

**1 Derwent Court
Silsden BD20 0QR
UK**

**Tel 00 44 (0) 1535 656849
Fax 00 44 (0) 1535 657737
E-mail agronomist1@aol.com**

KØBENHAVNS GOLF KLUB

AGRONOMY REPORT ON THE GOLF COURSE

Date of Inspection – 29 May 2008

1.0 PRESENT

- 1.1 The course was inspected with Martin Nilsson.
- 1.2 Matters arising were discussed with Birgit Peitersen, Frederik Ipsen and Steen Christian Pederson.

2.0 BRIEF

- 2.1 To carry out a review of course condition and resources for maintenance.
- 2.2 To comment upon findings and to make recommendations for future action.
- 2.3 To advise on aspects of the course renovation programme that will begin later in the year.

3.0 REVIEW

- 3.1 The course as a whole was better presented than in 2007 and there have been some good technical improvements on the greens as a result of treatments applied. Nevertheless, there is still some way to go to get the best out of every putting surface and to provide a better growing environment within green surrounds and on fairways. On tees, adjustments need to be made to materials and methods for ongoing renovation operations.
- 3.2 At that stage, the irrigation system was out of action, but only the 8th green that is on a high sand rootzone mix was generally dry. Elsewhere, dry zones were restricted to places where the grass type is still weak *Poa annua* that is shallow rooted and prone to droughting problems. This grass was most obvious on: the 18th; the practice putting green; to the left of the 3rd; and to the rear of the 5th. Isolated zones of *Poa annua* were noted too on the 6th and 10th. Overall though, there has been good progress in reducing the amount of this weak grass within the putting surfaces during the past year, with special progress having been made at the 16th. The 17th too has progressed well, there has been significant headway at the 1st and most of the 5th was at a better standard. Least progress has been made at the 18th and practice putting green, but given their location it is inevitable these two greens will be slow to change.

- 3.3** In my report last year I suggested the primary requirement to bring about improvements to turf type on putting surfaces is action to deal with soil compaction at a depth beyond 15cm from surface level. In the meantime, Vertidrain operations have been effective in loosening this soil compaction beneath the majority of greens, but at the 18th and practice putting green in particular soil compaction remains at a high level. This is the case too where there is weak turf elsewhere. Therefore, ongoing heavy duty vertidrain will be needed during the coming 12 months. At the 3rd and 5th, I think this should be combined with pruning off of fibrous roots from adjacent trees at the green margin, to reduce competition between tree roots and the turf.
- 3.4** Beneath greens, there has been a reduction in thatch levels at the turf base, bringing this to an average depth of 15mm. The target is 10mm, so this is not far away now. Root growth was better too, with a general increase in the depth of the main root bundle to 6-10cm. The putting surfaces were reported to be draining more quickly.
- 3.5** Adjacent to greens, foregreens, banks and mounds again had weak turf throughout the course where there is accumulated sand in the turf base and/or heavily compacted topsoil conditions. The planned renovation programme is certainly needed to improve matters, by providing a better growing environment and improved contouring.
- 3.6** Bunkers looked tidy, but it was reported the underlying sand is very hard. This is because raking has mixed soil into the sand and created a blend that will cement when it becomes wet. The old sand must be dug out and replaced as part of the renovation project.
- 3.7** The fairways were better grassed, but still were hard and bumpy and the turf mix contains too a high a percentage of *Poa annua* that will be unstable in dry weather. Fundamental to making an improvement will be dealing with soil compaction through vertidrain work. The Club reported there is a plan for a renovation programme on fairways involving intensive surface action on selected holes when renovation is being carried out on green surrounds involving scarifying, overseeding and topdressing. However, I strongly recommend vertidrain is carried out on all fairways, every year.
- 3.8** The tee platforms are not the best feature of the golf course and they will be areas for improvement as part of ongoing works over coming years. However, recent renovation works have not been fully successful, in that the sods used have not been of satisfactory quality. Also, on some tees there is still too much cross-fall. Small tees should be flat.
- 3.9** Looking further ahead it was suggested that if the Club is to get the best out of the tees in the long term, it is not only necessary to renovate the platforms, but also to improve the provision for irrigation. To keep tees in good order it is important you provide a full growing season and this is not possible if there are long spells of dry weather when the turf on tees stops recovering from general wear and tear.
- 3.10** The greens on the Par 3 course were in satisfactory order, albeit the turf contains a high percentage of weeds. However, I advised that even though it is planned to take turf from these greens for use on green extensions during the autumn, the intensity of maintenance applied over coming weeks should

be at a low level, to ensure the turf is strong enough for lifting and re-laying, and that it will re-establish quickly.

4.0 RESOURCES AND EQUIPMENT

- 4.1 Since my visit last year there has been improvements to key resources, not least the number of greenstaff has been taken to 6, as advised. Also, the Club has purchased the star slitting equipment recommended, and has bought a new vertidrain that is much more suited to the work in hand.
- 4.2 During this more recent visit the one extra recommendation was that the Club will need a new mower to maintain re-shaped green surrounds to a good standard. A Toro Sidewinder will be ideal
- 4.3 Beyond that, a number of points were raised concerning irrigation. Firstly, if the well is not performing properly then certainly you must dig a new one in the near future. Secondly, relocation of greenside sprinklers should be considered alongside the installation of the capacity to irrigate wider green surrounds, as discussed last year. And while they are on site, you might have the engineers look at what is needed to improve the irrigation system to tees. If improvements to tee irrigation are not possible in the short term, this should still be written into plans for the future.
- 4.4 Where comments were made on materials for maintenance, these are covered in the sections to follow.

5.0 GREENS

5.1 Assessment

Despite localised dryness and a temporary lack of an irrigation facility, I thought the playing performance of the putting surfaces was highly satisfactory at that stage. There was smooth ball roll at a medium-fast pace, which is a good baseline to build on for the future. The aim is for smooth, quick greens for long periods each year, on turf that is highly stable and will retain good completeness in the face of stress and disease.

The key to ongoing progress on greens continues to lie in making improvements to the underlying growing medium, to get this into the best structural condition and providing a balanced growing environment. With this in mind, vertidrain using large pins will again be required on all greens during the coming winter (for 2009/10 I envisage dropping back to 12mm diameter pins for all vertidrain operations). Also, heavy duty vertidrain might again be backed up by action using a Robin Dagger on the weakest greens, particularly the 18th and practice putting green.

At the 3rd and 5th, I think there are big benefits to be gained by pruning off fibrous roots from adjacent trees that are growing beneath the putting surfaces and competing vigorously for available resources (water and fertiliser). Experience elsewhere suggests this can be done easily and without any damage to the trees by cutting a narrow width trench as close to each green as possible, without damaging the irrigation system or any structural roots that hold up the trees. Hence, the trench need be no more

than 15cm wide and will go no deeper than 50cm. Indeed, even a trench 30cm deep will make a big difference. So, although it may be difficult to get the agreement of the foresters, I still think this is something you should target as a priority item to improve the condition of these greens year round, not just in dry weather.

Such tree root pruning though is not thought to be practical at the 18th and practice putting green and other avenues to improving water balance are advised, covering extra attention to deep aeration and the focussed introduction of zeolite.

At other greens, in places where there is low drought tolerance it is likely the sand layers reported last year continue to cause breaks in the potential for deep root growth, while at the 8th we know the rootzone mix has an especially high sand content. These are the areas to focus on when carrying out future hollow tining - I do not see hollow tining being needed on all greens now. Whenever hollow tining is carried out though, its effects of this should be made as positive as possible by brushing a fine grade of Zeolite into the open tine holes prior to topdressing.

Overseeding of greens will also be important in conjunction with hollow tining, to introduce better grasses into places where there is still too high a percentage of *Poa annua*. The overseeding carried out to date is producing a satisfactory result, even at the 1st and 6th. Where there is already good turf on putting surfaces I think this will develop naturally to the standards required without further routine input of new seed.

5.2 Treatment Recommendations

Where comments were made concerning ongoing operations, these are confirmed as follows:

Mowing. Continue to mow the greens at a minimum height of 5mm throughout the summer months. Maintain a good green speed by weekly rolling. Raise to 6.0mm for the winter.

Verticutting and Topdressing. During the growing season verticut the greens at a tighter setting, level with roller height, making a double pass at monthly intervals prior to light applications of topdressing. Complete the topdressing programme by the second week of September.

Routine Aeration. When ground conditions are moist, routinely aerate the greens with cross tines at monthly intervals. In between, perforate the putting surfaces using the star tine units as frequently as practical, aiming for passes every 1-2 weeks.

Hollow Tining. I think it is a good idea to hollow tine weak greens or areas of green in July, as per plan. For September, I do not see a need to hollow tine all the greens and I suggest again you only core weaker greens or sections of green. Back up hollow tining by spreading fine Zeolite at a rate of two bags per 50m² and brush thoroughly into the open tine holes prior to sand top dressing, then overseeding. Within this hollow tining programme, include the 8th, 18th and practice putting green and place a high priority on adding Zeolite to the growing medium.

Overseeding. Use a mixture of fescues and bentgrass, so the grasses that emerge have a good chance of adapting to individual circumstances from green to green.

Fertiliser. It was reported the greens received 48kg of nitrogen per hectare last year. This amount is on the low side, so if you feel that the greens need more input, there is scope for at least one extra fertiliser application during the growing season.

Irrigation and Wetting Agent. When it is possible to use the pop-ups in dry weather, I again recommend a wetting and drying cycle that allows a depth of 2-3cm of the turf base to dry between irrigation cycles. I was pleased to hear Revolution is being used as the wetting agent; I expect this will be very successful.

Vertidrain. When ground conditions are moist in October or early November, vertidrain the greens using 18mm diameter pins to a depth of 20-25cm, then apply gentle lift without ridging. Follow on by rolling to settle the turf, but no top dressing. In February, carry out further vertidrain using 12mm diameter pins. Again roll in.

Robin Dagger. It will be a good idea again to hire a Robin Dagger for deep aeration of selected greens, especially the 1st, 18th and practice putting green.

Tree Root Pruning. Tree root pruning will be a great asset at the 3rd and the 5th.

5.3 Green Extension at 4th

Turf from the greens on the Par 3 course is to be lifted in the Autumn to be used as an extension for the 4th green. In the meantime, it is important there is minimum disturbance to this turf, so that it will be easily handled when making this transfer. As such, avoid any routine aeration during coming weeks and once we get past the middle of the summer suspend top dressing and verticutting treatments. In contrast, ensure the turf does not struggle as a result of dry weather or low fertiliser input. The weed content will be best left as it is, rather than digging it out at this stage. While this may make the new extensions look untidy at the outset, the weeds will be easily removed once the new turf is properly established. Prior to lifting the turf, raise the height of cut to 6.0mm.

Turning to the profile for the extension area of the 4th, in my report last year I commented that you might take out 10cm of topsoil and replace this with rootzone mix. On consideration, this might be better as a 5cm depth of topsoil to be replaced with rootzone mix. The mix used can be the Green Mix Light seen during the visit. Ensure the irrigation system is adjusted so there is good coverage of the newly turfed areas for the future.

6.0 GREEN SURROUNDS

6.1 Assessment

Foregreens and green surrounds continue to be areas where there is scope for major improvements from hole to hole. With this in mind I was glad to learn the Club intends to go ahead with a redevelopment project over a period of three years, starting this during the coming autumn. Also, that the reshaping work is to be carried out by a specialist contractor.

In commenting further on this project, I emphasised it will be best if the growing medium for the new surrounds is the natural loamy topsoil on site. I recommend you do not cover this with rootzone mix or install a sand cap. Indeed, I feel so strongly about this point that if there are places where there is a shortfall of on-site topsoil, the amount re-spread should be reduced to a 10cm depth. Nevertheless, a 15cm depth will still be the target to aim for.

Adequate provision for drainage has been made within the proposed specification of works.

As to sods for this project, prior to the visit Lindum Turf sent me samples of their products. To date, Tillers have not sent samples. Of the samples seen, the turf that is fescue, bentgrass and *Poa pratensis* is by far the best mix and will be excellent for the purpose. It is understood Lindum has delivered to Denmark in the past, but I have no details of the clubs that bought this material.

I understand improvements to irrigation are in planning to allow for general close mowing of a wide green surround.

6.2 Treatment Recommendations

No new points were made concerning the short term management of existing foregreens and green surrounds. However, for the future, comments were made concerning the need for more intensive management of the new areas to be built, which require additional staff time, materials and machinery.

Rolling. Once new turf has been laid and is well rooted, light rolling will be needed to bed down the sods and ensure an even contact with the underlying soil. For the long term though, routine rolling will not be required.

Mowing. Once the turf is rooted and has started to grow, initial mowing will be necessary at a height of cut of 15-18mm, assuming smooth contours and a good machine for the job. I envisage the height of cut being reduced to 10-12mm as the new surrounds become fully established. Further adjustments may be necessary at a later stage.

Topdressing. Close mown green surrounds will require a generous topdressing in spring each year.

Fertiliser. A spring fertiliser application using a slow release granular product will be appropriate, such as Scotts 16.0.16 or similar, at 25g/m². In

the first year, a second application may be required in June or July, but in the long term I envisage no more than one treatment per year.

Irrigation. Irrigate the green surrounds 2-3 times per week during spells of dry weather to maintain uniformity and completeness.

Aeration. At some stage an aeration programme will be required, but possibilities in this respect will need to be assessed against the contouring created and the intensity of general wear and tear in particular locations. Therefore, this will be something that will be subject to a future review.

7.0 FAIRWAYS

7.1 Assessment

Although the fairways looked better, these improvements were superficial and there is still a requirement for a much more intensive treatment programme to provide stable growing conditions and a much more sustainable turf type.

The Club reported a plan to carry out intensive works on fairways on those holes where the green surrounds are to be renovated on a year by year basis, as a trial in the first instance. While I think this is a satisfactory way of assessing the value of overseeding and top dressing, when it comes to vertidrainage I think this really needs to be a course-wide operation applied as a high priority item every year. This is strongly recommended.

7.2 Treatment Recommendations

Mowing. A height of cut of 16mm was working well and I advised no changes.

Veemo'ing. Veemo'ing was planned for the short term, but if the weather remains dry this will be best avoided until spring 2009, in good growing weather.

Aeration. I strongly recommend you carry out vertidrainage as a general treatment throughout all fairways in the autumn or winter. This is not disruptive to the fairways in play so long as you roll afterwards to push back any tufting. Compaction control is the number one item required to make a fundamental improvement and the sooner you start a general programme the better.

8.0 BUNKERS

8.1 Assessment

There is good scope for improvements to bunkers along similar lines to recent achievements at the 5th. I understand work on bunkers is a major item within the course renovation plan.

When constructing new bunkers, allow for importation of new sand, rather than try to recycle what you have at the present, which is badly

contaminated with soil and will go hard as soon as it gets wet. As to selection of sand, the Lubber sand sample seen is around the correct grading. The other sands had too high a content of grit. If you can find a similar grade to the Lubber sand that has a more attractive colour, then use this instead, but note that particle grading is much more important in sand selection for bunkers than is colour.

9.0 TEES

9.1 Assessment

Several new tees have been built during recent months, but the results have not been entirely satisfactory. The turf used for the re-establishment of tees is not the best quality and in a number of cases, e.g. at the 6th and the 7th, I did not feel that the flatness of the platforms created is quite good enough. Of course, the alternative to laying sods when building new tees is to reseed and if the sods seen are the best available this should be seriously considered for the future, even when bearing in mind the problems presented by the deer. A further alternative will be to buy in turf from the UK, but this may be prohibitively expensive. The only other option would be to develop a turf nursery on site for long term use on tee platforms.

On tees in general there is a continuing requirement for an intensive management programme as discussed last year. In addition, it will be a great asset to have better irrigation that provides more effective coverage of tee platforms, but improvements to greens and green surrounds are much more important at this stage.

10.0 CONCLUSIONS

10.1 Management operations

There has been positive success from the treatment programme applied to the course during the past year, especially on greens where there have been sound technical improvements that can be built upon for the future. Nevertheless, an intensive treatment programme must be ongoing throughout. As a special target for the coming year, I recommend you extend your priorities to action on fairways and carry out winter vertidrainage at all holes.

10.2 Course renovation plan

In parallel with the ongoing treatment programme, the plan is to make a start on the proposed renovation of green surrounds and bunkers in the early autumn. I have no doubt at all this work will be of great benefit to the course as a whole.

D M STANSFIELD
9 June 2008