golby+luck
arboriculture services

Sand Arena Extension - Ham Polo Club, Richmond

Arboricultural Assessment

Client: Ham Polo Club Ltd

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1 INTRODUCTION

1.1 Golby & Luck have been instructed by Ham Polo Club Ltd to produce this report in relation to the proposed extension of an existing sand arena at the Ham Polo Club ground, Richmond. The purpose of this document is to assess the development proposal in relation to the site's existing tree stock and make recommendations for protective measures in accordance with British Standard 5837:2012 Trees in relation to Design, Demolition and Construction. A site visit was made on 2nd July 2021 to carry out the arboricultural survey.

1.2 This report should be read in conjunction with drawings GL1457 03 & 04, see **Figures,** the arboricultural survey schedule, see **Appendix A,** and the development proposal, see **Appendix B.**

Site Description

1.3 The application site is the Ham Polo Club sports ground in Richmond, London. The area considered in this report comprises an existing sand arena and grass field located at the west of the site.

1.4 To the north of the application site is the existing sand arena, bound by post and rail fencing. The main body of the site extends south from this and is laid predominantly to grass. The east boundary is defined by sporadic scrub, trees and an earth mound. The south boundary is open and undefined. The west boundary is defined by a post & wire fence, beyond which is a public right of way that adjoins the east boundary of Ham House. This is known as Melancholy Walk.

1.5 Ham House is a Grade I listed building, set within a Grade II* Registered Park & Garden. The wider context of the site includes the Grade I registered park and garden Richmond Park to the east, an area of public open space to the south known as 'The Copse' and the River Thames to the north.

Development Proposal

1.6 The development proposal is for the extension of an existing sand arena with associated fencing and surfacing, see **Appendix B.**

Statutory Protection

1.7 The trees considered in this survey are located within the Ham House Conservation Area designation. Section 211 of the Town & Country Planning Act 1990 requires the Local

Planning Authority (London Borough of Richmond) to be provided with six weeks notice of any proposed tree works in a Conservation Area, excluding the exempt works detailed in Regulation 14 of the Town & Country Planning (Tree Preservation) (England) Regulations 2012; for example, the removal of deadwood. If the Authority disagrees with the proposals, they must make a Tree Preservation Order to protect the affected trees and prohibit the works from being carried out. This must be issued within six weeks from receipt of the notice. If no response has been received within six weeks consent can be assumed. Consent for tree works in a Conservation Area may also be secured under a related development proposal subject to a full planning permission.

1.8 There are no Tree Preservation Orders affecting the surveyed trees, as advised by London Borough of Richmond Council on telephone (27-08-2021).

2 DATA COLLECTION

2.1 Information has been produced on all hedgerows and trees (>75mm dbh) present within or adjacent the application site. All trees have been surveyed individually, but may in some instances be categorised in groups or woodlands. Groups are specified where overall condition, species type or quality is uniform or closely assimilates. Branch spreads and root protection areas of groups are assessed individually, but may be displayed collectively.

2.2 Life stage was assessed as follows:

Young (Y)	Recently established and/or showing juvenile form.
Semi-mature (S/M)	An established tree, but with growth to make before reaching its potential maximum size. Within the first 1/3rd of life span.
Early-mature (E/M)	A tree that is reaching its ultimate potential height, whose growth rate is slowing down but, if healthy, will still increase in stem diameter and crown spread. Within the second 1/3rd of life span.
Mature (M)	A mature specimen with limited potential for any significant increase in size, even if healthy. A tree within its final 1/3rd of life span.
Over-mature (O/M)	A senescent or moribund specimen of low vigour within its final third of life span. Possibly also containing structural defects requiring remedial work.
Veteran (V)	Specimens exhibiting features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.
Dead (D)	The tree is dead. Its age up till death is of no significance.

2.3 Measurements have been recorded for height, stem diameter, crown clearance and branch spread at the cardinal points for all trees surveyed. Height measurements above 10m are accurate within 1m. Height, stem diameter and width measurements for hedgerows are provided as an average of the overall length.

2.4 Measurements of stem diameter were taken at 1.5m from ground level where conditions allowed. The diameters for multi-stemmed trees were recorded and root protections areas (RPAs) calculated in accordance with formulae outlined in section 6 of British

Standard 5837:2012. Hedgerow root protection area radii are to be plotted from the centreline of the hedge, unless specific stem locations have been identified.

2.5 Physiological and structural condition has been recorded has one of the following categories:

Good (G) A tree or hedgerow in good health typical of the species. Needling little, if any, remedial work. Few minor defects of minimal significance such as physical damage or suppressed branches. Showing no adverse risk of failure or decline.

Fair (F) A tree or hedgerow with minor but rectifiable defects or in the early stages of stress, from which it may recover. Showing minor signs of decline, including major defects in early life stages, or multiple minor defects. Remedial work possibly required.

Poor (P) A tree with major structural or physiological defects such that it would be inappropriate to retain in its current or future environment. Unlikely to return to a good condition given time or remedial work.

Dead (D) A tree no longer alive.

2.6 Estimated remaining contribution (ERC) has been categorised as: 0 - 10 years, 10+ years, 20+ years or 40+ years, based upon an assessment of the tree's potential safe and useful life expectancy relative to its species type and environment.

2.7 Deadwood has been defined as the following:

Twigs Small branch material up to 10mm diameter

Minor deadwood Deadwood 10mm to 50mm diameter

Major deadwood Deadwood greater than 50mm diameter

2.8 Structural defects, pathogens, disease and other relevant observations of trees condition have been noted. These are recorded under 'Observations' in the appended schedule and are accompanied by recommendations for any responsive work.

2.9 Where remedial works have been recommended they have been assigned a priority code 1, 2 or 3:

(1) Works to be completed immediately due to significant risk of failure in a high risk area.

(2) Works to be completed prior to the commencement of development or at the earliest opportunity to address moderate safety risk.

(3) Works to be completed prior to the completion of development or in the interests of good arboricultural or silvicultural management, where budget allows.

Tree Categorisation

2.10 Trees and hedgerows, as individuals, groups or woodlands, are assigned a category in accordance with Table 1 of BS5837:2012 (below):

BS5837:2012 Table 1 – Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)		
Trees unsuitable for retention (see Note)			
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see (BS5837:2012) 4.5.7.*		
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**
Trees to be considered for retention			
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value

Extract - BS5837:2012 Trees in relation to design, demolition and construction - Recommendations cascade chart for tree quality assessment.

Limitations

2.11 The survey was a visual assessment undertaken from ground level - no aerial inspection or invasive inspection techniques (e.g. drilling, excavation) were undertaken. Only binoculars, polythene mallet and a metal probe have been used to aid tree assessment. Trees and hedgerows were in full leaf when assessed and weather conditions were windy.

2.12 Where physical objects or vegetation obstructed inspection, measurements may have been estimated. A hash symbol # is indicated where measurements are estimated due to impeded access.

2.13 Specimens, such as shrubs or trees with a stem diameter less than 75mm, or those such a distance from the proposals to be of no significance, have been not been fully assessed.

2.14 The recommendations and conclusions in this report relate only to the conditions found on this site at the time of the site visit and inspection. Trees are living organisms the condition of which can change significantly and sometimes unpredictably in short time periods, particularly when the surrounding environment is subject to change or extreme weather conditions.

2.15 The findings of this report are valid for a period of twelve months only from the date of survey. Any major alteration to the site or unforeseeable events (level changes, hydrological changes, severe weather events, tree works undertaken without seeking arboricultural advice etc) may affect the trees and necessitate a re-assessment of those specimens affected. Potential hazards and levels of risk may change as the site usage alters during and following completion of the development. Unless otherwise stated, all trees should be re-inspected in 12 months from the date of survey or following any major storm event.

2.16 This report relates strictly to the condition of existing trees and hedges and is intended to form a guidance document for their retention and management. It is in no way intended to address subsidence or heave, a future risk thereof, or a detailed assessment of site soils. It remains the client's responsibility to ensure any building design or future tree removal is fully considered and supported with appropriate engineering advice.

3 ARBORICULTURAL SURVEY RESULTS

Tree Condition & Quality

3.1 The Assessment includes 2 groups and 1 individual tree. located along the boundaries of the proposed development area.

3.2 Group G001 includes a small area of scrubby hawthorn, including one young lime and one young sycamore. The trees are of limited significance and could easily be replaced as part of a development proposal. They are considered category C1.

3.3 T002 is a mature horse-chestnut located on the west site boundary. Frequent stem exudations on lower stem. Large tear wound c. 600mm diameter at crown break, 4m south, due to loss of codominant leader - significant entry point for disease and decay. Further moderate tear wound at 6m south. Pronounced asymmetry due to these previous failures.

3.4 G003 comprises part of an avenue of lime which lines Melancholy Walk, a footpath cycleway along the west site boundary and east boundary of Ham house. The trees were in full leaf when inspected and as such assessment of detailed aerial defects was inhibited. All trees appeared in good physiological condition and attract significant value as a formal arboricultural feature with high associated amenity value and cultural value, due to their relationship with Ham House.

3.5 T004 is a small horse chestnut located on an earth mound towards the south-east corner of the site. It is a small unremarkable tree but with reasonable growth potential and no significant defects. It is considered category B1.

Soils – Desk Based Assessment

3.6 LandIS Soil Viewer Map records the site as being within Soil Type 6: Freely draining slightly acid loamy soils.

3.7 British Geological Society: Geology of Britain Viewer records the site as being set on

- Bedrock: London Clay Formation - Clay And Silt. Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by deep seas.

- Superficial Deposits: Langley Silt Member - Clay And Silt. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by wind blown deposits (U). These sedimentary deposits are aeolian in origin. They are detrital, comprising medium - to fine- grained materials, forming lenses, beds (and locally) dunes.

3.8 These attributes do not indicate any ground characteristics that are likely to have influenced root distribution.

Summary of Arboricultural Constraints

3.9 Tree canopies have been plotted at the four cardinal points to give a true representation of each tree's branch extension. The canopy of some groups may be provided as a single line, defining the collective branch extension of all trees within the group.

3.10 Tree root protection areas have been plotted as a circle centred on the base of each tree stem. BS5837:20212 states:

> "***4.6.2*** *The RPA for each tree should initially be plotted as a circle centred on the base of the stem. Where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.*
>
> ***4.6.3*** *Any deviation in the RPA from the original circular plot should take account of the following factors whilst still providing adequate protection for the root system:*
> *a) the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures and underground apparatus);*
> *b) topography and drainage;*
> *c) the soil type and structure;*
> *d) the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management."*

3.11 Both T002 and G003 have footpaths or tracks in their RPA. In the case of T002, a sand track is present in the east of the RPA, used for exercising horses. Loose sand is not a hard surface and allows for water percolation and gaseous exchange. The track is subject to

limited compaction, occurring from only light pedestrian/equestrian use which would be mostly mitigated by the sand layer. This is therefore not considered significant enough ground disturbance to have substantially altered root distribution beyond the typical circular protection area afforded for by BS5837:2012.

3.12 The footpath running parallel to G003 is surfaced with a loose self-binding gravel type surface. This is again porous and would typically be installed on a stone sub-base of approximately 150mm depth. The overall construction of the surface is not likely to have extended further than 200mm below ground level with some further residual compaction of underlying soil likely to have occurred below this depth. It is generally features of robust, heavy construction such as modern roads and concrete building foundations, that pose a significant restriction on root development.

3.13 The features recorded in RPAs are both porous and of minor construction. it is not considered that there is any overriding justification to deviate from the circular RPA for the initial assessment of tree constraints.

Summary

3.14 Tree constraints have been recorded in line with BS5837:2012. Tree quality has been summarised in accordance with BS5837:2012. Of note, are the limes and single sycamore within group G001. These trees present a formal arboricultural feature which has direct cultural and historic associations with heritage assets. They are considered high quality, category A, and their protection and retention is of particular importance.

3.15 T001 and group G002 are of low quality, category C1. These trees should not be considered a significant constraint to development, but any general loss of tree cover should be mitigated through new planting.

3.16 T004 is a semi-mature tree with no major defects and an estimated remaining contribution not less than 20 years. It is moderate quality, category B1.

4 ARBORICULTURAL IMPACT ASSESSMENT

4.1 This section should be read in conjunction with the Tree Protection Plan & Method Statement, see **GL1457 04.** This drawing sets out details of the proposed development and the associated tree removal and retention.

Facilitation Works - Tree removal & pruning

4.2 The development does not require the removal of any trees recorded in this survey.

4.3 An area of hawthorn scrub requires removal to facilitate the construction of the sand arena. This equates to approximately 102m2. This removal represents a loss of vegetation and habitat from the site that should be replaced in equal measure as part of the development proposal.

4.4 In terms of remedial pruning, T002 requires crown reduction works to address crown asymmetry occurring from a previous major failure. This is a benefit of the scheme, securing positive arboricultural management of declining trees.

Construction within Root Protection Areas

4.5 There are two areas of construction within or immediately adjacent to tree root protection areas. These include:

1) Part of the sand arena proposed over the west extent of T002's RPA; and
2) The installation of boundary fencing for the sand arena close to the east extent of the RPA's of trees within G003.

4.6 The preceding section considered the calculation of the root protection areas of T002 and G003, with reference to features present within the RPA. It concluded there was no overriding reason to modify the typical circular RPA for the initial definition of tree constraints.

Proposed Construction – T002

4.7 The sand arena proposed in the RPA of T002 covers 62m2 of the tree's overall 243m2 RPA. This is approximately 25% of the area, which exceeds the 20% threshold of existing unsurfaced ground that is recommended by the British Standard. There are extensive

examples in industry of where no-dig surfacing has been used on a much greater extent than the 20% threshold, with success. Furthermore, the proposed surface uses open course surfacing and a porous sub-base material.

4.8 In terms of formation of levels, the arena floor does not require excavation and is installed at ground level. The site is broadly level between approximately +6.10m AOD and +6.60m AOD, with T002's RPA positioned to the middle of the arena boundary at +6.32m AOD. The level of the sand arena is proposed at +6.70m to avoid any need for excavation and accommodate the increase in level arising form the no-dig build up of the arena. excavation.

4.9 In terms of construction, the proposed construction method is detailed on drawing WAALTD34 10, see **Appendix B.** A 3D cellular confinement system (3D CCS) (e.g. Terram Geocell) could be used to house the sub-base material (angular stone) and avoid compaction of underlying soil during installation. Above this sits an *open* course tarmacdam layer, which allows for rainwater to percolate through to underlying soil. Drainage channels associated with the arena are situated beyond the tree's RPA. Subject to construction using a 3D CCS, it is considered the arena floor could be installed without any unreasonable risk to the retention of T002. Furthermore, this is a low quality (category C) tree requiring significant remedial work that it would be considered disproportionate to modify site design for.

4.10 The boundary fencing of the arena will require excavation to accommodate footings at 1.8m centres measuring 1m in depth and 0.75m square. 9no of these are required in the RPA of T002, with the closest 2.3m from the tree stem and the remaining 8no increasing in distance from the stem. Isolated areas of excavation, such as these pits, can be accommodated without significant impact on the root systems of the existing trees, as it is also possible for the pits to be slightly repositioned during installation to accommodate the retention of roots. Similar construction was recently approved under application **20/3676/FUL,** which permitted the erection of a ball-stop fence within the root protection areas of category B and C trees present in the east of the Ham Polo Club site. It is possible for the footings for the proposed fence posts to be excavated under the supervision of a qualified arboriculturalist and with areas of ground protection. Carried out correctly, this method will prevent any adverse impact to tree condition.

Proposed Construction – G003

4.11 In introducing further development near the RPAs of G003, it is necessary to first provide more detailed analysis of the existing footpath on Melancholy Walk and the root distribution of G003.

4.12 The existing path is considered a minor structure and has a porous surface treatment, see **3.11 – 3.13.** The remaining RPAs comprise undeveloped ground.

4.13 It is widely accepted that the majority of tree roots will, in undisturbed ground, occupy the upper 600mm of soil. However, when looking at the morphology of the roots of street trees, for instance, it is clear roots will proliferate at greater depths and continue to grow in what may appear adverse conditions. For example, under non-porous features such as tarmacadam pavements or equally the array of footpaths that define the treed avenues of London city.

4.14 Conversely, it is also recognised that root morphology will often by defined by the soil most readily available and unconstrained for roots to extend into, and that this will often occur in both asymmetrical and symmetrical patterns. A significant amount of fibrous root growth often occurs around the 'drip-line' of the canopy. The canopy of lime trees is relatively narrow and columnar and, in this case, set well within the majority of the RPAs recorded. G003 benefits from undeveloped ground within a broadly north to south direction, between the trees and parallel to the footpath, as well as into the open area to the east, along and within the site's west boundary. This intervening space supports a notable soil volume for root growth and while it is reasonable to assume this area may be that most occupied by roots, it should also be noted that the path structure is not likely to be present at any significant depth. Consequently, root growth beneath this surface is clearly still likely. Were this development proposal for the resurfacing or alteration of the existing footpath, the RPA and associated tree protection measures would certainly not be dismissed from this area.

4.15 Taking into account these points, it would remain proportionate to apply the typical circular RPA to G003.

4.16 Drawing **GL1457 04** demonstrates that the boundary of the sand arena aligns within the eastern edge of RPAs within G003 and in most cases is a minimum of 1m beyond it. It is significantly beyond tree canopies and their associated drip line.

4.17 Paragraph 4.10 has set out an assessment of installing the boundary fencing in proximity to trees. In the case of G003, the proposed fencing is at the esat edge of the RPA of two trees, and beyond the RPA for all other trees that form part of the group. This represents a particularly low risk of encountering root growth. For this reason, the preparation of a method statement that follows the principles approved in **20/3676/FUL** would appropriately manage and mitigate the works in line with BS5837:2012. The pits are positioned at 1.8m centres which will allow continued root growth to the east.

4.18 The arena floor itself will have a finished level of +6.70m, which requires 0.35m of build-up below this. This would dictate a ground level of +6.35m. The existing levels recorded along the west site boundary and within RPAs allow for this build up without necessitating any excavation within RPAs. A particularly minor amount of cut will be required in the northeast of the site, on the edge of RPAs, where the existing level will need to be reduced. Following the removal of the existing turf layer (typically 100mm) this would equate to only a 150mm reduction in level which could easily be accommodate alongside RPAs and would not affect the retention of existing levels within the RPAs itself.

4.19 In summary, there is no significant arboricultural reason why the arena floor and boundary fencing should not be installed, providing a method statement covering the installation of no-dig areas and the fencing is provided. The pits for the fence footings should be hang dug and lined with an impervious membrane to avoid soil compaction.

Planting Mitigation

4.20 The development requires the removal of no individual trees. It will secure the positive management of T002 through remedial pruning, which would otherwise be retained in a structurally unsound condition and left susceptible to failure.

4.21 The removal of an area of hawthorn scrub is required to extend the arena. This equates to approximately 102m2 of vegetation. To mitigate this removal, an equal area of new planting should be provided, comprising of a species rich mix of locally native shrubs.

Opportunities

4.1 The site sits within a context of Grade I and Grade II* heritage assets, including Registered Parks and Gardens and Listed Buildings.

4.2 A study of historic aerial photography has considered tree cover formally present within the site and its immediate setting. The image below illustrates an area of linear tree cover,

formerly present within the Ham Polo Club site which has been gradually lost throughout the course of the late 20th century. It is taken from aerial photography of London, captured in 1945.

4.3 The proposal provides a significant opportunity to secure the replanting of part of this arboricultural feature. This planting would contribute to restoring tree cover that once formed part of the historic setting of Ham House. Appropriate species selection could be used to ensure the planting is consistent with the composition of trees present in the Registered Park & Garden. For instance, the planning of lime (*Tilia sp.)* as present along the western site boundary.

4.4 Such benefits could not otherwise be secured without the delivery of the development and would, in turn, assist in assimilating the sand arena into its immediate setting.

Image 3: Taken from Google Earth, 1945 aerial photography of London. The image illustrates Ham House and the surrounding area. The Ham Polo Club is undeveloped fields. The River Thames is visible to the north. The approximate extent of the site is outlined red and the tree cover referred to outlined green.

Summary

4.5 T002 is a low quality tree that requires remedial work. The proposed construction within its RPA has been assessed and, while exceeding recognised thresholds, is not considered to

present a likelihood of tree failure if implemented correctly. The construction methods proposed can be installed with care and without significant root damage. The tree is a low quality category C tree and should not unreasonably constrain development.

4.6 G003 is a high quality group with significant cultural and amenity value. Detailed consideration of root distribution has been carried out to ensure the proposed works can be carried out without unnecessary risk to tree condition or retention. It is concluded that the works can be completed in line with the recommendations of BS5837:2012.

4.7 The proposals offer the opportunity to secure the positive management of one declining tree, together with securing new planting that would contribute to restoring tree planting that formed part of the historic landscape surrounding Ham House. Such benefits could not otherwise be secured without the delivery of the development.

5 ARBORICULTURAL METHOD STATEMENT & TREE PROTECTION

5.1 This section should be read in conjunction with the Tree Protection Plan & Method Statement, see **GL1457 04**, and survey schedule, see **Appendix A** and the development proposals, see **Appendix B**. It shall be read in full prior to any works commencing on site.

Facilitation Works

5.2 The following tree surgery operations are to be completed prior to any construction works commencing on site. They are to be completed by an appropriately qualified and insured arboricultural contractor and in strict accordance with British Standard 3998:2010 Tree Work – Recommendations.

5.3 No individual trees require removal to facilitate the development. An area of hawthorn scrub requires removal and it is proposed to complete remedial pruning to tree T002. These works shall be carried out in line with the pruning specifications set out at **Appendix A** and as illustrated on **GL1457 04.**

Tree Protection

5.4 Tree protection will be installed in line with the Tree Protection Plan & Method Statement, following completion of facilitate tree works and prior to the commencement of any construction works, including materials or plant entering the site. The alignment and format of tree and ground protection shall be in accordance with the protection plan, see **GL1457 04.**

5.5 A construction compound is defined on the drawing. Storage of plant, materials and site welfare will be in this area only.

Works within Root Protection Areas – Foundations for Arena Boundary Fence

5.6 The installation of the proposed fence posts occurs within the RPA of T002 and on the edge of the RPAs of G003. Drawing **GL1457 04** identifies which tree pits supervised by the project Arboriculturalist, outlining them with a blue square.

5.7 On commencement of works the Arboriculturalist will inspect ground protection to ensure it is positioned and installed correctly. Slight adjustments may be made where

appropriate to facilitate an adequate working area for the Contractor. Following checks, excavation may commence.

5.8 At all times, the excavator must remain positioned on the existing surfaced access track and work in a slow, careful manner, taking care to direct the machinery boom and material extraction away from the RPA or tree stem. The excavator shall not exceed 3-ton in size and will be fitted with an untoothed bucket. The surface shall be scraped gradually in 50mm layers, allowing the supervising arboriculturalist to identify any major roots before they are damaged. In the event roots >50mm diameter are identified, excavation shall be paused and continued by hand around the root. If necessary, slight adjustments to the position of the pit shall be made to allow for the retention of the root. Alternatively, they may be retained within the pit and sleeved in a load bearing impervious tubing (e.g. conduit pipe), the diameter of which will allow for 150% increase in the root's current girth (should this method be used the appointed building Contractor or Engineer must approve). Roots <50mm diameter severed during the excavation process shall be pruned back to 150mm beyond the pit wall in line with good pruning practice. If roots are to be left exposed for any period of time, they shall be wrapped in hessian to avoid desiccation.

5.9 Following completion of excavation and inspection of existing roots, materials installation may progress taking care to avoid spillages. A secondary check of ground protection shall be completed to ensure it has not been disturbed during the excavation process. The pit shall be lined with a suitable root deflector (e.g. ReRoot 1000 as supplied by GreenBlueUrban) and lined with an impervious membrane to prevent concrete causing fluctuations in soil pH levels. The supervising arboriculturalist will complete an inspection of the pit prior to backfilling. The pits shall then be backfilled and a final check carried out to ensure ground protection remains installed correctly. This shall then be left in situ for the duration of construction works and until the appointed Contractor's leaves site at practical completion.

Works within Root Protection Areas – No-Dig Surfaces

5.10 The area of the sand arena within the RPA of T002 shall be installed in line with the method statement set out on **GL1457 04**. A 3D cellular confinement system will be introduced into the sub-base of arena in the area defined on the drawing. The product shall be:

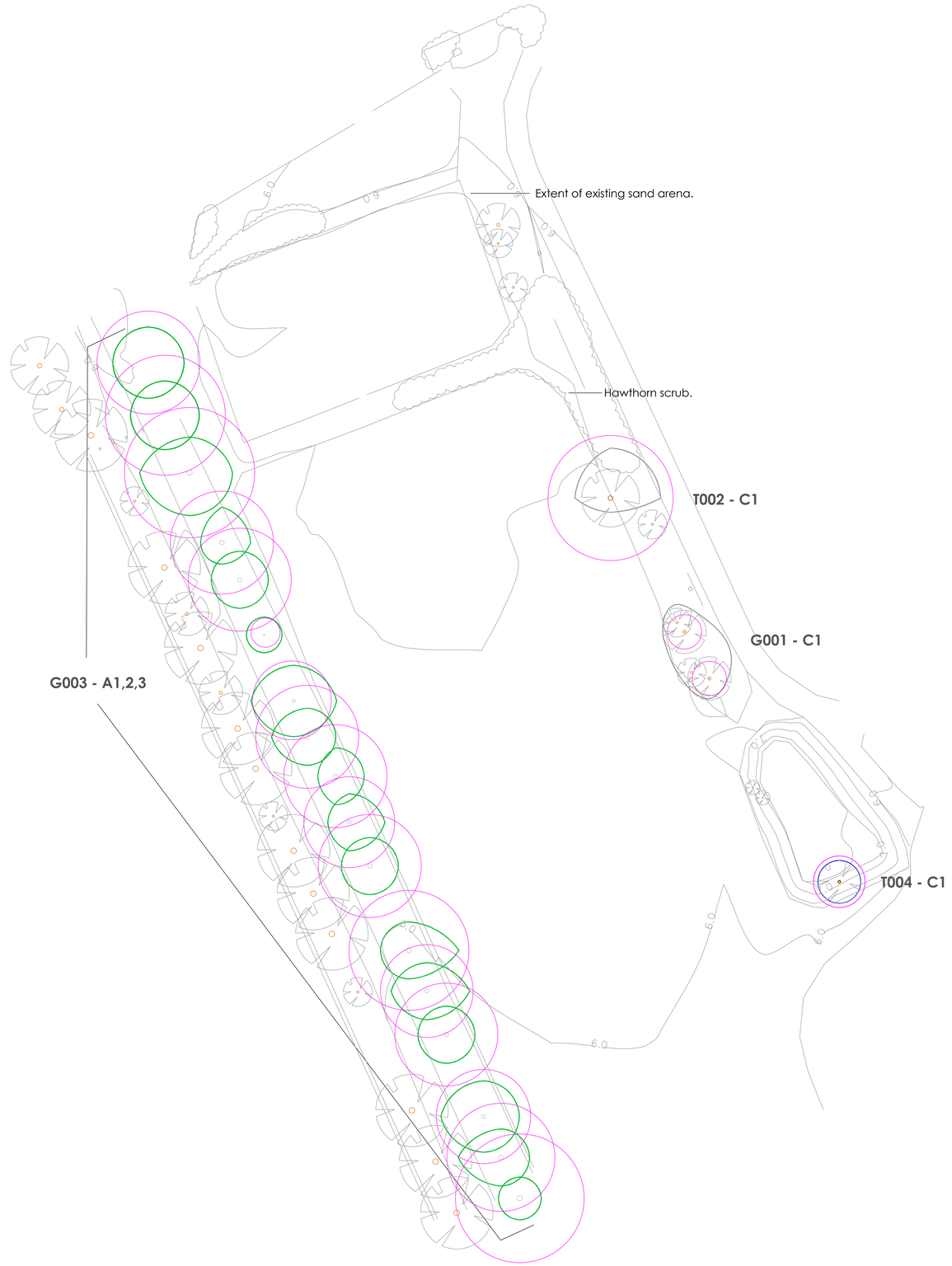
- Terram Geocell 25/15

5.11 This cell is 150mm depth and will be suitable for use with the proposed sub-base construction details, see **Appendix B.**

6 CONCLUSION

6.1 This Assessment has been produced in relation to the proposed extension of the sand arena at Ham Polo Club, Richmond. It has outlined an assessment of tree condition and quality on the site, highlighted constraints and categorized specimens in accordance with British Standard 5837:2012. It concludes that there are no significant arboricultural impacts associated with the proposed development. The impacts of the proposed development have been responded to and are fully mitigated by way of tree protection measures accompanying the scheme. Recommendations have also been made for landscaping to replace lost hawthorn scrub and, if required, provide new tree planting.

Figures



KEY

- Category A
- Category B
- Category C
- Category U
- Root protection area
- Reference number & BS5837:2012 category

T001 C1

T - Individual tree, G - Group, W - Woodland H - Hedgerow
Refer to survey schedule for full BS category details.

Project
Sand Arena - Ham Polo Club

Drawing title
Tree Constraints Plan

Client
Ham Polo Club

Scale
1:250 @ A0

Checked
DC

Date
06/07/2021

Number/figure
GL1457 03

golby+luck
landscape architects

Landscape Institute Registered Practice

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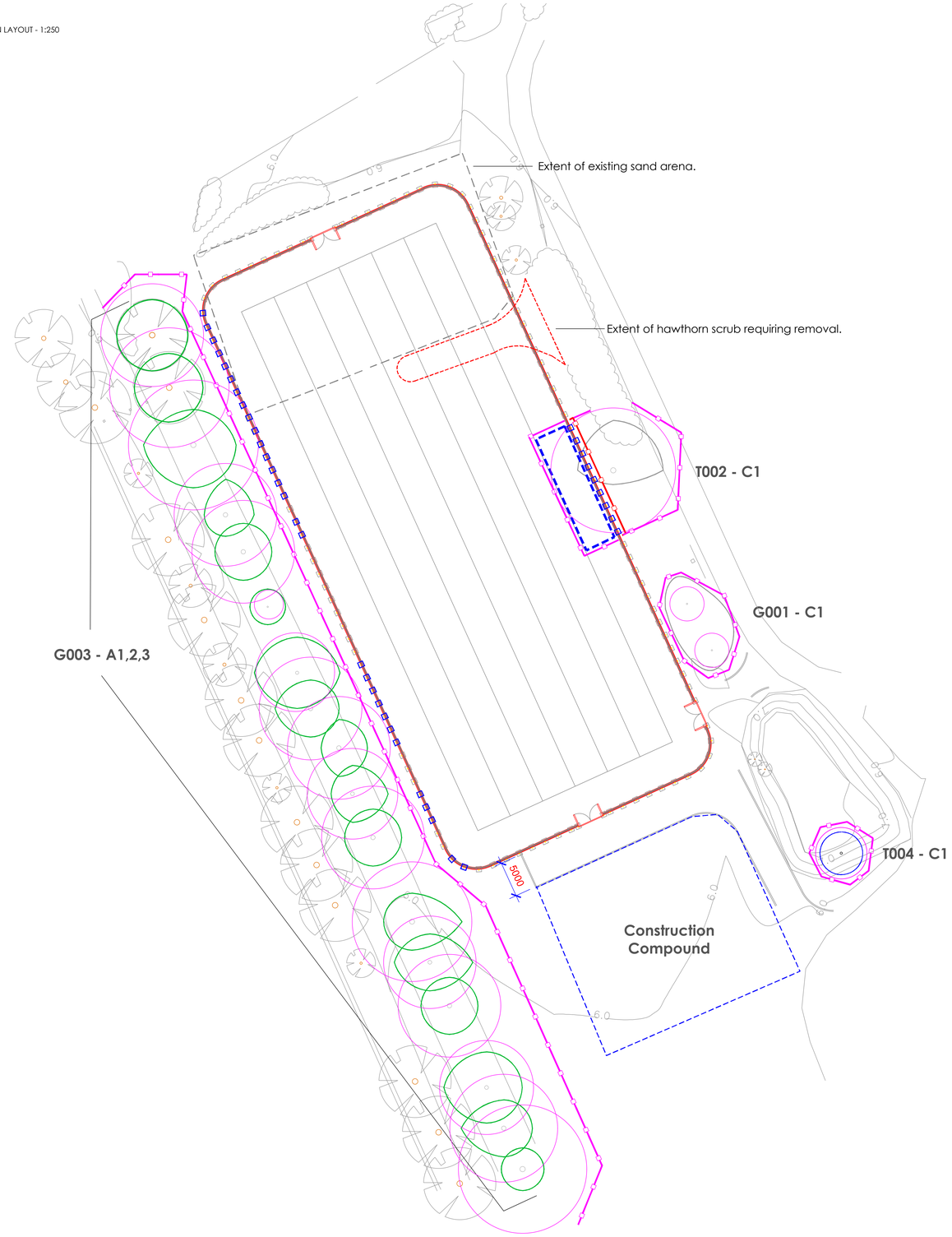
TREE PROTECTION LAYOUT - 1:250



NO-DIG CONSTRUCTION METHOD STATEMENT

Works may not commence on the no-dig surface until the protection zone has been established through the installation of the approved tree protection measures. The surrounding protective fence may be dismantled once installation of the no-dig surface commences and the secondary alignment installed.

Ground shall first be prepared ready to receive the approved cellular confinement product (Geocell). The alignment of the surface will be set out. Existing surface vegetation shall be treated with a translocated herbicide such as glyphosate. Any stumps within the driveway alignment shall be ground to sufficient depth using a pedestrian operated stump grinder.

Surface vegetation removal and grading may be carried out by hand or an excavator positioned outside of the RPA and using an untoothed bucket under the supervision of the project arboriculturalist. Only the turf layer may be removed from the RPA. Any minor undulations (<100mm deep) that need filling or leveling may be made up using site-won topsoil.

Following ground preparation, a permeable geotextile membrane shall be laid along the entirety of the no-dig area and be temporarily retained with stakes or weights. Any joins in the membrane shall be overlapped by 250mm.

The timber edging shall then be staked and installed along the edges of the surface, using timber stakes (max width. 50mm) at 2m centres. If ground resistance is met when fixing stakes, they should be marginally relocated to an area of lower resistance (resistance may indicate the presence of major roots).

Terram Geocel 25/15 is the recommended cellular confinement system - this is to be reviewed and confirmed by the project engineer prior to installation. This must be use to confine the sub-base across the no-dig area identified.

The approved Geocell shall be laid onto the membrane and spread by pedestrian operatives. Each panel shall be retained with 12mm diameter steel pins. The pins shall be orientated such that each panel of the product remains in an expanded state and tightly adjoins the adjacent panel. Pins will generally be positioned at 1 - 2m centres. Pins should be driven so that they touch the top of the cells but do not compress the fabric. Adjoining panels shall be connected using a minimum of four staples at each overlap. Where necessary, surplus Geocell panels can be removed using a sharp knife.

The expanded Geocell shall be filled with open graded granular aggregate; particle size range of 5 - 45mm. The use of MOT, crushed concrete of DOT Type 1 is not acceptable. Cells shall be overfilled by 50mm to create a surcharge over the product which protects the leading edges of the cells. The cells shall be handfilled by wheelbarrow. Plant may track over areas of filled cell panels only - it must not be operated, driven or stored within the protection zone aside from on the filled cells. Cells must not become contaminated with debris or soil.

The aggregate in the Geocells shall be compacted using a pedestrian operated whacker plate or a light roller (<1.5t) that shall track on the filled cell panels only. Following compaction a further permeable geotextile membrane shall be laid over the consolidated cells. The open course tarmacadam dressing shall then be applied in line with the construction detail.

Following completion of works the site shall be left tidy and the protective fencing and ground protection re-instated until wider site works are complete.

TREE PROTECTION MEASURES & PROTECTION ZONE

All tree works and felling are to be carried out in accordance with the Arboricultural Survey and approved by the Planning Authority prior to the erection of the protective fence. All works are to carried out by skilled operatives in accordance with BS 3998: 2010 'Tree Works - Recommendations' and all relevant Health & Safety standards. Prior to commencement of works the Contractor must submit written proof of the appropriate and valid public liability insurance, along with a full working method statement and risk assessment.

Tree & landscape protection is to be constructed in accordance with the approved detail. Alignment of fencing and ground protection is to be approved by the Planning Authority and erected prior to commencement of construction works on site to establish the protection zone. At no time will the alignment of the fencing or ground protection be altered and no section of fencing taken down, unless otherwise detailed to facilitate works set out on this drawing. Any other alterations or removals must be agreed with the Planning Authority prior to being carried out.

Signage will be attached to the fencing stating 'Tree & Landscape Protection Fencing - DO NOT move or dismantle for any reason'. **All fencing and signage will be checked on a daily basis by the Site Manager and any breech of the protection zone or damage to the retained trees must be photographed, reported and rectified that day.**

The protection zone is not to be used as a working area, no materials are to be mixed or partially constructed in this area. No materials, equipment or plant machinery will be stored or used within the protection zone. No fires are to be lit within the protection zone, or within 25m of existing trees. Ground levels within the protection zone are not to be altered.

All works within or around the protection zone will be carried out in accordance with BS 5837: 2012 'Trees in relation to design, demolition and construction - Recommendations', a copy of which is to be included within the site information pack to be handed to the Site Manager. Where construction/service installation has been approved in the protection zone, a suitable method statement must be agreed with the Planning Authority, in line with the recommendations and details set out in BS5837:2012.

To allow access to the protection zone for approved works, panels will be removed from the fence **under the supervision of the project arboriculturalist**. Areas of the RPA not affected by the approved construction will be covered with ground protection until works are completed or the protective fence is reinstated. All materials will be transported into the protection zone by hand or wheelbarrow, in accordance with all relevant Health & Safety policies and CDM Regulations. At no time will vehicles or heavy machinery will be allowed access into the protection zone. Once works are complete the protection fence will be reinstated under the supervision of the project arboriculturalist. The protection fence/ground protection may only be removed once all works on site, including the removal of site cabins, machinery etc, are complete and construction ceased.

KEY

- Category A
- Category B
- Category C
- Category U
- Root protection area
- Reference number & BS5837:2012 category
  T001 C1
  T - Individual tree, G - Group, W - Woodland H - Hedgerow
  Refer to survey schedule for full BS category details.
- Tree & hedge protection fencing
  Proposed alignment of tree protection fencing - All works to be carried out within or around the tree protection zone are to be carried out in accordance with BS5837:2012 Trees in relation to design, demolition & construction - Recommendations. Tree Protective fencing to be erected along the agreed alignment in accordance with the approved detail, as shown on the drawing, prior to the commencement of works.

  Fencing must be checked daily by the site manager. Any breech will be reinstated immediately.

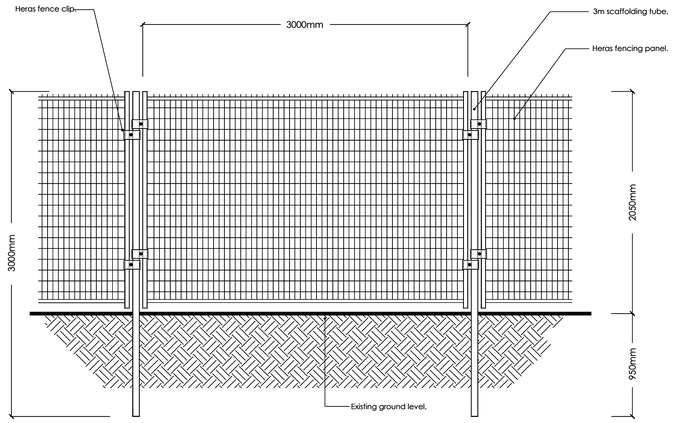
  The removal of fencing must be agreed with the project landscape architect/arboriculturalist and Planning Authority.
- Area of no-dig construction
  Refer to method statement.
- Fence posts pits to be hand-dug
  Refer to method statement.
- Secondary alignment of tree protection fencing - to be used during no dig installation.

TREE PROTECTION SIGNAGE

To be erected on protective fencing at 2m height and 5m intervals

NOTES

- It is proposed that static heras fencing is used to protect trees within the development area in accordance with BS 5837: 2012 'Trees in relation to construction'.
- 3000 x 2000mm galvanised steel heras fence panels to be used. All panels to be secured to 3000mm long steel scaffolding tubes using 4no. heras clips per unit. All clips to be secured tightly to avoid movement and reduce potential for vandalism or theft.
- 3000mm scaffolding tubes are to be driven into the ground to a recommended depth of 950mm. Where present tarmac must be removed by hand dig ONLY.
- No heavy plant machinery will be used during the erection of the tree protection fencing to ensure the safety of the trees and associated root zones.
- Once erected these zones must not be violated, except when carrying out hand dig works specified as part of a project method statement.



TREE PROTECTION FENCE DETAIL (1:20)

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Project
Sand Arena - Ham Polo Club

Drawing title
Tree Protection Plan & Method Statement

Client
Ham Polo Club

Scale
Varies @ A0

Checked
DC

Date
06/07/2021

Number/figure
GL1457 04

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Appendix A

Arboricultural Survey Schedule (No.2)

Recommendations - Priority Code

(1) Works to be completed immediately due to significant risk of failure in a high risk area.

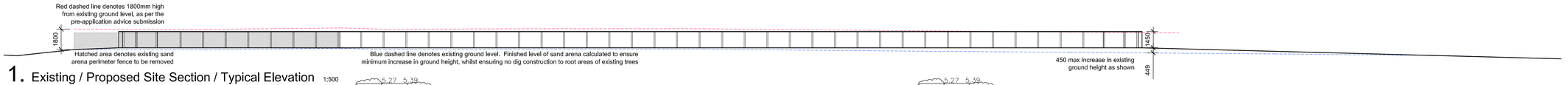
(2) Works to be completed prior to the commencement of development or at the earliest opportunity to address moderate safety risk.

(3) Works to be completed prior to the completion of development or in the interests of good arboricultural or silvicultural management.

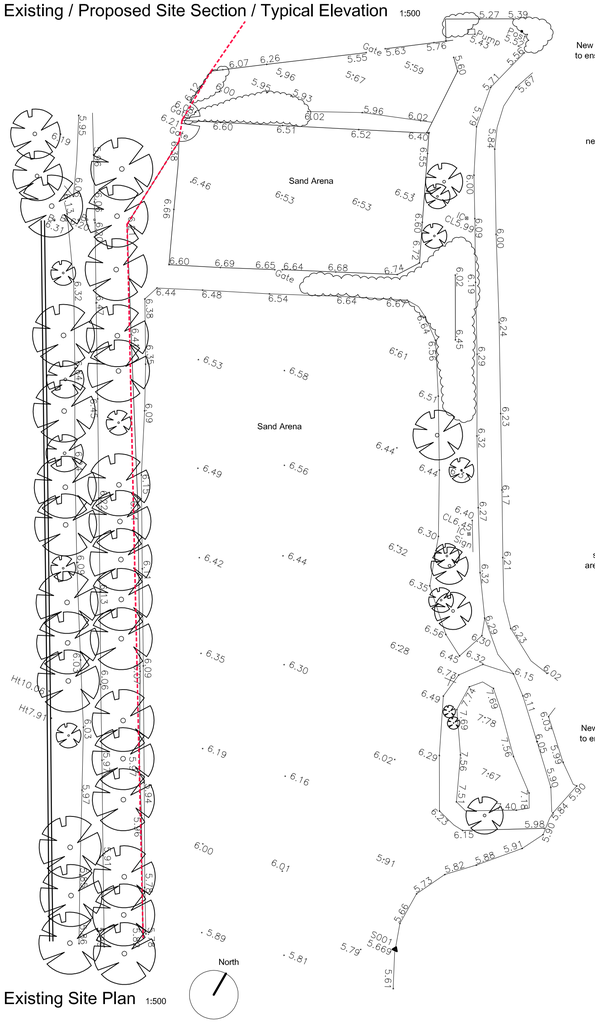
= Measurement estimated

Ref	Species	Life Stage	Stem Diam (mm)	Crown Clearance (m)	Ht. (m)	N	E	S	W	Phys. Condition	Strut. Condition	Comments	Recommendations	Ret. Category	Rem. Contrib.	RPA
G001	Sycamore (Acer pseudoplatanus) Common Hawthorn (Crataegus monogyna) Lime (Tilia sp.)	S/M	200	1	8	Refer to plan.				Good	Fair	Unremarkable small scrubby group with one dominant sycamore and one lime, both young.	None at this time.	C1	20+ Years	Area: 71 sq m.
T002	Horse Chestnut (Aesculus hippocastanum)	M	730	2	13	7	7	2	5	Fair	Poor	Frequent stem exudations on lower stem. Large tear wound c. 600mm diameter at crown break, 4m south, due to loss of codominant leader - significant entry point for disease and decay. Further moderate tear wound at 6m south. Pronounced asymmetry due to these previous failures.	Crown reduce north and east canopy by 2m, pruning back to suitable natural growth point (2).	C1	10+ Years	Radius: 8.8m. Area: 243 sq m.
G003	European Lime (16no) (Tilia x europaea) Sycamore (1no) (Acer pseudoplatanus)	M	600 avg	4	20 avg	Refer to plan.				Good	Good	Prominent lime avenue, formal arboricultural feature with direct relationship with designated heritage asset.Significant amenity and cultural value. Trees all appear in good physiological condtion. Basal inspection frequently inhibited due to dense basal and epicormic growth. Accurate canopy inspection inhibited due to foliage. Canopy form typical for continuous avenue trees. Tree tags present from third party surveys. Trees in third party ownership. Stem diameter for each tree recorded and associated RPA plotted on constraints plan.	None at this time.	A1,2,3	40+ Years	Refer to plan.
T004	Horse Chestnut (Aesculus hippocastanum)	S/M	300	2	8	3	3	3	3	Fair	Poor	Small tree on earth mound.	None at this time.	B1	20+ Years	Radius: 3.6m. Area: 40 sq m.

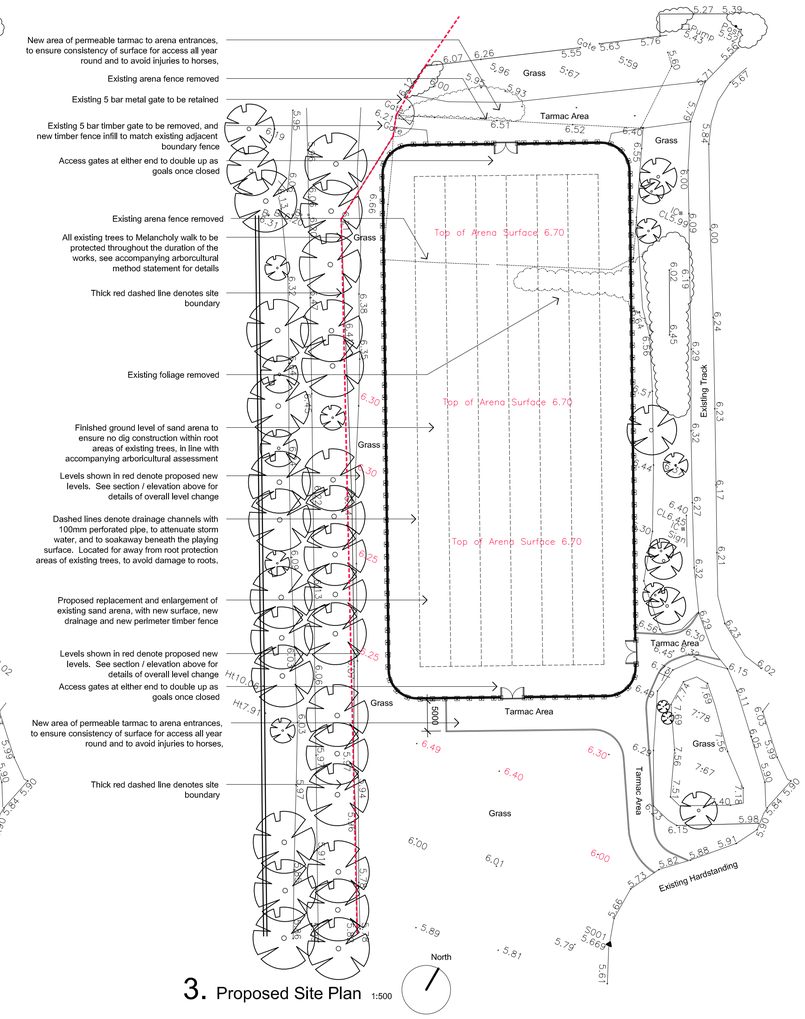
Appendix B



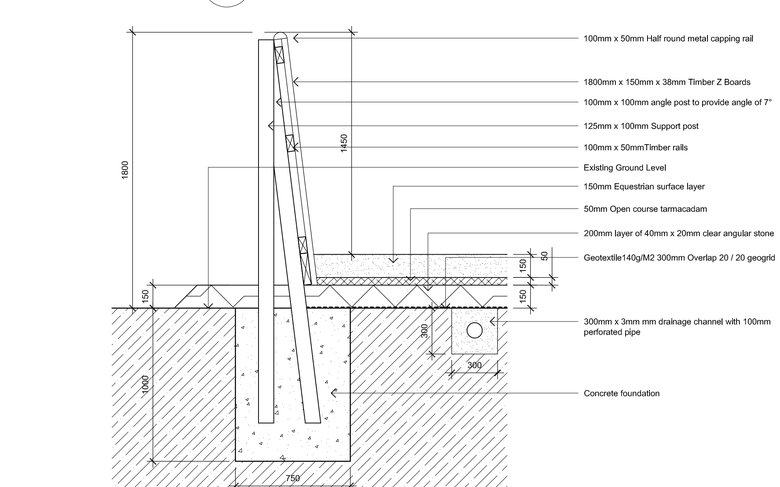
1. Existing / Proposed Site Section / Typical Elevation 1:500



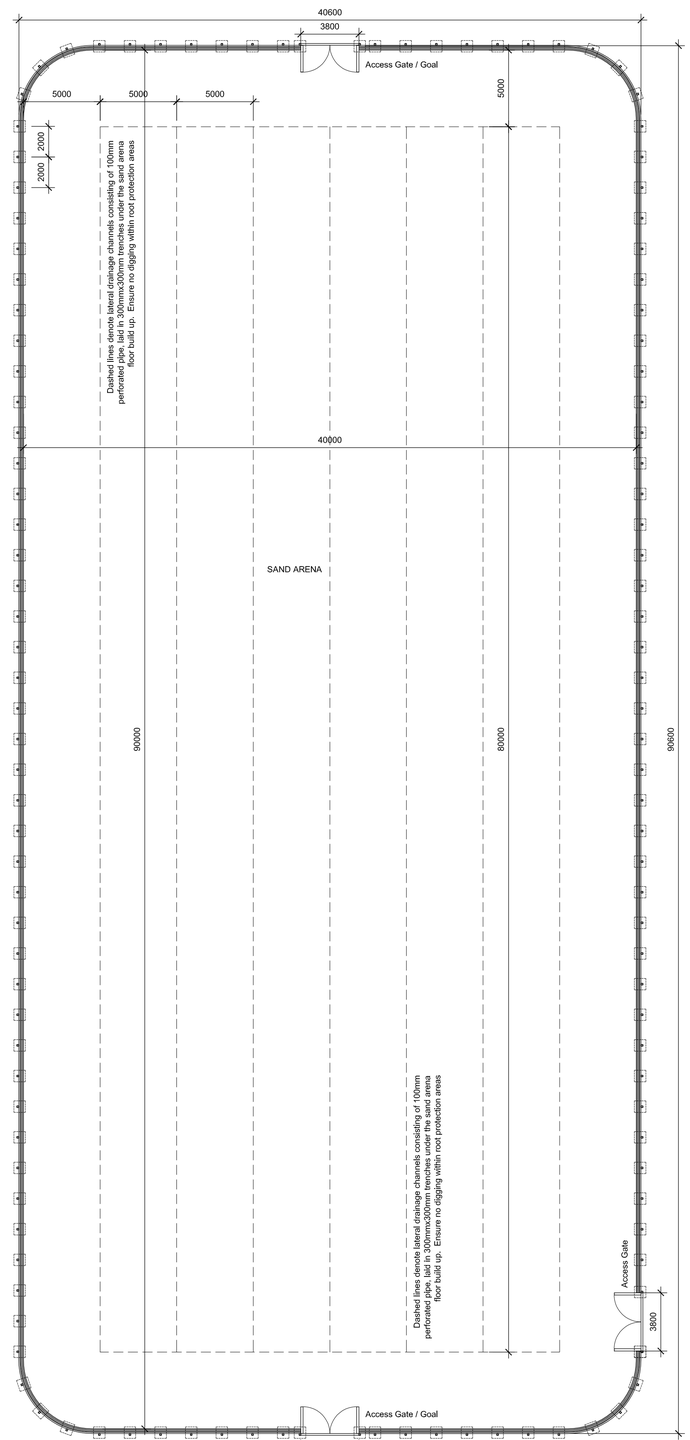
2. Existing Site Plan 1:500



3. Proposed Site Plan 1:500



4. Fence / Arena Floor Detail 1:20



5. Proposed Arena Plan 1:200

1. All boundaries, dimensions and levels are to be checked on site before construction and any discrepancies are to be reported to the Architect. 2. Drawings may be scaled from for planning purposes. 3. Drawings not supplied in paper format by Will Aust Architecture may not to be to the scale indicated in the size box. 4. This drawing is copyright and may not be reproduced or used for any purpose other than that intended without the prior written agreement of the Architect. 5. Any parts of the drawing based on ordnance survey maps are executed with the sanction of the controller of H.M. Stationery Office : Crown Copyright Reserved.

0 4M 8M 16M
1:200

0 10M 20M 40M
1:500

0 0.4M 0.8M 0.16M
1:20

Rev	Date	Description	By	Chk

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Client:
Ham Polo Club

Project:
Proposed Sand Arena Extension

Drawing title:
Proposed Plans and Details

Scale(s):	Size:	First issue:	Drawn:
Varies	A1	24.05.21	WA

Job no:	Drawing no:	Rev:
LTD34	10	

PLANNING

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arboriculture services