

Anwyl Homes

Alexandra Park
Feasibility Study

Report date: 27/09/2022

Consultant: Mark Murphy

Revision: B

CONTENTS

contents.....	2
1.0 Introduction and Background.....	4
2.0 General Site Descripton.....	6
3.0 Discussion.....	16
4.0 Recommendations	18
5.0 Indicative Cost Estimates	21
6.0 Health and Safety.....	22
7.0 Outline maintenance operations.....	23
Appendix 1 – Soil Size Analysis.....	25
Appendix 2 – Soil Chemical Analysis.....	26
Appendix 3 – Site Investigation Photos.....	27
Appendix 4 – Topographic Survey.....	32
Appendix 5 – indicative layout	33

Report Title: Sports Pitch Feasibility Report
Sports Facility Name: Alexandra report
Date of Visit: 30th August 2022
Visit Objective: Initial Site Appraisal

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0	27/09/22	Initial document issue to client	MM	NR
A	29/10/22	Minor updates following client review	MM	NR
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1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

STRI have been appointed to provide agronomic consultancy services to Anwyll Homes in relation to the development of natural grass sports facilities within Alexandra Park, Manchester.

1.2 Background and context

Alexandra Park has been identified as a potential site to provide replacement provision for the loss of playing field land at Harry Dalton Playing Fields, Wilbraham Road, Chorlton. The loss of playing field land is associated with a proposal to develop a residential scheme comprised of approximately 60 units.

STRI understand that the site at Harry Dalton Playing Fields is unallocated land which was formerly used as a natural grass football pitch but has been unused for over five years. The playing field area has been measured as 1.33 ha. The site also accommodates a derelict non-turf cricket wicket.

The site at Harry Dalton Playing Fields is considered to constitute a playing field or land last used as a playing field. As such STRI understand that Sport England will consider any proposals affecting Harry Dalton Playing Fields in line with National Planning Policy Framework (NPPF) and against Sport England's own playing fields policy. In this case, both the NPPF and Sport England require that an equivalent or greater quantity of playing field is provided, and that an equivalent or greater quality of playing field is provided at the proposed replacement site prior to the commencement of the development.

This report deals specifically with the proposal to meet the above criteria by providing policy compliant replacement provision at Alexandra Park. The current proposal is to develop a new playing field area in the northern half of Alexandra Park, which would be capable of accommodating an adult 11-a-side pitch and additional playing field space. This report also deals with the proposal to improve the condition of the existing playing field area in the southern half of the site.

1.3 Site appraisal

STRI carried out an appraisal at Alexandra Park to assess the condition of the site, alongside the technical and practical considerations associated with providing replacement provision within the site.

The objectives of the appraisal are summarised below:

1. To review existing site information made available to STRI
2. To investigate and report on the present situation at Alexandra Park including:
 - a. The existing playing field provision
 - b. The existing surface levels
 - c. The topsoil and ground conditions
 - d. The drainage conditions and drainage infrastructure present
 - e. To provide recommendations for the works required at Alexandra Park.

3. To provide indicative costs estimates for the recommended works

The report includes a photographic record of the conditions observed during the site visit. Additional site visit photos shall be made available upon request.

Representative samples of topsoil were collected for physical and chemical analysis. The results of the soil laboratory analyses are set out in tabular form within the general site description to enable comparison of the results. The full soil analysis reports are included as appendices to this report.

The site was inspected on the 30th of August by Mark Murphy, STRI Design Consultant and Luke Gawthorp, STRI Design Technician.

1.4 Reporting

The data obtained from the site survey is reported in a standard format, containing the following information:

- General site information.
- The type and condition of the vegetation and presence of weeds.
- The general geomorphological and soil conditions.
- The local climatic conditions.
- The type and condition of the soil profile and drainage systems present.
- General hydrology and drainage conditions.
- The overall performance is discussed with comments on the significant limiting factors.
- Recommendations on the required works.

2.0 GENERAL SITE DESCRIPTION

2.1 Location

Site address: Alexandra Park 180 Russell St, Manchester M16 7JL.

The area within the scope of this report is a circular shaped parcel of land as illustrated in Figure 1. The area is grassed and currently accommodates one natural grass adult football pitch located in the southern half of the site. The northern half of the site is not currently used for any formal sporting use and includes an unmanaged natural grass cricket wicket.

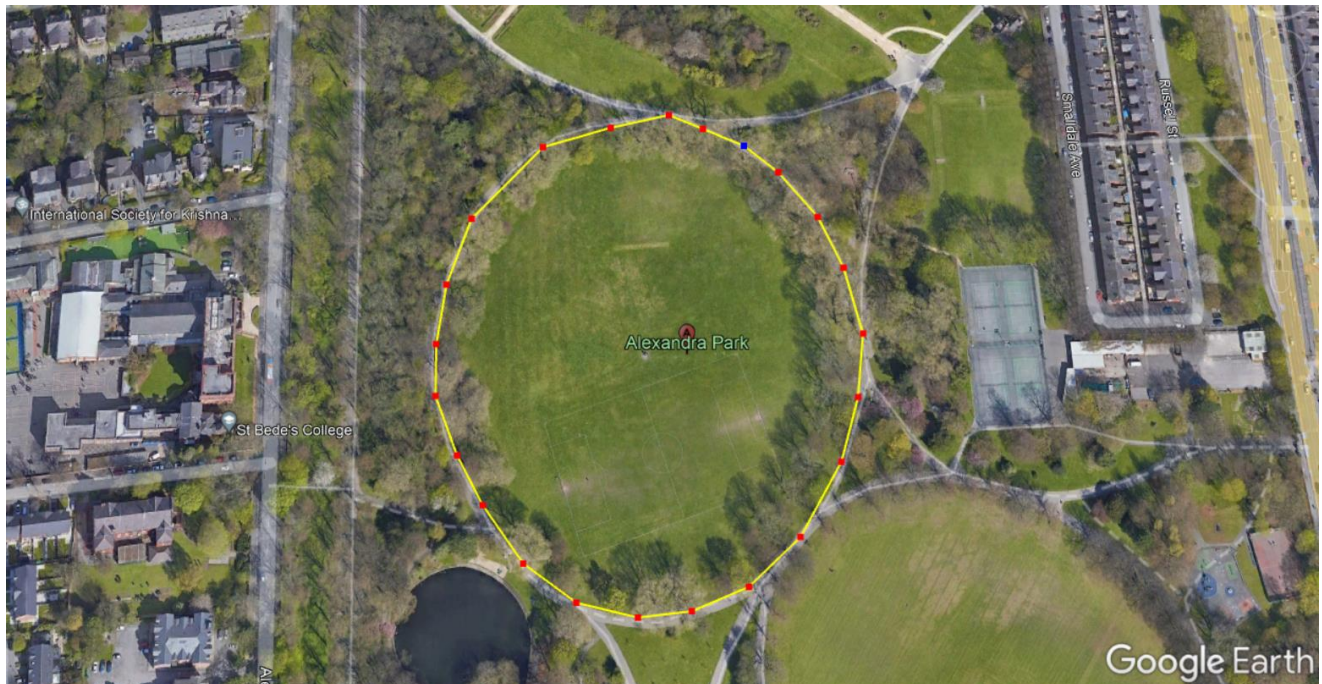


Figure 1 - Area within scope of STRI feasibility study (demarcated by solid yellow line)

Hereafter, the area within the scope of the STRI feasibility study as illustrated in figure 1 will be referred to as “the site”.

The grassed area of the site measures approximately 32,954 m² (3.29 hectares) and consists of poorly managed parkland surrounded by mature trees located around the perimeter. There was a flagpole feature located in the centre of the site, to the north of the existing natural grass pitch.

STRI understand that the site has been used historically for sport and recreational purposes. A review of historical mapping and aerial photography confirmed that land use appears to have remained largely unchanged in recent years. Aerial photography suggests that the cricket wicket has been unmaintained since approximately 2003.

The site is bound on all sides by a footpath and mature trees. Access for construction and maintenance purposes is gained to the north-east via Alexandra Road through a set of large double gates.

2.2 Spatial constraints

The usable space within the site is constrained by the presence of mature trees around the site perimeter. If the site is to be developed, there will be a requirement to identify and demarcate root protection areas (RPA's) to avoid loss or damage to the existing trees. A root protection area is an area of ground that lies immediately under a tree and beyond the extent of its crown. An arboricultural survey would be required to accurately assess the trees present, and to ascertain the location of any tree protection areas required. Note that tree protection areas are based on the diameter of the tree's trunk. Typically, a tree with a trunk measuring 1 m in diameter would require a root protection area of 12 m extending out from the tree trunk. There would be no topsoil stripping, re-grading or drainage installation works permitted within designated tree protection areas.

The area of new playing field that can be developed will be subject to the extent of any tree protection areas identified. For illustrative purposes, Figure 2 illustrates the potential working area for playing field development works. This is based on the root protection area extending 5 m beyond the extent of the tree canopy line (assumed from aerial photography).

Figure 2 illustrates that an area of approximately 12,125 m² (1.21 hectares) would be available for playing field development works in the northern half of the site. It should be noted that this area may be less depending on the tree protection areas identified.



Figure 2 Playing field area based on root protection area extending 5 m beyond the extent of the tree canopy line. 12,125m² available

In the southern half of the site, similar constraints would apply for any playing field improvement works. It is assumed that an area of approximately 7,500 m² (0.75) would be available for improvement works in this area, subject to an arboricultural survey. This includes the existing natural grass pitch measured to be 5,985m² excluding perimeter runoff areas.

2.3 Existing sports facilities (existing playing field provision)

At the time of the assessment, there was one natural grass adult football pitch located within the southern part of the site. There was an unused natural grass cricket wicket located in the northern half of the site. It was apparent that the northern half of the site had not been used for any formal sporting activities in recent years.

The existing football pitch has been classed as 'standard' in Manchester City Councils' emerging Playing Pitch Strategy (PPS). The dimensions of the existing pitch were measured to be 95 m x 63 m excluding runoff margins. Thus, providing an existing pitch area of 5,985m² (circa 0.6 Hectares).

The existing pitch had faint line markings at the time of the visit, however there were no goal posts in place. Goal sockets were observed. It was noted that there were no protective caps over the sockets.

The existing natural grass cricket wicket in the northern half of the site was in a state of disrepair and was not in a condition suitable for use. The northern half of the site is not currently utilised as a playing field and presents an opportunity to develop a replacement playing field area.

Overall, the existing natural grass facilities were in a poor condition and significant investment is required to develop a replacement playing field area within the site

2.4 Topography and surface levels

2.4.1 Topography

Surface levels and gradients have been assessed based on a topographic survey carried out by STRI.

The site is generally flat with a minor gradient towards the south-west side. The highest ground levels were observed in the north-eastern side of the site (30.73 m). The lowest ground levels were observed in the south-western side of the site (29.52 m). Gradients observed across the site were inconsistent.

The existing football pitch had an overall fall of approx. 1:210 along the line of play, with falls across the line of play ranging from 1:410 to 1:297.

Based on the topographic information obtained, the current gradients across the site do not meet Sport England requirements and are not conducive to efficient surface water drainage. Typically, a gradient of 1:100 is recommended to aid surface water drainage.

As part of any playing field development works, a cut and fill earthworks operation is recommended to create uniform gradients. The aim of any earthworks operations would be to form a playing field area with suitable gradients to accommodate a football pitch and surrounding natural grass areas fit for community use, (i.e., the pitch surfaces no steeper than 1:80 – 1:100 along the line of play and 1:40 – 1:50 across the line of play). An earthworks operation would be required to create the new replacement playing field in the northern half of the site. Earthworks could also be carried out in the southern half of the site to improve the gradients and surface levels in the existing playing field area.

2.4.2 Surface evenness

Surface evenness was generally variable across the site with various undulations observed which were negatively impacting the quality of the existing surfaces.

As part of the recommended earthworks, surface levels should be restored to provide even surfaces and eliminate any low spots which may collect surface water.

2.5 Turf condition and maintenance

At the time of the visit, the agronomic condition of the turf was poor across the entire site.

The site was grassed with *Lolium perenne* (Perennial ryegrass), with a high percentage of weed grass species such as *Poa annua* (Annual meadow-grass), and tufted grasses such as *Holcus lanatus* (Yorkshire fog). Grass cover was reduced in areas where water had been ponding during the winter months. Grass cover was reduced in the southern half of the site within the existing football pitch area, most notably in the goal mouths. Significant works are required to improve the agronomic condition of the turf to ensure wear tolerant surfaces fit for increased usage.

It was apparent that maintenance operations had been minimal across the site in recent years, likely limited to grass cutting only as well as line marking on the existing sports pitch.

Surface traction appeared to be poor, with large divots and footprints observed within the existing sports pitch. Significant broad leaved weed ingress was noted across the entire site, mainly in the form of dandelions, clover, and buttercups.

There was evidence of season waterlogging across the site based on the agronomic condition of the turf.

2.6 Climate

The local climate has been assessed to help guide playing field development options.

The average monthly rainfall (mm) is shown below using data from Rochdale, the nearest official Met Office climate station for the period 1991 – 2020.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
119	97	90	68	66	83	97	100	98	117	123	138	1197

Table 1 – Average monthly rainfall

Met Office data for the period 1991 – 2020 shows that the average annual rainfall observed at the Rochdale climate station is above the England average.

Rochdale average annual rainfall 1991-2020 = 1197 mm

England average annual rainfall 1991-2020 = 869 mm

The months receiving the highest average rainfall at the Rochdale climate station are October to January. This coincides with the winter months where temperatures and evapotranspiration will be at their lowest.

The average minimum temperature using data from Rochdale, for the period 1991 – 2020 is 6.0°C. It should be noted that the average minimum temperature is broadly in line with the England average minimum temperature (6.1°C).

The average maximum temperature using data from Rochdale for the period 1991 – 2020 is 13.1°C. It should be noted that the average maximum temperature is slightly below with the England average maximum temperature (13.8°C).

2.7 Topsoil conditions

2.7.1 General

It should be noted that the quality of a sports surface is always dependent on the soil or growing medium used in its construction.

A series of trial pits was excavated during the site investigation at various locations to confirm the topsoil conditions.

Five test pits (TP) were excavated across the site as shown in Figure 3 below.



Figure 3 - Trial pit location specified

2.7.2 Trial pits

The general description of the soil conditions within the trial pits excavated are summarised below.

Trial pit 1	Description
Surface Conditions	Managed parkland
Topsoil Description	Dark brown <u>clay loam topsoil</u> with significant stones/gravel observed. The total depth of topsoil was approximately 290 mm. The topsoil profile was friable at the time of the visit. Trial pits where difficult to excavate using a spade. Small tree roots were noted within the trial pit.
Subsoil Description	(290 mm +) dark brown <u>clay</u> with a gradual transition between topsoil and subsoil. Total depth was 590 mm reached when probed with a Dutch auger. Clay content was noted to increase with depth.
Trial Pit 2	Description
Surface Conditions	Managed parkland
Topsoil Description	Dark brown <u>clay loam topsoil</u> with less stones/gravel observed (compared to Trial Pit 1). The total depth of topsoil was approximately 330 mm. The topsoil profile was friable at the time of the visit. Evidence of seasonal waterlogging was noted through mottling of the topsoil and red stains along root lines. Test pits where difficult to excavate using a spade
Subsoil Description	(330 mm +) Dark brown <u>clay</u> with a gradual change between topsoil and subsoil. Clay content increased with depth.
Trial Pit 3	Description
Surface Conditions	Managed turf – football pitch
Topsoil Description	Dark brown <u>clay loam topsoil</u> similar in nature to Trial Pit 2. The total depth of topsoil was approximately 370 mm. The topsoil profile was friable at the time of the visit. Evidence of seasonal waterlogging was noted through mottling of the topsoil and red stains along root lines. Fragments of broken pottery and plastic were noted within the topsoil profile.

Subsoil Description	(370 mm +) Dark brown <u>clay</u> with a gradual change between topsoil and subsoil. Clay content increased with depth.
Trial Pit 4	Description
Surface Conditions	Managed parkland
Topsoil Description	Dark brown <u>clay loam topsoil</u> similar in nature to Trial Pit 2. The total depth of topsoil was approximately 250 mm. The topsoil profile was friable at the time of the visit. Evidence of seasonal waterlogging was noted through mottling of the topsoil and red stains along root lines.
Subsoil Description	(370 mm +) orange/grey <u>clay</u> with a distinctive change between topsoil and subsoil. Clay content increased with depth.
Trial Pit 5	Description
Surface Conditions	Managed parkland
Topsoil Description	Dark brown <u>clay loam topsoil</u> similar in nature to Trial Pit 2. The total depth of topsoil was approximately 300 mm. The topsoil profile was friable at the time of the visit. Evidence of seasonal waterlogging was noted through mottling of the topsoil and red stains along root lines.
Subsoil Description	(300 mm +) orange/grey <u>clay</u> with a distinctive change between topsoil and subsoil. Clay content increased with depth.

Table 2 - Trial pit descriptions

2.7.3 Particle size analysis

Five representative samples of topsoil were collected for particle size analysis to determine the mineral and organic matter composition of the site topsoil. The particle size analysis of the combined samples taken across the site is summarised below with more detailed results shown in Appendix 1.

For reference, winter games pitch topsoil should ideally fall into the loamy sand or sandy loam textural classification to enable suitable drainage performance.

Laboratory analysis confirms that the topsoil analysed from the site falls into the clay loam textural classification. The soil has a very high proportion of fine particles ('fines') comprising 9% very fine

sand, 27% silt and 35% clay. The high proportion of fine particles (71%) suggests that the hydraulic conductivity of the topsoil is likely to be low. As such, the soil will have high-water holding capacity. This is not conducive to the development of a playing field area, which must be efficiently drained to ensure playability all year round. The organic matter content of the site was 13.9 %. Sand amelioration should be included as part of the proposed development works to improve the drainage performance of the poor-quality native topsoil.

Sample Location & STRI lab no.	Soil Texture	Sand %	Silt %	Clay %	Organic Matter %
A19821/1 Representative topsoil sample	Clay	38	37	35	13.9

Table 3 - Particle analysis size

2.7.4 Chemical analysis

Representative samples of topsoil were collected for chemical analysis to determine the pH, extractable phosphate (P₂O₅) and extractable potassium (K₂O) levels in the site topsoil. The chemical analysis of the samples taken across the site is summarised below with more detailed results shown in Appendix 3.

Sample Location	pH	pH Status	P ₂ O ₅ Level (mg/l)	P ₂ O ₅ Status	K ₂ O (mg/l) Level	K ₂ O Status
A19821/1 Representative topsoil sample	6.0	Normal	22	Low	94	Satisfactory

Table 4 - Chemical analysis

Soil pH has a significant effect on the grass species which dominate the turf. The optimum range for a mixed sward of this type is generally between 6 - 7 and the test results fall within this range.

Laboratory analysis shows that concentrations of phosphate and potassium were low and satisfactory. For healthy turf growth, phosphate and potassium should be regulated as part of a balanced fertiliser programme. This can be addressed during development of the pitches and longer-term maintenance.

2.8 Drainage conditions and systems

It is understood that there is an existing below ground drainage system present across the site. However, the condition and effectiveness of the system is unknown.

It is understood that the drainage system consists of clay pipes arranged in a herringbone fashion. The age of the existing drainage system is unknown, however given the evidence of surface water drainage issues observed, it is assumed that the existing drainage system is ineffective in collecting and discharging surface water. Significant drainage improvements are needed across proposed playing field area in the northern half of the site. Drainage improvements should also be considered in the southern half of the site to improve the condition of the existing pitch surface and surrounding areas.

STRI carried out an excavation over an existing drain to confirm the materials present. During excavations, topsoil ingress was noted within the drainage backfill materials. This will significantly limit the efficiency at which surface water can percolate into the underlying clay pipes. The backfill material generally consisted of large stones (approx. 100 mm diameter) contaminated with soil. The lateral drains within the northern half of the site appeared to be located at approx. 5 – 6 m centres. In the southern half of the site, lateral drains appeared to be located at approx. 7 m centres.

Overall, there were slight variations in firmness across the site at the time of visit. The west of the site (near Trial Pit 4) was softer under foot compared to other areas. This correlates with the evidence of seasonal waterlogging observed.

As part of the drainage review, Scalgo was utilised to assess areas of surface water. Scalgo uses sensors and mapping technology to create high-resolution 3-dimensional maps of the surface of the earth. The Scalgo image below illustrates the areas within the site where seasonal water ponding is likely.

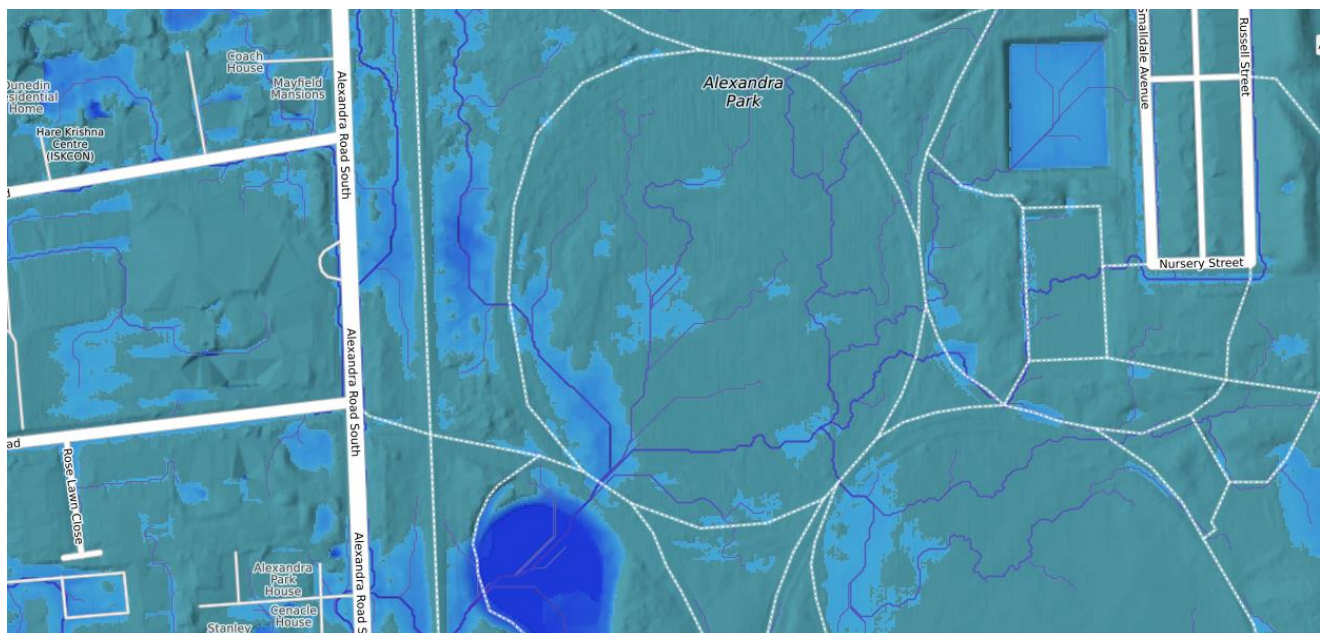


Figure 4 - Scalgo Image

STRI examined the manhole chambers within the site and recorded the invert levels, pipe diameters, and the general condition of the infrastructure present (appendix 4).

There was a manhole chamber located in the centre of the northern half of the site. In total there were three clay pipes entering this chamber, and two exiting the chamber. One pipe entered the chamber from the north, consisting of a 300 mm diameter clay pipe with an approximate invert level of 1100 mm below cover level. This pipe exited the chamber in a southern direction. A second inlet pipe was observed, consisting of a 150 mm diameter clay pipe, entering the chamber from a north-east direction. The pipe had an invert level of 750 mm below cover level. A 150 mm diameter clay pipe exited the chamber in a south-east direction with an invert level of 800 mm below cover level. A third pipe, 100 mm in diameter entered the chamber from a north-west direction with an invert level of 700 mm below cover level. It was noted that there was no water flowing through any of the pipes during the visit

The second manhole chamber was observed in the south-east corner of the site and appeared to be the final downstream chamber associated with the existing site drainage system. When opened, the chamber was blocked with a silty material and brick fragments. It is assumed that the pipework exiting this chamber heads in a south-west direction to the existing pond within the park grounds. A 200 mm diameter unperforated plastic pipe was observed entering the pond from this direction. This is the only known outlet location associated with the existing drainage system.

2.9 Utilities

The presence of any existing services should be confirmed in advance of any works.

3.0 DISCUSSION

When considering Alexandra Park as a potential site to provide replacement provision for the loss of playing field land at Harry Dalton Playing Fields, the following points should be considered.

- There is space available within the northern half of the site to develop a new playing field area.
- The area of space available to develop a new playing field area is constrained by the presence of mature trees around the periphery of the site. This is a significant limiting factor as there may be a requirement to establish root protection areas during any playing field development works. The extent of any tree protection areas should be confirmed by an arborocultural survey; however, this will limit the space available for development.
- Taking potential tree protection areas into consideration, the space available for the development of a new playing field in the northern half of the site has been estimated to be in the region of 12,125 m² (1.21 hectares).
- The existing natural grass surfaces within Alexandra Park are not currently capable of supporting a playing field which can be utilised all year round. This is largely due to a combination of the poor-quality site topsoil, the absence of an effective drainage system, the agronomic condition of the turf, and the absence of suitable surface levels to promote surface water drainage.
- Given the above, there is a requirement for extensive development works to ensure any new playing field area can withstand the proposed level of use.
- In conjunction with the development of a new playing field area in the northern half of the site, it is recommended that improvement works are carried out in the southern half of the site to provide consistent playing surfaces, and to improve the quality and capacity of the existing sports pitch and surrounding areas.
- The existing site topsoil was of a poor-quality and consisted of a clay loam material. The physical properties of the topsoil mean it will have inherently poor drainage characteristics. The site topsoil contains a high percentage of fines (very fine sand, silt, and clay). As such, the topsoil which is indigenous to the site is not ideally suited to the provision of winter games pitches. As part of any playing field development works, there will be a requirement to amend the site topsoil with imported sand material to improve the drainage performance of the site topsoil.
- Surface gradients were inconsistent with a slight fall towards the south-west corner of the site. The highest ground levels were observed in the north-east side of the site (30.73 m). The lowest ground levels were observed in the south-western side of the site (29.52 m). There were numerous dips and hollows which will be prone to standing water after rainfall events. As part of any playing field development works, a cut and fill earthworks operation is recommended to form uniform gradients in line with Sport England requirements. The quantum should be calculated to ensure the proposed formation surface can be formed without the need to export or import materials, i.e., on a balanced cut and fill basis.

- In conjunction with the development of a new playing field area in the northern half of the site, it is recommended that a regrading exercise is carried out in the southern half of the site to improve the gradients on the existing natural grass pitch and surrounding area.
- The existing clay pipe drainage system can be considered ineffective and should be disregarded with considering options to develop a new playing field area. New specialist primary and secondary drainage systems are required as part of any playing field development works. This would typically consist of a network of perforated lateral drains running across the playing field area, at an angle to the newly formed gradients, connecting in a perforated main carrier drain with dedicated silt chambers along its length.
- To ensure the playing surfaces remain playable all year round, a combination of pipe drains as described above, and a secondary drainage system of sand bands or sand slits is recommended.
- In conjunction with the development of a new playing field area in the northern half of the site, it would also be feasible to install primary and secondary drainage systems in the southern half of the site to improve the condition and capacity of the existing pitch and surrounding areas.
- It would be feasible to discharge any newly installed drainage systems to the existing pond via a sealed outlet pipe and specialist headwall, subject to obtaining the relevant permissions. Given the clay-based nature of the site subsoil, the installation of a soakaway has not been considered.
- The recommendations outlined in the next section are aimed at providing playing surfaces in line with a Sport England Type 5 pitch construction.
- Agronomically, the site was in poor condition with various grass and weed species present. Before any development works are undertaken, the surface vegetation should be thoroughly killed off and removed to enable the development works and prevent weed re-infestation.
- The months receiving the highest average rainfall at the Rochdale climate station are October to January. This coincides with the months with low average minimum temperatures. Winter rainfall coupled with low levels of evaporation mean drainage is likely to be the main limiting factor affecting the quality of the natural grass surfaces.
- A suitable level of ongoing maintenance is critical for the any playing field development works to ensure player safety, suitable playing performance and to ensure the longevity of the surfaces. Any maintenance recommendations included in this report assume that the facility will be used for community level use.

4.0 RECOMMENDATIONS

4.1 Playing field development works (north half of site)

To develop a new playing field within the northern half of the site, the following scope of works is recommended.

4.1.1 Initial site preparation

In advance of works starting on site, the existing vegetation should be cut as short as possible. It may necessitate bringing in a tractor mounted flail mower/ collector type machine to cut the existing grass vegetation back down to ground level.

This should then be followed-up by killing off the remaining surface vegetation with a total kill herbicide based on glyphosate.

4.1.2 Topsoil strip

Once the herbicide has taken effect, the topsoil would then be stripped across the entire working area and stored in on-site bunds for re-use. Topsoil bunds would be best located adjacent to the working area to avoid interference with subsequent works. There will be no requirement for the importation of any additional topsoil to facilitate the proposed pitch construction works. Note the extent of topsoil stripping operations will be determined by the location of any root protection areas associated with the perimeter trees.

4.1.3 Grading (cut/fill)

Following topsoil removal from the area, the underlying exposed subsoil would then be re-graded adopting the cut and fill principal to form the required gradients across the playing field area, in line with Sport England requirements. The subsoil material would be cut and filled to formation using laser guided grading equipment so that on placement of the topsoil, the proposed finished ground levels will be achieved.

Following the bulk cut/fill earthworks operations, the formation surface would be consolidated and trimmed to provide an even surface prior to topsoil re-spreading.

4.1.4 Topsoil resspreading

Prior to drainage installation, the site topsoil would be re-spread across the graded subsoil surface to provide a uniform depth of topsoil. The topsoil should be smoothly married into the surrounding undisturbed ground levels within any root protection areas.

The topsoil would then be cultivated and lightly graded throughout the whole of the working area to produce the desired levels.

4.1.5 Pipe drainage installation

Given the physical characteristics of the native topsoil present, there will be a requirement for the installation of specialist sports pitch drainage systems. The drainage system should comprise of a series of lateral drains installed at intensive intervals (typically every 4m), installed at an angle to the newly formed gradient. The lateral drains would connect into main collector drains on the lower side of the playing field area.

Silt chambers should also be installed at the end of the main drain runs into which water collected by the drainage system would be discharged. From these chambers, an outlet pipe would then be introduced, to discharge surface water to the nearest available outfall location. There may be a requirement for flow control and/or attenuation measures to limit the discharge rate to the proposed outlet depending on prior agreements.

Drain trenches would be formed using a chain trencher or tractor mounted wheel type trencher, these being approximately 150 mm wide and typically 600 mm deep. Lateral drains for a scheme of this nature typically consist of 80 mm diameter uPVC perforated land drainage pipes. Once the pipes have been laid and connected the trenches should be backfilled with a clean drainage aggregate. The recommended drainage aggregate is 2 – 6 mm gravel. Main carrier drains for a scheme of this nature typically consist of 150 mm diameter uPVC perforated land drainage pipes. Once the pipes have been laid and connected the trenches should be backfilled with a clean drainage aggregate. The remainder of the trench would then be backfilled up to surface level with a medium – coarse sand or sand/soil mix rootzone material.

It should be noted that there will be arisings generated from the drainage installation which will need to be disposed either on site in the form of landscaped mounds at agreed locations, or off-site to a licensed tip facility. The most cost-effective solution is to dispose of the drainage arisings on-site if suitable locations can be identified.

4.1.6 Secondary drainage

It is recommended that the primary pipe drainage systems are supplemented by a secondary drainage system of sand bands or sand slits to connect with the permeable drainage aggregate in the underlying lateral drains. When considering the installation of secondary drainage systems, it is important to note that the long-term effectiveness of secondary drainage systems such as sand slits or sand bands is subject to a suitable level on ongoing maintenance including periodic sand topdressing to maintain a hydraulic connection between the surface and underlying drainage channels.

The excavation of the secondary drainage systems would also generate a volume of spoil which would require removal off site to a licensed tip or disposed in an approved location on site where it could be landscaped.

4.1.7 Seedbed preparation

Following drainage installation, it is recommended that the topsoil is lightly cultivated again to relieve any compaction from the drainage installation process. At this stage it would be of benefit to apply

a layer of sand (sand amelioration) in two applications, the first to be very lightly worked into the surface with a rotary stone rake or similar. The second a capping layer of 25 - 30 mm should then be spread over the prepared surface.

Following sand application and cultivations., a smooth, fine, and evenly consolidated seed bed tilth would then be prepared by a combination of rolling and raking. This should be proceeded with the application of a pre-seed fertiliser with a N-P-K composition of 8-12-8 or similar.

4.1.8 Seeding

Once a suitable seed bed has been prepared, this would then be sown out with a seed mixture containing hard wearing cultivars of *Lolium perenne* (Perennial ryegrass) sown at a rate of around 35 g/m².

4.1.9 Initial maintenance

Thereafter, regardless of the final scope of works and construction methodology, it is recommended that the initial maintenance during the establishment period (12 months) is carried out by a specialist sports pitch contractor. During the initial 12-month maintenance period it is recommended that the following maintenance operations are included in the maintenance programme.

- Stone removal
- Mowing
- Fertiliser application
- Overseeding (provisional)
- Aeration
- Selective herbicide application (provisional)

4.1.10 Timing and establishment

The playing field development works would be best timed for drier ground conditions which would normally be experienced during the summer period, with final seeding carried out in the late summer, early autumn period (i.e., around late August or early September). Seeding in the summer months is not recommended without an irrigation system.

If final seeding can be achieved in early autumn, then there should be a period of some four to six weeks of the normal growing season remaining which should be sufficient to facilitate the initial seed germination and young grass establishment, provided there are sufficient levels of rainfall soon after seeding.

Depending on the success of the initial seed germination, and the subsequent growing conditions, it may be necessary to undertake an initial cut of the young grasses in the autumn, before grass growth ceases altogether. Then, once into the later autumn and winter period, grass growth will tend to decline and will remain dormant over the main part of the winter, before resuming once temperatures begin to rise in the early spring (i.e., around late March/early April). Further contractor maintenance would then be required during the late spring and summer months to help develop the grass sward, so that it can be handed over to the client in a manageable condition for ongoing maintenance.

4.2 Playing field improvement works (south half of site)

In conjunction with the development of a new playing field area in the northern half of the site, it is recommended that improvement works are carried out in the southern half of the site to provide consistent playing surfaces, and to improve the quality and capacity of the existing sports pitch and surrounding areas.

The works to improve the existing surfaces in the southern half of the site would generally following the scope of works identified above in Section 4.1. Again, the presence of mature trees around the periphery of the site is a significant limiting factor.

5.0 INDICATIVE COST ESTIMATES

The indicative cost estimates are based on the recommended works outlined in the previous sections, being undertaken by a specialist sports pitch contractor. An indicative pitch layout has been illustrated in Appendix 5. It should be noted that these costs can vary considerably, and they are included for indicative purposes only. The actual cost will depend on the final agreed scope of work.

When tendering for such works it is normal practice to add a 10% contingency sum to the tender costs to cover any unforeseen costs. It should be noted that the costs indicated are all exclusive of VAT.

5.1 Playing field development works (north half of site)

Playing field development works (north half of site) – assumed area = 12,125 m² (1.21 hectares)

Contract preliminaries and general requirements	£ 5,000.00
Site establishment	£ 5,000.00
Initial site clearance	£ 8,002.50
Level adjustment works	£ 48,650.00
Drainage	£ 74,692.50
Cultivating and seeding	£ 25,143.75
Initial 12 months maintenance	£ 19,830.00
Subtotal	£ 186,318.75
Contingency (10%)	£ 18,631.88
Total	£ 204,950.63

5.2 Playing field improvement works (south half of site)

Playing field improvement works (south half of site) – assumed area = 7,500 m² (0.75 hectares)

Contract preliminaries and general requirements	£ 4,000.00
Site establishment	£ 5,000.00
Initial site clearance	£ 4,950.00
Level adjustment works	£ 29,500.00
Drainage	£ 58,125.00
Cultivating and seeding	£ 16,125.00
Initial 12 months maintenance	£ 14,650.00
Subtotal	£ 132,350.00
Contingency (10%)	£ 13,235.00
Total	£ 145,585.00

6.0 HEALTH AND SAFETY

The following potential hazards are typical of sports pitch construction and maintenance works and have been identified during the site appraisal and in the preparation of this report.

- The presence of any underground services should be confirmed before commencing any drainage installation works
- Excavation work and protection of excavations
- Delivery and haulage of bulk materials on site
- Movement of construction plant
- Delivery of bulk materials to site
- Use of chemicals

These hazards are common to most sports pitch construction work, but this does not constitute a complete list and any additional issues should be identified before commencing work.

7.0 OUTLINE MAINTENANCE OPERATIONS

The following maintenance operations should be considered as part of an ongoing maintenance regime for the site. The timing of the maintenance operations is critical for the successful maintenance of natural turf pitches. Working in poor weather conditions can reduce the effectiveness of all treatments but particularly for soil aeration work which can result in an increase in soil compaction rather than alleviating the problem.

Mowing

Cut the grass frequently, maintain the height of cut within a reasonable height range, generally 25 – 35 mm, avoid scalping the grass and allow the grass clippings to fly. This would typically require mowing once per week during the growing season. Do not allow the grass to grow too long and clippings should not be allowed to smother the grass. The grass should be cut with a well sharpened mower, correctly adjusted to achieve a uniform cut. No more than a third of the leaf blade should be removed in any one mowing operation.

Fertiliser

Maintain nutrient levels in the soils by the application of fertiliser suitable for the time of year using higher nitrogen products in the summer months and lower nitrogen in the autumn as the temperatures drop.

A minimum of 1 - 2 fertiliser applications is desirable during the spring and summer months. A single winter feed should also be applied. If the pitch is used more frequently some additional fertiliser may be required to sustain the turf in good condition.

Fertilisers should generally be applied according to the manufacturers recommended rates, although this can be adjusted according to the nutrient status of the soil, preferably confirmed by soil analysis as well as the prevailing condition of the turf. The analysis of the fertilisers applied, and the rate of application can be adjusted according to the conditions at any given time.

It is essential that the fertiliser is applied evenly over the whole of the surface with an appropriate spreader, preferably during showery weather to break down and wash the fertiliser into the soil.

Soil Aeration

Soil aeration work will help to alleviate soil compaction to maintain good infiltration.

Verti-draining should be carried out when the soil is just moist enough to allow the tines to penetrate and to achieve the optimum soil shattering or loosening.

A number of treatments may be required to deal with excessive soil compaction. The depth of the aeration work can be varied, starting with shallower treatments and gradually increasing the depth to reduce compaction to improve water movement through the full depth of topsoil. A minimum of 2 – 3 Verti-drain treatments per year is recommended, concentrating on the late spring and late autumn months.

Sand Topdressing

It is important to apply medium fine top-dressing sand evenly over the whole playing surface to ensure good porosity in the upper layer of the topsoil. Over time this topdressing will build and create a drier surface which will improve overall performance of the pitch.

It is recommended that sand topdressing is applied on an annual basis if possible and in total, between 50 – 80 tonne per hectare should be applied as part of the end of season renovation works, this being done in conjunction with Verti-draining. Once brushed in, this roughly equates to 3-5mm of sand evenly spread across the surface.

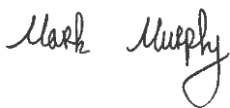
Overseeding

Overseeding should take place at the end of the season in May using a disc seeder using 100% Lolium perenne grass seed sown at a rate of 20 g/m².

Weed Control

Apply a selective herbicide to control any broad-leaved weeds as required during the growing season. This should be applied in accordance with current legislation and COSHH regulations.

Signed by:

A handwritten signature in black ink that reads "Mark Murphy".

Mark Murphy

Design Consultant

t: 01274 565131

e: mark.murphy@strigroup.com

APPENDIX 1 – SOIL SIZE ANALYSIS



STRI Ltd, St Ives Estate, Bingley, West Yorkshire, BD16 1AU

t. +44(0) 1274 565131 f. +44 (0) 1274 561891

e. enquiries@strigroup.com

www.strigroup.com

SOIL PARTICLE SIZE ANALYSIS

CLIENT:	ANWYL HOMES - SPC	DATE :	06/09/22
		RESULTS TO :	MM
DESCRIPTION:	REP TOPSOIL	SAMPLE NO :	A19881/1

CATEGORY	DIAMETER mm	%
Stones	>8	1
Coarse gravel	8-4	2
Fine gravel	4-2	1

Particle size distribution of mineral matter smaller than 2mm

Very coarse sand	2-1	1
Coarse sand	1.0-0.5	4
Medium sand	0.50-0.25	12
Fine sand	0.250-0.125	12
Very fine sand	0.125-0.050	9
Silt	0.050-0.002	27
Clay	<0.002	35
Loss on ignition (% of oven-dry fine earth)		13.9
Calcium carbonate	%	NIL
SOIL TEXTURE		CLAY LOAM

T = TRACE

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

APPENDIX 3 – SITE INVESTIGATION PHOTOS



Photo 1: General image facing south



Photo 2: General image facing north



Photo 3: General image facing east



Photo 4: General image facing west



Photo 5: Flag pole in centre of the site



Photo 6: Lowest part of the site beside the pond (south-west)



Photo 7: Manhole chamber in the north centre of the site



Photo 8: Main drain lines



Photo 9: Outlet manhole chamber in the south-western corner



Photo 10: Existing outlet into pond, 200 mm plastic unperforated pipe



Photo 11: Existing vegetation



Photo 12: Close-up of vegetation



Photo 13: Existing pitch grass cover



Photo 14: Unused cricket wicket



Photo 15: Excessive thatch build-up



Photo 16: Example test pit (TP1)



Photo 17: TP2 showing gradual transition from topsoil to darker subsoil



Photo 18: evidence of seasonal waterlogging (root lines)



Photo 19: Evidence of seasonal waterlogging (mottling)



Photo 20: Drain line excavation



Photo 21: Backfill material containing soil



Photo 22: Backfill material sample containing soil



Photo 23: Drain lines 5 – 6 m centres



Photo 24: Goal mouth of existing pitch



Photo 25: Sockets for football goals



Photo 26: Path surrounding the site

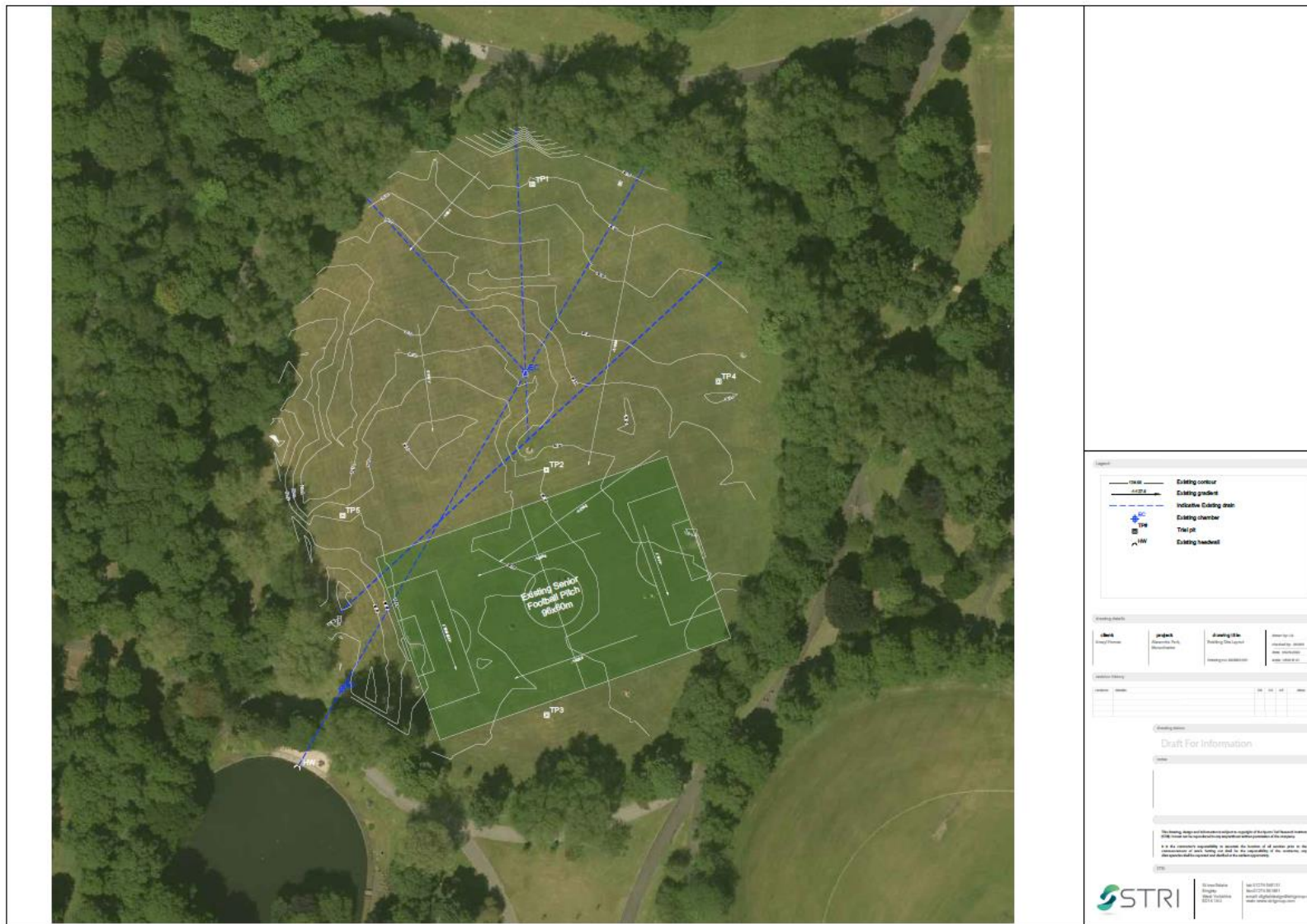


Photo 27: Existing access – maintenance access

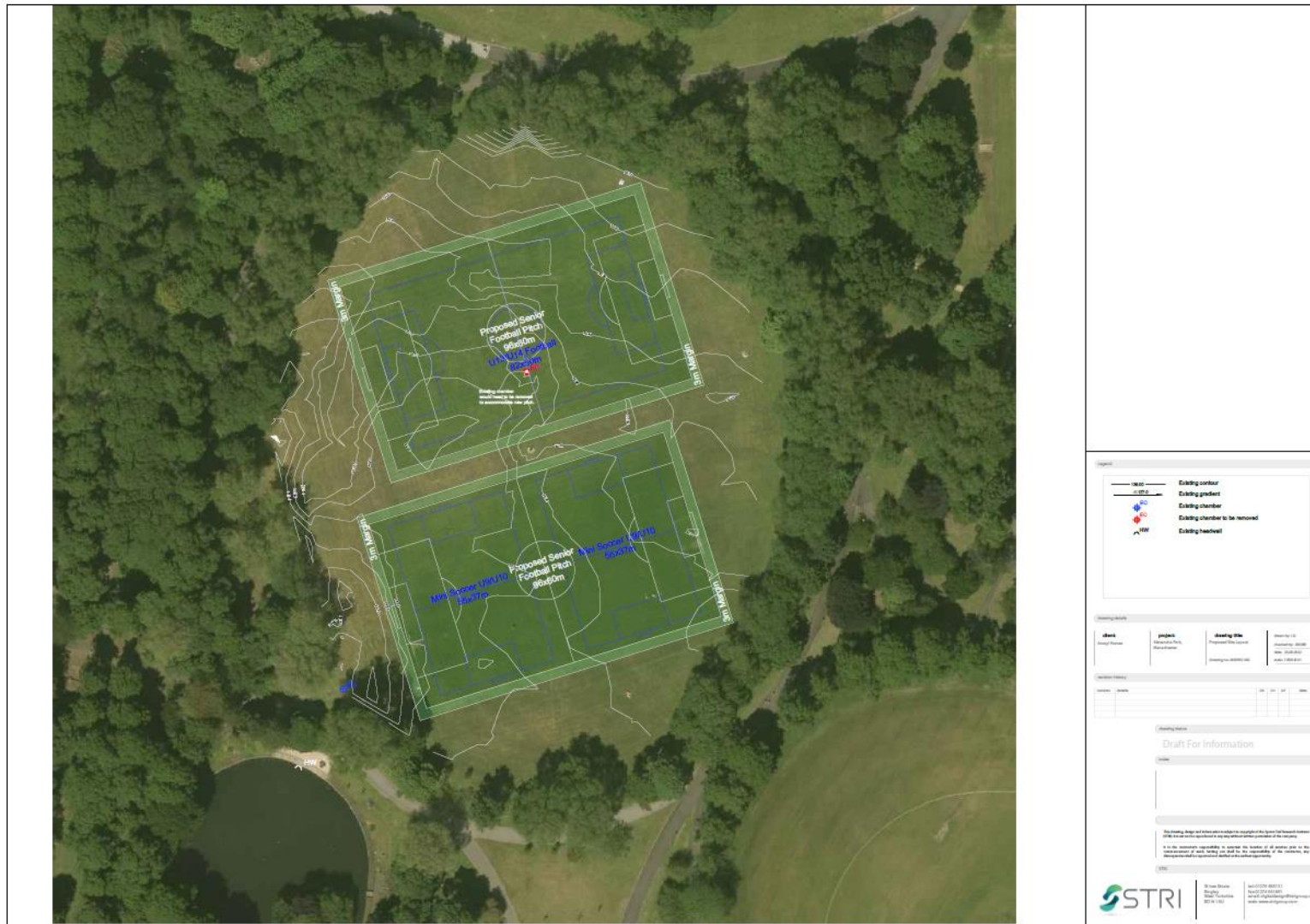


Photo 28: Continued access route

APPENDIX 4 - TOPOGRAPHIC SURVEY



APPENDIX 5 - INDICATIVE LAYOUT



STRI Group
St Ives Estate, Bingley
West Yorkshire BD16 1AU
t +44 (0)1274 565131
e enquiries@strigroup.com
strigroup.com

