Making great sport happen

GREAT HARWOOD GOLF CLUB

Advisory Report on the Golf Course incorporating the STRI Programme

Report Date: Tuesday 9th May 2017
Consultant: Emma Beggs

Great Harwood Golf Club

Date of Visit:	Tuesday 9th May 2017
Visit Objective:	To performance test three indicator greens and offer advice to support improvements in year-round playing quality on greens.
Present:	Mr Clive Dunn – Chairman of Green Mr Mark Smith – Club Secretary Mr Ben James – New Head Greenkeeper Mr Danny Morey – Deputy Head Greenkeeper Mr Gary Walters – Turfgrass Agronomist, STRI Mrs Emma Beggs – Turfgrass Agronomist, STRI
Weather:	Bright sunny day with a temperature of 14 °C following over a month of very dry weather and cold night temperatures.

Headlines

- The three wettest greens had pipe drainage installed last autumn. Remaining problem areas within these greens were turfed with fescue dominated material providing a poor match to existing surfaces.
- After that a severe outbreak of fusarium disease activity exacerbated problems on these greens and there was a further loss in surface quality and turf cover through scarred areas. Two of the three drained greens remain out of play.
- There is positive news however and profiles beneath greens were in reasonable condition. These should be able to support good quality putting surfaces as long as the recommended changes to the maintenance programme can be implemented in full.
- There are a number of items of additional equipment required to facilitate the proposed programme.

Key Actions

- Purchase an aerator for monthly work, a modern spinner top dresser for regular sand dressing, a replacement back up greens mower to enable the various maintenance cassettes to be used on greens and a suitable accurate moisture meter.
- Support recovery on the three weak greens with an intensive recovery programme as detailed.
- Complete verti-draining across greens, tees and fairways later this year to offset soil compaction and optimise surface drainage thereby maintaining a drier winter course going forwards.
- With introduction of effective and appropriate maintenance programmes the longer-term goal should be to keep main greens in play year-round with the occasional use of frost greens as required.

Objective Measurements

Measurement	Average	Target Range
Soil Moisture (%)	19% (range 15-23%)	15-30%
Hardness (Gravities)	99 Gravities (range 86-106)	85-110 g
Smoothness (mm/m)	45 mm/m	<25 mm/m
Trueness (mm/m)	17 mm/m	<8 mm/m
Green Speed	6 ft in (range 2 ft 1 in – 7 ft 11 in)	8 ft 6 in - 9 ft 6 in
Organic Matter 0-20 mm (%)	5%	4-6%
Organic Matter 20-40 mm (%)	6%	<4%
Soil pH	5.0	5.0-6.0
Phosphate (P_2O_5)	9 mg/l	>10 (mg/l)
Potassium (K_2O)	128 mg/l	>30 mg/l

Key: In Target | Marginal Variance | Out of Target

Photo Observations and Comments

Figure 1: 1st Green drained last autumn and subsequently damaged by extensive fusarium disease activity. Surface was weak, pitted and areas of worst damage had been turfed with imported fescue dominated commercial turf. Returfed sections are weak.

Figure 2: The 3rd green was also pipe drained last autumn then damaged by widespread disease activity. Tree shade plays a role here and selective tree removal is advised. Performance testing confirmed a green in very poor condition. Extensive remedial work is required.

Figure 3: A returfed area on the 3rd green, similar areas were noted through the drained 1st, 3rd and 9th greens. Fescue turf weakened through in part scalping due to poor levels.

Figure 4: Soil profile conditions as seen here beneath the 3rd green are reasonably good. Both laboratory testing and visual observations confirmed no significant build-up of thatch. This is great news and makes the process of improving these greens a little easier.

Figure 5: The 4th green was also assessed and provided reasonable surface conditions. Fusarium scarring was still widespread but greater recovery/filling in has occurred.

Figure 6: Very similar soil conditions were found beneath all greens. Soils were however very firm and it is important that appropriate aeration is completed going forwards including annual verti-draining. Profile beneath the 4th green shown.

Figure 7: The 8th green provided a better surface and with appropriate refinement in coming weeks should provide a good surface for play.

Figure 8: Sward density and plant health was strong on the 8th green. Annual meadow-grass is the dominant grass species and it is vulnerable to disease and drought. A bentgrass sward improvement programme is therefore proposed.

Figure 9: The 9th green remains heavily scarred from disease activity last autumn. New seedling grasses were visible in some repaired scarred areas.

Figure 10: The existing chemical storage facility breaches current legislation. A leaflet is included to assist the Club in addressing this and ensure all chemicals are stored and recorded in the required way.

Recommendations

Re-drained, Disease Damaged Greens

Background Information

- There are three greens, the 1st, 3rd and 9th, which following historic drainage problems were pipe drained by an outside contractor last October. Very weak areas within these three greens were then patch turfed with imported fescue dominated commercial turf. This does not match the indigenous turf.
- Fusarium patch disease pressures were high last autumn due to prevailing weather conditions. This resulted in extensive aggressive disease activity across these three already weakened greens. This level of disease resulted in a further decline in turf quality. A broken sprayer meant fungicides could not be used to swiftly manage disease activity.
- Current issues relate to a combination of factors including very poor surface levels caused by disease scarring and poor returfing work. Weak sward density in areas of commercial turf and thinning due to mower scalping of uneven surface levels. Turf weakness was also evident along the pipe drain runs – fortunately these were returfed with the original turf. Surfaces lacked any level of uniformity.
- Recent aeration in the form of verti-draining has further affected surface levels in places but has opened up profiles, offset compaction and should help speed the rate of recovery.
- All three greens are currently very weak and in a poor condition. They fall well below the standards found on the other greens on the course.

Recommended Recovery Programme

- Ideally all three greens would be rested for the next month or so to improve the rate of recovery.
- Weather conditions will play a crucial role in the rate of progress. Careful management and sensible decision making, in terms of when and what treatments, will also be critical.
- Mow at a standard height of cut of 5.5 – 6.0 mm and continue to cut regularly to promote sward density. Mowing any closer while levels are poor is likely to exacerbate issues around scalping. It is likely that these greens will need to be mown slightly higher than the rest of the greens for the remainder of this season.
- Make an immediate application of a good quality wetting agent taking care to apply in cloudy weather conditions and employ correct water volumes as stated on the product label.
- Hand water regularly while it stays dry to increase moisture content uniformly across all three greens. Drought stress will halt growth and recovery and current weather conditions are very drying as illustrated by data collected on the day.
- Hire a Vredo disc seeder or similar and blanket overseed all three greens. Employ a good quality bent/fescue greens seed mix. Blanket seed at a total rate of 35 g/m^2. Make two offset passes with the Vredo to achieve this seed rate and increase coverage of introduced seed.
- Use a good quality liquid NK fertiliser and apply every three weeks or so at low-mid rate to support recovery of the very weakened surfaces.
- Take care to avoid stressing the turf through this recovery process.
- Initiate very light applications of sand dressing to start the process of improving surface levels. There needs to be some growth to enable this process to start without the risk of smothering or damaging existing weak turf and seedling grasses. Plan for an application once every two-three weeks for the next few months.

Machinery Requirements

- The following pieces of equipment should be purchased to enable Ben and Danny to carry out the work required. I appreciate there will be financial considerations for the Club however these are standard items of equipment used in modern greenkeeping.
- Purchase an aerator such as the Toro Procore or similar. Ideally a pedestrian version would be preferable but also consider tractor mounted models. This would allow regular aeration work across

greens and would be used monthly February – October indefinitely. There should be some form of aeration carried out at least monthly year-round. Work could also be extended to green surrounds and tees as time permits.

- A modern spinner top dresser is needed to replace the existing drop spreader. I understand that a Dakota was trialled once before. Primary use would be on greens throughout the growing season however use could again be extended to tees and green surrounds in future. Arrange a demonstration and show the Committee the difference as compared to the existing spreader.
- It is important that there is a reliable way to use the GreenTek cassettes that the Club have invested in and purchase of a replacement (newer) back up ride-on triple is therefore advised.
- An accurate moisture meter is important for maintaining these greens particularly in the absence of an automatic irrigation system. Hand watering is a fantastic way of managing greens as long as there is staff time available to water when required. Having objective information available to inform decision making about when to water and for how long is considered critical. Look at the Delta T Soil Moisture Kit as used by all STRI agronomists, these currently retail for approximately £900.

Remaining Greens

- It is recommended that all greens receive some form of aeration on a monthly basis. Between February and October this should be slim solid tining, the ideal precursor to applications of sand dressing and wetting agent application.
- In future years in August carry out a deep solid tine compaction relief treatment using 12 mm diameter tines to full depth. This year with all of the problems experienced look to delay this important deep tine treatment into mid late September but it must be fitted in while there is still strong grass growth and soils to depth are dry. This should ensure greens drain better through wetter months.
- Slit tine (use a fine turf slitter) every three weeks or so October – end of year if it stays dry. This will promote root depth and density. Never slit after January to allow slits to close up ahead of dry ground conditions, particularly on this site.
- The introduction of an August Maintenance Week free of competitions or Society bookings would be advised when planning the fixture list from next year onwards. Important work can then be completed at the optimum time for the best results. This will be very important as we look to develop greens that can take play for nearly 12 months of the year. It is a common approach for Clubs to take.
- Introduce a wetting agent programme across all greens. Budget for monthly applications March – September and October if it stays dry. Next year make the first application in March ahead of any dry weather.
- Maintain greens at 15-25% moisture as assessed with a Delta T Soil Moisture Kit. Hand water as necessary to maintain this. Employ hose end dilutor gun/wetting agent tablets to deliver additional wetting agent to drought prone areas.
- The aim should be to apply in the region of 50 tonnes of sand dressing through an effective top dressing programme. Having a spinner top dresser would allow light applications to be made with minimal impact on golf.
- The fertiliser programme should deliver between 65-75 kg N/Ha. If you want further information please feel free to come back to me. The Coldstart 11:5:5 (N:P:K) ICL fertiliser product is becoming very popular for the initial spring application having been proven to support good early recovery. Order this in plenty of time and start next season with it.
- Through a typical summer liquid fertilisers are likely to be most appropriate in the absence of an automatic irrigation system. However if it is another wet summer you may wish to include an element of mini granular product to deliver improved growth over a number of weeks.
- Maintain a height of cut of 4.0-4.5 mm to support good surfaces and balance green speed with healthy turf.
- A combination of effective well timed mechanical treatments, appropriate sand dressing, effective moisture management and a sensible fertiliser regime should deliver good improvements across all greens.

- At some stage a bentgrass overseeding programme is recommended. Soil profile conditions are in good enough condition to support bentgrass establishment and there are a variety of advantages to increasing the amount of bentgrass in these greens. However with a busy programme required to re-instate the weakest three greens it might be sensible to wait until summer 2018 to start this programme. Budget for it from next year.
- Hold off further pipe drainage installation until the benefits of appropriate mechanical aeration programmes can be assessed. Monitor for at least the next 16-18 months before making any further decisions.

Tree Removal

- Try to ensure that tree shade is kept to an absolute minimum across all greens. The trees to the right of the 3rd green as shown in photo 2 above cast heavy shade for part of each day throughout the year. Look to thin and remove as many as possible to open up this green. Increased sunlight and air movement, especially early morning winter sunlight, is really important for the year-round health of the turf. Please find included an STRI Technical insert covering this subject in more detail.

Signed

Emma Beggs

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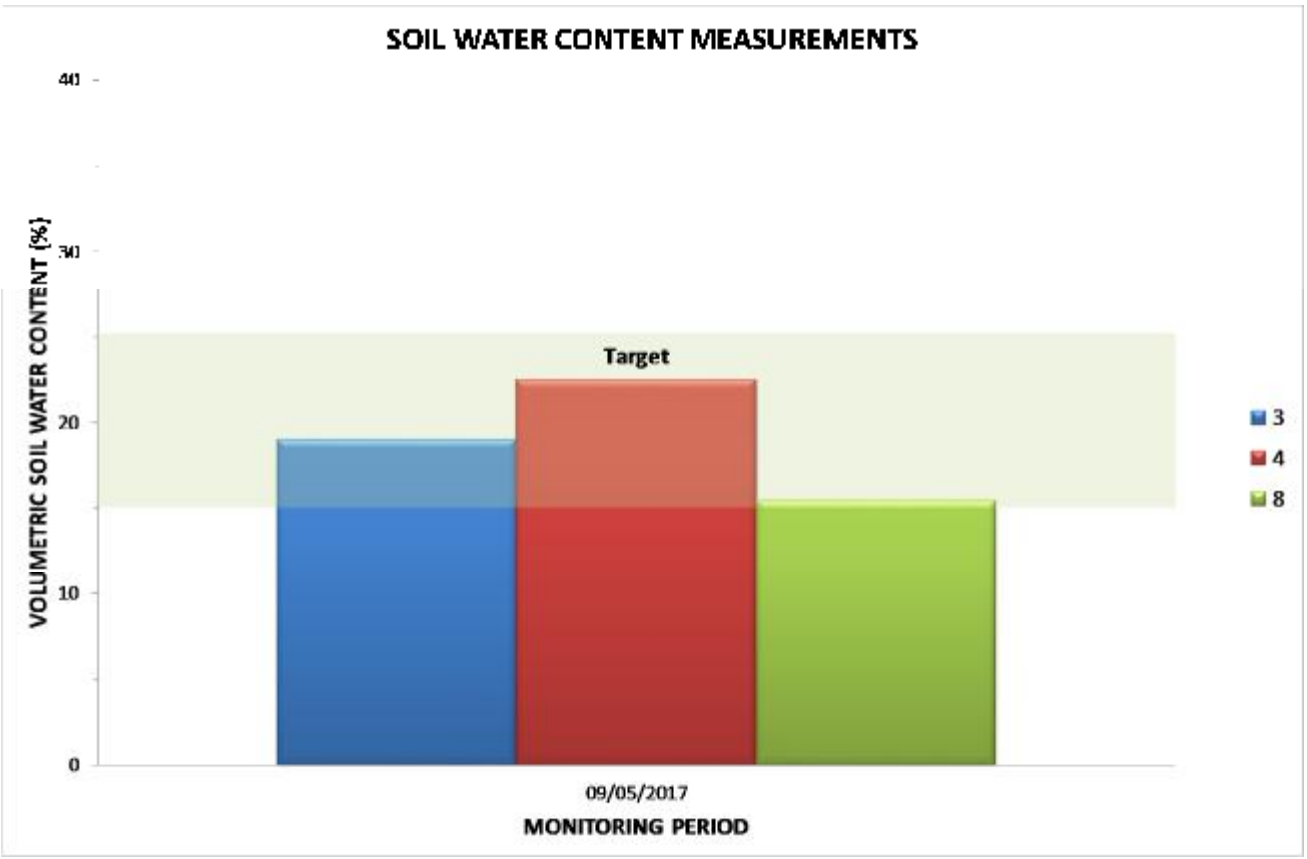
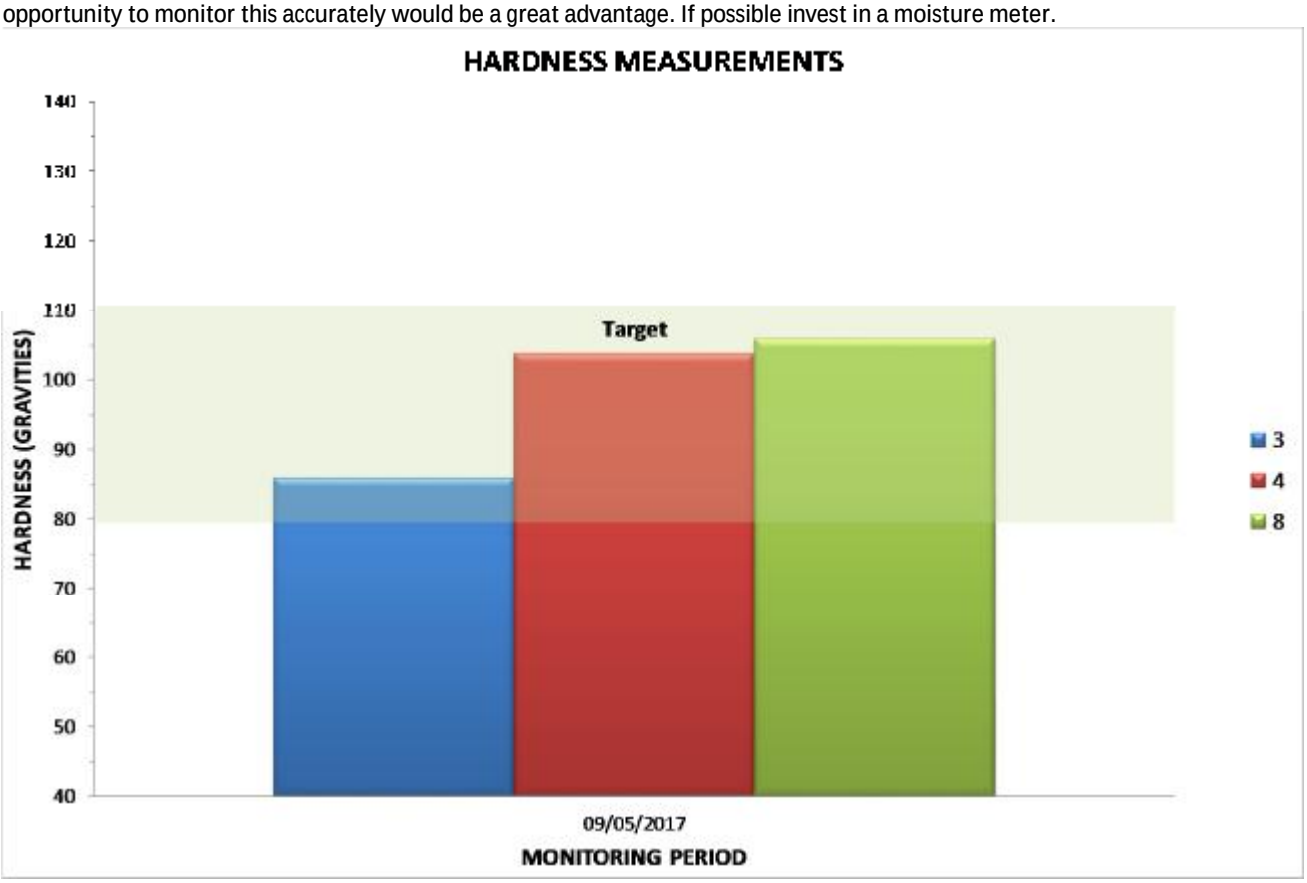
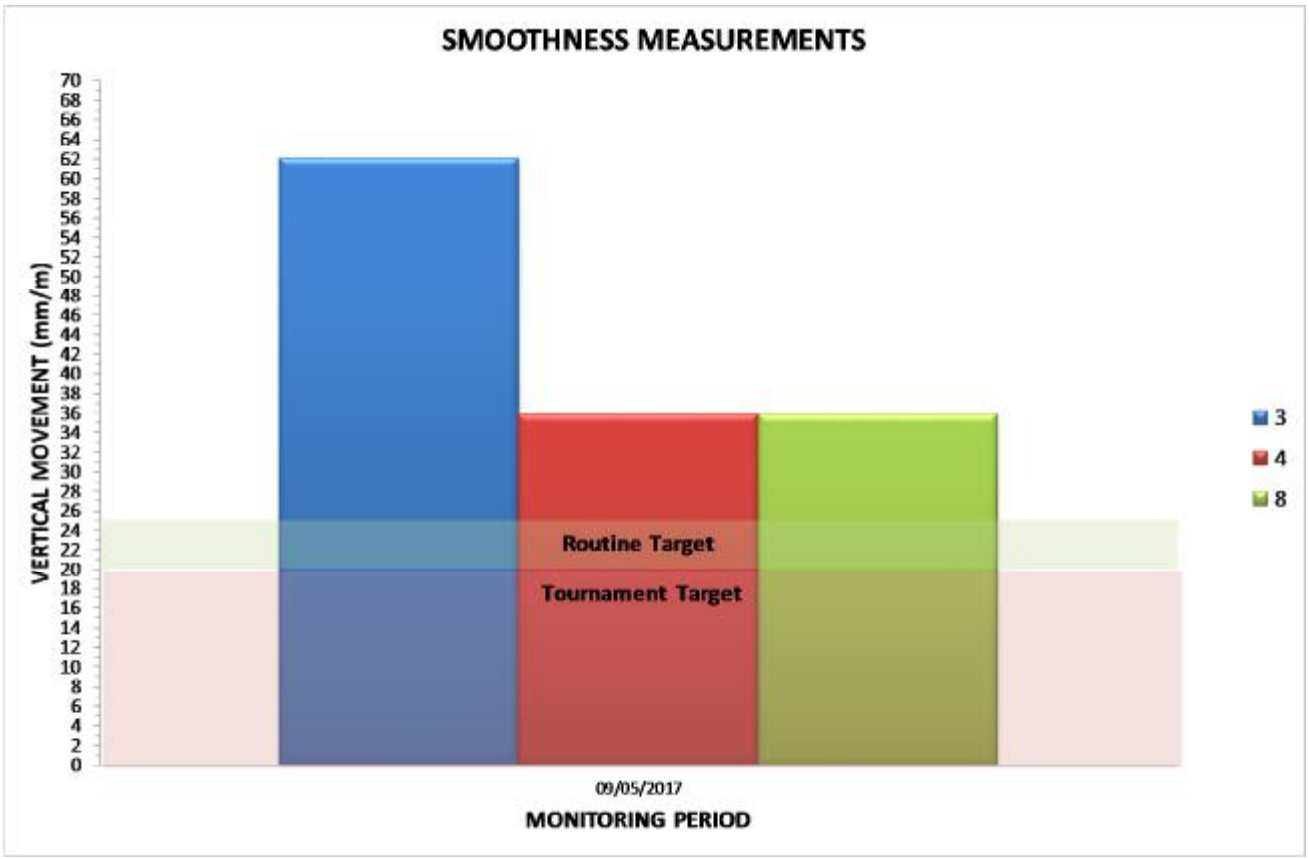


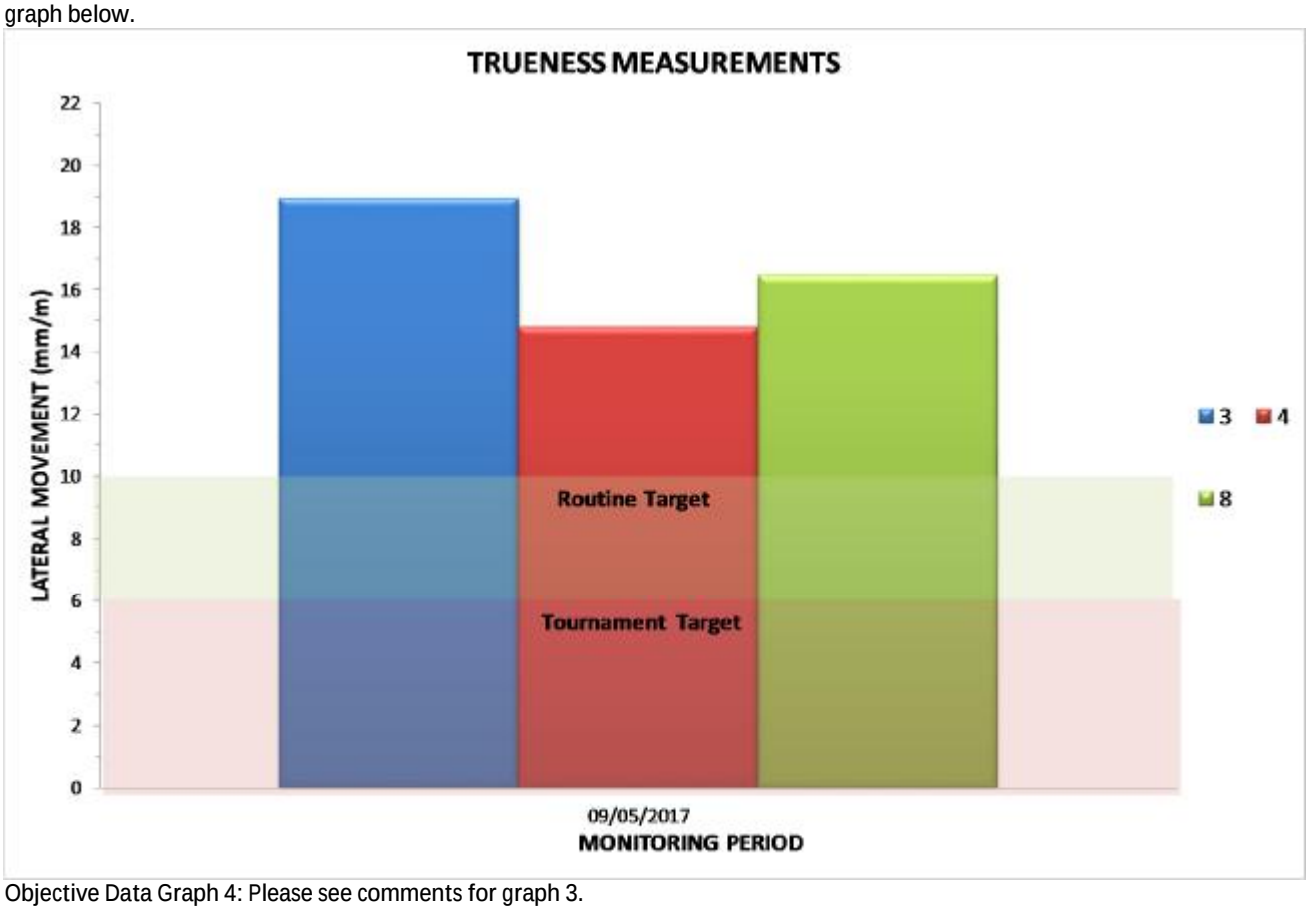
Objective Data Graph 1: Moisture content values were very good following the month or so of no rain. In dry weather having the opportunity to monitor this accurately would be a great advantage. If possible invest in a moisture meter.



Objective Data Graph 2: Firmness values were also very good in part due to the low moisture levels.

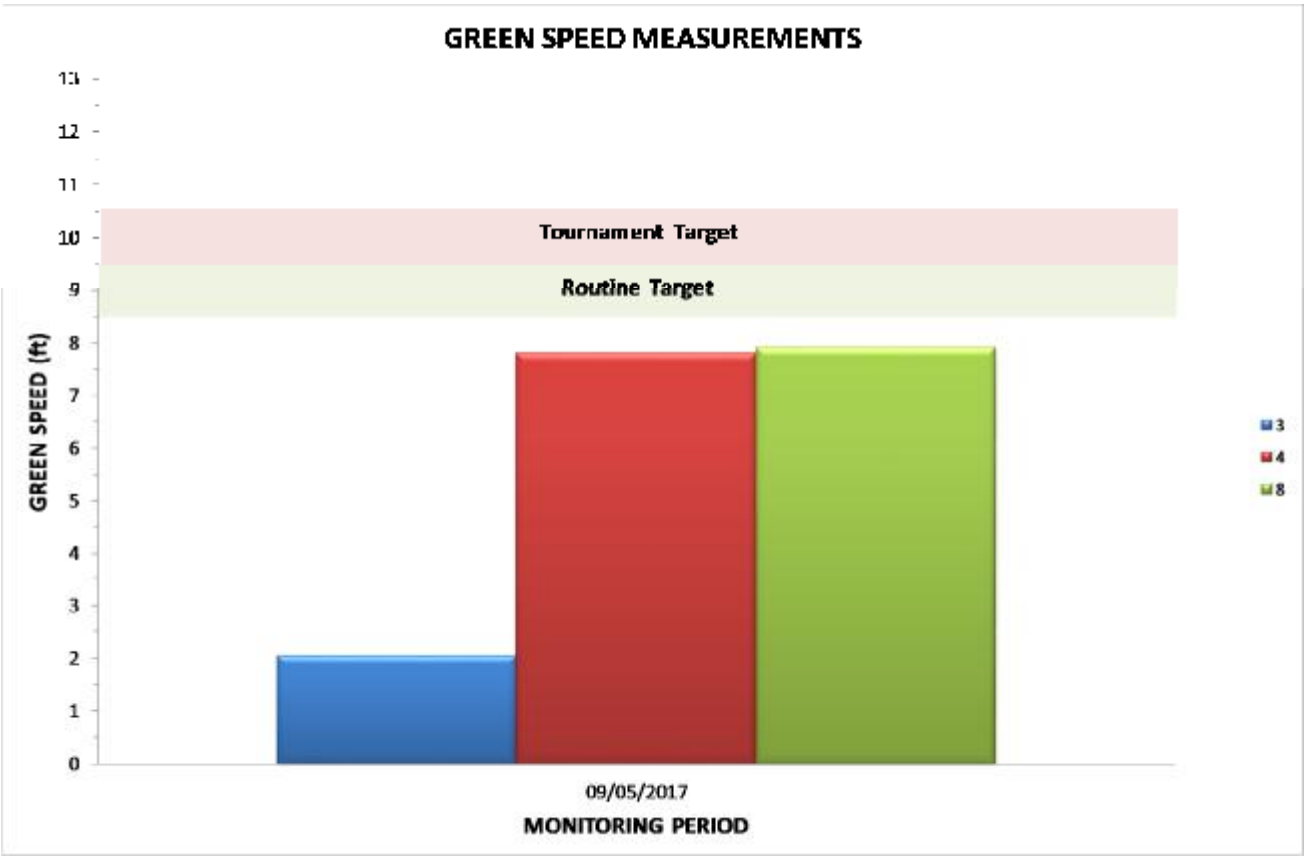


Objective Data Graph 3: Disease scarring, pipe drainage installation, annual meadow-grass seed head all played a part in resultant bumpy surfaces. The top dressing programme is a really important element of improving surface smoothness and trueness – see graph below.

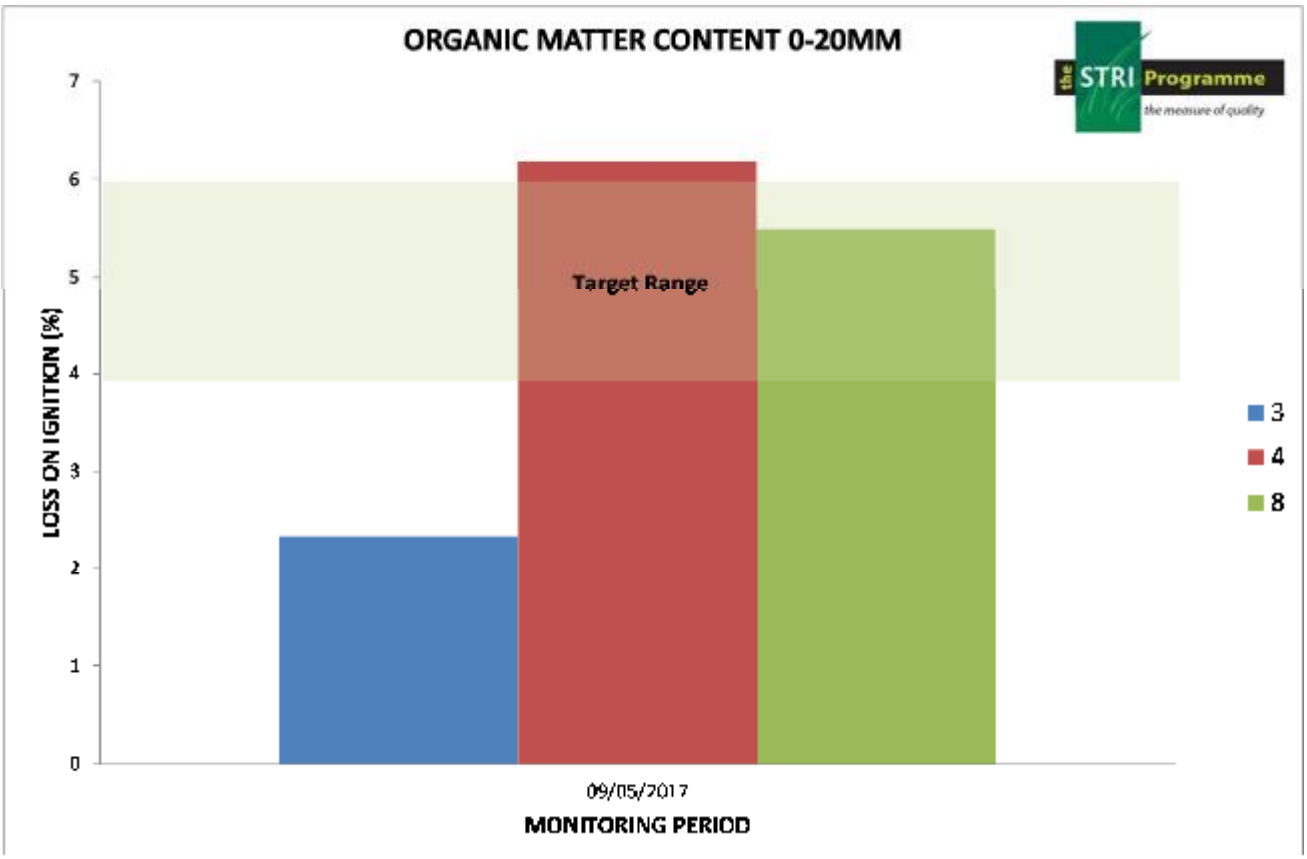


Objective Data Graph 4: Please see comments for graph 3.

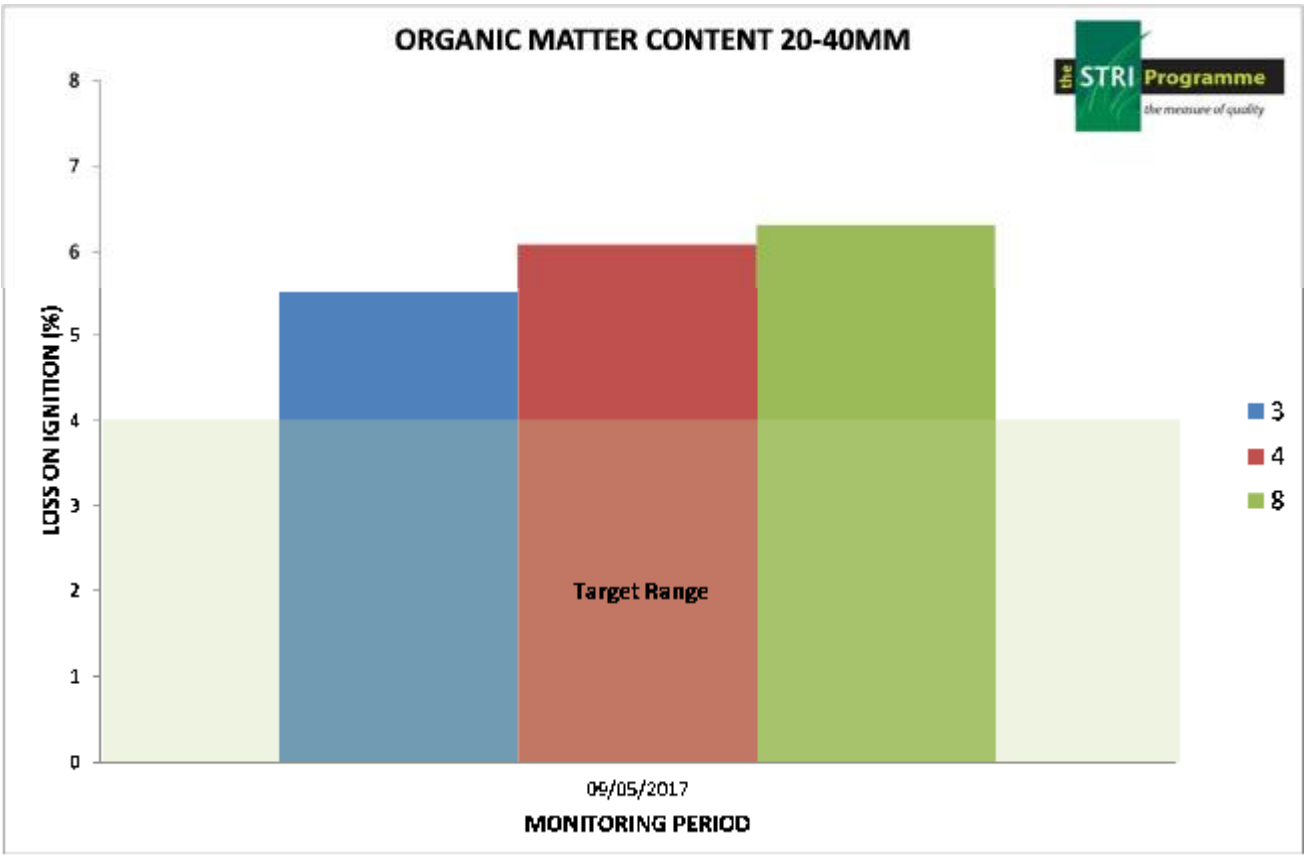
Objective Data (continued)



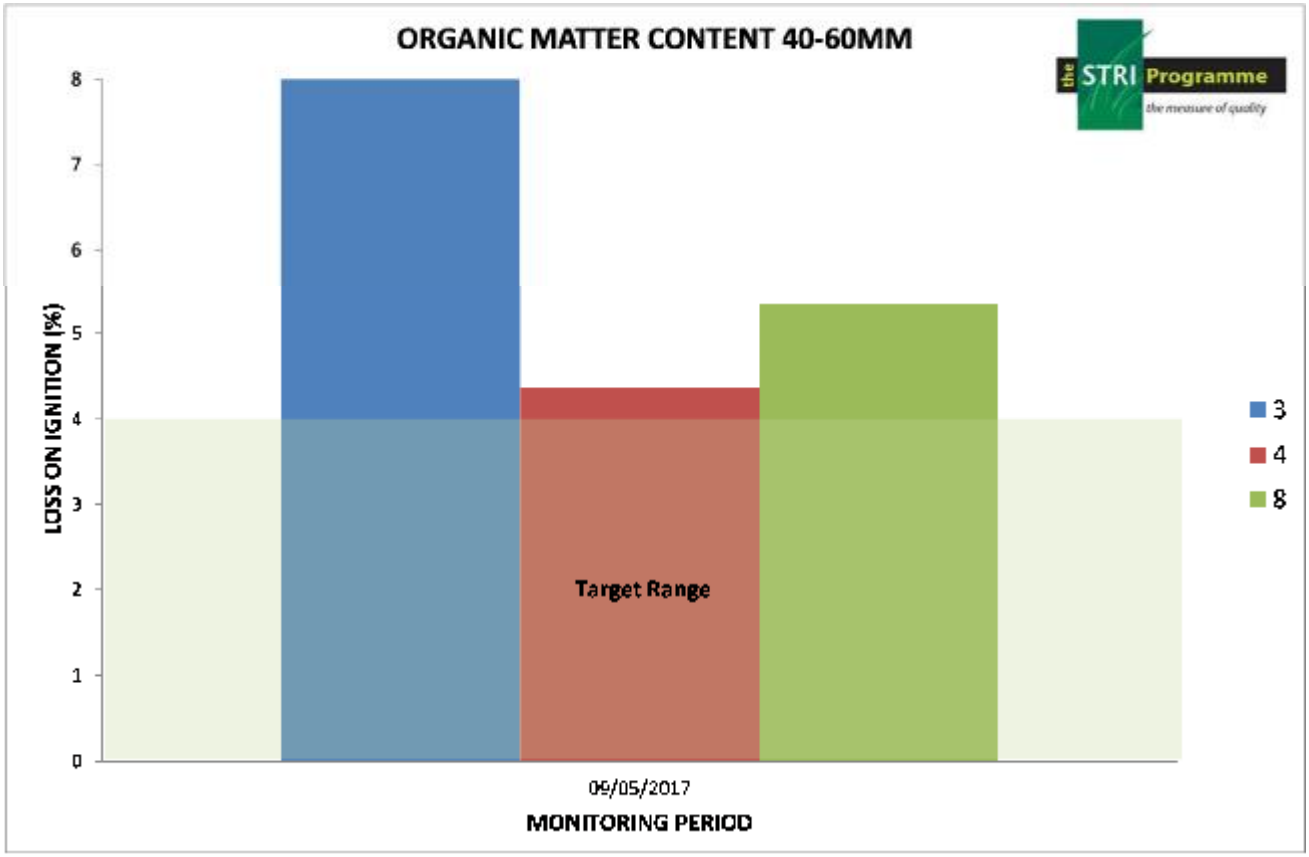
Objective Data Graph 5: The 3rd green had an average green speed of 2 ft 1 in. whilst the 4th and 8th performed better at around 7 ft 10 in. With appropriate surface refinement these healthy greens should soon provide green speeds within the target range.



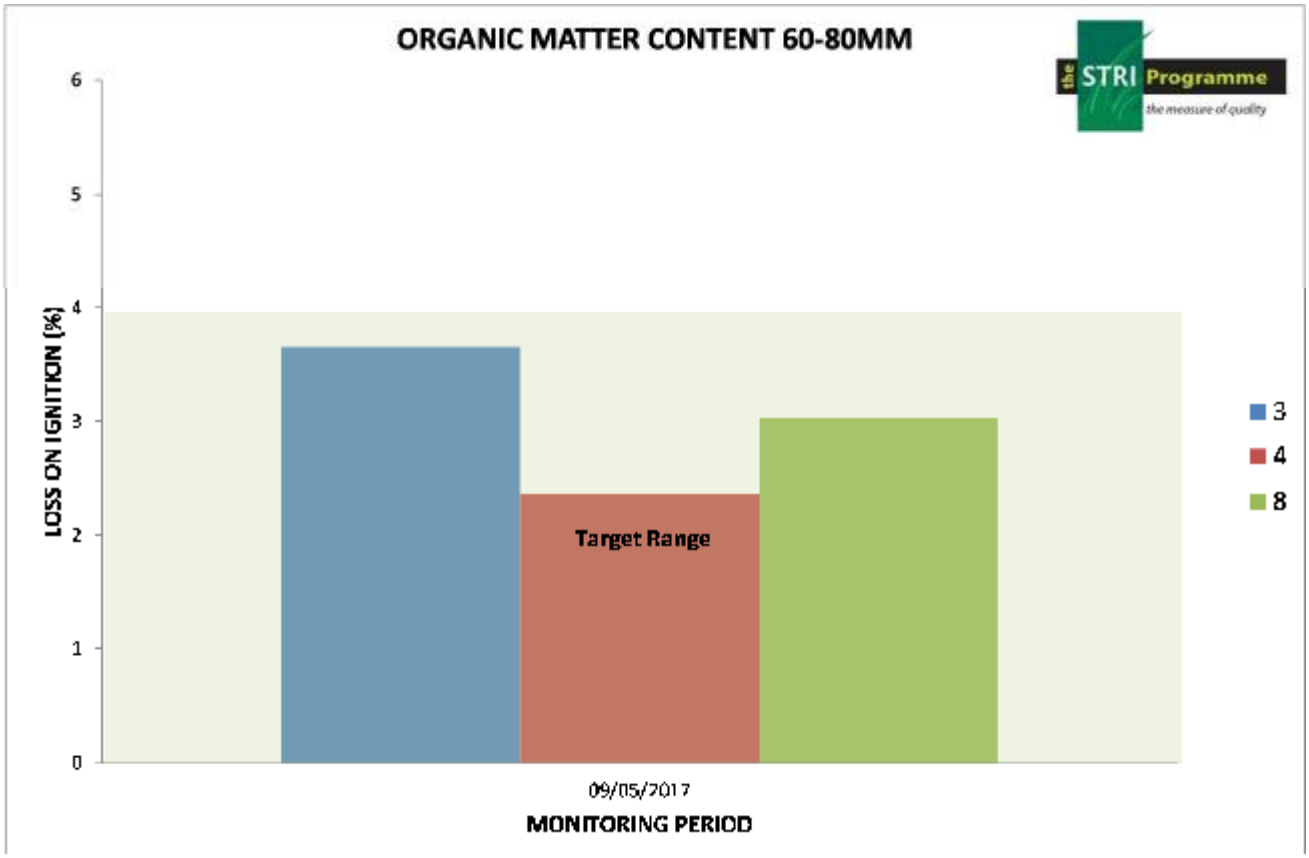
Soils Laboratory Graph 1: Data for the 3rd green appears to be incorrect, possibly due to sampling error or issues around sample collection. This can be re-assessed at the next visit. Organic matter values were otherwise good and very close to the upper target, the closer we can get to 4% the better these greens will perform.



Soils Laboratory Graph 2: Organic matter reduction is needed hence the recommended changes to aeration and top dressing practices.



Soils Laboratory Graph 3: Organic matter reduction is needed hence the recommended changes to aeration and top dressing practices. There appear to be errors in the data for green 3 at this depth too with this not reflected in visual observations during the site visit. All profiles were almost identical.



Soils Laboratory Graph 4: Data falls within target range at this depth being less than 4% at the 60 – 80 mm depth.

STRI

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ORGANIC MATTER CONTENT

CLIENT: GREAT HARWOOD GC

ADDRESS: HARWOOD BAR,
GREAT HARWOOD,
LANCASHIRE, BB6 7TE

DATE RECEIVED: 05/04/17

DATE REPORTED: 24/04/17

RESULTS TO: ECB

TEST RESULTS AUTHORISED BY:

Michael Baines, Laboratory Manager

CONDITION OF SAMPLE UPON ARRIVAL: MOIST

SAMPLE NO	DESCRIPTION		LOSS ON IGNITION (%)*
A15745/1	3	0-20 mm	2.33
		20-40 mm	5.50
		40-60 mm	8.19
		60-80 mm	3.65
A15745/2	4	0-20 mm	6.19
		20-40 mm	6.08
		40-60 mm	4.38
		60-80 mm	2.37
A15745/3	8	0-20 mm	5.49
		20-40 mm	6.31
		40-60 mm	5.35
		60-80 mm	3.03

* ASTM F1647-11 Standard Test Methods for Organic Matter Content of Athletic Field Rootzone Mixes (Method A)

ACCREDITED

Testing Certificate 2159 - 01

THE RESULTS PERTAIN ONLY TO THE SAMPLE(S) SUBMITTED AND TESTED

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SOIL CHEMICAL ANALYSIS

CLIENT:

GREAT HARWOOD GC

RESULTS TO: **ECB**

DATE RECEIVED:
05/04/2017

Lab No.	Source	pH	P_2O_5 (mg/l)	K_2O (mg/l)
A15745/1	GREEN 3	5.2	16	188
A15745/2	GREEN 4	5.0	6	80
A15745/3	GREEN 8	4.8	5	116

Mr M A Baines, Soil Laboratory Manager

THE RESULTS PERTAIN ONLY TO THE SAMPLE(S) SUBMITTED AND TESTED.

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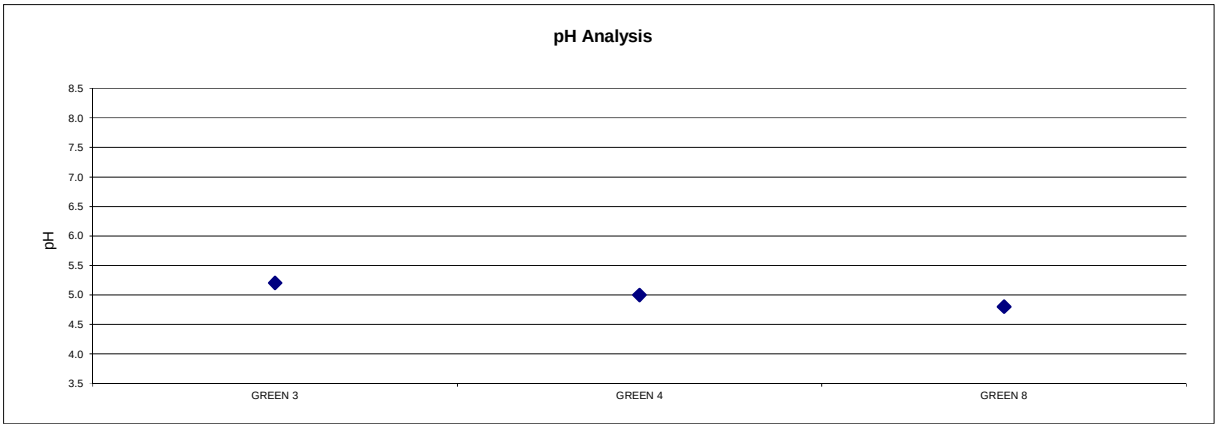
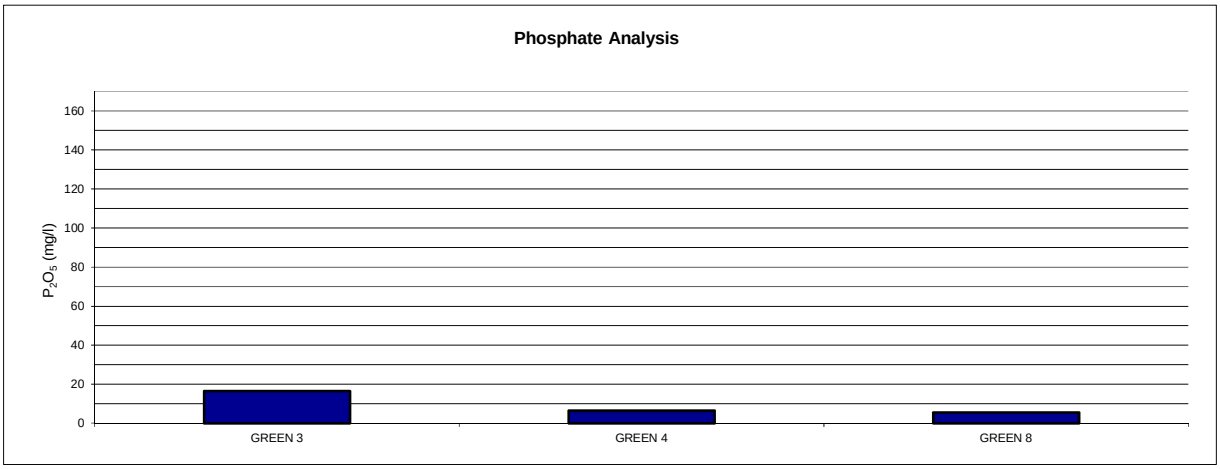
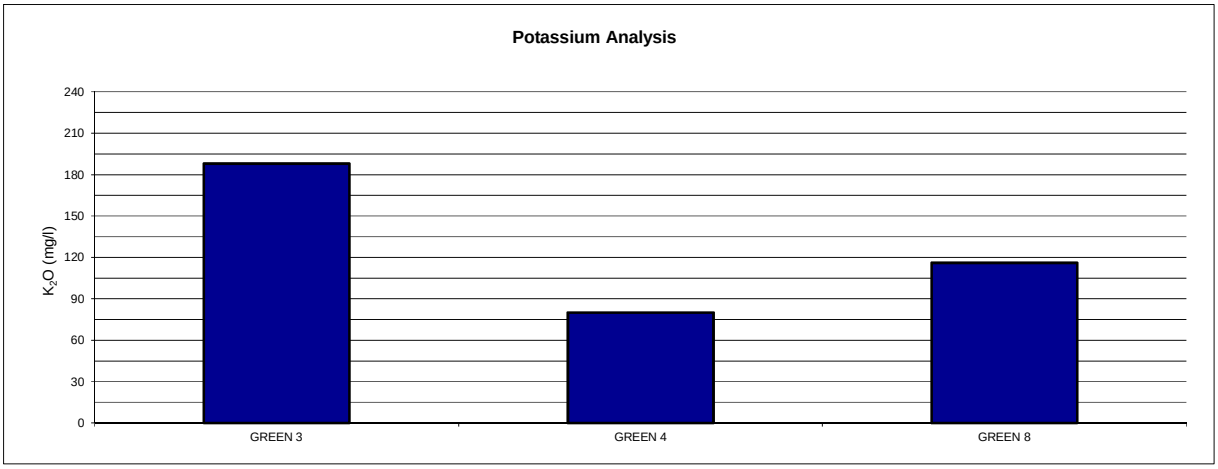
SOIL CHEMICAL ANALYSIS GREAT HARWOOD G(Date: 05/04/17







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Technical Note

TREES & SHADE ISSUES

The close proximity of large trees to major playing surfaces, such as greens and tees, will impact on the health of the sward and ultimately on the quality of surface that can be maintained. This impact is brought about by a combination of reduced sunlight due to dense canopies, competition for water and nutrient from large tree roots and reduced airflow particularly where trees provide shelter from the prevailing wind. Shade alone can have a significant effect on sward health and this is not always as a result of trees. Other large structures such as buildings will pose similar problems and playing surfaces located on north-facing slopes, especially when in the lee of a hillside, will suffer similar problems.

Typical symptoms of poor turf health brought about by trees and shade issues include:

- Lack of vigour and poor colour
- Wilting
- Reduced shoot density and ground cover
- Reduced wear tolerance and durability
- Increased elongation and more erect growth of leaves and stems
- Reduced root depth
- Increased disease
- Development of dry patch.

Where trees are an integral part of the golf course they should be carefully managed to minimise problems brought about by shade, roots and reduced airflow. Identification of priority trees for removal is important and this should be focused on trees that shade early morning sun (i.e. to an easterly aspect) and reduce airflow from the prevailing wind. Where tree removal is identified as a necessary requirement, a tree felling licence may be required. Seek guidance from your nearest Forestry Commission Office or visit **www.forestry.gov.uk** for further information.

When considering any tree management operation on a golf course, obtaining the assistance of a qualified Golf Course Ecologist will be an invaluable part of the process. Priority trees for removal will be identified to optimise the agronomic condition of the neighbouring playing surface at the same time as being sympathetic to the wider environmental requirements of the course. There are several options to improve turf quality and surface performance in a shaded situation and these include:

- Increase height of cut
- Dew removal
- Avoid excessive nitrogen fertiliser inputs
- Use deep irrigation/hand watering
- Wetting agent applications
- Overseeding with shade tolerant species/cultivars
- Application of a growth regulator to improve sward density and durability.

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Technical Note

PESTICIDE STORAGE

A detailed guidance sheet AIS16 "Guidance on Storing Pesticides for Farmers and other Professional Users" is available from the Health and Safety Executive (HSE) and can be downloaded from the HSE website at www.hse.gov.uk/pubns/ais16.pdf.

There are ten basic points which the HSE expect to see in every permanent store, small or large, new or converted. All stores must:

- Be suitably sited
- Have adequate capacity
- Be soundly constructed of material that will resist fire for a minimum of 30 minutes
- Have suitable entries and exits
- Be capable of containing 110% of the contents of the store in event of spillage (185% in environmentally sensitive areas)
- Be dry and frost-free
- Be well lit
- Be well ventilated
- Be marked with appropriate warning signs and secure against theft and vandalism
- Be equipped and organised to contain the intended contents.

Small quantities of pesticide can be stored in a leak-proof container in a locked room or building, away from retail areas, staff rooms, offices, human or animal food stores, food processing areas or dwelling houses. These containers must also meet the requirements outlined above and as stated in in guidance note AIS16.

Approved pesticides must be stored in their original container with the approved product label. Pesticides should be stacked to a height that can be easily reached and with no danger of them falling.

Stock should be rotated and inspected regularly to ensure containers remain sound.

Only authorised personnel should have access to keys and be allowed in the store.

Stores in excess of 200 l/kg should have a current stock list of stored pesticides retained in the office and a list of all pesticides used annually displayed in the washroom. Additionally, the local fire service should be provided with:

- A list and location of all pesticide storage facilities
- A list of chemicals used annually
- A named person for reference in an emergency.

Ensure that your store has suitable equipment for dealing with contamination, spills and small fires, and that you know how to use the equipment. A list of emergency phone numbers should be clearly displayed.

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