



Making great sport happen



# NAIRN DUNBAR GOLF CLUB

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

Report Date: 27<sup>th</sup> September 2021  
Consultant: Gary Smith



## Nairn Dunbar Golf Club

Date of Visit:	Thursday 12 <sup>th</sup> August 2021
Visit Objective:	To review condition of the course, take objective measurements of greens performance and confirm ongoing maintenance requirements.
Present:	Mr Richard Johnstone – Course Manager Mr Craig McKay – Dep. Course Manager (part) Mr Sean Smith Green Committee Mr Ian Duncan – Green Convenor Mr Kieran MacLean – General Manager (part) Mr Gary Smith – Agronomic Consultant STRI Ltd
Weather:	Sunny, 18mm rainfall 36hrs pre-visit.

### Headlines

- The difficulties in managing fine turf throughout these recent challenging times is very well documented, with periods of heat and drought in concurrence with the enforced maintenance restrictions on the wider turf industry resulting from the coronavirus pandemic lockdown. These problematic conditions, that we know adversely affected many plant health outcomes and interrupted their normal growth patterns then meandered into a severe winter, producing very icy and very frosty conditions across much of Scotland including the Nairn area.
- Many fine turf grass populations were further impacted in the unseasonal cold spring conditions (our traditional regenerative period), however the Nairn Dunbar course, despite these challenges, has prospered and in most fine turf surfaces, without doubt, have had another period of positive botanical change and greens surface improvement.
- Low temperature injury scars, more commonly called Winterkill, are still visible on many grass plants within the green surfaces today. The remainder of the lesions are still proving an interference in the grass plant's ability to photosynthesise and thus perform its normal growth cycle. However, at the time of STRI visit there was no evidence to suggest that the still injured grass plants should not make a full recovery within the coming weeks.
- The troublesome task in managing soil moisture during ever changing extremes of weather episodes of wet and dry cycles has been widely seen to fuel increased Basidiomycete fungi activity (fairy ring), the underlying trigger to many pathogenic (disease) outbreaks and developing areas of lingering abiotic and biotic stress.
- Greens rootzone moisture volume averages were just on or above target and displayed notable inconsistency across the tested surfaces. All related to very recent rainfall on a surface with a slightly elevated organic matter content.
- Surface firmness averages across all three greens were just within or below the target parameter and reflect the moisture content across the playing surfaces, your number one goal for the course going forward is to continue to improve firmness consistency across the greens and their surrounds.
- Smoothness results averages were in target, a very good outcome for the maintenance teams and a truer reflection of the quality of the putting surfaces at the Nairn Dunbar Course. Continued hard work by the maintenance team has underpinned these positive results despite the more challenging environmental conditions within the greens surfaces this season.
- Trueness results tests revealed a spike again this year on the 10<sup>th</sup> green (but it has improved since the last test and will continue to do so) due to the real challenges within the green surface from Take-all patch scarring, Basidiomycete activity such as fairy ring, localised dry patch, the visible *Poa annua* seed head expression and pitch mark damage, all played their part in affecting these outcomes. All other tested surfaces were within target and achieved excellent sets of results that can improve even further in the short term.
- Basidiomycete fungi (fairy ring) and Localised dry patch (LDP) activity was still visible on all viewed surfaces, greens, greens surrounds and approaches, tees, and fairways. Surfactant (wetting agent) and

appropriate maintenance strategies are in place in most sections and proposals were discussed to adapt the surfactant application strategy to include some off-season inputs. These strategic pre-loading applications, if adopted, should further suppress the numerous damaging symptoms expressed by the Basidiomycete fungi activity.

- Disease activity such as Take all patch (*Gaeumannomyces graminis*) has expressed with irritating regularity but with less aggression than possibly witnessed in previous years. The maintenance team's management strategy seems to be paying off.
- Anthracnose foliar blight (*Colletotrichum cereale*) had expressed on several sections of the greens and was most prevalent (at the time of STRI visit) on those sections with an underlying Basidiomycete fungi expression, either historic or current.
- Small volumes of *Poa annua* (annual meadow-grass) seed head expression was noticeable on a few sections of the course and more apparent on the sections that previously or currently experienced Basidiomycete fungi (fairy ring) expressions.
- Organic matter levels on all greens tested were elevated at the 0-20mm horizon. All other tested greens are within targets or on the cusp of target for optimal rootzone conditioning and plant health outcomes. The current elevated volumes are only of agronomic concern in the 0-20mm horizon, as if allowed to expand further they will affect green health and surface performance, however, I have every confidence the maintenance plans of increased aeration, encouraged microbial decomposition and disciplined top-dressing inputs will be adequate to stabilise and reverse the current elevation in these horizons.
- The forward thinking, bio-stimulant, chemical and nutritional product application choices, and application windows are apposite and correct for the conditions at Nairn Dunbar, although always subject to tweaks and revisions by the course manager and his maintenance team as the local grass plants react and adapt to seasonal changes in the fickle nature of our weather patterns causing the environmental stresses, both biotic and abiotic attributed to global climatic change. A model for the future management of most golfing facilities.
- The wider areas of the course are seen to be presented well, however many sections are struggling from the recent dry conditions, despite the very recent rainfall, whilst some areas of traffic related wear have had no additional time to recover during the cold period leading into the season. Proactive protection of sensitive areas through green approaches, green surrounds and natural pathways across the course needs to be set early this autumn, especially given the increase play courses are experiencing.
- The continued progressive, forward thinking, and necessary woodland management programme to reduce the impact from low light levels and reduced air movement, which was affecting many sections of the course and indeed had changed the very nature and natural playing characteristics of this historical golf club should continue. The remedial works are now affecting the plant health outcomes in a positive way and will continue to return this golf course to its original playing style. The ecological benefit is incredible in its positive eco system development and species diversity. So, until the recent historical situation is fully addressed/reversed to meet the club's ambitions, removal or an aggressive canopy management programme of the trees should continue, always with the thought in mind to provide the expected exceptional turf quality on all parts of the course and the return of the original visual impact expected at this illustrious golf club.

## Key Actions

- Aim to achieve previously agreed top-dressing input targets and continue with the plan to introduce increasing top-dressing inputs to the greens surrounds and approaches.
- Tweak the surfactant programme by increasing off-season applications to increase efficacy and product longevity.
- Increase inter-seeding on all greens and green surrounds using both fescue and bent seed cultivars.
- Plan to purchase independent seeding equipment to allow inter-seeding to take place throughout the year and on all sections of the course when required.
- Continue with the very successful woodland management strategy already implemented across the golf course.
- Continue to develop the sands crape sections and gorse management plan within the golf course boundary.

## Objective Measurements

Measurement	Average	Target Range
Soil Moisture (%)	34% (range 18-44%)	15-30%
Hardness (Gravities)	83 Gravities (range 74-101g)	85-120 g
Smoothness (mm/m)	15.8 mm/m	<25 mm/m
Trueness (mm/m)	8.8 mm/m	<10 mm/m
Green Speed	9ft 9in	9-11 ft
Organic Matter 0-20 mm (%)	7%	3-6%
Organic Matter 20-40 mm (%)	3%	<4%
Soil pH	5.5	5.0-6.5
Phosphate (P <sub>2</sub> O <sub>5</sub> )	9mg/l	>10 (mg/l)
Potassium (K <sub>2</sub> O)	68mg/l	>30 mg/l

Key: In Target Marginal Variance Out of Target

## Photo Observations and Comments



Figure 1: The continued improvement in the sward composition is worthy of note and increased interseeding should be adopted. Basidiomycete fungi activity is still the most common underpinning stress affecting surface quality.



Figure 2: Low temperature injury from the poor spring conditions was visible on many grass plants and will have exacerbated pathogenic attack this season.



Figure 3: Pitchmarks were visible across the course and although it's an outcome of the increase in golf play, this type of unrepaired damage is only making the maintenance teams job much harder to continue to produce the excellent surfaces at the Club.



Figure 4: Unsightly and surface disruptive *Poa annua* (annual meadow grass) is still affecting several surfaces within the course.



Figure 5: The upper rootzone is friable and organic matter is well diluted, despite the slight elevation this year, which is a national trend. Look to increase aeration across the profile and fracture the dense aggregate structure at the 150mm horizon.



Figure 6: Basidiomycete fungi activity is apparent on green surrounds, increase the volumes and applications of top-dressing, surfactants, and inter-seed more often with a suitable fescue bent mix or an ultra-fine ryegrass cultivar.

## Photo Observations and Comments (continued)



Figure 7: Expanded regular brushing of surrounds will support the grass plants more upright growth habit and encourage a more even sward canopy.



Figure 8: Tee surfaces are admirable in their canopy cover, despite huge increases in golf volumes alongside the very positive ecology and eco system promotion works.



Figure 9: Sand scrape ecology and managed gorse removal are proving a huge success at Nairn Dunbar.



Figure 10: Continued structured and strategic tree removal/canopy thinning will return the golf course to its unique original plan as well as open up the current dark canopies impacting on wildlife and plant diversity development at the Club.

## Recommendations

### Greens, Greens Collars, Surrounds and Approaches

- The maintenance team's current strategic surfactant (wetting agent), bio stimulant and nutritional inputs are positive and alongside the aeration and refinement strategies can achieve the desired plant health outcomes expected at Nairn Dunbar Golf Club. Applications of all products with the addition of some added Phosphate should be continued throughout the off-season months as required, with emphasis on the surfactant applications being used as a pre-loading of active ingredient to support improved efficacy through the early part of the following season. This extended product application strategy will help to facilitate healthy and robust grass plant swards and underpin a reduction in aggressive Basidiomycete fungi expression throughout the following season
- Top-dressing inputs should be achieved at a minimum 160 tonnes per hectare on the Greens and surrounds in a little and often approach throughout the whole of the calendar year. This approach will stabilise the surface and will further assist in dilution and reduction of the rootzone Organic Matter content.
- Plan a pass of a scarifying unit (subject to weather conditions) to remove organic material in the immediate surface of the green profiles and replace with top-dressing. This is an ideal opportunity to incorporate an inter-seeding with a Fescue - Bent seed mix. Repeat this operation in the spring as both operations, plus the inter-seeding will accelerate the recovery process.
- Renovation works carried out this autumnal period should include a solid tine of the greens with a 6-10mm diameter tine at 35mm spacings to a depth of 150-200mm. Apply a sand top-dressing to ensure that the holes are filled to the surface level through drag matting or a sweep-n- fill style brush if available. Increased aeration inputs must also be achieved to support the current works carried out by the maintenance team, bi-weekly Sarel rolling is requested (and will benefit the surface conditions short medium and long term), as is reduced intervals between aeration operations such as Hydrojecting, solid tine aeration or air injection methods. Another possibility and one that will produce effective results is the usage of the Dryject machine which can deliver a high-pressure jet of water through the organic matter and aggregate section within the rootzone (if water pressure is suitable on the course) whilst delivering diluent aggregates such as sands, to the target areas.
- The greens and surrounds would benefit in many ways if they were inoculated with Mycorrhizal fungi(MF). Mycorrhizal Associations/Mycorrhizal fungi form a mutualistic symbiosis with fine grass plants causing the fungal hyphae to extend the root systems and allow the roots to contact a greater volume of the rootzone and increase the solubilisation of nutrients, they also support and regulate intrinsic water use efficiency. Evidence in other plant-based production industries suggest that MF have a dampening effect on the activity of Take all and will impede its growth potential within the rootzone microbiome. Plants routinely signal to conspecific organisms in the rhizosphere by releasing primary and secondary metabolites from their roots. Some of these metabolites recruit beneficial microbes, including MF, furthermore MF inoculation is known to stimulate biological activity in the rhizosphere, a phenomenon commonly referred to as the mycorrhizosphere effect. This effect includes the attraction and selection of specific bacterial strains, such as plant growth-promoting rhizobacteria that possess the capacity to enhance plant growth and suppress pests and diseases.
- The addition of monthly applications of silicon may help in the removal of any lingering Poa annua (AMG) seed heads and further improve the already very good playing characteristics on the surfaces. Beneficial effects of silicon application have been studied extensively in fine turf grasses, and observed outcomes include improved cell wall strength and leaf erectness, increased tolerance to environmental stress, and decreased susceptibility of plants to pests and diseases. Silicon is also known to alleviate numerous abiotic and biotic sources of stress in plants including herbivory, pathogens, drought, and heavy metal toxicity whilst increased traffic tolerance has been observed following silicon applications.
- The application of plant growth regulators (PGR) is encouraged but as previously advised adopt a cautious approach with the use of Attraxor/Kopis (Prohexadione). Results achieved in reduction in the volume of Poa annua seeding is difficult to quantify and may vary season on season. There is mounting feedback from other fine sward sites that this product has overall benefits in the correct situation. Our general note for venues is to use conservatively and monitor, especially where Poa content is >20. Attraxor application rates would generally be between 375 gm/ha to 500 gm/ha. Our experience in other similar settings sees

application every three weeks from mid-late April dependant on location and growth (check mixing and application guidance – apply to a moist leaf for best results). The three-week interval may be similar or slightly wider than any current or planned programme . It may be worth experimenting with the differences to see if this eases any potential harm to the non-target species.

- An alternative may be the use of Primo-Maxx/Maintain nt (Trinexapac-ethyl) a similar PGR at 0.4lt per hectare monthly on greens during the growing season is highly recommended to positively influence sward texture and sward consistency throughout the growing season.

## Tees

- Aeration on these sections is regular but sometimes difficult in courses with such heavy volumes of play. I would encourage it continue with increasing operations on the more under pressure tees and all Par 3 tees. Hydrojecting, Spiking, Slitting or Air injection are all viable options to support oxygenation of the surfaces.
- Look to increase the inputs of both seaweeds and molasses-based products on the tees with particular attention given to the more pressured par 3s. Both bio stimulants will naturally improve the capacity for microbiome eco system development and grass plant health. Going forward the nutrition strategy must be robust enough to support a consistent, hard-wearing, and resilient turf canopy.
- Use of microbial inoculants such as mycorrhizae is encouraged to further support the growing environment and encourage a hardier turf canopy. The programmed use of PGRs on the tees would further support increased resilience and benefit grass plant health through the ever-increasing demand for play.
- Top-dressing of weaker areas on the tees will also help them develop, the usage of a Weidenmann TerraRake or similar scarification equipment on all tees will benefit both in organic matter removal and sward composition improvement. It is suggested surface raking be carried out at least once per annum. With additional aeration, surface raking and brushing introduced to these sections, they will continue to improve, if sufficient moisture and heat are available. In the meantime, any additional moisture inputs, surface oxygenation followed by increased inter-seeding of weaker areas will boost the expected results this year and beyond.

## Woodland Management

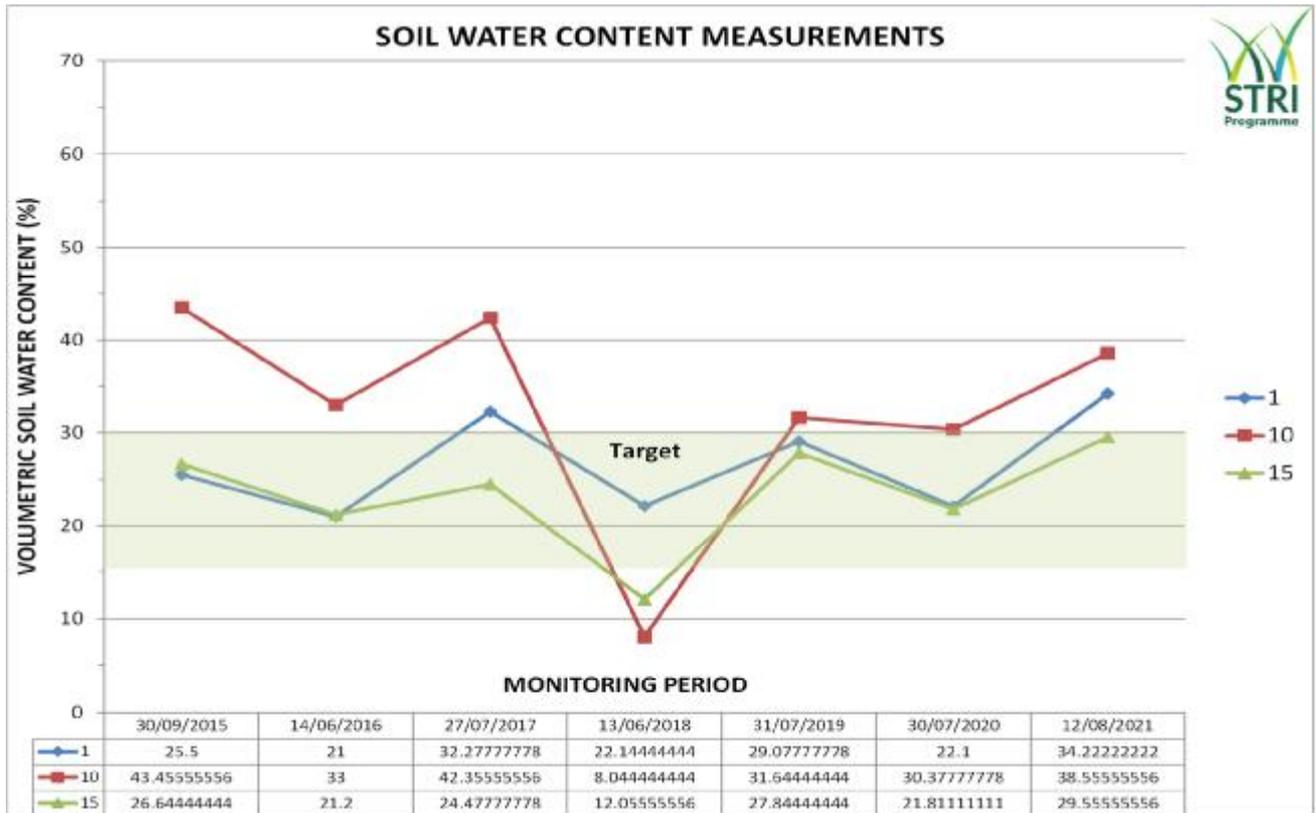
- Woodland management at Nairn Dunbar has been positive in approach and outstanding in outcome for some years now. Areas within the course boundary still exist where a similar approach would benefit, primarily the golf course and its golfers but also the local wildlife. I cannot emphasise enough that the current strategies should be included season on season until all heavily wooded dark canopy sections are open to allow enough air and light through to support not only healthy turf but increased eco system growth and positive species growth outcomes.
- The areas already returned to their more naturalised condition are visually stunning and in my opinion a reflection of how the golf course, within its natural boundaries, would have looked and played in its original imagined designs.

Signed

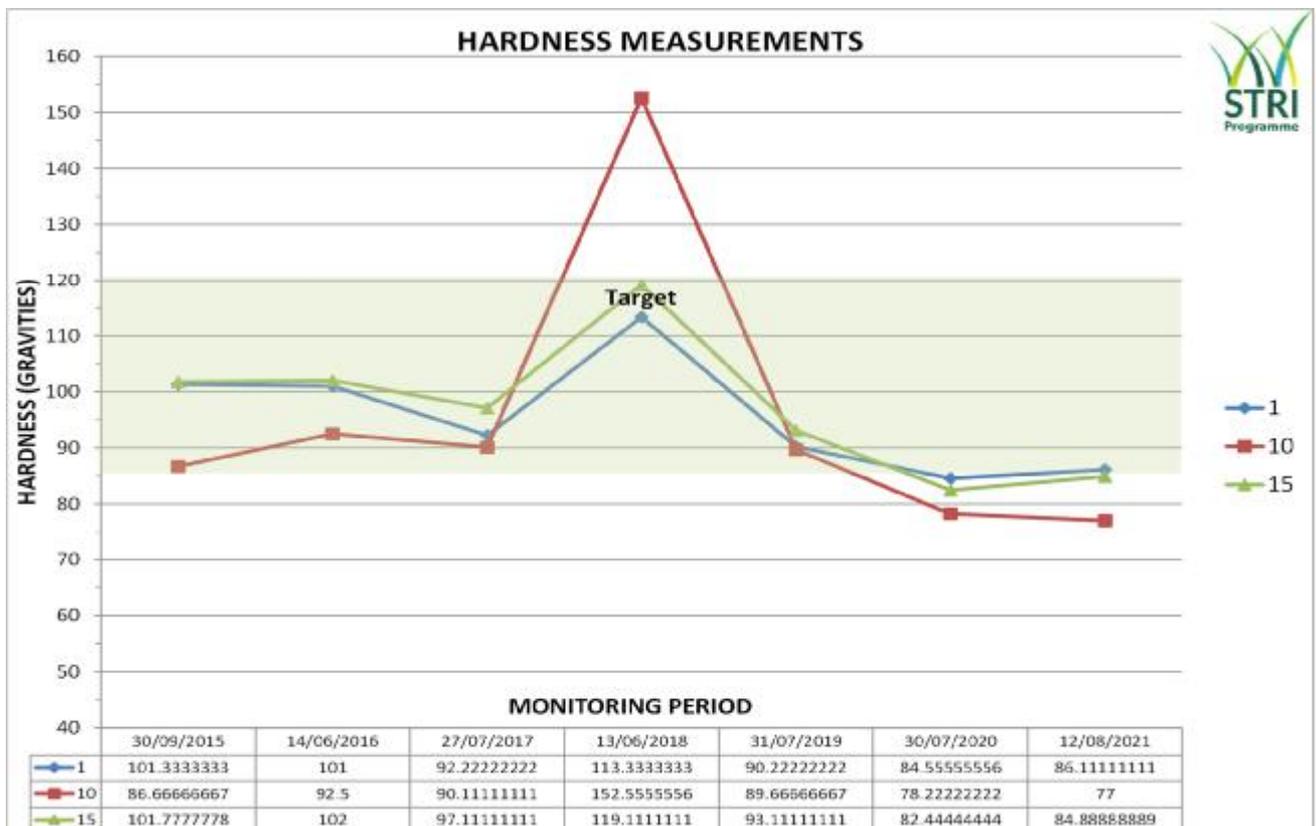
A handwritten signature in black ink, appearing to read 'Gary Smith', written in a cursive style.

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# Objective Data

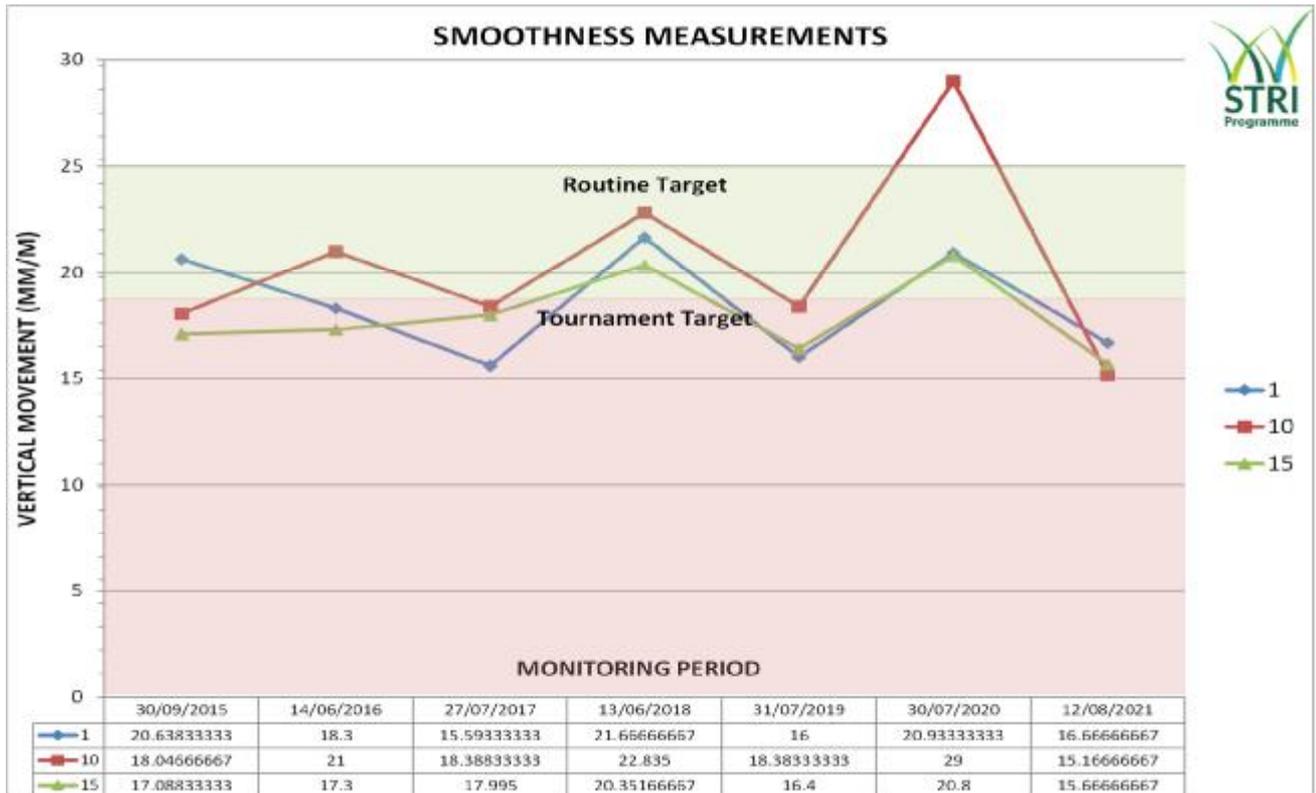


Objective Data Graph 1: Green 15 was just within target with greens 1 and 10 above targets. Without doubt influenced by recent rainfall and the elevated organic matter layer.

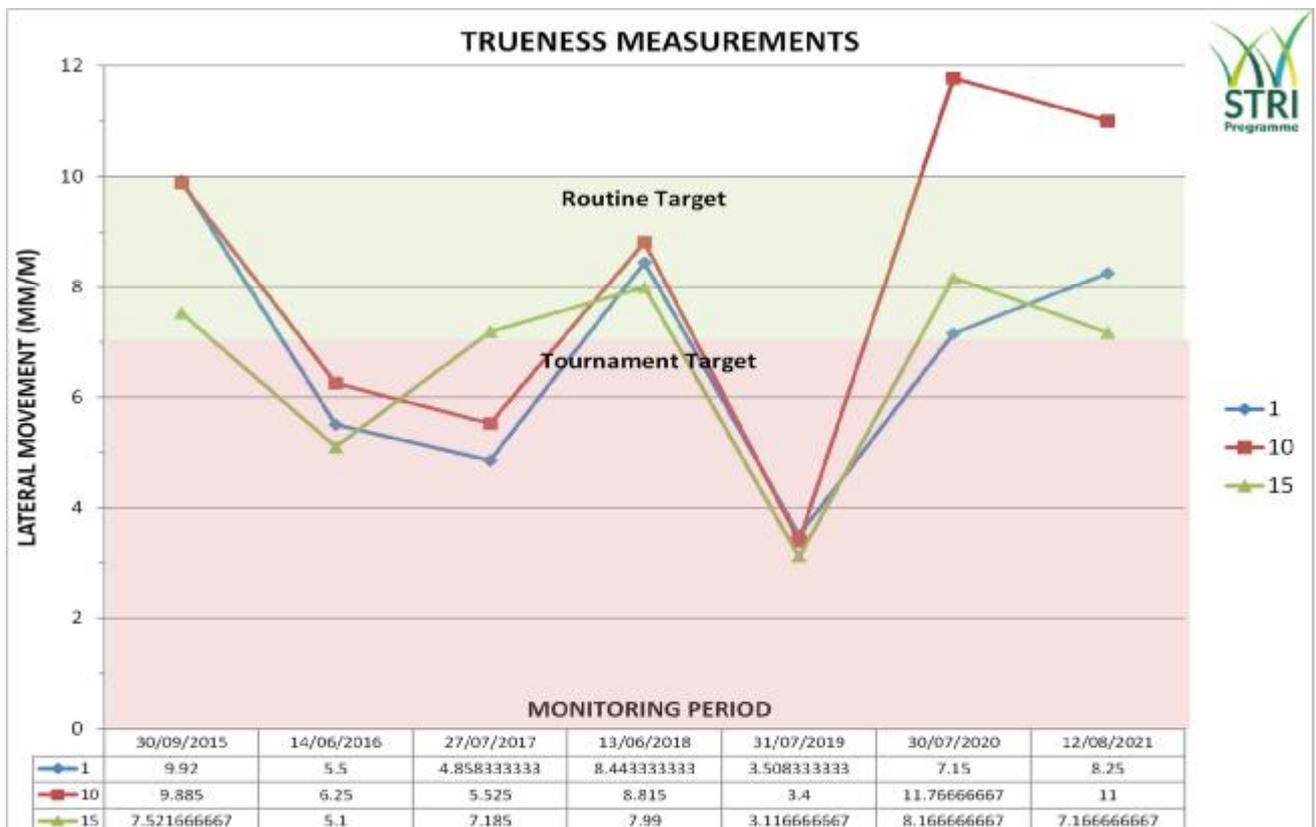


Objective Data Graph 2: Both greens 1 and 15 were around the lower end target parameter with green 10 averaging 77 gravities, all results showed a high degree of variability across the tested greens and have been impacted by recent weather, organic matter volumes and localised surface topography.

## Objective Data (continued)

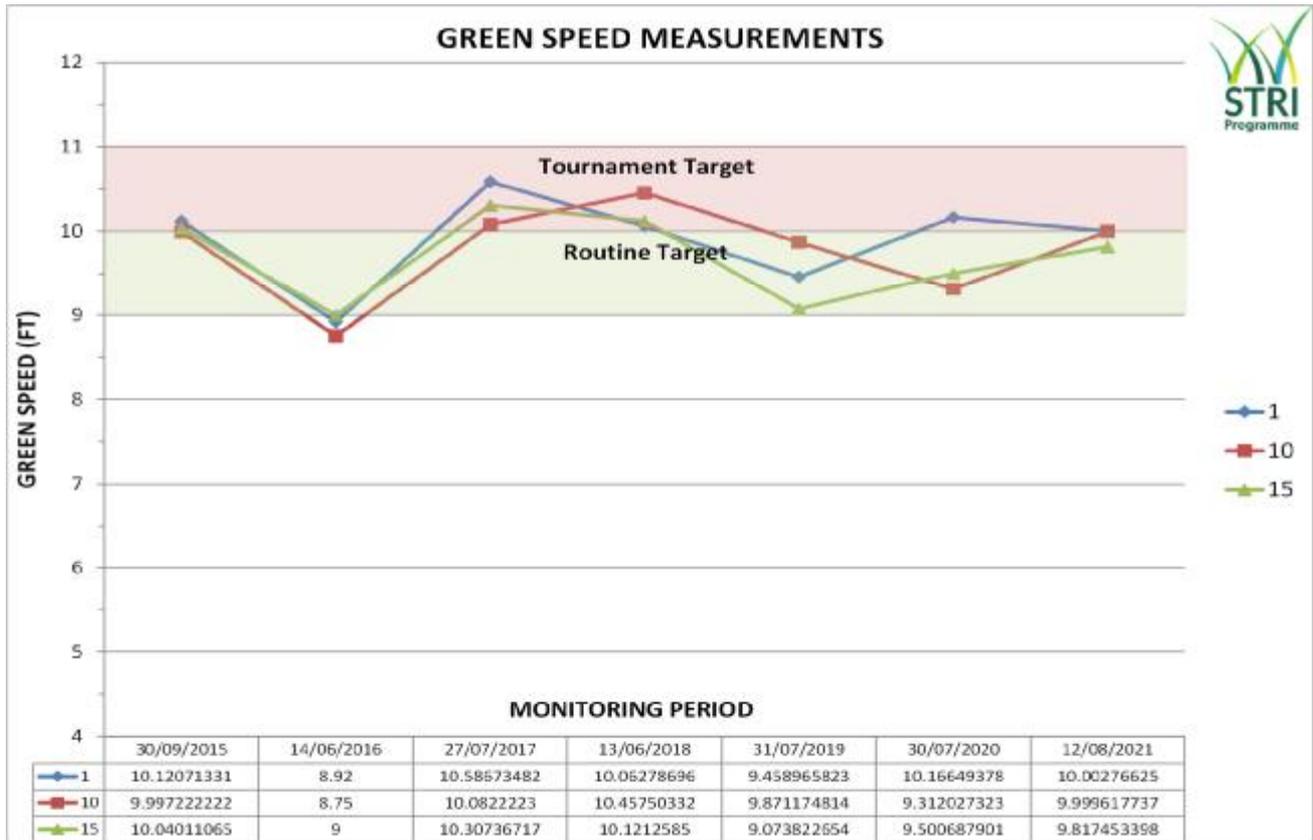


Objective Data Graph 3: Smoothness and Trueness were very good results for the team with the only anomaly being the Trueness on the 10<sup>th</sup> green, however that result was affected by several issues including pathogenic scarring and Pitchmarks scars and it was an improvement on last year. It will improve further in the coming months.

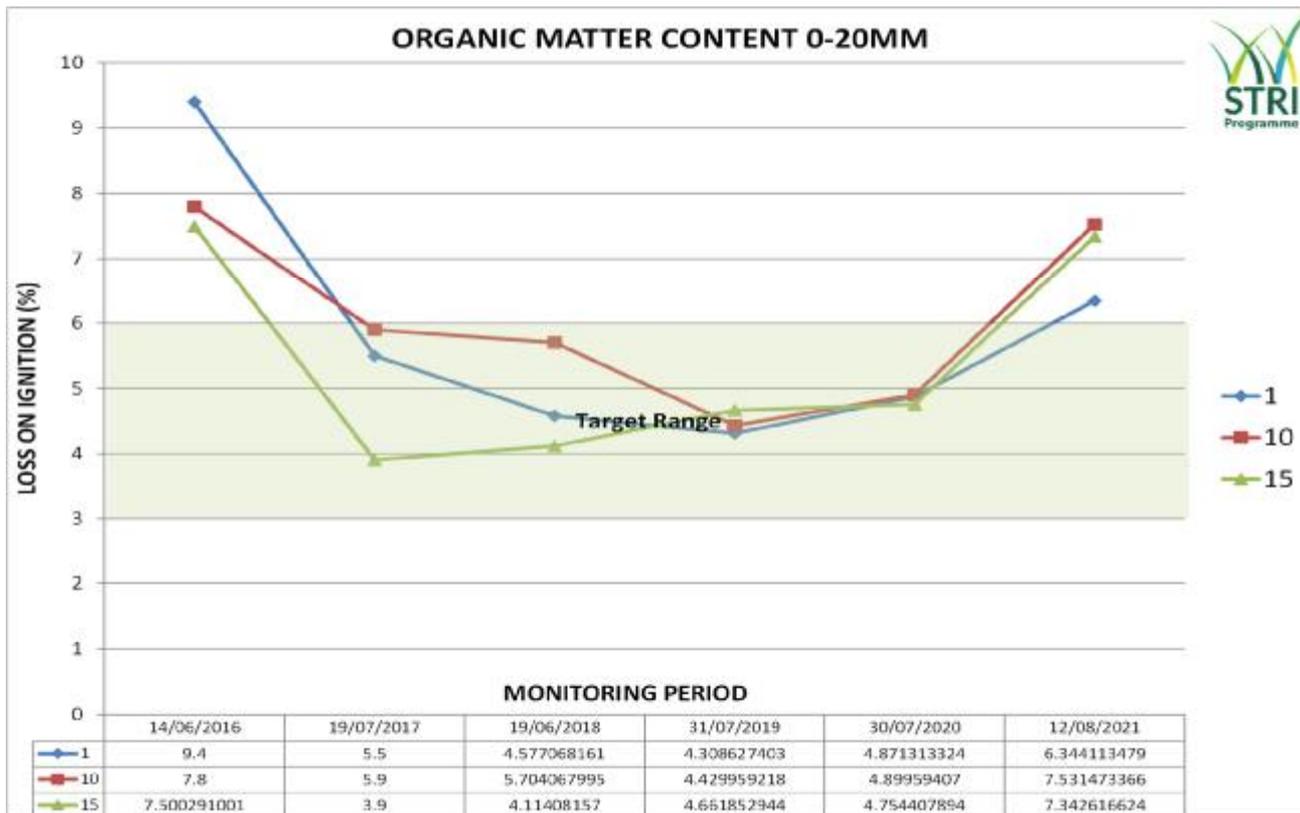


Objective Data Graph 4:

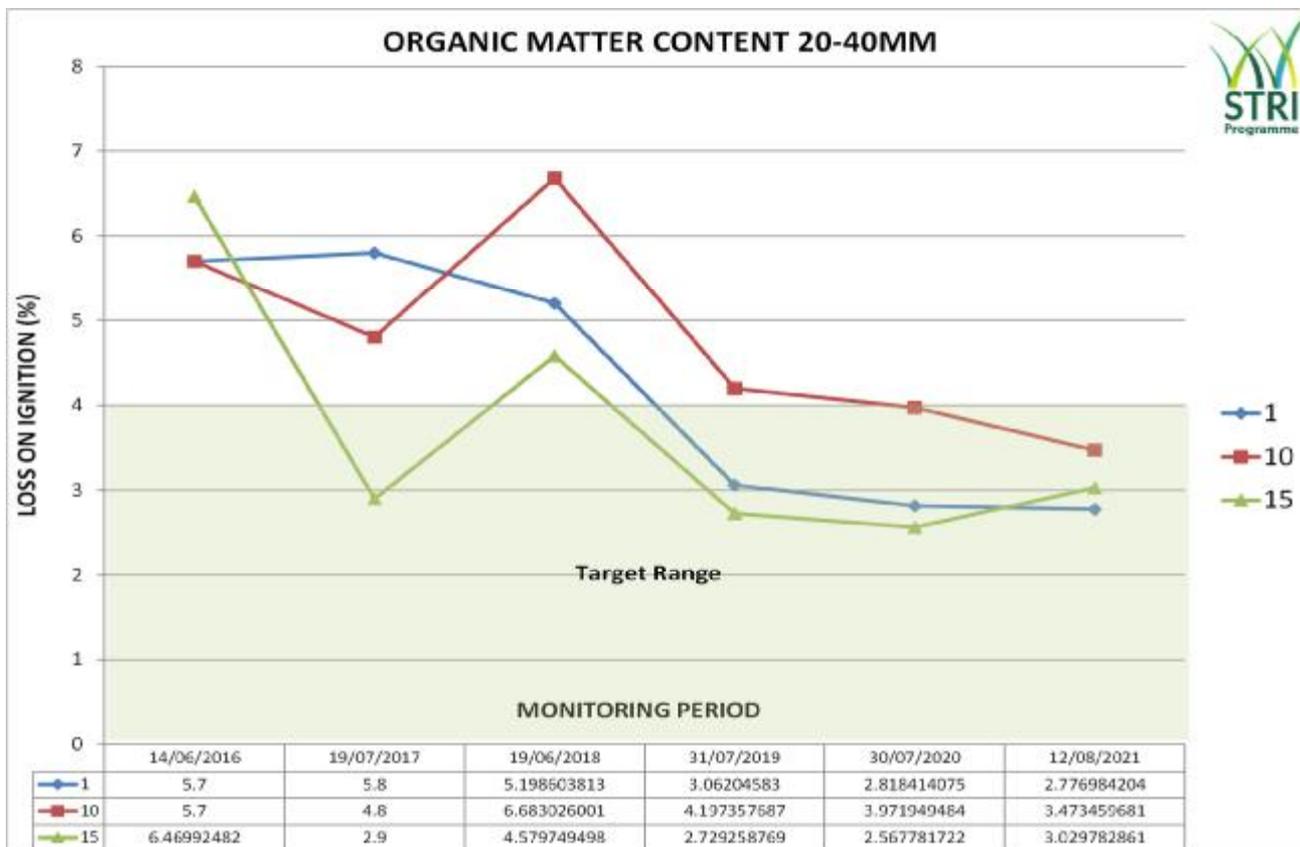
## Objective Data (continued)



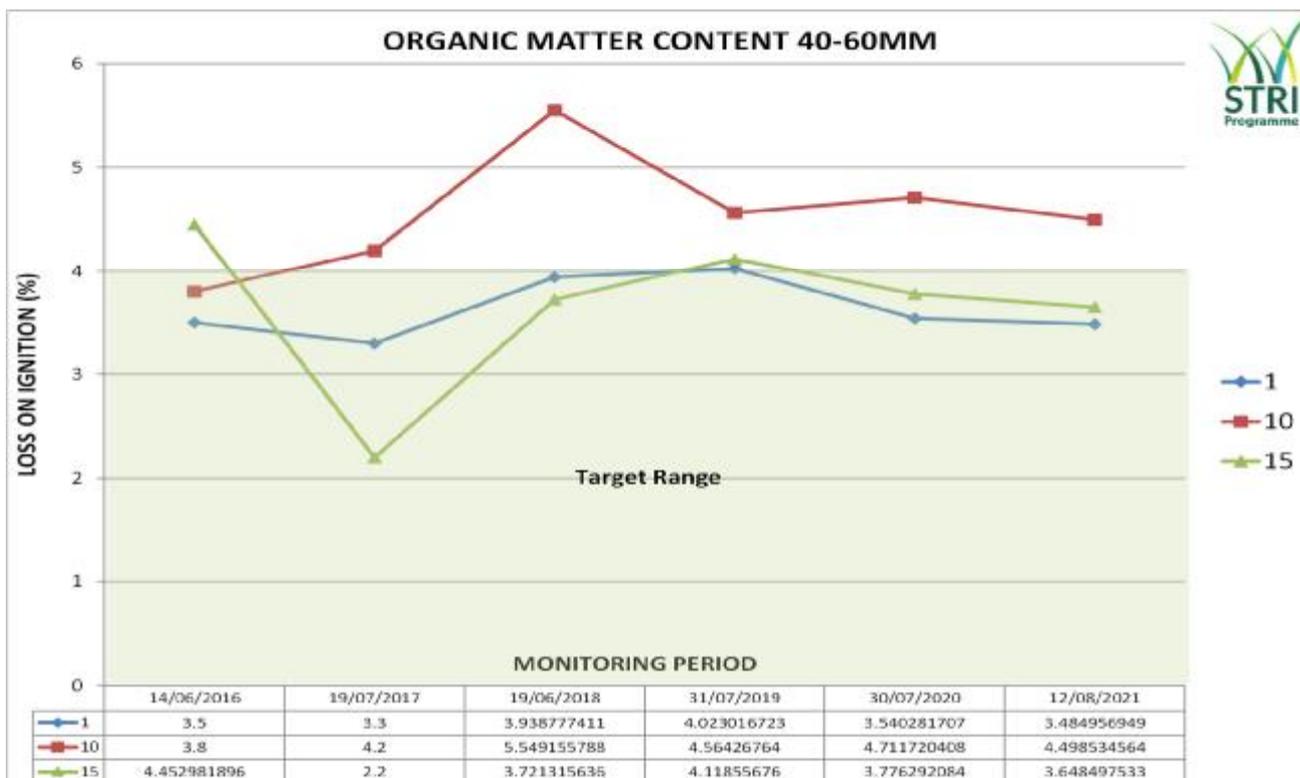
Objective Data Graph 5: Green speed performance was very good and delivered a superb consistency across the tested surfaces.



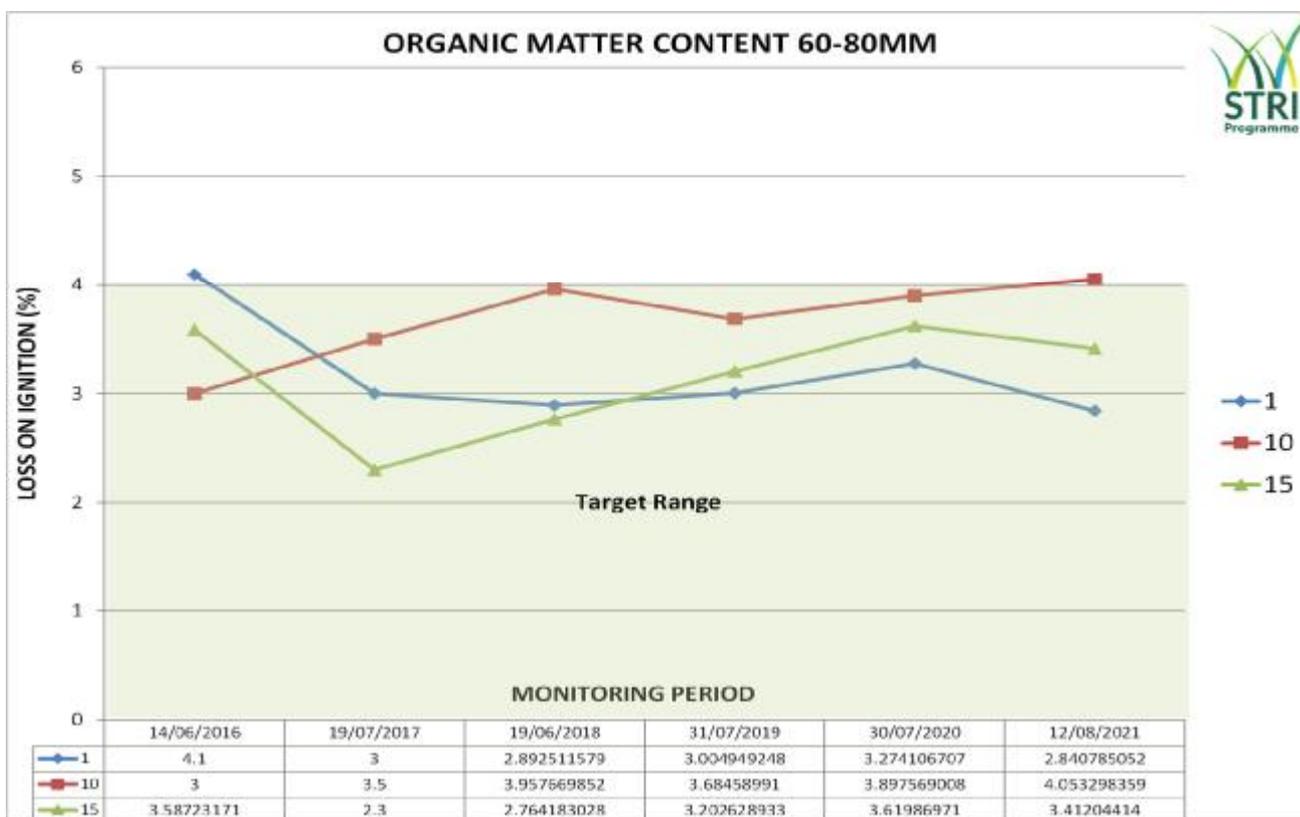
Soils Laboratory Graph 1: Organic matter has developed over the last 12 months or so, it is a national trend and should return to normal levels with the traditional management regime in place at the Club.



Soils Laboratory Graph 2: Organic matter at the 20-40mm horizon is well managed and well diluted.

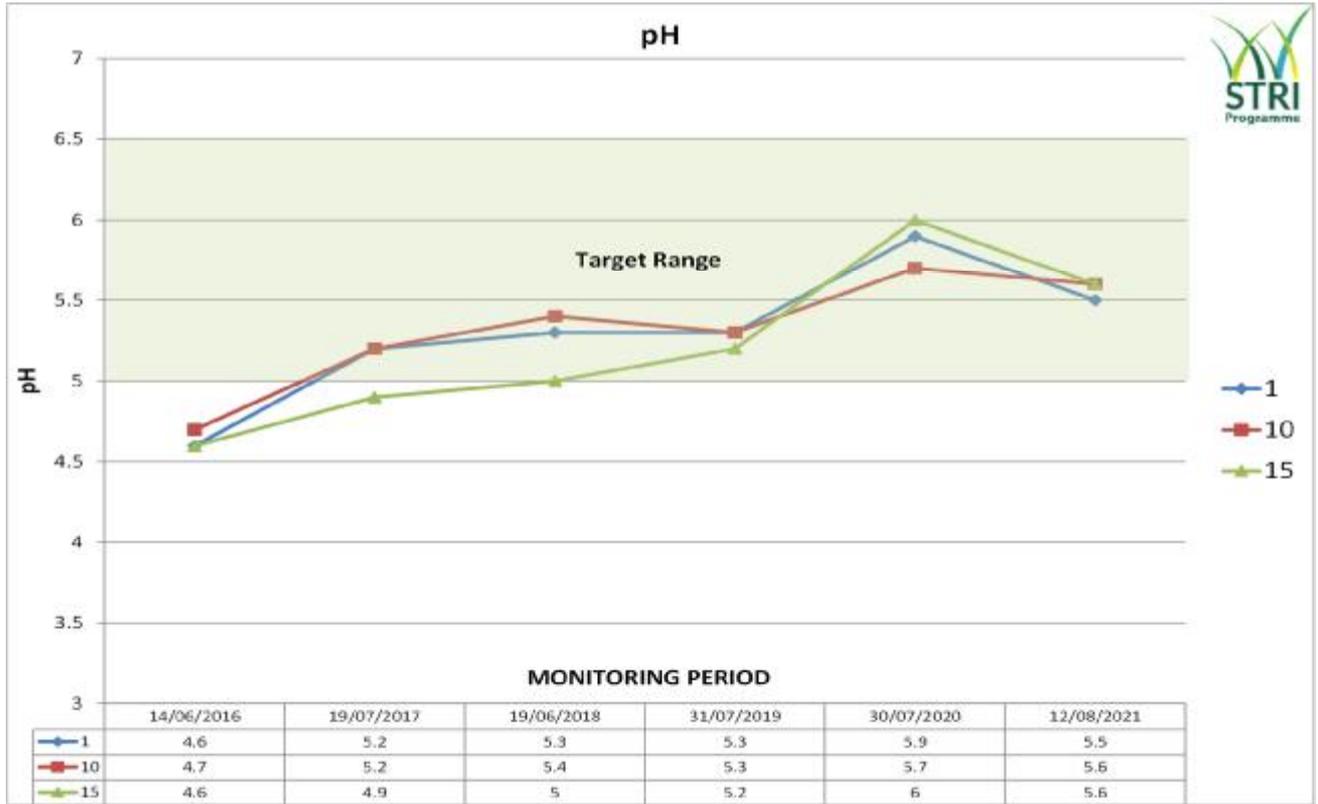


Soils Laboratory Graph 3: Organic matter volumes in the 40-80mm horizons is well managed and although green 10 is just above or on the cusp of targets, the elevated volumes statistically will not affect the performance of the growing environment and should return to normal levels through aeration and microbiome development.



Soils Laboratory Graph 4:

# Soils Laboratory Data (Continued)



Soils Laboratory Graph 5: pH is within target.

## ORGANIC MATTER CONTENT

CLIENT: NAIRN DUNBAR GC  
ADDRESS: LOCHLOY ROAD,  
NAIRN,  
INVERNESS-SHIRE, IV12 5AE

DATE RECEIVED: 19/07/21  
DATE REPORTED: 28/07/21  
RESULTS TO: GS

TEST RESULTS AUTHORISED BY:  
Michael Baines, Laboratory Manager

CONDITION OF SAMPLE UPON ARRIVAL: MOIST

SAMPLE NO	DESCRIPTION	LOSS ON IGNITION (%) <sup>*</sup>	
A19158/1	1	0-20 mm	6.34
		20-40 mm	2.78
		40-60 mm	3.48
		60-80 mm	2.84
A19158/2	10	0-20 mm	7.53
		20-40 mm	3.47
		40-60 mm	4.50
		60-80 mm	4.05
A19158/3	15	0-20 mm	7.34
		20-40 mm	3.03
		40-60 mm	3.65
		60-80 mm	3.41

<sup>\*</sup> ASTM F1647-11 (2018) Standard Test Methods for Organic Matter Content of Athletic Field Rootzone Mixes (Method A)



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

Testing Certificate 2159 - 01



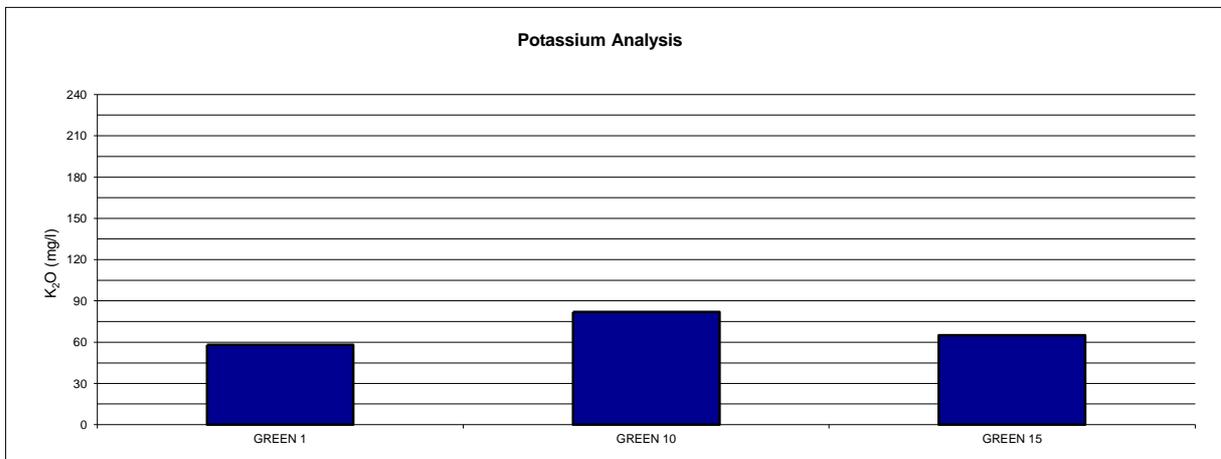
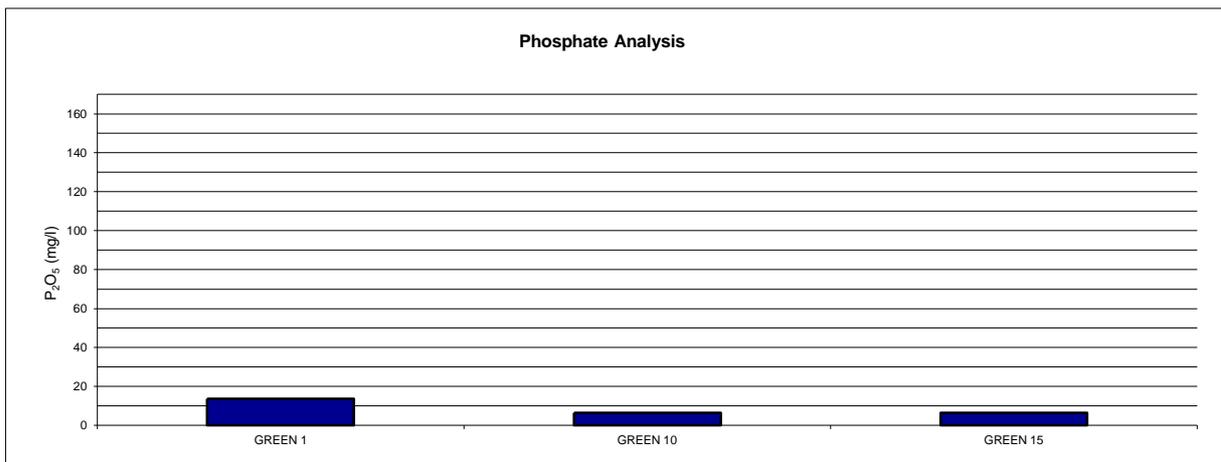
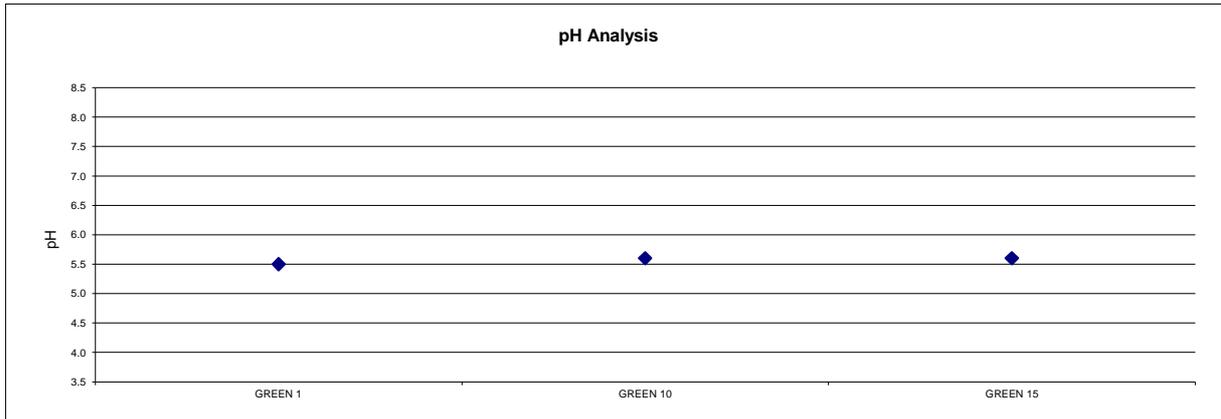
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## SOIL CHEMICAL ANALYSIS

## NAIRN DUNBAR GC

Date: 19/07/21



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