The most significant aquifer system in the Amadeus Basin has been developed in the Mereenie Sandstone of Siluro - Devonian age. This aquifer system provides 80% of Alice Springs water needs through bores in the Roe Creek borefield and will continue to be important for the town supply through the proposed Rocky Hill borefield development.

In the borefield area the Mereenie Sandstone has a true thickness of approximately 365 metres (drilled thickness 425m). Varying thicknesses have been noted in other locations where oil wells have intersected the formation. This is because different lithological controls have been used to mark the transition between the Mereenie and sediments of the Pertnjara Group. Often basal sandstones of the Pertnjara Group have been derived from erosion of the Mereenie Sandstone making determination of the contact almost impossible in oil and water wells.

4.1 Depositional History of the Mereenie Sandstone

Deposition of the Mereenie Sandstone commenced with shallow marine sediments in the west of the Amadeus Basin contemporaneously with the broad epirogenic uplift of the eastern sector (the Rodingan Movement). Subsequent erosion and deposition of fluvial marker beds across the Alice Springs area occurred. Arid desert conditions became widely established across the whole basin and up to 600 metres of mature quartz sand was deposited in this aeolian environment.

The Mereenie Sandstone is generally a white, pale brown to red brown, exceptionally pure quartz sandstone, generally fine grained, rarely medium, well rounded and well sorted. Minor accessory tourmaline, zircon and feldspar occur within the top and bottom few metres of the formation. Shale and siltstone lenses do occur. Sedimentary structures include thin massive bedding, characteristically cross-bedded with trough cross sets up to 10m thick. This suggests aeolian deposition. Ripple marks are frequently present and sediment transportation was dominantly towards the west and south. Palaeontological evidence for the age is lacking. The measured age of the Mereenie results in large depositional gaps between it and adjacent formations, which is unlikely, so several major depositional breaks probably occur within the sequence.

In the borefield area, data from cored holes RN 15020 and RN 15021 and observations of outcrop, particularly near Pine Gap, confirm the general conclusion that a terrestrial and mostly aeolian, at times fluvial to lacustrine depositional environment existed. Deposition commenced with coarse fluvial sediments, followed by a mixture of lacustrine to aeolian sediments.

Although Lau has divided the formation into five units based on composite petrographic work, data suggests that in a hydrogeological context the formation in the Alice Springs area can be divided into three units. These are, going upwards from the unconformity base, units