



Pro Projekte GmbH & Co. KG

Project William, Dove Valley Park, Foston, Derbyshire

Arboricultural Assessment

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1.0 INTRODUCTION

- 1.1 This report has been prepared by FPCR Environment and Design Limited on behalf of Pro Projekte GmbH & Co. KG to present the findings of an Arboricultural Assessment and survey of trees located at land along the northern edge of Dove Valley Park, Foston (hereafter referred to as the site – shown by way of a red line on the accompanying plans), OS Grid Ref SK 205 325.
- 1.2 The original survey was carried out on 15th March 2017 and covered a larger red line assessment area. A subsequent re-survey was carried out on the 26th September 2019 to reassess the condition of trees to determine if there had been any changes to their structural or physiological condition in the two years that has since passed.

Scope of Assessment

- 1.3 The tree survey and assessment of existing trees has been carried out in accordance with guidance contained within British Standard 5837:2012 '*Trees in Relation to Design, Demolition and Construction - Recommendations*' (hereafter referred to as BS5837). The guidelines set out a structured assessment methodology to assist in determining which trees would be deemed either as being suitable or unsuitable for retention.
- 1.4 The guidance also provides recommendations for considering the relationship between existing trees and how those trees may integrate into designs for development; demolition operations and future construction processes so that a harmonious and sustainable relationship between any retained trees and built structures can be achieved.
- 1.5 The purpose of the report is to present the results of a re-assessment of the existing trees' arboricultural value, based on their current condition and quality in accordance with the recommendations, to accompany an application for part single, part two-storey facility for the extraction, processing, bottling and distribution of water based products (combined B2 and B8 use), with associated ancillary office, infrastructure, access, parking and landscaping.
- 1.6 The proposals also illustrate the inclusion of new structured tree planting and opportunities for the implementation of green infrastructure in the form of landscape buffer planting strategically positioned along the boundaries of the site, currently devoid of any significant tree cover, as well as structured tree planting to line the length of the new road layout, forming avenue style vistas. A large majority of this landscaping shall form green corridors linking to existing tree cover, much of which is to be retained and incorporated into the final scheme.

Site Description

- 1.7 The site consisted of several field compartments, used historically for agricultural purposes including the grazing of livestock, located in Foston, a small village in south Derbyshire; circa. 12 miles south west of Derby city centre. Bounded to the north by a narrow access lane; the east by a number of structures used for storage; and adjoining a boundary to the south with Muller Milk and Ingredients, the site was largely devoid of any significant tree cover with the majority of those assessed being positioned around the peripheries of the site.

2.0 PLANNING POLICY

National Planning Policy Framework 2019

- 2.1 National Planning Policy is defined by the National Planning Policy Framework (NPPF). This sets out the Government's most current and up to date planning policies for England and how these should be applied. The current NPPF is dated February 2019.
- 2.2 Paragraph 11 of the NPPF states that there is a presumption in favour of sustainable development and states that for decision making, the LPA should be '*c) approving development proposals that accord with an up-to-date development plan without delay*'. In the absence of a development plan or the development plan is out of date, the acting LPA should grant planning consent so far as the development proposals do not breach the policies and guidance outlined in the NPPF.
- 2.3 In relation to arboriculture, the NPPF also states that:
- 175(c) '*development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists*';
- and provides specific guidance that:
- 175(d) '*development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity*'.
- 2.4 Examples of what is deemed to be '*wholly exceptional*' are included within Footnote 58 and provides the examples of '*infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat*'.

Statutory Considerations

- 2.5 Local authorities have a Duty under the Town and Country Planning Act to create Tree Preservation Orders (TPO) in order to protect and preserve specific trees and woodlands that bring significant amenity benefit to a particular site or location. Under a TPO it is a criminal offence to cut down, top, lop, uproot or willfully destroy a tree protected by that Order, or to cause or permit such actions, if carried out without the prior written consent of the acting LPA. Anyone found guilty of such an offence is liable and in serious cases, may result in prosecution and incur an unlimited fine.
- 2.6 No direct consultation with the Local Planning Authority has taken place, however, it is understood having used the online search facility on the website for the Local Planning Authority, South Derbyshire County Council, that there are no Tree Preservation Orders and Conservation Areas that would apply to any trees present on, or in close proximity to the assessment site and therefore no statutory constraints would apply to the development in respect of trees.

- 2.7 This information was last checked on the date of preparing this assessment and cannot be assumed to remain unchanged. Before any tree works are undertaken confirmation of the online information should be sought from the Local Authority.

3.0 SURVEY METHODOLOGY

- 3.1 The survey of trees has been carried out in accordance with the criteria set out in Chapter 4 of BS5837. The survey has been undertaken by a suitably qualified and experienced arboriculturist and has recorded information relating to all those trees within the site and those adjacent to the site which may be of influence to any proposals. Trees were assessed for their arboricultural quality and benefits within the context of the proposed development in a transparent, understandable and systematic way.
- 3.2 Trees have been assessed as groups where it has been determined appropriate.
- The term group has been applied where trees form cohesive arboricultural features either aerodynamically, visually or culturally including biodiversity or habitat potential for example parkland or wood pasture.
 - For the purposes of this assessment, a hedgerow is described as any boundary line of trees or shrubs less than 5m wide at the base and are managed under a regular pruning regime.
 - For the purposes of this assessment woodland is described as a habitat where ‘trees are the dominant plant form. The individual tree canopies generally overlap and interlink, often forming a more or less continuous canopy’¹. Woodlands however, are not just formed of trees and generally include a great variety of other plants. These will include ‘mosses, ferns and lichens, as well as small flowering herbs, grasses and shrubs’².
- 3.3 An assessment of individual trees within groups has been made where a clear need to differentiate between them, for example, in order to highlight significant variation between attributes including physiological or structural condition or where a potential conflict may arise.

Ancient and Veteran Trees

- 3.4 Veteran trees and Ancient Woodland are important components of the landscape, their importance can be for a number of reasons including that of their ecological, social, cultural and historic value.
- 3.5 Veteran Trees and Ancient Woodlands are material considerations within the planning process and their importance is specifically recognised within the National Planning Policy Framework (NPPF) 2019, which defines the terms ancient or veteran tree as:

‘A tree which, because of its age, size and condition, is of exceptional biodiversity, cultural or heritage value. All ancient trees are veteran trees. Not all veteran trees are old enough to be ancient, but are old relative to other trees of the same species. Very few trees of any species reach the ancient life-stage.’³

¹ http://www.countrysideinfo.co.uk/woodland_manage/whatis.html

² http://www.countrysideinfo.co.uk/woodland_manage/whatis.html

³ Ministry of Housing, Communities and Local Government. (2019). *National Planning Policy Framework*. London: Ministry of Housing, Communities and Local Government.

- 3.6 Various published methodologies are currently available which, due to the complexity and subjectivity of the process of defining and assessing these trees, often have conflicting definitions. This assessment, and the criteria used for defining ancient/veteran trees and the identification of attributable ancient/veteran features, has been based on a range of currently published guidance and resources.

BS5837 Categories

- 3.7 Trees have been divided into one of four categories based on Table 1 of BS5837, '*Cascade chart for tree quality assessment*'. For a tree to qualify under any given category it should fall within the scope of that category's definition (see below).
- 3.8 Category U trees are those which would be lost in the short term for reasons connected with their physiology or structural condition. They are, for this reason not considered in the planning process on arboricultural grounds. Categories A, B and C are applied to trees that should be of material considerations in the development process. Each category also having one of three further sub-categories (i, ii, iii) which are intended to reflect arboricultural, landscape and cultural or conservation values accordingly.
- 3.9 **Category (U) – (Red):** Trees which are unsuitable for retention and are 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 within this category are:
- Trees that have a serious irremediable structural defect such that their early loss is expected due to collapse and includes trees that will become unviable after removal of other category U trees.
 - Trees that are dead or are showing signs of significant, immediate or irreversible overall decline.
 - Trees that are infected with pathogens of significance to the health and/ or safety of other nearby trees or are very low quality trees suppressing adjacent trees of better quality.
 - Certain category U trees can have existing or potential conservation value which may make it desirable to preserve.
- 3.10 **Category (A) – (Green):** Trees that are considered for retention and are of high quality with an estimated remaining life expectancy of at least 40 years with potential to make a lasting contribution. Such trees may comprise:
- Sub category (i) trees that are particularly good examples of their species, especially if rare or unusual, or are essential components of groups such as formal or semi-formal arboricultural features for example the dominant and/or principal trees within an avenue.
 - Sub category (ii) trees, groups or woodlands of particular visual importance as arboricultural and / or landscape features.
 - Sub category (iii) trees, groups or woodlands of significant conservation, historical, commemorative or other value for example veteran or wood pasture.

- 3.11 **Category (B) – (Blue):** Trees that are considered for retention and are of moderate quality with an estimated remaining life expectancy of at least 20 years with potential to make a significant contribution. Such trees may comprise:
- Sub category (i) trees that might be included in category A but are downgraded because of impaired condition for example the presence of significant though remediable defects, including unsympathetic past management and storm damage.
 - Sub category (ii) 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.
 - Sub category (iii) trees with material conservation or other cultural value.
- 3.12 **Category (C) – (Grey):** Trees that are considered for retention and are of low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm. Such trees may comprise:
- Sub category (i) unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.
 - Sub category (ii) trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value or trees offering low or only temporary / transient screening benefits.
 - Sub category (iii) trees with no material conservation or other cultural value.

Tree Constraints and Root Protection Areas

- 3.13 Below ground constraints to future development are represented by tree roots and the soil environment in which they grow which needs to be protected if the tree is to be retained. Tree rooting systems are essential for the uptake of water and nutrients, serving the storage of carbohydrates for the future growth and function of the tree, and form structural anchorage and support for the stem and crown. The perceived rooting area of the tree; referred to as the root protection area (RPA) needs to be protected if the tree is to be retained.
- 3.14 The RPA is a notional area considered to be the minimum zone that must be protected to avoid any adverse impacts on retained trees. The RPA has been calculated in accordance with Annex C, D and Section 4.6 of BS5837:2012 and requires suitable protection in order for the tree to be successfully incorporated into any future scheme. As such, the RPA of existing trees is an important material consideration when considering site constraints and planning development activities.
- 3.15 Where applicable the shape of the Root Protection Area has been modified to consider the presence of any nearby obstacles (existing or past) which may have restricted root growth and the likely root distribution i.e. the presence of hard standing, structures and underground apparatus. Where groups of trees have been assessed, the Root Protection Area has been shown based on the maximum sized tree in any one group and so may exceed the Root Protection Area required for some of the individual specimens within the group. Further detailed inspection of the individual trees forming a group may be required where development impacts upon the group.

- 3.16 Whilst it is generally accepted that a trees roots may extend far greater distances than the notional RPA, with the distribution of the root system relating directly to the availability of suitable conditions for growth (namely oxygen, water and nutrients), with roots predominantly located in the upper 1,000 mm of the soil horizon; the RPA offers an accepted protective buffer from development.
- 3.17 Above ground constraints such as the current crown spread of the trees and an illustration of the shade pattern (where appropriate) have been considered and identified within the Tree Survey Plan and Tree Retention Plan indicates their potential area of shading influence.

Considerations and Limitations of the Tree Survey

- 3.18 The survey was completed from ground level only and from within the boundary of the site. Aerial tree inspections or an assessment of the internal condition of the stem/s or branches were not undertaken at this stage as this level of survey is beyond the scope of the initial assessment.
- 3.19 The statements made in this report regarding defects in assessed trees does not take into account the effects of extreme / adverse weather conditions, changes in land use prior to the site's development, unforeseen accidents or anti-social behaviors, such as vandalism, which occur since the date of the survey. As such, the assessment of tree condition given within applies to the date of survey and cannot be assumed to remain unchanged.
- 3.20 It will be necessary to review all comments and observations made within this report, in accordance with sound arboricultural practice, within two years of the date of survey (unless explicitly stated elsewhere within this report). Further review may also be necessary where site conditions change or works to trees are carried out which have not been specified in detail within this report.
- 3.21 Hedgerows are identified as a Habitat of Principal Importance (HPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The tree survey conducted, in accordance with BS5837, does not assess hedgerows against the Hedgerow Regulations 1997 or specifically from an ecological perspective, and is outside the scope of this assessment.
- 3.22 It may be necessary during detailed design to undertake further assessment and accurate positioning of woody species within tree groups and hedgerows to assist structural calculations for foundation design of structures in accordance with current building regulations. The exact position of individual trees or species included as part of a tree group should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths in accordance with NHBC Chapter 4.2 Building near Trees.

4.0 RESULTS

- 4.1 A total of nineteen individual trees, eighteen groups of trees and two hedgerows were surveyed as part of the original Arboricultural Assessment carried out in 2017. As part of this assessment, only those trees which form part of the reduced redline boundary have been reassessed and discussed further in the following paragraphs. This includes, twelve individual trees and eleven groups of trees.
- 4.2 It was found that the general condition of the trees had not changed from the original survey, the only difference being the addition of two individual trees, identified as T18 and T19.

Tree Schedule

- 4.3 Appendix A presents details of any individual trees, groups, hedgerows and woodlands found during the assessment including heights, diameters at breast height, crown spread (given as a radial measurement from the stem), age class, comments as to the overall condition at the time of inspection, BS5837 category of quality and suitability for retention and the root protection area.
- 4.4 General observations particularly of structural and physiological condition for example the presence of any decay and physical defect and preliminary management recommendations have also been recorded where appropriate.

Tree Survey Plans

- 4.5 The individual positions of trees and groups have been shown on the Tree Survey Plan (drwg.no.7732-A-02). The positions of trees are based on a topographical / land survey, as far as possible, supplied by the client. Where topographical information has not identified the position of trees these have been plotted using a global positioning system and aerial photography to provide approximate locations. The crown spread, root protection area and shade pattern (where appropriate) are also indicated on this plan.
- 4.6 Several of the trees have been discussed in more detail following the table, owing to their physical condition or arboricultural significance.

Table 1: Summary of Trees by Retention Category

	Individual Trees	Total	Groups of Trees	Total
Category U - Unsuitable		0		0
Category A (High Quality / Value)	T5, T6, T7, T9, T10	5		0
Category B (Moderate Quality / Value)	T1, T3, T17	3	G1, G2, G3, G4, G7, G15, G18	7
Category C (Low Quality / Value)	T2, T4, T8, T16	4	G5, G6, G16, G17	4

Results Summary

- 4.7 The tree cover within the confines of the new assessment area was formed in the majority by tree cover around the peripheries of field parcels. Tree cover, for the most part, offered moderate to low arboricultural quality overall (categories B and C) with specimens being of a semi-mature to mature age, with the site being devoid of any significantly aging trees which were large upon maturity or considered to offer veteran attributes.
- 4.8 Two individual trees were observed as offering a higher arboricultural quality (category A) namely trees T5 and T6, each English oak *Quercus robur* which were free from any significant or irremediable major structural defects and which offered strong landscape value. Both trees were positioned within the northern section of the assessment area, toward the north west corner of the site positioned amongst a linear row of tree cover identified as G2 and G3.
- 4.9 The sites western boundary contained the vast majority of the tree cover across the assessment area, in particular the sites high and moderate quality individual specimens. T3 and T17 were two other English oak trees free from any major defects and G1, a group of two moderate quality early-mature ash specimens, were also situated along the western boundary of the site.
- 4.10 The northern boundary, despite being of considerable length, was devoid of any significant tree cover with G5 and G7 being the only notable tree cover, both being sections of unmaintained and outgrow hedgerow offering a moderate to low arboricultural quality.
- 4.11 The sites southern and eastern boundaries were devoid of any tree cover. The only notable trees in this region of the site formed G15, a moderate quality group of crack willow *Salix fragilis*, goat willow *Salix caprea* and silver birch *Betula pendula*. The group was only semi-mature of age and contained trees with bark wounds, multi-stemmed forms and pruning wounds, detracting from the quality of the tree group.

5.0 ARBORICULTURAL IMPACT ASSESSMENT

- 5.1 The following paragraphs present a summary of the tree survey and discussion of particular trees and groups recorded in the context of any proposed development in the form of an Arboricultural Impact Assessment in accordance with section 5.4 of BS5837. Any final tree retentions will need to be reconciled with the advice contained within this report.
- 5.2 The AIA has been based upon the Preliminary Site Plan and seeks to outline the potential impact that the proposals would have on the existing trees and vice versa. The masterplan outlines proposals detailing a part single, part two-storey facility for the extraction, processing, bottling and distribution of water based products (combined B2 and B8 use), with associated ancillary office, infrastructure, access, parking and landscaping.
- 5.3 As part of this assessment, a Tree Retention Plan has been prepared. An overlay of the layout has been incorporated in the Tree Retention Plan to assist in identifying the relationship and any potential conflicts between the proposals and the existing trees and hedgerows and identifies which trees would be required to be removed or retained as part of the proposed development.
- 5.4 As with any site in a former agricultural environment in which the lands historic use is subject to change, in this case from its distinctive land use for grazing pastureland to incorporating a more established built element requiring certain associated infrastructures and amendments to topography/fall of the land, tree losses have to be expected and cannot entirely be avoided. It is felt that this would be the case regardless of how sympathetically the scheme has been designed.
- 5.5 Within the context of the current proposals, a number of individual trees and groups of trees shall require removal to facilitate the positioning of the proposed built element. However, a large majority of the tree cover shall be retained and incorporated into the final scheme. Not only will most of the tree cover be retained given its peripheral positioning, but this tree cover is shown to be further enhanced and protected by new landscape planting.
- 5.6 The small loss of tree cover required, namely T1 and groups G6, G7 and part of G15, G16 and G17 comprised of a moderate (three trees; T1, G7 and G15) to low arboricultural quality (categories B and C respectively).
- 5.7 None of the site's high-quality trees assessed would need to be removed and have been retained by the proposals. Perhaps most importantly, the entirety of the boundary forming tree cover shall be retained. This tree cover shall aid the developments integration into the landscape, helping to soften views over the developable area from wider vantage points, particularly those properties to the north of the site.
- 5.8 The loss of predominantly lower quality tree cover should not be seen as a constraint to the development.
- 5.9 Furthermore, the proposed development provides an ideal opportunity to mitigate the loss of these specimens through new tree planting which shall be supplied as part of a robust supporting landscape scheme. The planting of new specimen tree cover would help to establish a younger generation of trees for the future. At present, there is a poor age structure across the site with the majority of the early mature trees unlikely to succeed in maturity due to their poor growing environment or the lack of management to rectify the early onset and establishment of defects.

- 5.10 The limited number of mature trees which were present are nearing an over mature condition and are unlikely to have a useful life expectancy greater than 40 years old. This would therefore eventually result in a significant loss of the larger individual specimen trees on site over a similar timeframe and without a successive generation of trees to replace them, this would ultimately have a far greater detrimental effect on the landscape character of the site. Therefore, the development provides a realistic opportunity to plant new trees ensuring not only the tree removals are mitigated for, but also successive tree cover will be present across the site in the future.

Tree Management

- 5.11 All retained trees should be subjected to sound arboricultural management as recommended within section 8.8.3 of BS5837 *Post Development Management of Existing Trees*, where there is a potential for public access in order to satisfy the landowner's duty of care. Additionally, inspections annually and following major storms should be carried out by an experienced arboriculturist or arborist to identify any potential public safety risks and to agree remedial works as required.
- 5.12 All tree works undertaken should comply with British Standard 3998:2010 and should therefore be carried out by skilled tree surgeons. It would be recommended that quotations for such work be obtained from Arboricultural Association Approved Contractors as this is the recognised authority for certification of tree work contractors.
- 5.13 All vegetation and, particularly, woody vegetation proposed for clearance should be removed outside of the bird-breeding season (March - September inclusive) as all birds are protected under the Wildlife and Countryside Act, 1981 (as amended) whilst on the nest. Where this is not possible, vegetation should be checked for the presence of nesting birds prior to removal by an experienced ecologist.

6.0 NEW TREE AND HEDGEROW PLANTING

- 6.1 As part of the development proposals an adequate quantity of structured tree planting has been demonstrated predominantly along the peripheries of the site to support and enhance the existing tree cover. The purpose and function of this new tree planting should be understood from the start of any design stages so that key objectives from a landscape perspective can also be achieved.

Trees

- 6.2 The landscaping scheme should consider the use of both native tree species (for their low maintenance requirements and nature conservation value) and ornamental species (for their contribution to urban design and amenity value). Species choices should be selected on the basis of their suitability for the final site use. Furthermore, during the design process consultation should be made with the Local Planning Authority to obtain information on their tree strategy and incorporate the planting proposals with any local policies and initiatives and/or Biodiversity Action Plans (BAP).
- 6.3 In line with the NPPF all schemes should aim achieve a net gain in biodiversity value. Nationally recognised biodiversity metrics allow for the inclusion of, not limited to, newly planted scattered trees, woodlands and hedgerows as a means of compensating for loss of habitat as part of the development. Tree and shrub planting can therefore be used to contribute to this biodiversity gain.
- 6.4 To maximise biodiversity value (and contribution to net gain) native species or varieties should be specified. Such provisions can be incorporated into both the hard and soft landscaping of the scheme. It is recommended that tree and hedgerow specifications are made following consultation with guidance published by the Local Planning Authority.
- 6.5 When deciding upon suitable tree species, careful consideration would need to be given to the following: ultimate height and canopy spread, form, habit, density of crown, potential shading effect, colour, water demand, soil type and maintenance requirements in relation to both the built form of the new development and existing properties.
- 6.6 Through careful species selection, the landscape scheme shall reduce the risk of trees being removed in the future on the grounds of nuisance.
- 6.7 Nuisance can be perceived in a number of ways and vary from person to person however most commonly, within the context of trees, low overhanging branches, excessive shading, seasonal leaf fall and the misinformed perception that trees close to buildings cause damage.

Hedgerows

- 6.8 Hedgerows are identified as a Habitat of Principle Importance (HPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Consequently, it is important that the proposed scheme delivers a net gain in terms of linear hedgerows through new planting to compensate for any losses. Species should be native, and characteristic of the locality.
- 6.9 Recommended species for native hedgerow planting are as follows:

- *Crataegus monogyna*
- *Prunus spinosa*
- *Cornus sanguinea*
- *Corylus avellana*
- *Acer campestre*
- *Euonymus europaeus*

Rooting Environment and Soil Volumes

- 6.10 The success of any landscaping scheme relies on an adequate provision of a high-quality rooting environment within which trees can thrive and reach their full potential. Planting trees with due care and consideration can, in the long term, provide a greater return on a schemes green investment and ensure trees remain healthy and grow to mature proportions. Healthy mature trees integrate well into the built environment; increase the maturity of the landscape; help provide a natural green and leafy urban environment in which people would want to reside whilst also benefiting local wildlife.
- 6.11 The planting of trees within confined urban environments should consider the use of appropriately designed planting pits specifically engineered to promote tree health and longevity. Crucially the aim will be to provide an adequate volume of quality soil for roots to suitably develop by calculating the amount of available soil volumes needed and selecting species whose mature size is compatible with the site. This is an integral component of the planning stage (Lindsey & Bassuk, 1991).
- 6.12 In a natural environment free from constraints to growth, it has been proven through research that root systems can extend up to three times the radius of the tree crown and although in an urban environment there is often insufficient space to accommodate the extent of the full potential for root growth, all efforts should be made to at least provide as much soil volume as possible. One researched method of calculating the minimum required soil volume is shown in Table 2.

Table 2: Example of calculating Soil Volume for New Tree Planting (Source: CIRIA C712 and Calculating Target Soil Volumes – Green Blue Urban)

Projected canopy area of mature tree (m) x depth 0.6m		
Calculation 1	Projected mature canopy diameter (metres)	= 3 (Diameter)
Calculation 2	Projected mature canopy area (square metres), ($n \times \text{Radius}^2$)	= 7.1 (Area)
Calculation 3	Target soil volume (cubic metres), (Area x 0.6m)	= 4.24 (Volume)
	Target soil volume	= 4.24m ³

General Planting Recommendations

- 6.13 Wherever possible, following discussions with the developer and utility companies, common service trenches should be specified to minimise land take associated with underground service provision and facilitation access for future maintenance.

- 6.14 Tree planting should be avoided where they may obstruct overhead power lines or cables. Any underground apparatus should be ducted or otherwise protected at the time of construction to enable trees to be planted without resulting in future conflicts.

General Design Principles in Relation to Retained Trees

- 6.15 The routing of below ground services should also be considered with regard to the retained trees as part of a subsequent reserved matters application pursuant to layout. As recommended by the guidance given in section 7.7 of BS5837 services, where possible, should not encroach within the Root Protection Areas of retained trees. If below-ground services are proposed within a Root Protection Area, modifications to the alignment of the service route may need to be made in order to minimise adverse effects on root stability and overall tree health.
- 6.16 Consideration may also need to be given to the potential for tree roots of newly planted trees and hedgerows to affect or compromise the future services. As far as feasible, it would be preferable that proposed services near both the existing and any new planting should be ducted for ease of access and maintenance and grouped together to minimise any future disturbance.

7.0 TREE PROTECTION MEASURES

- 7.1 Retained trees will be adequately protected during works ensuring that the calculated root protection area for all retained trees can be appropriately protected through the erection of the requisite tree protection barriers. Measures to protect trees should follow the guidance in BS5837 and will be applied where necessary for the purpose of protecting trees within the site whilst allowing sufficient access for the implementation of the proposed layout. These have been broadly summarised below.

General Information and Recommendations

- 7.2 All trees retained on site will be protected by suitable barriers or ground protection measures around the calculated RPA, crown spread of the tree or other defined constraints of this assessment as detailed by section 6 and 7 of BS5837.
- 7.3 Barriers will be erected prior to commencement of any construction work and before demolition including erection of any temporary structures. Once installed, the area protected by fencing or other barriers will be regarded as a construction exclusion zone. Fencing and barriers will not be removed or altered without prior consultation with the Project Arboriculturist.
- 7.4 Any trees that are not to be retained as part of the proposals should be felled prior to the erection of protective barriers. Particular attention needs to be given by site contractors to minimise damage or disturbance to retained specimens.
- 7.5 Where it has been agreed, construction access may take place within the root protection area if suitable ground protection measures are in place. This may comprise single scaffold boards over a compressible layer laid onto a geo-textile membrane for pedestrian movements. Vehicular movements over the root protection area will require the calculation of expected loading and the use of proprietary protection systems.

- 7.6 Confirmation that tree protective fencing or other barriers have been set out correctly should be gained prior to the commencement of site activity.

Tree Protection Barriers

- 7.7 Tree protection fencing should be fit for the purpose of excluding any type of construction activity and suitable for the degree and proximity of works to retained trees. Barriers must be maintained to ensure that they remain rigid and complete for the duration of construction activities on site.
- 7.8 In most situations, fencing should comprise typical construction fencing panels attached to scaffold poles driven vertically into the ground. For particular areas where construction activity is anticipated to be of a more intense nature, supporting struts, acting as a brace should be added and fixed into position through the application of metal pins driven into the ground to offer additional resistance against impacts.
- 7.9 Where site circumstances and the risk to retained trees do not necessitate the default level of protection an alternative will be specified appropriate to the level / nature of anticipated construction activity. The recommended methods of fencing specifications for this site have been illustrated in Appendix B.
- 7.10 It may be appropriate on some sites to use temporary site offices, hoardings and lower level barrier protection as components of the tree protection barriers. Details of the specific protection barriers for the site can be provided should the application be approved, as part of a site specific Arboricultural Method Statement for a Reserved Matters application and in accordance with the guidance contained within BS5837.

Protection outside the exclusion zone

- 7.11 Once the areas around trees have been protected by the barriers, any works on the remaining site area may be commenced providing activities do not impinge on protected areas.
- 7.12 All weather notices should be attached to the protective fencing to indicate that construction activities are not permitted within the fenced area. The area within the protective barriers will then remain a construction exclusion zone throughout the duration of the construction phase of the proposed development. Protection fencing signs can be provided upon request.
- 7.13 Wide or tall loads etc should not come into contact with retained trees. Banksman should supervise transit of vehicles where they are in close proximity to retained trees.
- 7.14 Oil, bitumen, cement or other material that is potentially injurious to trees should not be stacked or discharged within 10m of a tree stem. No concrete should be mixed within 10m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree.
- 7.15 No fires will be lit where flames are anticipated to extend to within 5m of tree foliage, branches or trunk, taking into consideration wind direction and size of fire.
- 7.16 Notice boards, telephone cables or other services should not be attached to any part of a retained tree.
- 7.17 Any trees which need to be felled adjacent to or are present within a continuous canopy of retained trees, must be removed with due care (it may be necessary to remove such trees in sections).

Protection of Trees Close to the Site

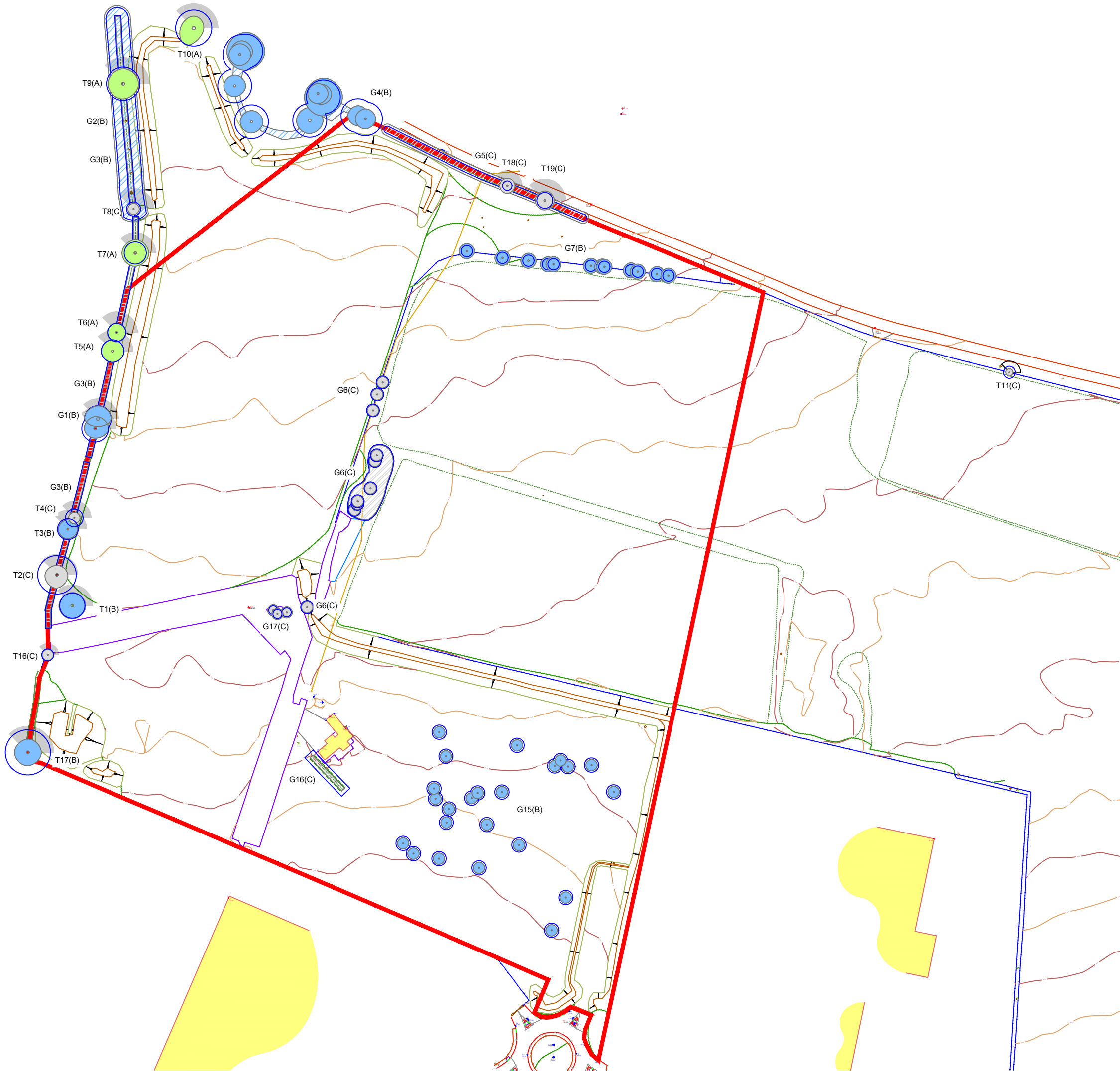
- 7.18 A number of trees were located on the boundaries of the site and therefore the root protection area and crown spread of these trees will need to be protected in the same way as all the retained trees within the site. All trees located outside the boundaries of the assessment site yet within close proximity to works should be adequately protected during the course of the development by barriers or ground protection around the calculated root protection area.
- 7.19 Any trees which are to be retained and whose Root Protection Areas may be affected by the development should be monitored, during and after construction, to identify any alterations in quality with time and to assess and undertake any remedial works required as a result.

Protection for Aerial Parts of Retained Trees

- 7.20 Where it is deemed necessary to operate wide or tall plant within close proximity to trees it is best advised that appropriate, but limited tree surgery, be carried out beforehand to remove any obstructive branches as any such equipment would have potential to cause damage to parts of the crown material, i.e. low branches and limbs, of retained trees within the protective barriers. This is termed as 'access facilitation pruning' within BS5837. Any such pruning should be undertaken in accordance with a specification prepared by an arboriculturist.
- 7.21 A pre-commencement site meeting with contractors who are responsible for operating machinery is advised to firstly highlight the potential for damage occurring to tree crowns and to ensure that extra care is applied when manoeuvring machinery during such operations within close proximity to retained trees to avoid any contact.
- 7.22 In the event of having caused any branch or limb damage to retained trees it is strongly recommended that suitable tree surgery be carried out, in accordance with British Standard 3998:2010 and in agreement with the Local Planning Authority prior to correcting the damage, upon completion of development.

8.0 CONCLUSION

- 8.1 The site consisted of several field compartments, used historically for agricultural purposes including the grazing of livestock, located in Foston, a small village in south Derbyshire, circa 12 miles south west of Derby city centre.
- 8.2 The masterplan outlines proposals detailing a part single, part two-storey facility for the extraction, processing, bottling and distribution of water based products (combined B2 and B8 use), with associated ancillary office, infrastructure, access, parking and landscaping.
- 8.3 In order to facilitate the development a small loss of tree cover shall be required, namely T1 and groups G6, part of G7 G15, G16 and G17 each considered as offering moderate to low arboricultural quality (categories B and C).
- 8.4 None of the high-quality trees assessed shall be removed with each of these trees being retained by the proposals.
- 8.5 The sites former land use and historic management has led to the sporadic distribution of tree cover which does not lend itself to the integration of a development of the type being proposed. Therefore, it would be considered that no matter how sympathetically the layout is designed, the loss of tree cover is unavoidable. As such these losses should not be seen as a constraint to the development.
- 8.6 The proposed development provides an ideal opportunity to mitigate the loss of these specimens through new tree planting which should be supplied as part of a robust supporting landscape scheme. The investment of the development therefore provides a realistic opportunity to plant new trees thus ensuring successive tree cover which may not have been secured should the land continue to serve limited use.



KEY

Category U - Trees / Groups Unsuitable for Retention
(BS 5837:2012)

Category A - Trees / Groups of High Quality
(BS 5837:2012)

Category B - Trees / Groups of Moderate Quality
(BS 5837:2012)

Category C - Trees / Groups of Low Quality
(BS 5837:2012)

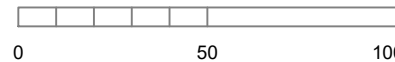
Root Protection Area (The RPA has been altered
where appropriate to reflect underground constraints)

Individual / Group Number and BS5837:2012 Category

Indicative Shade Pattern (in accordance with
BS5837:2012 where appropriate)

Application Redline Boundary

Scale 1:2000 @ A3



NOTES

All dimensions to be verified on site. Do not scale this drawing, use figured dimensions only. All discrepancies to be clarified with project Arboriculturalist. Drawing to be read in conjunction with Arboricultural Assessment and Appendix A - Tree Schedule.

Drawing has been produced in colour and is based on digital information in .dwg format, aerial images and/or GPS location where appropriate. A monochrome copy should not be relied upon. The exact position of individual trees or species included as part of a tree group, woodland or hedgerow should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths.

Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked by the project Arboriculturalist should works commence 12 months after the date of this survey.

SOME TREES MAY BE SUBJECT TO STATUTORY CONSTRAINTS. IT IS THEREFORE ADVISED THAT NO WORKS SHOULD BE UNDERTAKEN TO ANY TREES ILLUSTRATED HEREIN WITHOUT FIRST OBTAINING THE RELEVANT AUTHORISATION TO DO SO UNLESS AGREED AS PER THE APPROVED PLANS THROUGH PLANNING CONSENT.

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A	26.09.2019	Resurvey	EKP
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masterplanning

environmental assessment

landscape design

urban design

ecology

architecture

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Pro Projekte GmbH & Co. KG

project
Dove Valley Park
Foston

drawing title
TREE SURVEY PLAN

scale
1:2000 @ A3

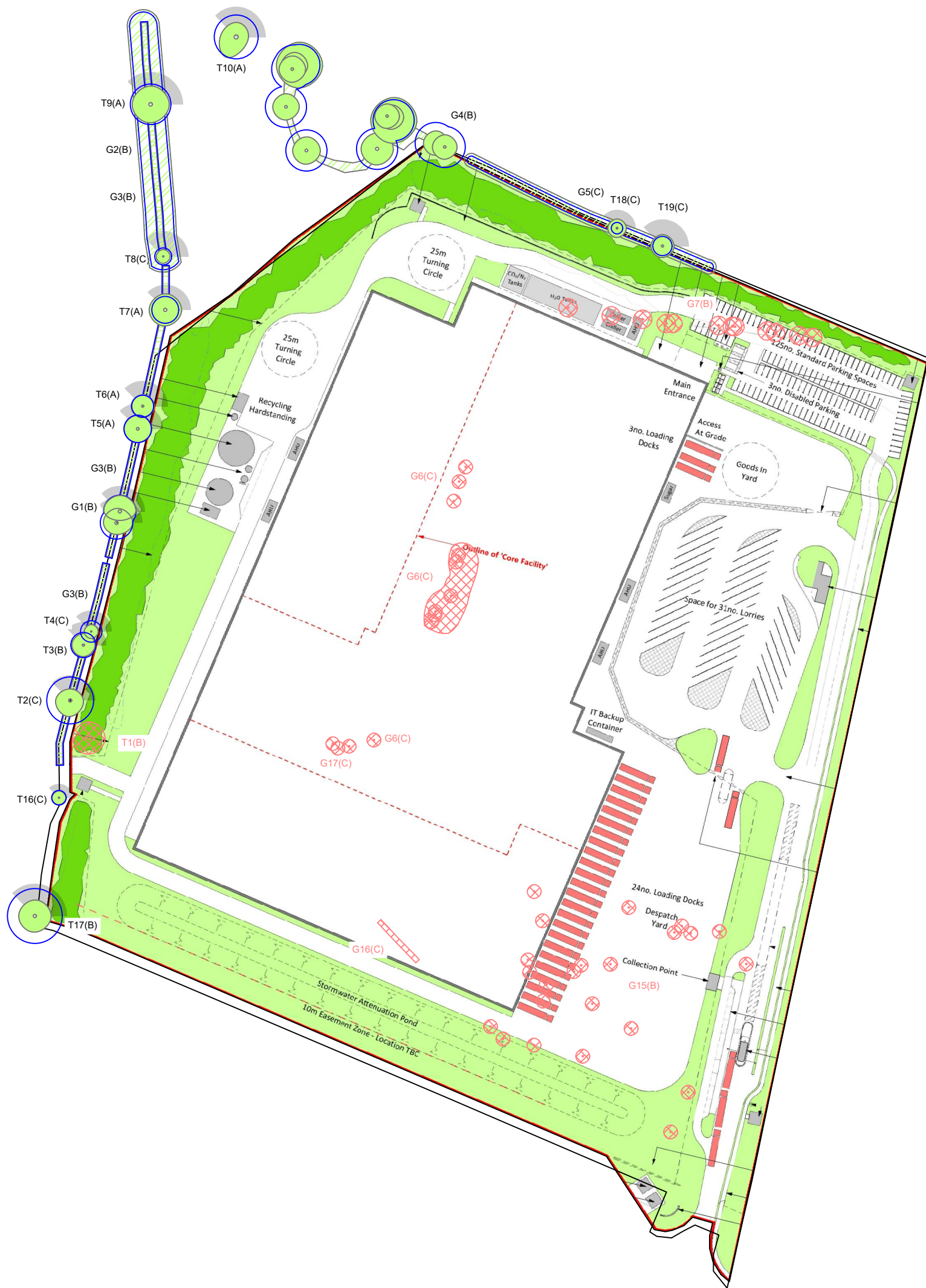
drawn / checked
EKP / CTT

date
September 2019

drawing number
7723-A-02

rev
A

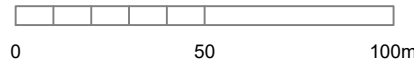
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KEY

-  Tree/Group to be Retained
-  Tree/Group to be removed to facilitate the proposals
-  Category U - Unsuitable for retention on arboricultural grounds
-  Root Protection Area (The RPA has been altered where appropriate to reflect underground constraints)
-  Individual / Group Number and BS5837:2012 Category
-  Indicative Shade Pattern (in accordance with BS5837:2012 where appropriate)
-  Application Redline Boundary

Scale 1:2000 @ A3



NOTES

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Drawing has been produced in colour and is based on digital information in .dwg format, aerial images and/or GPS location where appropriate. A monochrome copy should not be relied upon. The exact position of individual trees or species included as part of a tree group, woodland or hedgerow should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths.

Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked by the project Arboriculturalist should works commence 12 months after the date of this survey.

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B	03.10.2019	Latest Masterplan Inserted	CTT
C	10.10.2019	170622_150630DoveValleyPark- Masterplan- SK02 - REV 4	CTT
D	18.10.2019	Updated Layout Inserted	CTT

rev	date	description	by
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- masterplanning ■
 - environmental assessment ■
 - landscape design ■
 - urban design ■
 - ecology ■
 - architecture ■
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project

Dove Valley Park
Foston

drawing title

TREE RETENTION PLAN

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drawn / checked
EKP / CTT

date
October 2019

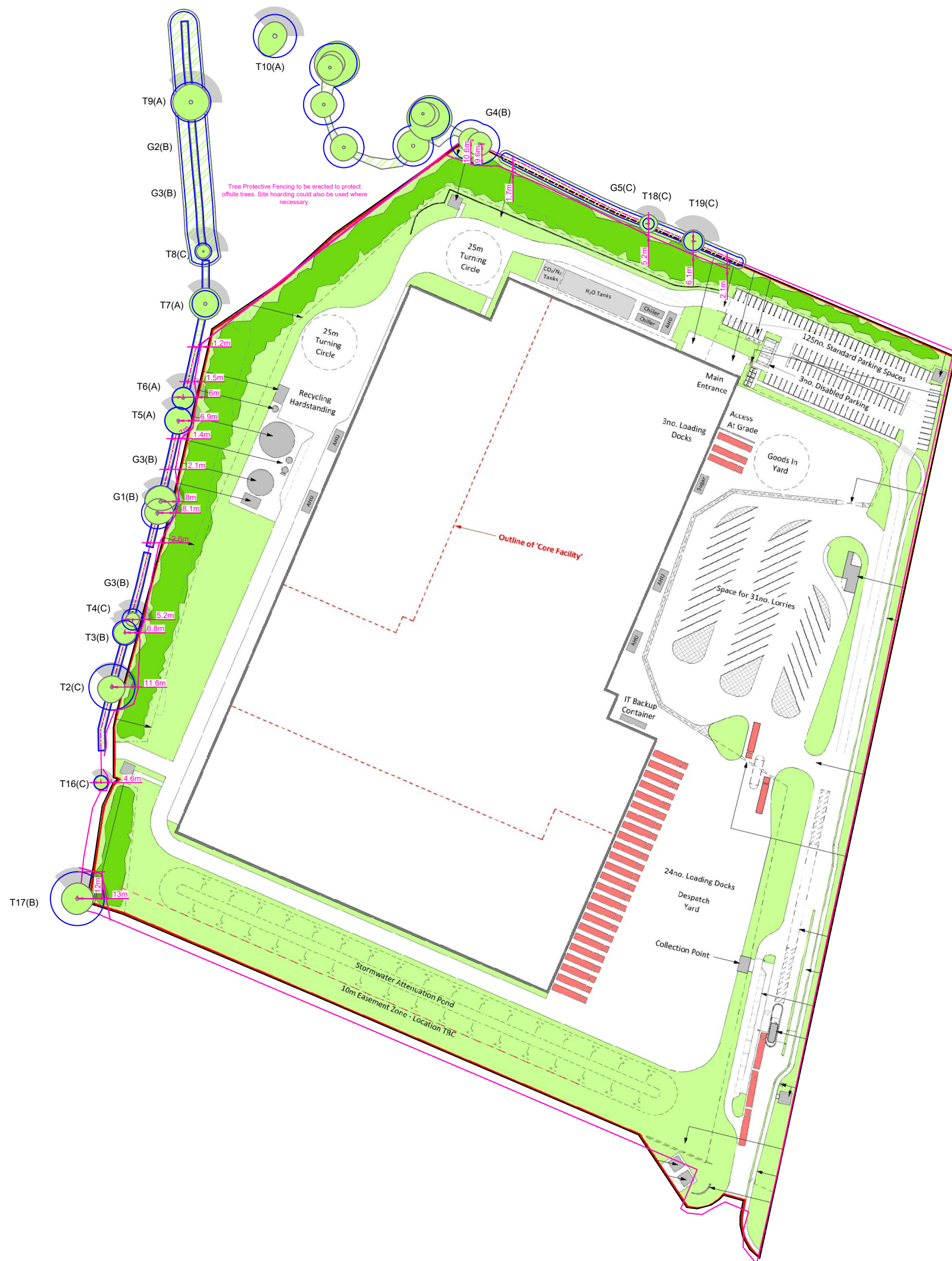
drawing number

7723-A-05

rev

D

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- Tree/Group to be Retained
- Root Protection Area (The RPA has been altered where appropriate to reflect underground constraints)
- Individual / Group Number and BS5837:2012 Category
- Indicative Shade Pattern (in accordance with BS5837:2012 where appropriate)
- Application Redline Boundary
- Line of Protective Barriers
(and distance from tree or retained structure)

All dimensions to be verified on site. Do not scale this drawing, use figured dimensions only. Any discrepancies to be clarified with project Arboriculturalist. Drawing to be read in conjunction with Arboricultural Assessment and Appendix A - Tree Schedule.

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Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked by the project Arboriculturalist should works commence 12 months after the date of this survey.

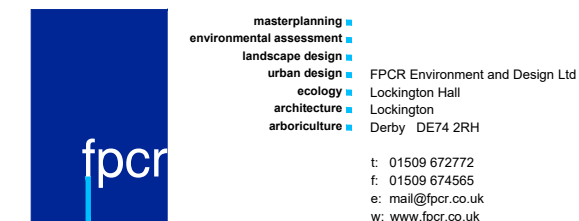
SOME TREES MAY BE SUBJECT TO STATUTORY CONSTRAINTS. IT IS THEREFORE ADVISED THAT NO WORKS SHOULD BE UNDERTAKEN TO ANY TREES ILLUSTRATED HEREIN WITHOUT FIRST OBTAINING THE RELEVANT AUTHORISATION TO DO SO UNLESS AGREED AS PER THE APPROVED PLANS THROUGH PLANNING CONSENT.

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C	18.10.2019	Revised Layout Inserted	CTT

rev	date	description	by
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drawing title
TREE PROTECTION PLAN

drawing number rev

7723-A-07 **C**

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Appendix A - Tree Schedule

Measurements	Age Classes	Quality Assessment of BS Category	ULE (relates to BS Category)
Height - Measured using a digital laser clinometer (m)	YNG: Establishing, typically with good vigour and fast growth rates and strong apical dominance; c. less than 1/3 life expectancy	Category U - Trees 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.	<10 years
Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837	SM: Semi-mature trees less than 1/3 life expectancy	Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.	40+ years
Crown Radius - Measured using a digital laser clinometer radially from the main stem (m)	EM: Established, typically vigorous and increasing in apical height and lateral spread; 1/3 - 2/3 life expectancy. Offers landscape significance	Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.	20-40 years
Abbreviations est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group	M: Fully established over 2/3 life expectancy, generally good vigour and achieving full height potential with crown still spreading	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 150mm.	10-20 years
	OM: Fully mature, at the extremes of expected life expectancy, vigour decreasing, declining or moribund	Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value	
	V: biological, cultural or aesthetic value comprising niche saproxylic habitat. Individuals of large proportions (stem girth) in comparison to trees of the same species/surviving beyond the typical age range for their species.	The BS category particular consideration has been given to the following: • The presence of any structural defects in each tree/group and its future life expectancy • The size and form of each tree/group and its suitability within the context of a proposed development • The location of each tree relative to existing site features e.g. its screening value or landscape features • Age class and life expectancy	

Structural Condition	Physiological Condition
Good - No significant structural defects	Good - No significant health problems
Fair - Structural defects that can be remediated	Fair - Symptoms of ill-health that can be remediated
Poor - Significant defects beyond remediation, present a risk of failure in the foreseeable future	Poor - Significant ill-health. Unlikely the tree will recover in the long term
Dead - Dead tree with structural integrity of tree severely compromised	Advanced Decline / Dead - Advanced state of decline and unlikely to recover or Dead

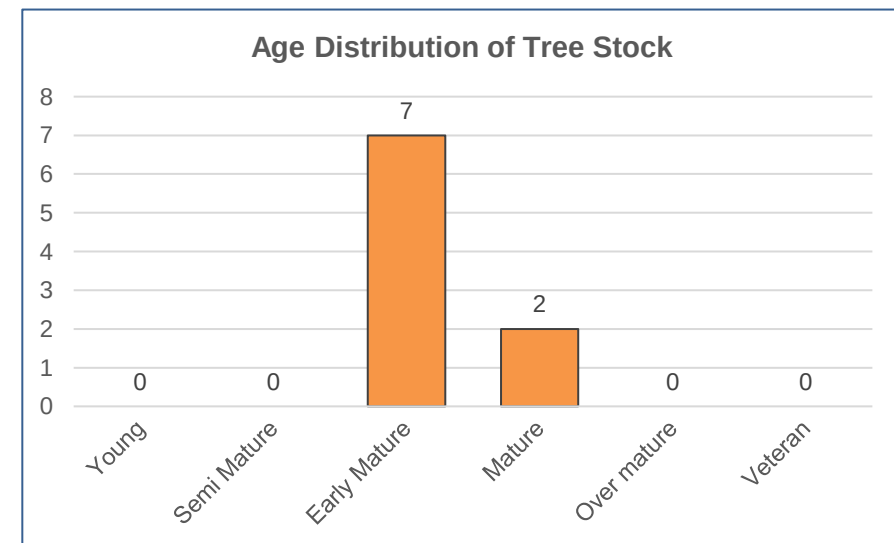
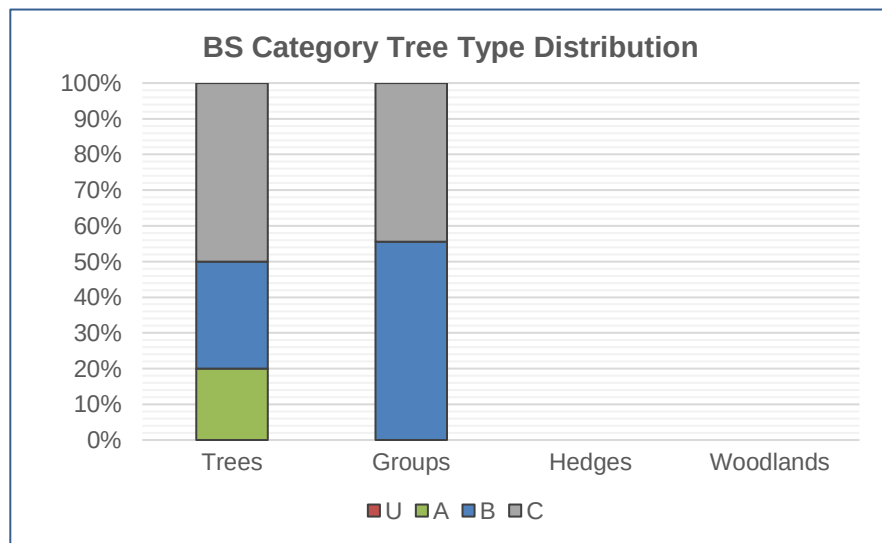
Root Protection Area (RPA)
• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required for a tree to be successfully retained. Tree roots extend beyond the calculated RPA in many cases and where possible a greater distance should be protected. • Where veteran trees have been identified the RPA has been calculated in accordance with Natural England guidance i.e. 15x the stem diameter, uncapped.

Appendix Summary

	Individual Trees	Totals	Tree Groups and Hedgerows	Totals
Category U	T12	0		0
Category A	T5, T6, T7, T9, T10	2		0
Category B	T1, T3, T13, T17	3	G1, G2, G3, G4, G7, G8, G15, G18	8
Category C	T2, T4, T8, T11, T14, T15, T16	5	G5, G6, G8, G10, G11, G12, G13, G14, G16, G17, H1, H2	12
	Total	10	Total	20

BS Category Tree Type Distribution displays the proportion of trees assessed in each type to enable a better understanding of the category distribution.

Age Distribution of Tree Stock shows the number of trees in each age category across the tree stock allowing assessment of their longevity to be made.



Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
INDIVIDUAL TREES										
T1	English Oak Quercus robur	11	560	7	EM	G	Characteristic for species Close cultivation of the soil Minor dead wood evident in the crown (<75mm) No major defects were noted	142	6.7	B (i)
T2	English Oak Quercus robur	11	Over ivy 855	N - 4 S - 7 E - 5 W - 6	M	F	Base obscured Broken branches evident Dense ivy cover on main stem Dense undergrowth at the base Epicormic growth evident within the crown Minor dead wood evident in the crown (<75mm) 2 x failed limbs hanging in lower crown - east	331	10.3	C (i)
T3	English Oak Quercus robur	10	est 460	5	EM	F	Base obscured Dense ivy cover on main stem Dense undergrowth at the base Minor dead wood evident in the crown (<75mm) No major defects were noted	96	5.5	B (i)
T4	Crack Willow Salix fragilis	9	est 390	3	EM	F	Characteristic for species Limited future potential Low crown form Multi leadered form	69	4.7	C (i)
T5	English Oak Quercus robur	11	est 500	6	EM	G	Light ivy cover No major defects were noted	113	6.0	A (i)
T6	English Oak Quercus robur	11	est 400	5	EM	G	Epicormic growth evident within the crown Light ivy cover No major defects were noted	72	4.8	A (i)
T7	Tree outside of application boundary									

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T8							Tree outside of application boundary			
T9							Tree outside of application boundary			
T10							Tree outside of application boundary			
T11							Tree outside of application boundary			
T12							Tree outside of application boundary			
T13							Tree outside of application boundary			
T14							Tree outside of application boundary			

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T15	Tree outside of application boundary									
T16	Sycamore Acer pseudoplatanus	6	180 140 110 80	3	EM	F	Multi stemmed from base Pruning wounds noted	32	3.2	C (i)
T17	English Oak Quercus robur	14	Over ivy 1000	7	M	F / G	Characteristic for species Dense ivy cover on main stem Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Unable to gain access	452	12.0	B (i)
T18	Sycamore Acer pseudoplatanus	8	210	4	EM	P	Dieback of the crown observed Limited future potential	20	2.5	C (i)
T19	Ash Fraxinus excelsior	11.5	est 350	5	EM/M	F	Sparse / thinning crown Minor dead wood evident in the crown (<75mm) Branch stubs Severed ivy Dense undergrowth at base	55	4.2	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
GROUPS OF TREES										
G1	Ash Fraxinus excelsior	11	Over ivy 590	N - 6 S - 4 E - 7 W - 5	EM	F	Base obscured Characteristic for species Dense ivy cover on main stem Dense undergrowth at the base Epicormic growth evident within the crown Minor dead wood evident in the crown (<75mm) Dense ivy impeded close inspection	157	7.1	B (ii)
G2	Trees outside of application boundary									
G3	Blackthorn Prunus spinosa Crack willow Salix fragilis Hawthorn Crataegus monogyna Holly Ilex aquifolium	5	avg 50 80 100	1.2	EM	F / G	Gaps present in hedgerow Light ivy cover Un-maintained hedgerow Along length of boundary	9	1.6	B (ii)
G4	Ash Fraxinus excelsior Crack Willow Salix fragilis Hawthorn Crataegus monogyna Silver Birch Betula pendula	18	avg 750	6	SM / M	F	Bark wounds noted Basal suckers present Branch stubs evident Broken branches evident Characteristic for species Dense undergrowth at the base Minor dead wood evident in the crown (<75mm) Multi leadered form Multi stemmed from base	254	9.0	B (ii)

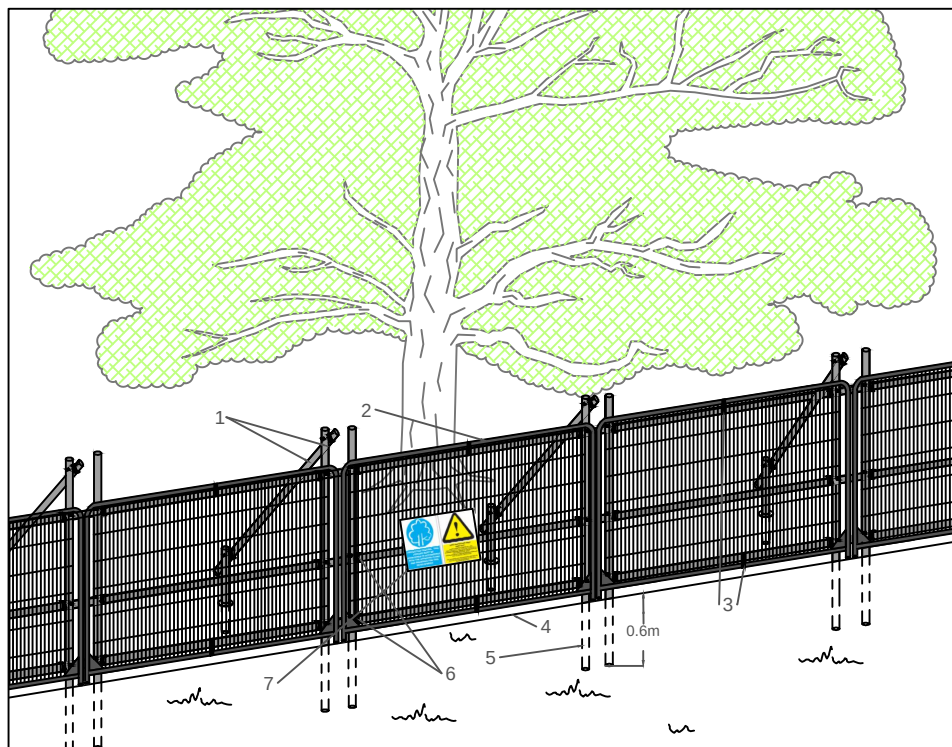
Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G5	Ash Fraxinus excelsior Blackthorn Prunus spinosa Hawthorn Crataegus monogyna Sycamore Acer pseudoplatanus	7	avg 150	3	EM	F / G	Characteristic for species Dense undergrowth at the base No major defects were noted Outgrown hedgerow Blackthorn hedgerow with occasional specimen trees of early mature age	10	1.8	C (ii)
G6	Goat Willow Salix caprea Hawthorn Crataegus monogyna Crab Apple Malus sylvestris	8	avg 150 160 180	3	EM	F	Characteristic for species Included bark union Limited future potential Low crown form Multi leadered form Multi stemmed from base Farm waste piled at base	36	3.4	C (ii)
G7	Hawthorn Crataegus monogyna	6	avg 250	4	M	F	Bark wounds noted Characteristic for species Low crown form Multi leadered form No major defects were noted Old hedgeline of mature hawthorn	28	3.0	B (ii)
G8	Trees outside of application boundary									

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G9	Trees outside of application boundary									
G10	Trees outside of application boundary									
G11	Trees outside of application boundary									
G12	Trees outside of application boundary									
G13	Trees outside of application boundary									

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G14	Trees outside of application boundary									
G15	Crack Willow Salix fragilis Goat Willow Salix caprea Silver Birch Betula pendula	7	upto 210 150 160 100	3	SM	F	Bark wounds noted Epicormic growth evident within the crown Low crown form Multi leadered form Multi stemmed from base Pruning wounds noted	46	3.8	B (ii)
G16	Leyland Cypress Cupressocyparis leylandii	6.5	avg 250	1	EM	G	Maintained hedgerow Newly planted trees of smaller proportions on end of group	28	3.0	C (ii)
G17	Sycamore Acer pseudoplatanus	5	upto 200	3	SM	F	Interlocking crowns Limited future potential No major defects were noted Pruning wounds noted	18	2.4	C (ii)

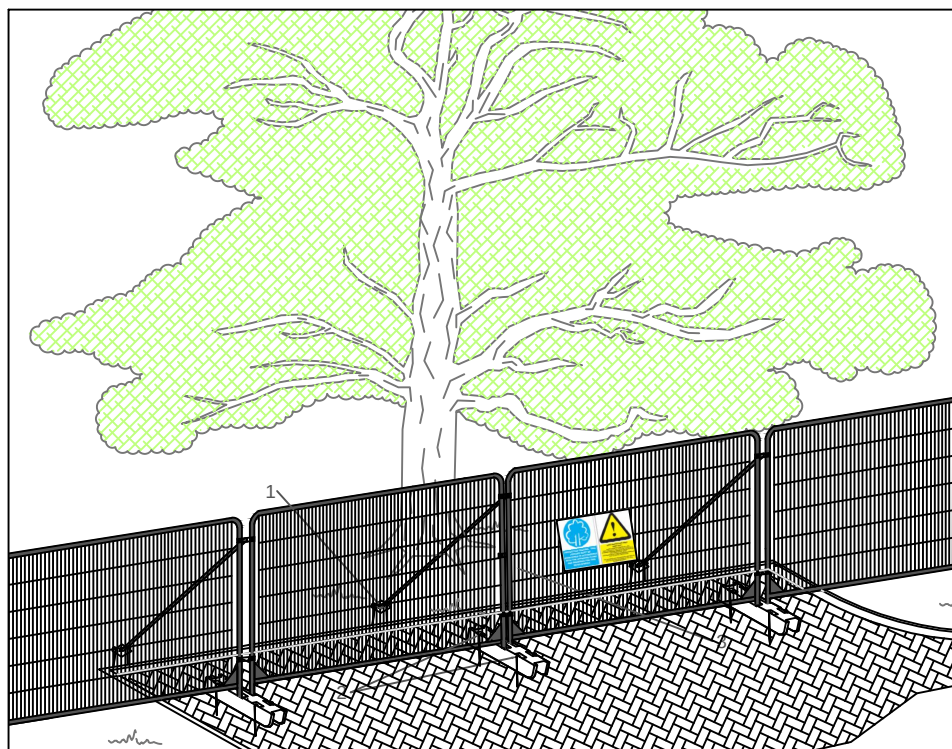
Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G18	Trees outside of application boundary									

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
HEDGEROWS										
H1	Trees outside of application boundary									
H2	Trees outside of application boundary									



Standard specification for protective barrier

1. Standard scaffold poles
2. Heavy gauge 2m tall galvanized tube and welded mesh infill panels
3. Panels secured to scaffold frame with wire ties
4. Ground level
5. Uprights driven into the ground until secure (min depth of 0.6m)
6. Standard scaffold clamps
7. Construction Exclusion Zone signs



Above ground stabilising systems

1. Stabiliser strut with base plate secured with ground pins
2. Feet blocks secured with ground pins
3. Construction Exclusion Zone signs

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drawing title

APPENDIX B PROTECTIVE FENCING SPECIFICATIONS

CAD file: S:\Arb resources\Basic Templates\Tree Protection\Appendix B - Protective Fencing A4.dwg