

## 4.0 SOIL CONDITIONS

### 4.1 Geology

The *British Geological Survey* website (*Geology of Britain 1:50,000*) describes the site geology (Bedrock and Superficial Deposits) as follows:

- Bedrock – *London Clay Formation – Clay and Silt.*
- Superficial Deposits – *Langley Silt Member – Clay and Silt*
- Superficial Deposits – *Alluvium – Clay, Silty, Peaty and Sandy* (southern part of the site towards the River Thames only)

### 4.2 Soils Map of England Wales

The Soil Map of England and Wales (1:250,000 scale) classifies the soils of this site as:

*Unsurveyed* Mainly urban and industrial areas.

Soils within urban and industrial areas are potentially subject to a wide range of natural and anthropologic influences and impacts, and can include building materials and soils which have been imported from outside of the subject site. In horticultural terms, this can result in variable soil conditions with regards to soil chemistry, fertility status and physical condition, including compaction and the presence of foreign matter within the soil matrix.

### 4.3 Soil Conditions

With reference to the findings of the existing Soil Resource Survey (ref. TOHA/16/3995/CS, dated 03/11/2016), three soil profile types were recorded across the Park as a whole. Two of these profile types (*Profile 1* and *Profile 3*) are applicable to the sports pitches as outlined below:

- *Profile 1 – Light to Medium Textured Soils.* Sandy loam topsoil over sandy loam or sandy clay loam subsoil.
- *Profile 3 – Heavy Textured Soils.* Clay loam topsoil over clay loam or clay subsoil.

*Profile 1* was encountered within the majority of the sports pitches, whilst heavier textured, '*Profile 3*' type *subsoil* was recorded within parts of the rugby pitches only. These soil profiles are described in further detail within the Soil Resource Survey report (including soil horizon depths), with a summary given in Table 5.

**Table 5: Soil Profile Characteristics**

<b>Profile 1 – Light to Medium Textured Soils</b>	<b>Profile 3 – Heavy Textured Soils</b>
<ul style="list-style-type: none"> <li>• Sandy loam to sandy clay loam soil textures</li> <li>• Fine textures – significant proportions of ‘fines’ (very fine sand, clay, silt)</li> <li>• Slightly broad particle size distribution</li> <li>• Virtually stone-free to slightly stony</li> <li>• Adequate structures (uncompacted below surface)</li> <li>• Acid to slightly alkaline soil reaction</li> <li>• Non-calcareous, with occasionally slightly calcareous subsoil</li> <li>• Non-saline</li> <li>• Topsoil has sufficient reserves of organic matter, nitrogen and magnesium</li> <li>• Topsoil is deficient in phosphorus and potassium</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy clay loam to clay soil textures</li> <li>• Virtually stone-free to slightly stony</li> <li>• Alkaline to strongly alkaline soil reaction</li> <li>• Slightly calcareous</li> <li>• Non-saline</li> <li>• Topsoil has sufficient reserves of organic matter, nitrogen and magnesium</li> <li>• Topsoil is slightly deficient in phosphorus and potassium</li> </ul>

The topsoil depths recorded in the sports pitch zones ranged between 200-510mm, typically being between 200-390mm.

Topsoil surface smearing was commonly recorded within Football Pitches 1 and 2. Smearing of the surface effectively prevents water from entering the soil profile, reducing soil aeration and drainage, resulting in unfavourable conditions for root growth. Continual or intensive use when wet may also destroy grass cover, further compounding the problem of poor aeration and impeded infiltration.



Plate 7: Profile 1 Topsoil at TH26



Plate 8: Subangular and subrounded, small to medium sized stones within Profile 1 Topsoil



Plate 9: Yellowish brown *Profile 1 Subsoil*



Plate 10: Strong brown *Profile 1 Subsoil*

#### 4.4 Infiltration Tests

A total of 4 No. surface infiltration tests were carried out using double-ring infiltrometer apparatus. The test locations are indicated on the supplied plan in Appendix 2.

The results recorded were as shown in Table 6 below:

Table 6: Infiltration Test Results

Test Location	Result (mm/hr)
IF1	4
IF2	20
IF3	13
IF4	15

These results indicate that the pitch surface at three out of four of these locations has reasonable infiltration capacity.

At location IF1 the infiltration rate is lower, which is likely to be indicative of this pitch having heavy use, resulting in increased surface smearing and loss of infiltration performance.

Recent verti-draining/spiking is likely to have influenced the infiltration rate at locations IF2 and IF4.

## 5.0 TURF ASSESSMENT

An assessment of turf quality was carried out across the playing field in order to provide baseline data. The survey was carried out with reference to the Sport England guidelines.

The turf was examined using a quadrat at several locations across each pitch/outfield. A 2 metre long straight edge with measuring wedge was used to assess surface evenness.

A summary of the measurements is presented in Table 7 – Table 9 below. The full results for each performance property at each location examined are presented in the tables in Appendix 4. A site plan showing turf inspection locations is shown in Appendix 3.

Table 7: Turf Quality Assessment Summary – Football Pitches

Performance Property	Average Score
Ground Cover %	70
Bare Area %	29
Weeds %	6
Moss %	0
Algae/Lichen %	0
Undesirable Grass Species %	0
Desirable Grass Species %	100
Disease %	0
Worms %	2
Evenness: 2 m/st/e: mm	14

**Table 8: Turf Quality Assessment Summary – Rugby Pitches**

Performance Property	Average Score
Ground Cover %	93
Bare Area %	7
Weeds %	7
Moss %	0
Algae/Lichen %	0
Undesirable Grass Species %	0
Desirable Grass Species %	100
Disease %	0
Worms %	2
Evenness: 2 m/st/e: mm	8

**Table 9: Turf Quality Assessment Summary – Cricket Outfield**

Performance Property	Average Score
Ground Cover %	99
Bare Area %	1
Weeds %	2
Moss %	3
Algae/Lichen %	0
Undesirable Grass Species %	0
Desirable Grass Species %	100
Disease %	0
Worms %	1
Evenness: 2 m/st/e: mm	6

## 5.1 Summary of Findings

### Ground Cover and Bare Areas

The average ground cover was moderate in the football pitches and was high across the rugby pitches and cricket outfield. Significant bare areas were recorded in play hotspots on the football pitches, including the goal mouths, centre circles and penalty spots.

### Weed Infestation

There was a low to moderate weed population across the survey areas, with occasional broad-leaved weeds, including clover (*Trifolium repens*), yarrow (*Achillea millefolium*), daisy (*Bellis perennis*) and dandelion (*Taraxacum officinale*).

### Algae/ Lichen/ Moss

There were no major populations of algae or lichen.

Moss was generally absent from the football and rugby pitches, with a patch identified within the cricket outfield (inspection location No. 30). Low soil pH can favour moss growth, which could be a factor in this location.

### Undesirable Grass Species

Overall, undesirable grass species were not observed across the survey areas.

### Desirable Grass Species

The survey area had a high population of desirable grass species comprising perennial ryegrass (*Lolium perenne*), which has a high wear tolerance.

### Pests and Diseases

No evidence of disease was recorded and the sward was free of turf pests. However, the Park is heavily used by dog walkers, and excrement was occasionally seen on pitches, together with small patches of flush growth which could be associated with dog urine.

### Worms

The proportion of worm casts on the playing field surface was low. Worm casts produce an unpleasant slippery surface in wet weather, and can also affect the mowing of the turf.

### Evenness

An even playing surface is necessary for the safety of the players and for the consistent roll of the ball for certain sports, including football. In the football pitches there were a number of undulations greater than 25mm along a 2m straight edge recorded in wear hotspots, including the goal mouths and centre circles. These areas may need to be infilled and re-graded to improve evenness.