

# NANO BUBBLE TECHNOLOGIES

## AVONDALE GOLF CLUB

WATER QUALITY & ROOT MASS / LENGTH IMPROVED AND PYTHIUM  
DRAMATICALLY DECREASED USING NANOBUBBLE TECHNOLOGY

### INSTALLATION DETAILS

Tank Size: 500,000 litres  
Unit Type: 10-Cell Injector  
Installed: October 2017



### BENEFITS

Successful reduction in odour  
& obliteration of green algae /  
fungi in dam water.  
Significant decrease in pythium and  
increase in plant health

### RESULTS

2000% increase in DO ✓  
Thicker, longer root system ✓  
67% decrease in chemical use ✓

## AVONDALE GOLF CLUB

Avondale's prestigious 18-hole Group 1 golf course faced a persistent challenge with Pythium, a highly destructive turfgrass disease that had long affected its greens and fairways. Known for causing slimy, patchy, and eventually dead areas across turf, Pythium thrives in damp and shaded conditions. The course's greens surrounded by towering gum trees, created an ideal environment for the disease to flourish. Despite utilizing large fans to improve airflow and employing a variety of other turf management strategies, the course was unable to effectively contain the spread of Pythium.



# WATER QUALITY & ROOT MASS / LENGTH IMPROVED AND PYTHIUM DRAMATICALLY DECREASED USING NANOBUBBLE TECHNOLOGY

## AVONDALE GOLF CLUB

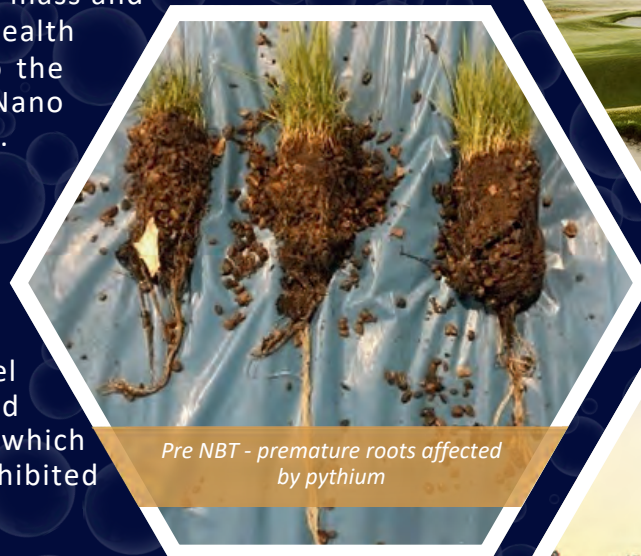
In addition to this, the course contended with a secondary issue: the dam water used for irrigation was dark-coloured and emitted a foul odour, indicative of poor water quality. In November 2017, prior to the implementation of the NBT solution, tests showed the dissolved oxygen (DO) levels in the dam were at 1.10 ppm, far below the levels required to support plant health.

Avondale sought to evaluate their treatment options. In 2017, in collaboration with Nano Bubble Technologies, they completed some successful trials using the innovative nano bubble technology. Anecdotally, they found that the water quality improved remarkably, root mass and length increased and general plant health improved. These successful trials led to the installation of the patented NBT Nano Bubble Injector (NBT10) in October 2017.

### RESULTS

The initial deployment of the NBT10 immediately improved water quality, delivering irrigation water with a DO level exceeding 23ppm. This transformation led to noticeable changes in the dam water, which no longer displayed a dark colour and exhibited a substantial reduction in foul odour.

Furthermore, the increased oxygen levels in the water effectively eliminated algae and fungi, allowing Avondale to experience it's first Pythium-free summer in decades. The improved water quality also enabled a 67% reduction in the use of chemical treatments throughout a particularly hot and dry summer season. Overall, the aesthetic quality of the golf course has been enhanced significantly, with with club members frequently expressing their appreciation for the improved conditions of the course.



*Pre NBT - premature roots affected by pythium*



*Post NBT - longer, thicker, healthier root system*



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