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Proposed Artificial Grass Pitch Philips High School Higher Lane, Whitefield Manchester M45 7PH



Site Investigation Report

Revision 00: January 2026
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Proposed Artificial Grass Pitch
Philips High School
Higher Lane, Whitefield
Manchester
M45 7PH

Site Investigation Report

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Contents

1.0	Executive Summary	1
2.0	Introduction	4
2.1	Client Instructions and Reliance	4
2.2	Site Proposals and Objectives	4
3.0	Desk Study Information	5
3.1	Site Location and Description	5
3.2	Site Photographs	7
3.3	Site History	9
3.4	Geology	9
3.5	Land and Historic Feature Designations	10
3.6	Hydrology and Hydrogeology	10
3.7	Flood Risk	10
3.8	Artificial/Made Ground and Landfills	11
3.9	Unexploded Ordnance	11
3.10	Coal Mining Risk	11
3.11	Buried Services	12
3.12	Electrical Capacity Survey	12
4.0	Fieldwork	13
5.0	Ground Conditions	14
5.1	Soils	14
5.2	Groundwater	16
6.0	Laboratory Testing	17
6.1	Geotechnical Testing	17
6.2	Chemical Testing	17
7.0	Engineering Assessment	18
7.1	Geotechnical Laboratory Results	18
7.2	Floodlight Foundations	18
7.3	Excavations	20
7.4	Concrete Classification	20
7.5	Artificial Pitch Construction	21
7.6	Infiltration Potential and Surface Water Drainage	23
8.0	Contamination	24
8.1	Contamination Assessment	24
8.2	Topsoil Assessment	25
9.0	Waste Classification	26
9.1	Hazardous or Non-Hazardous Classification	26
9.2	Classification under the Waste Acceptance Criteria	26
Appendix A	A	
Drawing	A	



Appendix B B

Fieldwork Records B

Appendix C..... C

Laboratory Testing and Analysis..... C

Appendix D D

Consultant’s Coal Mining Report.....D

Appendix E..... E

Utilities Records..... E

Appendix F..... F

Electrical Capacity Survey..... F

1.0 Executive Summary

1.1.1 The following is provided as an overview and should not be relied upon in isolation to the main report.

Summary overview	
Existing site	The proposed pitch is located in the north east of the main playing field, with the school buildings located to the north of the proposed pitch, including a recently constructed (circa 2012) sports hall building immediately adjacent to the north. Adjacent to the north east side of the proposed pitch are trees and hedgerow, the RPZ and influence of these may dictate the positioning of the pitch.
Proposals	Construction of a 3G Artificial Grass Pitch (AGP) with associated fencing, floodlights and infrastructure.
History	Historical OS mapping and aerial images shows the proposed pitch location appears to remain undeveloped fields prior to being playing fields for the school. There was formerly a pond located centrally within the proposed pitch footprint and therefore a potential for Made Ground and possible adverse settlement. There was also a field boundary adjacent to or potentially inline with the south west edge of the proposed pitch. There were slopes recorded down into the playing fields along the south west boundary which could suggest past excavations. The sports hall appears to have been constructed adjacent to the north east of the proposed pitch circa 2012.
UXO	Low risk of encountering buried UXO.
Buried Services	Statutory undertaker's assets show no services recorded to extend within or close to the proposed pitch. These records exclude any private services which could be present. Aerial images indicate the presence of land drainage in the form of a herringbone system, which is fairly distinctive adjacent to the north west of the proposed pitch, with carrier drains directed towards the south eastern boundary of the playing fields. A survey of the existing drainage is recommended both for avoidance purposes and in order to determine a connection, onward connectivity and ultimate outfall for the proposed pitch drainage.
Geology	BGS mapping of the site records superficial deposits of Devensian Till with Glaciofluvial Deposits to the north and north west of the school site. Bedrock geology beneath the proposed pitch and majority of the site is recorded as the Pennine Middle Coal Measures Formation, with an outcrop/intrusion of Nob End Rock across the north east end of the school site and of Newton Heath Sandstone to the south west, coinciding with geological fault lines.
Coal Mining	The site is mapped within a coal mining reporting area and is in close proximity to a development high risk area to the south. We produced a separate Coal Mining Risk Assessment which should be referred to for more details. This assessment was carried out to inform the pitch position, which has now been located as far as possible from the recorded extent of the development high risk zone.
Fieldwork	8 windowless sample boreholes to a maximum depth of 5.00m bgl with indicative infiltration testing within 2 positions, 2 dynamic probes to a maximum depth of 6.00m bgl and 5 TRL Dynamic cone penetration tests to measure insitu CBR values.
Ground Conditions	Each borehole encountered grass over a generally dark brown silty very sandy clayey or very clayey sandy Topsoil with frequent roots and rootlets to depths of between 0.10m – 0.41m bgl. Underlying the Topsoil in WS01/WS01A, WS02 and WS07, Made Ground soils were encountered to depths of between 0.75m to 1.00m bgl, and not penetrated at 1.00m bgl in WS07 located centrally within the location of a infilled former pond, and comprised a firm very sandy slightly gravelly Clay with occasional roots and rootlets with gravels consisting of fine to medium subrounded to subangular brick and sandstone. Borehole WS07 was carried out to target the likely position of a former pond recorded on historical OS mapping and encountered Made Ground soils to beyond the base of the excavation of 1.0m bgl and water in the base causing collapse of the borehole. Beneath the initial Made Ground layer, a potential relic Topsoil layer was encountered at WS01, WS01A and WS02, which comprised a very soft dark brown very sandy slightly gravelly Clay with rare roots and rootlets and rare pockets of fine to coarse sand.

Summary overview

Underlying the Made Ground/Topsoil in each of the borehole locations around the outside of the proposed pitch (excluding WS07 located centrally targeting the historic pond, which did not penetrate the Made Ground at 1.00m depth bgl) to the base of each borehole (3.0m to 5.0m bgl) were variable deposits considered to be representative of mapped natural Devensian Till. The soils generally comprised a very soft to firm very sandy slightly silty gravelly Clay with occasional pockets/laminations of fine to coarse sand. Gravels, where encountered, generally comprised fine to coarse subrounded to subangular flint and sandstone. Within the variable clay dominated natural Devensian Till, layers of granular soils were encountered at WS02 (0.75m to 1.68m bgl), WS03 (2.82m to 3.0m bgl) and WS04 (2.93m to 3.46m and 4.00m to 4.63m bgl). These soils were described as a silty to very silty occasionally clayey fine to medium Sand.

Groundwater Water strikes were encountered within the majority of locations, between 1.00m to 4.00m bgl and standing water levels recorded between 0.68m to 3.61m bgl after 10-15 minutes of observation.

Water levels recorded across the site were noted to be highly variable between locations and is likely associated with the variable nature of the Devensian Till and associated granular layers which may hold isolated perched water strikes of varying volume. This correlates with the findings in the ground investigation report undertaken to the north of the site which also report shallow perched water strikes.

Floodlight Foundations Where soft/loose or variable ground conditions are encountered at founding level, then foundations should be deepened to locate consistent and more competent founding ground conditions and fully penetrating any Made Ground or reworked deposits, to minimise the risk of differential settlement or higher total settlement. This could require deepened foundations based on the ground conditions encountered and more significant following levelling earthworks where levels are increased, particularly where Made ground was encountered at the lowest point in the south east of the site. In addition, shallow groundwater inflows and instability could prevent the construction of successful pad foundations. It is recommended that such excavations are carried out during seasonally drier conditions. An alternative foundation solution may need to be considered such as piling.

Pad foundations will require a minimum founding depth of 0.75m (below existing or proposed site levels, where the deepest should apply following any levelling earthworks) and at least 0.3m penetration into the natural firm clays of the Devensian Till and deepening through any Made Ground (encountered to depths of between 0.45 and 1.0m bgl along the south east side of the pitch) and deepened where required for the influence of trees and hedgerow based on low volume change potential. Foundations should also be deepened to locate consistent soils at formation level and through any potentially loose or soft/low strength deposits, as evident at the location of WS01, WS02, WS03 and WS04, where the ground conditions were found to be much softer in comparison to the other borehole locations.

Concrete Classification DS-1 ACEC AC-1 for the Made Ground.
DS-1 ACEC AC-2z for the Devensian Till.

Pitch Construction For formation onto natural Devensian Till clay deposits, a CBR of 3% is recommended for design and to be reassessed during construction and <2% where any Made Ground/reworked soils are encountered and remains at formation level, encountered during our investigations within the south east of the pitch and centrally associated with the former pond, to depths of between 0.45m and in excess of 1.0m bgl (not penetrated in the presumed former backfilled pond) and ground improvement required to improve the CBR and reduce the potential for adverse settlement.

There is potential for variability in formation soils between granular deposits and clays and also for softened clays. Ground improvement such as lime/cement stabilisation and introduction of geogrid reinforcement is likely to be appropriate to improve the CBR and reduce the potential for adverse settlement where the pitch spans between natural and Made Ground soils and between variable clay and granular deposits, particularly following any levelling earthworks. The formation soils are susceptible to softening and it is recommended that earthworks are carried out during seasonal drier conditions and adequate protection of excavated and exposed soils during earthworks.

Some trenching excavation may be prudent to establish the full extent, depth and composition of this possible backfilled pond to assess whether the soils may need to be removed and replaced or whether a ground improvement near surface such as geogrid or lime stabilisation may be sufficient.

Summary overview

There is also potential for near surface soils close to trees to be affected by seasonal shrinkage and swelling. Root ingress beneath the pitch could result in uplift and damage to the surfacing and therefore root barriers may need to be installed around the perimeter of the pitch, close to trees. This will be subject to advice from a tree specialist to confirm any root protection zones and influence.

Infiltration Potential/ Surface Water Drainage

Infiltration testing indicates that near surface cohesive soils of the Devensian Till are not considered viable for the use of infiltration systems due to the low permeability of the soils encountered. It should also be noted that shallow groundwater was encountered across the site which is likely to restrict the effective depth of any soakaways and potentially precluding their use.

Herringbone drains are understood to be present beneath the existing playing field, with carrier drains shown to flow down slope to the east towards the golf course. It may be possible to connect into the existing outfall or provide a new outfall for the proposed pitch drainage.

Enquiries, inspection and potentially surveys would be recommended to establish any existing drainage routes close to the proposed pitch, including land drainage, and ultimate outfall, with a view to connecting into for the proposed pitch. Any outfall will be subject to seeking necessary approvals and a detailed drainage strategy.

Table 1.1

2.0 Introduction

2.1 Client Instructions and Reliance

- 2.1.1 JPP were appointed by Labosport Ltd to carry out a ground investigation to inform the construction of a proposed 3G Artificial Grass Pitch (AGP), with associated fencing, floodlights and drainage infrastructure at Philips High School, Higher Lane, Whitefield, Manchester, M45 7PH. Our site investigation was carried out in November 2025 with this report produced in January 2025.
- 2.1.2 JPP were also instructed to commission an Electrical Capacity Survey which is presented in Appendix F and discussed in Section 3.12.
- 2.1.3 This report has been produced for the benefit of Labosport Ltd to be utilised in conjunction with the Football Foundation AGP Framework, and JPP will not accept liability for third-party use of the information provided herein without prior reliance agreed. This report is valid for 6 years from the date of issue, however any significant changes to the proposals or followed legislation and guidance within this time could dictate review of our findings and recommendations.
- 2.1.4 Investigations have been carried out using reasonable care and judgement based on the development proposals and brief. There is a potential for ground conditions to vary from those encountered during our investigations and differ where not exposed by our investigations.

2.2 Site Proposals and Objectives

- 2.2.1 It is proposed to construct a 103m x 64m (total footprint) 3G Artificial Grass Pitch (AGP) with associated floodlighting, fencing and drainage infrastructure within existing grassed playing fields.
- 2.2.2 This report describes a ground investigation carried out to inform the construction of the proposed 3G AGP at Philips High School, Higher Lane, Whitefield, Manchester, M45 7PH.

3.0 Desk Study Information

3.1 Site Location and Description

- 3.1.1 The proposed pitch is located in the north east of the main playing fields associated with Philips High School, with the school buildings located to the north of the proposed pitch, including a recently constructed (circa 2012) sports hall building immediately adjacent to the north. To the north east of the sports hall building is a row of small sided artificial pitches and tarmac sports courts, with a smaller sports field area to the north of this. The proposed pitch is centred at an approximate grid reference of 380179, 405436.
- 3.1.2 Access into the school site is to the north east, off Higher Lane. Adjacent to the north east side and south east end of the proposed pitch are trees and hedgerows. The playing field is approximately rectangular and extends further to the north west, west and south west of the proposed pitch. There is a pavilion building approximately midway along the north west side of the playing fields, adjacent to Park Lane, which follows the south west boundary.
- 3.1.3 Adjacent to the tree lined south east and south west boundaries is Whitefield Golf Course. There is also a small copse of trees adjacent to the south west corner of the playing field which includes a pond. Surrounding the wider site to the north west, north and north east is residential housing, and a school to the north east.
- 3.1.4 Ordnance Survey map contours suggest there to be a fall to the south east, with an 110m AOD contour crossing through the proposed pitch from the north east to south west and a 115m AOD contour to the north west of the school site. There is a small localised low point of an 105m AOD contour circle adjacent to the south west of the proposed pitch, however there is indicated to be a slope down to this or possible bund along the south west boundary. The playing fields and proposed pitch location appear to be relatively flat at around 112m AOD and there is a slope down into the area of school buildings from the north west. It is possible therefore that the playing fields have been subject to some past levelling earthworks.
- 3.1.5 The topographical survey undertaken by JPP in August 2025, ref. 30586Y, determines there to be a fall across the proposed pitch from north west to south east, with levels of approximately 110.75m AOD in the north western corner, falling to approximately 108.6m AOD in the south eastern corner, a fall of approximately 2.15m across the proposed pitch. Some levelling earthworks (cut and fill) are therefore anticipated to reduce the fall and some surrounding banking, as appropriate, or potentially retaining features where there is insufficient space for sloped banking.



Figure 3.1: OS mapping showing the approximate pitch location in blue.

3.2 Site Photographs



Photograph 3.2.1 View from the south east corner of the proposed pitch position, looking northwest across the site.



Photograph 3.2.2 View from the north west corner of the proposed pitch position, looking north west towards the existing pavilion.



Photograph 3.2.3 View from the south west corner of the proposed pitch position, looking north east across the site towards the sports building.



Photograph 3.2.4 View from the north west corner of the proposed pitch position, looking roughly north towards the pumping station and field entrance.

3.3 Site History

- 3.3.1 Earliest available mapping from the 1830-80s shows the site as open space/fields, with a small pond situated roughly centrally within the proposed pitch footprint (indicatively outlined onto the exploratory location plan, Drawing 01 in Appendix A). A field boundary crosses adjacent/in line with the south west edge of the proposed pitch footprint. A small sand pit is recorded to the north west of the site and the land where the school buildings are located present day is recorded as Sand Hole, which could reference the name of the building on site or potentially suggest a past excavation. There are occasional springs recorded to the south.
- 3.3.2 Mapping dated from 1888-1915 mapping no longer records Sand Hole in the north. There is now a school building on the opposite side of Park Lane to the north west of the present-day school site. The pond within the proposed pitch location appears to be slightly larger. The sand pit to the north west is recorded as old and is more extensive. Mapping dated 1937-61 no longer shows the pond and the field boundary to the south west of the proposed pitch is no longer shown with the school site now divided into two with a field boundary consistent with the present day between the buildings and the playing fields. There is a slope recorded down into the site along the north west edge, potentially suggesting some past excavation or levelling. There has been further residential development in the larger surrounding area.
- 3.3.3 Mapping dated 1944-74 shows the playing fields as present day with pavilion building along the north west side and a slope recorded along the south east boundary, down to the golf course. Buildings are recorded in the north east of the site, named Whitefield Stand Grammar School for Girls, with tennis courts to the south east, as present day. Mapping dated 1951-73 shows some additional building in the school site and residential development to the west and north of the site and Whitfield Hebrew Congregation Synagogue in the former school site and where the former sands pits were
- 3.3.4 Earliest available aerial imagery dated 2000 shows the site largely as present day, the grass in the north west of the playing fields appears to be exposed topsoil where it is presumed the pitch is being prepared. Changes in grass colour along the edges of the pitch in the south west of the playing fields, possibly suggesting some banking slopes. There are no notable changes until the mapping dated particular changes until images dated from 2013 (no images available from 2005 to 2013) which shows the sports hall building has been constructed (circa 2012) and the small sided artificial pitches to the north east are now 3G surface.
- 3.3.5 Aerial images suggests land drainage in the form of a herringbone system, which is fairly distinctive adjacent to the north west of the proposed pitch, with carrier drains directed towards the eastern boundary of the playing fields.

3.4 Geology

- 3.4.1 British Geological Survey GeolIndex and Geology of Britain Viewer online indicates there are no artificial ground deposits mapped on site, or within close proximity to the site. Superficial deposits of Till are mapped across the majority of the site, with Glaciofluvial Deposits (Sand and Gravel) mapped off site to the north west.

3.4.2 Bedrock geology beneath the proposed pitch and majority of the site is recorded as the Pennine Middle Coal Measures Formation (mudstone, siltstone and sandstone), with an outcrop/intrusion of Nob End Rock (sandstone) across the north east end of the school site and of Newton Heath Sandstone to the south west.

3.4.3 To the north and to the south of the site two fault lines are mapped which converge to the northwest. These are shown to be faults within the rockhead and have displaced the coal seam on the north of the fault to deeper depths.

3.5 Land and Historic Feature Designations

3.5.1 There are no listed buildings, scheduled monuments or heritage sites within close proximity to the site.

3.5.2 The site is within an SSSI impact zone for the Rochdale Canal (SSSI) to the east and on the edge of the impact zone for Nob End (SSSI) and Ashdough (SSSI) to the west.

3.5.3 The site is recorded to be within a Nitrate Vulnerable Zone for surface water.

3.6 Hydrology and Hydrogeology

3.6.1 The Devensian Till deposits are designated as a Secondary (undifferentiated) Aquifer, with the nearby Glaciofluvial Deposits designated as a Secondary A Aquifer. The underlying bedrock Pennine Middle Coal Measures Formation, Nob End Rock and Newton Heath Sandstone are designated as Secondary A Aquifers. The site is recorded to have medium groundwater vulnerability.

3.6.2 The site is not recorded within a groundwater Source Protection Zone (SPZ).

3.6.3 Groundwater is considered likely to be fairly deep within the underlying bedrock deposits, however there were shallow perched water strikes encountered within the granular Glacial Deposits of the boreholes carried out adjacent to the north east of the proposed pitch for the sports hall building, which suggest that similar conditions maybe encountered on the subject site.

3.6.4 There are no obvious watercourses or drains within or in close proximity to the site, with the closest features appearing to be a pond within the Golf Course adjacent to the south east corner of the playing field. The nearest watercourse is mapped as the Bradley Brook, recorded to originate to the south of the M60.

3.7 Flood Risk

3.7.1 According to Environment Agency mapping, the site is within a Flood Zone 1 with a low risk of fluvial flooding.

3.7.2 There is recorded to be no chance/very low risk of surface water flooding across and around the proposed pitch location. With some areas of low to high chance around the school buildings to the north. A Flood Risk Assessment is unlikely to be required.

3.8 Artificial/Made Ground and Landfills

- 3.8.1 According to the British Geological Survey, there is no artificial or Made Ground recorded within close proximity to the site.
- 3.8.2 There are no historic or authorised landfills recorded on site or within close proximity.
- 3.8.3 A pond is historically recorded towards the centre of the proposed pitch location (as indicated on Drawing 01 in Appendix A) which will therefore likely be infilled and produces a potential for poor ground or organic deposits and risk of adverse settlement. The playing fields may also have been subject to past levelling.

3.9 Unexploded Ordnance

- 3.9.1 Online mapping indicates the site to be located where there is a low risk of encountering buried UXO.

3.10 Coal Mining Risk

- 3.10.1 Due to the close proximity of the proposed pitch to a Development High Risk Area, a Consultant's Coal Mining Report, included within Appendix D, was obtained and a site-specific Coal Mining Risk Assessment was written by JPP under separate cover (Ref: R-CMRA-30447-01-00), dated October 2025, which should be referred to for more details. This assessment was carried out to inform the pitch position, which has now been located as far as possible from the recorded extent of the development high risk area.
- 3.10.2 An extract of the Summary and Recommendations from the CMRA is provided as follows for ease of reference: *'Given the development type and shallow foundations of the floodlighting columns the potential presence of unrecorded coal mine workings are not expected to pose a significant risk on the basis that there is sufficient covering of overburden soils above such possible workings. Should however the pitch location be underlain by deep Made Ground, reducing the thickness of such competent overburden soils, then there is a potential risk that collapsed workings or voiding could migrate to the surface resulting in instability at the surface close to the conjectured outcrop at the south east corner of the proposed pitch, where the coal is anticipated to be shallowest. It is therefore recommended that the pitch is located further north west to increase the distance from the conjectured outcrop and thus further reduce the potential risk. Should the initial proposed position closer to the south east boundary be pursued, then potentially deep borehole investigations may be required to provide further assurance that the pitch and floodlighting foundations in the south east corner are not at risk of instability from potential voided or collapsed workings. Deep boreholes to assess potential for workings at depth would need to be undertaken under permit from the Mining Remediation Authority.'*
- 3.10.3 *During construction, should any ground conditions be encountered to suggest deep Made Ground, disturbed deposits or of loosening to suggest a potential void or collapsed feature at depth, then further advice should be sought before proceeding.*

- 3.10.4 *Risks associated with Mine Gas are also not considered to pose an issue in regards to the proposed development given the open-air nature of the proposed sports pitch and absence of enclosed spaces.'*

3.11 Buried Services

- 3.11.1 Statutory Undertaker's asset records obtained are presented in Appendix E. According to these records, there are no services recorded to extend within or close to the proposed pitch. These records exclude any private services which could be present including land drainage which was identified to be present on site through review of aerial imagery.
- 3.11.2 United Utilities records show a pumping station recorded within the school site to the north east of the buildings, with a private combined sewer from this connecting to the public combined sewer at the junction of Higher Lane, Park Lane and Pinfold Lane to the north east of the school.

3.12 Electrical Capacity Survey

- 3.12.1 JPP were also instructed to commission an Electrical Capacity Survey, which was carried out by Halliday, and is presented in Appendix F. The inspection identified a suitable power supply within the sports block located to the north/northeast of the proposed pitch, with the plant room location along the southern side of the building. There is a distribution board with spare ways and enough spare capacity for the proposed floodlighting. The cable route would take the new cable through the internal wall into the boiler room, where there is an existing cable tray to the outer wall. The cable would then go through the outer wall and down to the ground (with containment) and out to the new pitch site which is approximately 60 to 70m from the sports block. The cable route is mostly in soft dig out to the pitch, with some paving slabs adjacent to the plant room. The report should be referred to for more details.

4.0 Fieldwork

- 4.1.1 Our fieldwork was carried out on the 20th November 2025 and comprised the following:
- 8 windowless sample boreholes to a maximum depth of 5.00m bgl.
 - 2 indicative infiltration tests within WS01A at 1.00m bgl, and within WS01 at 1.80m bgl.
 - 2 dynamic probes to a maximum depth of 6.00m bgl.
 - 5 TRL Dynamic Cone Penetration tests to measure insitu CBR values.
- 4.1.2 Each position was scanned using a cable avoidance tool and signal generator prior to positioning and proceeding. Utilities searches were also obtained prior to the fieldwork to confirm the position of potential underground services (excluding private services). These are presented in Appendix E.
- 4.1.3 The approximate location of each exploratory hole position is shown on the plan (Drawing 01) and included within Appendix A.

5.0 Ground Conditions

5.1 Soils

Topsoil

- 5.1.1 Each borehole encountered grass over a generally dark brown silty very sandy clayey or very clayey sandy Topsoil with frequent roots and rootlets to depths of between 0.10m – 0.41m bgl (average thickness of 0.23m).

Made Ground

- 5.1.2 Underlying the Topsoil in WS01, WS01A, WS02 and WS07, Made Ground soils were encountered to depths of between 0.75m to 1.00m bgl (average thickness of 0.41m) The initial/only layer in all locations where encountered generally comprised a firm very sandy slightly gravelly Clay with occasional roots and rootlets with gravels consisting of fine to medium subrounded to subangular brick and sandstone.
- 5.1.3 A potential relic Topsoil layer was encountered underlying the initial Made Ground layer in WS01, WS01A, located in the south east corner, and WS02, located centrally along the south west side of the pitch, where levels are lowest and considered likely to be a result of past levelling earthworks. Such deposits generally comprised a very soft dark brown very sandy slightly gravelly Clay with rare roots and rootlets and rare pockets of fine to coarse sand. Gravels consisted of fine to medium rounded to subrounded flint. Borehole WS07 was an additional position carried out in an attempt to target the likely position of a former pond recorded on historical OS mapping and encountered Made Ground soils to beyond the base of the excavation of 1.0m bgl and water in the base causing collapse of the borehole.
- 5.1.4 Hand pocket penetrometer measurements converted to kPa within the clayey Made Ground soils returned values of between 15kPa to 40kPa, indicating generally very low strength soils.

Devensian Till

- 5.1.5 Underlying the Made Ground or Topsoil in each of the boreholes positioned around the outside of the proposed pitch (excluding WS07 located centrally to target the historic pond, which did not penetrate the Made Ground at 1.00m depth bgl), to the base of each borehole (3.0m to 5.0m bgl) were variable deposits considered to be representative of mapped natural Devensian Till. However, there is a possibility that in some areas of the site this could initially represent reworked deposits given the potential for historical cut and fill to have taken place on site.
- 5.1.6 The soils were variable in nature but generally comprised a very soft to firm very sandy slightly silty gravelly Clay with occasional pockets/laminations of fine to coarse sand. Gravels, where encountered, generally comprised fine to coarse subrounded to subangular flint and sandstone.

- 5.1.7 Within the variable clay dominated natural Devensian Till, layers of granular soils were encountered at WS02 (0.75m to 1.68m bgl), WS03 (2.82m to 3.0m bgl) and WS04 (2.93m to 3.46m and 4.00m to 4.63m bgl). These soils were described as a silty to very silty occasionally clayey fine to medium Sand.
- 5.1.8 Within WS01 to WS04, hand pocket penetrometer measurements converted to kPa within the cohesive Devensian Till ranged from 0kPa to 90kPa, with sporadic outliers of 115kPa and 135kPa removed from the data set, indicating variable extremely low to high strength soils. **These soils were highly varied in nature and may potentially have been reworked, giving rise to the observed low strength.**
- 5.1.9 At the locations of WS05 and WS06, which were situated in the north west of the proposed AGP, hand pocket penetrometer measurements converted to kPa where possible within the cohesive Devensian Till ranged from 65kPa to 190kPa, , indicating medium to very high strength soils. **The nature of the soils and recorded strengths at the locations of WS05 and WS06 were significantly different from those recorded elsewhere on site, indicating that these soils could be insitu natural.**
- 5.1.10 SPT 'N' values recorded within the natural Devensian Till ranged between 3 to 14 from 1.00m to 4.00m bgl indicating highly variable soils with low to medium strength. Below 4.00m, SPT values increased to between 37 to 40 at 5.00m bgl, indicating very high strength/dense soils at 5.00m bgl. At the locations of WS05 and WS06 at 4.00m and 3.00m respectively, SPT 'N' values were recorded as refusals, with 50 blows for less than the full test penetration of 300mm.

Dynamic Probes

- 5.1.11 Dynamic probe DP1 was carried out adjacent to WS01 and WS01A in the south eastern corner of the proposed AGP. Blow counts were initially recorded as between 0 to 1 per 100mm penetration to 2.80m bgl, with 2 blows recorded at 1.90m bgl. Below 2.8m bgl, blow counts increased to 2 to 3 blows per 100mm down to 4.40m bgl, which broadly correlates with the recorded shear strengths and SPT results within WS01. Below 4.4m to the base of the probe at 6.0m bgl, blow counts steadily increased to between 4 to 8 blows per 100mm.
- 5.1.12 Dynamic probe DP2 was carried out adjacent to WS06 in the north east corner of the proposed pitch. Blow counts were initially between 0 to 2 blows per 100mm penetration to 0.80m bgl before increasing slightly to 3 to 5 blows per 100mm down to 2.90m bgl. Below 2.90m blow counts increased sharply to 13 blows per 100mm down to 3.10m bgl before increasing further to blow counts of 16, 19, 22, 21 and 27 consecutively down to 3.60m bgl, before refusal at 3.7m bgl. WS06 encountered a very dense Sand from 2.95m bgl, which is considered to be a granular layer within the Devensian Till and broadly correlates with the results from the dynamic probe.

5.2 Groundwater

5.2.1 Water strikes were encountered within the majority of positions with a summary of the strikes provided in the following table.

Summary of Groundwater Observations			
Location	Depth of Strike (m bgl)	Water Level upon Completion (m bgl)	Observations
WS01	3.00	1.73	Collapsed to 1.80m bgl upon completion.
WS01A	1.00	0.81	Groundwater seepage at the base of the borehole. Collapsed to 0.80m bgl upon completion.
WS02	3.00	0.83	Collapsed to 1.10m bgl upon completion.
WS03	4.00	0.72	Collapsed to 0.80m bgl 5 minutes after completion.
WS04	3.00	2.62	Recovered as damp from 2.59m bgl.
WS05	4.00	3.61	No groundwater strikes during drilling, presumed seepage at the base of the borehole.
WS07	1.00	0.68	Groundwater seepage at the base of the borehole. Collapsed to 0.84m bgl upon completion.

Table 5.2.1

5.2.2 Groundwater levels recorded across the site were noted to be highly variable between locations and is likely associated with the variable nature of the Devensian Till and associated granular layers which may hold isolated perched water strikes of varying volume. This correlates with the findings in the ground investigation report undertaken to the north of the site which also report shallow perched water strikes.

5.2.3 The volume of water and speed of ingress within the shallow perched water strikes is likely to vary seasonally and during periods of persistent rainfall which may impact excavations and dewatering requirements depending on the time of year construction works commence.

6.0 Laboratory Testing

6.1 Geotechnical Testing

6.1.1 Geotechnical testing was completed on selected samples as follows:

Summary of Geotechnical Laboratory Testing Strategy		
Sample reference and depth	Soil type	Laboratory testing scheduled
WS03 0.70m	Devensian Till	1 point plasticity index and moisture content
WS05 0.40m	Devensian Till	1 point plasticity index and moisture content
WS06 1.60m	Devensian Till	1 point plasticity index and moisture content
WS04 0.50m	Devensian Till	BRE SD1 Suite
WS05 0.80m	Devensian Till	BRE SD1 Suite
WS06 0.60m	Devensian Till	BRE SD1 Suite
Table 6.1		

6.2 Chemical Testing

6.2.1 Chemical testing was completed on a composite sample of Topsoil from depths of between 0.05m to 0.20m bgl, and a composite sample of the Made Ground from depths of between 0.30m to 0.60m bgl as follows:

- Metals, metalloids, inorganics & PAHs
- Asbestos screening
- Waste Acceptance Criteria – WAC testing (Made Ground Composite only)

6.2.2 In addition to the chemical testing, a representative composite Topsoil sample from across the site was also scheduled for testing in accordance with BS 3882:2015 *Specification for Topsoil*.

6.2.3 The laboratory testing was carried out by Normec i2Analytical who are UKAS and MCERTS accredited. The full results of the laboratory testing are located in Appendix C.

7.0 Engineering Assessment

7.1 Geotechnical Laboratory Results

7.1.1 The results of the laboratory testing are summarised in the following table. The full results can be found in Appendix C.

Summary of Plasticity Classification results				
Sample reference and depth	Soil type	Plasticity Index %	Modified Plasticity %	Volume change potential (Plasticity Term)
WS03 0.70m	Devensian Till	12	11	Low (Low)
WS05 0.40m	Devensian Till	13	12	Low (Low)
WS06 1.60m	Devensian Till	16	14	Low (Low)

Table 7.1

7.1.2 The results of the plasticity testing indicate that the cohesive Devensian Till deposits are considered to have a **low volume change potential** in accordance with NHBC Standards Chapter 4.2.

7.2 Floodlight Foundations

7.2.1 The topographical survey shows the pitch to fall towards the east/southeast, from 110.75m AOD in the north western corner, falling to approximately 108.6m AOD in the south eastern corner, a fall of approximately 2.15m across the proposed pitch footprint and therefore some levelling earthworks are likely to be necessary to reduce the fall.

7.2.2 Made Ground was encountered within two positions (WS01/WS01A in the south east corner and WS02 central south west side of the pitch) around the perimeter of the pitch to depths of between 0.45m to 1.00m bgl and generally comprised a firm very sandy slightly gravelly Clay with occasional roots and rootlets with gravels consisting of fine to medium subrounded to subangular brick and sandstone. WS01, WS01A and WS02 also each encountered a potential relic Topsoil layer underlying the Made Ground to depths of between 0.75m to 1.00m bgl which was encountered as a very soft dark brown very sandy slightly gravelly Clay with rare roots and rootlets and rare pockets of fine to coarse sand. Gravels consisted of fine to medium rounded to subrounded flint. This is considered to be a result of past levelling earthworks and at the lowest areas of the proposed pitch, therefore where levels are likely to need to be raised to reduce the fall across the pitch. This would lead to the Made Ground and potential relic Topsoil layer being buried if not removed. Foundations will need to fully penetrate such Made Ground and potential relic Topsoil layer by at least 0.3m into the underlying natural Devensian Till soils, which could make the overall foundation depths required deeper than 2.5m bgl.

- 7.2.3 Floodlight pad foundations should be formed at least 0.3m penetration into the underlying natural firm sandy Clay soils of the Devensian Till, fully penetrating any Made Ground/reworked deposits encountered to depths of 0.45m to 1.00m bgl within the east/south east of the proposed pitch position and in the middle of the site. Foundations should be a minimum of 0.75m below ground levels (existing or proposed, whichever is deepest should apply), and deepened where required in proximity to trees as appropriate based on a low volume change potential. Foundations should fully penetrate any apparent soft or loose ground, (encountered in WS01, WS02, WS03 and WS04) into firm competent and consistent strata.
- 7.2.4 At the locations of WS01, WS02, WS03 and WS04, due to the low insitu strength recorded, we suggest a reduced allowable bearing capacity of 50kN/m² for a 1.5 x 1.5m square pad and 40kN/m² for a 2.0 x 2.0m square pad, limiting total settlement to 25mm, assuming the load is vertically applied to the centre of the pad with no lateral loading applied.
- 7.2.5 At the locations of WS05 and WS06, where the clay soils were found to have a higher insitu strength, we suggest an allowable bearing capacity of 90kN/m² applies for a 1.0 x 1.0m square pad, 60kN/m² for a 1.5 x 1.5m square pad and 50kN/m² for a 2.0 x 2.0m square pad, limiting total settlement to 25mm, assuming the load is vertically applied to the centre of the pad with no lateral loading applied.
- 7.2.6 During our investigation variable perched water strikes and associated borehole instability were observed in all but one of the boreholes, with standing water levels of between 0.68m to 3.61m bgl recorded, which could make the formation of the pads at the required foundation depths difficult to achieve without significant dewatering and lateral trench support. Ground conditions should be more favourable in the drier summer months, assuming a sustained period of below average rainfall. Alternative foundation solutions such as piling may need to be considered if ground conditions and groundwater inflows preclude the construction of successful pad foundations.
- 7.2.7 Foundations should be deepened within the influence of trees and major vegetation based on low volume change potential soils following NHBC Chapter 4.2, accordingly. Foundations should extend through any potentially desiccated soils or any observed roots or root hairs. A tree survey is recommended to determine the position, species and height of the trees and hedgerow adjacent to the north east of the proposed pitch position to allow assessment of the root protection zones, potential zone of influence and thus necessary foundation depth and may dictate final positioning of the pitch.
- 7.2.8 Where soft/loose or variable ground conditions (anticipated in the location of WS01, WS02, WS03 and WS04) are encountered at founding level, then foundations should be deepened to locate consistent and more competent founding ground conditions to minimise the risk of differential settlement or higher total settlement. If foundation depths exceed what is considered economical then consideration should be given to alternative solutions such as piling which could require additional deeper boreholes to be drilled to assess ground conditions at depth and obtain piling parameters may require further liaison with the Mining Remediation Authority regarding the potential to encounter shallow workings.

7.3 Excavations

- 7.3.1 Based on the variable nature of the Devensian Till, which was observed to vary between granular and cohesive soils and the shallow variable water strikes encountered, we consider that the sides of foundation excavations are likely to be susceptible to instability and collapse due to the varied composition of the soils and shoring may be required to maintain open excavations. Where clay is present, the fines content of the soils could result in rapid deterioration in wet weather conditions therefore it is recommended that trenches are not left open for long periods of time and concrete should be poured as soon as possible after excavation and any softened soils removed from the excavation before pouring concrete.
- 7.3.2 Based on the shallow groundwater levels recorded on site there will be a requirement for dewatering of excavations from pumps within the main excavation and shoring of excavations will be necessary to reach the required founding depths. Ground conditions should be more favourable in the drier summer months, assuming a sustained period of below average rainfall. Alternative foundation solutions may need to be considered if ground conditions and groundwater inflows preclude the construction of successful pad foundations.
- 7.3.3 Human entry should always be avoided where possible, however, where entry is necessary then the contractor should ensure that the excavations are suitably managed with supports or benched to prevent collapse. Any entry should be undertaken in accordance with suitable Risk Assessments and Method Statements in accordance with the relevant guidance and recommendations.

7.4 Concrete Classification

- 7.4.1 An assessment of laboratory test results following BRE Special Digest 1 'Concrete in aggressive ground' has been carried out on three samples of the Devensian Till and water-soluble sulphate on the composite sample of Made Ground.
- 7.4.2 For the Made Ground sample, the concentration of water-soluble sulphate was measured at 0.00618g/l. Groundwater conditions are considered to be mobile with pH measured at 7.2. Therefore, a classification of DS-1 ACEC AC-1 is applicable for the Made Ground deposits.
- 7.4.3 For the Devensian Till, concentrations of water-soluble sulphate were measured at 0.00724g/l to 0.0246g/l. The calculated oxidisable sulphate did not exceed 0.3% and therefore Total Potential Sulphate (TPS) has not been considered. Groundwater conditions are considered to be mobile with pH measured at between 5.4 to 6.8. Therefore, based on the lowest pH of 5.4, a worse case classification of DS-1, AC-2z is applicable for the Devensian Till. Additional testing of the soils pH across the pitch location and at proposed foundation depths may potentially allow for a change to DS-1, AC-1, if the pH of the soils is recorded above 5.5.

7.5 Artificial Pitch Construction

- 7.5.1 The topographical survey shows the pitch to fall towards the east/southeast, from 110.75m AOD in the north western corner, falling to approximately 108.6m AOD in the south eastern corner, a fall of approximately 2.15m across the proposed pitch footprint and therefore some levelling earthworks are likely to be necessary to reduce the fall. Should any reduced level earthworks result in slopes/banks around the edges of the pitch then the levels and gradient of these shall need to be designed taking into account the slope stability and retaining features may be required.
- 7.5.2 A former pond is shown on historical OS mapping towards the centre of the proposed pitch location and an indicative position and extent of this is shown on the exploratory location plan, Drawing 01 in Appendix A. Borehole WS07 was an additional position carried out in an attempt to target the likely position of this pond and encountered Made Ground to in excess of the base of the excavation of 1.0m bgl and water in the base causing collapse of the borehole. Some sort of ground improvement is likely to be required to reduce the potential for adverse settlement of the pitch surface spanning across this former backfilled pond. Some trenching excavation may be prudent to establish the full extent, depth and composition of this possible backfilled pond to assess whether the soils may need to be removed and replaced or whether a ground improvement near surface such as geogrid or lime stabilisation may be sufficient.
- 7.5.3 Made Ground soils and a potential relic Topsoil layer were encountered in WS01/WS01A located in the south east corner and WS02 centrally along the south west side, likely a result of some past levelling earthworks to reduce the fall across the playing fields. This is also where levels are lowest of the proposed AGP and therefore likely to require raising as part of levelling earthworks which would lead to the Made Ground and potential relic Topsoil layer being buried if not removed. Such soils are likely to be prone to primary and secondary settlement which would potentially lead to differential settlement/movement across the base of the pitch over time. Consideration will need to be given to the removal of these soils as part of the earthworks phase of the development.
- 7.5.4 An equilibrium Californian Bearing Ratio (CBR) design value can be derived from the classification testing. Near surface natural soils were encountered beneath the topsoil at the locations of WS03, WS04, WS05 and WS06 and were encountered as a firm orange brown sandy gravelly Clay. Based on the modified plasticity index results (11%-14%) an equilibrium CBR of 3% is considered appropriate. Due to the presence of Made Ground/relic topsoil at the locations of WS01, WS02 and WS07 (possible backfilled pond), a CBR value of <2% should be assumed and some ground improvement to reduce the potential for adverse settlement to occur where underlain by Made Ground and where spanning between the Made Ground and natural soils which will be more competent.

- 7.5.5 A TRL Dynamic Cone Penetrometer has been used to assess the insitu CBR values for near surface soils on the proposed pitch. The probe comprises a 60° 20mm diameter steel cone which is driven vertically into the ground by the force of an 8kg weight dropped vertically by 575mm height. The depth of penetrations is then recorded per blow up to 950mm. The test is aborted if the depth of penetrations is less than 2mm per blow. The derived Soil strength expressed as mm/blow can be converted to CBR using the equation: $\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$.
- 7.5.6 TRL-DCPs were carried out within 5 positions across the proposed pitch extent, as indicated on Drawing 01 included within Appendix A. The TRL DCP results are provided in Appendix B. We have discounted the results within the Topsoil which will be stripped from the pitch. The CBR values for the Made Ground/potential relic Topsoil were generally measured in the range of 4.2% to 8%. For the Devensian Till, CBR values were measured in the range of 5% to 28%, with an anomalous value of 86% recorded within DCP04, performed adjacent to WS05.
- 7.5.7 For formation onto natural soils, a precautionary CBR of 3% is recommended for design based on the equilibrium CBR and to be reassessed during construction based on worst case of clay soils at formation level, particularly following levelling earthworks and anticipated variation in formation ground conditions across the pitch footprint. A CBR of <2% should be assumed where Made Ground remains at formation level or remains insitu following cut and fill works.
- 7.5.8 The soils encountered on site are likely to soften extremely quickly when exposed to periods of sustained wet weather and where over trafficked. There is also a potential for groundwater to be encountered within shallow soils, particularly following levelling earthworks. Care should be taken to work on the exposed soils in periods of dry weather and to not excessively track over the exposed subsoil/formation layer prior to laying the subbase, otherwise softening/dilation could occur which would lower the CBR values of the underlying soils and potentially result in soils being unsuitable for use in earthworks. This should also be accounted for during the proposed earthworks and any excavated and exposed soils will need to be sufficiently protected.
- 7.5.9 Ground improvement such as lime/cement stabilisation and use of a geogrid reinforcement is recommended to improve the CBR value and, due to the variation in formation ground conditions spanning between variable granular and clay/cohesive deposits and Made Ground, to reduce potential for variable/adverse settlement. Stabilisation will also assist in protecting the soils from degradation/softening in wet weather. Some trenching excavation may be prudent to establish the full extent, depth and composition of this possible backfilled pond to assess whether the soils may need to be removed and replaced or whether a ground improvement near surface such as geogrid or lime stabilisation may be sufficient.
- 7.5.10 The formation soils are considered to be frost susceptible.

7.5.11 There is also potential for near surface soils close to trees and major vegetation to be affected by shrinkage and swelling. A root barrier may be appropriate to reduce the potential for root ingress beneath the pitch footprint. The position of the pitch may be subject to the Root Protection Zones and influence of nearby trees and hedgerow adjacent to the north east. Consultation with a tree specialist is recommended in this regard and to determine the Root Protection Zone and influence. Future overhang should also be considered for ongoing maintenance requirements.

7.5.12 All topsoil or organic material should be removed from the proposed footprint of the AGP and any obvious soft or loose spots excavated and backfilled with a suitable fill. Reference should be made to the compaction requirements outlined in Highways England Volume 1: Specification for Highway Works Series 600: Earthworks.

7.6 Infiltration Potential and Surface Water Drainage

7.6.1 Indicative infiltration testing was carried out within WS01A at 0.81m bgl (drilled to 1.00m bgl but collapsed upon completion) from groundwater seepage at the base of borehole within the potential relic Topsoil, and within WS01 at 1.73m (drilled to 5.00m bgl but collapsed upon completion) where a groundwater strike was observed to be rising quickly after completion within the Devensian Till/Glaciofluvial Deposits. Within both WS01 and WS01A, water levels rose roughly 0.02m and 1.10m respectively after more than 200 minutes of observation. Based on the testing and ground conditions encountered, soakaways are not considered to be a viable option for surface water drainage and an alternative positive outfall is considered to be appropriate.

7.6.2 There are no obvious watercourses or drains within or in close proximity to the site, with the closest features appearing to be a pond within the Golf Course adjacent to the south east corner of the playing field. Aerial imagery suggests that the existing grassed playing field is underlain by land drainage in the form of a herringbone system, which is fairly distinctive adjacent to the north west of the proposed pitch, with carrier drains directed towards the south eastern boundary of the playing fields. There is also likely private drainage in place for the nearby pavilion adjacent to the north west corner of the proposed pitch location and for the sports building to the north, as well as for the golf course to the east.

7.6.3 United Utilities records show a pumping station recorded within the school site to the north east of the buildings, with a private combined sewer from this connecting to the public combined sewer at the junction of Higher Lane, Park Lane and Pinfold Lane to the north east of the school. This could provide a potential outfall and there may be an existing private network closer to the pitch that connects into this.

7.6.4 Enquiries, inspection and potentially surveys would be recommended to establish any existing drainage routes close to the proposed pitch, including land drainage, and ultimate outfall, with a view to connecting into for the proposed pitch. Any outfall will be subject to seeking necessary approvals and a detailed drainage strategy.

8.0 Contamination

8.1 Contamination Assessment

- 8.1.1 A full human health and environmental risk assessment is outside of our scope of works for this site. Made Ground was encountered within four positions to depths of between 0.45m – 1.00m bgl and generally comprised a firm very sandy slightly gravelly Clay with occasional roots and rootlets with gravels consisting of fine to medium subrounded to subangular brick and sandstone. WS01, WS01A and WS02 also encountered a potential relic Topsoil layer underlying the Made Ground to depths of between 0.75m – 1.00m bgl, which was encountered as a very soft dark brown very sandy slightly gravelly Clay with rare roots and rootlets and rare pockets of fine to coarse sand. Gravels consisted of fine to medium rounded to subrounded flint. The soils encountered did not exhibit obvious visual or olfactory contamination. Laboratory testing and asbestos screening was scheduled on a composite sample of Made Ground (from depths of between 0.30m to 0.70m bgl), to assess the potential risk of harm to human health and to allow waste classification for offsite disposal (Section 9.0).
- 8.1.2 On the basis that the site will be a surfaced sports pitch following redevelopment and within a school site, a public open space (park) is considered the most appropriate model for exposure following CLEA and the associated guideline values have been adopted for our Tier 1 Screening. These are considered to be screening values by which any exceedance should be further considered as to whether it presents a potentially unacceptable risk of harm to receptors identified by our conceptual model. We have directly compared the measured concentrations with the screening values.
- 8.1.3 Screening values adopted for our risk assessment are sourced from current guidance including Category 4 Screening Levels C4SL from DEFRA, Suitable 4 Use Levels S4ULs from LQM CIEH and Atkins ATRISK SSV (subscription, derived using CLEA Software) limits.
- 8.1.4 We have compared laboratory test results with guideline values for a public open space (residential) end use for which all measured concentrations of metals, metalloids, inorganics and PAHs do not exceed the threshold screening values, and total mineral oil and BTEX/MTBE are recorded below the detection limit. No asbestos was detected within the sample tested.
- 8.1.5 It should be noted that there is a potential for areas to be identified that contain higher concentrations of chemical contaminants, not presently investigated. Should any suspect ground be uncovered during the course of the construction works, we should be consulted to advise an appropriate course of action.
- 8.1.6 Adequate precautions including appropriate PPE should be adopted by construction workers and site users during the construction phase, where they may come into contact with soils.

8.2 Topsoil Assessment

- 8.2.1 Topsoil should not be disposed of to landfill but reused or recovered and recycled. Where such soils require removal from site to be reused elsewhere, additional testing is required to determine whether it is fit for purpose for the intended use. Consequently, a composite sample of the Topsoil has been tested to assess its suitability for reuse or to be recovered and recycled based on concentrations of chemical contaminants.
- 8.2.2 We have compared the measured concentrations of chemical contaminants with those for the most stringent assessment for exposure following CLEA guidance which is for use in residential gardens and the associated guideline values have been adopted for our Tier 1 Screening. These are considered to be screening values by which any exceedance should be further considered as to whether it presents a potentially unacceptable risk of harm to identified receptors and therefore whether it is suitable for use.
- 8.2.3 Screening values adopted for our risk assessment are sourced from current guidance including Category 4 Screening Levels C4SL from DEFRA, Suitable 4 Use Levels S4ULs from LQM CIEH and Atkins ATRISK SSV (derived using CLEA Software) limits.
- 8.2.4 We have directly compared the measured concentrations with screening values for residential gardens (with plant uptake/home grown produce). Measured concentrations of metals, metalloids and polycyclic aromatic hydrocarbons do not exceed the threshold screening values for residential uptake (with and without home grown produce). No asbestos was detected in the sample. On this basis, the topsoil can be recovered and recycled for use on sites including residential gardens.
- 8.2.5 The composite sample of Topsoil has also been analysed to assess the properties in accordance with BS 3882: 2015 *Specification for Topsoil*. The results show that 'TS Composite' is classified as a loamy Sand and does **not** meet any of the criteria for soil texture. Additionally, the sample was not compliant with any soil types due to inadequate pH levels (too high for Acidic/Low-Fertility Acidic and too low for Calcareous/Low-Fertility Calcareous) and insufficient extractable phosphate potassium concentrations. It may be possible to treat the Topsoil to meet the required criteria with the addition of some form of fertilizer, however, advice should be sought from an expert in this field such as an agronomist or landscape consultant/specialist to assess this further, and to correct the texture of Topsoil. It is noted that the topsoil currently supports grass growth.
- 8.2.6 Wherever possible, Topsoil should not be disposed of to landfill but reused or recycled. Where there is no other option but for the soils to be disposed of to landfill, we have carried out a first stage analysis of the laboratory test data following WM3 to determine whether the topsoil is classified as hazardous or non-hazardous using HazWasteOnline™. Copies of the generated report is provided in Appendix C. The analysis determines the soils to be **non-hazardous**. Laboratory testing under the Waste Acceptance Criteria (WAC) would be necessary to determine whether the soils are classified as inert or non-hazardous, as required by the landfill operator. Typically, due to the organic content (Total Organic Carbon) of most Topsoil, the soils may be non-hazardous rather than inert.

9.0 Waste Classification

9.1 Hazardous or Non-Hazardous Classification

- 9.1.1 Following WM3, we have carried out analysis of our laboratory test data on a composite sample of the Made Ground, using HazWasteOnline™. A copy of the generated report is provided in Appendix C. This analysis determines the Made Ground soils to be **Non-Hazardous**.

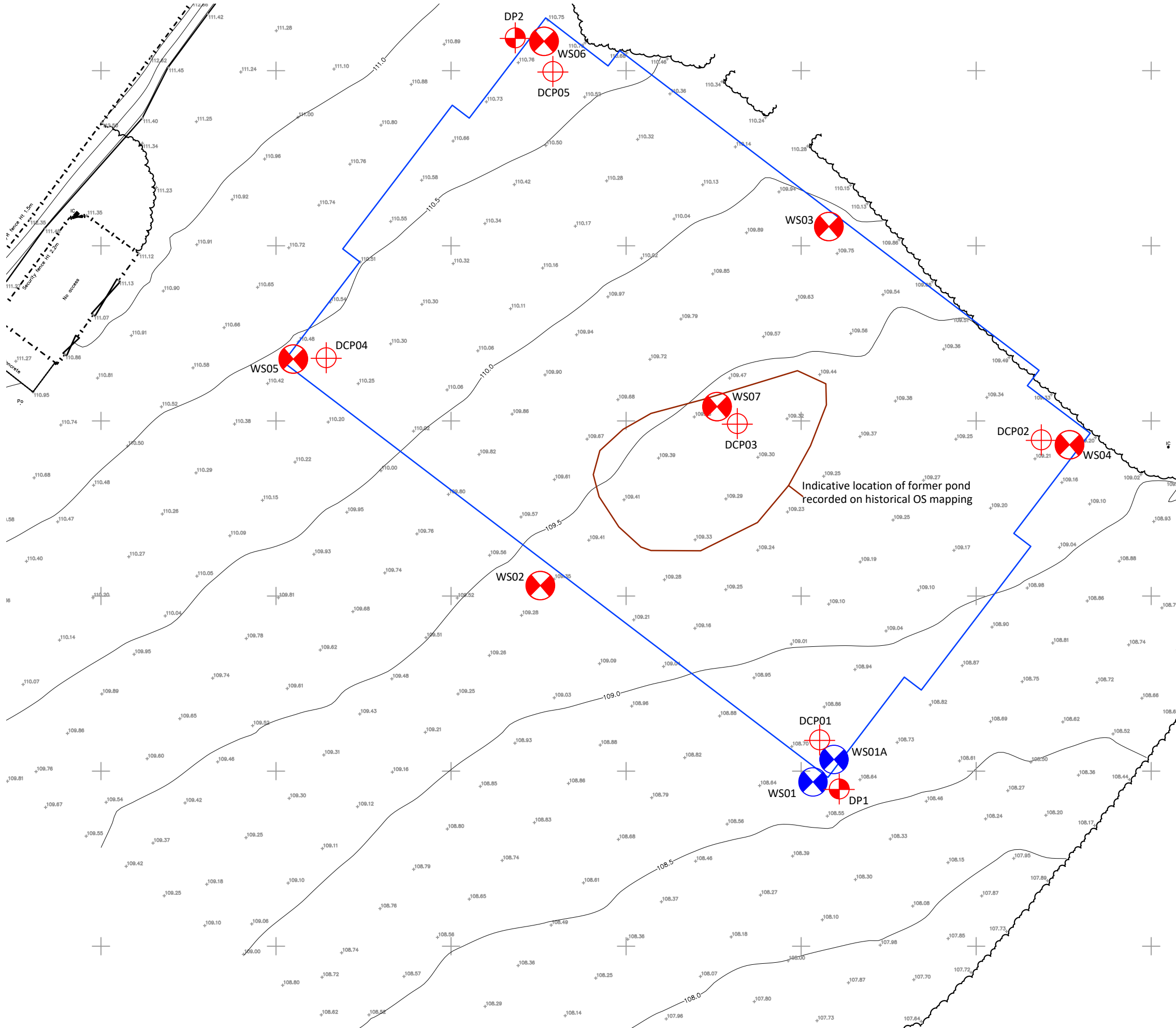
9.2 Classification under the Waste Acceptance Criteria

- 9.2.1 The Made Ground sample was also submitted for laboratory testing under the waste acceptance criteria WAC. The testing determines that the Made Ground soils are classified as **inert waste**. We suggest that copies of the laboratory certificates are provided to the landfill operator to confirm they can accept the soils.
- 9.2.2 Arisings of natural deposits, that are naturally occurring and where not affected by artificial contamination can be classified as non-hazardous and potentially inert for offsite disposal to landfill. Testing may be necessary to confirm such deposits can be disposed of as inert.



Appendix A

Drawing



Base drawing:
Topographical survey by JPP Surveying
drawing number: 30586Y, dated 05/08/2025

- KEY
-  WS Windowless sample borehole
 -  WS Windowless sample borehole with infiltration test
 -  DP Dynamic probe
 -  DCP TRL - Dynamic cone penetration test
 -  Approximate outline of proposed 3G AGP taken from Labosport layout plan.



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Client	Labosport		
Project	Philips High School, Whitefield		
Title	Investigation positions and proposed pitch extent onto topographical survey		
Scale at A3	NTS	Drawn by	LC
Status	Project ref	Drawing no.	Revision
	30447	01	
Checked by	DK	Date	December 2025



Appendix B
Fieldwork Records

Key to Exploratory Hole Logs

General

Descriptions for soils and rocks generally following:

BS 5930:2015+A1:2020

BS EN ISO 14688-2:2004

BS EN ISO 14689-1:2003

Sampling

ES	Environmental Sample (taken in appropriate sampling container)
D	Disturbed Sample
B	Bulk Sample
C	Core Sample
U	Undisturbed Sample (number of blows indicated in results column)
UT	Thinwalled Undisturbed (number of blows indicated in results column)
W	Water Sample

Insitu Tests

SPT	Standard Penetration Test
SPT (C)	Cone Penetration Test
PID	Photo Ionisation Detector Results (ppm)
PP	Pocket Penetrometer reading converted to shear strength kPa
HV	Converted Shear Vane measurement kPa

Drilling Records

▼	Depth to standing water level
▽	Depth to water strike
TCR	Total Core Recovery (%)
SCR	Solid Core Recovery (%)
RQD	Rock Quality Designation (%)

Backfill Symbols

Arisings	
Concrete	
Blacktop	
Bentonite Seal	
Gravel Filter	
Sand Filter	

Pipe Symbols

Plain Pipe	
Slotted Pipe	
Filter Tip	

Principal Soil Types

Topsoil	
Made Ground	
Clay	
Silt	
Sand	
Gravel	
Peat	

Principal Rock Types

Mudstone	
Siltstone	
Sandstone	
Limestone	
Chalk	

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- Infrastructure Design
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Key to Exploratory Hole Logs





Groundwater strike at 3.00m bgl. Collapsed to 1.80m bgl upon completion. Standing water level at 1.73m bgl after 15 minutes.



Remarks



Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES		0.20			Grass over dark brown silty very sandy clayey TOPSOIL with frequent roots and rootlets.	
		0.40	D					Firm orange brown and beige very sandy slightly gravelly CLAY with occasional roots and rootlets. Gravel consists of fine to medium subrounded to subangular brick sandstone and flint. (MADE GROUND)	
		0.40	PP	25.00	0.52				
		0.60	PP	35.00					
		0.90	D		0.75			Very soft dark brown very sandy slightly gravelly CLAY with rare roots and rootlets and rare pockets of fine to coarse sand and Gravel. Gravel consists of fine to medium rounded to subrounded flint. (RELIC TOPSOIL/MADE GROUND?)	1 -
		1.00		N=4 (2,1/1,1,1,1)					
		1.20	D					Very loose/loose light orange brown and beige clayey very silty fine to medium SAND. (DEVENSIAN TILL)	
		1.75	D		1.68				
		1.80	PP	45.00				Firm dark orange brown mottled grey with black speckling very sandy very silty slightly gravelly CLAY. Gravel consists of fine to medium subangular sandstone. (DEVENSIAN TILL)	2 -
		2.00	PP	65.00				No recovery from 2.00m - 3.00m bgl.	
		2.00		N=6 (2,1/1,1,2,2)					
		3.00		N=4 (1,2/1,1,1,1)					3 -
		3.30	PP	65.00				Becoming very soft from 3.10m bgl.	
		3.50	PP	50.00					
		3.80	PP	50.00	3.64			Soft to firm orange brown very sandy CLAY. (DEVENSIAN TILL)	4 -
		4.00		N=8 (2,2/2,1,2,3)					
		4.60	PP	25.00					
4.90	PP	15.00	5.00						
5.00		N=40 (4,7/10,11,10,9)				End of Borehole at 5.000m	5 -		
								6 -	

[illegible]

Recovered as damp from 1.00m bgl. Groundwater strike at 3.00m bgl. Collapsed to 1.10m bgl upon completion. Standing water level at 0.83m bgl after 15 minutes.



Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.30	ES		0.41		Grass over dark brown silty very clayey sandy TOPSOIL with frequent roots and rootlets.			
		0.50	PP	25.00				Very soft dark orange brown and beige very sandy silty slightly gravelly CLAY. Gravel consists of fine to medium rounded to subrounded flint and sandstone. (DEVENSIAN TILL)		
		0.70	D							
		0.70	PP	25.00						
		0.90	PP	30.00						
		1.00		N=5 (2,1/2,1,1,1)				No recovery from 1.00m - 1.90m bgl.	1	
		2.00		N=3 (1,1/1,1,0,1)					2	
		2.20	D							
		2.20	PP	20.00						
		2.40	PP	15.00						
		2.60	PP	15.00						
					2.82					
		3.00		N=4 (1,2/1,1,1,1)	3.00		Very loose (est) grey silty fine to coarse SAND. (DEVENSIAN TILL)	3		
		3.40	PP	60.00			Very soft becoming firm dark orange brown and grey very sandy very silty slightly gravelly CLAY. Gravel consists of fine to medium subrounded to subangular flint. (DEVENSIAN TILL)			
		3.50	D							
		3.70	PP	75.00						
		4.00	PP	90.00						
	4.00		N=14 (2,4/4,3,3,4)							
	5.00		N=37 (7,9/10,8,9,10)	5.00		End of Borehole at 5.000m	5			
								6		

[illegible]

Remarks
Groundwater strike at 4.00m bgl. Collapsed to 0.80m bgl 5 minutes after completion. Standing water level at 0.72m bgl after 10 minutes.



Recovered as damp from 2.60m bgl. Groundwater strike at 3.00m bgl. Standing water level at 2.62m bgl after 20 minutes.



No groundwater strikes during drilling. Standing water level at 3.61m bgl after 20 minutes. Borehole terminated at 4.00m bgl due to refusal on very dense granular soils.