# 2003 Metropolitan Water Price Determination Public Hearing

### Preamble

This paper is based on the reports that the Department of Public Works and Services have produced for the Gosford Wyong Councils Water Authority. It examines the options for further development of the existing water systems to provide for the projected increases in Central Coast water demands. There is also consideration of the new water sharing plans, as introduced by the Water Management Act 2000.

John Anderson's help in preparing the paper is kindly acknowledged.

### Demands

- Without the implementation of water efficiency and demand management measures, system demands during drought years are projected to grow from 34,300ML/a in 2001 to 55,200ML/a in 2051.
- The impacts of climate change due to global warming may increase demands by about 5% under CSIRO mid-range projection of rainfall and evaporation changes.

### **Existing System**

- The Gosford-Wyong Joint Water Supply System is dependent on four small coastal streams: Wyong River, Ourimbah Creek, Mooney Mooney Creek and Mangrove Creek. Drought security is provided by three storages with a combined capacity of 202,000ML.
- The current storage in Mangrove Creek Dam is below the level needed to provide secure yield at current demands.
- Upgrading works including a new Mardi Dam outlet and a new high lift pumping station from Mardi water treatment plant to Tuggerah No.2 reservoir has been identified as a potential solution for the next stage of development. Further development work is needed before a decision can be taken on this.

#### Water Resources and Water Sharing

- Average annual flow at the GWCWA extraction points is about 196,000ML/a.
- The NSW Government is drawing up new Water Sharing Plans for NSW rivers under the Water Reform Program introduced by the Water Management Act 2000 to allocate more water to the environment to protect the health of NSW rivers. Under the new arrangements it is proposed to allocate to water users between 30% and 60% of daily flows above a determined base flow, depending on local environmental needs.

# Implications of limiting the urban and rural water share to 60% of available daily flow

- Water available to the existing town water supply system would be reduced to less than 52,000ML/a. An increase to not more than 75,000ML/a may be possible by increasing pumping capacities to capture more wet weather flows.
- The existing system plus upgrading of the Mardi headworks and rising mains would be able to meet demands until about 2027. Thereafter, additional yield could be met by importing an average of 20ML/d from neighbouring systems or by supplying water from alternative sources, or by further development of the Lower Wyong river Mangrove Transfer System surface water option.

# Implications of limiting the urban and rural water share to 30% of available daily flow

- Water available to the existing town water supply system would be less than 31,000ML/a. An increase to not more than 40,000ML/a may be possible by increasing pumping capacities to capture more wet weather flows.
- No expansion of the existing system would be able to meet projected 2051 demands, and it would be necessary to import water from other areas or resort to more expensive alternatives such as water reclamation and desalination.

• A large proportion of the previous Council and Government investment in the existing system would be lost. It is estimated that between \$70M and \$110M additional costs would be incurred to develop alternative sources.

# **FUTURE OPTIONS**

# **Demand Management / Water Savings**

- Water Efficiency: The propogation of water efficient appliances and fittings in new and existing houses is projected to reduced demands by about 13.5% by 2051.
- There is potential for additional demand management and leakage reduction programs to reduce demand by a further 3% to 5%.
- Water efficiency and demand management will be sufficient to offset fully the increase in demand due to climate change, leaving a net reduction in demands of about 10% of the projected 2051 demands at current demand levels.
- Installation of 5kL rain tanks in 60,000 new houses under the provisions of Wyong Shire's DCP100 will increase system yield by about 2,200ML/a. If an incentive program for installation of rain water tanks was introduced, which achieved a 20% uptake in existing houses, system yield would increase by about another 800ML/a.

# **Surface Water Sources**

- Upgrade existing pumping capacities to capture more wet weather flows.
- Upper Wyong River Mangrove Transfer System. This was the option adopted in the 1985 Strategy.
- Lower Wyong Mangrove Transfer System. This has a number of environmental and operational advantages over the Upper Wyong River Mangrove Transfer System.
- Lower Mangrove Mangrove Transfer System
- A second off-river storage near Mardi.

# Link to Hunter Water

• The 1985 Strategy envisaged future import of water from the Hunter Water system at Newcastle. There is no spare yield in the Hunter system at present, and only limited spare capacity after 2006 under current Hunter Water augmentation plans.

# Groundwater

- There may be potential to harvest about 2,500ML/a of groundwater from the Kulnura Mangrove Mountain Aquifer. The amount of water available for town supply water may be limited by issues relating to access and the competing interests of local landholders. The estimated cost of supply would be about \$0.60/kL, not including water treatment costs.
- Provided environmental constraints could be overcome, there may be potential to harvest up to 1,800ML/year of groundwater from the Tuggerah Beach and Dune aquifer. The estimated cost of supply would be in the order of \$0.38/kL, including water treatment.
- Provided environmental constraints could be overcome, there may be potential to harvest up to 1,100ML/year of groundwater from the Budgewoi Beach and Dune aquifer. The estimated cost of supply would be in the order of \$0.58/kL, including water treatment.
- There is potential to use water from the Woy Woy Umina aquifer for irrigation of recreation areas and urban landscaping requiring about 250ML/year. The estimated cost of supply would be in the order of \$0.25/kL, not including water treatment costs.

# Water Reuse

- A comprehensive reclaimed water system for irrigation of open space supplied from the Kincumber, Wyong South and Charmhaven treatment plants would cost around \$1.70/kL for the reclaimed water supply. Such a system could potentially reduce demands on the joint water supply system by about 2,500ML/a.
- There is scope for some smaller local reuse systems for irrigation of open space areas close to the treatment plants at Toukley and Bateau Bay

- There is potential to use up to 1,200ML/a of reclaimed water from the Mannering Park and/or Charmhaven treatment plants to meet the process water needs of the Vales Point and Munmorah power stations.
- There is some potential to use reclaimed water for rural irrigation needs in the Wyong River and Ourimbah Creek valleys, but significant issues would need to be addressed to control the risks associated with using reclaimed water within the water supply catchments.
- A comprehensive urban system could provide the foundation for an environmental flow substitution system which could supply up to 50ML/d of reclaimed water to meet environmental flow needs and free up a matching amount of streamflow to meet GWCWA water supply needs. The cost of implementing a major environmental flow substitution system would be about \$0.65/kL to \$0.70/kL. There would be potential to use 80% or more of dry weather flows from the Central Coast sewage treatment plants and to increase water supply system yields by up to 17,600ML/a.

# Desalination

- There is potential to develop a desalination plant at either Vales Point or Eraring power stations.
- The estimated costs for an MED plant operating at full capacity are \$1.05/kL for a 20ML/d plant and \$0.95/kL for a 50ML/d plant.
- There may be some environmental constraints on the disposal of brine from the plant which could result in additional costs.

# **Overall Assessment**

- The water sharing arrangements for the GWCWA surface water sources are a key issue which will dictate the Authority's price path. Further negotiations with the Government on the water sharing arrangements are warranted with a view to achieving an appropriate balance between environmental needs and costs to the community.
- Reductions in system demands through propogation of water efficiency, demand management measures and rain tanks will provide numerous benefits and should form part of any scheme.
- Significant increases in system yield could be achieved by increasing existing pump capacities to capture more wet weather flows, and completing the Lower Wyong river to Mangrove Creek Dam Transfer system to enable storage of those flows.
- There is potential to achieve some further reductions in demands on the system through development of selected urban and industrial water reuse projects.
- There is some potential to supply limited quantities of water from groundwater in the Somersby-Mangrove Mountain area and in coastal sand aquifers. However, there may be access and environmental constraints on the development of both these options.
- Alternative water sources such as environmental flow substitution and desalination are more costly to implement and have higher operating costs. However, introduction of some supplementary supply from alternative sources would provide additional flexibility and robustness in the system if climate change impacts are greater than currently expected.
- Further community consultation is required to determine acceptability of the options. Additional studies to determine environmental impacts are also required.

# The Way Ahead

- Peer group review of study findings.
- Public exhibitions and consultation.
- Specific interest group meetings and workshops.
- Further consideration of the technical, economic, social and environmental impacts.
- Further investigation of the Mardi High Lift Pumping Station and transfer capacity upgrade.
- Develop a methodology for evaluation of options.