21 Grove Park, Walsham le Willows, Bury St Edmunds, IP31 3AE
Tel/Fax: 01359 259361

info@agrostis.co.uk www.agrostis.co.uk

BROCKWELL PARK - MARCH 2025

Brockwell Park March 25.Docx

A*grostis* Sports Surface Consulting

Tel: 01359 259361
E-mail: info@agrostis.co.uk
Website: www.agrostis.co.uk

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Agrostis Turf Consultancy Ltd. Registered office: Eldo House, Kempson Way, Bury St Edmunds, Suffolk, IP32 7AR.
Company No: 6675140. VAT Reg No: 889 4960 43.

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1 INTRODUCTION

1.1 Objectives

An advisory visit was undertaken to assess the general ground and surface conditions from an agronomic perspective of part of Brockwell Park. The assessment followed the reinstatement works following a major outdoor event, the immediate aftermath of which was reported on in June 2024.

Agrostis' client is:

London Borough of Lambeth

Represented by:

Lucy Zaman
Events Services Manager

Environment and Streetscene
Residents' Services
Civic Centre
3rd Floor, 6 Brixton Hill,
London
SW2 1EG

Tel: 0207 926 2437
Email: LZaman@lambeth.gov.uk

1.2 The assessment

The assessment of the site took place on 7 March 2025.

Aerial imagery of the entire affected area was obtained using a UAV (drone).

The surface and soil profile were examined in detail at three contrasting and representative locations within the site. Measures of soil texture, structure and hydraulic conductivity were taken from samples obtained from these locations.

Volumetric soil moisture content was measured at over 300 locations across the entirety of the site using a FieldScout TDR Moisture Meter linked to GPS to enable mapping of the data.

2 GROUND COVER

2.1 General

A single composite image, with component photos taken from around 50 metres altitude across the entire site, is shown in Figure 2-1. This is placed alongside the equivalent image from June 2024 in the immediate aftermath of the last major event to take place on the area.

Figure 2-1 Entire site in March 2025 (right). Equivalent area from June 2024 on the left

A general restoration of ground cover is apparent across all of the affected areas although the form of that ground cover continues to indicate the areas of greatest ground cover loss.

2.2 Main areas

Lido area

The area to the west I refer to as the Lido area. The pattern of vegetation growth and establishment across this area is indicated in Figure 2-2.

Figure 2-2 Lido area

Entrance area

The Entrance area to the north is shown in Figure 2-3.

Figure 2-3 Entrance area

Football area

The area north of the central woodland I have referred to as the Football area, a football pitch being frequently marked out here (although it was not at the time of the investigation). The aerial image of this area is shown in Figure 2-4.

Figure 2-4 Football area

Eastern area

The area to the east was not used intensively during the 2024 event but it is to be incorporated into the events proposed for 2025. This area is shown in Figure 2-5.

Figure 2-5 Eastern area

South-western area

The south-western area is shown in Figure 2-6. Note that the photogrammetry was less successful than elsewhere for this section on this occasion.

Figure 2-6 South-western area

2.3 Sward characteristics

A detailed assessment of the sward characteristics across such a large area would be beyond the scope of this exercise (and of questionable merit anyway). An assessment of these characteristics was undertaken in the vicinity of the 3 soil profile examinations described below.

Football area

A reasonably full ground cover had been retained on the football area although a general thinning of the sward was apparent in places.

Figure 2-7 Images of Football area ground cover

Entrance area

In the entrance area ground cover had been affected by persistent surface water retention. Numerous areas of ponding were apparent at the time of the investigation and it was clear from the sward characteristics that these had been significantly more extensive during the winter period.

Figure 2-8 Images of the sward in the entrance area

South-western area

It appeared that the upper section of this area had been used for football or other sporting purposes, either organised or otherwise (there were no line markings present). This had brought about some thinning of the sward although these features were not apparent elsewhere where ground cover was quite substantial.

Figure 2-9 Images of ground cover from the south-western area

3 SOIL CHARACTERISTICS

3.1 Soil profiles

Football area

Excavation in the football area revealed a topsoil of sandy loam texture that extended to around 250 mm. This became increasingly stony beyond 250 mm.

The subsoil was of a similar sandy loam and contained numerous stones, chiefly in the form of rounded pebbles.

The excavation was made to a depth of 600 mm through which it was fairly dry, no ground or surface water being present.

Figure 3-1 Features of the soil profile of the football area

Entrance area

Two excavations undertaken in the lower, entrance, area indicated that some modifications may have been made to the soil profile over time. The topsoil was generally very hard and stony despite the presence of extensive surface water over the area. What may have been a gravel layer was encountered at around 100 mm. This was causing a distinct break in the depth of grass roots that was achievable. Excavation by hand was impossible beyond around 200 mm due to the presence of a very stony, possibly old macadam, layer.

Figure 3-2 Features of the soil profile of the entrance area

South-western area

A soil profile essentially similar to that of the Football area was encountered in the south-western area. Here a sandy loam topsoil extended to around 250 mm with a slightly finer and possibly greater clay content in the subsoil beyond this. An increasing quantity of stones were encountered at around 350 mm.

Figure 3-3 Features of the soil profile of the south-western area

3.2 Soil texture

Samples of topsoil and subsoil were taken for analysis of particle size distribution and organic matter content, the components of soil texture. The results are shown in Table 3-1.

	Football		South-west	Entrance
	Topsoil	Subsoil	Topsoil	Topsoil
	%	%	%	%
Sand	69	65	73	59
Silt	17	20	15	23
Clay	14	15	12	18
Organics	5.8	4	6	6.1
Textural class	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam

Table 3-1 Textural characteristics of topsoil from the 3 areas and subsoil from the Football area

These data indicate the different characteristics of the soil from the Entrance area which has a lower sand content and higher clay content. The better quality of the topsoil of the South-west area is supported by the slightly greater sand and slightly lesser clay content. The organic content of all samples was fairly typical.

3.3 Soil structure and hydraulic conductivity

Hydraulic conductivity was measured using intact cores (50 mm diameter, 50 mm depth), taken from varying depths through the soil profile of the three excavations.

Total porosity (Total P) was calculated from soil dry weight and organic content. Air-filled porosity (AFP) was also determined for each of the core samples after the application of 300 mm tension for 24 hours. From these data, total water content at field capacity (Field cap) was determined. The moisture content (Field VMC) of the soil at the time of sampling was also calculated.

The results, with conductivity measures adjusted to 10 ºC, are shown in Table 3-2.

	Depth (mm)	Hyd Cond (mm/hr)	AFP 300 (%)	Total P (%)	Field cap (%)	Field VMC (%)
Football	35	9	3.92	45.64	41.72	40.07
Football	100	5	2.95	41.32	38.37	37.53
Football	200	21	8.52	39.18	30.66	27.53
Football	350	0	5.57	34.65	29.08	26.81
Football	400	0	10.33	50.91	40.57	39.15
Football	500	0	4.01	37.69	33.69	32.18
Entrance	0	0	6.76	42.92	36.16	35.04
Entrance	50	2	5.60	49.86	44.26	44.64
Entrance	50	7	4.66	50.81	46.15	46.27
Entrance	150	25	4.08	40.24	36.16	34.98
South-west	50	5	9.56	51.87	42.31	40.88
South-west	50	20	5.38	51.81	46.43	43.38
South-west	150	20	6.19	44.02	37.83	35.00
South-west	150	2	3.32	42.88	39.56	37.33

Table 3-2 Hydraulic conductivity and porosity from intact cores at varying depths

The average values for topsoil and subsoil are shown in Table 3-3.

	Hyd Cond	AFP 300	Total P	Field capacity	Field VMC
	(mm/hr)			(%)	
Football					
Topsoil	**12**	**5**	**42**	**37**	**35**
Subsoil	**0**	**7**	**41**	**34**	**33**
Entrance	**8**	**5**	**46**	**41**	**40**
South-West	**12**	**6**	**48**	**42**	**39**

Table 3-3 Average soil structural and hydraulic conductivity values of topsoil and subsoil

Values of hydraulic conductivity reasonable for the topsoil of the Football and South-west areas though they were reduced for the Entrance area.

The zero value of hydraulic conductivity obtained from the subsoil of the Football area will almost certainly apply in the Entrance area also from where the stoniness of the subsoil prevented satisfactory samples from being taken.

Air-filled porosity often provides a more consistent indication of the likely conductivity and in all cases this was low. Values greater than around 10 % would indicate a free-draining and well-aerated soil.

3.4 Soil moisture content

The results of the soil moisture mapping exercise from 7 March 2025 are shown in with contours at 2.5 % VMC (Volumetric Moisture Content) intervals are shown in Figure 3-4.

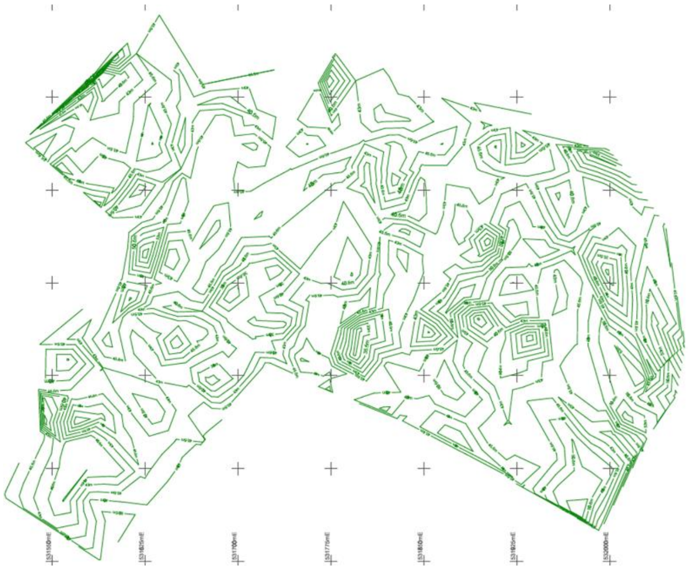

Figure 3-4 VMC (%) across the site. Contours at 2.5 % intervals

Values ranged between 58.9 % and 26.1 % and the average of 331 samples was 44.4 %. This corresponds with the values of total porosity shown in Table 3-3 and indicates that the soils were generally at or just below saturated at the time of the assessment.

The areas of VMC greater than 50 % are shown shaded in Figure 3-5.

Figure 3-5 VMC contours on Google Earth image of site. Areas over 50 % shaded

4 DISCUSSION

The restoration of ground cover following the event of 2024 has, in general, been very successful. Almost all areas of previously bare ground now support a grass cover. However, the condition of that ground cover, reflecting the health and density of the grass, continues to reflect the disruption that it has undergone. The pattern of the event structures and activities may still be discerned quite clearly in the aerial imagery. This implies that the soil conditions, as opposed to the grass cover on that soil, continue to carry the legacy of the event most probably in terms of its structure and hydraulic behaviour.

The fullest and healthiest ground cover at the moment may be seen in the area to the east. This was largely unaffected by the 2024 event but it also coincides with what are generally sheltered areas on low, moist, ground.

The moisture measurement did not pick up the extremely wet area of the Entrance field, north of the wood. This is possibly because most of the water to be seen in this area sits in the surface, the deeper layers of soil where the measure was taken being of similar moisture content to other areas of the Park. This discrepancy is almost certainly related to the very poor soil structure, and low hydraulic conductivity, that prevails in this area.

We know that there are pipe drains incorporated into the Lido area to the west. There may also be some pipes in the Entrance field though their functionality is questionable. Elsewhere, the natural drainage properties of the soil profile determine the hydrological behaviours across the site. Away from the Entrance field, those natural and intrinsic properties are probably quite satisfactory to serve the 'purpose' of the site as public open space and, essentially, an ornamental parkland. If and when the site is to be used for more intensive purposes, such as organised sport or the hosting of major events, then these areas will require appropriate enhancement in terms of both construction and maintenance in order to meet those challenges.

On this and during previous observations of the Park, the persistence of surface water and evidence of poor drainage is relatively rare, apart from on the Entrance field area north of the wood. The factor most strongly influencing the pattern of grass growth, apart from the events themselves, is almost certainly the extent of drought. Although the phenomenon is not as prominent at Brockwell as it is at other London parks, this condition limits growth and recovery. A general observation might be that areas most exposed to sunshine tend to display the slowest recovery from wear damage or installation placement during events. This assessment is supported by the generally more vigorous growth that occurs along the shaded and more moist eastern areas.

The open areas of the site tend to be used for casual play, sunbathing, dog exercising etc. Sunbathers are perhaps the most selective in terms of on what quality of surface they are prepared to place themselves. This speaks to the quality of surface that users of the park may be expecting. Without thinking about it necessarily, such users will be seeking out the areas of dense, fairly vigorous swards of uniform height. It is this quality of surface, therefore, that should be aspired to. The presence of broadleaved species may not be relevant. Indeed, a diverse vegetation may be desirable in that it provides interest in itself while simultaneously contributing to biodiversity more generally. It is this general objective that I think it is important to consider in relation to the overall maintenance and development of the site.

5 RECOMMENDATIONS

5.1 Area north of the central woodland (part of the 'Entrance' area)

Two factors combine to make this area especially poor, both as an area of public open space and for its deployment for any other purpose. One is the very poor structure of the soil and the make-up of the profile as a whole. The other, which may be related to this, is the tendency for ground water from the higher ground to the south to emerge at the surface. This makes the area more or less inaccessible, certainly over the winter months. This phenomenon is not, however, a consequence of the events.

Considerable improvement is likely to be achievable by incorporating a catchwater drain along the lower edge of the woodland. This should be as deep as possible, possibly up to 1000 mm, and may be made to discharge into low ground somewhere north of the perimeter track or into an existing surface water collection feature if one can be located. The profile of such a drain is shown in Figure 5-1.

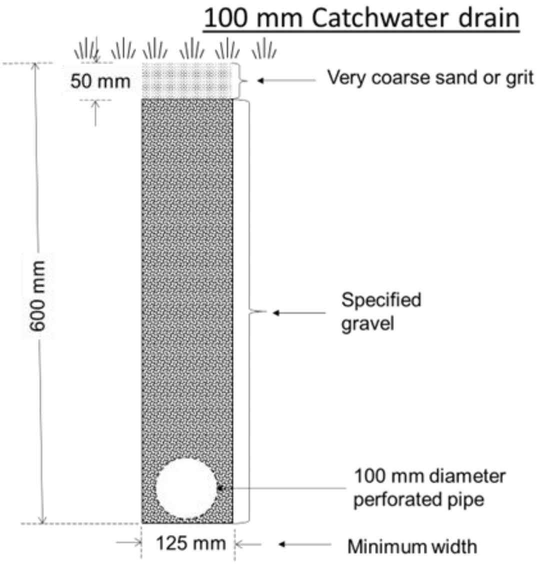

Figure 5-1 Section through a catchwater drain

The area itself requires a substantial reconstructive effort to bring it in line with the rest of the park. At around 10 000 m^2, or 1 hectare, the size of two football pitches, the work involved is by no means unusual in the world of natural turf construction in which similar projects of much larger scale are regularly undertaken.

The procedure would retain all of the useable topsoil, though this would need to be stripped and set aside while the underlying subsoil is graded. With the subsoil surface suitably reformed the topsoil would then be replaced. Into this surface pipe drainage would then need to be incorporated, ideally with laterals at 5 metre centres. The profile of one of one such drain is shown in Figure 5-2.

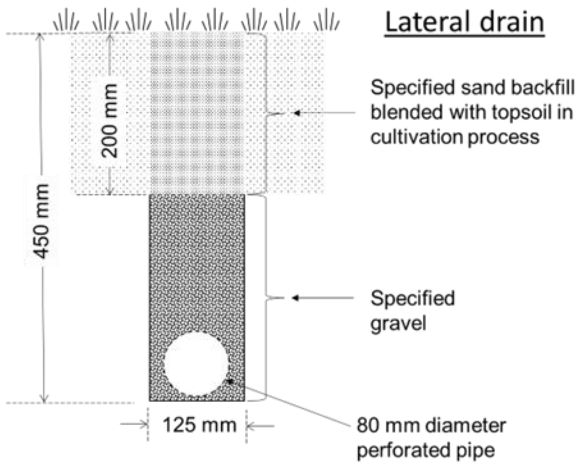

Figure 5-2 Profile of lateral drain

The construction should be finished with a sand carpet, typically 50 mm deep into which the new grass seed should be sown.

In the process of this, there should be space to provide 1, possibly 2 full-size football pitches or whatever other sports may be called for by the local community. This would alleviate the pressures placed on the areas to the south of the woodland and at the top of the south-western area where sport provision is probably considered less than ideal. The cross-slope on the ‘Football’ field is certainly not satisfactory for more formal games.

Were this process to be considered, a cost estimate based on similar operations carried out in the south-east of England recently could readily be provided. For the improvement of parkland this would not be cheap but as an alternative, for example, to the installation of an artificial sports pitch, this approach would be considerably less expensive, perhaps only 30 % or so of the costs for twice the playing area.

5.2 Other Event areas

The substantial enhancements of the area described above will also improve its capacity to sustain and recover from major events. Elsewhere in the Park, more consistent ground conditions prevail and the capacity to sustain and recover from events here may be determined chiefly by the intensity with which these areas are maintained throughout the year.

Aeration

In this respect, operations that enhance soil structure are likely to be most effective. Verti-draining should be undertaken across all relevant areas when soil conditions allow the full penetration of tines, to around 300 mm. Ground conditions need to be sufficiently firm to allow the passage of the tractor without inducing excessive surface damage but such operation should become routine and undertaken typically between November and late April or May. During this period, up to 4 treatments would not be excessive.

When verti-draining, use the largest available machine fitted with 25 mm solid tines at the closest centres the machine will allow and set to achieve maximum heave action. Any excessive disruption to the surface should be made good by hand by which means any very large stones or other debris that may be brought to the surface by the action of the verti-drain should be removed.

Fertiliser

At the appropriate stages of the growing season, fertiliser applications should be made in order to sustain suitably vigorous growth.

Mowing

That growth must be regulated by appropriately frequent mowing. The combination of growth and regular mowing is key to achieving the dense and attractive swards that are expected of parklands and which is best able to withstand and recover from the impacts of the events.

Generally allowing the sward height to be maintained at a greater level, say 35 mm, would also be advantageous. During the weeks leading up to future summer events, the extent of ground cover retention would be improved by not mowing at all, allowing the sward to reach up to 100 mm in height where this may be acceptable in relation to other perceptions of the Parks' usage.

5.3 Seed selection

A number of factors indicate that a different approach to grass species selection would be appropriate. Those factors include the costs and general demands of maintenance and the impact of climate change. Generally speaking, prolonged hot and dry periods imply that a different range of grass species would be better adapted to these conditions.

Specifically, seed mixes should contains a substantial inclusion of smooth-stalked meadow-grass and fescues. Both these species are more tolerant of drought and have a lesser fertiliser requirement which makes it more suitable for low maintenance situations. SSMG seed is, however, significantly more costly than ryegrass but the longer-term advantages of its substantial establishment will become apparent during the years ahead. Fescues and SSMG also combine to produce a very attractive sward.

Note that SSMG requires warm soil temperatures for its successful establishment. If the sowing is delayed for any reason beyond the end of September, it may be more appropriate to revert to a ryegrass-rich mixture.

5.4 Top dressing

Sports pitches invariably benefit from the application of sand top dressings. If the area north of the woodland is to be developed as suggested, this would certainly merit annual dressings. As part of the preparation for events, those areas likely to be subject to the most damaging footfall wear would also benefit from such treatment.

6 EVENT APPROVAL

Determining the suitability or otherwise of the site to support a particular event is inevitably a subjective decision in the final analysis. Objective data can, however, inform that decision and throughout this assessment I have tried to identify what form that data should take.

The existing state of the ground cover may readily be quantified at the largest scale by means of the aerial imagery employed here right down to the detailed assessments of quadrat data collected from as many points around the site as is considered necessary. However, there needs to be a general appreciation of the baseline or target sward characteristics that are being aspired to. It is that state which will need to be restored, in good and reasonable time, in the aftermath of events. Without this, the regular events will most likely lead to a continual deterioration in the overall quality of the surfaces. In the discussion above I refer to the expectations of sun-bathers. I believe this is a reasonable definition of the kind of sward that should be aspired to for public parks. In achieving this, however, the intensity of maintenance work and investment will be directly proportional to the intensity of extra pressure being placed on the surfaces by events. The more damaging the event, the more work needs to be put into the maintenance.

Sports represents another use to which areas of the park may be put. Here the expectations regarding the form of surface will differ but the relationship between the intensity of maintenance and of usage, for both sport and events, will still apply. Due to their nature, however, sports surfaces as described here would be better able to tolerate and recover from events, their maintenance already being enhanced.

The other major factor determining the impact of events, other than the size of the event itself, is the weather or, more precisely, the moisture content of the soil and surface at the time of the event. Invariably, the most damaging occurrences have coincided with heavy or persistent rain bringing about wet surfaces during the event itself. At the time of the assessment, the site as a whole was certainly unsuitable for such events due to the moisture content of the soil. So, the data presented here represents an objective description of a state that would fall well outside the ‘suitable for events’ condition. The VMC values will inevitably fall as the spring and summer progress and there will come a point where the site would be considered suitable for an event in relation to the soil conditions. Over time, therefore, continuing to monitor soil moisture levels while simultaneously observing the suitability or otherwise of the site to sustain events will lead to a point at which it should be possible to state at what VMC level the cut-off point is reached. VMC measurements need not be as extensive as was carried out here but a selection of test areas may be identified for regular monitoring.

As I have pointed out, the decision to go ahead or otherwise is ultimately a subjective one but that decision may be informed by a generally accepted objective methodology covering the points addressed here.

Signed:

Dr Tim Lodge
Consultant

Agrostis
SPORTS SURFACE CONSULTING

27 March 2025