4,500 $\mu\text{S}/\text{cm}$. For the second Emergency Discharge 320 ML was discharged with an EC level between 3,250 and 4,500 $\mu\text{S}/\text{cm}$.

There has been an increase in the salt load discharged from LDP24 to Wilpinjong Creek in recent years, with the current annual salt load discharged being ~415 tonnes per annum¹¹. The total cumulative salt load discharged since 2013 sits at ~1769 tonnes (as of April 2025)¹². Based on total flows and estimated conductivity levels, the Emergency Discharges during 2022-2023 would have added a further ~3,500 to ~4,600 tonnes of salt to the environment. WRM (2025) is largely silent on the effects of the discharge of these salt loads on the environment.

WRM (2025) also does not discuss the effect of discharging 14,000 $\mu\text{S}/\text{cm}$ EC *concentrate* and *backwash* to Pit 2W. Over time this would obviously have the effect of increasing the EC concentration in Pit 2W. Subsequent feed water drawn from Pit 2W would then likely increase EC concentrations yet again as 15% of the feed comes back to Pit 2W as *concentrate* and *backwash*. There appears to be a high likelihood that salts are simply recirculating and concentrating in Pit 2W.

Since Pit 2W is unlikely to be lined (ie impervious to saline water) there is also significant potential for waste mine water with rising EC levels in Pit 2W to be leaching into the groundwater of the area. This is a common problem in other coal mining areas where brine is either mixed with ash or coal waste and placed in ash repositories (e.g. near Mt Piper) or discharged into underground workings (e.g. at Tahmoor). The potential for highly saline water in Pit 2W to migrate/leach into groundwater aquifers is not currently monitored and has not been assessed in the current proposal.

2. A brief overview of likely impacts to streams, including Wilpinjong and Wollar Creeks, from the Wilpinjong MOD3 proposal.

The IESC (2013) identified that the cumulative impacts from the expansion of mining operations in the upper Goulburn River potentially had long term implications for the groundwater and river system. In relation to the Wilpinjong Mine, the March 2016 IESC advice (IESC 2016a)¹³ on the project noted the lack of information on mitigation and management measures, surface water baseline data, and groundwater baseline data in the Environmental Impact Statement (EIS). The IESC (2016b)¹⁴ considered that uncertainty remained regarding the potential impact of the proposed project on a number of key water resources identified in the area, such as downstream aquatic ecosystems, particularly within the Goulburn River National Park, and the registered bore associated with Wollar

¹¹ For 2024.

¹² But note there is significant uncertainty associated with this estimate given data quality issues and the lack of public access to daily flow and EC levels.

¹³ IESC 2016-075: Wilpinjong Extension Project (EPBC 2015/7431, SSD6764) – Expansion. <https://www.iesc.gov.au/sites/default/files/2022-07/iesc-advice-wilpinjong-2016-075.pdf>

¹⁴ Advice to decision maker on coal mining project IESC 2016-078: Wilpinjong Extension Project (EPBC 2015/7431, SSD 6764) – Expansion. <https://www.iesc.gov.au/sites/default/files/2022-07/iesc-advice-wilpinjong-2016-078.pdf>

School. Other groundwater dependent ecosystems (GDEs) may also be present within the project boundary and surrounds; however the potential impact on these remains uncertain.

Existing open cut mining at Wilpinjong Mine has already permanently altered the connectivity and hydrological processes of the following streams: Planters Creek (2nd order stream); Spring Creek (4th order stream); Narrow Creek (2nd order stream); Ben's Creek (3rd order stream); Slate Gully Creek (2nd order stream); as well as a number of smaller unnamed 1st order streams. Whilst the Cumbo Creek (5th order stream) drainage line is still largely intact¹⁵, actual gauged flow and stage data for the Cumbo Creek downstream gauge¹⁶ were not presented in the Pit 8 Extension Modification assessment. It appears likely that Cumbo Creek no longer provides flows to Wilpinjong Creek except perhaps after exceptionally high rainfall events.

Ulan Seam aquifers that were previously considered artesian¹⁷ and connected to Wilpinjong Creek (e.g. AGE 2005) have now been demonstrated to be impacted and in many areas both alluvial and coal seam aquifers have not recovered to their baseline levels. In many other areas there was no adequate baseline data collected on alluvial and coal seam aquifers to even be able to make such an assessment. This situation continues to occur with no new bores identified in either the alluvium or coal seam close to Wollar Creek. It is noted that none of the existing bores are actually located in the *Highly Productive Alluvium* of the Wollar Creek Water Source¹⁸ and there is currently no monitoring of identified/ mapped GDE's at risk of impact from the Pit 8 Extension.

One of the most important features of the current Pit 8 Extension Plan is that it is now proposes to move open cut mining outside of the Wilpinjong Creek local catchment and into the Wollar Creek catchment, immediately adjacent to an area designated as a *Highly Productive Wollar Creek Water Source*. There is currently no flow gauge in Wollar Creek and there hasn't been any gauged flow measurements in Wollar Creek since the DIPNR gauge ceased recording in 1997 (before the Wilpinjong Coal Mine was approved). As a result, Wilpinjong Coal are in a very poor position to quantify the actual impact of Pit 8 on flows in Wollar Creek. The use of poorly calibrated and unvalidated surface water model outputs in the Surface Water Assessment provides little confidence in the resulting conclusions. At this point in time and without further evidence, little faith is placed in the predictions from the AWBM model.

The current Pit 8 Extension Plan will likely permanently alter the connectivity and hydrological processes of one unnamed secondary tributary and two unnamed 1st order tributaries of Wollar Creek (see Figure below). Since it is difficult to accurately define the southern boundary of the proposed Pit 8 (because of the lack of a publicly available GIS layer), another 1st order tributary to Wollar Creek may also be at risk of permanent alteration. Whilst these tributaries are currently likely to be ephemeral in nature, it is noted that they have very limited if any baseline data collected and these streams have not been adequately described or assessed in the MOD3 Pit 8 Extension Surface Water Assessment.

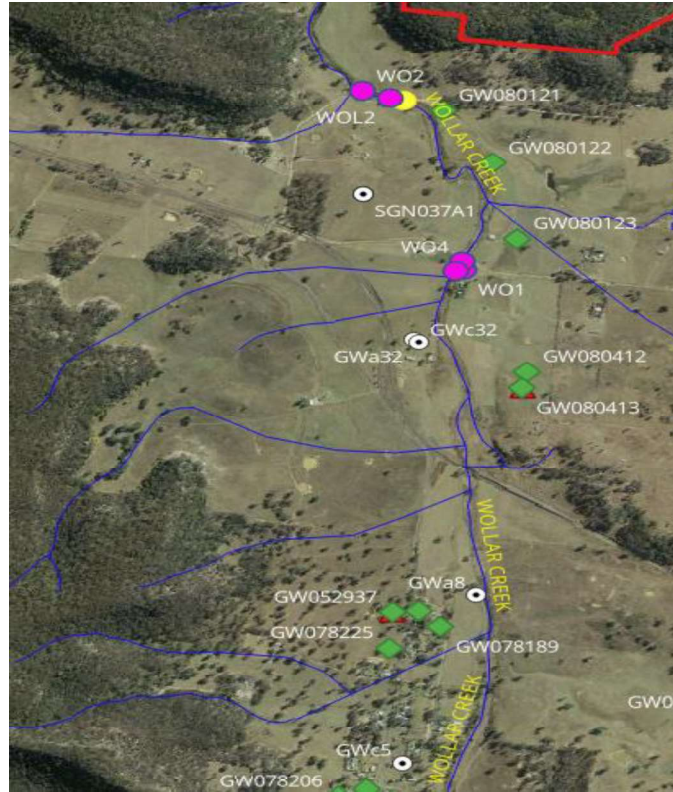
¹⁵ Despite previous approvals allowing direct mining.

¹⁶ WRM (2025) did provide a graph of the Cumbo Creek upstream gauge (CCGSU), but the CCGSU gauge appears to have been installed in 2015 and has no pre-mining baseline data. At the time of a site visit on 14 October 2025 neither Cumbo Creek at the Wollar Road crossing or Ulan-Wollar Road Crossing were flowing. In contrast, Wollar Creek has a steady flow well upstream of Wilpinjong Creek.

¹⁷ The USGS suggests that Artesian water is really not different from other groundwater, except for the fact that it flows to the land surface because pressure in the rocks underground force it to the surface.

https://www.usgs.gov/water-science-school/science/artesian-water-and-artesian-wells?qt-science_center_objects=0#qt-science_center_objects

¹⁸ Or *Highly Productive Alluvium* in Wilpinjong Creek.



First and second order tributaries draining to Wollar Creek within or near the MOD3 Pit 8 Extension area. Drainage lines based on the Geoscience Australia (2015) Surface Hydrology Lines (Regional) GIS layer.

Based on past experience at Wilpinjong mine, it is highly likely that the Pit 8 Extension Plan will also significantly alter the groundwater levels in the coal seam and alluvial aquifers adjacent to Wollar Creek. The degree of connectivity and the rate of water flow between aquifers and water systems are strongly influenced by local and regional hydraulic pressures. This connectivity has not been well studied for Wollar Creek and is not rigorously addressed in the Surface Water or Groundwater Assessments.

There are insufficient coal seam and alluvial aquifer monitoring bores adjacent to Wollar Creek and insufficient baseline monitoring of flows in Wollar Creek to be able to assess the full extent of drawdown and impacts to surface waters as a result of the proposed Pit 8 Extension. As a result, there is significant uncertainty as to whether the important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 proposal is approved.

It is also highly likely that discharges to Wilpinjong Creek will increase further, further altering the natural flows in this system; as well as in Wollar Creek downstream of the Wilpinjong Creek confluence. The potential effects on Wollar Creek within Goulburn River National Park are largely unknown and these areas are not currently monitored. The likely increases in discharges will also lead to an increased salt load to the Wollar Creek (and Hunter River) catchment.

It is noted that the June and September 2025 CCC Minutes identify that Wilpinjong Coal are negotiating with the EPA to increase the discharge volume for LDP24 to 20 ML/day. The September 2025 CCC minutes stated: *Application to NSW EPA to increase water discharge is due to be submitted*

in the coming weeks. The proposed increase in discharge volume for LDP24 (to 20 ML/day) was neither identified nor assessed in the WRM (2025) report.

Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands is recognised as a major factor contributing to loss of biological diversity and ecological function in aquatic ecosystems, including floodplains. *Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands* is listed under Schedule 4 of the *Biodiversity Conservation Act* as a **key threatening process**¹⁹.

3. Any areas relevant to the Wilpinjong MOD3 Surface Water Assessment which, in your view, have not been adequately covered

In my view there are a number of areas relevant to the Surface Water Assessment that receive inadequate coverage.

A summary of the surface water impacts from previous mining has not been provided, nor used to help inform the Pit 8 Extension proposal. Existing open cut mining at Wilpinjong Mine has already permanently altered the connectivity and hydrological processes of the following streams: Planters Creek (2nd order stream); Spring Creek (4th order stream); Narrow Creek (2nd order stream); Ben's Creek (3rd order stream); Slate Gully Creek (2nd order stream); as well as a number of smaller unnamed 1st order streams.

WRM (2025) do not illustrate flow records for Wilpinjong Creek prior to 2012 (which would include baseline flow data for Wilpinjong Creek). Moreover, there has been no investigation of the potential impacts of Wilpinjong mining on flows, especially at WILSGD which now consistently receives ~4.5 ML/day of water from the RO Plant. There has been inadequate Before-After assessments undertaken to assess mining impacts on Wilpinjong Creek (and other areas).

Whilst the Cumbo Creek (5th order stream) drainage line is still largely intact²⁰, actual gauged flow and stage data for the Cumbo Creek downstream gauge²¹ were not presented in the Pit 8 Extension Modification assessment. It appears likely that Cumbo Creek no longer provides flows to Wilpinjong Creek except perhaps after exceptionally high rainfall events. The effect of mining on Cumbo Creek flows could potentially be assessed further if there was unrestricted access to Wilpinjong Coal's flow data for Cumbo Creek (i.e. for both the Cumbo Creek upstream and downstream gauging stations over the entire period of records).

One of the most important features of the current Pit 8 extension plan is that it is now proposes to move open cut mining outside of the Wilpinjong Creek local catchment and into the Wollar Creek catchment, immediately adjacent to an area designated as a *Highly Productive Wollar Creek Water Source*. Very little sampling and/or monitoring has occurred in these areas to establish baseline

¹⁹ <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2000-2003/alteration-to-the-natural-flow-regimes-key-threatening-process-listing>

²⁰ Despite previous approvals allowing direct mining.

²¹ WRM (2025) did provide a graph of the Cumbo Creek upstream gauge (CCGSU), but the CCGSU gauge appears to have been installed in 2015 and has no pre-mining baseline data. At the time of a site visit on 14 October 2025 neither Cumbo Creek at the Wollar Road crossing or Ulan-Wollar Road Crossing were flowing. In contrast, Wollar Creek has a steady flow well upstream of Wilpinjong Creek.

conditions. There is significant uncertainty as to whether these important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 proposal is approved.

It is well known that many groundwater and surface water systems are connected to some degree and many ecosystems rely on groundwater for their survival (NWC 2012; Commonwealth of Australia 2013). Connectivity between groundwater and surface water largely occurs via alluvial aquifers and can vary in space and time. Interactions between groundwater and surface water sustain groundwater-dependent ecosystems and regulate river temperature and biogeochemical cycles, amongst many other processes (Irvine et al 2024). The Wilpinjong MOD3 Surface Water Assessment provides limited discussion of the potential connectivity issue and largely relies on modelling to estimate flow losses.

It is noted that there has been significant variation in the surface and groundwater models used to assess impacts at Wilpinjong Mine over time (e.g. see Gilbert & Associates 2005, AGE 2005, WRM 2015, WRM 2025, Hydrosimulations 2015, SLR 2024, 2025). Whilst there is obviously a need to try and maintain consistency/accuracy in such models over time, the constant changing of models means that the validation phase of modelling is rarely, if ever, addressed in detail.

Under such circumstances, there is an important need to include rigorous calibration reports for the modelling when assessing the utility of the models for impact prediction in Project Modifications/Expansions. One of the most important ways to incorporate scientific rigour into these assessments is to assess the congruence between modelled and observed data and investigate the reasons behind any serious deviations from model predictions.

It is noted that the original surface water AWBM model (Gilbert & Associates 2005) often exhibited a poor agreement with observed data. Whilst the Gilbert & Associates AWBM model was able to replicate the 2008 flows in Wilpinjong Creek, it provided a very poor prediction for the 2009 flows. In particular the model predicted flows of between 600 ML/day (Wilpinjong Creek upstream gauge) and 1500 ML/day (Wilpinjong Creek downstream gauge) in December 2009 when there was virtually no flow recorded at either gauge. Similar discrepancies were seen in the predicted and observed flows in 2010. Such discrepancies cast significant doubt on the predictive value of the Gilbert & Associates AWBM model itself.

More recent surface water assessments (e.g. WRM 2015 and WRM 2025) have also used an AWBM²² model but have not provided sufficient details of the model architecture and assumptions or any time series graphs of modelled and observed data, and so the reliability and veracity of the conclusions from the AWBM model cannot be appropriately assessed. Where “modelled” flow exceedance curves have been provided they do not appear to match ‘real’ gauged flow data; in some cases, seriously underestimating the flow percentiles in these areas. This effect is compounded by a lack of public access to the daily flow data and, for Wollar Creek, the complete lack of any contemporary gauged flow monitoring.

It is also noted that the groundwater assessment and previous groundwater reviews (e.g. AGE 2005; Groundwater Exploration Services 2014; SLR 2024) identified the potential direct connection of the Ulan Coal seam aquifer to Wilpinjong Creek. There are obvious impacts documented to both the coal seam and alluvial aquifers adjacent to Wilpinjong Creek. Where there were once artesian connections between the coal measures and Wilpinjong Creek, they have now potentially been permanently altered as a result of mining. No allowance has been made for similar effects of the Wilpinjong Pit 8 Extension Proposal on Wollar Creek and there are currently insufficient coal seam

²² Potentially a different AWBM model to that of Gilbert & Associates (2005).

and alluvial aquifer monitoring bores adjacent to Wollar Creek to investigate surface water - groundwater connectivity in this area.

The Hunter River valley is generally considered to be saline due to the marine origin of some of its Permian sediments. However, recent land-use activities in the catchment may have contributed to rising groundwater levels in some areas and an increase in the salinity load reaching many streams. Dryland salinity is one of the most intractable threats to the health and utility of Australia's rivers, soil and vegetation (Williams et al 2002). The 1998 report to the Prime Minister's Science Engineering and Innovation Council (PMSEIC) on dryland salinity noted that 'the time scales over which salinity establishes itself, spreads, and has its effects can be long, but once established it can be very difficult or impossible to contain or reverse.

There has been an increase in the salt load discharged from LDP24 to Wilpinjong Creek in recent years, with the current annual salt load discharged being ~415 tonnes per annum²³. The total cumulative salt load discharged since 2013 sits at ~1769 tonnes (as of April 2025)²⁴. Based on total flows and estimated conductivity levels, the Emergency Discharges during 2022-2023 would have added a further ~3,500 to ~4,600 tonnes of salt to the surface water environment. The salt load discharged from Wilpinjong Mine could also be expected to significantly increase further if the proposed increase in discharge (to 20 ML/day) is approved. The Surface Water Assessment does not consider the effect of these salt loads on the surface water systems (ie Wilpinjong Creek and Wollar Creek downstream of the Wilpinjong Creek confluence).

WRM (2025) also do not discuss the effect of discharging 14,000 µS/cm EC *concentrate* and *backwash* to Pit 2W. Over time this would obviously have the effect of increasing the EC concentration in Pit 2W. Subsequent feed water drawn from Pit 2W would then likely increase EC concentrations yet again as 15% of the feed comes back to Pit 2W as *concentrate* and *backwash*. There appears to be a high likelihood that salts are simply recirculating and concentrating in Pit 2W. Since Pit 2W is unlikely to be lined (ie impervious to saline water) there is also significant potential for waste water with rising EC levels in Pit 2W to be leaching into the groundwater of the area. It is likely that spray irrigation from Pit 2W would also contribute salt to the landscape. All of these components should have been considered in the Salt Balance for the mine site and the potential environmental effects of these salt loads assessed.

WRM (2025) have only provided a total site water balance and do not state an incremental water make due to the Pit 8 Extension on its own. Four clean water dams are identified with a total storage capacity of 2.3 ML. Discharges from the clean water dams would be up to 80 L/s and would be discharged via a "*proposed new LDP*". **No location or details for this "proposed new LDP" are provided in the Surface Water Assessment.** The environmental effects of concentrating the flow from 4 catchments and redirecting the water to a single location has not been assessed. It is expected that there could be significant erosional effects of such concentrated flows on Wollar Creek if such a discharge is not properly managed.

²³ For 2024.

²⁴ But note there is uncertainty associated with this estimate given data quality issues and the lack of public access to daily flow and EC levels.

4. Recommendations on any matters that should be referred to the Independent Expert Advisory Panel for Mining (IEAPM)

One of the most important features of the current Pit 8 extension plan is that it is now proposes to move open cut mining outside of the Wilpinjong Creek local catchment and into the Wollar Creek catchment, immediately adjacent to an area designated as a *Highly Productive Wollar Creek Water Source*. Very little sampling and/or monitoring has occurred in these areas to establish baseline conditions. There is significant uncertainty as to whether the important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 Extension Proposal is approved.

It is recommended that the Independent Expert Advisory Panel for Mining (IEAPM) investigate the following issues in detail:

- Review the existing impacts to Wilpinjong Creek and Cumbo Creek flows and alluvial and coal seam aquifers as a result of previous open cut pit operations at Wilpinjong Coal Mine²⁵.
- Review the adequacy of current monitoring of alluvial and coal seam aquifers close to Wollar Creek as well as the lack of any contemporary monitoring of flows in Wollar Creek.
- Investigate the calibration and validation of the Surface Water and Groundwater Models and assess the congruence of modelled output with 'real' measured data.
- Review the poor level of agreement of modelled versus observed data for the Surface Water and Groundwater Models and the implications for flow losses in the *Wollar Creek Water Source* as a result of the Wilpinjong Pit 8 Extension Proposal.
- Investigate the adequacy and validity of the Water Balance Model for the mine site and identify whether all water input volumes have been appropriately accounted for, quantified and assessed. It is highly questionable whether there is currently sufficient storage for all on-site water make/retention when Pit 8 is included (which is potentially why Wilpinjong Coal is seeking an increase in volume for LDP24 to 20 ML/day).
- Review the magnitude and consequences of salt loads discharged from LDP24 to Wilpinjong Creek in recent years and the potential effect it has on Wollar Creek and the Hunter River catchment more broadly. In particular, assess the effect of the proposed increase of LDP24 discharge to 20 ML/day which was NOT identified nor assessed in the Wilpinjong Pit 8 Extension Proposal.
- Review the current practice of discharging 14,000 $\mu\text{S}/\text{cm}$ EC *concentrate* and *backwash* to Pit 2W and the likelihood that salts are simply recirculating and concentrating in Pit 2W. There appears to be significant potential for highly saline water in Pit 2W to be migrating/leaching into groundwater aquifers in this area but this is not currently monitored nor assessed in the Wilpinjong Pit 8 Extension Proposal. Spray irrigation/evaporation of Pit 2W also has the potential to add a further salt load to land in a catchment already at risk from salinisation.

²⁵ This is likely to only be achievable by access to the full dataset on flows (and groundwater level data) in this area. These data are not in the Public domain.

5. Recommendations on any ways to avoid impacts, eg. Redesign of pit geometry to avoid/minimise impacts to Wilpinjong and Wollar Creeks.

There are many potential options available to either avoid/minimise impacts to Wilpinjong and Wollar Creeks, including a reduction of the open cut footprint and/or an increase in setbacks from Wollar Creek²⁶.

In terms of water management, Wilpinjong Coal could increase the amount of water storage on-site and thereby avoid a need to significantly increase licensed flows to Wilpinjong Creek.

Wilpinjong Coal could also investigate ways to address the brine and backwash from the RO Plant so that it doesn't simply accumulate and concentrate salt in Pit 2W, with the significant potential for this highly saline mixture to then leach/migrate into groundwater aquifers.

6. Any other matters that you consider relevant to a better understanding and assessment of Surface Water impacts from the proposed mine expansion.

In my view, there is an urgent need to install flow gauging stations along Wollar Creek upstream and downstream of the proposed Pit 8 Extension area. A gauge in Wollar Creek downstream of the Wilpinjong Creek confluence is also needed to assess the effects of licensed discharges (including the proposed licence limit increase to 20 ML/day) on Wollar Creek before it moves into Goulburn River National Park.

Significantly more paired alluvial and coal seam bores²⁷ are required to both assess the existing connectivity of alluvial and coal seam aquifers to the *Wollar Creek Water Source* and the subsequent impacts to this connectivity as a result of the Wilpinjong Pit 8 Extension (if approved).

In reviewing the monthly EPL 12425 Reports for Wilpinjong Mine it became evident that the reported minimum, maximum and mean flows remained constant between April 2023 and August 2024 reducing confidence in the credibility of the EPL reporting. Over the same timeframe the EC levels showed variability in the reported minimum, maximum and mean levels. It is recommended that the EPA, as regulator, investigate the accuracy of reporting of flow discharges for LDP24 for the period April 2023 and August 2024.

Open and transparent reporting (including time series graphs) of ALL modelled flows with actual gauged flows should be made a condition of consent (if the Wilpinjong Pit 8 Extension is approved).

Open and transparent reporting (including time series graphs) of ALL modelled and measured alluvial and coal seam aquifer levels should be made a condition of consent (if the Wilpinjong Pit 8 Extension is approved).

²⁶ Since some of the alluvial and coal seam aquifers affected by previous operations have been ~500-600m away from previous open cut pits (and on the northern side of Wilpinjong Creek), setbacks of at least this order of magnitude would likely be required. Even then significant uncertainty would remain in terms of impacts to alluvial and coal seam aquifers and their connectivity to Wollar Creek.

²⁷ On both sides of Wollar Creek.

7. Methodology

The following tasks were undertaken to support this review:

- Review of the *Surface Water Assessment Pit 8 Extension Modification* for Wilpinjong Coal Mine (WRM 2025).
- Review of the *Pit 8 Extension Modification Groundwater Impact Assessment* for Wilpinjong Coal Mine (SLR 2025).
- Review of Annual Reports and surface and groundwater findings from 2008 to 2024 (reports downloaded from the Wilpinjong Coal website)
- Review of EPL Reporting from February 2013 to April 2025 (reports downloaded from the Wilpinjong Coal website)
- Review of the original Wilpinjong Environmental Assessment (EA) reports for Surface Water (Gilbert & Associates 2005) and Groundwater (AGE 2005).
- Review of the 2015 Wilpinjong Expansion reports for Surface Water (WRM 2015) and Groundwater (Hydrosimulations 2015).
- Review of water quality and flow results from the surrounding areas
- Review of the scientific literature where deemed relevant.

A site visit to the area was conducted on 14 October 2025.

8. The Wilpinjong Coal MOD3 Proposal

According to WRM (2025), the Modification would comprise the following components:

- open cut mining within the Pit 8 Extension area
- extraction of approximately 14 million tonnes (Mt) of ROM coal from the Pit 8 Extension area;
- development of ancillary infrastructure to support open cut mining activities;
- realignment of some public infrastructure to facilitate the Pit 8 Extension (e.g. sections of public roads, local low voltage powerlines and telecommunication services);
- in-pit crushing of waste rock for use as construction and/or stemming material;
- an additional six months of mining operations to backfill final voids and shape the final landform (i.e. mining operations until 30 June 2034); and
- development of additional water management infrastructure (e.g. dams, drains, pumps and pipelines).

The location of the proposed Pit 8 Extension is illustrated below.

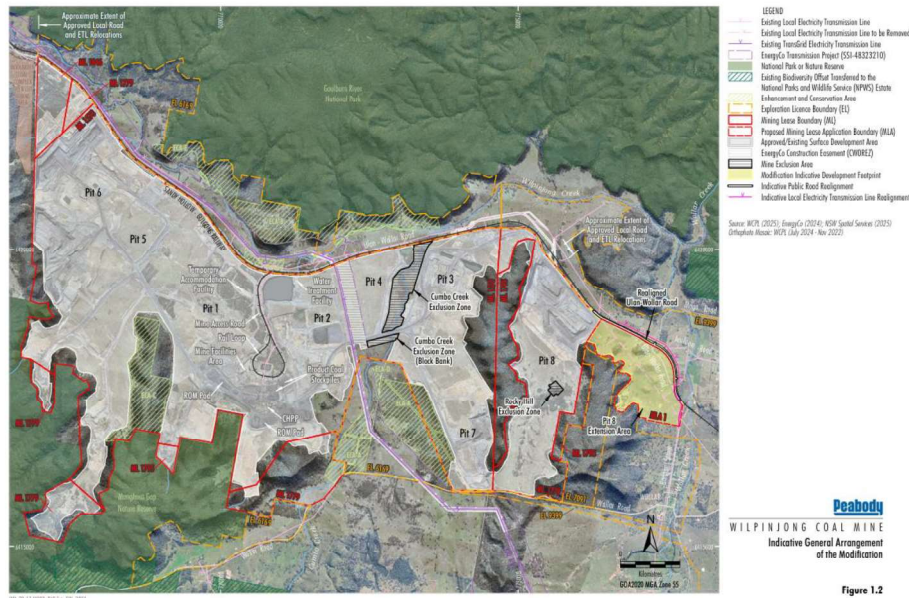


Figure 1.2

Source: WRM (2025)

WRM (2025) also stated that the Modification would include the proposed avoidance of direct disturbance of the existing Cumbo Creek corridor and the Rocky Hill complex which are currently approved to be mined in Pit 4 and Pit 8, respectively, under Development Consent (SSD-6764).

Condition 30, Schedule 3 of Development Consent (SSD-6764) requires that a Water Management Plan (WMP) be developed for operations at the Wilpinjong Coal Mine, comprised of the following components:

- Cumbo Creek Relocation Plan;
- Site Water Balance;
- Surface Water Management Plan (SWMP); and
- Groundwater Management Plan.

Condition 30, Schedule 3 of Development Consent (SSD-6764) also prescribed the requirements of the WMP, Cumbo Creek Relocation Plan, Site Water Balance, SWMP and Groundwater Management Plan.

9. Hydrological Description of the Area

Australia is the world's driest inhabited continent with highly variable climate patterns, rainfall and water supply with recurrent droughts and floods (Productivity Commission 2021). Droughts (and floods) can have devastating environmental consequences such as algal blooms and fish death events (Vertessy et al. 2019).

The larger streams in NSW are usually defined by DPI-Fisheries as 'Key Fish Habitats'²⁸. *Key Fish Habitat* was defined by DPI-Fisheries to include all marine and estuarine habitats up to the highest astronomical tide level (that reached by 'king' tides) and most permanent and semipermanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments

²⁸ <https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/key-fish-habitat-maps>

up to the top of the bank. Small headwater creeks and gullies (known as first and second order streams), that only flow for a short period after rain are generally excluded, as are farm dams constructed on such systems. Wholly artificial waterbodies such as irrigation channels, urban drains and ponds, salt and evaporation ponds are also excluded, except where they are known to support populations of threatened fish or invertebrates.

Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands is recognised as a major factor contributing to loss of biological diversity and ecological function in aquatic ecosystems, including floodplains. *Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands* is listed under Schedule 4 of the *Biodiversity Conservation Act* as a **key threatening process**²⁹.

General Catchment Area

The topography of the Wilpinjong Mine area comprises predominantly alluvial/colluvial flats lying between the escarpment of the Munghorn Gap Nature Reserve to the south and the Wilpinjong Creek floodplain to the north (Gilbert & Associates 2005). The northern side of the Wilpinjong Creek catchment is bounded by the sandstone escarpment of the Goulburn River National Park (Gilbert & Associates 2005).

The upstream reaches of Wilpinjong Creek flow west from the Goulburn River National Park toward its confluence with Murragamba Creek, approximately 5 km upstream of the Wilpinjong Coal Mine (WCM). It then flows in a south-easterly direction, before turning generally easterly as it passes the WCM, toward its confluence with Wollar Creek, approximately 4 km downstream of the WCM .

The local drainage network in the vicinity of the Wilpinjong Project Expansion Area and the additional Pit 8 Extension proposal is shown in Figure 1 below.

²⁹ <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2000-2003/alteration-to-the-natural-flow-regimes-key-threatening-process-listing>

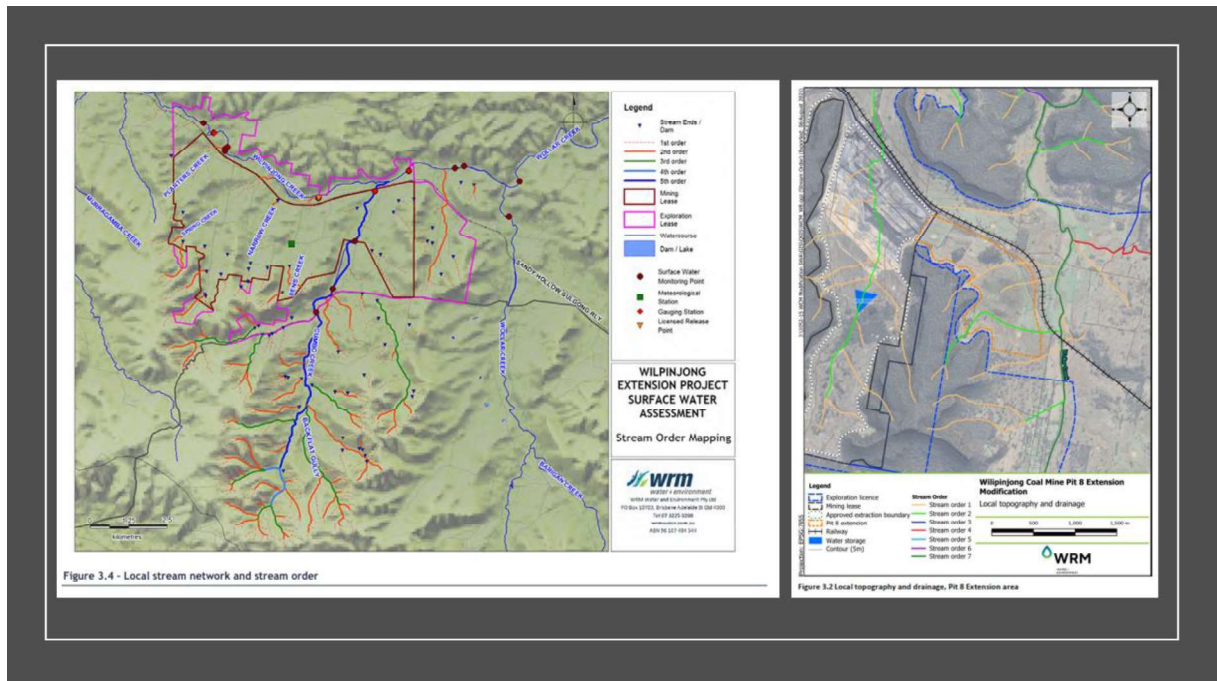


Figure 1. Streams and drainage lines in the vicinity of Wilpinjong Mine. Pit 8 Expansion Area shown as orange polygon in the right-hand image. Source: WRM (2015 - left); WRM (2025 – right).

The mining area itself is drained by a number of north-flowing headwater tributaries of Wilpinjong Creek, including Cumbo Creek. Other streams delineated on 1:25,000 scale maps of the areas include Planters Creek, Narrow Creek and Bens Creek (WRM 2015). These streams, and other unnamed gullies crossing the Project area, have been described as spring-fed semi-perennial streams in their upper reaches near the Munghorn Gap Nature Reserve, transitioning to wide, ill-defined ephemeral³⁰ drainage paths in the lower reaches near Wilpinjong Creek (Gilbert & Associates 2005; WRM 2015).

In the original Wilpinjong Mine EA, BioAnalysis (2005) described Planters, Spring, Narrow and Bens Creeks as being the main natural drainage lines flowing through the Project area. During normal dry weather conditions flow in these creeks would range from semi-perennial, spring fed pools and soaks in the upper reaches near Munghorn Gap Nature Reserve, to wide, ill-defined dry channels in the mid and lower reaches. The creeks would have a rapid response to intense storm rainfall with recession following cessation of rainfall. Often, the only aquatic habitat available was in the form of farm dams located along the drainage lines. Springs and saline groundwater seepages occurred along Wilpinjong Creek, Cumbo Creek and lower half of Wollar Creek (BioAnalysis 2005).

Cumbo Creek was described as a 5th order stream and the largest tributary crossing the site, with a pre-mine catchment area of approximately 70 km². The downstream reaches of Cumbo Creek were approved to be relocated and the existing alignment mined as part of approved mining operations for Wilpinjong Mine. Other tributaries crossing the site were described as 1st or 2nd order streams

³⁰ Thomas and Goudie (2000) identify three main types of river and stream flow regimes: *perennial*, *intermittent* and *ephemeral*. *Ephemeral* streams are streams which contains flowing water only during and immediately after a rainstorm which may be fairly intense. A stream is classified as *intermittent* if flow occurs only seasonally when the water table is at maximum level. Flow may occur along intermittent streams for several months each year but will seldom occur when the water table is lowered during the dry season. Under such circumstances, most of the higher order streams of this area are potentially better described as *intermittent* streams.

(WRM 2015)³¹. The unnamed drainage line west of Slate Gully Road was identified as an ephemeral 2nd order stream that was to be impacted by mining associated with the proposed Pit 8 (WRM 2015).

Gilbert & Associates (2005) conjectured:

Whilst the groundwater modelling prediction includes reduced piezometric pressures in parts of the coal seam aquifer underlying the Goulburn River National Park sandstone plateau, it is expected that there would be no discernible effect on the groundwater and surface water regimes in the overlying sandstone units (i.e. Narrabeen Group) (AGEC, 2005).

This conjecture remains to be tested and more concerningly is not currently being monitored/assessed.

Wollar Creek

Wollar Creek commences in the hilly areas east of the Great Dividing Range at the southern end of the Totnes Valley, NSW. It is subsequently joined by Dry Creek, Spring Creek³², and then Barigan Creek, with the Barigan Creek confluence located approximately 6.5 km upstream of the Wollar township. Wollar Creek is a very important stream in this area and one which is identified as its own water source (*Wollar Creek Water Source*) in the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources (NSW Department of Primary Industries, Water 2016). Wollar Creek is a 7th order stream under the Strahler categorization (Strahler 1952³³) as it flows past the proposed Pit 8 area, before being joined by the 6th order Wilpinjong Creek approximately 3.5km downstream of Wollar township.

Wilpinjong Creek joins Wollar Creek before the creek enters the Goulburn River National Park. BioAnalysis (2005) described Wollar Creek as heavily modified upstream of its confluence with Wilpinjong Creek. There was significant erosion and the creek banks were heavily infested with weeds, including willows. Blooms of floating algae were also observed within many places which indicated eutrophication. Instream macrophytes were dominated by *Typha domingensis*, *T. orientalis* and *Phragmites australis*. There had been some attempts to restore riparian vegetation at places along Wollar Creek as part of Natural Heritage Trust grants to local land care groups. Wollar Creek was rated as poor aquatic habitat upstream of the road crossing on Mogo Road, whilst downstream the aquatic habitat improved and was rated as moderate (BioAnalysis 2005).

Surface water quality monitoring had been undertaken in three locations of Wollar Creek: upstream of the confluence of Barigan Creek; immediately downstream of the village of Wollar; and immediately downstream of the confluence with Wilpinjong Creek.

³¹ However, this statement was not accurate as Spring Creek is a third order stream as it passes through these areas and becomes a fourth order stream close to the confluence with Wilpinjong Creek.

³² A different Spring Creek to that directly impacted by Wilpinjong Coal open cut coal mining operations.

³³ Strahler, A. N. 1952. Hypsometric (area-altitude) analysis of erosional topography', Geological Society of America Bulletin 63 (11), pp. 1117 – 1142.



Photographs of Wollar Creek. Source: BioAnalysis 2005.



Photographs of Wollar Creek on 14 October 2025: at Araluen Road crossing (top and bottom left); opposite Wollar township (middle and top right); and at Mogo Road Crossing (bottom right). At the time of sampling Wollar Creek was flowing at both the Araluen Road and Mogo Road crossings. Source: M. Krogh

Sampling results for Wollar Creek upstream of the confluence with Barigan Creek indicate an average pH of 7.2 and EC range of 185 $\mu\text{S}/\text{cm}$ to 310 $\mu\text{S}/\text{cm}$. Measured concentrations of metals were generally low and either below detection or below the trigger values for the 95% protection level for aquatic ecosystems. The only exception was a single measurement of a copper concentration of 3 $\mu\text{g}/\text{L}$, which was greater than the trigger value for the 80% protection level for aquatic ecosystems. Immediately downstream of the village of Wollar, sampling results indicate an average pH of 8.1 and an average EC of 1,878 $\mu\text{S}/\text{cm}$. Downstream of the confluence with Wilpinjong Creek, sampling results in Wollar Creek indicate an average pH of 8.1 and EC range of 1,690 to 3,500 $\mu\text{S}/\text{cm}$ (Gilbert & Associates 2005).

DIPNR operated a flow gauging station (Stn210082; catchment area ~258 km²) on Wollar Creek upstream of the Wilpinjong Creek confluence between 1980 and 1997. The hydrograph and flow exceedance curve for Wollar Creek during this period (1/5/80 – 10/9/97) were compared with the gauging data for the Goulburn River at Coggan (Stn210006; catchment area ~3340 km²) and are illustrated below. It is noted that there is currently no monitoring of flows in Wollar Creek, moreover, Wilpinjong Coal have not committed to installing any flow monitoring in response to their plans to move open cut mining in close proximity to Wollar Creek.

Over the period of records (1980 to 1997³⁴), median flows in Wollar Creek were 1.7 ML/day and the average flow was ~9 ML/day. This compares to the Goulburn River at Coggan Gauge over the same time period³⁵ which had a median flow of ~37.3 ML/day and average flow of ~168.6 ML/day. On a proportional basis, flows measured at Wollar were approximately 4.5% (median) to 5.3% (average) of the flows in the Goulburn River at Coggan. Whilst relatively small in terms of proportions, they are nevertheless highly significant for Wollar Creek, particularly where it flows through Goulburn River National Park.

Hydrographs of the flows for Wollar Creek (Stn 210082) and Goulburn River at Coggan (Stn 210006) are provided in Figure 2. Flow exceedance curves³⁶ for these gauges are shown in Figure 3.

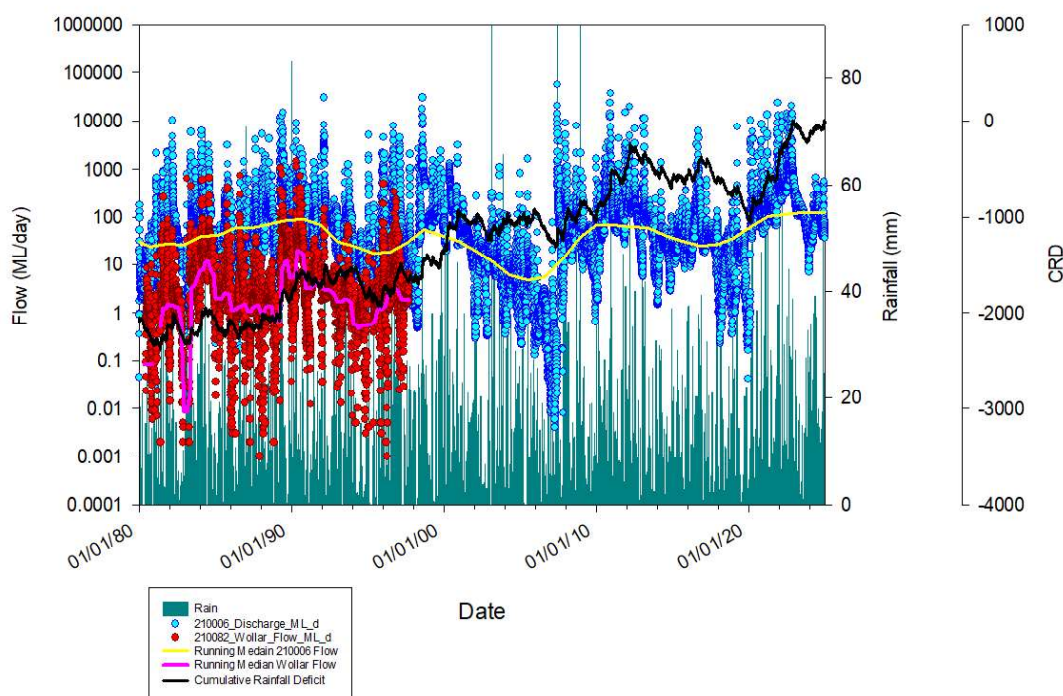


Figure 2. Hydrographs of the flows for Wollar Creek (Stn 210082) and Goulburn River at Coggan (Stn 210006). Data sourced from Pineena and WaterNSW real time data website

³⁴ Data sourced from the Pineena database.

³⁵ Data sourced from the WaterNSW real time data website <https://realtimedata.watnsw.com.au/water.stm>

³⁶ The flow exceedance curves (statistically the empirical cumulative distribution function) were generated using the *ecdf* function in R.

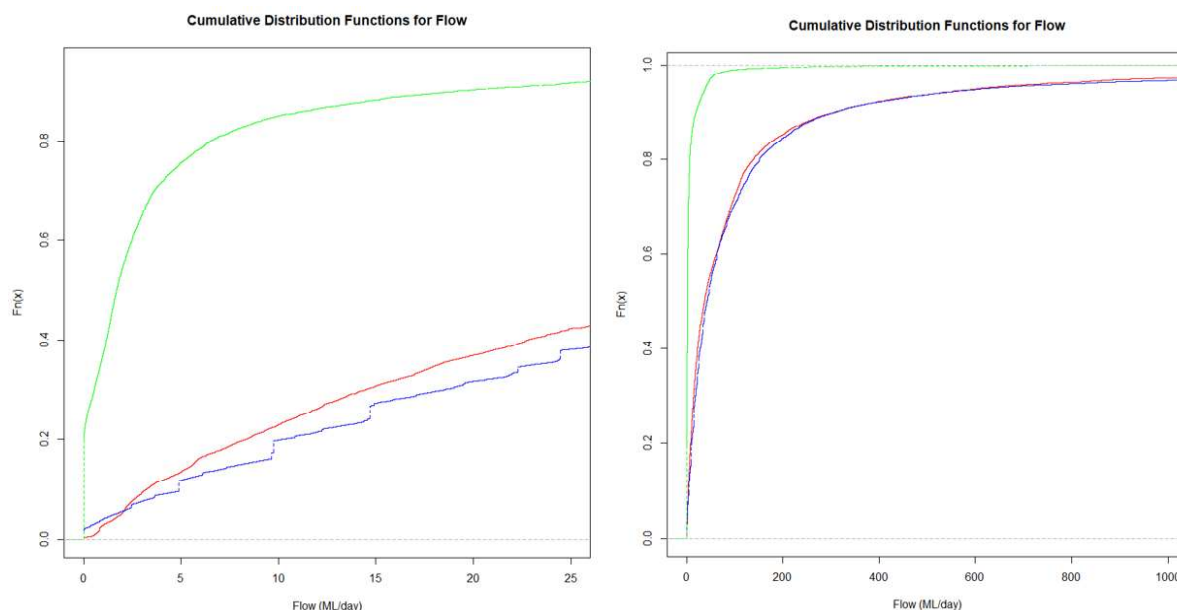


Figure 3. Flow exceedance (empirical cumulative distribution function) curves for Wollar Creek (Stn 210082; green line) and Goulburn River at Coggan (Stn 210006; red line=all data, blue line=data for the same time period as the Wollar gauge data). Data sourced from Pineena and WaterNSW real time data website.

DPI Water (2016b)³⁷ identified the vulnerable Giant Barred Frog (*Mixophyes iteratus*) as being recorded in the Wollar Creek catchment. According to OEH³⁸, Giant Barred Frogs are found along freshwater streams with permanent or semi-permanent water, generally (but not always) at lower elevation. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for shelter and foraging, as well as open perching sites on the forest floor. However, Giant Barred Frogs will also sometimes occur in other riparian habitats, such as those in drier forest or degraded riparian remnants, and even occasionally around dams.

According to DPI Water (2016b), Wollar Creek has a *High* hydrologic stress risk.

Murragamba Creek

Based on the Surface Hydrology Lines (Regional) GIS layer³⁹, Murragamba Creek is a 4th order stream before it joins Wilpinjong Creek. The Moolarben Coal Mine has already had a large impact on the Murragamba Creek catchment.

Surface water quality sampling results for Murragamba Creek (site MC1 located immediately upstream of the confluence with Wilpinjong Creek) indicated an average pH of 6.3 and EC of 549 $\mu\text{S}/\text{cm}$. (Gilbert & Associates 2005). No flow data were available for Murragamba Creek.

³⁷ Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009 Background document for amended plan 2016 NSW Department of Primary Industries, Water

³⁸ <https://threatenedspecies.bionet.nsw.gov.au/profile?id=10538>

³⁹ Geoscience Australia 2015. Surface Hydrology Lines (Regional)

<https://ecat.ga.gov.au/geonetwork/srv/api/records/1186e898-14b5-812e-e053-10a3070a76f0>

Wilpinjong Creek

Based on the Surface Hydrology Lines (Regional) GIS layer⁴⁰, Wilpinjong Creek is a 4th order stream, becoming a 5th order stream after it is joined by the 4th order Murragamba Creek. Wilpinjong Creek then continues on the southern side of Goulburn River National Park until it is joined by the 5th order Cumbo Creek, thereafter becoming a 6th order stream until it eventually joins Wollar Creek.

Wilpinjong Creek forms a series of semi-permanent soaks fed primarily by drainage from the surrounding alluvial plain and colluvium which is recharged by runoff from the adjacent sandstone plateau (Gilbert & Associates 2013; WRM 2015). There are areas of reed growth along the creek bed which form wide swampy areas in places. Vegetation on the banks and overbank areas is predominantly grass with occasional trees and little in-stream vegetation. The emergent macrophytes *Typha orientalis* and *Phragmites australis* tended to dominate the bed of the creek in the upstream section (BioAnalysis 2005).



Photographs of Wilpinjong Creek. Source: BioAnalysis 2005.

In 2015, investigative drilling was undertaken within alluvium associated with the Wilpinjong Creek in order to gain an understanding of the geometry of the alluvium and the contact with the underlying Permian Strata (Groundwater Exploration Services 2014)⁴¹. A single transect was undertaken in which six shallow holes were drilled⁴². The topography along the investigative transect was described as that of a narrow floodplain associated with Wilpinjong Creek. There was a sharp topographical transition to the north into remnant Triassic sandstone typical along the course of the creek in this area. To the south of Wilpinjong Creek there was a relatively rapid transition from alluvium to weathered Permian and colluvium slopes on gently rising ground (Groundwater Exploration Services 2014).

⁴⁰ Geoscience Australia 2015. Surface Hydrology Lines (Regional)

<https://ecat.ga.gov.au/geonetwork/srv/api/records/1186e898-14b5-812e-e053-10a3070a76f0>

⁴¹ Groundwater Exploration Services 2014. *GROUNDWATER FIELD INVESTIGATION* A Groundwater Investigation Status Report for the Wilpinjong Coal Project. Groundwater Exploration Services Pty Ltd March 2014

⁴² The transect was located approximately 180m upstream of the WILGSD gauge.

Figure 4 below shows Groundwater Exploration Services' (2014) interpreted schematic cross section along the investigative transect based on the six investigation holes. Generally, alluvium depths were limited to 4 – 5m thickness overlying a weathered Permian surface. The soil structure within the alluvium varied across the transect showing no definitive trend. Grain size varied from clays and silts to gravels with the variability consistent with a variable fluvial depositional environment and the inter-fingering of unconsolidated soils of alluvial and colluvial origins. It is important to note that Groundwater Exploration Services (2014) identified that the *Permian coal measures are exposed within the base of Wilpinjong Creek providing a hard traversable base*.

Figure 8: Schematic Alluvial Transect Cross Section

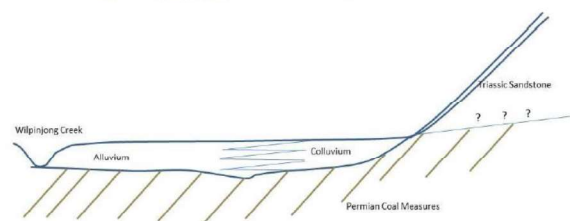


Figure 4. Schematic Alluvial Transect Cross Section - Wilpinjong Creek. Source: Groundwater Exploration Services (2014)

Water quality sampling results upstream of the confluence with Cumbo Creek indicated an average pH of 7.0 and EC range of 681 to 2,990 $\mu\text{S}/\text{cm}$. Downstream of the confluence with Cumbo Creek, sampling results indicate an average pH of 7.8 and an average EC of 3,921 $\mu\text{S}/\text{cm}$. These results were considered to be consistent with the surface water quality in the lower reaches of Cumbo Creek which is significantly more saline than Wilpinjong Creek and is likely to be a significant source of salinity to the lower reaches of Wilpinjong Creek (Gilbert and Associates 2005).

In 2015, BioAnalysis described Wilpinjong Creek as *ephemeral*, but that *after sufficient rainfall, Wilpinjong Creek flowed eastwards into Wollar Creek, approximately 5 km downstream of the approved mining lease*. The definition of Wilpinjong Creek as *ephemeral* appears to be misplaced when the hydrographs for the upstream (WILGSU) and downstream (WILGSD) gauging stations are considered (e.g. see Figure 5). Given the flow exceedance curves, Wilpinjong Creek is far better described as an *intermittent* stream.

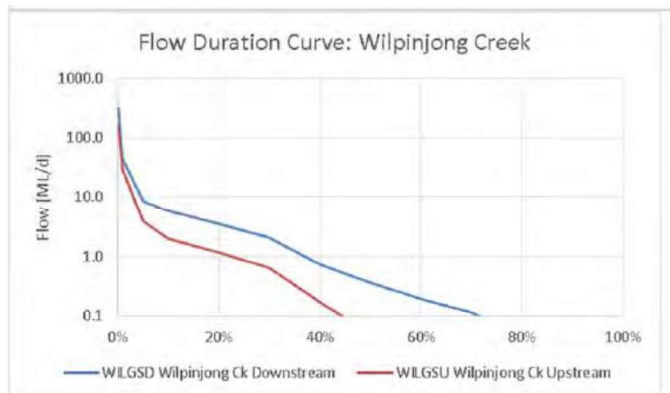


Figure 5. Flow duration curve for Wilpinjong Creek. Source: Hydrosimulations 2015⁴³.

⁴³ Hydrosimulations 2015. WILPINJONG EXTENSION PROJECT Groundwater Assessment FOR Wilpinjong Coal Pty Ltd by W. Minchin, Stuart Brown and Dr N.P. Merrick Heritage Computing Pty Ltd trading as HydroSimulations. Project number: WIL006; Report: HC2015/042; Date: November 2015.

It is interesting that the representation of flow above appears to be different to that provided by WRM (2015)⁴⁴ – see Figure 6

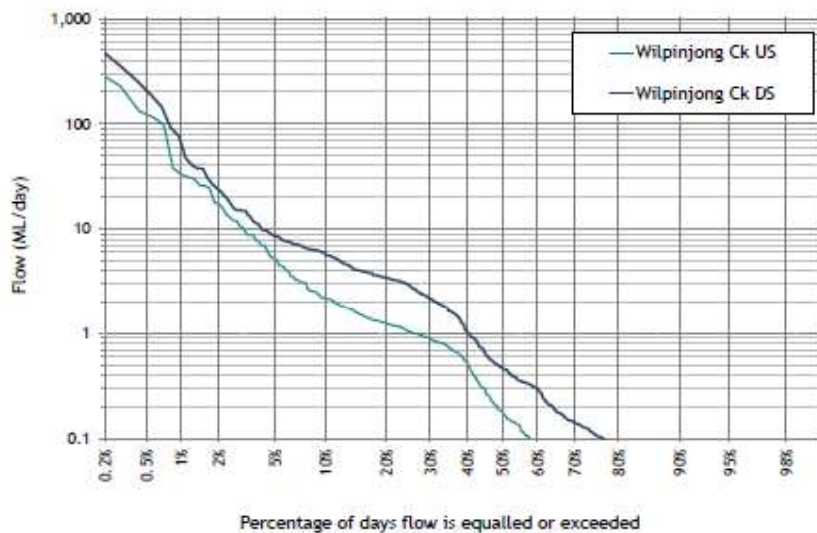


Figure 3.14 - Frequency curves - Wilpinjong Creek gauges (2011-2014 common record)

Figure 6. Flow frequency curve for Wilpinjong Creek. Source: WRM (2015).

Hydrosimulations (2015) stated that: *Average flow along Wilpinjong Creek is about 1.9 megalitres per day (ML/d) (WILGSU) and 3.5 ML/d (WILGSD).* In more recent times, flows at WILGSD have been augmented by discharge from WCPL's RO plant (see Figure 7). Hydrosimulations (2015) identified that *WCPL also have a gauging station on Cumbo Creek, however it was not rated for flow (i.e. stage only).*

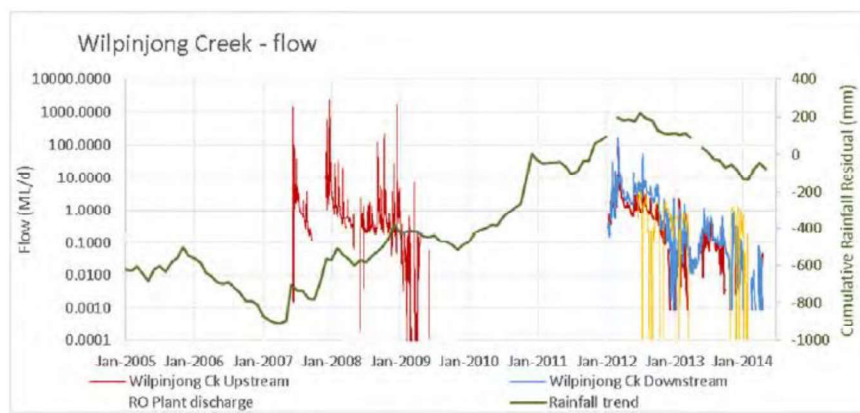


Figure 7. Flow and RO Plant Discharges in Wilpinjong Creek. Source: Hydrosimulations 2015.

WRM (2015) stated:

⁴⁴ WRM 2015. Wilpinjong Extension Project Surface Water Assessment Wilpinjong Coal Pty Ltd 1052-01-B9, 25 November 2015

Wilpinjong Creek is generally a gaining stream, however, there have been occasions when in some sections there has been brief reversal of gradient between the stream water level and the water table level (HydroSimulations, 2015).

And

Between 2011 and 2014, the median daily flow in Wilpinjong Creek was approximately 0.2 ML/day upstream of the confluence with Cumbo Creek and 0.5 ML/day downstream of the confluence with Cumbo Creek. The relatively higher median flow at the downstream gauge is primarily due to the increased catchment area at this location (particularly including inflows from Cumbo Creek) rather than approved discharges from the WCM RO Plant.

Of particular note was the missing flow data between mid-2009 and 2012 (Figure 8).

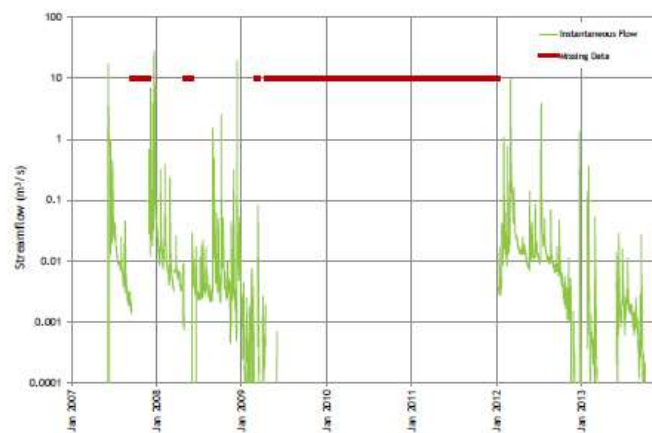


Figure 3.12 - Recorded streamflow - Wilpinjong Creek U/S 2007-2014

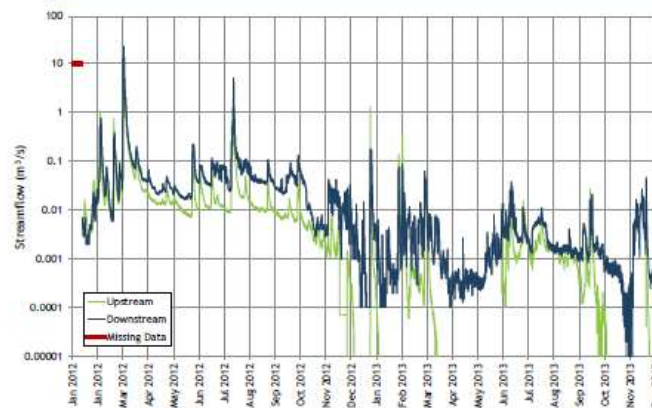


Figure 3.13 - Recorded streamflow - Wilpinjong Creek U/S and D/S 2012 to 2013

Figure 8. Flow hydrographs for Wilpinjong Creek upstream and downstream gauging stations. Source: WRM 2015.

Cumbo Creek

Cumbo Creek is a 5th order stream with a pre-mine catchment area of approximately 70 km². The downstream reaches were approved to be relocated with the existing alignment mined as part of the

approved mining operations for the Wilpinjong Expansion Project (WRM 2015). This mining and realignment of Cumbo Creek is no longer proposed (WRM 2025).

BioAnalysis (2005) suggested that Cumbo Creek had been heavily modified by land clearing and grazing and that there was very little riparian vegetation along the creek. Aquatic macrophytes include *Typha domingensis*, *Typha orientalis*, *Phragmites australis* and *Aster subulatus*. The upper parts of the creek drain through some extensive low-lying marshes, which provide some ecological function to the creek system. The banks of the creek are not very high and are gently sloped. There was evidence of erosion caused by cattle on both the streambanks and in the streambed itself. Cumbo Creek was heavily infested in places with the introduced emergent species *Juncus acutus* which forms monospecific stands at the expense of native species. This species has become a widespread invasive problem in wetlands in NSW (Bioanalysis 2005).



Photographs of Cumbo Creek, Source: BioAnalysis 2005.



Photographs of Cumbo Creek on 14 October 2025: at Wollar Road crossing (top and bottom left and middle); and at the Ulan-Wollar Road Crossing (right). At the time there was no visible flowing water at either site. Source: M. Krogh

The average EC levels range from 4,323 to 4,933 $\mu\text{S}/\text{cm}$ in the mid to upper reaches, upstream of the Project area. A highly saline groundwater seep (EC of 11,000 to 12,000 $\mu\text{S}/\text{cm}$) enters Cumbo Creek immediately east of Wilpinjong Road (CC5) and upstream of the Project area. The water quality of the groundwater seep is consistent with the poorer quality groundwater associated with the Nile Subgroup which surfaces (subcrops) in the area. Sampling results at site CC1 (located immediately upstream of the confluence with Wilpinjong Creek) and site CC2 (downstream of the groundwater seep) indicate that average EC levels are 7,223 and 6,435 $\mu\text{S}/\text{cm}$ respectively (Gilbert & Associates 2005).

Surface water quality in the lower reaches of Cumbo Creek are significantly more saline than Wilpinjong Creek and this is likely to be a significant source of salinity to the lower reaches of Wilpinjong Creek (Gilbert & Associates 2005). WRM (2015) provided details on two gauging stations on Cumbo Creek (see their Table 3.5 below). However, because of limited data for CCGSU, WRM (2015) only provided a level/flow hydrograph for the Cumbo Creek downstream site - see Figure 9 below.

Table 3.5 - Streamflow monitoring site details

Monitoring Site	Description	Catchment area (km ²)	Frequency	Period of Record
<i>DPI Water monitoring site</i>				
210006	Goulburn River @ Coggan	3,340	daily (up to 1973) sub-daily (from 1973)	1913-2014
<i>WCPL monitoring site</i>				
WILGSU	Wilpinjong Creek U/S Gauging Station	81	continuous	2007-2014
WILGSD	Wilpinjong Creek D/S Gauging Station	168	continuous	2007-2014
CCGSD	Cumbo Creek D/S Gauging Station	67.5	continuous	2007-2015
CCGSU	Cumbo Creek U/S Gauging Station		continuous	2015

Given the limited data period for the Cumbo Creek U/S Gauging Station (i.e. 2 months), it has not been analysed further in this report.

U/S = upstream

D/S = downstream

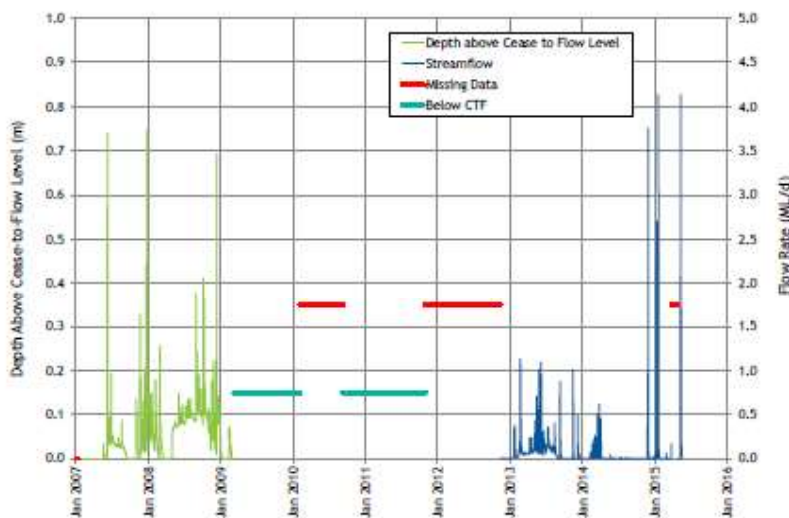


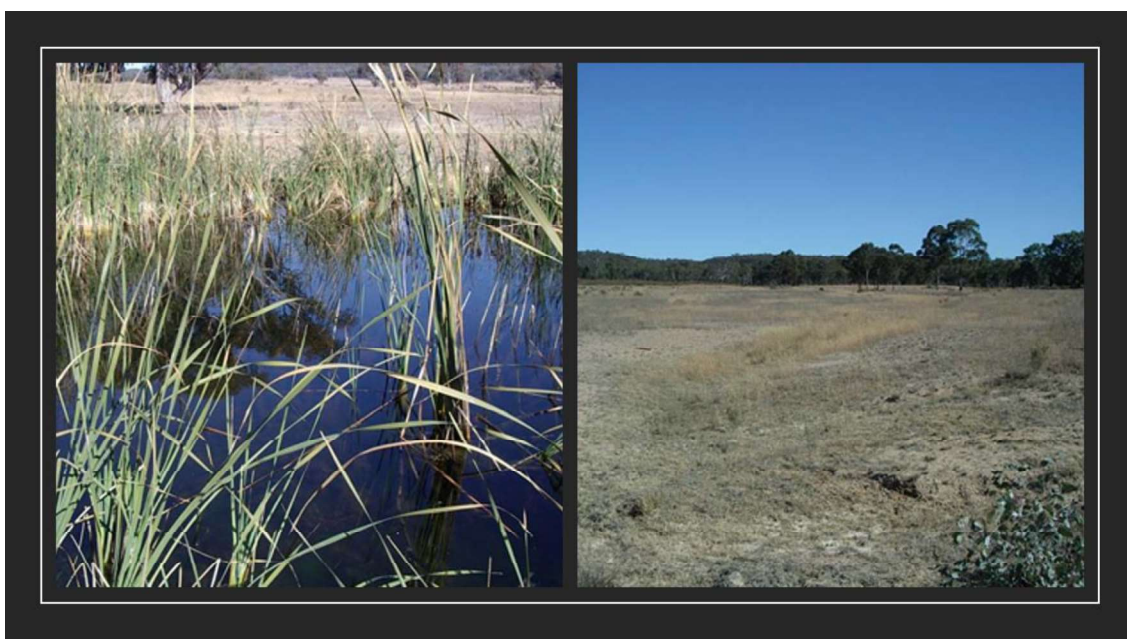
Figure 3.15 - Recorded stream height and flow - Cumbo Creek Downstream

Figure 9. Flow hydrographs for the Cumbo Creek gauging station. Source: WRM 2015.

Planters Creek

Prior to Wilpinjong mining, Planters Creek was a 2nd order stream which joined Wilpinjong Creek upstream of surface water monitoring site WIL1 (downstream of the upper Wilpinjong Creek gauge WILGSU).

BioAnalysis (2005) suggested Planters Creek was restricted to a series of five small farm dams which had restricted the natural flow regime. Planters Creek was identified as a natural drainage line that generally only contains water after significant rainfall events. The dry conditions experienced over the months prior to the survey and grazing had reduced or eliminated semi-aquatic plants from the overland flow-path, however there were some scattered *Juncus spp.* and *Carex sp.* recorded. Aquatic macrophytes were generally restricted to a single dam, situated approximately 50 m to the south of the Ulan-Wollar Road. *Typha orientalis*, *Potamogeton ochreatus* and *Ottelia ovalifolia* were found in this dam (BioAnalysis 2005).



Photographs of Planters Creek, Source: BioAnalysis 2005.

Water quality samples were collected from the lower reaches of Planters and Spring Creeks during the Aquatic Ecosystem Assessment in May 2004 (Sites PL1 and SP1). Sample results indicated pH values of 7.1 and 9.1 and EC levels of 1,781 and 6,000 $\mu\text{S}/\text{cm}$ in Spring Creek and Planters Creek, respectively (Gilbert & Associates 2005).

Planters Creek has now been largely consumed by Pit 6.

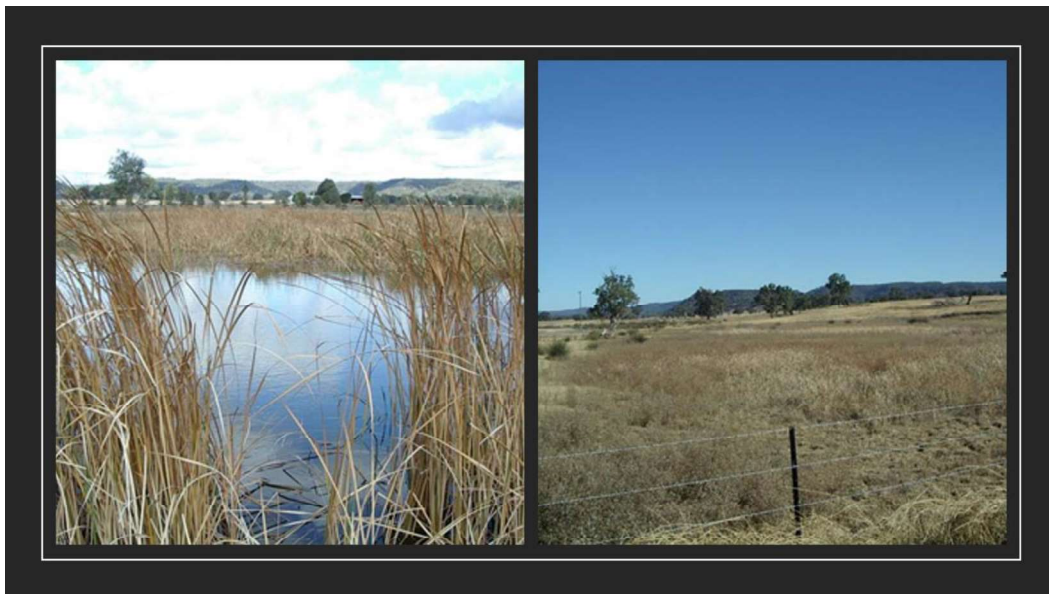
Spring Creek

Prior to Wilpinjong mining, Spring Creek was a 4th order stream⁴⁵ which joined Wilpinjong Creek near alluvial bore monitoring site Gwa2.

⁴⁵ Spring Creek became a 4th order stream when it was joined by an unnamed third order stream close to the Ulan-Wollar Road.

BioAnalysis (2005) noted that Spring Creek had similar attributes to Planters Creek in that it is a natural drainage line that generally only contains water after significant rainfall events. BioAnalysis (2005) also noted that Spring Creek had been heavily grazed and the natural flow regime modified in its catchment by farm dams. Macrophytes recorded included *Juncus spp.* and *Carex sp.* Aquatic macrophytes within the dam immediately upstream of the Ulan-Wollar Road included *Typha orientalis* and *Potamogeton ochreatus*.

BioAnalysis (2015) identified Spring Creek as a second order stream⁴⁶ flowing south-west to north-east through the proposed open cut extension areas. The creek was suggested to be a semi-perennial, spring fed stream in its upper reaches near the Munghorn Gap Nature Reserve, but that the poorly defined ephemeral lower reaches had been intercepted by mining operations. Aquatic habitat within the upper reaches of the creek was restricted to occasional dams. Aquatic macrophytes, including *Eleocharis gracilis*, *Schoenoplectus validus*, *Paspalum distichum*, *Paspalum dilatatum*, *Juncus subsecundus*, *Juncus usitatus*, *Myriophyllum latifolium*, *Elatine*, *Ottelia ovalifolia*, *Cyperus difformis*, *Plantago lanceolata*, and *Isolepis cernua* were abundant around the edges of dams (BioAnalysis 2015).



Photographs of Spring Creek, Source: BioAnalysis 2005.

⁴⁶ However, based on the Surface Hydrology Lines (Regional) GIS layer, Spring Creek became a 4th order stream when it was joined by an unnamed third order stream close to the Ulan-Wollar Road.



Photographs of Spring Creek. Source: BioAnalysis 2015.

Spring Creek has now been largely consumed by Pit 5.

Narrow Creek

Prior to Wilpinjong mining Narrow Creek was a 2nd order stream which joined Wilpinjong Creek near surface water monitoring site WILNC. Very little baseline information was provided for Narrow Creek.

Narrow Creek has now been largely consumed by Pit 1.

Bens Creek

Prior to Wilpinjong mining Ben's Creek was a 3rd order stream which joined Wilpinjong Creek near the alluvial bore monitoring site Gwa11. Very little baseline information was provided for Bens Creek.

Bens Creek has now been largely consumed by Pit 2.

Slate Gully Creek

Prior to Wilpinjong mining, Slate Gully Creek was a 2nd order stream which joined Wilpinjong Creek near surface water monitoring site WC8 - not far from Robinsons Road.

At the time of BioAnalysis' (2015) field visit, the tributary was restricted to occasional small dams where the shale shelf had forced water to the surface. Many reaches of the creek appeared to have been grazed recently. Near the top of the catchment, *Paspalum dilatatum* and *Penucetum sp.* were abundant within the indistinct drainage channel. Plants growing at the edges of a small dam included *Persicaria sp.*, *Juncus subsecundus* and *Cyperus difformis*.



Photographs of Unnamed Drainage Line West of Slate Gully Road. Source: BioAnalysis 2015.

The lower end of Slate Gully Creek has now been largely consumed by Pit 8.

Backflat Gully Creek

Backflat Gully Creek is a 3rd order tributary of Cumbo Creek. No baseline information was provided for Backflat Gully Creek and it has not been mined.

Barigan Creek

Barigan Creek is a major tributary of Wollar Creek. Surface water quality sampling results for Barigan Creek (site BC1 located upstream of the confluence with Wollar Creek) indicate an average pH of 7.5 and EC of 1,954 $\mu\text{S}/\text{cm}$. (Gilbert & Associates 2005). Barigan Creek is currently outside of proposed mining areas.

10. Wilpinjong Pit 8 Extension Surface Water Assessment

Section 2.7 of the WRM (2025) Surface Water Assessment discussed the obligations under the EPBC Act. WRM (2025) identified that an action associated with the Modification was referred to the Commonwealth Minister (EPBC 2025/10105) for the new surface development footprint associated with the proposed Pit 8 Extension. A delegate of the Commonwealth Minister determined that the proposed action is a “controlled action” and therefore the Pit 8 Extension requires approval under the EPBC Act due to potential impacts on MNES, including a water resource, in relation to unconventional gas development and large coal mining development (section 24D and 24E).

The delegate of the Commonwealth Minister also determined that the action is to be assessed under the Bilateral Agreement with NSW. Assessment requirements for MNES matters were issued by the NSW Department of Planning, Housing and Infrastructure (DPHI) under the Bilateral Agreement on

29 May 2025. WRM (2025) discussed the IESC's *Information guidelines for proponents preparing coal seam gas and large coal mining development proposals* (IESC, 2024) including a checklist which provides specific guidance on IESC information needs. Important components of the IESC checklist relevant to surface water assessment identified the need to consider *Water and salt balances* including:

- *Provide data for the hydrological regime of all watercourses, standing waters and springs across the site, including:*
 - *spatial, temporal and seasonal trends in streamflow and/or standing water levels*
 - *spatial, temporal and seasonal trends in water quality data (such as turbidity, acidity, salinity, relevant organic chemicals, metals, metalloids and radionuclides).*
- *Identify and justify dedicated sites to monitor hydrology, water quality, and channel and floodplain geomorphology before, during and for a suitable period after the proposed development.*
- *Provide salt balance modelling that includes stores and the movement of salt between stores, and takes into account seasonal and long-term variation.*
- *Indicate the vulnerability to contamination (e.g., from salt production and salinity) of, and the likely impacts of contamination on, the identified water-dependent ecological assets.*
- *Identify how produced water, brine and waste from water treatment plants that are stored on site during operations will be managed and disposed of after operations cease, where applicable.*

It is important to note that SLR (2025) identifies two large areas of “*Highly Productive Wollar Creek Water Source*” within Wilpinjong Creek and Wollar Creek immediately adjacent to the proposed Wilpinjong Pit 8. Very little sampling and/or monitoring has occurred in these areas to establish baseline conditions - see Figure 10⁴⁷. There is significant uncertainty as to whether these important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 proposal is approved.

⁴⁷ Note the dearth of sampling within these areas in Figure 5-6 of SLR (2025b).

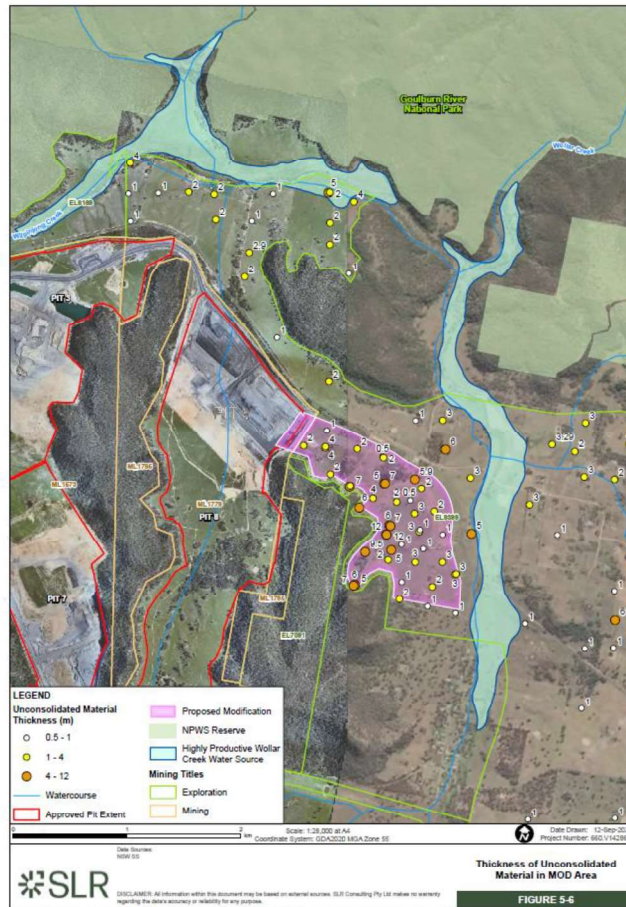


Figure 10. Location of proposed Wilpinjong Pit 8 relative to areas of *Highly Productive Wollar Creek Water Source*. Note the lack of sampling locations in areas mapped as *Highly Productive Wollar Creek Water Source*: SLR 2025b⁴⁸.

Flow Assessment for Pit 8 Extension

WRM (2025)⁴⁹ presents an assessment of the impacts of the Pit 8 Extension Modification on local and regional surface water resources. Key components of the assessment included numerical modelling of:

- water contained within the site water management system (during operations and post-mining); and
- flooding in Wilpinjong Creek and Wollar Creek, which drain along the northern boundary and eastern boundary of the mining disturbance area.

It is however, unclear how the WRM (2025) Surface Water Assessment addresses the likely impacts of the Pit 8 Extension Modification proposal on flows in Wollar Creek. There is currently no flow

⁴⁸ SLR 2025b. Pit 8 Extension Modification - Groundwater Modelling Technical Report Wilpinjong Coal Mine Prepared by: SLR Consulting Australia SLR Project No.: 660.V14286.00001 11 September 2025 Revision: 8

⁴⁹ WRM 2025. *Surface Water Assessment Pit 8 Extension Modification Wilpinjong Coal Mine* Wilpinjong Coal Pty Ltd 8 August 2025 1052-15-D4

gauge in Wollar Creek and there hasn't been any flow measurements since the DIPNR gauge ceased recording in 1997 (before the Wilpinjong Coal Mine was approved). Up until the current proposal, the impacts of the mining have largely been restricted to the Wilpinjong Creek catchment. Wilpinjong Coal are now proposing to have a very large open cut pit right next to Wollar Creek, upstream of the Wilpinjong Creek junction, but have no means of quantifying the impact of Pit 8 on flows in Wollar Creek (aside from a poorly calibrated and largely unvalidated model).

WRM (2025) stated:

Figure 3.9 to Figure 3.10 show the average daily flowrate at the Wilpinjong Creek gauging stations from 2012 to 2024. Figure 3.11 shows the average daily flowrate at Cumbo Creek gauging station from 2015 to 2024. The two Wilpinjong Creek gauging stations have been recording since January 2012. The catchment area reporting to the upstream site (WILGSU) is 80 km² while the downstream site has a catchment area of 192 km². CCGSU on Cumbo Creek has been recording data since August 2015 and has a catchment area exceeding 60 km².

In actual fact, flows have been monitored in Wilpinjong Creek (WILGSU and WILGSD) and Cumbo Creek since at least January 2008 (see Figures 11, 12 & 13).

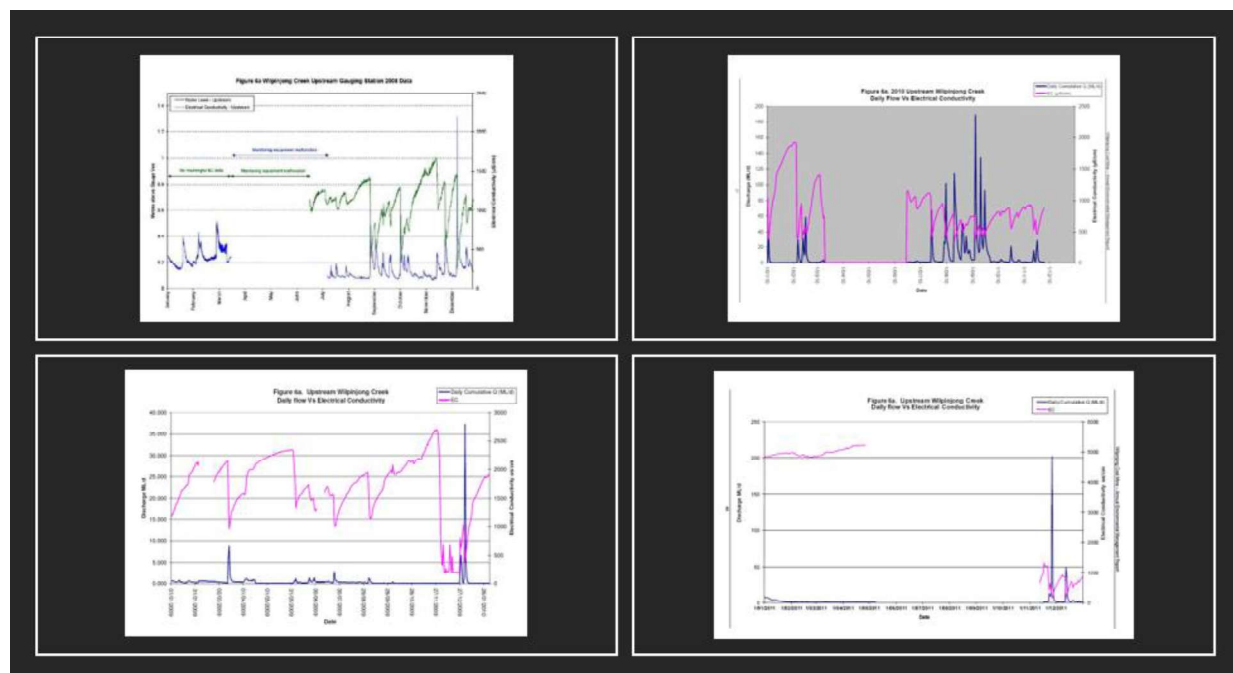


Figure 11. Flows for WILGSU presented in the Wilpinjong Coal 2008 (top left), 2009 (top right), 2010 (bottom left) and 2011 (bottom right) Annual Reviews.

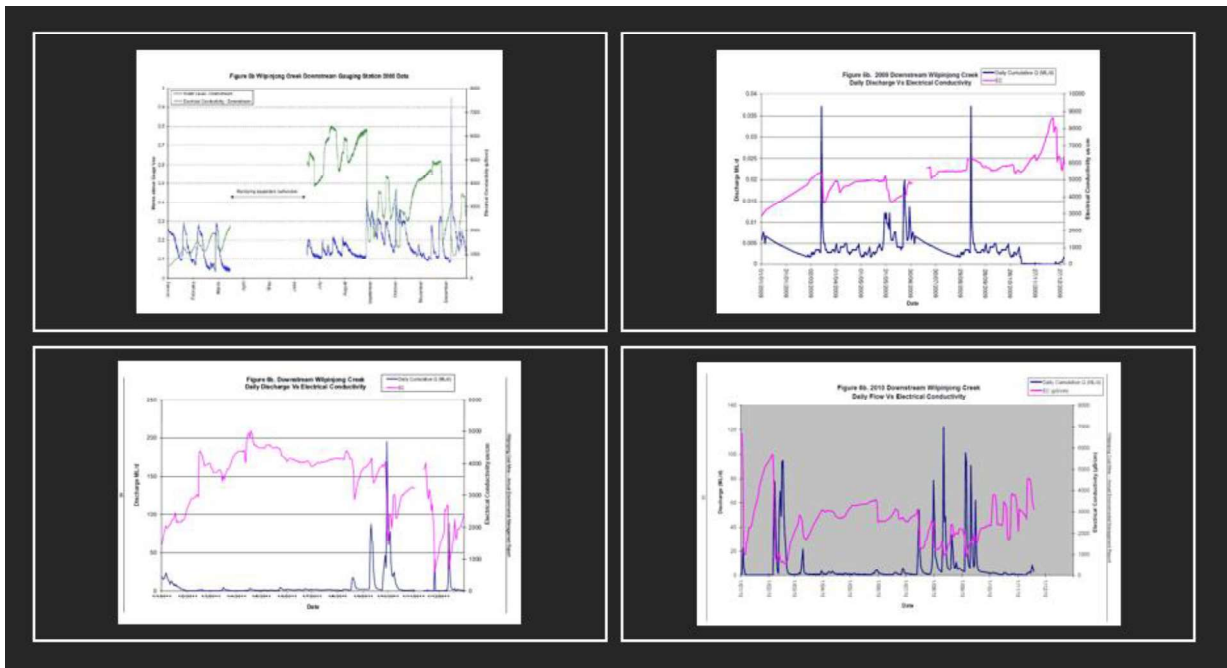


Figure 12. Flows for *WILGSD* presented in the Wilpinjong Coal 2008 (top left), 2009 (top right), 2010 (bottom left) and 2011 (bottom right) Annual Reviews.

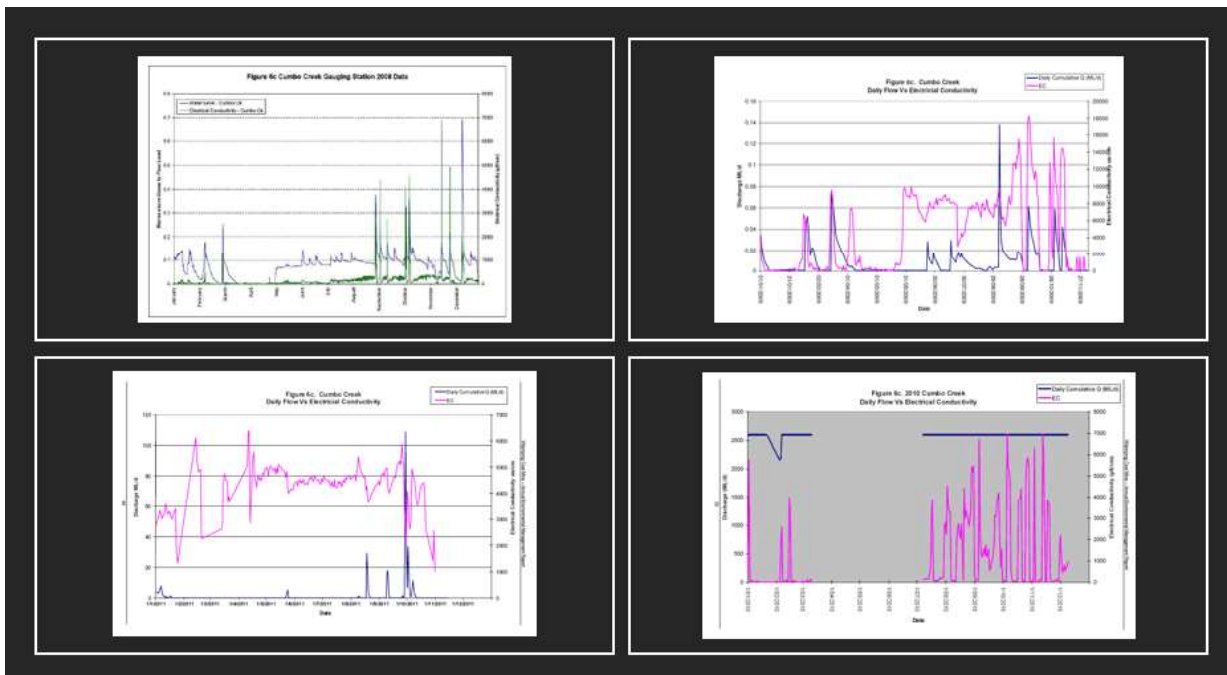


Figure 13. Flows for *Cumbo Creek* presented in the Wilpinjong Coal 2008 (top left), 2009 (top right), 2010 (bottom left) and 2011 (bottom right) Annual Reviews.

It is difficult to discern actual flows in Wilpinjong Creek in more recent times given the scaling used by WRM (2025) in their flow hydrographs (see Figure 14 below). It is additionally noted that they do not illustrate flow records prior to 2012 (which would include at least some baseline flow data for Wilpinjong Creek prior to mining commencing). Moreover, there has been no investigation of the

potential impacts of Wilpinjong mining on flows, especially at the gauging site WILSGD which now consistently receives ~4.5 ML/day of water from the RO Plant.

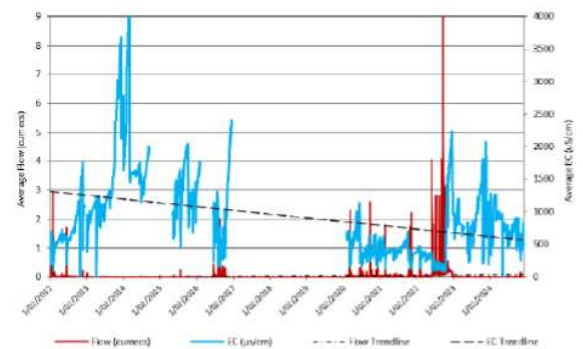


Figure 3.9 Wilpinjong Creek upstream gauging station (WILGSU) long-term trends (source: Peabody, 2025)

Note: cumecs = cubic metres per second; EC = electrical conductivity.

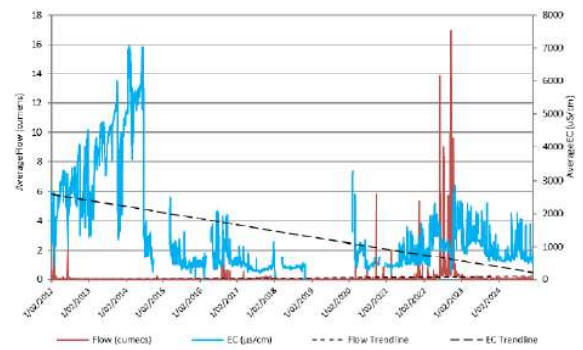


Figure 3.10 Wilpinjong Creek downstream gauging station (WILGSD) long-term trends (source: Peabody, 2025)

Figure 14. Flows in Wilpinjong Creek. Source: WRM 2025.

WRM (2025) did however, provide estimates of average flow in Wilpinjong Creek and Cumbo Creek - see their Table 3.5 below. Obviously, there was no reporting of gauged flows in Wollar Creek because there is no longer any gauge measuring flows in Wollar Creek (and there are no stated intentions to install a flow gauge in Wollar Creek). A significant proportion of the flow in Wilpinjong Creek at WILGSD in recent times comes from the licensed discharge from LDP24⁵⁰.

Table 3.5 Calculated average daily flowrate at Wilpinjong and Cumbo Creeks (source: Peabody, 2025)

Monitoring Location	Average daily flowrate (ML/d)											
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
WILGSU	0.16	0.03	0.24	2.80	0.00	0.00	0.00	5.17	5.06	25.85	1.10	0.30
WILGSD	0.27	0.22	0.39	5.70	5.90	0.70	0.00	6.00	10.0	70.0	6.30	5.00
COGSU	No data		0.14	1.61	0.62	0.37	0.06	0.86	2.12	20.44	0.95	0.30

⁵⁰ See the *Volume and Quality of LDP24 Discharges* Section below.

The presentation of flow exceedance curves for Wilpinjong Creek in WRM (2025) are contrasted with the flow exceedance curve provided in WRM (2015) - see Figure 15. It appears that the data presented in WRM (2025) is primarily modelled data as opposed to measured/gauged flow data⁵¹.

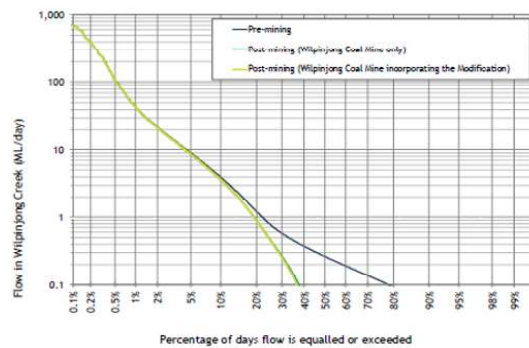


Figure 9.1 Wilpinjong Creek at Cumbo Creek flow frequency

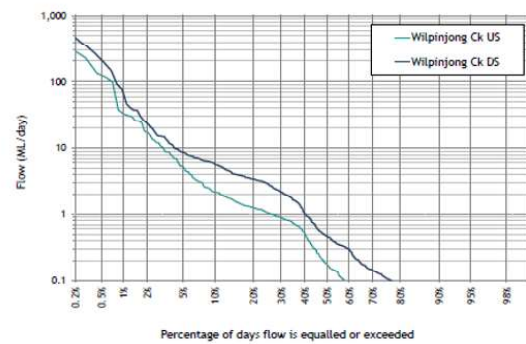


Figure 3.14 - Frequency curves - Wilpinjong Creek gauges (2011-2014 common record)

Figure 15. Modelled (left) and measured/gauged flows (right) in Wilpinjong Creek. Source: WRM 2025 (left) and WRM 2015 (right).

Surface Water Groundwater Interactions

It is well known that many groundwater and surface water systems are connected to some degree and many ecosystems rely on groundwater for their survival (NWC 2012⁵²; Commonwealth of Australia 2013⁵³). Connectivity between groundwater and surface water largely occurs via alluvial aquifers and can vary in space and time (Commonwealth of Australia Bioregional Assessments⁵⁴).

Poor groundwater quality has the potential to impact on surface water quality and GDEs. GDEs can be categorised into three broad types (Commonwealth of Australia 2013):

- surface ecosystems that rely on groundwater discharge to rivers, wetlands and springs
- surface ecosystems that access groundwater from below the water table—for example, vegetation
- subterranean aquatic ecosystems, which include stygofauna, in aquifers and caves.

Interactions between groundwater and surface water sustain groundwater-dependent ecosystems and regulate river temperature and biogeochemical cycles, amongst many other processes. These interactions occur in freshwater environments including rivers, springs, lakes, and wetlands, and in coastal environments via tidal pumping, submarine groundwater discharge, and seawater intrusion (Irvine et al 2024).

Evans (2007) provided a conceptual model for surface water - groundwater interactions⁵⁵ stating:

⁵¹ See further discussion of this issue in the *Modelled versus Measured Data* Section below. WRM's (2025) flow exceedance curve for Wollar Creek also shows poor concordance with the 'real' gauged data for Wollar Creek given by WRM (2015).

⁵² NWC 2012, Groundwater essentials, National Water Commission, Canberra.

⁵³ Commonwealth of Australia 2013. Guidelines for groundwater quality protection in Australia National Water Quality Management Strategy

⁵⁴ <https://www.bioregionalassessments.gov.au/assessments/11-context-statement-central-west-subregion/1161-connectivity-between-groundwater-and-surface-water>

⁵⁵ For the Murray Darling Basin, but these conceptual models are just as relevant to the Hunter River catchment, including Wollar Creek.

Groundwater contributes to and increases stream flow when the water table is higher than the level of the stream. The quantity of groundwater contributing to stream flow is called *baseflow* (Figure 1). If an aquifer's water table is below the level of the stream, the stream water will tend to recharge (replenish) the groundwater (Figure 2). If aquifer and stream are separated by a semi-permeable layer (e.g. clay) this will slow the water flow in either direction creating a lag. How closely a stream and groundwater are connected depends on the extent and nature of the saturated material between them (permeability). If the groundwater table and stream level are the same, any change in the groundwater table will affect the level of the stream so that it either gains or loses flow.

Groundwater and surface water are regarded as being poorly connected if they constantly differ in water level and are separated by a layer of material with low permeability. Research however shows that over time, all streams are connected with groundwater.

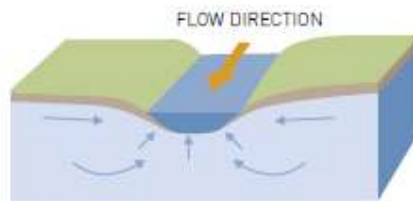


Figure 1 - Gaining stream

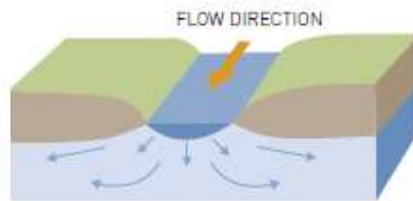


Figure 2 - Losing stream

Groundwater is recharged in three ways:

- by rainfall or irrigation
- by leakage from streams, lakes and reservoirs, or
- by water rising from aquifers underneath.

And it can discharge in three ways:

- by evapotranspiration (water lost through the combined effects of evaporation from the grounds surface and transpiration from the vegetation)
- by flowing into surface water, or
- by leaking into a deeper aquifer.

The IESC (2014) also provided guidance on identifying the connectivity between water systems, stating:

When groundwater is extracted from an aquifer there are potential impacts on other water resources, depending on the duration and rate of extraction, and the connectivity (or degree of connection) between the water resources. Connectivity refers to the degree of hydraulic interaction between aquifers, between different parts of the same aquifer, and between groundwater and surface water systems. It depends largely upon the lithology of geological strata, and their integrity and spatial continuity. Fractures, faults and open or inadequately-sealed boreholes can form preferential flow paths that also affect connectivity. The degree of connectivity and the rate of water flow between aquifers and water systems are strongly influenced by local and regional hydraulic pressure. As groundwater and surface water systems are dynamic, these gradients can change with time (Australian Government, 2014).

Connectivity can be considered in the context of groundwater flow paths. For example, groundwater flow in shallow aquifers is often constrained by local catchment boundaries.

One of the most important features of the current Pit 8 extension plan is that it is now proposes to move open cut mining outside of the Wilpinjong Creek local catchment and into the Wollar Creek catchment, immediately adjacent to an area designated as a *Highly Productive Wollar Creek Water Source*. Very little sampling and/or monitoring has occurred in these areas to establish baseline conditions. There is significant uncertainty as to whether these important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 proposal is approved.

In the original Wilpinjong EA AGE (2005)⁵⁶ identified that:

Standing water levels in the Ulan Seam, within the Project area, range from 2.73 m above ground to 9.9 m below ground, with artesian levels in the north and sub-artesian levels in the topographically elevated areas to the south. Analysis of the groundwater levels indicates that along parts of the southern extent of the Project area the Ulan Seam may be dry due to its elevation being above regional groundwater levels.

The Marrangaroo Sandstone aquifer is typically separated from the overlying Ulan Seam by a relatively thin siltstone layer, but in some areas both aquifers are in direct contact. Standing water levels in the Marrangaroo Sandstone range from 0.98 m above ground to 10.46 m below ground level.

Similar to the water levels in the Ulan Seam, artesian levels were identified in the north, and subartesian levels in the southern, topographically higher, areas. In general, groundwater levels in the Marrangaroo Sandstone appear to be at slightly higher elevations (0.05 m to 0.7 m) than those in the Ulan Seam. Pumping test results reported by GeoTerra (2004) indicate that at the test locations both aquifers are hydraulically connected.

SLR (2024)⁵⁷ stated:

There is also historical evidence of upward hydraulic gradients from Permian strata to the Wilpinjong Creek alluvium which would have provided a source of recharge. Drawdown due to WCM operations is observed at the coal measures (Permian aged Illawarra Coal

⁵⁶ AGE 2005. REPORT on Wilpinjong Coal Project Groundwater Impact Assessment prepared for Wilpinjong Coal Pty Limited Project Number G1245 April 2005

⁵⁷ SLR 2024. Wilpinjong Coal Mine Annual Review – Wilpinjong Coal Mine SLR Project No.: 665.v10014.02411 28 March 2024.

Measures) monitoring bores displayed on **Figure 5**, with coal measures no longer recharging the alluvium. However, **Figure 5** also shows recovery in Permian strata in response to above average rainfall conditions since 2020, with upward gradients from Permian to alluvial strata observed for some of 2023.

and

Based on the analysis of the hydrographs in the Wilpinjong alluvium and Cumbo Creek alluvium, mining effects are considered to have occurred historically at some locations on Wilpinjong Creek.

An example of hydrographs illustrating the vertical gradient (and linkage) between Permian and Alluvial strata is shown in Figure 16. The widespread decline in coal measure bore levels is shown in Figure 17.

Figure 5: Example Hydrographs showing Vertical Gradient between Permian and Alluvial Strata.

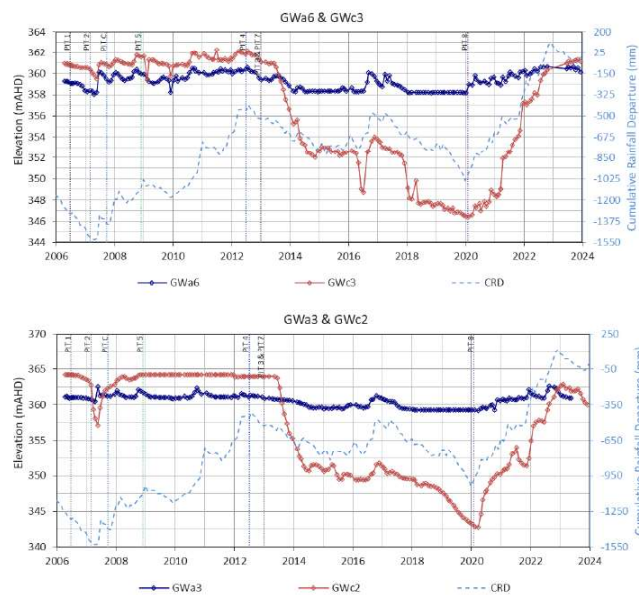


Figure 16. Hydrographs illustrating the vertical gradient between Permian and Alluvial strata. Source: SLR (2024)

Figure 6: Coal Measures Bore Groundwater Levels

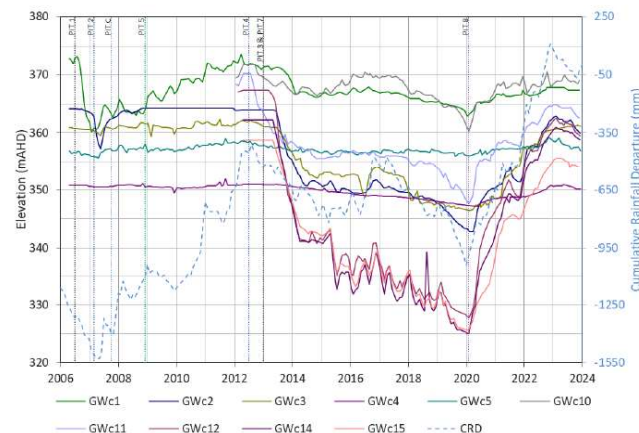


Figure 17. Hydrographs illustrating the decline in coal measure bore levels. Source: SLR (2024)

Previous groundwater assessments have identified the potential connection of the Ulan Coal seam aquifer to Wilpinjong Creek. Obvious impacts have also now been documented to both the coal seam and alluvial aquifers adjacent to Wilpinjong Creek (See Wilpinjong Coal Annual Reports; SLR 2024). It is likely that the artesian nature of areas close to Wilpinjong Creek have now potentially been permanently altered.

No allowance appears to have been made in WRM (2025) *Surface Water Assessment* for similar effects to occur on Wollar Creek and the current coal seam and alluvial aquifer monitoring bores adjacent to Wollar Creek are clearly insufficient to assess the full extent of drawdown (and its effects on Wollar Creek flows) from the proposed Pit 8 extension. There is an over-reliance on poorly calibrated and often unvalidated surface water and groundwater models, with limited real time monitoring of flows and aquifer levels in or close to Wollar Creek.

Conclusion

One of the most important features of the current Pit 8 extension plan is that it is now proposes to move open cut mining outside of the Wilpinjong Creek local catchment and into the Wollar Creek catchment, immediately adjacent to an area designated as a *Highly Productive Wollar Creek Water Source*. Very little sampling and/or monitoring has occurred in these areas to establish baseline conditions. There is significant uncertainty as to whether these important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 proposal is approved.

It is unclear how the WRM (2025) *Surface Water Assessment* addresses the likely impacts of the Pit 8 Extension Modification proposal on flows in Wollar Creek. There is currently no flow gauge in Wollar Creek and there hasn't been any flow measurements since the DIPNR gauge ceased recording in 1997 (before the Wilpinjong Coal Mine was approved). Up until the current proposal, the impacts of the mining have largely been restricted to the Wilpinjong Creek catchment. Wilpinjong Coal are now proposing to have a very large open cut pit right next to Wollar Creek, upstream of the Wilpinjong Creek junction, but have no means of assessing the true impact of Pit 8 on flows in Wollar Creek (aside from a poorly calibrated and largely unvalidated model).

In effect there is no recent baseline data on flows in Wollar Creek to assess the full extent of impacts for the Pit 8 extension (if it is approved).

WRM (2025) do not illustrate flow records prior to 2012 (which would include baseline flow data for Wilpinjong Creek). Moreover, there has been no investigation of the potential impacts of Wilpinjong mining on flows, especially at WILSGD which now consistently receives ~4.5 ML/day of water from the RO Plant.

It is noted that alteration to the natural flow regime of rivers is listed as a **key threatening process**⁵⁸ under the *Biodiversity Conservation Act* - Schedule 4 Key threatening processes (*Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands (as described in the final determination of the Scientific Committee to list the threatening process)*).

Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands is recognised as a major factor contributing to loss of biological diversity and ecological function in aquatic ecosystems, including floodplains. Alteration to natural flow regimes can occur through

⁵⁸ <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2000-2003/alteration-to-the-natural-flow-regimes-key-threatening-process-listing>

reducing or increasing flows, altering seasonality of flows, changing the frequency, duration, magnitude, timing, predictability and variability of flow events, altering surface and subsurface water levels and changing the rate of rise or fall of water levels (Walker 1985; Cadwallader and Lawrence 1990; Gehrke *et al.* 1995; Kingsford 1995; Maheshwari *et al.* 1995; Poff *et al.* 1997; Boulton and Brock 1999; Robertson *et al.* 1999, 2001). Natural flow regimes are determined by the climate, run-off, catchment size and geomorphology without the impacts of dams, weirs, extraction and river management (NSW Threatened Species Scientific Committee 2002).

It is also noted that the groundwater assessment identifies the potential connection of the Ulan Coal seam aquifer to Wilpinjong Creek and that obvious impacts have now been documented to both the coal seam and alluvial aquifers adjacent to Wilpinjong Creek. Where there were once artesian connections between the coal measures and Wilpinjong Creek, they have now potentially been permanently altered as a result of mining. No allowance has been made for similar effects of Pit 8 on Wollar Creek and there are currently insufficient coal seam and alluvial aquifer monitoring bores adjacent to Wollar Creek.

In effect, there are insufficient coal seam and alluvial aquifer monitoring bores adjacent to Wollar Creek and insufficient baseline monitoring of flows in Wollar Creek to be able to assess the full extent of drawdown and impacts to surface waters as a result of the proposed Pit 8 extension.

It is concluded that Wilpinjong Coal is ill-prepared to properly assess the impacts of the Pit 8 Extension Proposal on groundwater adjacent to and flows within Wollar Creek (because they have inadequate baseline data).

It is recommended that the Independent Expert Panel undertake a thorough review of existing impacts to Wilpinjong Creek flows and alluvial and coal seam aquifers as a result of previous open cut pit operations at Wilpinjong Coal Mine. This is likely to only be achievable by access to the full dataset on flows (and groundwater level data) in the area.

Water Quality Assessment

Salinity

The Hunter River valley is generally considered to be saline due to the marine origin of some of its Permian sediments. However, recent land-use activities in the catchment may have contributed to rising groundwater levels in some areas and an increase in the salinity load reaching many streams. Overlaid on the natural cycling of salts in the Hunter River catchment are anthropogenic sources – particularly mining, power generation and agriculture (EPA 2013)⁵⁹. The EPA (2013) illustrated the geological classification for the Hunter River Catchment based on the Geological Survey of NSW 1:250,000 Geological Maps, identifying the extent of Permian sediments in the catchment (see Figure 18). There was a strong correlation between the areas of Permian sediments and areas of known or predicted dryland salinity risk (see Figure 19).

⁵⁹ EPA 2013 Hunter Catchment Salinity Assessment Final Report *Martin Krogh, Forugh Dorani, Edwina Foulsham, Adam McSorley and David Hoey* ISBN 978 1 74359 322 6 EPA 2013/0787 November 2013

Salinity and Water Quality in the Wilpinjong and Wollar Creek catchments.

[illegible]

⁶⁰ Williams, J., Walker, G.R. and Hatton, T.J. 2002. Dryland salinization: a challenge for land and water management in the Australian landscape. *Agriculture, hydrology and water quality* pp. 457-475 <https://doi.org/10.1079/9780851995458.0457>

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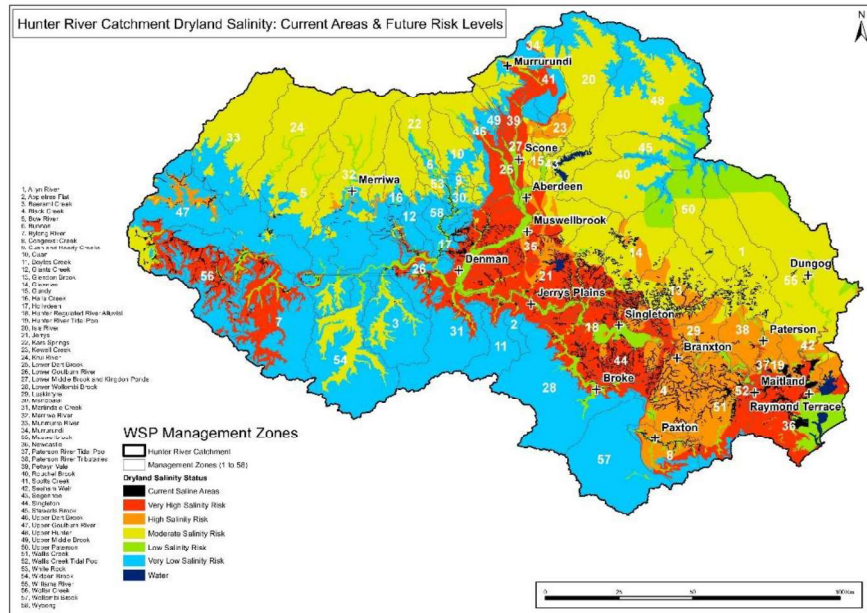


Figure 19. Hunter River Catchment Dryland Salinity. Source: EPA 2013.

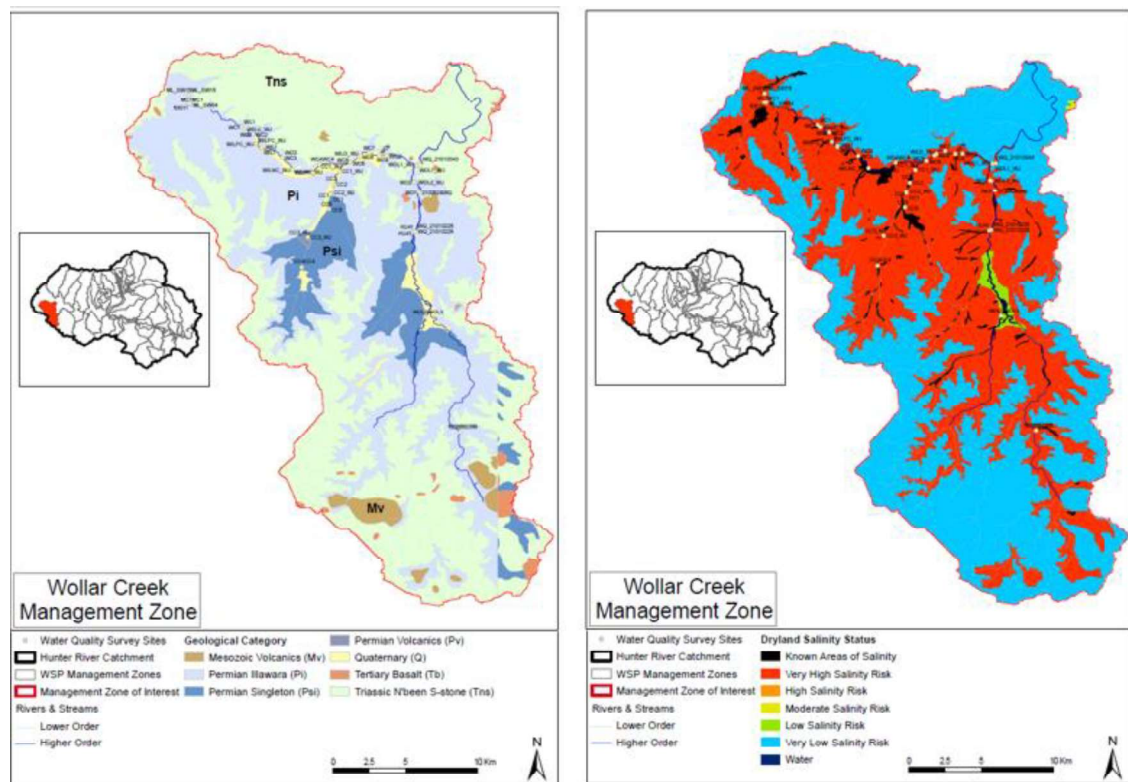


Figure 20. Hunter River Catchment Geological Classification and Dryland Salinity in the Wollar Creek Management Zone.

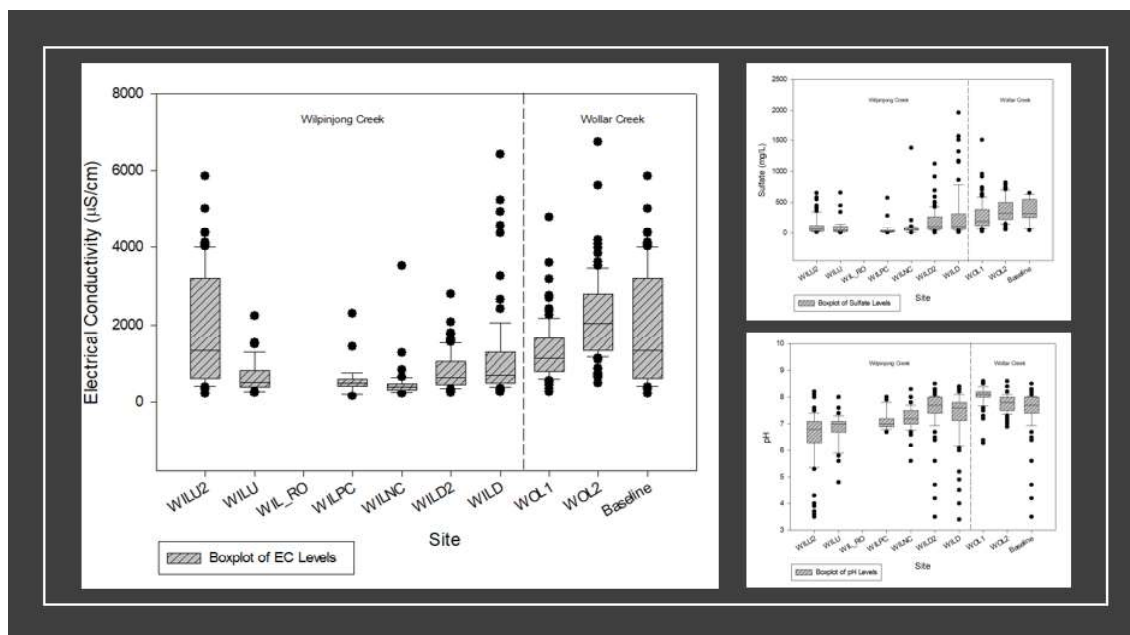


Figure 21. Boxplots of conductivity (left), pH and sulphate (as SO₄) levels (right) in the Wollar Creek Catchment.

Compared to baseline levels, there was little evidence of significant changes in EC or Sulphate in Wollar Creek downstream of Wilpinjong Creek (site WOL1) over the last decade. However, this conclusion is relevant to EC/salt concentrations and does not consider the load of salt moving into the environment from mining operations. The salt load issue is discussed further in the *Salt Loads from Wilpinjong Mine Licensed and Emergency Discharges* Section below.

The pH levels at WOL1 were slightly higher than baseline levels and upstream Wollar Creek (WOL2) pH levels, however, it is unclear whether this could be interpreted to be a mining related impact or not. It is noted that surface water trigger exceedances were recorded by Wilpinjong Coal in August 2023⁶² for WIL_D2 and WIL_D (3 consecutive readings greater than 7.7 pH).

The Wilpinjong Coal 2023 Annual Report identified that:

Exceedances of the Wilpinjong Creek (Downstream) pH upper trigger value (7.7 pH) have been observed at the Wilpinjong Creek (Downstream) sites of WIL_D2 and WIL_D from mid-2021. A review of the exceedances of this trigger value, during the reporting period of 1 June 2021 to 4 July 2023, was undertaken to identify the plausible and possible causes of the exceedances. The review found that the plausible and possible causes of the exceedances of the Wilpinjong Creek (Downstream) pH (upper) trigger value are:

- *Emergency discharge of EMW (temporary influence).*
- *Cumby Creek influencing the water signature of Wilpinjong Creek (Downstream).*
- *Cumby Creek contributing bicarbonate alkalinity to Wilpinjong Creek (Downstream).*
- *Potential mine water seeping from Pit 2 to Wilpinjong Creek (unlikely, but not excludable as a potential contributing cause).*
- *Higher pH surface water within the broader catchment, beyond the influence of WCM activities, indicates the possibility of natural variation also contributing. High rainfall*

⁶² Wilpinjong Coal (2023) Wilpinjong Coal Mine – SSD-6764 Water Management Plan Trigger Exceedances 03 October 2023.

conditions in late 2022 may have resulted in the migration of stagnant surface waters which may have contributed to elevated pH levels across the catchment.

On this basis, it is likely that a combination of factors caused the exceedance of the Wilpinjong Creek (Downstream) pH (Upper) trigger value and it is unlikely that the observed pH exceedances were directly caused by, or predominantly the result of, WCM mining activities.

Insufficient time was available to undertake a more comprehensive analysis of publicly reported surface water quality data at Wilpinjong Mine. It is noted that apart from EC, oil and grease, suspended solids and pH, there is limited reporting of other constituents in the RO discharge (e.g. cations and anions; particularly bicarbonate).

Wilpinjong Mine Licensed and Emergency Discharges

EPL 12425

The NSW EPA licences discharge from Wilpinjong Mine via EPL 12425. EPL12425 currently identifies two licensed discharges to waters points: LDP24 - Surface water discharge downstream of the outlet from the reverse osmosis plant located on Lot 234 DP723412; and LDP30 - Surface water discharge downstream from clean water dam located on Lot 3 and Lot 4 of DP 250053. LDP24 has a maximum volume limit of 6.5 ML/day⁶³ (approximately 2.7 Olympic swimming pools per day). There are also licence limits for LDP24 on conductivity, pH, suspended solids and oil and grease (see below). LDP30 has no volumetric limit but the turbidity value measured in the discharge at licence point 30 must not exceed 50 Nephelometric Turbidity Units (NTU) unless the turbidity value measured at the Wilpinjong Creek upstream gauging station is higher. In this instance, the turbidity measured at point 30 cannot exceed the value measured at the gauging station.

POINT 24

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Conductivity	microsiemens per centimetre				500
Oil and Grease	milligrams per litre				10
pH	pH				6.5-8.5
Total suspended solids	milligrams per litre				50

Licence Limits for LDP24 in EPL12425.

In addition, EPL12425 specifies that *all water discharged from the premises must have a flow regime which is variable and consistent with the ephemeral nature of the flows in Wilpinjong and Cumbo Creeks.*

In regard to EPL Point 30, the Wilpinjong Coal 2022 Annual Review stated that:

Discharge from the Pit 8 clean water diversion (CWD) dam to the downstream reach of Slate Gully Creek before it enters Wilpinjong Creek. There is no daily discharge limit and the EPL reflects Wilpinjong Coal's position that the water quality (i.e., measured as turbidity) from

⁶³ Originally the volume limit on EPL12425 was 5 ML/day but it has been varied a number of times in the past, including an increase to 15 ML/day at one stage to enable emergency discharges from Wilpinjong Coal dams.

the Pit 8 clean water diversion must be equal to or better than the receiving water in Wilpinjong Creek.

It is noted that the June and September 2025 CCC Minutes identify that Wilpinjong Coal are negotiating with the EPA to increase the discharge volume for LDP24 to 20 ML/day. The September 2025 CCC minutes stated: *Application to NSW EPA to increase water discharge is due to be submitted in the coming weeks. The proposed increase in discharge volume for LDP24 (to 20 ML/day) was not identified nor assessed in the WRM (2025) report.*

A recent search of the POEO Public Register for this review identified that there has been recorded non-compliances with EPL12425 in the annual returns each and every year since 2006 (see below). Regulators appear to have a very high tolerance for repeated non-compliances in this area.

Annual Returns

Start date	End date	Date received	Non-compliance LBL data
08-Feb-2024	07-Feb-2025	07-Apr-2025	YES Not available
08-Feb-2023	07-Feb-2024	05-Apr-2024	YES Not available
08-Feb-2022	07-Feb-2023	04-Apr-2023	YES Not available
08-Feb-2021	07-Feb-2022	06-Apr-2022	YES Not available
08-Feb-2020	07-Feb-2021	06-Apr-2021	YES Not available
08-Feb-2019	07-Feb-2020	07-Apr-2020	YES Not available
08-Feb-2018	07-Feb-2019	04-Apr-2019	YES Not available
08-Feb-2017	07-Feb-2018	09-Apr-2018	YES Not available
08-Feb-2016	07-Feb-2017	05-Apr-2017	YES Not available
08-Feb-2015	07-Feb-2016	05-Apr-2016	YES Not available
08-Feb-2014	07-Feb-2015	08-Apr-2015	YES Not available
08-Feb-2013	07-Feb-2014	02-Apr-2014	YES Not available
08-Feb-2012	07-Feb-2013	10-Apr-2013	YES Not available
08-Feb-2011	07-Feb-2012	04-Apr-2012	YES Not available
08-Feb-2010	07-Feb-2011	08-Apr-2011	YES Not available
08-Feb-2009	07-Feb-2010	12-Apr-2010	YES Not available
08-Feb-2008	07-Feb-2009	16-Mar-2009	YES Not available
08-Feb-2007	07-Feb-2008	08-Apr-2008	YES Not available
08-Feb-2006	07-Feb-2007	18-Apr-2007	YES Not available

Source: EPA POEO Public Register for EPL12425

Summary

The NSW EPA licences discharges from Wilpinjong Mine via EPL 12425.

LDP24 has a maximum volume limit of 6.5 ML/day⁶⁴ (approximately 2.7 Olympic swimming pools per day). There are also licence limits for LDP24 on conductivity, pH, suspended solids and oil and grease (see below).

LDP30 has no volumetric limit but the turbidity value measured in the discharge at licence point 30 must generally not exceed 50 Nephelometric Turbidity Units (NTU),

In addition, EPL12425 specifies that *all water discharged from the premises must have a flow regime which is variable and consistent with the ephemeral nature of the flows in Wilpinjong and Cumbo Creeks.*

It is noted that the June and September 2025 CCC Minutes identify that Wilpinjong Coal are negotiating with the EPA to increase the discharge volume for LDP24 to 20 ML/day.

⁶⁴ Originally the volume limit on EPL12425 was 5 ML/day but it has been varied a number of times in the past, including an increase to 15 ML/day at one stage to enable emergency discharges from Wilpinjong Coal dams.

A recent search of the POEO Public Register for this review identified that there has been recorded non-compliances with EPL12425 in the annual returns each and every year since 2006.

Discharge from the Water Treatment Facility (WTF)

The RO discharge point is located in between the two gauges on Wilpinjong Creek, approximately 3.4 km upstream of the Wilpinjong Creek downstream gauge and 2.6 km upstream of the Cumbo Creek confluence (WRM 2015). Various changes to the operation of the WTF have occurred over time.

The Wilpinjong Coal 2017 Annual Review stated:

The WTF comprises two separate reverse osmosis (RO) treatment plants located immediately east of Pit 2W. Both plants receive a feed water stream from Pit 2W, and produce a low salinity permeate stream and a concentrate stream. The permeate stream is blended with small quantities of Pit 2W water and then discharged into Wilpinjong Creek in accordance with the site's environmental protection license (EPL No. 12425). The concentrate stream is recirculated into the water management system (either Pit 2W, Pit 1S or the RWD). 2017 AR

The Wilpinjong Coal 2020 Annual Review stated:

*The WTF is located adjacent to and east of Pit 2W (location marked in **Figure 1**). Feed water is extracted from Pit 2W (EC 3,500 to 4,000 $\mu\text{S}/\text{cm}$), and then passes through a process of strainers, UF filters and RO membranes to produce a low EC permeate stream (typ. 180 $\mu\text{S}/\text{cm}$ EC). The permeate stream is blended with a small amount of feed water prior to release to achieve a mixed EC closer to the 500 $\mu\text{S}/\text{cm}$ limit prescribed in the EPL. The EC of the RO reject by-product varies depending on permeate recovery but is typically around 14,000 $\mu\text{S}/\text{cm}$ EC. Prior to Q4 2018, reject was pumped to Pit 1S. Reject is now pumped to either the RWD or Pit 2W given that Pit 1S has been taken offline (mined through). Some permeate is also used for RO back-flushing/cleaning.*

The surface water assessment (WRM 2025) for the Wilpinjong Pit 8 Modification described the Treated Water Discharge in Section 4.7.5 stating:

Excess mine water accumulating on site is released after treatment in the ROP located adjacent to Pit 2W in accordance with EPL 12425. The ROP is supplied with feed water from Pit 2W. ROP permeate is discharged to Wilpinjong Creek in accordance with the requirements of EPL 12425, which prescribes water quality (maximum EC of 500 $\mu\text{S}/\text{cm}$) and daily discharge (maximum of 6.5 ML/day) limits. Permeate is mixed with a proportion of feed water prior to discharge to produce treated water which meets the discharge criteria (i.e. once mine water is combined with permeate it is considered treated). Backwash from the ROP and concentrate is discharged to Pit 2W. As described in Section 3.8, the current EPL limit of $\mu\text{S}/\text{cm}$ is generally lower than the salinity of flows at the Wilpinjong Creek Upstream sampling point and well below observations at the Wilpinjong Creek Downstream gauge. As a result, approved releases from the discharge point tend to significantly reduce salinity in Wilpinjong Creek downstream of the Cumbo Creek confluence compared to what they would be without discharge.

The following concentrate, backwash and permeate percentages generally represent the operation of the ROP:

- Permeate – 85% of feed; and
- Concentrate and backwash – 15% of feed.

The ROP has a theoretical maximum discharge capacity of around 5.0 ML/day. An increase in capacity, expected to be completed mid-2025, would increase the output of the plant to 6.5 ML/day. Monthly ROP discharge volumes from January 2018 to December 2024 were reported in the 2024 Annual Review and are shown in Figure 4.5.

The most salient features of the operation of the WTF are therefore:

- There is currently only one reverse osmosis (RO) treatment plant in operation
- Feed water to the WTF is extracted from Pit 2W (EC 3,500 to 4,000 $\mu\text{S}/\text{cm}$)
- The feed water passes through a process of strainers, UF filters and RO membranes to produce a low EC permeate stream (typ. 180 $\mu\text{S}/\text{cm}$ EC)
- The permeate stream is blended with a small amount of feed water prior to release to achieve a mixed EC closer to the 500 $\mu\text{S}/\text{cm}$ limit prescribed in the EPL.
- The EC of the RO reject by-product varies depending on permeate recovery but is typically around 14,000 $\mu\text{S}/\text{cm}$ EC.
- Prior to Q4 2018, reject was pumped to Pit 1S. Reject is now pumped to either the RWD or Pit 2W given that Pit 1S has been taken offline. In the most recent description, WRM (2023) stated that Backwash from the ROP and concentrate is discharged to Pit 2W.
- The *permeate* is approximately 85% of the feed; and the *concentrate* and *backwash* is approximately 15% of the feed.
- ROP permeate is discharged to Wilpinjong Creek in accordance with the requirements of EPL 12425, which prescribes water quality (maximum EC of 500 $\mu\text{S}/\text{cm}$) and daily discharge (maximum of 6.5 ML/day) limits.

It is noted that WRM (2025) do not discuss the effects of discharging 14,000 $\mu\text{S}/\text{cm}$ EC *concentrate* and *backwash* to Pit 2W. Over time this would obviously have the effect of increasing the EC concentration in Pit 2W. Subsequent feed water drawn from Pit 2W would then likely increase EC concentrations yet again as 15% of the feed comes back as *concentrate* and *backwash* to Pit 2W. There appears to be a high likelihood that salts are simply recirculating and concentrating in Pit 2W.

SLR (2025) noted that there was limited EC data for the WMS dams or pits provided from 2020 to 2024. Review of available information showed the following:

- Water circulating through the WMS has historically averaged around 3,000 to 4,000 $\mu\text{S}/\text{cm}$ (see pit, dam and feed water data). Since 2023, available data indicates salinity has trended upwards at the site (Pit 2W and WTF discharge).
- The EC of water within CWD increased slightly in 2019, coinciding with input from external bore supplies;
- The EC of water within Pit 1S prior to 2018 is higher than the water in the rest of the WMS, due to inflow of RO reject. Concentrations of salt within this storage appear to have been diluted with upstream clean catchment runoff (RO reject EC sampled at 14,000 $\mu\text{S}/\text{cm}$ in February 2017 compared to Pit 1S EC of around 7,850 $\mu\text{S}/\text{cm}$ in October 2017).
- The EC of the blended discharge stream to Wilpinjong Creek has generally increased over time, now typically ranging around 350 to 450 $\mu\text{S}/\text{cm}$. This likely coincides with the salinity increase observed throughout the broader WMS which coincides with the site's increased confidence with the WMS and ability to effectively manage salinity. The discharge remains compliant with the 500 $\mu\text{S}/\text{cm}$ EC end-of-pipe limit specified in EPL 12425.

Summary

The RO discharge point is located in between the two gauges on Wilpinjong Creek, approximately 3.4 km upstream of the Wilpinjong Creek DS gauge and 2.6 km upstream of the Cumbo Creek confluence (WRM 2015).

The most salient features of the operation of the WTF are:

- There is currently only one reverse osmosis (RO) treatment plant in operation
- Feed water to the WTF is extracted from Pit 2W (EC 3,500 to 4,000 $\mu\text{S}/\text{cm}$)
- The feed water passes through a process of strainers, UF filters and RO membranes to produce a low EC permeate stream (typ. 180 $\mu\text{S}/\text{cm}$ EC)
- The permeate stream is blended with a small amount of feed water prior to release to achieve a mixed EC closer to the 500 $\mu\text{S}/\text{cm}$ limit prescribed in the EPL.
- The EC of the RO reject by-product varies depending on permeate recovery but is typically around 14,000 $\mu\text{S}/\text{cm}$ EC.
- Prior to Q4 2018, reject was pumped to Pit 1S. Reject is now pumped to either the RWD or Pit 2W given that Pit 1S has been taken offline. In the most recent description, WRM (2023) stated that Backwash from the ROP and concentrate is discharged to Pit 2W.
- The *permeate* is approximately 85% of the feed; and the *concentrate* and *backwash* is approximately 15% of the feed.
- ROP permeate is discharged to Wilpinjong Creek in accordance with the requirements of EPL 12425, which prescribes water quality (maximum EC of 500 $\mu\text{S}/\text{cm}$) and daily discharge (maximum of 6.5 ML/day) limits.

Conclusion

WRM (2025) do not discuss the effect of discharging 14,000 $\mu\text{S}/\text{cm}$ EC *concentrate* and *backwash* to Pit 2W. Over time this would obviously have the effect of increasing the EC concentration in Pit 2W. Subsequent feed water drawn from Pit 2W would then likely increase EC concentrations yet again as 15% of the feed comes back to Pit 2W as *concentrate* and *backwash*. There appears to be a high likelihood that salts are simply recirculating and concentrating in Pit 2W.

There is currently inadequate monitoring of Pit 2W EC concentrations and since 2023, salinity has trended upwards at the Pit 2W and WTF discharge sites. The EC of the WTF discharge could potentially be as low as 180 $\mu\text{S}/\text{cm}$, but Wilpinjong Coal is blending the permeate with feed water to bring it up to the EPL EC limit (500 $\mu\text{S}/\text{cm}$). In my view, this could potentially be termed polluting up to a licence limit rather than delivery of a waste water stream to better protect the environment (especially in terms of salt loads).

Since Pit 2W is unlikely to be lined (i.e. impervious to saline water) there is also significant potential for waste water with rising EC levels in Pit 2W to be leaching into the groundwater of the area. This is a common problem in other coal mining areas where brine is either mixed with ash or coal waste and placed in ash repositories (e.g. near Mt Piper) or discharged into underground workings (e.g. Tahmoor). **The potential for highly saline water in Pit 2W to migrate/leach into groundwater aquifers is not currently monitored and has not been assessed in the current proposal.**

Volume and Quality of LDP24 Discharges

In order to assess what has been discharged from the Wilpinjong Mine site over time, a review of EPL 12425 Reporting⁶⁵ from February 2013 to April 2025 was undertaken. According to the Wilpinjong Coal 2013 Annual Review (Wilpinjong Coal 2013), construction of the RO Plant was completed in June 2012, and approved water releases commenced on 16 June 2012. The total water discharged over the 2013 review period was approximately 75 ML. On a number of occasions there has been no discharge from the RO Plant, including between May and September 2013, between February 2014 and June 2014, and from the end of November 2018 to November 2020. The monthly EPL reports only included minimum, maximum and mean flows and these have been plotted in Figure 22. The minimum, maximum and mean electrical conductivity (EC) have also been plotted (see Figure 22).

In reviewing these data it became evident that the reported minimum, maximum and mean flows remained constant between April 2023 and August 2024 reducing confidence in the credibility of the EPL reporting. Over the same timeframe the EC levels showed variability in the reported minimum, maximum and mean. It is recommended that the EPA, as regulator, investigate the reporting of flow discharges for LDP24 for the period April 2023 and August 2024.

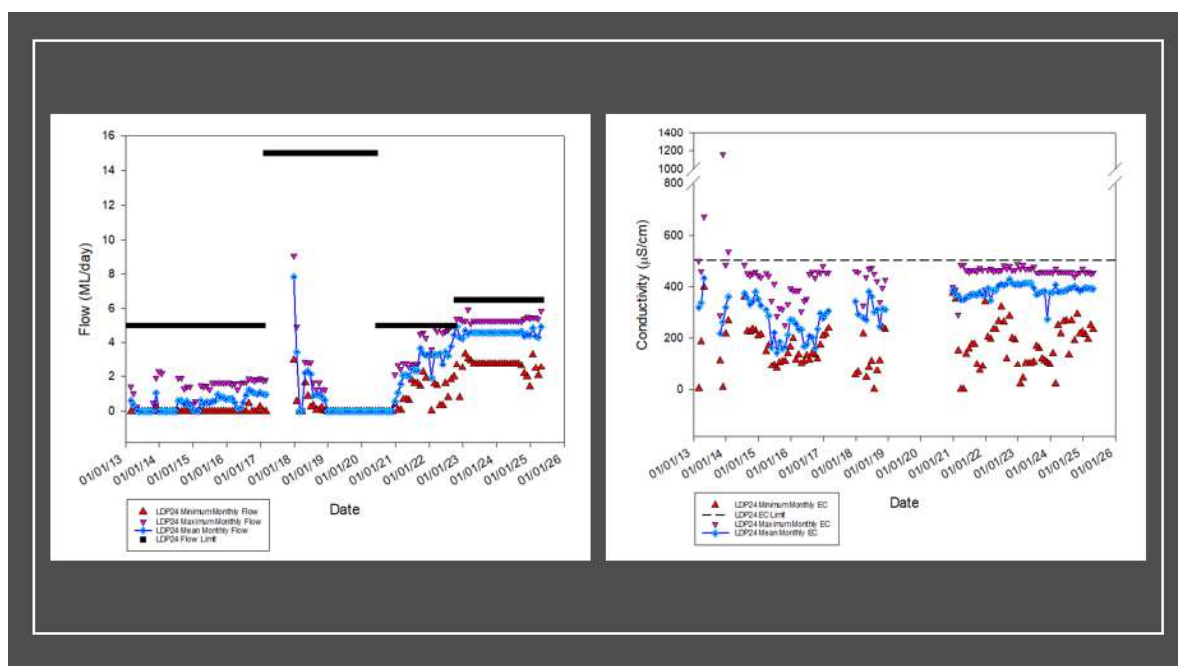


Figure 22. LDP24 minimum, maximum and mean flows (left) and EC (right). EPL12425 Flow limits shown as horizontal black lines (left) and EC limits shown as horizontal dashed line (right). Data sourced from EPL reports between February 2013 and April 2025.

Apart from a couple of early exceedances in 2013 and January 2014, reported EC levels have generally complied with the EPL 12425 EC limits. Average EC levels are currently around 390 $\mu\text{S}/\text{cm}$ (see Figure 22).

The reported discharges from LDP24 were all within the EPL 12425 maximum flow volume limit (see Figure 22), although as identified earlier the volume limit has changed at different times (currently

⁶⁵ Monthly EPL Reports were downloaded from the Wilpinjong Coal website. Difficulties were experienced downloading the monthly EPL reports from March 2017 to November 2017 and so there was no data included for this time period.

set at 6.5 ML/day). In recent times, mean monthly flows have been approximately 4.5 ML/day (~1.9 Olympic swimming pools per day).

Plots of the daily flow releases over the last 3 years⁶⁶ are shown in Figure 23. A flow/discharge exceedance curve for the RO discharge was calculated using the EPL 12425 reported discharges and compared to the flow exceedance curve for Wollar Creek for the period 1980 to 1997 (see Figure 24).

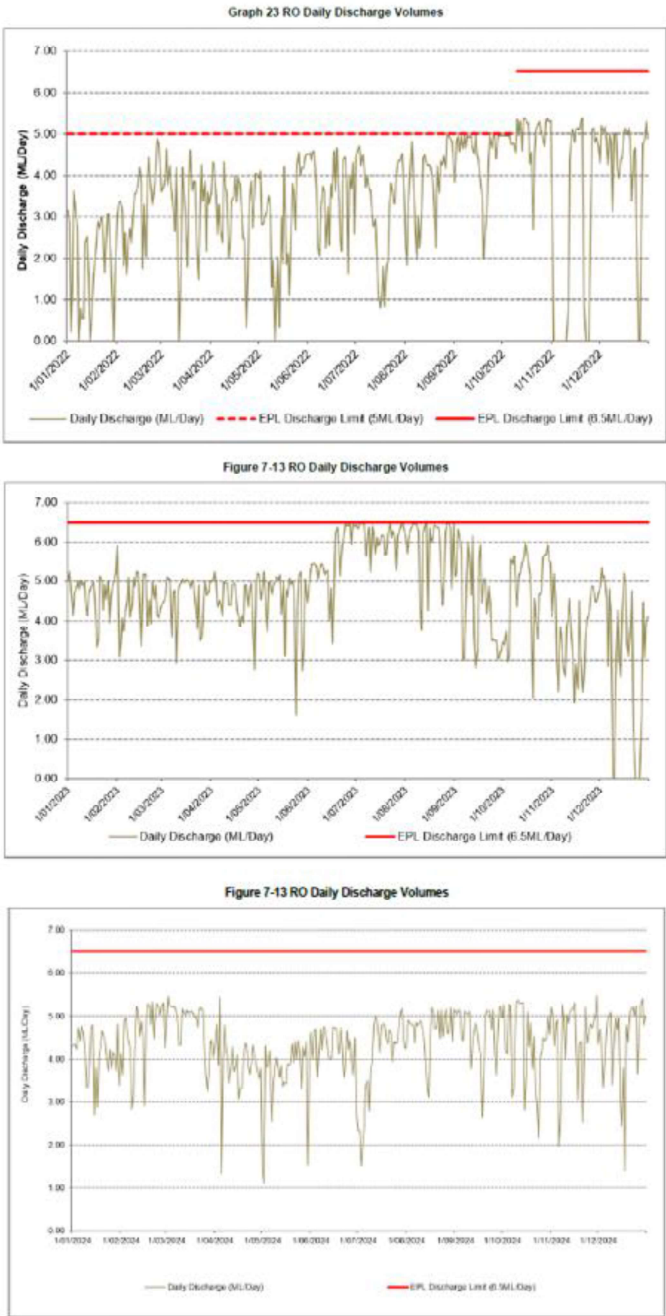


Figure 23. Daily discharge rates to Wilpinjong Creek from LDP24. Source: Wilpinjong Coal 2022, 2023 & 2024 Annual Reviews.

⁶⁶ Sourced from the 2022, 2023 and 2024 Annual Reviews.

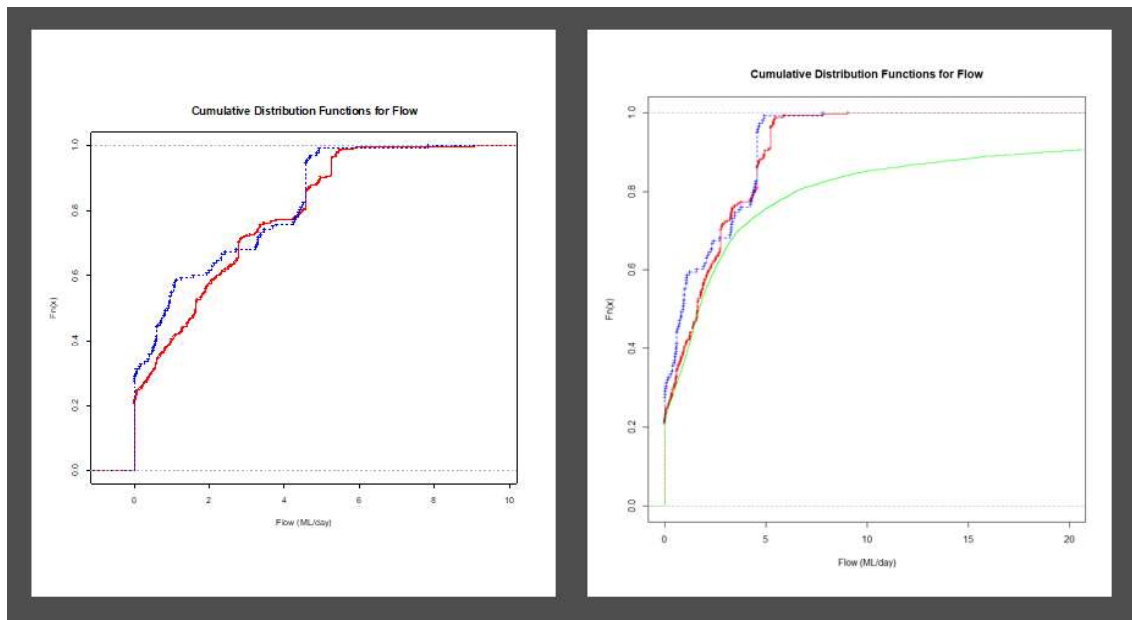


Figure 24. Flow exceedance curves (empirical cumulative distribution function⁶⁷) for reported LDP24 discharge volumes (red and blue lines; left) and compared to the flow exceedance curve for Wollar Creek (green line; right). The blue line has been generated by taking all EPL 12425 reported mean flows; the red line includes the reported mean flows as well as the minimum flows and maximum flows).

As identified earlier, over the period of records (1980 to 1997), median flows in Wollar Creek were ~1.7 ML/day and the average flow was ~9 ML/day. Current discharge rates from the RO plant (~4.5 ML/day) are far above the median flow rate for the WILGSU gauge (close to 0.2 ML/day based on the flow exceedance curve provided in WRM 2015) and 2.6 times the median flow in Wollar Creek (DIPNR flow gauge data for Stn 210082). Wilpinjong Coal is seeking to increase this flow even further (to 20 ML/day; see WCPL June 2025 CCC Minutes) but have not assessed this projected increase in discharge in the *Surface Water Assessment* for the proposed Pit 8 Extension Modification for Wilpinjong Coal Mine.

It is unclear how the current flow rates from LDP24 (and variability) can be reconciled with the EPL condition that: *All water discharged from the premises must have a flow regime which is variable and consistent with the ephemeral nature of the flows in Wilpinjong and Cumbo Creeks.*

WRM (2025) did not address this EPL condition in their assessment, nor have they mentioned/assessed a projected increase in flow from LDP24 (to 20 ML/day; see June 2025 CCC Minutes). It would seem likely that the identified need to increase the EPL24 discharge to 20 ML/day is generated largely by the proposal to develop the Pit 8 Extension.

Summary

Apart from a couple of early exceedances in 2013 and January 2014, reported EC levels generally comply with the EPL EC limits. Average EC levels are currently around 390 $\mu\text{S}/\text{cm}$.

The reported discharges from LDP24 were all within the maximum flow volume limit (see Figure G), although as identified earlier the volume limit has changed at times (currently it is set at 6.5 ML/day).

⁶⁷ The flow exceedance curves (statistically the empirical cumulative distribution function) were generated using the *ecdf* function in R.

In recent times, mean monthly flows have been approximately 4.5 ML/day (~1.9 Olympic swimming pools per day).

Conclusion

Over the period of records (1980 to 1997), median flows in Wollar Creek were ~1.7 ML/day and the average flow was ~9 ML/day. Current discharge rates from the RO plant (~4.5 ML/day) are far above the median flow rate for the WILGSU gauge (close to 0.2 ML/day based on the flow exceedance curve provided in WRM 2015) and 2.6 times the median flow in Wollar Creek.

The Pit 8 Extension surface water assessment (WRM 2025) has not teased out the contribution of RO water from LDP24 to the current flow hydrograph at WILGSD⁶⁸ and, as a result, does not fully assess the impact of the discharge on Wilpinjong Creek (or Wollar Creek downstream of the Wilpinjong Creek confluence).

It is unclear how the current flow rates from LDP24 (and its variability) can be reconciled with the EPL condition that: *All water discharged from the premises must have a flow regime which is variable and consistent with the ephemeral nature of the flows in Wilpinjong and Cumbo Creeks.*

The current discharge rates from the RO plant are significantly altering the natural flow regimes of Wilpinjong Creek. Since there has been no flow monitoring of Wollar Creek since the DIPNR monitoring ceased in 1997, there is no assessment of the effect of these increased flows on Wollar Creek downstream of the Wilpinjong Creek confluence. This is considered to be a serious omission from the *Surface Water Assessment*.

It is noted that Wilpinjong Coal is also seeking to increase these flows even further (to 20 ML/day; see June 2025 CCC Minutes) but have not assessed this projected increase in discharge in the *Surface Water Assessment* for the proposed Pit 8 Extension Modification. This is also considered a serious omission from the Pit 8 Extension Modification assessment.

In reviewing the reported EPL data it became evident that the reported minimum, maximum and mean flows remained constant between April 2023 and August 2024 reducing confidence in the credibility of the EPL reporting. Over the same timeframe the EC levels showed variability in the reported minimum, maximum and mean. It is recommended that the EPA, as regulator, investigate the reporting of flow discharges for EPL24 for the period April 2023 and August 2024.

It is recommended that Wollar Creek has appropriate flow gauges installed (at Wollar Creek downstream of the Wollar Creek and Wilpinjong Creek confluence; at the site of the old DIPNR gauge in Wollar Creek upstream of the Wilpinjong Creek confluence; and Wollar Creek near the Wollar Road crossing) as soon as reasonably practicable.

Emergency Discharges

SLR (2024)⁶⁹ identified that:

⁶⁸ For example, by subtracting LDP24 discharges from the WILGSD gauged flows to identify 'natural flows' at the downstream gauging station

⁶⁹ SLR (2024). Wilpinjong Coal Mine Annual Review 2023 – Surface Water Compliance Wilpinjong Coal Pty Ltd Prepared by SLR Consulting Australia SLR Project No.: 665.v10014.02010 28 March 2024 Revision: 2.0

During the previous reporting period (2022), due to the ongoing above average rainfall conditions and the high potential for an uncontrolled off site water discharge, WCM was granted two licence variations for the following periods by the NSW Environmental Protection Authority (EPA) to discharge excess mine water (EMW) to Wilpinjong Creek:

- WCM discharge to Wilpinjong Creek and Cumbo Creek was permitted and occurred between 31 October 2022 and 25 November 2022 at three locations (EPL Points 30, 31, 32) with a total combined permissible discharge limit of 71 ML/day.*
- In addition, discharge to Wilpinjong Creek was permitted and occurred between 15 December 2022 and 1 January 2023 at two locations (EPL Points 30 and 32) with a total combined permissible discharge of 20 ML/day.*

The decrease in allowable daily discharge volume was proposed by WCM given the reduction in natural flow within the receiving environment following a short period of drier conditions. 16.4 ML was discharged within the reporting period for this annual review (2023), with the second period of emergency discharge ceasing at 5pm 1 January 2023.

The Wilpinjong Coal 2022 Annual Review gave further details on the emergency water discharge locations, volumes and conductivity levels noting:

There were three variations to EPL 12425 during the Reporting Period, including:

- Licence Variation Notice 1623412 to vary licence condition to increase discharge volume from 5 megalitres per day (5ML/day) to 6.5 ML/day;
- Licence Variation Notice 1623919 to discharge from the premises, under emergency conditions, surplus rainwater captured and stored in open cut pits and associated dams. Licence condition *E1 Emergency Water Discharge* permitted the volumes of water discharged from:
 - o Point 30 - 18 ML/day
 - o Point 31 - 18 ML/day
 - o Point 32 - 35 ML/day
- Licence Variation Notice 1625163 to extend the time of the water discharge under emergency water discharge conditions from 5pm on the 25 November 2022 to 5pm 1 January 2023 from the following locations:
 - o Point 30 - 5 ML/day
 - o Point 32 - 15 ML/day

SLR (2023)⁷⁰ described the characteristics of the Emergency Discharge as follows:

⁷⁰ SLR (2023). WILPINJONG COAL MINE Annual Review 2022 Surface Water Compliance Prepared for: Wilpinjong Coal Pty Ltd SLR Ref: 665.10014.02305-R01 Version No: -v2.0 March 2023

Table 3 Wilpinjong emergency water discharge locations

Site	Description
EPL Point 32	- EMW from Pit 2 was discharged to Wilpinjong Creek. - The water make-up varied over the discharge period, as the Pit 2 dam water was periodically simultaneously released with treated water from the Reverse Osmosis (RO) Plant. - Water was released to Wilpinjong Creek using a combination of the existing RO Plant discharge infrastructure and natural drainage channels. - The daily discharge limit for WCM Period 1 from EPL Point 32 was 35 ML/day. - The daily discharge limit for WCM Period 2 from EPL Point 32 was 15 ML/day.
EPL Point 31	- EMW from Pit 4 was discharged to Cumbo Creek, a tributary of Wilpinjong Creek. The discharge location was approximately 1.3 km from the confluence with Wilpinjong Creek. - The daily discharge limit for WCM Period 1 from EPL Point 31 was 18 ML/day. - No discharge was permitted for WCM Period 2 from EPL Point 31.
EPL Point 30	- EMW from Pit 8 was discharged to Wilpinjong Creek via the Slate Gully drainage line, utilising existing clean water diversion infrastructure. - The daily discharge limit for WCM Period 1 from EPL Point 30 was 18 ML/day. - The daily discharge limit for WCM Period 2 from EPL Point 30 was 5 ML/day. - Ongoing discharge of collected surface water above mining operations from the Pit 8 clean water dam outside of emergency discharge periods is permissible, as was originally licenced at this location.

Site	Description
EPL Point 24	- Product water from the RO treatment plant is discharged to Wilpinjong Creek. - The daily discharge limit from the RO Plant is 6.5 ML/day. - Ongoing discharge of product water from the RO treatment plant outside of emergency discharge periods is permissible.

For Discharge Period 1:

- 1,287 ML out of an allowable 1,775 ML was discharged.
- The EC of discharge water was between 3,500 and 4,500 $\mu\text{S}/\text{cm}$, which was higher than the EC of the receiving water in Wilpinjong Creek prior to discharge.
- Turbidity was generally <10 NTU at all discharge sites. This is lower than the turbidity of the receiving water in Wilpinjong Creek prior to discharge.
- pH was between 7 and 8.5 at all discharge sites, this is generally consistent with recent pH of the receiving water in Wilpinjong Creek prior to discharge.
- The discharge of EMW temporarily influenced the surface water EC in Wilpinjong Creek. The elevated EC in Wilpinjong Creek was within the range of natural variation and declined following the cessation of WC discharge. There were no discernible changes in EC observed beyond the range of natural variation further downstream at the Goulburn River.
- It is unlikely that water quality (in particular EC) in Goulburn River was significantly influenced by discharge of EMW from WCM during Discharge Period 1 in October/November 2022. This is due to high flows induced by high rainfall events in the Goulburn River catchment compared to EMW discharge volumes.

For Discharge Period 2:

- 320 ML out of an allowable 360 ML was discharged.
- The EC of discharge water was between 3,250 and 4,500 $\mu\text{S}/\text{cm}$ and observed to be reasonably consistent at each discharge location. This is higher than the EC of the receiving water in Wilpinjong Creek prior to discharge.
- Turbidity was generally <10 NTU at all discharge sites. This is lower than the turbidity of the receiving water in Wilpinjong Creek prior to discharge and lower than historical observations.
- pH is between 7.5 and 8.5 at all discharge sites, this is generally consistent with recent and historical pH of the receiving water in Wilpinjong Creek prior to discharge.
- The discharge of EMW from WCM during December 2022 and early January 2023 influenced the surface water EC in Wilpinjong Creek, downstream of the two discharge points during the discharge period. However, it appears that this influence was temporary and limited in extent. Elevated EC in Wilpinjong Creek was within the range of natural variation and declined following the cessation of WCM discharge. There were also no discernible changes

in EC observed, beyond the range of natural variation, further downstream at the Goulburn River.

SLR (2023) also stated that:

WCM was also approved to discharge up to 5 ML/day via the RO plant at EPL Point 24, which treats water from on-site water retention dams. On 10 October 2022, EPL 12425 was updated to increase the discharge limit at EPL Point 24 to 6.5 ML/day.

Summary

In 20022, WCM was granted two licence variations by the NSW Environmental Protection Authority (EPA) to discharge excess mine water (EMW) to Wilpinjong Creek.

During the first emergency discharge (Discharge Period 1) WCM discharged to Wilpinjong Creek and Cumbo Creek between 31 October 2022 and 25 November 2022 at three locations (EPL Points 30, 31, 32). A total of 1,287 ML was discharged with the EC of discharge water being between 3,500 and 4,500 $\mu\text{S}/\text{cm}$.

During the second emergency discharge (Discharge Period 2) WCM discharged to Wilpinjong Creek between 15 December 2022 and 1 January 2023 at two locations (EPL Points 30 and 32). A total of 320 ML was discharged with the EC of discharge water being between 3,250 and 4,500 $\mu\text{S}/\text{cm}$. This was higher than the EC of the receiving water in Wilpinjong Creek prior to discharge (SLR 2023).

On 10 October 2022, EPL 12425 was updated to increase the discharge limit at EPL Point 24 to 6.5 ML/day.

Conclusion

The emergency discharges would have added to the salt load moving into Wilpinjong and Wollar Creeks.

Spray Irrigation

In addition to the EPL12425 discharges and approved emergency discharges, Wilpinjong Coal also undertakes spray irrigation, involving a bank of four evaporators in Pit 3 - approx. 150L/second throughput (12.9ML/d) with a current estimate on evaporation at 40% or ~5ML/d. (Wilpinjong Coal CCC Minutes March 2025).

SLR (2025)⁷¹ described the operation of evaporator sprays as:

WCPL have access to a suite of evaporator sprays which are employed to reduce water inventory in times of surplus. The site operates the sprays at two distinct locations:

- *On the eastern bank of Pit 2W; and*
- *On the southern bank of Pit 3.*

⁷¹ SLR 2025. *Site Water Balance Model* Model Update and Calibration 2025 Wilpinjong Coal Mine SLR Consulting Australia SLR Project No.: 630.032087.00001 27 March 2025 Revision: v1.0

The sprays at Pit 2W have been intermittently run since 2017, while the sprays at Pit 3 were only recently introduced during 2024. Between October 2017 and February 2018, a total of ten sprays were in operation at Pit 2W. Water supply to the spray system was unmetered and has been estimated at approximately 1 ML/day. Net water losses have been estimated at 0.25 ML/day assuming a 25% spray efficiency, which has been selected based on past experience with similar systems at other operations. The Pit 2W sprays were not operated from 2019 – 2021, then later recommissioned in 2022 and 2023 and employed on an ad-hoc basis. In 2024, the Pit 3 sprays were run during late December with a total usage volume of 38.6 ML reported.

Summary

In addition to the EPL12425 discharges and approved emergency discharges, Wilpinjong Coal also undertakes spray irrigation, involving a bank of four evaporators in Pit 3 - approx. 150L/second throughput (12.9ML/d) with a current estimate on evaporation at 40% or ~5ML/d. (Wilpinjong Coal CCC Minutes March 2025).

Conclusion

It is likely that spray irrigation of the area also contributes salt into the landscape.

Salt Loads from Wilpinjong Mine Licensed and Emergency Discharges

As identified earlier, the Hunter River valley is generally considered to be saline due to the marine origin of some of its Permian sediments. Dryland salinity is one of the most intractable threats to the health and utility of Australia's rivers, soil and vegetation (Williams et al 2002). It is therefore important to consider the load of salt moving into the environment from existing mining operations as well as what would likely occur with the proposed Pit 8 expansion. In order to do this, the mean flow and EC levels from the EPL Reporting from February 2013 to April 2025 were taken and the EC levels converted to Total Dissolved Solids (TDS) using a factor of 0.64⁷². The resulting estimates of TDS were then multiplied by the mean flow to generate estimates of mean daily salt load for each month. This load was then multiplied by the number of days in the month and the load each month summed to give an annual salt load (see Table 1 and Figure 25).

Year	Annual Load (kg)	Average of Mean Flow (ML/day)	Average of Mean EC ($\mu\text{S}/\text{cm}$)	Cumulative Load (kg)	Cumulative Load (tonnes)
2013	11663	0.2	314.5	11663	11.7
2014	17748	0.2	355.8	29411	29.4
2015	26285	0.5	222.2	55696	55.7
2016	40803	0.8	225.1	96499	96.5
2017	64017	3.3	313.7	160516	160.5
2018	88540	1.2	306.3	249056	249.1
2019	0	0.0		249056	249.1
2020	4373	0.05	386.0	253428	253.4

⁷²Electrical conductivity, measured in micro Siemens per cm ($\mu\text{S}\cdot\text{cm}^{-1}$, also known as EC, or electroconductivity units), is often multiplied by 0.64 to estimate TDS. The relationship, however, is dependant on both chemistry and temperature, and factors of between 0.50 and 0.64 are used across Australia.

<https://guidelines.nhmrc.gov.au/australian-drinking-water-guidelines/part-5/physical-chemical-characteristics/total-dissolved-solids>

2021	209220	2.5	363.2	462649	462.6
2022	334773	3.6	398.6	797422	797.4
2023	417333	4.6	390.4	1214755	1214.8
2024	414947	4.5	389.9	1629702	1629.7
2025	139097	4.6	392.5	1768798	1768.8
Grand Total	1768798				

Table 1. Salt Load from EPL discharges to Wilpinjong Creek.

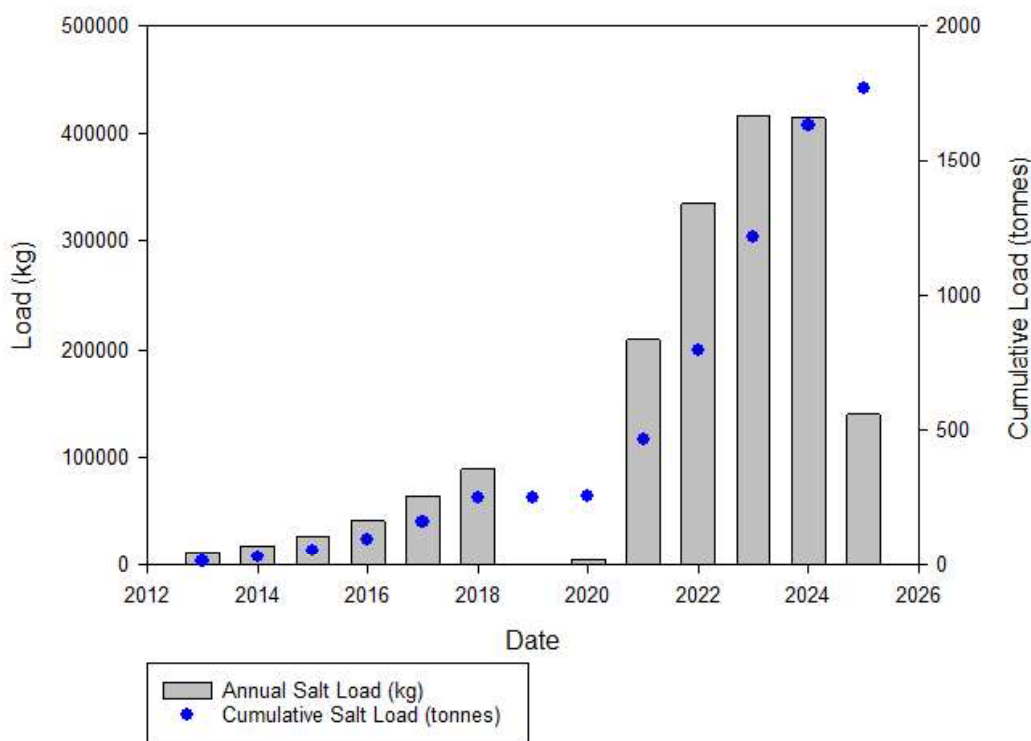


Figure 25. Estimated Salt Loads from LDP24 discharges. There was no discharge from the RO Plant between May and September 2013; between February 2014 and June 2014; and from the end of November 2018 to November 2020. The estimated load for 2025 is up to April 2025.

Summary

There has been a significant increase in salt load in recent years with the current annual salt load being ~415 tonnes per annum⁷³. The total cumulative salt load since 2013 sits at ~1769 tonnes (as of April 2025)⁷⁴.

Based on total flows and estimated conductivity levels⁷⁵, the Emergency Discharges during 2012-2013 would have added a further 3,500 to 4,600 tonnes of salt to the environment.

⁷³ For 2024.

⁷⁴ Although there is considerable uncertainty in this estimate given the lack of public access to daily flow and EC records; and as identified earlier, potential quality assurance issues with the reported data.

⁷⁵ See *Emergency Discharges* Section above.

Overall Conclusions

The Hunter River valley is generally considered to be saline due to the marine origin of some of its Permian sediments. There is a strong correlation between the areas of Permian sediments and areas of known or predicted dryland salinity risk. Dryland salinity is one of the most intractable threats to the health and utility of Australia's rivers, soil and vegetation (Williams et al 2002). The 1998 report to the Prime Minister's Science Engineering and Innovation Council (PMSEIC) on dryland salinity noted that 'the time scales over which salinity establishes itself, spreads, and has its effects can be long, but once established it can be very difficult or impossible to contain or reverse.

The NSW EPA licences discharge from Wilpinjong Mine via EPL12425. EPL12425 currently identifies two licensed discharges to waters points: LDP24 - Surface water discharge downstream of the outlet from the reverse osmosis plant; and LDP30 - Surface water discharge downstream from the clean water dam. LDP24 has a maximum volume limit of 6.5 ML/day⁷⁶ (approximately 2.7 Olympic swimming pools per day). LDP30 has no volume limit but the turbidity value measured in the discharge at licence point 30 must not exceed 50 Nephelometric Turbidity Units (NTU)⁷⁷. A search of the POEO Public Register identifies that there has been recorded non-compliances with EPL12425 in the annual returns each and every year since 2006 (see below). Regulators appear to have a high tolerance for repeated non-compliances in this area.

The most salient features of the operation of the WTF (reverse osmosis plant) are:

- There is currently only one reverse osmosis (RO) treatment plant in operation
- Feed water to the WTF is extracted from Pit 2W (EC 3,500 to 4,000 $\mu\text{S}/\text{cm}$)
- The feed water passes through a process of strainers, UF filters and RO membranes to produce a low EC permeate stream (typ. 180 $\mu\text{S}/\text{cm}$ EC)
- The permeate stream is blended with a small amount of feed water prior to release to achieve a mixed EC closer to the 500 $\mu\text{S}/\text{cm}$ limit prescribed in the EPL.
- The EC of the RO reject by-product varies depending on permeate recovery but is typically around 14,000 $\mu\text{S}/\text{cm}$ EC.
- Prior to Q4 2018, reject was pumped to Pit 1S. Reject is now pumped to either the RWD or Pit 2W given that Pit 1S has been taken offline. In the most recent description, WRM (2023) stated that Backwash from the ROP and concentrate is discharged to Pit 2W.
- The *permeate* is approximately 85% of the feed; and the *concentrate* and *backwash* is approximately 15% of the feed.
- ROP permeate is discharged to Wilpinjong Creek in accordance with the requirements of EPL 12425, which prescribes water quality (maximum EC of 500 $\mu\text{S}/\text{cm}$) and daily discharge (maximum of 6.5 ML/day) limits.

WRM (2025) do not discuss the effect of discharging 14,000 $\mu\text{S}/\text{cm}$ EC *concentrate* and *backwash* to Pit 2W. Over time this would obviously have the effect of increasing the EC concentration in Pit 2W. Subsequent feed water drawn from Pit 2W would then likely increase EC concentrations yet again as 15% of the feed comes back to Pit 2W as *concentrate* and *backwash*. There appears to be a high likelihood that salts are simply recirculating and concentrating in Pit 2W.

⁷⁶ Originally the volume limit on EPL12425 was 5 ML/day but it has been varied a number of times in the past, including an increase to 15 ML/day at one stage to enable emergency discharges from Wilpinjong Coal dams.

⁷⁷ Unless the turbidity value measured at the Wilpinjong Creek upstream gauging station is higher. In this instance, the turbidity measured at point 30 cannot exceed the value measured at the gauging station.

There is currently inadequate monitoring of Pit 2W EC concentrations and since 2023, salinity has trended upwards at the Pit 2W and WTF discharge sites. The EC of the WTF discharge could potentially be as low as 180 $\mu\text{S}/\text{cm}$, but Wilpinjong Coal is blending the permeate with feed water to bring it up to the EPL EC limit (500 $\mu\text{S}/\text{cm}$). In my view, this could potentially be termed polluting up to a licence limit rather than delivery of a waste water stream to better protect the environment (especially in terms of salt loads).

Since Pit 2W is unlikely to be lined (i.e. impervious to saline water) there is also significant potential for waste water with rising EC levels in Pit 2W to be leaching into the groundwater of the area. This is a common problem in other coal mining areas where brine is either mixed with ash or coal waste and placed in ash repositories (e.g. near Mt Piper) or discharged into underground workings (e.g. Tahmoor). The potential for highly saline water in Pit 2W to migrate/leach into groundwater aquifers is not currently monitored and has not been assessed in the current proposal.

In reviewing the EPL reporting documents it became evident that the reported minimum, maximum and mean flows remained constant between April 2023 and August 2024 reducing confidence in the credibility of the EPL reporting. Over the same timeframe the EC levels showed variability in the reported minimum, maximum and mean. It is recommended that the EPA, as regulator, investigate the reporting of flow discharges for EPL24 for the period April 2023 and August 2024.

Apart from a couple of early exceedances in 2013 and January 2014, reported EC levels generally comply with the EPL EC limits. Average EC levels are currently around 390 $\mu\text{S}/\text{cm}$.

The reported discharges from LDP24 were all within the maximum flow volume limit, although as identified earlier the volume limit has changed at times (currently set at 6.5 ML/day). In recent times, mean monthly flows have been approximately 4.5 ML/day (~1.9 Olympic swimming pools per day).

Over the period of records (1980 to 1997), median flows in Wollar Creek were ~1.7 ML/day and the average flow was ~9 ML/day. Current discharge rates from the RO plant (~4.5 ML/day) are far above the median flow rate for the WILGSU gauge (close to 0.2 ML/day based on the flow exceedance curve provided in WRM 2015) and 2.6 times the median flow in Wollar Creek.

The surface water assessment has not teased out the contribution of RO water from LDP24 to the current flow hydrograph at WILGSD⁷⁸ and, as a result, does not fully assess the impact of the discharge on Wilpinjong Creek (or Wollar Creek downstream of the Wilpinjong Creek confluence).

It is unclear how the current flow rates from LDP24 (and its variability) can be reconciled with the EPL condition that: *All water discharged from the premises must have a flow regime which is variable and consistent with the ephemeral nature of the flows in Wilpinjong and Cumbo Creeks.*

WRM (2025) does not address this EPL condition in their assessment, nor have they mentioned/assessed a projected increase in flow from LDP24 (to 20 ML/day; see WCPL June 2025 CCC Minutes). It would seem likely that the identified need to increase the EPL24 discharge to 20 ML/day is primarily generated by the Modification proposal to develop Pit 8⁷⁹.

The current discharge rates from the RO plant are significantly altering the natural flow regimes of Wilpinjong Creek. Since there has been no flow monitoring of Wollar Creek since the DIPNR

⁷⁸ For example, by subtracting LDP24 discharges from the WILGSD gauged flows to identify 'natural flows' at the downstream gauging station

⁷⁹ And Pits 9 & 10 in the future. See *Cumulative Impact* Section.

monitoring ceased in 1997, there is no assessment of the effect of the increased flows on Wollar Creek downstream of the Wilpinjong Creek confluence.

Emergency discharges from Wilpinjong Coal Mine also occurred in 2022- January 2023. For the first Emergency Discharge 1,287 ML was discharged with an EC level between 3,500 and 4,500 $\mu\text{S}/\text{cm}$. For the second Emergency Discharge, 320 ML was discharged with an EC level between 3,250 and 4,500 $\mu\text{S}/\text{cm}$.

Compared to baseline EC and sulfate levels, there was little evidence of significant changes in EC or Sulfate in Wollar Creek downstream of Wilpinjong Creek (site WOL1) over the last decade. This conclusion, however, is relevant to EC/salt concentrations and does not consider the load of salt moving into the environment from Wilpinjong Coal mining operations.

There has been an increase in the salt load discharged from LDP24 to Wilpinjong Creek in recent years, with the current annual salt load discharged being ~415 tonnes per annum⁸⁰. The total cumulative salt load discharged since 2013 sits at ~1769 tonnes (as of April 2025)⁸¹.

Based on total flows and estimated conductivity levels, the Emergency Discharges during 2022-2023 would have added a further 3,500 to 4,600 tonnes of salt to the environment.

The salt load discharged from Wilpinjong Mine could be expected to significantly increase further if an increase in discharge (to 20 ML/day) is approved.

In addition to the EPL12425 discharges and approved emergency discharges, Wilpinjong Coal also currently undertakes spray irrigation, involving a bank of four evaporators in Pit 3 - approx. 150L/second throughput (12.9ML/d) with a current estimate on evaporation at 40% or ~5ML/d. (WCPL CCC Minutes March 2025). It is likely that spray irrigation of the area would also contribute salt to the landscape.

The pH levels at WOL1 were slightly higher than baseline levels and upstream Wollar Creek (WOL2) pH levels, however, it is unclear whether this could be interpreted to be a mining related impact or not. Surface water trigger exceedances were recorded by Wilpinjong Coal in August 2023⁸² for WIL_D2 and WIL_D (3 consecutive readings greater than 7.7 pH). It was concluded that a combination of factors potentially caused the exceedance of the Wilpinjong Creek (Downstream) pH (Upper) trigger value, including some that were potentially related to mining in the catchment.

Groundwater Dependent Ecosystems (GDE's)

It is well known that many groundwater and surface water systems are connected to some degree and many ecosystems rely on groundwater for their survival (NWC 2012; Commonwealth of Australia 2013). Connectivity between groundwater and surface water largely occurs via alluvial aquifers and can vary in space and time. Interactions between groundwater and surface water sustain groundwater-dependent ecosystems and regulate river temperature and biogeochemical cycles, amongst many other processes (Irvine et al 2024).

⁸⁰ For 2024.

⁸¹ But note there is uncertainty associated with this estimate given data quality issues and the lack of public access to daily flow and EC levels.

⁸² WCPL (2023) Wilpinjong Coal Mine – SSD-6764 Water Management Plan Trigger Exceedances 03 October 2023.

SLR (2025)⁸³ provided a figure that showed GDE Atlas mapping in the vicinity of the Pit 8 Extension area (see Figure 26). The figure shows many areas in valley headwaters, along drainage lines and adjacent to watercourses are mapped as 'high potential terrestrial GDEs'. There are also isolated vegetation communities across the area mapped as 'moderate potential terrestrial GDEs', while 'moderate potential aquatic GDEs' are also mapped along the Goulburn River north-east of Wilpinjong Coal Mine. A more detailed figure showing GDE's and Predicted Maximum Incremental Water Table Drawdown due to the Modification was provided in Section 8.3 Predicted Maximum Drawdowns (SLR 2025; see Figure 27). While the greatest drawdowns are associated with the pit itself, drawdowns of up to 10m are predicted adjacent to Wollar Creek and drawdowns of 1 to 5 m are predicted in the Wollar Creek *Highly Productive Alluvium*. These predictions do not bode well for the long-term integrity and natural flows for Wollar Creek.

Drawdowns of 1 to 2 m are also predicted for some *High potential GDE's*, with at least 3 of these *High potential GDE* areas located within Pit 8 itself. Given the potential dependence of these areas on groundwater, it is likely that many of these areas will no longer support GDE communities. Notably there is no current monitoring in place in the overwhelming majority of these areas to verify the accuracy (or otherwise) of these drawdown predictions.

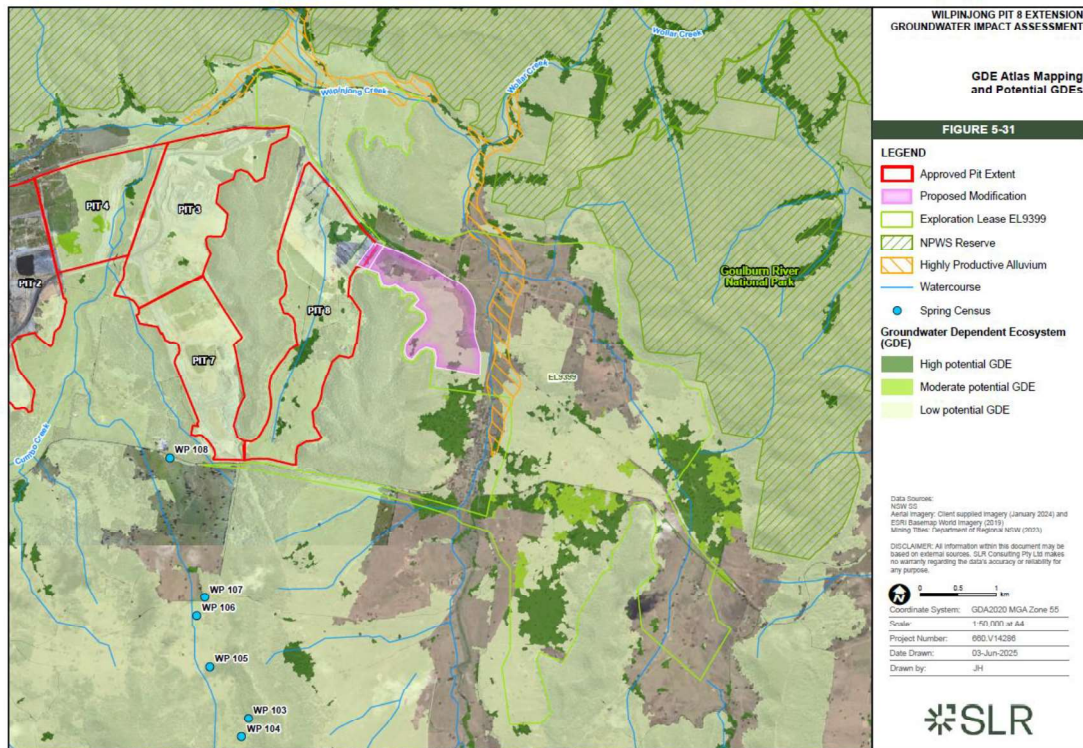


Figure 26. GDE Atlas mapping in the vicinity of the Pit 8 Extension area. Source: SLR 2025.

⁸³ SLR 2025. Pit 8 Extension Modification Groundwater Impact Assessment Wilpinjong Coal Mine Prepared by: SLR Consulting Australia SLR Project No.: 660.V14286.00001 11 September 2025 Revision: 7

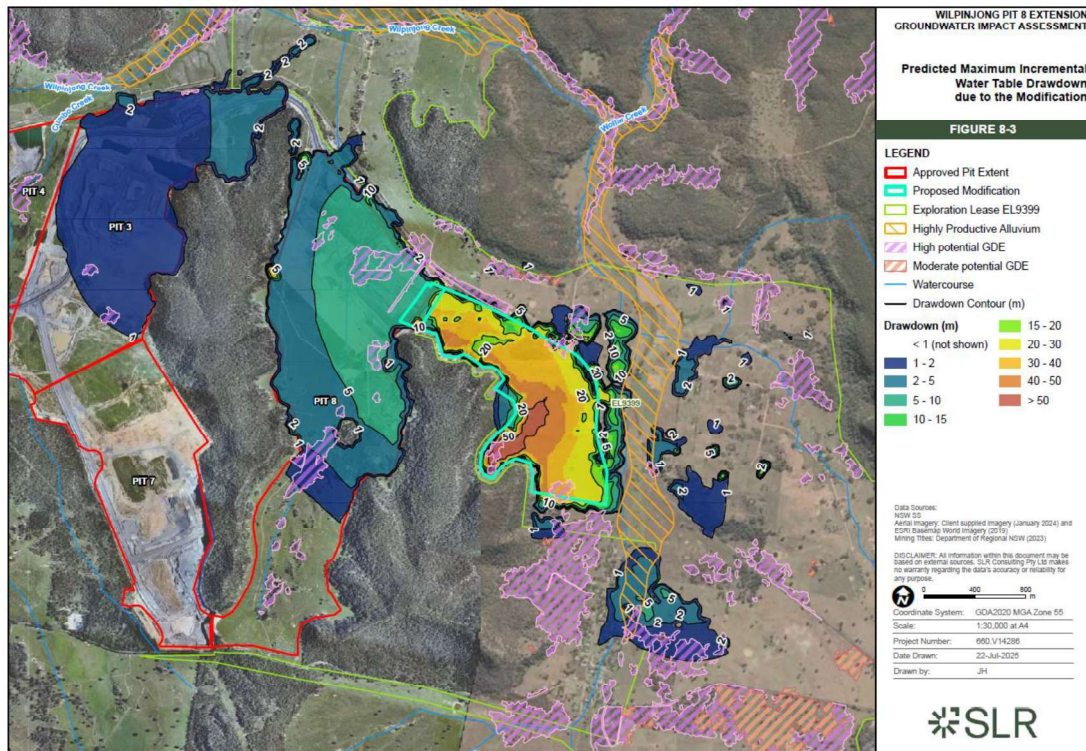


Figure 27. Predicted Maximum Incremental Water Table Drawdown due to the Modification. Source: SLR 2025.

11. Modelled versus Measured Data

Original Wilpinjong Mine EA 2005

Surface Water Modelling

For the original EA, Gilbert and Associates (2005) developed an AWBM model to try and predict flows in Wilpinjong and Cumbo Creeks. A comparison of modelled and predicted flows in Wilpinjong Creek was provided in the Wilpinjong Coal 2009 Annual Review (see Figure 28 below). Whilst the AWBM model was able to replicate the 2008 flows in Wilpinjong Creek, it provided a very poor prediction for the 2009 flows. In particular, the model predicted flows between 600 ML/day (upstream gauge) and 1500 ML/day (downstream gauge) in December 2009 when there was virtually no flow recorded at either gauge. Similar discrepancies were seen in the predicted and observed flows in 2010 (see Figure 28). Such discrepancies cast significant doubt on the validity and predictive value of the AWBM model itself.

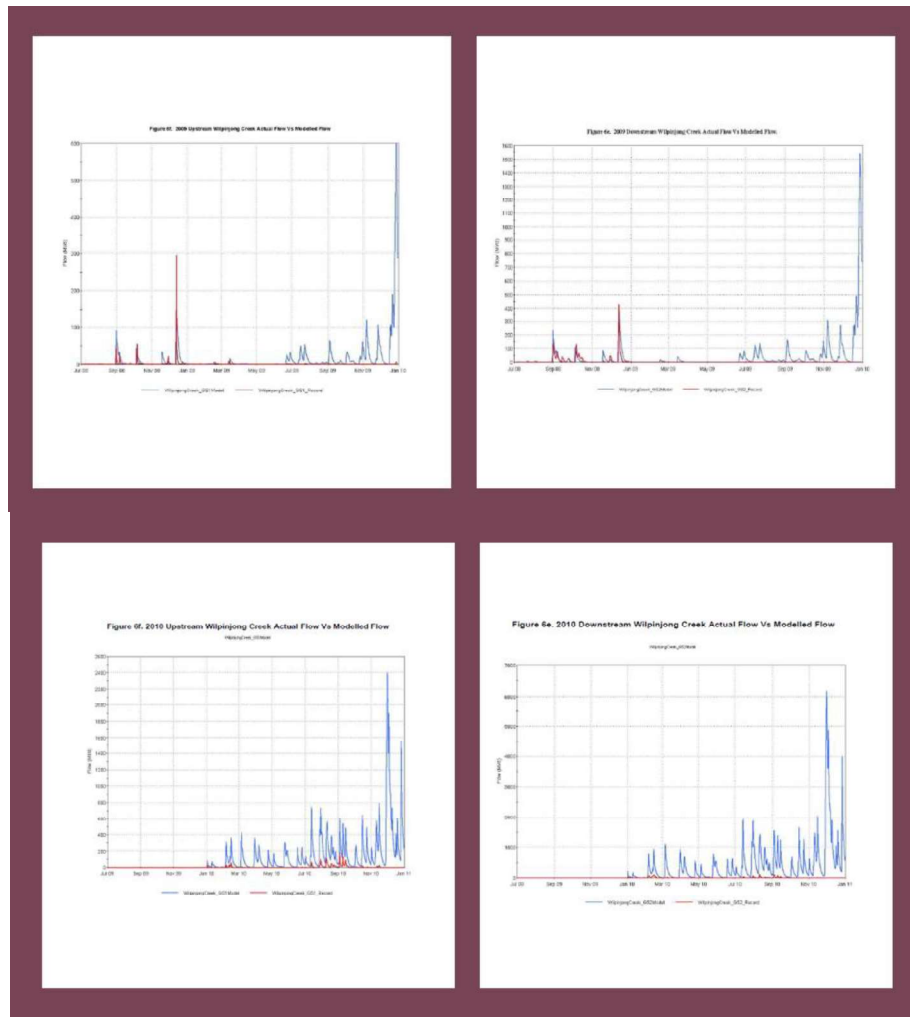


Figure 28. Comparison of modelled and predicted flows in Wilpinjong Creek. Source: Wilpinjong Coal 2009 Annual Review (above); Wilpinjong Coal 2010 Annual Review (below)

Groundwater Modelling

For the original EA, AGE (2005) developed a MODFLOW model to predict groundwater behaviour for the Wilpinjong Mine. AGE (2005) did not provide any calibration graphs (observed versus predicted) for the groundwater model to assess the veracity of the predictions. Statements about drawdown levels and extent were very general in nature. Simulated drawdown around the pits varied from 5m to 20m. Drawdowns of 1-5m extended well inside Goulburn River National Park (Figure 29).

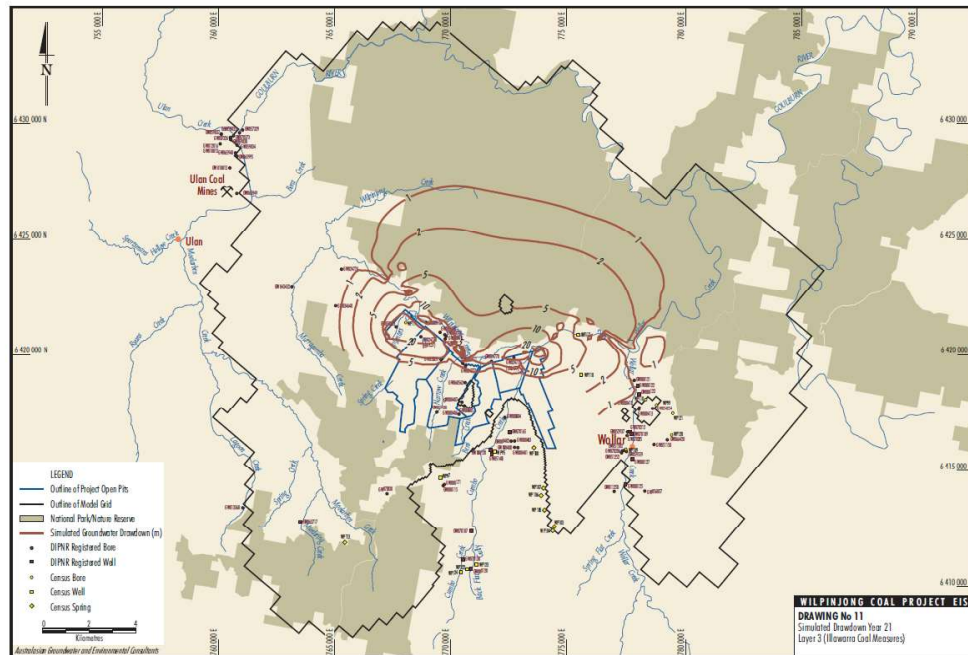


Figure 29. Simulated Drawdown Year 21 Layer 3 (Illawarra Coal Measures). Source: AGE 2005.

Wilpinjong Extension Project 2015

Surface Water Modelling

In the Wilpinjong Extension Project Surface Water Assessment, WRM (2015) used an operational simulation model (OPSIM) to assess the dynamics of the mine water balance under conditions of varying rainfall and catchment conditions throughout the development of the Project. It was stated that the OPSIM model uses the Australian Water Balance Model (AWBM) (Boughton, 1993) to estimate runoff from rainfall. Groundwater inflows to the open cut mining areas over the life of the Project were adopted based on estimates provided by HydroSimulations (2015). Calibration of the Project OPSIM water balance model was undertaken against observations of the gross system behaviour made over the period January 2013 to December 2014 (WRM 2015).

WRM (2015) stated that the predicted groundwater inflow rates resulted in a poor calibration, with significant over-estimation of the total site inventory over the calibration period. They suggested that *the previous groundwater model was likely conservative with respect to inflow estimates in the calibration period* and that to achieve a satisfactory calibration, *the total groundwater inflow rates were subsequently amended*. The final model calibration was summarised in WRM's (2015) Figure 6.9 (see Figure 30 below).

Under the sensitivity analysis section, WRM (2015) stated:

- For both the 1 and 10th percentile results, the peak annual RO discharge volume is 1,280 ML under all scenarios. This represents the RO plant running at full capacity during wet climatic conditions, regardless of the scenario.
- There are no discharges from mine water storages to the receiving environment under any scenario.

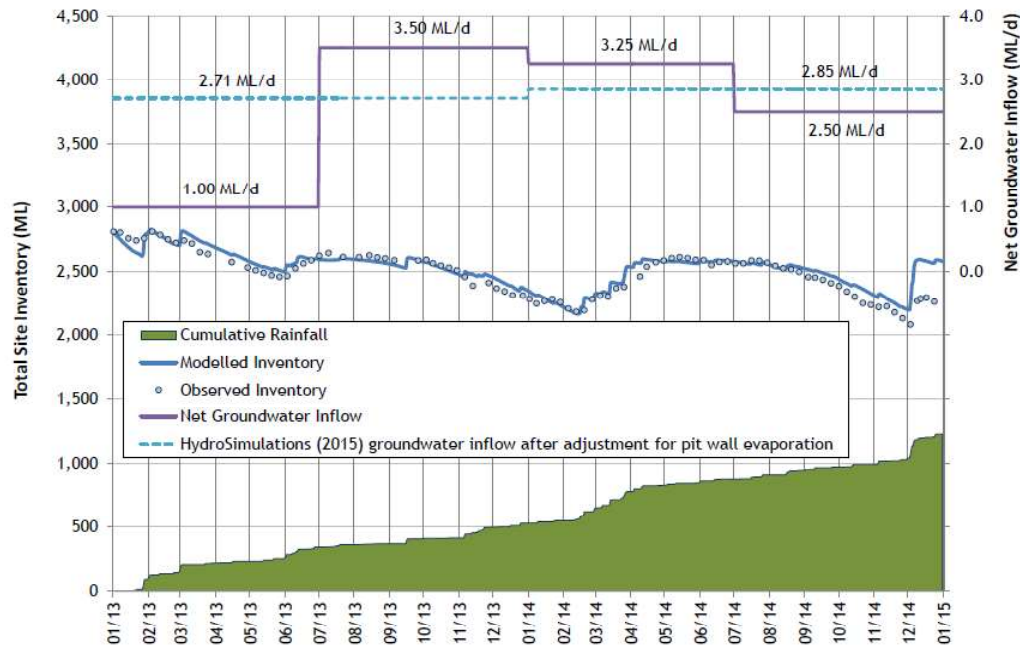


Figure 6.9 - Final model calibration results - revised groundwater inflows

Figure 30. Final model calibration results for the Wilpinjong Mine water balance. Source: WRM 2015.

COMMENT: As identified earlier, the volume of RO water released over the subsequent periods has often exceeded 1280ML (equivalent to an average of 3.5 ML/day). In 2022 to January 2023, 1607 ML was discharged from the Wilpinjong Mine storages to Wilpinjong and Cumbo Creeks (contradicting WRM's (2015) prediction of *no discharges from mine water storages to the receiving environment under any scenario*).

WRM (2015) also stated:

The predicted maximum effect of runoff capture and potential reduction of baseflow on flow frequency in Wilpinjong Creek (at the confluence with Wollar Creek) was presented on Figure 8.5 (see Figure C below). Flow frequency curves were developed using the AWBM model, which was suggested to have been calibrated to flow data in Wilpinjong Creek from 2012-2014. The Wilpinjong Catchment Model (WCM) was estimated to result in approximately 37% more days with less than 0.1 ML/day flow relative to pre-mining conditions.

WRM (2015) conjectured that:

The maximum incidence of days with less than 0.1 ML/day flow for the WCM (incorporating the Project) would be effectively unchanged from the impacts of the existing/approved WCM. The Project would therefore have no measurable incremental impact on flow in Wilpinjong Creek.

WRM (2015) provided flow exceedance curves for Wilpinjong Creek at the upstream and downstream gauges and a modelled flow exceedance curve for Wilpinjong Creek (see Figure 31).

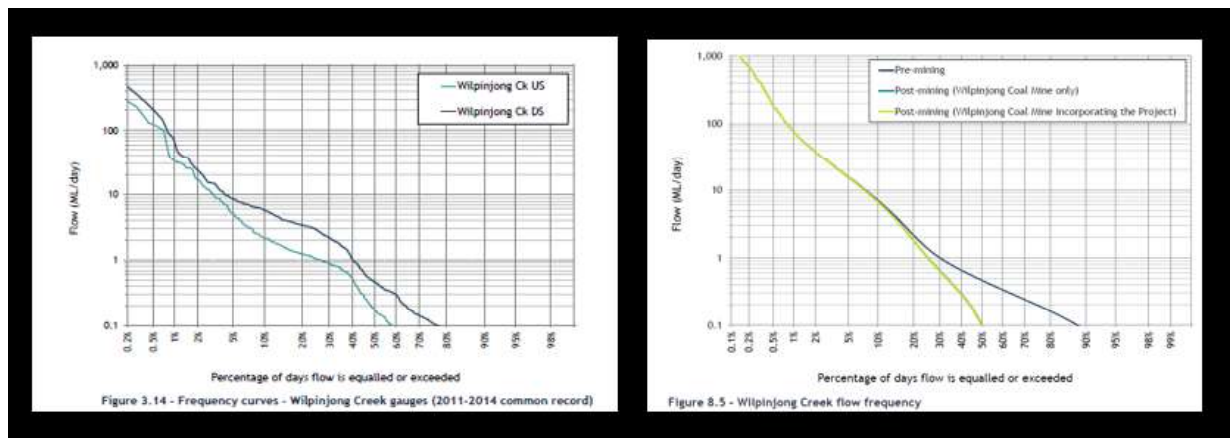


Figure 31. Flow exceedance curve for Wilpinjong Creek at the upstream and downstream gauges (left) and modelled flow exceedance curve for Wilpinjong Creek (right). Source: WRM 2015.

COMMENT: It is unclear exactly where in Wilpinjong Creek the modelled exceedance curve above was specifically related to. As can be seen from Figure 31, the modelled exceedance curve is not a good match to the observed exceedance curves for the Wilpinjong Creek upstream and downstream gauges. WRM (2015) did not provide any details on the AWBM model, and they did not provide any calibration graphs (observed versus predicted) for the AWBM model to assess the veracity of the predictions in relation to ‘real’ measured data. Given the significant increase in LDP24 discharges since the approval of the Wilpinjong Extension Project, the predictions from the AWBM model used by WRM (2015) appear to have been significantly underestimated. The Wilpinjong Extension Project has clearly had a *measurable incremental impact on flow in Wilpinjong Creek*.

Groundwater Modelling

Hydrosimulations (2015) used a MODFLOW-USG model to predict groundwater behaviour for the Wilpinjong Mine Extension Project. Calibration was carried out using a single calibration model, utilising both steady state and transient phases. Hydrosimulations (2015) stated: *automated calibration, using PEST software (Doherty, 2010), and manual (‘trial and error’) calibration techniques were used to ‘history match’ simulated groundwater levels and volumetric flows against the observed data*. Verification was to be carried out via future periodic reviews.

Hydrosimulations (2015) provided predictions of Water Table Drawdown at the End of Mining (2033) and Water Table Drawdown in 2300 (long-term post-mining) - see Figures 32 & 33.

Hydrosimulations (2015) also provided a range of predicted versus measured groundwater levels in their APPENDIX H – MODELLED GROUNDWATER LEVELS.

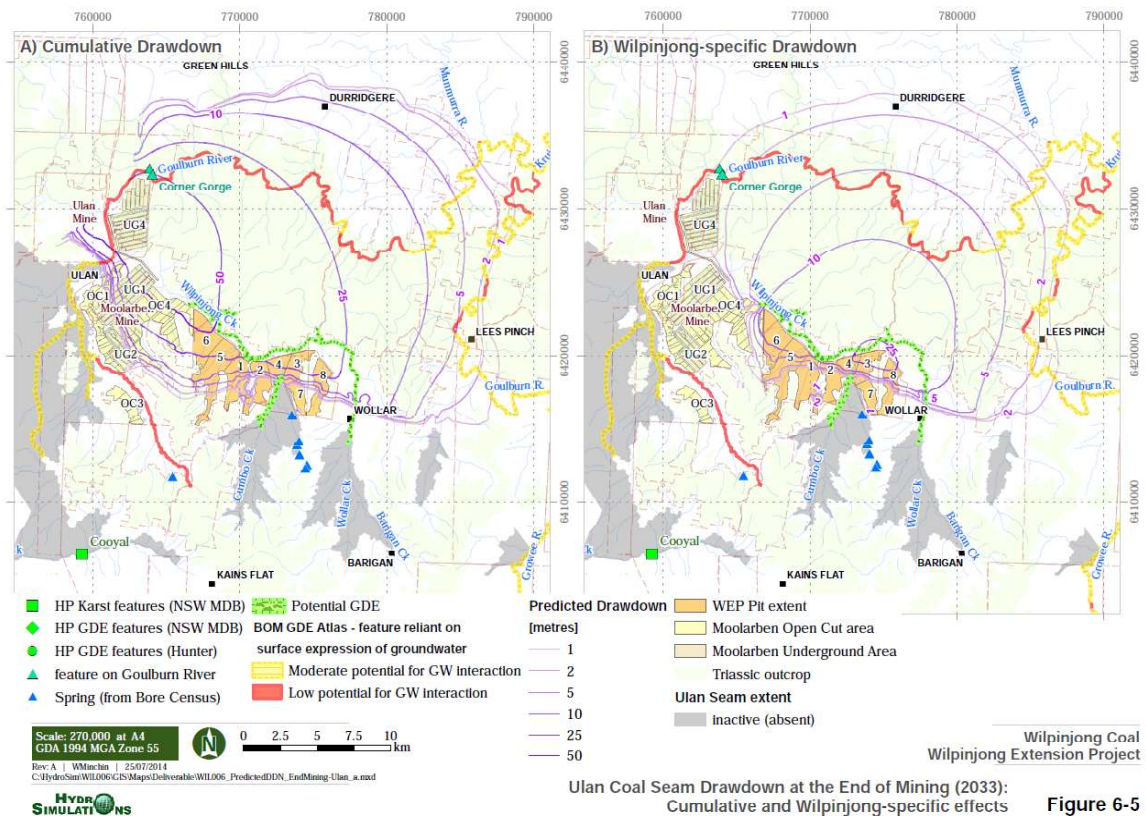


Figure 32. Ulan Coal Seam Drawdown at the End of Mining (2033): Cumulative and Wilpinjong-specific effects. Source: Hydrosimulations (2015)

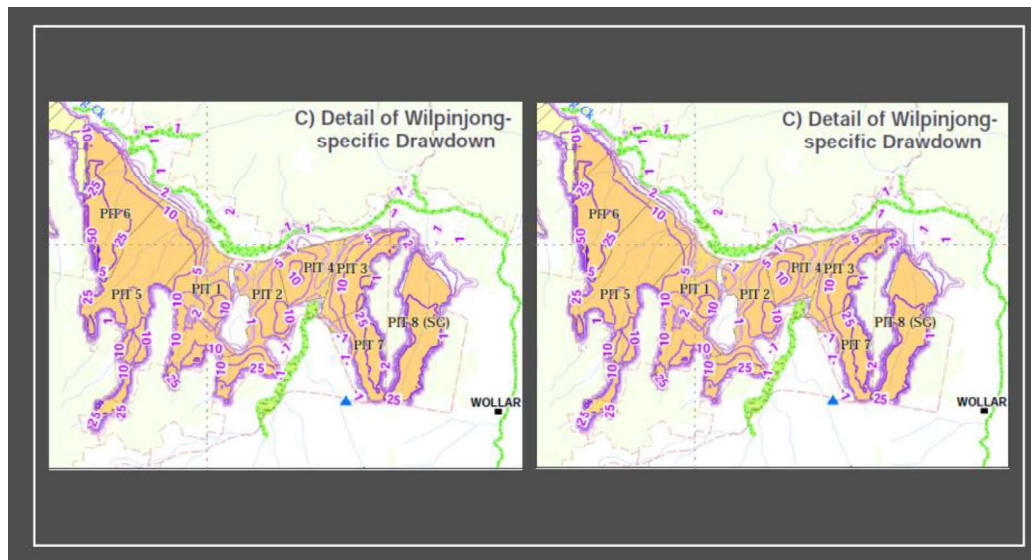


Figure 33. Water Table Drawdown at the End of Mining (2033; left) and Water Table Drawdown in 2300 (long-term post-mining). Source: Figures 6-6 and 6-10 of Hydrosimulations (2015)

COMMENT: It is noted that Hydrosimulations (2015) groundwater model now predicted a zone of 25m drawdown directly under Wilpinjong Creek and a 10m drawdown in the Ulan Seam aquifer underneath Goulburn River National Park (Figure 32). This predicted cumulative drawdown within Goulburn River National Park was ~10 times the predicted drawdown provided by AGE (2005) – see above. A further 15-40m drawdown in the Ulan Seam aquifer underneath Goulburn River National

Park was predicted due to the cumulative action of Wilpinjong Mine together with Ulan and Moolarben mines. Closer to the Wilpinjong Mine Pits, Hydrosimulations (2015) predicted water table drawdown at the End of Mining (2033) ranging between 1m and 50m (see Figure 32). Strangely, exactly the same drawdown was predicted to persist until 2300 (see Figure 33).

COMMENT: It is unclear whether the Hydrosimulations (2015) model is still being used, but SLR (2024)⁸⁴ provided a review of the concordance between modelled and observed groundwater data in their 2023 Groundwater Compliance Review. In many cases there was a very poor concordance between modelled and observed data. The model appears to do particularly poorly for the alluvial aquifers (for example, see Figure 34). In particular, the model appears unable to predict when the alluvial bores dry out completely. This lack of sensitivity and poor concordance between modelled and observed data casts significant doubt on the veracity of the groundwater model and its outputs.

Figure D 7: Gwa12 Model Performance

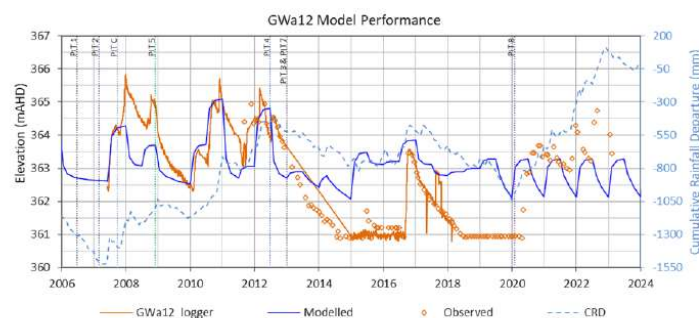


Figure D 8: Gwa14 Model Performance

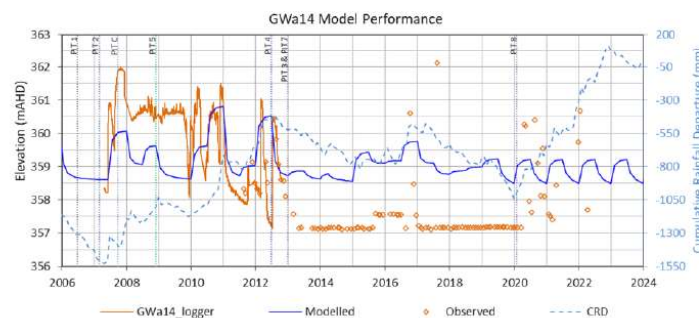


Figure 34. Concordance between modelled and observed groundwater data for alluvial monitoring bores Gwa12 and Gwa14. Source: SLR (2024)

Wilpinjong Coal MOD3 Pit 8 Extension Proposal

Surface Water Modelling

WRM (2025) described two models in their surface water assessment for the Wilpinjong Coal MOD3 Proposal.

Their surface water balance model used the GoldSim water balance model which uses the AWBM (Boughton, 2004) to estimate runoff from rainfall. WRM (2023) stated that the AWBM rainfall runoff

⁸⁴ SLR 2024. Annual Review – Wilpinjong Coal Mine 2023 Groundwater Compliance Wilpinjong Coal Mine Prepared by: SLR Consulting Australia SLR Project No.: 665.v10014.02411 28 March 2024 Revision: 2.0

parameters have been validated over successive annual reviews for Wilpinjong Coal Mine and were re-validated for the Modification by comparing the model predicted mine water inventory to the recorded mine water inventory over a three year period.

A URBS hydrologic model (Carroll, 2023) was used to the separate simulation of catchment and channel routing. The TUFLOW hydrodynamic model (BMT, 2024) was then used to simulate the flow behaviour of Wollar Creek and its tributaries (Wilpinjong Creek and Cumbo Creek) around Wilpinjong Coal Mine. This model appears to have primarily been used to predict flood depths and extent in and around Wilpinjong Mine.

WRM (2025) provided a flow frequency or exceedance curve for Wilpinjong Creek at Cumbo Creek based on their AWBM model (see Figure 35). WRM (2025) also provided a flow frequency or exceedance curve for Wollar Creek at Wilpinjong Creek (Figure 35).

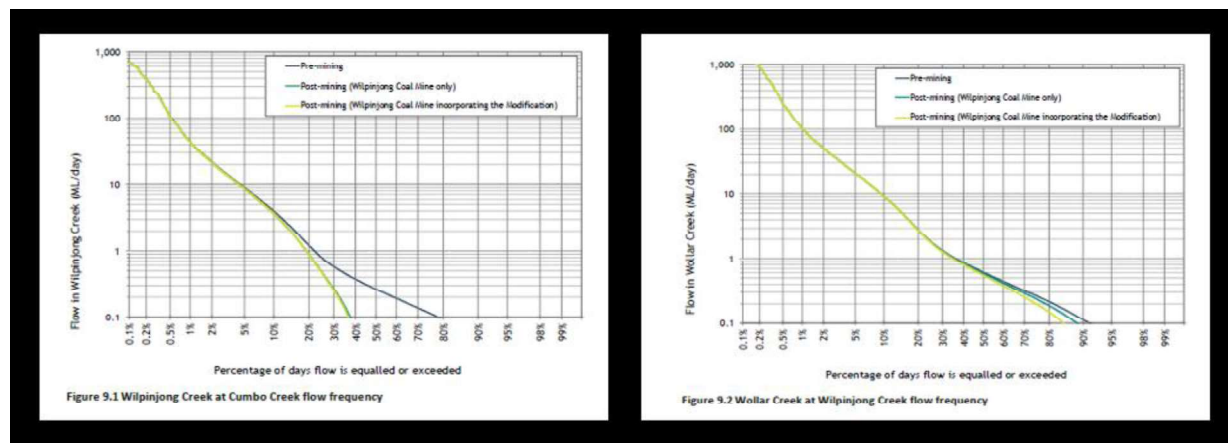


Figure 35. Flow exceedance curve for Wilpinjong Creek at Cumbo Creek (left) and Wollar Creek at Wilpinjong Creek (right). Source: WRM 2025.

Largely on the basis of this modelling (and the groundwater modelling), WRM (2025) concluded:

- The approved Wilpinjong Coal Mine is estimated to result in approximately 41% more days in
- Wilpinjong Creek at Cumbo Creek with less than 0.1 ML/day flow relative to pre-mining conditions (at the peak reduction in baseflow contribution post mining).
- The Modification is predicted to further reduce the less than 0.1 ML/day flows in Wilpinjong Creek by 1% extra days (at the peak reduction in baseflow contribution post mining). The Modification is predicted to have a negligible change (compared to the approved Wilpinjong Coal Mine) on the frequency of higher Wilpinjong Creek flows (e.g. greater than 1 ML/day).
- Hence, the impact of the Modification on Wilpinjong Creek flows (at the Cumbo Creek confluence) is localised, minor (1% increase in days less than 0.1 ML/day) and temporary (after 30 years post closure the baseflow contribution is predicted to increase rather than decrease).
- The approved Wilpinjong Coal Mine is estimated to result in approximately 3% more days in Wollar
- Creek at Wilpinjong Creek with less than 0.1 ML/day flow relative to pre-mining conditions (at the
- peak reduction in baseflow contribution post mining).
- The Modification is predicted to increase the reduction in 0.1 ML/day flows in Wilpinjong Creek by a further 4% extra days. The Modification is predicted to have a negligible change

(compared to the approved Wilpinjong Coal Mine) on the frequency of higher Wollar Creek flows (e.g. greater than 5 ML/day).

- Hence, the impact of the Modification on Wollar Creek flows (at the Wilpinjong Creek confluence) is localised, minor (4% increase in days less than 0.1 ML/day) and temporary (after 20 years post closure the baseflow contribution is predicted to increase rather than decrease).

COMMENT: The veracity of these conclusions are very dependent on the modelling used, however, the AWBM model itself has not been described in sufficient detail to ascertain its reliability (i.e. how well calibrated and validated the model is). It is unclear how ‘real’ gauged and LDP24 discharge data have been incorporated into the modelling. No presentation of AWBM modelled versus observed flow data were provided to demonstrate whether there was a good (or otherwise) agreement between the model output and reality.

If the median flow (50th percentile) for Wilpinjong Creek at Cumbo Creek is estimated from WRM’s (2025) Figure 9.1, then for the pre-mining case, median flow would be approximately 0.3 ML/day. If the median flow (50th percentile) for Wollar Creek at Wilpinjong Creek is estimated from Figure 9.2, then for the pre-mining case, median flow would be approximately 0.5 ML/day. As identified in the *Stream Section* above, over the period of gauged records (1980 to 1997⁸⁵), median flows in Wollar Creek were 1.7 ML/day and the average flow was 9.01 ML/day. WRM’s (2025) modelling for Wollar Creek appears to significantly underestimate the typical flow in Wollar Creek.

For the Wilpinjong Creek exceedance curve provided above, WRM (2025) appear to have presented the “modelled” flow for Wilpinjong Creek at Cumbo Creek. It is noted that the Wilpinjong-Cumbo Creek confluence is downstream of the upper Wilpinjong Creek flow gauge (WILGSU) and downstream of the discharge point for LDP24.

As can be seen from Figure 36 below, the modelled exceedance curve is not a good match to the observed exceedance curves for the Wilpinjong Creek upstream and downstream gauges provided by WRM (2015). It is also difficult to discern much of a difference between the WRM (2015) exceedance curve and the WRM (2025) exceedance curve for Wilpinjong Creek (see Figure 37). However, a close inspection of the two curves shows that the percentage of days that flow is equaled or exceeded is reduced by approximately 10% for the lower flow percentiles in the modelled 2025 data when compared to the modelled 2015 data. In particular, the 2025 “Pre-mining” exceedance curve is also approximately 10% lower than the 2015 “Pre-mining” exceedance curve for the lower flows (around 0.1 ML/day). Whilst it is possible that the 2015 and 2025 modelling used different points in Wilpinjong Creek to model flow exceedance, neither model appears to capture the reality of what has been happening in Wilpinjong Creek very well.

⁸⁵ Data sourced from the Pineena database.

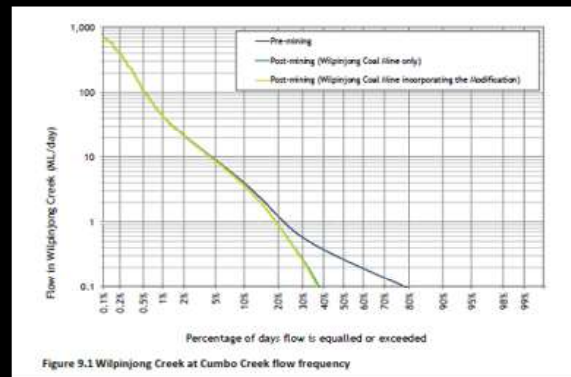
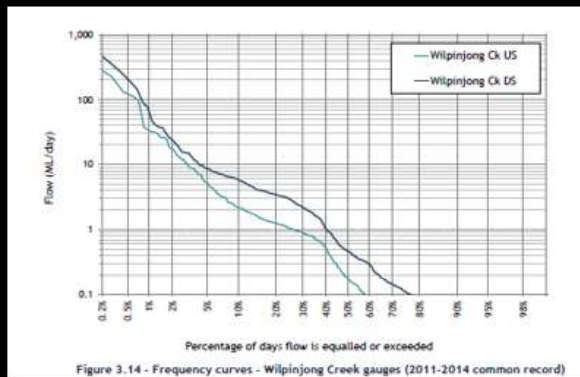


Figure 36. Flow exceedance curve for gauged flows in Wilpinjong Creek (left) and modelled flows for Wilpinjong Creek at Cumbo Creek (right). Sources: WRM 2015 (left) and WRM 2025 (right).

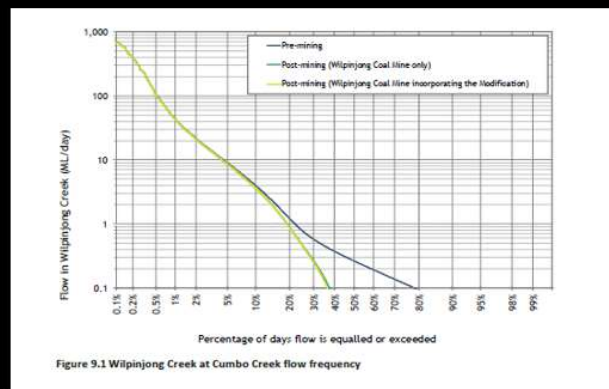


Figure 37. Flow exceedance curve for modelled flows in Wilpinjong Creek (left) and modelled flows for Wilpinjong Creek at Cumbo Creek (right). Sources: WRM 2015 (left) and WRM 2025 (right).

WRM (2025) did not provide sufficient details on the AWBM model structure and assumptions, and they did not provide any calibration graphs (observed versus predicted) for the AWBM model to assess the veracity of the predictions in relation to ‘real’ measured data. Given the significant increase in LDP24 discharges since the approval of the Wilpinjong Extension Project (and likely future increase; especially if a 20 ML/day licence limit is granted), the predictions from the AWBM model at the Wilpinjong Creek at Cumbo Creek used by WRM (2025) appear to be significantly underestimated. At this point in time, and without further supporting evidence, little faith is placed in the WRM (2025) AWBM model predictions.

Groundwater Modelling

SLR (2025)⁸⁶ undertook the Groundwater Impact Assessment for the Pit 8 Extension Modification at Wilpinjong Coal Mine. The groundwater model was developed using GIS in conjunction with MODFLOW-USG. SLR (2025) identified that this groundwater model is an update of an existing model (SLR, 2022), which shows that there are several model revisions and the latest site data has been included. The groundwater model domain is approximately 40 km by 50 km. Compared to the

⁸⁶ SLR 2025. Pit 8 Extension Modification Groundwater Impact Assessment Wilpinjong Coal Mine Prepared by: SLR Consulting Australia SLR Project No.: 660.V14286.00001 11 September 2025 Revision: 7

previous groundwater model, the groundwater model domain has been extended approximately 10 km to the east to limit boundary influence on potential predicted mining induced groundwater level changes.

COMMENT: Figure 8-4 of SLR (2025) shows the Predicted Maximum Incremental Drawdown in Layer 7 (Ulan Seam) due to the Modification (see Figure 38 below). Here it is clear that drawdown of between 1m and 10m is predicted well inside Goulburn River National Park and underneath Wollar Creek. Figure 8-4 of SLR (2025) shows the Predicted Maximum Cumulative Drawdown in Ulan Seam (Layer 7) – see Figure 39 below. This figure identifies an even greater extent of drawdown with between 1m and 20m drawdown predicted inside even larger areas of Goulburn River National Park as well as underneath Wollar Creek. Given the demonstrated linkages between groundwater and surface water from past monitoring, there appears to be significant potential for impacts to aquifers not only in the vicinity of the Pit 8 Extension Modification, but also inside Goulburn River National Park.

COMMENT: While a great deal of work has obviously been put into the development of this groundwater model, obviously the accuracy of model predictions will remain very uncertain at individual locations given the extensive model coverage (2000 km²). What is most important, however, is how well the model has been calibrated and validated for areas of particular environmental significance/concern to the Pit 8 Expansion areas (i.e. Wollar Creek).

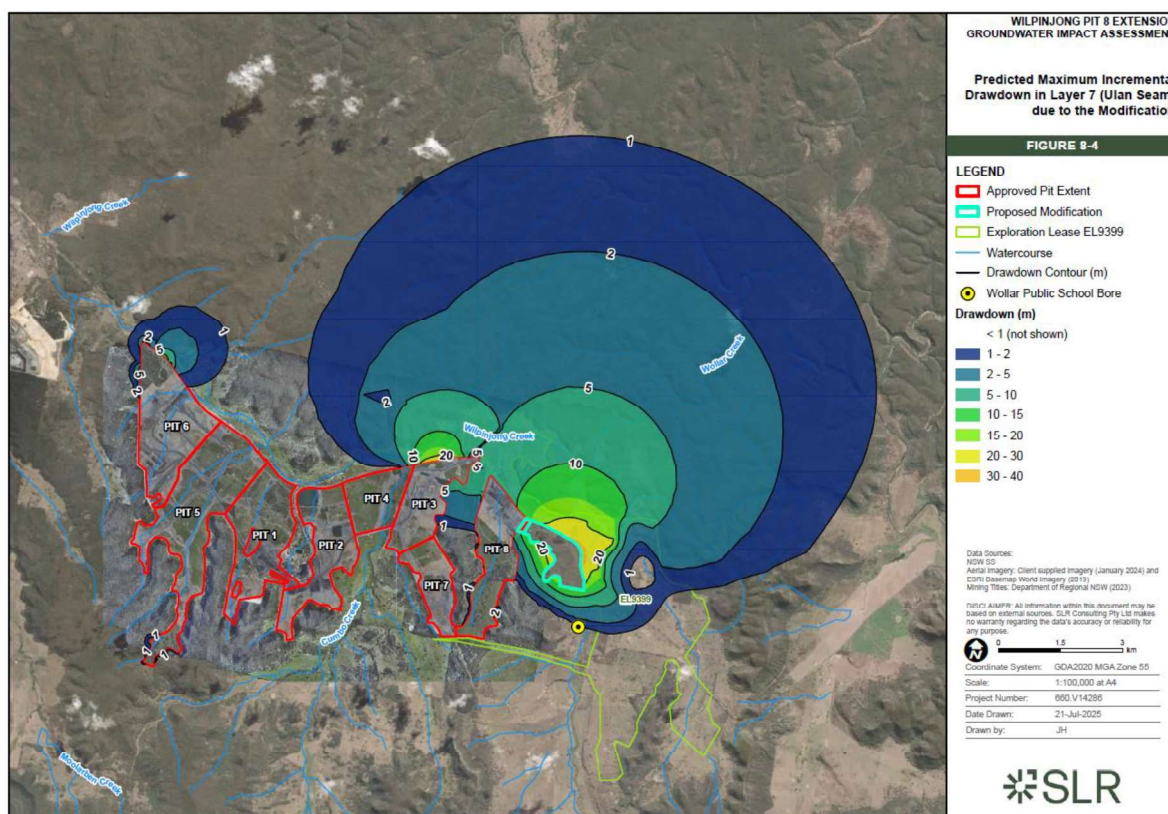


Figure 38. Predicted Maximum Incremental Drawdown in Layer 7 (Ulan Seam) due to the Modification.
Source: SLR 2025

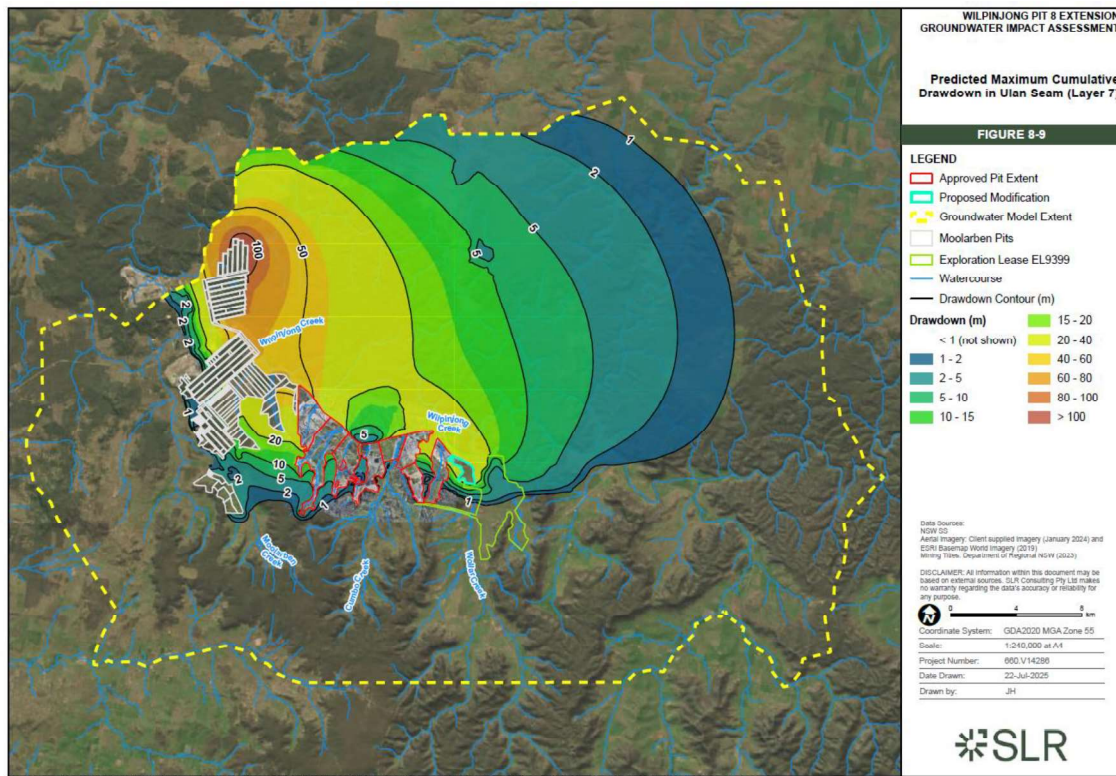


Figure 39. Predicted Maximum Cumulative Drawdown in Ulan Seam (Layer 7). Source: SLR 2025

COMMENT: SLR (2025b)⁸⁷ also provided Calibration Hydrographs for the Pit 8 Extension Modification. Potentially the most important calibrations from an environmental perspective are those associated with Wollar Creek, especially given the potential for significant drawdown in the Wollar Creek *Highly Productive Alluvium* and in the vicinity of *High potential GDEs*. The most relevant bores in this area are Gwa7, GWc4, Gwa32 and GWc32. The Calibration Hydrographs for these bores are illustrated in Figure 40 below. It is clear that the current model provides quite a poor prediction for Gwa7, GWc4, Gwa32 and GWc32, with differences between measured and “most likely estimate” of the order of ~2m in the alluvium (Gwa7 and Gwa32) and 4-12m in the coal measures (GWc4 and GWc32).

⁸⁷SLR 2025b. Appendix A Calibration Hydrographs Pit 8 Extension Modification - Groundwater Modelling Technical Report Wilpinjong Coal Mine SLR Project No.: 660.V14286.00001 11 September 2025

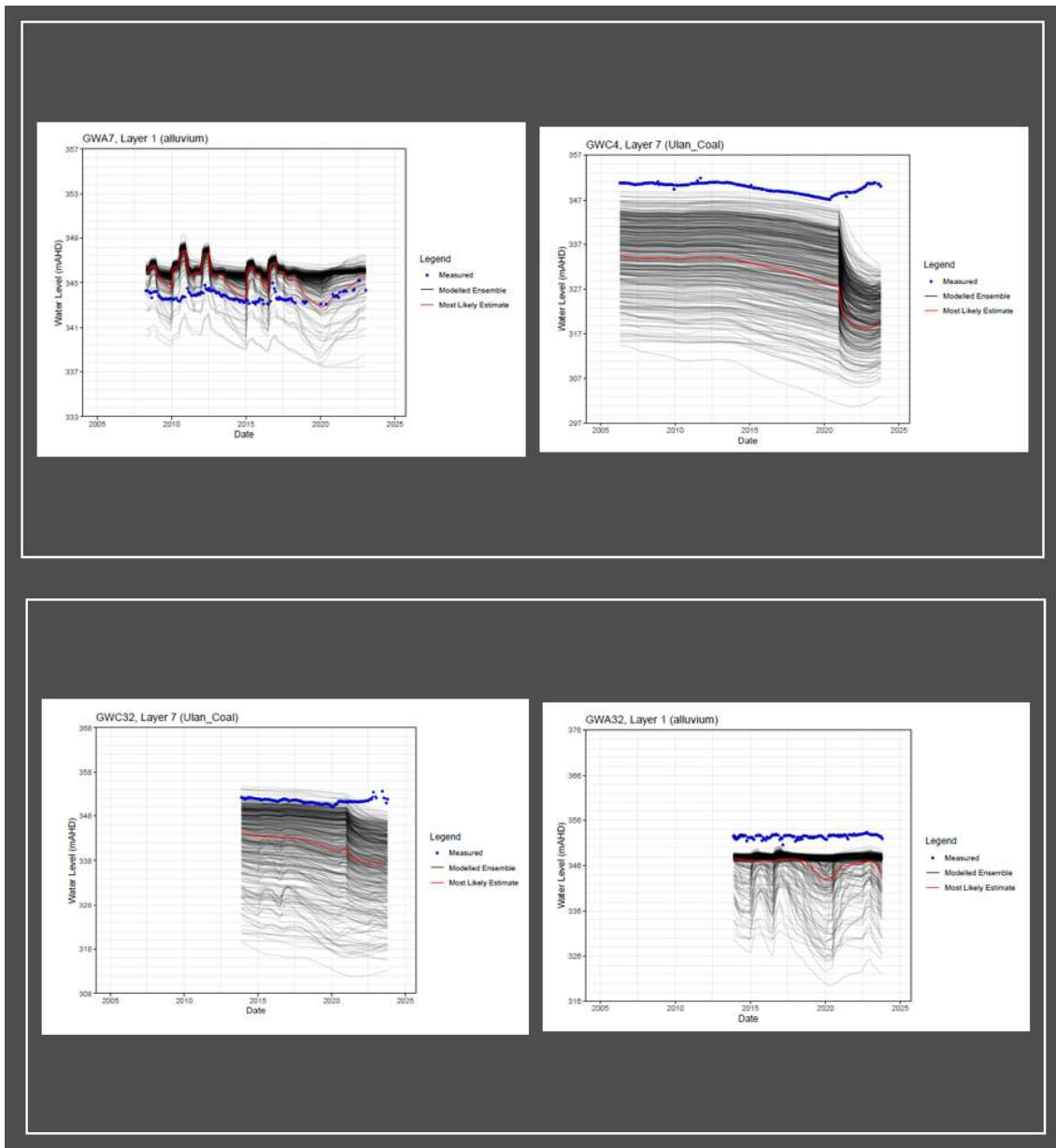


Figure 40. Calibration Hydrographs for Gwa7, GWc4, Gwa32 and GWc32. Source: SLR 2025c

COMMENT: Another concern with many of the Calibration Hydrographs for the Pit 8 Extension Modification is that in some cases they leave out relevant observed data, particularly where some of the alluvial bores have gone dry altogether. This is illustrated by contrasting the Calibration Hydrographs for Gwa14 and Gwa 16 from SLR (2025b) with the observed data for the same bores from SLR (2024) - see Figure 41 below.

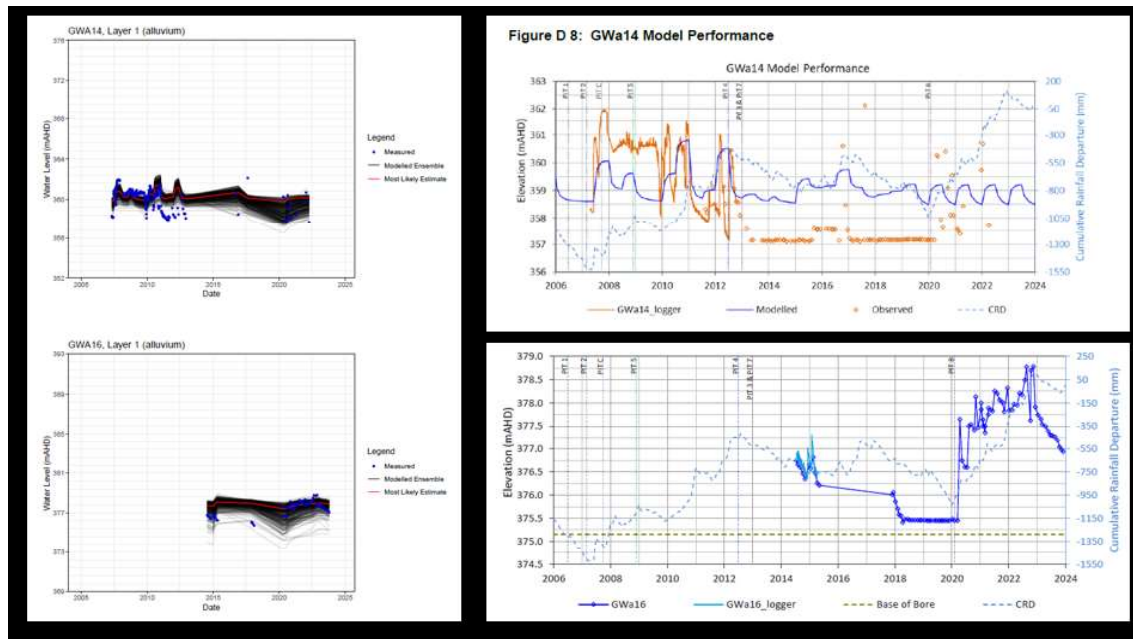


Figure 41. Calibration Hydrographs for Gwa14 and Gwa 16 from SLR (2025c) with the observed data from SLR (2024)

Modelled Water Balance For Pit 8 Extension

The GoldSim software (developed by GoldSim Technology Group) was used to simulate the water balance of the modified Wilpinjong Coal Mine on a daily basis until the end of the modified Wilpinjong Coal Mine (nominally 2033).

WRM (2025) stated: *The AWBM rainfall runoff parameters have been validated over successive annual reviews for Wilpinjong Coal Mine and were re-validated for the Modification by comparing the model predicted mine water inventory to the recorded mine water inventory over a three year period (see Figure 42 below).*

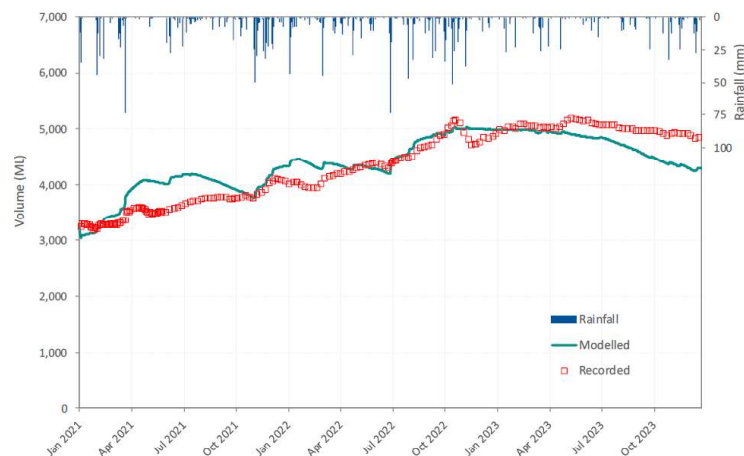


Figure 5.5 Recorded and modelled Wilpinjong Coal Mine water inventory, 2021-2024

Figure 42. Recorded and modelled Wilpinjong Coal Mine water inventory, 2021-2024. Source: WRM (2025).

COMMENT: It is noted that the recorded mine inventory at the end of 2023 was ~500 ML greater than the modelled inventory. There was no discussion of how Wilpinjong Coal proposed to deal with this additional 500 ML. It appears likely that this excess (and more) was what was discharged during the Emergency Discharges of 2022- January 2023 discussed above (see *Emergency Discharges* Section)

WRM (2025) stated:

The Modification would not change the overall objectives of the site water management system. The site water management system would however, be progressively developed during the construction and operation stages of the Modification to incorporate the Pit 8 Extension.

However, WRM (2025) have only provided a total site water balance and do not state an incremental water make due to the Pit 8 Extension on its own. A schematic of the existing water management system was shown in WRM (2025; see WRM's Figure 4.1 below) but the exact connection of the Pit 8 Extension water pathway (circled in pink) is very vague – seemingly suggesting that all groundwater flows into Pit 8 (and presumably rainfall that falls directly into Pit 8) will be pumped to the Pit 2W water storage.

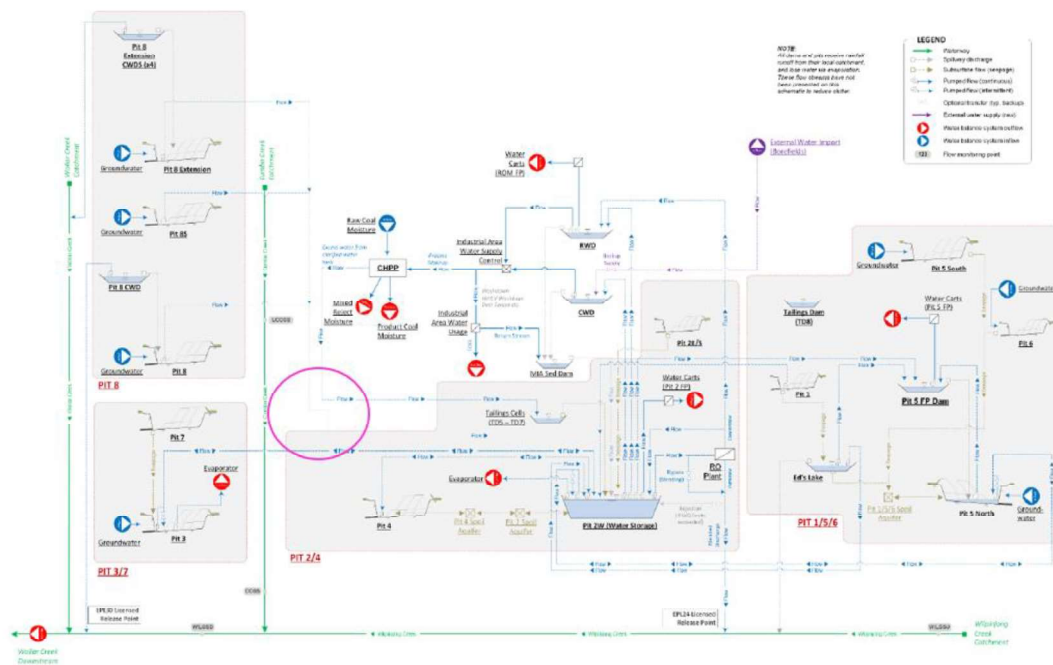


Figure 4.1 Schematic of the existing Wilpinjong Coal Mine water circuit

Source: WRM 2025.

According to the Surface Water Assessment (WRM 2025) the proposed Pit 8 Extension clean water management strategy is a partial upslope clean water diversion – key streams would be partially diverted via temporary clean water dams and pump system (see Figure 43 below). Four clean water dams are identified in Figure 4.3 with a conceptual pipeline alignment connecting to one another via a pipeline that eventually runs along the southern boundary of the Pit 8 extension area. WRM's (2025) Table 4.1 Wilpinjong Coal Mine water management structures suggests the proposed storage of all 4 clean water dams is 2.3 ML and that discharges from the clean water dams would be up to 80 L/s and would be discharged via a **proposed new LDP**.

COMMENT: No location or details for the “proposed new LDP” are provided in the Surface Water Assessment. The environmental effects of concentrating the flow from 4 catchments and then redirecting the water to a single location has also not been assessed. It is expected that there could be significant erosional effects on Wollar Creek if such a discharge is not properly managed.

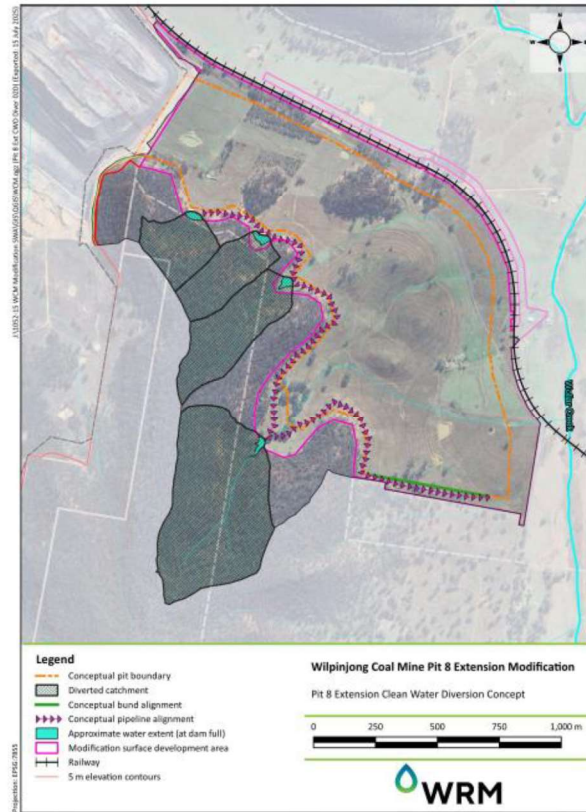


Figure 4.3 Pit 8 extension drainage design

Figure 43. Proposed clean water dams for the Pit 8 Extension and ‘conceptual’ pipeline arrangement. Source: WRM (2025).

Conclusions

There has been significant variation in the surface and groundwater models used to assess impacts at Wilpinjong Mine (e.g. see Gilbert & Associates 2005, AGE 2005, WRM 2015, WRM 2025, Hydrosimulations 2015, SLR 2024, 2025). Whilst there is obviously a need to try and maintain consistency/accuracy in such models over time, the constant changing of models means that the validation phase of modelling is rarely, if ever, addressed in detail.

Under such circumstances, there is an important need to include rigorous calibration reports for the modelling when assessing their utility for impact prediction in Project Modifications/Expansions. One of the most important ways to incorporate scientific rigour into these assessments is to assess the congruence between modelled and observed data and investigate the reasons behind any serious deviations from model predictions.

Recent surface water assessments (e.g. WRM 2015 and WRM 2025) have not provided graphs of modelled and observed data and so the reliability and veracity of the conclusions from the model cannot be appropriately assessed. Where “modelled” flow exceedance curves have been provided they do not appear to match ‘real’ gauged flow data; in some cases, seriously underestimating the

percentiles for flow in these areas. This effect is compounded by a lack of public access to the daily flow data and, for Wollar Creek, the complete lack of any contemporary gauged flow monitoring.

The groundwater models are becoming enormous; the current SLR (2025) model used for the PIT 8 Extension now covers an area of approximately 2000 km². For the Predicted Maximum Incremental Drawdown in Layer 7 (Ulan Seam) due to the Modification, drawdown of between 1m and 10m is predicted underneath Wollar Creek and well inside Goulburn River National Park.

Predicted Maximum Cumulative Drawdown in Ulan Seam (Layer 7) identifies an even greater extent of drawdown, with between 1m and 20m predicted inside an even larger area of Goulburn River National Park as well as underneath Wollar Creek. Given the demonstrated linkages between groundwater and surface water from past monitoring, there appears to be significant potential for impacts to aquifers not only in the vicinity of the Pit 8 Extension Modification, but also inside Goulburn River National Park. The ramifications/consequences of such potential impacts are not appropriately discussed in the Pit 8 Extension proposal documents.

SLR (2025)⁸⁸ provided Calibration Hydrographs for the Pit 8 Extension Modification. Potentially the most important calibrations from an environmental perspective are those associated with Wollar Creek, especially given the potential for significant drawdown in the Wollar Creek *Highly Productive Alluvium* and in the vicinity of *High potential GDEs*. The most relevant bores in this area are Gwa7, GWc4, Gwa32 and GWc32. It is clear from these hydrographs that the current model often provides quite poor predictions for Gwa7, GWc4, Gwa32 and GWc32; with differences between measured and “most likely estimate” of the order of ~2m in the alluvium (Gwa7 and Gwa32) and 4-12m in the coal measures (GWc4 and GWc32).

Another concern with many of the Calibration Hydrographs for the Pit 8 Extension Modification is that they often leave out some of the relevant observed data, particularly where some of the alluvial bores have gone dry altogether. This was illustrated by contrasting the Calibration Hydrographs for Gwa14 and Gwa 16 from SLR (2025c) with the observed bore level data from SLR (2024)

WRM (2025) stated: *The AWBM rainfall runoff parameters have been validated over successive annual reviews for Wilpinjong Coal Mine and were re-validated for the Modification by comparing the model predicted mine water inventory to the recorded mine water inventory over a three year period.* It is noted that the recorded mine inventory at the end of 2023 was ~500 ML greater than the modelled inventory. There was no discussion of how Wilpinjong Coal proposed to deal with this additional 500 ML.

WRM (2025) have only provided a total site water balance and do not state an incremental water make due to the Pit 8 Extension on its own. Four clean water dams are identified with a total storage capacity of 2.3 ML. Discharges from the clean water dams would be up to 80 L/s and would be discharged via a “*proposed new LDP*”. **No location or details for this “new LDP” are provided in the Surface Water Assessment.** The environmental effects of concentrating the flow from 4 catchments and redirecting the water to a single location has not been assessed. It is expected that there could be significant erosional effects of such concentrated flows on Wollar Creek if such a discharge is not properly managed.

⁸⁸SLR 2025c. Appendix A Calibration Hydrographs Pit 8 Extension Modification - Groundwater Modelling Technical Report Wilpinjong Coal Mine SLR Project No.: 660.V14286.00001 11 September 2025

It is recommended that the Expert Panel investigate the calibration and validation of the Surface Water and Groundwater Models and assess the congruence of modelled output with 'real' measured data.

It is recommended that the Expert Panel review the adequacy of current monitoring of alluvial and coal seam aquifers close to Wollar Creek as well as the lack of any contemporary monitoring of flows in Wollar Creek.

It is recommended that the Expert Panel investigate the adequacy and validity of the Water Balance Model for the mine site and identify whether all water input volumes have been appropriately accounted for, quantified and assessed. It is highly questionable whether there is currently sufficient storage for all on-site water make/retention when the Pit 8 Extension is included (which is potentially why Wilpinjong Coal is seeking an increase in volume for LDP24 to 20 ML/day).

12. Cumulative Impacts

The IESC (2013) identified that the cumulative impacts from the expansion of mining operations in the upper Goulburn River potentially had long term implications for the groundwater and river system. In relation to the Wilpinjong Mine, the March 2016 IESC advice (IESC 2016a)⁸⁹ on the project noted the lack of information on mitigation and management measures, surface water baseline data, and groundwater baseline data in the Environmental Impact Statement (EIS). The IESC (2016b)⁹⁰ considered that uncertainty remained regarding the potential impact of the proposed project on a number of key water resources identified in the area, such as downstream aquatic ecosystems, particularly within the Goulburn River National Park, and the registered bore associated with Wollar School. Other groundwater dependent ecosystems (GDEs) may also be present within the project boundary and surrounds; however the potential impact on these remains uncertain.

The 14 March 2016 IESC advice (IESC 2016a) stated that:

while the assessment documentation includes a cumulative impact assessment for surface water, the scale of the assessment and approach of not quantifying the existing level of impact does not enable cumulative impacts to Wilpinjong and Wollar creeks to be considered.

In my opinion, the current Pit 8 Extension Modification assessment has also not adequately used the information on existing impacts from mining at Wilpinjong Mine to identify what will likely occur with the introduction of a new open cut pit immediately adjacent to Wollar Creek. As a result, the scale of the assessment and the lack of quantification of the existing level of impact continues to impede a realistic assessment of the cumulative impacts of the proposed mining on Wilpinjong and Wollar creeks.

Existing open cut mining at Wilpinjong Mine has already permanently altered the connectivity and hydrological processes of the following streams: Planters Creek (2nd order stream); Spring Creek (4th order stream); Narrow Creek (2nd order stream); Ben's Creek (3rd order stream); Slate Gully Creek (2nd

⁸⁹ IESC 2016-075: Wilpinjong Extension Project (EPBC 2015/7431, SSD6764) – Expansion. <https://www.iesc.gov.au/sites/default/files/2022-07/iesc-advice-wilpinjong-2016-075.pdf>

⁹⁰ Advice to decision maker on coal mining project IESC 2016-078: Wilpinjong Extension Project (EPBC 2015/7431, SSD 6764) – Expansion. <https://www.iesc.gov.au/sites/default/files/2022-07/iesc-advice-wilpinjong-2016-078.pdf>

order stream); as well as a number of smaller unnamed 1st order streams. Whilst the Cumbo Creek (5th order stream) drainage line is still largely intact, actual gauged flow and stage data for the downstream gauge in Cumbo Creek⁹¹ were not presented in the Pit 8 Extension Modification assessment.

Ulan Seam aquifers that were previously considered artesian and connected to Wilpinjong Creek have now been demonstrated to be impacted and in many areas both alluvial and coal seam aquifers have not recovered to their baseline levels. In many cases there was no adequate baseline data collected on alluvial and coal seam aquifers to even make such an assessment. This situation continues to occur with no new bores identified in either the alluvium or coal seam close to Wollar Creek. It is noted that none of the existing bores are actually located in the *Highly Productive Alluvium* of the Wollar Creek Water Source⁹² and there is currently no monitoring of identified/mapped GDEs at risk of impact from the Pit 8 Extension.

One of the most important features of the current Pit 8 extension plan is that it is now proposes to move open cut mining outside of the Wilpinjong Creek local catchment and into the Wollar Creek catchment, immediately adjacent to an area designated as a *Highly Productive Wollar Creek Water Source*.

It is extremely unclear how the WRM (2025) Surface Water Assessment actually addresses the likely impacts of the Pit 8 Extension Modification proposal on flows in Wollar Creek. There is currently no flow gauge in Wollar Creek and there hasn't been any flow measurements since the DIPNR gauge ceased recording in 1997 (before the Wilpinjong Coal Mine was approved). Up until the current proposal, the impacts of the mining have largely been restricted to the Wilpinjong Creek catchment. Wilpinjong Coal are now proposing to have a very large open cut pit right next to Wollar Creek, upstream of the Wilpinjong Creek junction, but have no means of quantifying the actual impact of Pit 8 on flows in Wollar Creek (aside from potentially poorly calibrated and largely unvalidated models).

In effect, there are insufficient coal seam and alluvial aquifer monitoring bores adjacent to Wollar Creek and insufficient baseline monitoring of flows in Wollar Creek to be able to assess the full extent of drawdown and impacts to surface waters as a result of the proposed Pit 8 Extension. As a result, there is significant uncertainty as to whether the important *Highly Productive Wollar Creek Water Sources* will remain if the Wilpinjong Pit 8 proposal is approved.

Wilpinjong Coal is considered to be ill-prepared to properly assess the impacts of the Pit 8 Extension Proposal on groundwater adjacent to and flows within Wollar Creek (due to the lack of appropriate baseline data).

The current NSW Planning system is very poor at assessing the cumulative impacts of an ongoing mining development. The current Planning system is also only capable of dealing with the proposal placed before it and so it does not consider future mining operations in the same or nearby areas. Wilpinjong Coal have already identified future plans to extend mining further upstream in the Wollar Creek catchment with proposed open cut Pits 9 & 10 (see <https://wilpinjongmine.com.au/future-plans/> and Figure 44 below⁹³).

⁹¹ At the time of a site visit on 14 October 2025 neither Cumbo Creek at the Wollar Road crossing or Ulan-Wollar Road Crossing were flowing. In contrast, Wollar Creek has a steady flow well upstream of Wilpinjong Creek.

⁹² Or *Highly Productive Alluvium* in Wilpinjong Creek.

⁹³ See also Mudgee District Environment Group (MDEG). <https://mdeg.org.au/peabodys-wilpinjong-mine-expansion/>

Pits 9 & 10 are proposed to cover an additional **670 Ha**. These pits will likely cause even greater additional impacts to the Wollar Creek catchment and surface and groundwater hydrology.

The current piecemeal submission of individual pit plans as “*Modifications*” to an existing SSD virtually ensures that a proper cumulative assessment of all proposed mining impacts cannot be undertaken.



Figure 44. Future Wilpinjong Coal plans for the extension of mining further upstream in the Wollar Creek catchment - open cut Pits 9 & 10. Source: Screenshot from Wilpinjong Coal website “Our Future Plans” video. <https://wilpinjongmine.com.au/future-plans/>⁹⁴.

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