



Cromer Golf Club

To Whom It May Concern with reference to Hydrosmart water conditioning technology.

Cromer Golf Club is located on the northern beaches of Sydney and has had problems for many years with its highly mineralised bore water supply. The main problem we have experienced has been due to levels of iron in the water which could vary from anything from 30 up to around 76 parts per million (ppm).

Coupled with this has also been the issue of low ph of the water.

In respect to the levels of iron the club has for some years attempted to reduce the amount of oxidized iron by injecting Phosphonic Acid into the bore supplies prior to going into the holding tanks in an attempt to sequester the iron in the water so that this "iron" could be displaced out through the irrigation system and onto the turf areas of the golf course. The other issue that the club has faced has been in regard to the pH level of the bore supply. Generally the pH level of the water from the bores has been somewhere in the mid to high 5 levels. The club has addressed this issue by the injection of Caustic Soda into the supply also prior to placement in the holding tanks. As one can imagine the implementation of two injection type systems and the ongoing supply of chemicals to address this problem has been quite significant and depending on water usage on the course could in one year cost over \$40,000.

The other problem that we experienced with the Phosphonic Acid treatment was that as the iron levels in the water rose we could not sequester all of the iron in the water. This led to the iron then oxidizing in the tanks and settling to the bottom. This then caused problem as the sludge was prone to be dragged into the system and displaced out onto play areas of the course. Under extreme conditions this would have the resultant effect of staining quite heavily all surfaces that the water came into contact with, including golfers on some extreme occasions. The agronomic effect of water of this quality was the effective "locking up" of all phosphorus, resulting in a dramatically reduced root system. Another noticeable problem was in regard to how hard the water was which made infiltration into the profile and through any accumulated thatch very difficult.

Following some significant investigations in respect to other water treatment alternatives we installed seven Hydrosmart Enhanced Output units onto our 200mm, 150mm and 100mm supply and discharge mains in August 2006. Over the next eight months we monitored the water primarily for staining effects and softness. Up to this point in time we have seen a gradual and consistent improvement in our water quality that has resulted in less use of wetting agents especially on fairways and roughs and a greater colour retention in the overall grass and course till now in March 07.


The continued drought in Sydney over the past summer has meant that we were forced to water a great deal with only Hydrosmart treated water, and there has been an overall agreement that our course has looked as good as it ever has. This might be put down to the Hydrosmart making iron and other minerals available from the water itself or lower chemical interference now that we stopped dosing with Caustic, or both these elements combined. Of most interest is the way Hydrosmart is not attempting to take the iron and minerals out as with chemical treatments or reverse osmosis approaches.

Rather, by keeping it suspended in solution it would seem it is making the water quality better with some anecdotal improvements to grass colour and overall health. We no longer have the issues with pH swings that we used to have when we used to dose with Caustic and the iron stains are reducing on the pathways. From an agronomic stand point we will monitor certain aspects of our overall turf health in the coming spring and summer so that we can actually gauge any other benefits of the Hydrosmart Units.

Another notable outcome is that some of our members would complain after a game if they had been hit by water from the sprinklers. This was because the iron oxide in the water would badly stain their clothing. Since installing Hydrosmart we have received no more complaints.

We are very happy with the way the process has worked from the outset and are only too happy to recommend it to any other golf courses or turf users experiencing problems due to high iron levels in their water.

Yours sincerely



10/07/07

Mark Couchman
Golf Course Manager