

Job Title **Balderstone Park**

Job Number **1541**

Document Title **A Report for the Development of Two Pitches at Balderstone Park**

Document Reference **L/001/RBC/1541/R/190131**

Prepared By **Charles Henderson**

Signed

Date **31/01/19**

REVISION RECORD					
Revision	Date	Description/Filename		Prepared	Approved
A	02/01/19	DRAFT ONLY		CH	CH

TABLE OF CONTENTS

- 1 Introduction & Objectives
- 2 Executive Summary
- 3 Summary of Findings
- 4 Recommendations and Budget Costs
- 5 Timescales/Indicative Programme
- 6 Confidentiality
- 7 Additional Information
- 8 Contact Details

Appendices

1. Site Layout/Topographical Survey
2. Soil Textural Analysis
3. PQS Assessment
4. Maintenance Guidelines

1.0 INTRODUCTION & OBJECTIVES

Plincke Landscape Architects have appointed PSD Agronomy to complete a feasibility study to investigate the development of 2 new pitches on an existing grassed area. This work is being carried out on behalf of Rochdale Borough Council.

The site has previously been used as a recreational area with evidence of a cricket strip in place. However, this has fallen into a disused state with no known last date of use.

The objective of the appointment was to appease planning conditions and identify works required in order to develop the pitches to Sport England required minimum standards.

The following summary report includes a synopsis of findings from site investigations, desk study findings and recommendations along with budget costs.

The site inspected is located at: Wasp Avenue, Rochdale, OL11 2AQ
(Located at the north section of the park)

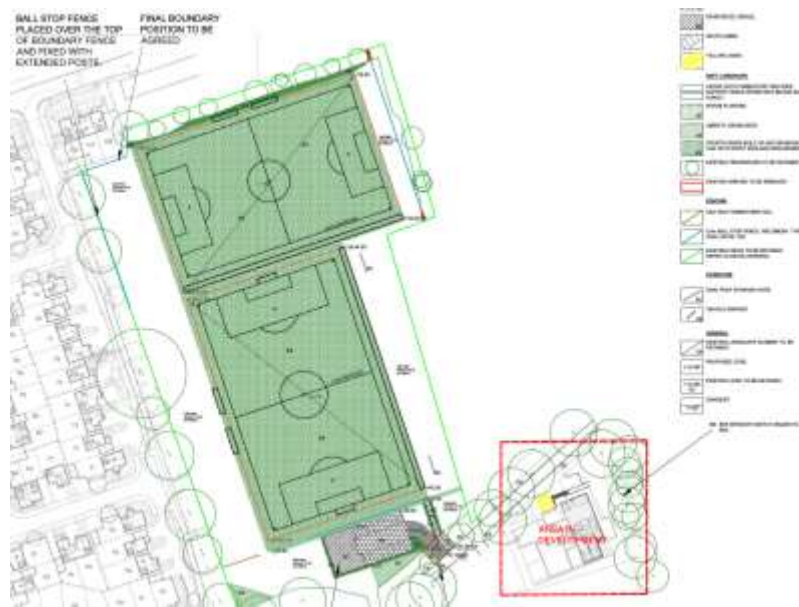
PSD were instructed by Plincke Landscape Architects and a site visit was carried out by Charles Henderson of PSD on the 15th November 2018.



Location of proposed pitches hatched in green

2.0 EXECUTIVE SUMMARY

- As part of the plans Plincke have instructed for the site to include 1 x U15/16 size regulation pitch and 1 x U13/14 size regulation pitch. Plincke have provided a site layout plan which confirms that the pitches can be located within the areas made available. Although the U13/14 pitch can not be located on the ideal angle, however, it is not feasible to provide both pitches within the site at any other angle. It is recommended to proceed with the pitch layout which maximises the green space available.



Plincke Provided Site and Pitch Layout Plan

- Site access, machinery and material storage is available within a carpark to be installed as part of the scheme. Tree clearance will be required in order to provide access onto the proposed car park area.
- Overall pitch gradient falls over the proposed U15/16 pitch is within Sport England guidelines; however, undulations are present within the pitch profile which require rectification within the project scheme. Topsoil depths are not sufficiently deep to achieve this solely through reshaping of just topsoil at this stage. As such ideally cut and fill would be implemented.
- The U13/14 pitch overall gradient is within SE requirements. However, several low points are present within the pitch which will be prone to holding water, even post installation of drainage.
- Costs and budgets are prepared for the pitch areas and 3m surrounds only. An additional cost item is provided to cover the cost of the areas between the pitches as requested.

- Due to lack of use and maintenance of the site surface smoothness undulations have become exceptionally poor. With several points exceed $\pm 30\text{mm}$ deviation over a 3m straight edge. As such this would have to be rectified as part of any development scheme in order to provide safe functional services. Gradient fall over the lower pitch are insufficient to support natural drainage fall and engineered gradients would be required. Infilling some areas of the lower pitch would also be required. Careful setting out of the drainage would be required on this pitch.
- Two options for improving surface levels are outlined for consideration with variable cost, this is the most significant impact on overall cost.
- The existing topsoil is classified as a sandy loam boarding loam and will have limited drainage performance due to high silt and clay content on the completion of any level improving works. As such by-pass drainage would conventionally be used as part of any development on such topsoil. Failure to install drainage will result in limited use during the months December to March, regardless of maintenance.
- No existing drainage infrastructure could be identified on site or was known to be installed.
- During the site visit, it was queried as to whether any drainage had been installed on the facilities neighbouring the site and no knowledge of this was identified. Some additional soak-away tests have been carried out under the MUGA at the southeast of the site.
- The site generally falls towards the northwest corner of the field at which point there is no known available drainage outlet. The site is also landlocked at this end of the development, unless an agreement from the neighbouring site development can be obtained. Queen Victoria Street would provide an ideal drainage outlet location where at all feasible. It is initially stated this will be very difficult and time consuming to achieve.
- Soak-a-way tests have been carried out by Ian Farmer Associates in 2014. While this demonstrated some potential for soak-a-way on the site, the general geology for the location indicates a presence of an imperviable clay layer at 7-9m which would not support ongoing and guaranteed soak-a-way levels. No presence of sandstone or limestone is reported in the area, generally required to support sustainable soakaway potential for sports pitches.
- As such soak-a-way would likely be absorbed into the sandy silt layer identified within boreholes. Once this layer became saturated it is likely the northwest end of the playing field would become increasingly saturated with the soakaway scheme concentrating problems to this corner.
- The site is not located within any flood zones nor is it known to be located within areas subject to flooding from rivers or seas. The land make-up does not appear indicative of a landfill site and nor does any information appear on an authorised landfill site location. It does appear as if a cricket wicket area/square has been located on the site historically. This will require rectification during the development scheme with improved levels.
- Two development options are outlined within the report which include a comprehensive releveling and drainage solution and a basic levelling and drainage solution, details and costs are outlined within the report.

- Works of this nature should ideally be completed between the months of April-August when soils are sufficiently dry, with seeding being carried out at the latest by late August early September. From this point between 6 and 12 months of grown-in are required depending on timing of seeding and weather conditions experienced. Further detail is outlined in the report.

3.0 SUMMARY OF FINDINGS

3.1 Proposed Layout/Orientation

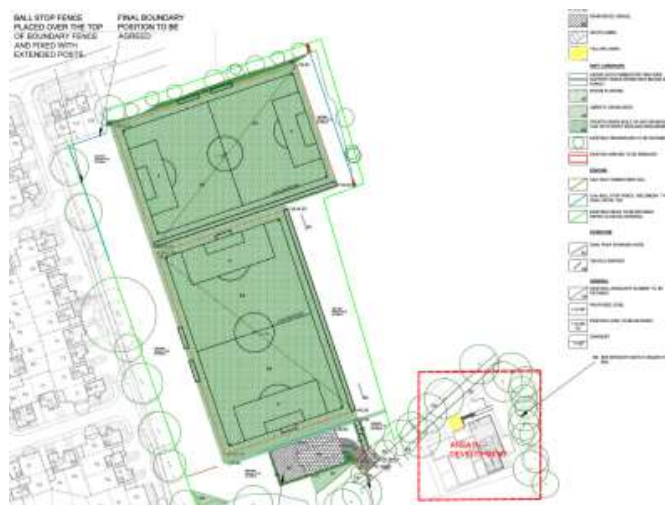


Fig. 1: Proposed Site Layout

The proposed pitch layout, see Fig. 1 above, is to facilitate 1no. U15/16 pitch of 91m x 55m dimension and 1no. U13/14 pitch of 82m x 50m dimension, including 3m run-offs on all perimeters, in line with SE recommended pitch dimensions.

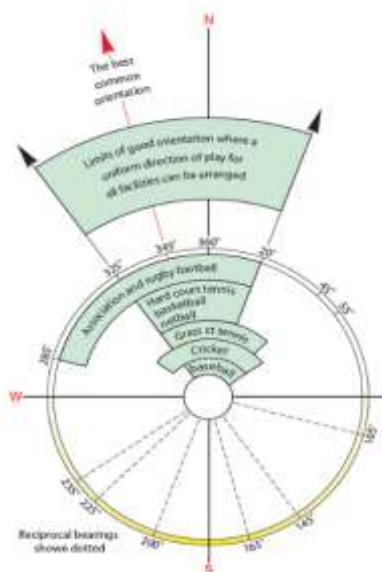


Fig 2: SE/NGB recommended orientation for association football

South Ribble Borough Council - LSGFC

Sport England/National Governing Body Preferred Orientation

Pitch Orientation	SE/NGB Preferred	Measured on Site *
U13/14	Between 285° and 20°	60
U15/16		345

Key

	Denotes pitches within preferred range 285° and 20°
	Denotes pitches within 10° of preferred range 285° and 20°
	Denotes pitches between 30° and 275°

* Denotes approximate measurement

Table 1: Approximate pitch orientation

In terms of orientation the proposed U15/16 pitch layout falls within the recommended range of 285° and 20°, the U13/14 pitch falls outwith the recommended range, kick-off times may need to be given consideration to avoid the low sun near sunrise/sunset.

Due to site dimensions for the proposed improvement area, no alternative orientation is available for the layout of the U13/14 pitch, therefore, orientation should be disregarded.

3.2 Existing Gradients/Surface Levels

The study of topographical survey data made available for review, recorded longitudinal and crossfall gradients of the existing field and are shown in Table 2 below in relation to current SE/NGB guidelines. With regard to the guidelines, the general site gradients are within the recommended tolerances in both line of play and crossfall directions.

Rochdale Borough Council - Balderstones Park				
Sport England/National Governing Body Preferred Gradients				
Pitch Orientation	SE/NGB Preferred %		Measured on Site %	
	Line of Play	Across Play	Line of Play	Across Play
U13/14	<1.25	<2.0	0.1	0.5
U15/16			1.1	1.0
Key				
Longitudinal Gradients				
	Denotes pitches within preferred range of <1.25% (<1:80)			
	Denotes pitches between 1.25-1.43% (1:80 to 1:70)			
	Denotes pitches >1.43% (1:70)			
Crossfall Gradients				
	Denotes pitches within preferred range of <2.0% (<1:50)			
	Denotes pitches between 2.0-2.5% (1:50 to 1:40)			
	Denotes pitches >2.5% (1:40)			

Table 2: Overall existing site gradients.

In terms of surface levels, although overall gradients were observed to be within guideline tolerances, the site possesses undulations, some of which are significantly outwith SE/NGB tolerances.

The site requires cut/fill earthworks to create a smooth, uniform plateau marrying in to existing peripheral levels. Existing topsoil should be harvested and stockpiled on site for re-application following completion of the subsoil formation levels, which will add significant cost to the improvement works.

Alternatively, if excess topsoil was available from neighbouring development sites or peripheral areas, this could be harvested and placed across the pitches to remove hollows/undulations and improve general surface levels.



Plate 1: General view looking north



Plate 2: General view looking south

3.3 Soil Profile



Plate 3: Approximate location of soil profile excavations.

Excavations with a spade and hand-held auger together with laboratory analysis of the topsoil indicated the following:

a) Topsoil

- 250-300mm deep, dark brown sandy loam, compaction noted in the upper 80-100mm; dense angular blocky structure with some vertical fissures, turning crumbly when handled; occasional stone/debris and earthworms observed; some slight iron staining of root channels evident.
- A layer of fibrous organic matter 5-10mm thick was present at the immediate surface of the topsoil.
- Laboratory analysis (see Table 3 below and Appendix 2) classified the topsoil as a **Sandy Loam**.

Sample	% Gravel	After removal of gravel			Soil Texture Classification
		% Sand	% Silt	% Clay	
Sample RBP/1/11089	0.1	55.1	33.4	11.5	Sandy Loam

Table 3: Soil textural analysis

The laboratory results for the representative topsoil sample taken on the development field in Appendix 2 also confirmed:

- 33.6% of particles were distributed between the medium and fine sand fractions (particles between 0.125 to 0.5mm).
- 62.2% of all particles were found below the fines fraction (particles less than 0.125mm).

In summary, the existing topsoil will behave as a very fine textured soil, with reduced drainage characteristics in the winter months and susceptible to structural damage (compaction) during play in wet conditions.



Plate 4: Typical topsoil profile and condition

b) Subsoil

The subsoil was found to be a grey clay loam/clay of variable depths to between 500-650mm. Below this was generally found to be an orange/yellow clay to between 800-1000mm depths, although a yellow/orange fine sand was observed in trial pits 3, 4, and 6, with some stone/grit content found at locations 1, 5, 6, and 7.



Plate 5: Typical subsoil profile

3.4 Climatic Data

A collation of historical climatic data is tabulated in Table 4 below.

Characteristic	Data	Comments
Annual rainfall	1,133mm	All represent high readings
Excess winter rain (median)	600mm	
Excess winter rain (quartile range)	460-720mm	
Return to field capacity	11 September	The pitches will be at field capacity for the majority of the season
End of field capacity	13 May	
Period of field capacity	245 days	
Growing season	2 April- 26 Nov (238 days)	Reasonably long growing season; little need for irrigation
Grass drought factor	<5 days	
Potential transpiration	442mm	

Table 4: Historical Climate Data

From the table above, the following should be noted:

- Average rainfall for the area is high at 1133mm per year
- The median excess winter rainfall which is the amount of rainfall that needs to be discharged through the profile and the drainage system over the winter period is recorded as 600mm (excess winter rain does vary from year to year and the quartile range given is 460-720mm).
- Field capacity is that state in which the soil is holding maximum amount of water after free drainage has ceased. It is useful to know this since it indicates the time of year about which drainage will start to occur and also that time when soil compaction is most likely to happen. Fine textured soils in particular are susceptible to compaction from physical forces when at field capacity or above. The median date for return to field capacity is 11 September for this area and the end of capacity given as 13 May. This equates to the topsoil being at field capacity for 245 days and the majority of the winter sport season.
- The grass drought factor gives an indication of the number of days when the soil moisture deficit exceeds 50mm within the main rootzone. Such a soil moisture deficit is likely to lead to the growth of grass being impeded due to a lack of regularly available soil moisture. In this area the grass drought factor is estimated to be under 5 days.
- The determination of the growing season is not easy as it depends upon a number of different factors. However, in this case it is defined as the length of time that the top 300mm of soil remains above 6°C. For this site the growing season is said to be 238 days (2 April – 26 November) and will provide a significant recovery period between seasons, assuming that the pitches are not excessively used for summer activities/usage.

In summary, excess winter rainfall is high and will need to be removed by an efficient drainage system given the presence of the impermeable clay subsoil. Deterioration of the topsoil structural condition especially at the surface, would be expected given it would be at field capacity for much of the football season. Supplementing the pipe drainage system with sand slits to bypass the deteriorated topsoil must be considered as a component of the works along with sand amelioration of the topsoil to improve its natural drainage properties.

The need to irrigate to enable the sward to recover following renovations at the end of the soccer season in spring is assessed as not being essential but useful according to historical weather data. Nevertheless, a late summer sowing would be preferred for establishment of the pitches if overseeding is deemed to be required.

3.5 Existing Drainage

Knowledge of any historical land drainage system within the development field is very limited with nothing significant thought to exist. No evidence of any existing drainage system was observed during the site visit and soil pit excavations.

The field is landlocked, therefore, no definitive outlet facility exists to connect any designed drainage system for discharge. However, potential exists via a culvert installation on a neighbouring housing development scheme on land to the west of the pitches.

Controlled flow will be a likely outcome through obtaining planning permissions and gradient falls over the U13/14 pitch to the north of the field are virtually flat, therefore, this will require further investigation at detailed design stage with reference to minimum pipe drain depths and gradient falls being used along with the use of smooth bore pipe.

Should the depths of the culvert not accept the outlet pipe, an allowance will be required for the installation of a small sump and pump chamber arrangement in the north west corner to pump water into the culvert.

Given the very fine textural nature of the existing topsoil combined with regional climatic data and the proposed use of the area for winter sports, a pipe drainage system will be required as part of any proposed improvement works complimented with the installation of an efficient secondary slit drain system to remove surface water effectively through the playing season.

3.6 Agronomic Assessment

Through lack of use and regular maintenance regimes, the area was observed to possess a variety of grass species, including perennial rye grass, annual meadow grass, some fescue/bent species along with significant volumes of coarse meadow grasses and some moss and weed invasion.

As part of any improvement proposals, the existing sward will be desiccated and killed off, therefore, existing grass quality should be disregarded.

An old cricket wicket was observed on the site which will need to be removed with the excavation of the clay loam material and replacement with suitable topsoil harvested from peripheral areas of the field.



Plate 6: Typical ground cover



Plate 7: Old cricket wicket observed on site

3.7 Pitch Usage

With the site not currently used for sport, existing usage data is not applicable. In terms of proposed usage, this is still to be confirmed, but Sport England consider the information provided in Table 5 below as giving a reasonable estimation of the likely usage level on winter sports pitches for a range of construction types.

Drainage status	Adult weekly use* (hours)
Undrained	Under 2
Pipe-drained	2 – 3
Pipe-drained with mole drains	2 – 4
Pipe-drained with sand grooves	3 – 6
Pipe-drained with slit drains	3 – 6
Pipe-drained with topsoil and drainage layer	3 – 6
Pipe and slit drained	3 – 6
Pipe-drained with suspended water table	4 – 6

*The usage levels shown will increase by ~50 % for players 15 years of age and under.

Table 5. Estimated usage levels

Given the fine textured topsoil, which has very poor natural drainage properties, the low permeability of the clay dominated subsoil and proposed use for winter sports, it is essential that pipe and slit drain systems are installed to remove surface water efficiently. In addition, sand amelioration and topdressing applications should be considered to help maintain the surface connection of installed drainage systems and prevent soil capping.

Sand topdressings should be applied annually at 120 tonnes/hectare with aggressive raking/harrowing also undertaken to integrate the sand into any soil capping that occurs over the course of the playing season to dilute it. Over time, say 7-10 years, the build-up of sand topdressing will improve the physical characteristics of the immediate playing surface/upper topsoil (0-60mm) and provide a more free draining buffer to the indigenous topsoil below, providing some protection to the secondary drainage system.

Overall, if a pipe and slit drain system is installed combined with sand amelioration of the topsoil, it is expected that pitch usage of 3-6 hours per week, 4 ½ - 9 hours for younger age groups, would be sustainable based on SE's estimates.

4.0 RECOMMENDED OPTIONS

The brief for the works is to achieve a minimum Sport England standard to facilitate amateur junior sport on the pitches.

Current site limitations are:

- Isolated moderate high and low points within the pitches
- Poor pitch smoothness
- Lower than required pitch surface drainage performance
- Lack of available gravitational drainage outlet (to be confirmed)
- No guaranteed soakaway drainage solution

Site Outlet for Drainage Water

At this point the most significant cost risk is the drainage outlet for the site. Presently the site gradient falls will be designed to outlet to the northwest of the site. Tests conducted at the southeast of the site demonstrate some level of natural drainage, it is believed that this soakaway will be contained within the sandy silt layer in the deeper soil profile. At points within the peak season sandy silt layer will likely become saturated and water tables will begin to rise and ultimately affect the performance of the drainage especially within the north west corner of the field. As such it is recommended an attenuated and pumped drainage outlet is located in the northwest and installed. However, this will incur significant additional cost as it will have to be pumped all the way back up to the southeast end of the pitch into the library scheme, incurring planning difficulties in itself with accessing power to the northwest of the site.

The best and most effective outlet for the pitches will be to the Northwest of the site into the drainage system on the new housing development. Even if this is restricted to avoid peak flow, it will be easier to accommodate than having to redirect flood water back up to the library building.

Where this cost is unfeasible, and the council are happy to take on a level risk associated with a soakaway scheme, accepting limitations in peak winter periods, the following staged approach to outlet drainage could be considered;

Option 1: Comprehensive re-levelling and drainage works.

Involving full stripping of topsoil, cut and fill of subgrade and replacement of topsoil. Full comprehensive primary and secondary drainage with surface ameliorated sandcarpet.

Item	Description	Total
1	Preliminaries	£8,500.00
2	Fencing	£1,300.00
3	Material testing	£1,800.00
4	Outlet of drainage via construction site (gravitational means)	£2,000.00
5	Kill-off existing turf cover	£550.00
6	Cultivate topsoil	£3,400.00
7	Strip topsoil	£14,500.00
8	Cut and fill level pitches	£17,000.00
9	Replace topsoil	£14,500.00
10	Consolidate and grade out topsoil	£3,000.00
11	Install collector drain	£4,750.00
12	Install lateral drains (5m)	£35,000.00
13	Supply and apply 25mm sand carpet	£22,571.16
14	Ameliorate into topsoil	£3,200.00
15	Install slit drains (1m)	£23,316.75
16	Supply and apply 15mm sand carpet	£13,542.69
17	Supply and apply base fertiliser	£950.00
18	finish and seed surface	£8,450.00
19	12 Months grow-in	£13,500.00
	Subtotal	£191,830.60
	Total with 5% Contingency	£201,422.13
	Provisional: Install attenuation tank and pump back to library building area / out to construction site discharge	£30,000.00

To complete drainage and sandcarpeting of the area between pitches would require an addition £30,000.00.

Option 2: Basic levelling and drainage works.

Contained improvement of levels within the available topsoil depth onsite and some imported topsoil. Economic primary and secondary drainage scheme with a conservative ameliorated sandcarpet.

	Basic Pitch Relevelling and drainage	
Item	Description	Total
1	Preliminaries	£8,500.00
2	Fencing	£1,300.00
3	Material testing	£1,800.00
4	Outlet of drainage via construction site (gravitational means)	£2,000.00
5	Kill-off existing turf cover	£550.00
6	Cultivate topsoil	£3,400.00
7	Allow for digging out of cricket square	
7	Allow for harvesting of topsoil from peripheral areas and levelling of low points on pitch and box grade levelling. Note can be scaled slightly to budget.	£40,000.00
8	Add additional topsoil (to budget only)	£0.00
9	Install collector drain	£4,750.00
10	Install lateral drains (6m)	£28,000.00
11	Supply and apply 25mm sand carpet	£22,571.16
12	Ameliorate into topsoil	£3,200.00
13	Install slit drains (1m)	£23,316.75
14	Supply and apply 10mm sand carpet	£9,028.46
15	Supply and apply base fertiliser	£950.00
16	finish and seed surface	£8,450.00
17	12 Months grow-in	£11,000.00
	Subtotal	£168,816.37
	Total with 5% Contingency	£177,257.19
	Provisional: Install attenuation tank and pump back to library building area / out to construction site discharge	£30,000.00

To complete drainage and sandcarpeting of the area between pitches would require an addition £25,000.00.

Recommendations

From the two options both will provide pitches of Sport England standard. However, Option 2 will not address all the limitations identified with isolated low areas still being present.

Where at all feasible options 1 would provide the best options.

The primary action must be to confirm the access to a drainage discharge point and associated conditions.

5.0 TIMESCALES/INDICATIVE PROGRAMME

With respect to timescales for completing the project, it is recommended that construction works are only undertaken under suitable ground and weather conditions ideally achieving a late summer/early autumn seeding so that the pitches have the maximum amount of time for grass establishment over the pipe and slit drains.

An indicative work programme is presented below:

Possible Timescales 2019/20 – Cut/fill earthworks, drains @ 5m centres and excavated slits @ 1m centres

Sportsfield Drainage Works	2019										2020							
	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Design																		
Tender																		
Mobilisation of contractor																		
Selective Herbicide																		
Earthworks																		
Pipe Drainage																		
Seeding																		
Maintenance – Phase 1																		
Excavated Slit Drains																		
Maintenance – Phase 2																		
Pitch Brought Into Use																	P	

P Denotes possible first use

6.0 CONFIDENTIALITY

This presentation is confidential and is only for the use of officers of Plincke/Rochdale MBC. Without the specific consent in writing of Professional Sportsturf Design (NW) Ltd, no copies of this presentation are to be made and information contained herein should not be communicated to any third party. At the request of Professional Sportsturf Design (NW) Ltd all copies of this document, in whatever form, are to be returned.

7.0 ADDITIONAL INFORMATION

It is Plincke/Rochdale MBC responsibility to check with the relevant local authority regarding permissions to implement the works e.g. planning permission or any other factors that could affect starting on site or progress whilst on site.

A Performance Quality Standards assessment (PQS) is provided in Appendix 3 which provides valuable data to compare the condition of the pitches post improvement.

This report does not constitute a detailed Specification or Bill of Quantities, and as such, is not suitable for use in obtaining prices from contractors or as a formal construction contract document.

Successful implementation of the works on the natural turf facilities at Balderstone Park should involve the preparation of a full design and specification and the skilled implementation of the designed works. It must be appreciated that the preparation of good sports turf surfaces involves a great deal of skill and care. Materials, particularly soils on site, are variable. The way in which the works are implemented and especially the weather and ground conditions prevailing at the time are as important as the methods used.

Any work would best be carried out during the normally drier months of late spring and summer, with an aim to grow in the pitch ready for use in late summer to early autumn – depending on the weather.

Following the construction works it is essential that the facilities should be properly maintained, receiving a full maintenance programme designed around the individual requirements of the site.

All relevant Health and Safety Regulations must be observed and the works, as more widely described, would not fall within the scope of the Construction (Design & Management) Regulations 2015 (CDM 2015).

8.0 CONTACT DETAILS

Mr Charles Henderson
Professional Sportsturf Design (NW) Ltd
Wigan Road
Leyland
Lancashire
PR25 5XW

Tel: 01772 297830

APPENDIX 1

PLINCKE/ROCHDALE MBC – BALDERSTONE PARK

SITE LAYOUT/TOPOGRAPHICAL SURVEY

APPENDIX

PLINCKE/ROCHDALE MBC – BALDERSTONE PARK

SOIL ANALYSIS RESULTS

14967/1	14967/2	PARTICLE SIZE DISTRIBUTION		
		SAND / SILT / CLAY		
		Test Report	Number 14967/A	Page 1 of 2
100%				Project 1541 Sample RBP/1/11089
	100%			Project 1541 Sample RBP/2/11090
27/11/18	27/11/18			Sample Received Date
moist	moist			Sample Moisture (very wet, wet, moist, dry, n/a)
friable	friable			Sample Consistency (hard, friable, plastic, n/a)
high	high			Sample Homogeneity (high, medium, low, n/a)
				Particle Size Distribution – ASTM F1632-03 (Reapproved 2010)
SA - SR	SA - SR			Angularity (VA, A, SA, SR, R, WR, n/a)
M	M			Sphericity (H, M, L, n/a)
				% Coarse Gravel > 3.4 mm
0.1	0.1			% Fine Gravel 2 to 3.4 mm
0.6	2.6			% Very Coarse Sand 1 to 2 mm
3.5	6.6			% Coarse Sand 0.5 to 1 mm
17.0	30.7			% Medium Sand 0.25 to 0.5 mm
16.6	29.8			% Fine Sand 0.15 to 0.25 mm
17.4	18.2			% Very Fine Sand 0.05 to 0.15 mm
33.3	9.6			% Silt 0.002 to 0.05 mm
11.5	2.4			% Clay less than 0.002 mm
0.7	2.7			% greater than 1mm
20.5	37.3			% Coarse + Medium Sand
16.6	29.8			% Fine Sand
62.2	30.2			% Fines less than 0.15 mm

Continued on Page 2

Continued from Page 1

14967/1	14967/2				PARTICLE SIZE DISTRIBUTION
					SAND / SILT / CLAY
					Test Report Number 14967/A Page 2 of 2
					Coarse Gravel Criterion
					Fine Gravel / Very Coarse Sand Criterion
					Coarse / Medium Sand Criterion
					Fine Sand Criterion
					Very Fine Sand Criterion
					Total Fines Criterion
					Silt Criterion
					Clay Criterion

Angularity codes: VA, very angular; A, angular; SA, sub-angular; SR, sub-rounded; R, rounded; WR, well rounded.
 Sphericity codes: H, high; M, medium; L, low

ASTM Method: F1632-03 (Reapproved 2010)

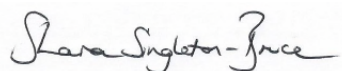
"Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sports Field Root Zone Mixes"

These results refer only to the samples provided. No guarantee is given that they are representative of the bulk material.
 Full terms and conditions are set out in document 'ETL / Conditions' which is available on request.
 This report shall not be reproduced except in full without the written approval of ETL.

Professional Sportsturf Design (NW) Ltd

Wigan Road, Leyland, Lancashire, PR25 5XW

Approved by:

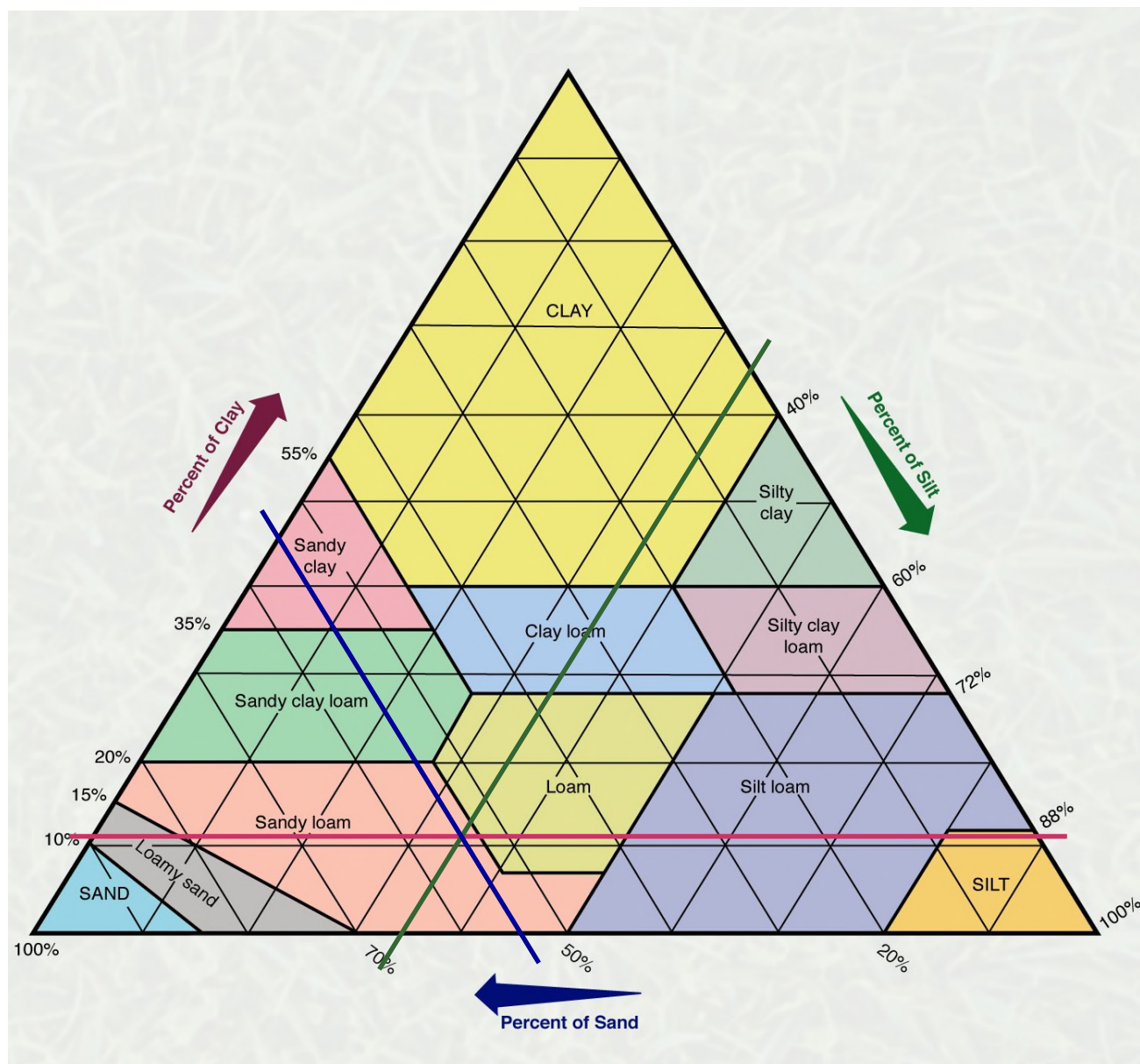


Date: 30th November 2018

Laboratory Manager, for European Turfgrass Laboratories Ltd

Triangle of Texture : Soil Classification

Date of Issue: May 2011, Revision 2,
Issuing Authority: Sharon Singleton-Bruce



Soil Sample: PSD (NW) Ltd

Project 1541

Sample	% Gravel	After removal of gravel			Soil Texture Classification
		% Sand	% Silt	% Clay	
Sample RBP/1/11089	0.1	55.1	33.4	11.5	Sandy Loam

Signed:

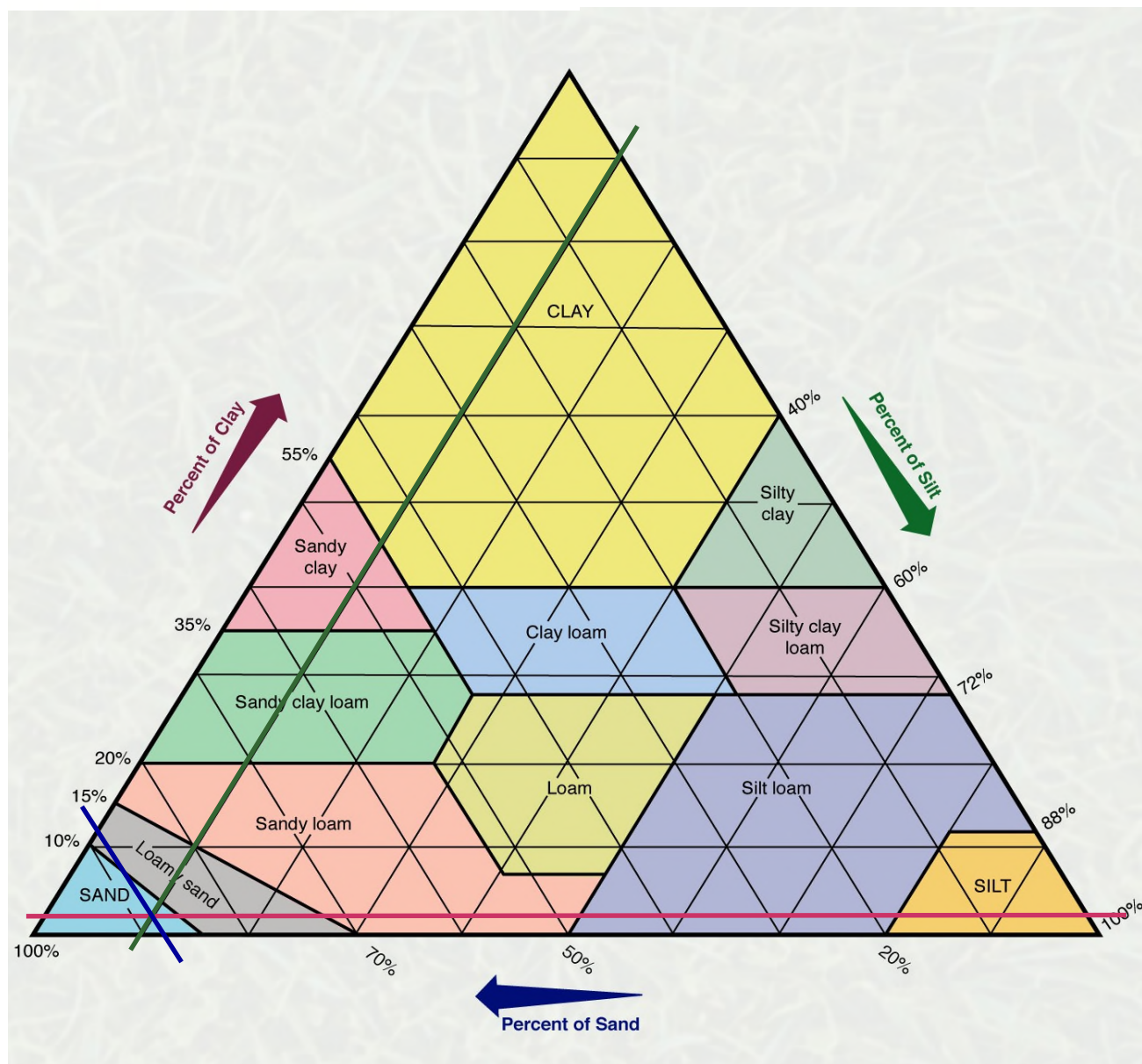
Sharon Singleton-Bruce

Date: 30th November 2018

for European Turfgrass Laboratories Ltd

Triangle of Texture : Soil Classification

Date of Issue: May 2011, Revision 2,
Issuing Authority: Sharon Singleton-Bruce



Soil Sample: PSD (NW) Ltd

Project 1541

Sample	% Gravel	After removal of gravel			Soil Texture Classification
		% Sand	% Silt	% Clay	
Sample RBP/2/11090	0.1	88.0	9.6	2.4	Sand, bordering on Loamy Sand

Signed:

Sharon Singleton-Bruce

Date: 30th November 2018

for European Turfgrass Laboratories Ltd

APPENDIX 3

PLINCKE/ROCHDALE MBC – BALDERSTONE PARK

PQS ASSESSMENT

Appendix 4: Performance Quality Standards

Client: Plincke/Rochdale MBC – Balderstone Park

Physical Site Survey date:

15th November 2018

Project Title: Sports Pitch Improvements

ELEMENT	LIMITS	METHOD OF TEST	Visit 1	Visit 2
Ground cover %	>75%	BS 7370 : P3 A6	✓	
Broad-leaved weeds %	<10	BS 7370 : P3 A6	✗	
Sward height mm	20-70 PS 30-60 CS	BS 7370 : P3 A3	✗	
Thatch depth mm	<15	BS 7370 : P3 A7	✓	
Hardness in g	35-200	STRI method of test using a 0.5 kg Clegg Impact Hammer from a drop height of 0.55 m	n/a	
Water infiltration rate mm d ⁻¹	5 (mm/hr)	BS 7370 : P3 A8	✗	
Evenness (2 metre straight edge)	<25 mm	BS 7370 : P3 A6	✗	
Slope: Direction of play (%)	<1.00 - 1.25	BS 7370 : P3 A5	✓	
Across play (%)	<1.25 - 2.5%		✓	
pH value	5.8 – 7.5	ISO 10390	tbc	

KEY: SH = Sward Height

PS = Playing Season

CS = Closed Season

Visual assessment is an acceptable alternative method of testing, if undertaken by a turfgrass consultant who is able to satisfy the selection criteria identified within the Turfgrass Consultants – Construction/Upgrade Brief.

Assessment undertaken by: Charles Henderson

Consultancy:

Professional Sportsturf Design (NW) Ltd

APPENDIX 4

PLINCKE/ROCHDALE MBC – BALDERSTONE PARK

MAINTENANCE GUIDELINES

Appendix 5: Outline Maintenance Recommendations

Mowing. The grass shall be maintained between a height of 25 - 40 mm using cylinder mowing equipment. The grass should never be allowed to exceed a height of 50 mm. If the grass does become too long, the height of cut should be reduced gradually over 3 – 4 cuts allowing some time for recovery in between. N.B. On no account should the grass height be reduced by more than 50% on any one occasion. Overall, approximately 30 mowing operations may be required each year, depending on weather and growing conditions.

Fertiliser application. Allowance should be made for a sufficient number of fertiliser applications to maintain healthy growth and colour. The fertiliser regime should be based on the results of annual soil sampling to determine nutrient concentrations, but the following programme is provided as a guide:

May (end of playing season when renovated)	8:12:8 at 350 kg/ha
June/July (during warm wet spell)	12:0:12 at 350 kg/ha
September (if needed)	5:5:10 at 350 kg/ha

Fertiliser shall be applied with appropriate equipment that ensures a uniform distribution.

Weed control. Apply a selective herbicide in the spring (if required) to combat the weeds present. This to be applied at least two weeks after the first fertiliser treatment (April/May) and at a time when grass growth is strong and healthy. NB. Do not apply herbicide during periods of potential turf stress, i.e. if the weather is hot and dry or if frosts are forecast. Apply herbicide strictly according to the manufacturers label recommendations and only by suitably qualified personnel. Usually only needed every 3 years or so.

Pesticide/Fungicide [If required]. A pesticide/fungicide application may be required should disease be present within the grass sward. An approved fungicide should be used with activity against the pathogens present and be applied following the manufacturers label recommendations by suitably qualified personnel.

Aeration / Compaction Alleviation. Verti-drain (or other similar de-compaction treatment) the pitch on at least two occasions in the spring and autumn. Use 18 mm diameter solid tines working to a minimum depth of 200 mm below the surface set to provide some heave. Verti-draining must not be carried out if ground conditions are too soft or during frost.

Additional aeration treatments (e.g. slitting or spiking) during the playing season would also be highly beneficial to maintain surface drainage rates. These treatments should only be undertaken when ground conditions are suitable.

Sand topdressing. Supply and spread approved medium-fine sand suitable for sports use during the renovations period (e.g. mid May) at the rate of approximately 65 t/senior-sized pitch. After each application, the sand should be worked into the surface with brushes or drag mats.

Overseeding. Overseed the pitch area and safety margins as required at the application rate of approximately 200kg/ha (20g/m²) immediately after the topdressing application in May. Use at least three cultivars of perennial ryegrass chosen from the latest Turfgrass Seed booklet with live ground cover and visual merit ratings of 6.5 or more. Make at least two passes with seeding equipment designed to place the seed approximately 5mm below the surface.

Harrowing [Playing season as required]. To maintain surface levels, it is recommended to chain harrow / drag mat the pitch as opposed to flat rolling which tends to compact the pitch surface and exacerbate undulations. This should only be undertaken under suitable ground conditions.

Divot repair [Playing season]. After each match, divot and tread the divots back into position. This will remove any bare soil which allows weeds and weed grasses to germinate. Filling in divots with seed/soil mix will help to maintain better grass coverage.

Renovation of worn areas [Playing season]. Areas of high wear, e.g. goal mouths, should be dressed and seeded using a divot repair mix (seed/rootzone) during the playing season as required in order to maintain good grass cover. These areas should be hand watered (if necessary) to ensure rapid grass germination and establishment.

Line Marking [Playing season]. Line marking should be undertaken on a weekly basis during the playing season.

Goal post safety. The posts should be regularly checked for damage and re-painted / re-paired as necessary following the manufacturer's guidance.

