



# Glasgow Golf Club

## Advisory Report on the Killermont Course incorporating the STRI Programme

Report date: 1<sup>st</sup> September 2015

Consultant: Richard Windows



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## CONFIDENTIAL

Date of Visit: 1<sup>st</sup> September 2015

Visit Objective: To take objective measurements of green performance and review general course condition

Present: Mr John Caven – General Manager,  
Mr Stuart Taylor – Course Manager  
Mr Richard Windows – Agronomy Manager, STRI Ltd

Weather: Warm, dry and calm.

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## Executive Summary

- The main objective of the visit was to take measurements of green performance to provide an assessment of playing qualities later in the season at a time that is reflective of routine member play.
- The general performance of the greens was excellent for routine play and following limited refinement in the form of a single cut with the triple mower on the morning of measurements.
- Surface firmness was all within the upper end of the desired target which is particularly pleasing given the wet weather recently (40mm) over the 10-14 days before the visit.
- Localised hollow coring has been completed to softer sections of greens (e.g. right of 5 and front of 9) and approaches (5 & 9) since the last visit.
- Some minor fusarium patch activity was present but should be adequately checked with the recent application of iron.

## Key Observations

### Greens

The greens have performed excellently throughout the season both in terms of quality and consistency of performance. For certain events, refinement operations are intensified to provide an additional polish but, even under low intensity refinement, ball roll qualities remain very good. The results from the measurements taken during the recent visit provided a good example of normal performance on a routine day at Killermont.

Despite the wet weather and a busy golfing schedule, maintenance operations have been fully implemented with minimum disruption to golf. Sand top dressing frequency has been compromised slightly but this will be rectified with dressings through the autumn to mid-spring period.

The 9<sup>th</sup> green was the cause of some concern during the June visit but additional coring and top dressing has been carried out to the front section with good success. Further more intensive work will continue to this green over the autumn to early spring period.

### Objective Measurement Results

The full suite of STRI Programme measurements were taken from the six indicator greens during the visit following a single cut with the triple mower at 3.5 mm. The results are shown in the table below and compared against previous results in the Appendix section of the report.

Performance Measurement Results							
Green No.	Speed (distance)	Smoothness (mm/m)	Trueness (mm/m)	Firmness Mean (gravities)	Firmness SEM (±)	Moisture Content (%)	Moisture Content SEM (±)
1	8 ft 2 in	23.99	8.31	115	1.0	27.4	1.3
5	9 ft 1 in	24.37	10.68	103	3.5	34.0	1.6
8	8 ft 3 in	22.55	8.06	107	2.4	30.1	2.0
9	8 ft 7 in	21.75	7.86	101	3.1	35.6	1.0
13	8 ft 6 in	22.55	8.72	108	1.7	29.3	1.8
14	8 ft 7 in	21.65	7.57	109	1.3	26.6	0.9
Average	8 ft 6 in	22.8	8.5	107	2.2	30.5	1.4
Target	9 -11 ft	<25 m/m	<10 mm/m	>85	<3.0	<30%	<2.0

The results are summarised below.

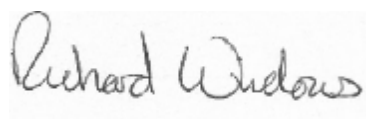
- Average surface firmness was 107 gravities (range 101 -115) and therefore all within the desired target. Such good levels of firmness are particularly positive given the relatively heavy rain over the past 10-14 days.

- Such values are more akin to links greens, which makes the results even more impressive again considering the rain. Consistent attention to organic matter management is the reason for such good levels of firmness.
- Average soil moisture was 30.5% (range 26.6% on 14<sup>th</sup> green to 35.6% on the 9<sup>th</sup> green). Values remain rather variable between greens especially regarding the 5<sup>th</sup> and 9<sup>th</sup> which continue to be more moisture retentive in comparison to the other greens.
- Despite the high moisture levels to the 5<sup>th</sup> and 9<sup>th</sup> green, it was particularly pleasing to see surface firmness remained at 103 and 101 gravities respectively.
- Reducing soil moisture to the 5<sup>th</sup> and 9<sup>th</sup> will create better conditions for bentgrass establishment.
- Average smoothness was 22.8mm/m meaning values were in the routine target range.
- Average trueness was 8.5mm/m and within the routine target range.
- Smoothness and trueness values were particularly good given the limited refinement involving a single cut with the triple mower on the morning of the measurements. This means that values would be easily improved following a roll.
- Average green speed was 8 ft 6 in. Although these were a little slower than normal, they would still be considered acceptable for routine play. A roll is likely to increase speed by approximately 10-12 inches.
- In summary, the objective measurement results from the greens were excellent and provide great evidence of continued improvements to the response to the successful implementation of the maintenance programme over the past few years.

## Greens Approaches

The main issue to discuss regarding the approaches is the additional work carried out to the 9<sup>th</sup> involving hollow coring and top dressing. This has increased firmness and values were 85 gravities at 40% soil moisture. While these remained softer than the green, it was felt ongoing intensive work will deliver further improvements.

Signed



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STRI is completely independent and has no alliances to commercial products, services or contractors. This ensures that our design, project management and advisory services provide the best solutions for each individual client.

*The STRI Programme provides golf courses with measurements and data that help to monitor and assess golf course performance. The R&A has recently developed CourseTracker ([www.coursetracker.org](http://www.coursetracker.org)), a free, online business management tool for golf courses, to record, review and analyse golf club performance across many areas of your business, including the golf course. STRI believes The R&A CourseTracker combined with the STRI Programme provides the tools you need to objectively monitor and assess your golf course performance.*

# APPENDIX 1

## PERFORMANCE DATA

## Performance Data

### STRI Programme Measurement Protocols

By taking measurements of the playing qualities we can accurately describe the standards being set and also compare the results against our target performance levels. Essentially, our aim is to produce a set of greens that receive approach shots correctly then provide smooth/true and well-paced surfaces for putting. It is important that the greens are performing consistently on any given day and as well as possible throughout the year.

#### Soil Moisture Content

The soil moisture content is measured using a Theta Probe Moisture Meter. Nine points are sampled on each green (3 x 3 grid pattern) and the average calculated. The Theta Probe measures volumetric water content (VWC) through the upper 60mm of the soil profile.

The moisture content of the soil profile has a significant impact on the playing qualities of the greens and also the health of the turf. When the soil moisture content is too high, the surfaces can become soft and the turf health can also suffer. When the soil moisture content is too low the consistency and uniformity of the turf can become compromised.

#### Surface Firmness/Hardness

The firmness of the greens is measured using the Clegg Impact Hammer. A 9-point sampling grid was employed to allow us to calculate an average hardness reading for each green and also determine the level of consistency within the 9 readings.

#### Green Speed

The speed of the greens is measured using a Stimpmeter. The speed is expressed as the average distance rolled by 3 golf balls that are delivered from the Stimpmeter ramp on a flat area of the green and repeated in the opposite direction. The greater the distance the faster the surface is deemed to be. At least two readings are taken from each green then the results were calculated using the Brede equation to take out any slope effects.

#### Smoothness/Trueness

The smoothness and trueness of the selected greens is measured using the Trueness Meter™. This device measures the smoothness (vertical deviation) and trueness (lateral deviation) of the putting surfaces with the level of deviation being expressed in millimeters per meter (mm/m). With these results, lower readings indicate a smoother or truer surface.

Our aim when maintaining the greens is to produce surfaces that are smooth and true for putting for as long as possible throughout the year. We are aiming to create smooth and true surfaces for putting that do not deflect the ball from its intended path ("snaking") or kill its momentum ("bobbling" and "chattering"). During the main playing season, our target range for smoothness is <25 mm/m of vertical deviation and for trueness <10 mm/m of lateral deflection. The lower end of these target ranges represents fantastic putting surfaces with the higher end providing really good standards for routine play. These target ranges are very challenging but we are striving to achieve the highest standards of play.

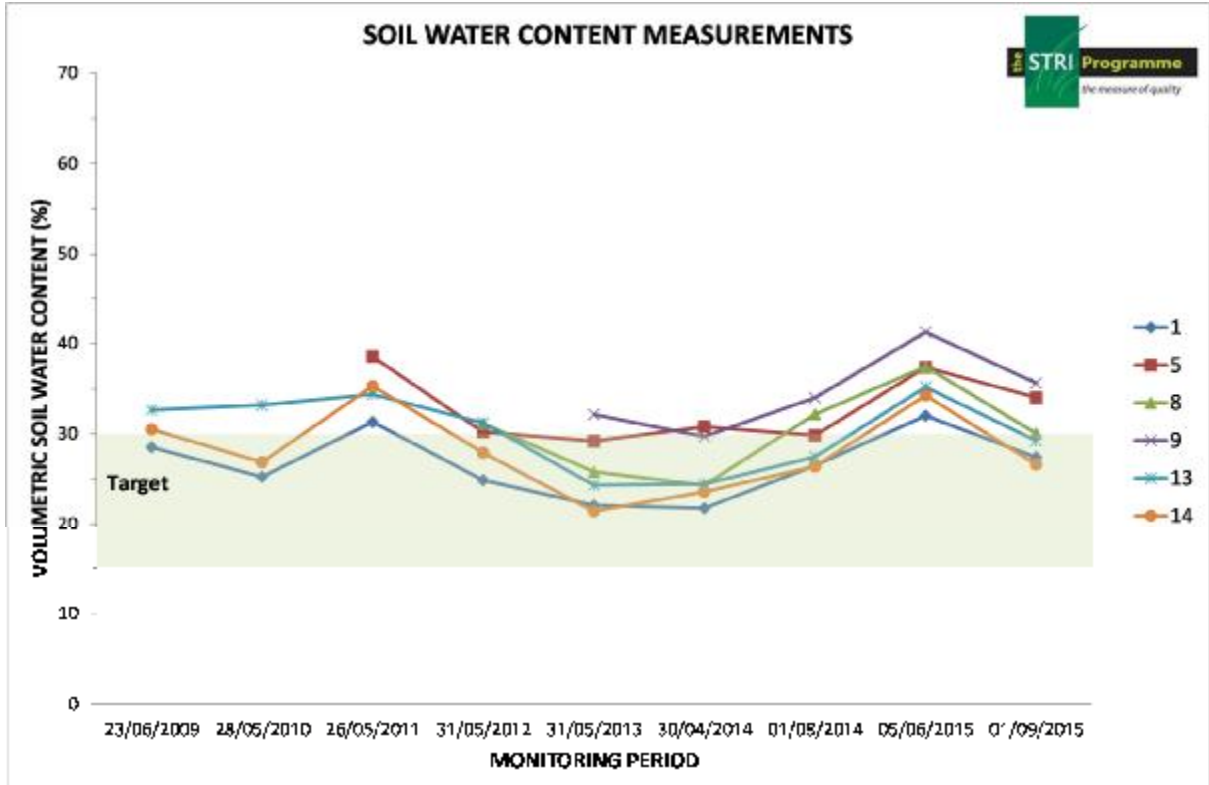


Figure 1

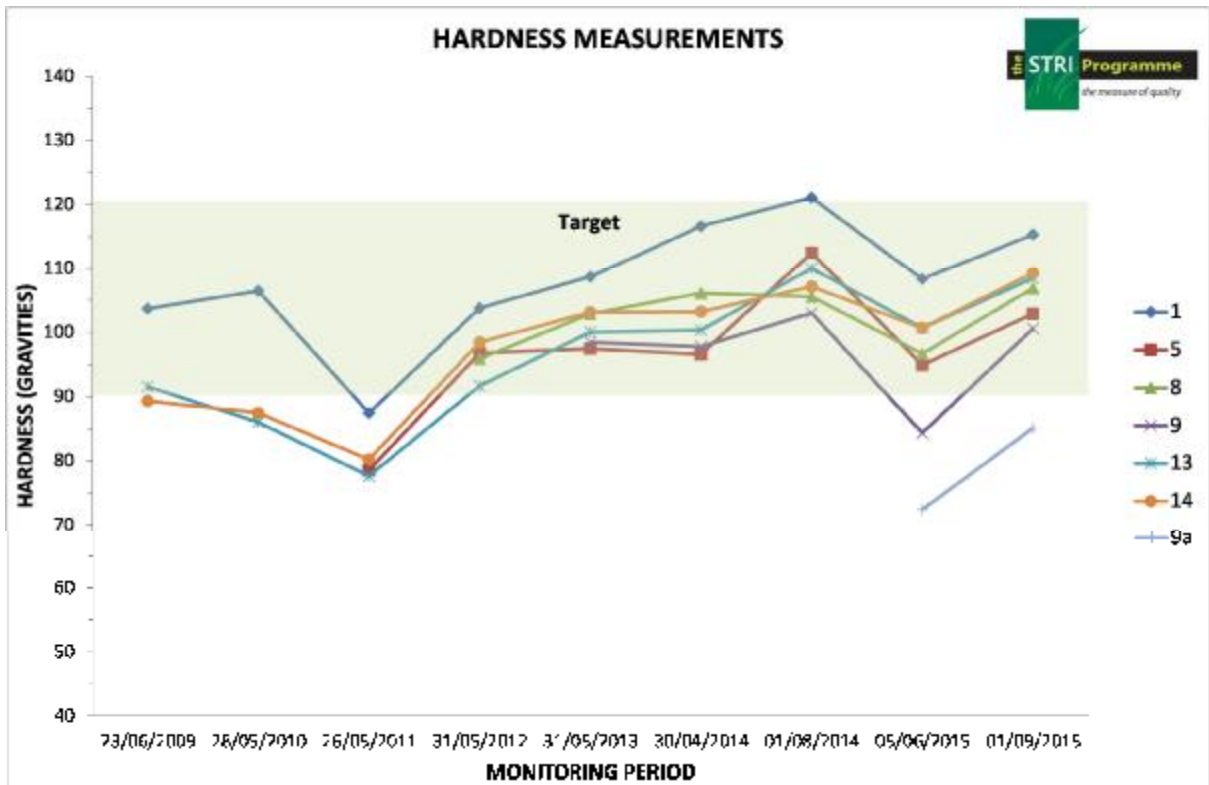


Figure 2



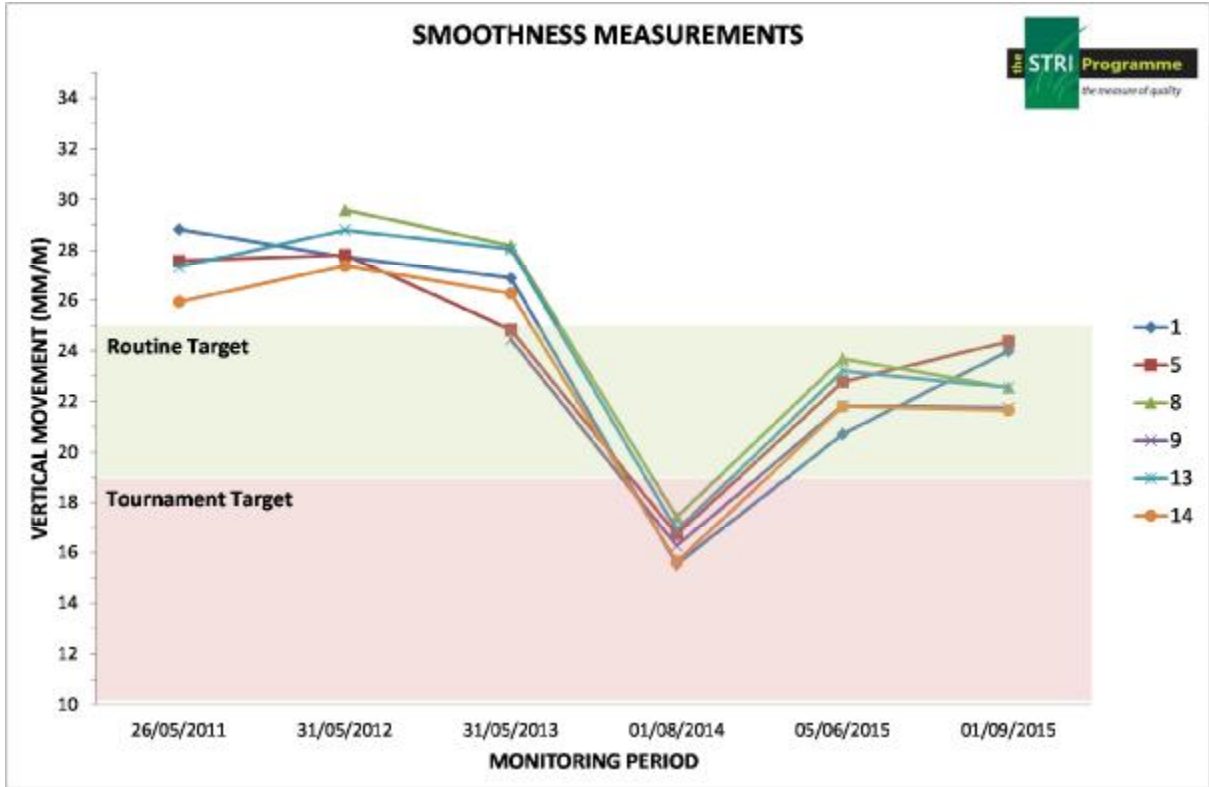


Figure 3

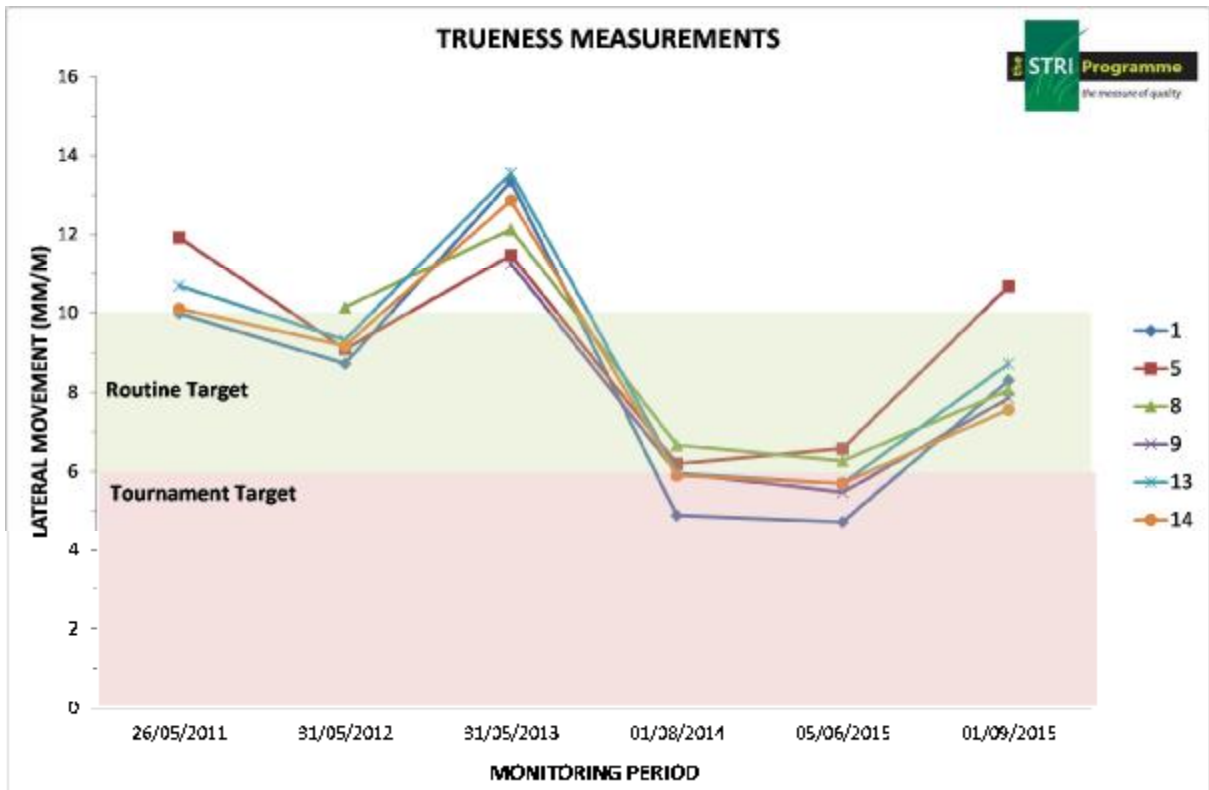


Figure 4

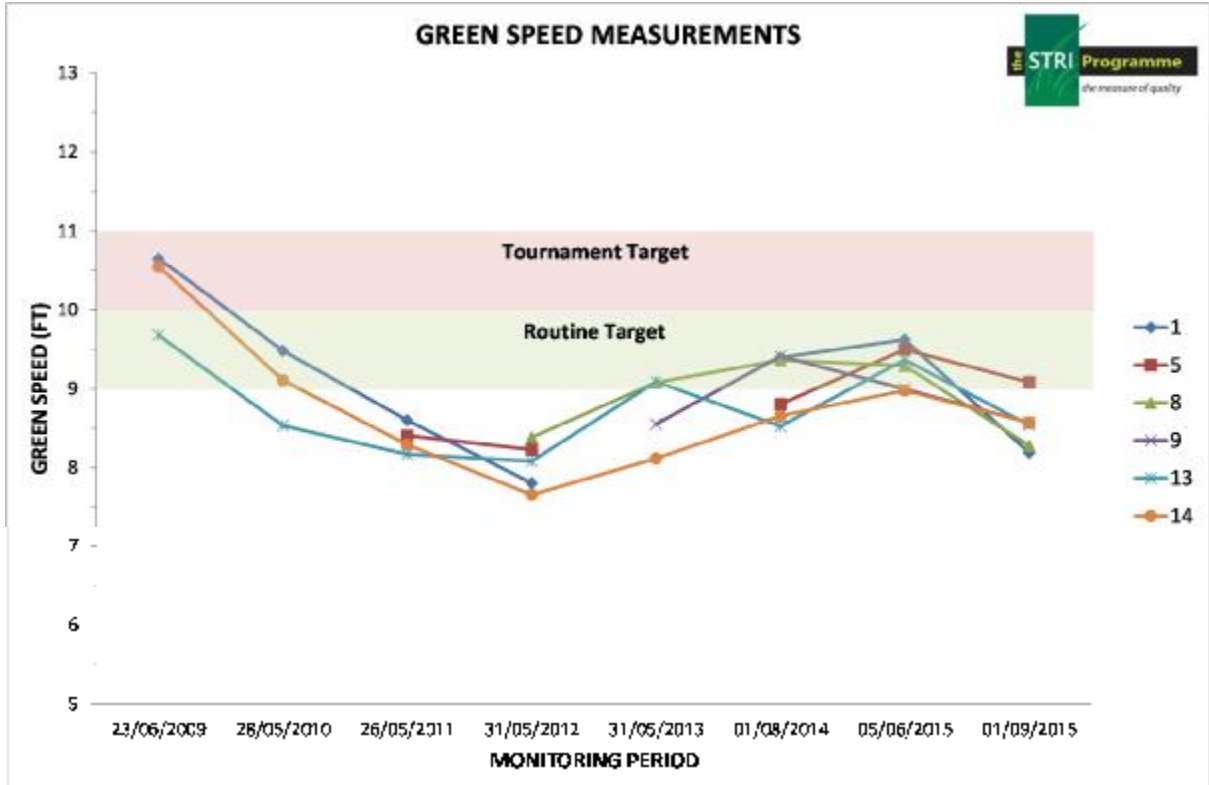


Figure 5