

## 7.Regional Water Supply System

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*The potential Impacts of the Wallarah 2 Coal Project on the regional Surface Water Supply System was identified as an issue of high concern to the community. The potential for the W2CP to impact on the water supply system would be as a consequence of subsidence, possible alterations to surface water flows, catchment areas and impacts on water holding structures, all of which are discussed in this chapter.*

### 7.1 Description of the Water Supply Scheme

In 1985, Gosford City Council, Wyong Shire Council and the NSW Government formed a joint water supply scheme to serve Gosford City and Wyong Shire. The agreement is managed by the Gosford-Wyong Councils' Water Authority (GWCWA). This strategy was an expansion of the original joint water agreement executed in 1977.

The present Gosford-Wyong Water Supply Scheme is based on harvesting potable water from four coastal streams; Wyong River, Mangrove Creek, Mooney Mooney Creek and Ourimbah Creek. During times of insufficient flow to meet the demand, for example during a drought, security of supply is provided by the major water storage dam in the upper reach of Mangrove Creek (Mangrove Creek Dam) and two smaller dam storages at Mardi and Mooney Mooney.

The scheme has the capacity to transfer water between the two local government areas. Water can be transferred from Wyong Shire to Gosford City using a coastal connection between Wamberal and Foresters Beach and from Gosford City to Wyong Shire via the western connection through Ourimbah and Tuggerah.

The existing water supply scheme incorporates three dams, three weirs, two water treatment plants, 40 reservoirs, and approximately 1,900 km of pipelines. A new two-way transfer pipeline between the Hunter and Central Coast water supply systems was constructed and commissioned in early 2007. The major headworks components in the Gosford-Wyong Water Supply Scheme are shown in Figure 7.1 and Figure 7.2 consist of the following:

- ☐ Mangrove Creek Dam;
- ☐ Mooney Mooney Dam;
- ☐ Mangrove Creek Weir;
- ☐ Mangrove Creek Weir – Somersby Transfer System;
- ☐ Mooney Mooney Dam – Somersby Transfer System;
- ☐ Somersby Water Treatment Plant;
- ☐ Mardi Dam;
- ☐ Mangrove Creek Dam – Wyong River Transfer System;
- ☐ Lower Wyong River Weir;
- ☐ Lower Wyong River Weir – Mardi Dam Transfer System;
- ☐ Ourimbah Creek Weir;
- ☐ Ourimbah Creek Weir – Mardi Dam Transfer System;
- ☐ Mardi Water Treatment Plant;
- ☐ Transfer System between Gosford and Wyong LGAs;
- ☐ Transfer System between Wyong and Gosford LGAs; and
- ☐ Mari to Mangrove Creek Dam Pipeline.

These elements are described in the following sections.

### 7.1.1 Mangrove Creek Dam - Stage 1

This major rockfill dam is located on Mangrove Creek in the upper part of the Mangrove Creek Catchment approximately 4 km downstream of the Boomerang Creek confluence. The 81 m high dam is the key storage in the Gosford-Wyong Water Supply Scheme with a storage capacity of 190,000 ML and a catchment area of about 100 square kilometres.

Mangrove Creek Dam is the Central Coast's main water supply dam. Water is drawn from the dam by a 50 m high intake tower which transfers water under the dam wall releases it into Mangrove Creek to supply Gosford City. Another small intake tower draws water from the dam and pumps it through the Boomerang Creek Tunnel and into Wyong River to supply the Wyong Shire.



**Figure 7.1** Location of W2CP Within the Water Supply Catchment



**Figure 7.2 Schematic Diagram of Water Supply System and Mine Location**

### 7.1.2 Mooney Mooney Dam

This 28 m high concrete arch dam is located on Mooney Mooney Creek about 21 km upstream of the junction of Mooney Mooney Creek and the Hawkesbury River. The dam has a storage capacity of 4,600 ML and a catchment area of 39 square kilometres.

Water from the dam is pumped to the Somersby Treatment Plant and then to the Gosford Shire.

### 7.1.3 Mangrove Creek Weir

This small 3 m high concrete weir is located on Mangrove Creek immediately downstream of its confluence with Worleys Creek. The weir pool retains approximately 300 ML with a residual catchment area of approximately 140 square kilometres. During 'dry' periods the weir pool also accepts water released as required from Mangrove Creek Dam. These releases are presently daily and supplement run-of-river flows to the weir.

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#### **7.1.4 Mangrove Creek Weir - Somersby Transfer System**

A pumping station at Mangrove Creek Weir extracts water from the weir pool with a 14 km transfer through a 900 mm main to a set of two balance tanks on the Somersby plateau. The balance tanks have a total capacity of 22 ML. The water is then transferred approximately 4 km via gravity flow to the Somersby Water Treatment Plant.

#### **7.1.5 Mooney Mooney Dam - Somersby Transfer System**

A pumping station immediately downstream of Mooney Mooney Dam transfers dam water some 1.6 km upgradient to the Somersby balance tanks. This 570 mm main is presently a one way transfer system. However, a retrofit is underway to render the system two way.

#### **7.1.6 Somersby Water Treatment Plant**

This is a conventional municipal water treatment plant located immediately west of the Somersby Industrial Estate. The plant was commissioned in 1985 and has a capacity of 140 ML/d based on 24 hours/day operation.

#### **7.1.7 Mardi Dam**

A 26 m high off stream earth-fill embankment storage dam located 4 km south-west of Wyong with a catchment of only 4 km<sup>2</sup>. The dam is an off-stream storage. This means that it is not fed directly by a stream, but rather is filled by water pumped to it from Wyong River and Ourimbah Creek.

Water is pumped from the 7,400 ML dam to the nearby Mardi Water Treatment Plant before it is distributed as drinking water. The dam also acts as a settling pond for water pumped to it.

#### **7.1.8 Mangrove Creek Dam – Wyong River Transfer System**

As part of Stage A of the 1985 Gosford-Wyong Water Supply Scheme, the Boomerang Creek tunnel was constructed. This 11 km long inter-catchment tunnel directly transfers water by gravity as required from Mangrove Creek Dam to the upper reaches of Wyong River via Bunning Creek 1.5 km upstream of Yarramalong. The tunnel is used to supplement run-of-river flow to the Lower Wyong River Weir when Mardi Dam is drawn down. However, due to the continuing fall in dam water levels below the invert of the tunnel, the tunnel has not been used since mid October 2004.

#### **7.1.9 Lower Wyong River Weir**

This small 2 m high weir is located on Wyong River approximately 3 km downstream of the confluence with Jilliby Jilliby Creek. The weir pool has a capacity of about 300 ML and a catchment area of almost 355 square kilometres. Water from this weir is pumped to Mardi Dam, then to Mardi Treatment Plant before being distributed for drinking.

In dry times, water can be released from Mangrove Creek Dam through Boomerang Tunnel to the Wyong River and then for drinking water.

#### **7.1.10 Lower Wyong River Weir - Mardi Dam Transfer System**

Water is pumped from the weir pool south to Mardi Dam via a 2 km long 600 mm pipeline.

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#### **7.1.11 Ourimbah Creek Weir**

This 4 m high concrete weir is located on Ourimbah Creek immediately upstream of the junctions with Bangalow Creek and Canada Drop Down Creek. The weir has a storage capacity of approximately 100 ML and a catchment of about 88 square kilometres. The weir has an inbuilt open 200 mm pipe that allows continuous creek flow downstream.

Water from the weir is pumped to Mardi Dam, then to Mardi Treatment Plant before being distributed to residents for consumption.

#### **7.1.12 Ourimbah Creek Weir- Mardi Dam Transfer System**

Water is pumped from the weir pool through 5.6 km of 600 mm pipeline to Mardi Dam.

#### **7.1.13 Mardi Water Treatment Plant - Stage 1**

This is a direct filtration plant located immediately downstream of Mardi Dam with a 24 hrs/day capacity of 160 ML/d. The design provides for future augmentation in 80 ML/d stages.

#### **7.1.14 Transfer System between Gosford and Wyong LGAs**

A coastal connection provides a link between the Gosford and Wyong water distribution systems and comprises approximately 10 km of 450 mm main between Terrigal and Bateau Bay. Although this connection has the capacity to deliver about 20 ML/d in either direction, the actual supply is constrained by operational issues to about 10 ML/d.

#### **7.1.15 Transfer System between Wyong and Gosford LGAs**

The system comprises a total of 17 km of existing 1050, 900 and 750 mm mains and a two-way pumping station at Ourimbah. Gravitational transfers can be made from Gosford to Wyong when required and these supplies can be supplemented by boosting from the Ourimbah Pumping Station.

#### **7.1.16 Other Recent Water Supply Enhancements**

A minor weir enhancement at Porters Creek was recently constructed to provide a minor water supply supplement. Additional bores have been installed in the Ourimbah Creek area while a plan for temporary mobile desalination plants has been approved if required.

#### **Mardi to Mangrove Creek Dam Pipeline**

The Mardi-Mangrove Creek Dam Pipeline is a key element of the Gosford Wyong Joint Water Authority's Water Plan 2050 to address future water supply priorities for the Central Coast region. It includes:

- ☐ a new 2.1 km buried water pipeline from Wyong River to Mardi Dam;
- ☐ a new 19 km mainly buried water pipeline from Mardi Dam to the existing Boomerang Creek tunnel at Mangrove Creek Dam;
- ☐ a new water pumping station at Mardi Dam;
- ☐ a new water pump station beside the Wyong River, and
- ☐ associated works.

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The project is supported by Australian Government funding of \$80.3 Million which is to be expended by July 2011 and is therefore a key driver in the project schedule. Although the full cost of the project is not known at this time, this funding is anticipated to cover over half of the project's cost with the remainder to be funded jointly by Gosford and Wyong Councils.

Although some community concerns about the project remain, the pipeline route has been finalised and approved by both Councils in May 2009. About 20% of the pipeline will be laid within the Yarramalong Road reserve while the majority of the pipeline length will be constructed within 55 private landholdings. There will be four river crossings comprising one underbored crossing beneath the river and three elevated pipeline bridges. Concept designs for all project components have been completed as well as detailed engineering design drawings. Following a tender process in late 2009, a construction contract is scheduled to be awarded in December 2009 and physical construction due to begin in early 2010. Completion and final commissioning is due by mid-2011.

Water licensing upgrades are sought from the NSW Government to optimise water extractions from the Wyong River in high flows. Pumping capacity will increase from 125 million litres (megalitres) per day to a maximum of 320 megalitres per day for drinking water supplies. There will be greater extraction in high flows and reduced extraction at low flows.

The project will result in delivery of release water from Mangrove Dam being routed through this pipeline to Mardi Dam instead of through the Wyong River as historically been the case.

W2CP has liaised with the Mine Subsidence Board and Wyong Council's project design team in respect of potential mining implications and ensuring adequate and construction criteria to address potential subsidence.

## **7.2 Gosford-Wyong Councils' Water Authority Water Plan 2050**

WaterPlan 2050 has been developed by the Gosford-Wyong Councils' Water Authority (GWCWA) to ensure that the growing population of the Central Coast has sufficient water to meet its needs for the next 50 years without compromising the health of our rivers and lakes.

WaterPlan 2050 is based on a 50 year planning horizon designed to support a population of approximately 460,000 and the associated commercial and industrial development to promote new regional employment opportunities. With the WaterPlan in draft stages during the preparation of this environmental assessment documentation, suitable consideration of the W2CP should be given as a potential industry and substantial future employer, and included in the plan.

The Water Plan 2050 has the following aims:

- ☐ achieve a safe, reliable and secure water supply for the Central Coast that meets community needs;
- ☐ ensure the supply and use of water is efficient and affordable;
- ☐ protect the health of rivers, streams and general environment;

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- ☐ involve the community in the development and selection of the proposed options; and
  - ☐ ensure that the proposed measures are realistic and achievable.

The WaterPlan 2050 contains a number of options for securing the Central Coast water supply into the future. These options are summarised below:

- ☐ Regional Tillegra Dam - State Environmental Planning Policy (Major Projects) 2005 (*Amendment No 32*) was gazetted on 9 January 2009.
- ☐ Upper Wyong River to Mangrove Creek Dam transfer system;
- ☐ Lower Mangrove Creek Weir to Mangrove Creek Dam transfer system;
- ☐ Second lower Wyong Off-river Storage (Toobys Creek Dam);
- ☐ MacDonald River to Mangrove Creek Dam transfer system;
- ☐ Lower Wyong River to Mangrove Creek Dam transfer system;
- ☐ 20 ML/d permanent desalination plant at Toukley;
- ☐ Large scale retrofit of rainwater tanks on existing houses;
- ☐ Environmental flow substitution – 10 ML/d at lower Wyong River Weir, or 20 ML/d at Lower Wyong River Weir; and
- ☐ Indirect potable reuse of 10 ML/d to Mardi Dam, or 20 ML/d to Mardi Dam, or 10 ML/d to Mooney Dam.

As part of future water restrictions, all customers (including industrial) with demands greater than 3.5 ML/a will be required to prepare a Water Management Plan (WMP). Council will review each WMP and it is anticipated that this will reduce industrial water consumption by up to 20 percent. While the W2CP will be a net water producer, during the initial years it will be a net water user. It is proposed to source this water during the initial year from the Council managed recycled water supply. Consequently, a Water Management Plan will be prepared for the project and submitted to Wyong Shire Council.

The WaterPlan 2050 also recognizes the importance of planning for, and providing environmental flow to maintain or improve the health of rivers and estuaries. The introduction of environmental flow conditions will principally affect the extractions from Wyong River and Mangrove Creek which are the major sources for the water supply scheme. The most likely option would be to utilise stormwater from Warnervale and recycled water from Wyong South and Charmhaven wastewater treatment plants for environmental flow substitution at Wyong River weir. Other options include desalination of sea water, indirect potable reuse subject to regulatory approval or transfers from Hunter Water Corporation.

The Central Coast Water Supply has relied on the surface water sources of the Wyong River, Ourimbah, Mangrove and Mooney Creeks. The opportunities to develop new surface water sources on the Central Coast are limited by the absence of other significant rivers and creeks. The drought contingency program

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implemented as a result of the current drought has resulted in the diversification of the above sources to include:

- ☐ groundwater drawn from aquifers in Gosford and Wyong LGA (none sourced from the Dooralong or Yarramalong valleys);
- ☐ transfers from Hunter Water Corporation comprising surface water from the Williams River stored in Grahamstown storage and groundwater from the Tomago sand beds.

It is anticipated that the W2CP will produce excess water during the life of the project that will require disposal. A beneficial outcome for both the environment, W2CP and Council would be to discharge excess water of suitable quality from the mine into surrounding waterways to assist in providing environmental flows, while allowing stored water to remain available for use by the community.

### **7.3 Water Supply Catchment**

The potential impact of proposed underground mining on the surface water supply system has been identified as a key area for detailed scientific assessment. A rigorous analysis of potential effects is considered important for the proposed mining area which represents just 5% of the local water supply catchment area.

Factors that govern the supply of water from a catchment are considered to include:

- ☐ Amount and distribution of rainfall and amount of evapotranspiration;
- ☐ Shape and size of the catchment;
- ☐ The geology of the catchment including the nature and distribution of lithologies, soils and alluvial deposits;
- ☐ Hydrological characteristics of the catchment;
- ☐ Prevailing hydrogeological conditions in the underlying rock formations and alluvial systems associated with the former and present creeks and rivers;
- ☐ Types and distribution of vegetation;
- ☐ Types and distribution of land use; and
- ☐ The amount of water extracted from river sources for irrigation and municipal purposes, and from bores or direct from rivers and creeks by registered users.

The water quality is also considered important because it can determine the usefulness of the supply for municipal and other purposes.

### **7.4 Supply Catchment within Proposed Mining Area**

As shown on Figure 7.1, the proposed mining area occupies a very small area of the existing water supply catchment. Moreover, the mining area does not lie within the catchment of Mardi Dam, within or under the Mangrove Creek Dam catchment, nor under the Wyong River, Wyong Weir, Ourimbah Creek, Porters Creek Wetland or related water facilities and infrastructure.



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The mining area lies within a small section of the Dooralong Valley with its principal creekline being Jilliby Jilliby Creek. This valley is recognised as providing relatively minor flow contribution with commonly poor water quality to the Wyong River Weir.

The W2CP proposal provides for an enhancement program which will improve both water supply and water quality to the Wyong River Weir. The following sections provide a description of the existing water supply scheme, measures incorporated into the project to protect the water supply catchment and an assessment of how the project can improve both water supply and quality for the benefit of the community.

## **7.5 Water Sharing Plans**

The water sharing plans (WSP) under the *Water Management Act 2000* applying in the area of the W2CP are:

- ☐ Jilliby Jilliby Creek WSP; and
- ☐ Central Coast Unregulated Water Sources WSP.

Both WSP's have relevance to water supply because they have rules which specify the maximum amounts and rules of water extraction from Wyong Lower Weir for town water supply (as well as extraction by other licensees such as irrigators throughout the water courses). All extractions are subject to variation based on rules related to river flow conditions. Further information about the planning aspects of WSPs is provided in Chapter 4.

The Jilliby Jilliby Creek WSP commenced in 2004 and was revised in July 2009 following public consultation in late 2008 and early 2009. The key refinement to the WSP was an amendment to the long term average annual extraction limit (LTAAEL) for the Tuggerah Lakes (relevant to the W2CP area) and Gosford Extraction Management Units to create separate LTAAEL for local water utility access licences to other licensed water users. This will provide for improved water supply management while generally protecting irrigator licence arrangements.

The Jilliby Jilliby Creek WSP applies only to the surface water resources occurring on land shown on the plan at Schedule 2 of the Jilliby Jilliby Creek WSP (which includes Jilliby Jilliby Creek itself) and any lakes and wetlands in the water source area. The WSP does not include any water contained within the aquifers underlying the water source.

The Central Coast Unregulated Water Sources WSP commenced on 1 August 2009. The water source relevant to W2CP under this plan is the Wyong River water source. Although Jilliby Jilliby Creek is a tributary of Wyong Creek, it remains a separate management unit but with linkages between the respective plans enabling opportunities for co-ordinated water resource management. The key management elements provided for phasing in under the plan relate to cease-to-pump and daily flow share arrangements.

The Wyong River water source report card (DWE, August 2009) noted that the Wyong River had high relative instream biodiversity value (within the catchment) and high relative economic significance of irrigation extraction. However, the river also had high hydrological stress (where peak extraction demand exceeds available flows such as typically in December) and that the high instream values are at high risk of being impacted by extractions within the water source.

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In terms of the Wyong River water source, the WSP for the Central Coast Unregulated Water Sources only applies to the surface water resources of Wyong River itself and any lakes and wetlands in the water source area. However, the WSP does not include any water contained within the aquifers underlying the water source, including alluvial sediments.

## **7.6 Potential Impacts from Mining to the Water Supply System**

The proposed mining operations will not impact on the Gosford-Wyong Water Supply Scheme infrastructure. The proposed mine layout will however underlie a small section of the Jilliby Jilliby Creek system albeit at significant depth. Implications of this intersection and a preliminary discussion of any potential impacts of the proposed mining on stream flow are discussed in the following section.

W2CP does not anticipate the need to procure an access licence to secure water supply for the project from the Jilliby Jilliby Creek or Wyong River water sources under the respective WSPs. Accordingly, the W2CP will not have an impact on water users within and downstream of the project area. The project's investigations indicate that there will be no measurable impact on the overall flow regime and catchment yield from these two water sources and the adjoining alluvial groundwater systems. No impacts are predicted for the proposed Mardi-Mangrove Pipeline. Impact assessments on water supply issues related to the water sharing plans are further described in the following sections while other specific information on the surface and groundwater regimes and water supply infrastructure is also provided in other chapters covering flooding, groundwater (including impact on groundwater users within the W2CP area) and subsidence (Chapters 6, 8 and 9).

### **7.6.1 Potential for Alterations of Flow**

The water extracted from the Lower Wyong River Weir and pumped 2 km to Mardi Dam constitutes approximately 30% of the combined Central Coast Water Supply. The average annual Central Coast usage in 2005 was approximately 28,000 ML with restrictions. The 10-year average is about 30,000 ML.

The average river flow contribution from the Jilliby Jilliby Creek system to the Lower Wyong River Weir is approximately 37%. The remaining 63% contribution is from the Wyong River system. That is, the Jilliby Jilliby Creek contribution equates to about 11% of the total Central Coast water supply. This contribution primarily occurs during periods of wet weather. At other times the creek is characterised by a series of ponds with low to nil flow. A combination of its low flow characteristics and catchment land uses has resulted in frequently degraded water quality within Jilliby Jilliby Creek, in terms of elevated faecal coliforms and nutrients particularly at low flows.

Baseline drilling and permeability testing in the Jilliby Jilliby Creek catchment and in similar coastal catchments and geological settings on the Central Coast indicates that the valley-fill alluvial system is generally composed of stacked layers of sand, gravel, silt and clay. However, the sequence is dominated by low permeability, fine grained sediments. Although localised layers and lenses of more permeable granular materials may exist in the sequence some of which constitute aquifers, the vertical hydraulic connection is inhibited by the ubiquitous layered fine grained, less permeable sediments that result in confined or semi-confined hydrogeological conditions.

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Fresh to moderate salinity water is hosted by shallow, near-surface alluvial aquifers within about 5 to 10 m beneath the valley floor. This alluvial system is rainfall driven and contrasts with the moderately to locally highly saline alluvial aquifers found in the deeper parts of the alluvial system some 20 to 40 m below surface.

Current data indicates that recharge in the alluvial system is slow and provides limited contribution to surface stream flows. This characteristic is supported by the results of recent age dating of groundwater in alluvial and hard rock aquifers in a similar coastal valley setting on the Central Coast.

The depth of alluvial cover and overburden lithologies associated with the Jilliby Jilliby Creek alluvial system indicates that the potential for any vertical drainage of the near surface alluvial aquifer is also very low.

### **7.6.2 Potential for Draining into Underground Mine**

Groundwater impact assessments have been conducted for the proposed W2CP (Appendix B). Two aquifer systems have been identified and include the regional hardrock strata hosting the Wallarah-Great Northern (WGN) seam, and the unconsolidated aquifers associated with valley infill and coastal plain environments.

Computer based aquifer simulations of proposed mining operations have been conducted in order to understand the many complex groundwater flow processes that could evolve during extraction of longwall panels in the WGN seam.

Within the limitations and constraints imposed by numerical modelling techniques, computer simulation of panel development predicts panel extraction will depressurise the seam for distances of 1 to 3 km beyond the panels. The depressurisation wave will also expand through overlying strata at a slow rate. A rise in mine water seepage is predicted from less than 0.1 ML/day at commencement of panel extraction to a predicted maximum rate of about 2.5 ML/day over a period of 38 years of mining. This seepage rate may be enhanced from time to time, by dewatering of fracture related storage at depth. This may lead to short term increases of 0.5 ML/day which should dissipate over a period of weeks to months.

Pre-mining upwards leakage from the hard rock strata to the valley fill alluvium is currently inferred from regional water level monitoring and from the aquifer simulation models. A reduction in hard rock pore pressures will slightly reduce the rate of upward leakage beneath the alluvium in some areas overlying extracted panels. However the reduction in leakage induced by depressurisation after 38 years of mining is less than 2 millilitres per day (ml/day) per square metre of land surface. This rate is very low compared to a potential rate of rainfall recharge calculated to as high as 130 ml/day/m<sup>2</sup> (assuming 4% infiltration). Reduction and reversal of leakage induced by deep depressurisation is therefore not predicted to impact creek flows or existing bores/wells located in the alluvium in a significant way. On cessation of mining, groundwater levels/pressures within the hardrock strata will be re-established. The period for significant repressurisation is predicted to exceed 200 years.

Subsidence over longwall panels will directly affect the shallow alluvial aquifer systems through a transient change in the groundwater storage component. The change may occur through either filling of temporary shallow crack storage, or readjustment of groundwater levels to changed surface water levels brought about

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by regional subsidence. Temporary filling of shallow crack storage will lead to very localised short term depletion of alluvial groundwater storage followed by rapid recovery. Subsidence will induce a more widespread impact due to a reduction in water table elevation as a part of a panel is subsided relative to an unsubsided area. The process will be a continuum that will include rebound of the subsided water table. The duration of the rebound recovery process will depend largely upon local unconsolidated aquifer properties (permeability and storage characteristics), the recharge capacity of local drainages, and the prevailing climate.

Based upon study results, impacts of mining on groundwater and surface water environments are judged to be low and unlikely to measurably deplete the water resources of the alluvial lands situated within the Dooralong and Yarramalong valleys. Groundwater within the hardrock strata is considered to be a limited non potable resource with beneficial use restricted to occasional stock supply in areas where localised storage is developed.

## **7.7 Impact Assessment**

The groundwater study has shown that any affects will be minor and transient. The modelling has extended over an area of more than 400 square kilometres compared with an actual mining area of 37.3 square kilometres in order to determine the full extent of potential groundwater impacts.

The W2CP extraction area covers only 5% of the Gosford Wyong Water Supply catchment area, the majority of which lies within the Wyong State Forest.

Of significantly greater threat to the water supply scheme is existing rural residential and agricultural pressures on Jilliby Jilliby Creek and the Wyong River. Data provided by Wyong Shire Council supports current water quality monitoring data being undertaken by W2CP and which shows high levels of bacteria and nutrients within the waterways. This is combined with a number of dam structures within the Jilliby Jilliby Creek itself, pumping to support intensive agricultural pursuits and stock and domestic bores.

Water quality is also affected by existing erosion and sedimentation problems within some, but not all, sections of Jilliby Jilliby and Little Jilliby Jilliby Creeks, primarily due to lack of vegetation cover on the banks of the creeklines and existing farm crossings.

Despite the fact that the W2CP will not adversely affect the functions of the supply catchment but given that the water supply scheme has been recognised as an important issue, the project has developed an outline of an enhancement scheme designed to assist in improving overall water quality. This program will include environmental initiatives such as weed eradication, riparian zone plantings and education programs on agricultural water use and maintenance of sewage treatment and disposal.

Other water initiatives that form part of the W2CP include treating any surplus saline water which may be encountered by the underground workings to a standard so that it can be returned to either enhance the environmental flows of the surrounding waterways or directly to the water supply system or other industrial users. This water occurs at considerable depth, is naturally of poor quality and would otherwise be unavailable to either groundwater users or the catchment.

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The surface facilities of the mine will include water recycling and use of rainwater as well as utilisation of sewage effluent from the existing Charmhaven Sewage Treatment Plant.

The overall impacts of the project on the water supply scheme will be positive.

## **7.8 Implications from Strategic Inquiry**

On 5<sup>th</sup> February 2007 the NSW Government Minister for Planning announced an independent strategic inquiry into potential coal mine developments within the Wyong Local Government Area, including the Dooralong and Yarramalong Valleys. An Independent Expert Panel was appointed to conduct the inquiry and report on:

- ☐ Whether coal mining under the catchment for the Mardi Dam would compromise, in any significant way, the water supply of the Central Coast;
- ☐ Environmental impacts of any underground coal mining, with a particular emphasis on:
- ☐ Surface and groundwater resources, especially on drinking water supply and flooding;
- ☐ Hazards and risks of subsidence impacts; and
- ☐ The amenity of the community, including dust and noise impacts;
- ☐ Social and economic significance of any underground coal mining to the local community, the region and State; and
- ☐ Areas where mining should not be permitted, or if permitted the conditions under which it may proceed, having regard to the matters listed above and the NSW Government's strategic planning policies that apply to the area.

There were a number of findings and recommendations for future coal mining activities in the Wyong LGA as a result of the Inquiry and the subsequent Strategic Review Report produced (July 2008).

The Panel of independent experts that undertook the Strategic Review accepts the position of the WACJV, as presented in this EA, that the proposed W2CP will not have a significant effect on the regions water supply infrastructure, be it existing or planned for the future. The concerns raised by other interest groups that the infrastructure would be damaged by far-field horizontal movements were also considered by the panel to be highly unlikely.

With respect to the methodology and principles used by the WACJV for modelling and predicting the potential for loss of surface and sub-surface waters due to mining, the Panel acknowledged in the Review that they *"appear sensible and consistent with subsidence engineering principles. The proposal satisfies each of the three different criteria used to design mine workings to avoid hydraulic connectivity with the surface..."*

A number of submissions made to the Panel during the Strategic Inquiry referred to mining related damage to water supply networks in the Southern Coalfield, thereby suggesting that the same impacts will be seen on the Central Coast. However, the

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Panel has acknowledged that the topographical and geological conditions are significantly different, and the same impacts are not likely to be seen associated with the W2CP.

Furthermore, the Panel considers “...that the Wallarah 2 approach is consistent with industry best practice and that its conclusions in respect of potential impacts on the Wyong River are, on the basis of available evidence, reasonable.” These conclusions and predictions for the potential to impact the regions water have been presented in this Chapter of the EA.

In summary, the Panel states in the Strategic Review Report:

*“At these depths, the Panel is confident that the risk of connective cracking from the ground surface to the mined seam is extremely low. Hence, in the opinion of the Panel, there is no reason why the community and Government agencies should have concerns over potential loss of either creek or alluvial groundwater to mine workings.”*

## **7.9 Commitment to Protect the Water Supply Catchment**

In recognition of the importance of protecting the water supply catchment, W2CP has made a public commitment to only propose a mine plan that will safeguard the surface and underground water regimes.

To achieve this commitment the proposed mine plan:

- ☐ will not adversely impact on the yield of the water supply catchment. Subsidence will not measurably increase or decrease the runoff coefficient of the catchment above the mine plan nor individual drainage lines within the mine plan;
- ☐ will not reduce the runoff volume contained within surface drainage lines;
- ☐ will not adversely impact on near surface aquifers and their water supply functions;
- ☐ will not adversely affect water quality within any watercourse above the mine plan; or,
- ☐ will not adversely affect riparian vegetation associated with any water course above the mine plan.

To further ensure that the project will not adversely affect the functions of the water supply catchment, the W2CP proposal includes a catchment environmental enhancement program designed to improve the water supply catchment. What has become clearly evident during the EA studies is that the current water quality and catchment yield within Jilliby Jilliby Creek is commonly poor. This is also confirmed by Wyong Shire Council monitoring data which highlighted the occurrence of elevated faecal micro-organisms (*E. coli*) in both Jilliby Jilliby Creek and the Wyong River.

Should the project receive project approval, a catchment environmental enhancement program will be developed in consultation with the Gosford Wyong Water Supply Authority, Hunter-Central Rivers Catchment Management Authority

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Department of Environment, Climate Change and Water, and relevant landowners, including:

- ☐ a community education program on the methods to improve domestic effluent treatment and onsite disposal. Particular emphasis will be given to reducing the current poor water quality runoff from existing treatment systems;
- ☐ access to specialist advice on appropriate land management practice to reduce the current elevated nutrient levels within the creek systems. This is particularly evident in intense agricultural areas within Jilliby Jilliby Creek catchment;
- ☐ development and funding of riparian vegetation improvement programs within the Jilliby Jilliby Creek and Little Jilliby Jilliby Creek systems. The programs will be designed specifically to reduce the current weed infestation and bank erosion problems evident in many sections of the creeks. These programs will be developed in close consultation with individual landowners with advice only provided by the Hunter-Central Rivers Catchment Management Authority, Wyong Shire Council and Department of Environment, Climate Change and Water. Landowner privacy will be maintained at all times; and
- ☐ assistance with understanding the government's policy and requirements for water rights, water sharing and licensing requirements. This work will be undertaken exclusively with individual landowners without involvement of any government agency. This work will only be undertaken with the cooperation of individual landowners and at no cost to the landowners. Privacy will be maintained and assured.

Despite the development of the W2CP, the Dooralong Valley is under stress from existing land use pressure. As part of the WACJV's commitment to the environment, the aim of the proposed catchment environmental enhancement program is to reduce some of these stresses on the catchment. The success of the program however, will rely predominantly on the cooperation of individual landowners within the valley.

It must be stressed that this program will not diminish the rights of individual landowners nor will confidential information regarding the status or appropriateness of current land management practices be provided to any external government or non-government organisation or individual unless with the consent of the landowner.