

15.0 CONCLUSIONS

This report has considered the long term water sourcing requirements of the Capricorn Coast on the basis that the yield able to be obtained from the existing water supply source of Waterpark Creek and the yield based on the planned diversion of flows from Sandy Creek. The following conclusions have been drawn from the investigation.

- 1) The year 2056 potable water requirement of the Capricorn Coast's urban area is estimated to be 13,000ML/a. This water requirement can be compared with the current annual consumption of 3,500 to 3,750ML/a.
- 2) The maximum consumption based on the current state of development could approach 4,500ML/a. This consumption has been assessed on the basis of the fluctuations in demand which has occurred in recent years and the need to adopt a conservative approach in terms of water supply sourcing. This likely maximum consumption and the actual consumption in the year 2004/05 of 3,650ML can be compared with the safe yield of the existing Waterpark Creek system of 2,400ML/a.
- 3) Assessment of the 'safe yield' of Waterpark Creek is dominated by the drought event of the year 1902. If this event had not occurred the yield of Waterpark Creek would be approximately 4,000ML/a. If restrictions involving reducing demands by 25 percent were applied, when the volume of Kellys Offstream Storage was reduced below 75 percent, the yield from Waterpark Creek would increase to 2,950ML/a (ie. with the year 1902 drought event included in the period of assessment).
- 4) The safe yield of the existing Waterpark Creek system cannot be determined with a level of confidence appropriate to that required for a rapidly developing community such as the Capricorn Coast. Reasons for this primarily relate to the length and accuracy of the flow records and the difficulty associated with modelling the rainfall runoff relationship of the Waterpark Creek catchment. These inherent uncertainties in the determination of the safe yield mean that at all times the available safe yield should exceed the demand by at least 25 percent (ie. About the benefit that can be derived from the imposition of restrictions). Given the type of catchment supplying a major urban area of considerable economic significance to Central Queensland it is believed that reliance on a single source of supply is not satisfactory in the longer term. Also, in the shorter term consideration needs to be given to raising Kellys Offstream Storage so that the safe yield at least exceeds the demand.
- 5) The yield able to be obtained from the Waterpark Creek and Sandy Creek catchments will, in most years, exceed the safe yield by a substantial amount and this water should be used preferentially if a second source is constructed so as to minimise costs.
- 6) While further development of the Waterpark and Sandy Creeks system is an option there is a need to obtain a second source of supply for the following reasons.
 - ∅ The Waterpark and Sandy Creek supply is limited and cannot meet the longer term requirements of the Capricorn Coast;
 - ∅ The safe yield available from the Waterpark and Sandy Creeks system must at least equal actual demand (this is currently not the case);
 - ∅ Some doubt exists as to how well the historical rainfall runoff model is in predicting future runoff in Waterpark and Sandy Creeks particularly during periods of low rainfall;
 - ∅ Failure of the potable water supply is not an option.

- 7) Current extraction practices associated with Waterpark Creek are sustainable and the current environmental flow does not need to be increased.
- 8) Should the proposed Sandy Creek intake be constructed in order to augment the existing flows drawn from Waterpark Creek an environmental flow of 8.6ML/d (ie 100L/s) should be maintained.
- 9) No suitable sources of 'brackish water' appear to exist within the environs of the Capricorn Coast to warrant further investigation of treating such supplies.
- 10) The most suitable means of converting sea water to potable water to meet the needs of the Capricorn Coast is by means of reverse osmosis. The design of a suitable plant would need to include an intake main drawing supplies from relatively deep water some considerable distance from coastline, pre-treatment of the intake water, conversion of portion of the sea water to potable water, post-treatment and storage. There would also be a need to return the surplus brine to deep water some distance from the coast. The actual percentage of intake water needing to be returned to the ocean, or disposed of by some other means, is likely to exceed 50 percent.
- 11) Currently there are a number of important factors which inhibit the use of desalination of sea water as a means of augmenting the Capricorn Coast's water supply. Some of these inhibiting factors are as follows.
 - € Capital and operating costs;
 - € Short life of many plant components;
 - € High energy demands which, if based on current supplies of electricity generated from coal contribute to the production of 'greenhouse gases';
 - € A need for considerable operational and management expertise;
 - € Periodic turbidity problem from flood runoff;
 - € Difficulties with disposal of waste brine; and
 - € Difficulties in matching production with demand variations.
- 12) Advantages of a desalination plant's construction are as follows.
 - € The plant can be constructed in modules based on demand;
 - € There is no requirement to negotiate with other local governments; and
 - € There are no reliability issues in terms of source water.
- 13) The availability of 'high priority' water from the Fitzroy River Barrage needs to be confirmed.
- 14) The options for augmenting the Capricorn Coast's water supply are ranked as follows in terms of cost.
 1. Augmentation of the existing Waterpark Creek system by development of Sandy Creek and the raising of Kellys Offstream Storage to stage 2 and stage 3 plus one of the following in the longer term;
 2. Construction of a pipeline from the Yaamba Road Reservoir within Rockhampton City to the Capricorn Coast;
 3. Construction of an intake, treatment plant and pipeline from the Fitzroy River Barrage to the Capricorn Coast;
 4. Construction of desalination plant.

-
- 15) The cost differential between the various pipeline routes marginally favours the construction of a pipeline along Routes 1A and Route 2A.
 - 16) It is believed that no significant environmental issues exist with the construction of a pipeline from the Fitzroy River along each of the routes examined. However, this will need to be confirmed at the preliminary design stage, and particularly with respect to cultural heritage.
 - 17) Termination of a pipeline a Yeppoon rather than Emu Park will enable the source waters from both the existing system and from the Fitzroy River to be mixed prior to distribution.
 - 18) The overall cost of providing the Capricorn Coast with an alternative supplementary water supply which will most likely become the major supply is significantly beyond the resources of Livingstone Shire to fund and substantial State Government assistance of at least 80% will be necessary to ensure the Capricorn Coast is provided with a supply which will not fail.
 - 19) The capital cost of the preferred scheme involving the augmentation of the existing Waterpark Creek supply with the diversion of flows from Sandy Creek, the raising of Kellys Offstream storage and construction of a pipeline from Yaamba Road Reservoir to Yeppoon is expected to require the expenditure of some \$70m to \$85m over the next 40 years; and
 - 20) To ensure that any increase in water charges is limited to 40% of the existing charge it will be necessary to procure:
 - i. a subsidy of at least 80 percent in relation to the construction of a pipeline from the Rockhampton City water distribution system, and
 - ii. a 40% subsidy with respect to works associated with upgrading the existing supply from Waterpark Creek.