

# CASE STUDY: The History of Water Supply on the Central Coast

## 11. Geology of the Mangrove Creek Dam site proposed in 1974

The **principle of superposition** in geology is a proposition based on observation of sedimentary rocks throughout the world: The principle states that *Sedimentary layers are deposited in a time sequence, with the oldest on the bottom and the youngest on the top*. The principle was first proposed by the Danish scientist Nicolas Steno in the 17th century.

### ACTIVITY:

Examine the geological map of the catchment on the previous page (i.e. page 11), together with the diagram in Appendix 5 and the information in the Table below. Then answer the questions that follow the Table.

#### Findings of the 1974 investigation into 23 potential dam sites on upper Mangrove Creek.

*"Present worth analysis shows that the Mangrove Creek dam could be constructed at any one of several dam sites with little economic effect on the cost of the overall scheme. However Site 7 is slightly more economic at all discount rates and is the site preferred at this level of investigation for the construction of a high embankment dam by the Department of Mines geologist and the geotechnical consultants. This site has the **narrowest valley** and the **least amount of alluvial material** and, therefore, reduced unforeseen construction difficulties. It **requires less catchment control for water quality purposes** as little development has occurred to date on the catchment. Additionally, it has a smaller storage basin with less inundation of the attractive Mangrove Creek valley floor. The capital cost of the Stage 1 dam at site 7 is also the lowest of all the sites compared."*

Source: "Report on Mangrove Creek Damsites, Gosford-Wyong Water Supply"  
Report No 1 January 1974, Department of Public Works N.S.W.

### QUESTIONS:

1. Of the geological formations within the Mangrove Creek catchment, which is the oldest, the 'Hawkesbury sandstone' or the 'Narrabeen Group'?  
**Explain** your answer?
2. Within the 'Narrabeen Group' of rock strata, which stratum is the oldest, Unit 'P' or Unit 'B' (examine the diagram in Appendix 5 to determine this)?  
If you happened to observe these geological formations in the field, **describe** what kind of differences you would expect to see between the rock layers in Unit 'P' and in Unit 'B'?
3. For the purpose of constructing a dam, **explain** why each one of the following properties was considered an advantage in the preferred site:
  - (a) it 'has the narrowest valley'
  - (b) it has 'the least amount of alluvial material'
  - (c) it 'requires less catchment control for water quality purposes'