

E4 Environment Limited

Ledbury Road, Hereford

# **Arboricultural Assessment**

September 2015

#### FPCR Environment and Design Ltd

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## APPENDICES

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#### 1.0 INTRODUCTION

- 1.1 This report has been prepared by FPCR Environment and Design Limited on behalf of E4 Environment Limited to present the findings of an arboricultural assessment and survey of trees located at land to the south east of Ledbury Road, Hereford (hereafter referred to as the site), OS Grid Ref SO 535401 as shown in Figure 1. The survey was carried out on Thursday 17<sup>th</sup> September 2015.
- 1.2 The tree survey and assessment of existing trees has been carried out in accordance with British Standard 5837:2012 'Trees in Relation to Design, Demolition and Construction Recommendations' (hereafter referred to as BS5837). The guidelines give recommendations on the relationship between trees and design, demolition and construction processes to achieve a harmonious and sustainable relationship between trees and structures.
- 1.3 The purpose of the report is to present the results of an assessment of the existing trees' arboricultural value, based on their current condition and quality in accordance with the proposals to construct a single track access lane engineered to a specification suitable for the passage of HGV's. The tree survey has therefore focused on any trees present within or bordering the site that may potentially be affected by the future proposals or will pose a constraint to any proposed construction works.

#### **Site Description**

- 1.4 The site consisted of an expansive area of flat open agricultural land sub-divided into several large to medium field compartments by way of linear tree belts and managed/partially managed deciduous hedgerows. The southern portion of the site was host to a higher density of tree cover including uniformly planted rows of apple variety orchard trees, situated off-site within neighbouring land, unmanaged mature hedgerows providing broken field boundaries and sporadic areas of self-set or planted scrub buffer groups. The northern boundary of the site adjoins Ledbury Road.
- 1.5 The site was orientated approximately north to south with the north and west boundaries providing the longest unbroken areas of tree cover. The eastern portion of the site consisted of a high quality area of open countryside supporting a number of good arboricultural and landscape quality trees.
- 1.6 The type and species of trees varied but the majority were those typically associated with open countryside and dominated by English oak *Quercus robur* and common ash *Fraxinus excelsior*. Also included in the survey were a number of managed and lapsed field bounding and bisecting hedgerows comprising common hawthorn Crataegus monogyna, Blackthorn *Prunus spinosa* and small numbers of intermittently distributed English elm *Ulmus procera* and elder *Sambucus nigra*.
- 1.7 The presence of any tree preservation orders or conservation area designations that may affect the site has yet to be confirmed by Herefordshire Council. Once this information has been received, the report will be updated accordingly.
- 1.8 It must be understood that should any specific tree protection be required, this would need to be separately considered where needs arise prior to the commencement of construction activity following approval of the application.

This should be in the form of an arboricultural method statement produced in accordance with guidance in BS5837 and is beyond the scope of this arboricultural assessment.

## 2.0 METHODOLOGY

- 2.1 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 arboriculturalist 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.
- 2.2 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. An assessment of individual trees within groups or woodlands 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.
- 2.3 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). 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.
- 2.4 **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.
- 2.5 **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.
- 2.6 **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.
- 2.7 **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 Schedule

- 2.8 Appendix A presents details of any individual trees, groups and hedgerows 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.
- 2.9 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.

#### Hedgerows

- 2.10 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. Hedgerows and substantial internal or boundary hedges (including evergreen screens) have been recorded including lateral spread, height and stem diameter(s). Where trees are present within a hedgerow that are significantly different in character from the remainder, these have been identified and recorded separately.
- 2.11 A tree survey 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.

#### **Other Considerations**

2.12 Knowledge of soil type is not known at the time of this tree assessment. If a current soil survey of the site has taken place then it must be read in conjuction with the results of the tree survey. It may also be necessary to undertake further assessment and accurate positioning of woody species within hedgerows and tree groups to assist structural calculations for foundation design of structures in accordance with current building regulations.

#### **Conditions of Tree Survey**

2.13 The survey was completed from ground level only and from within the boundary of the site. Aerial inspection of trees was not undertaken at this stage. Investigations as to the internal condition of a tree have also not been undertaken as this is beyond the scope of this assessment. Evaluation of tree condition given within this assessment applies to the date of survey and cannot be assumed to remain unchanged. It may be necessary to review these within 12 months, in accordance with sound arboricultural practice.

#### Site Plans

- 2.14 Figure 1 (drawing no. 6873-A-01) identifies the assessment area including trees beyond the application boundary that may be affected by future development of the site and should not be considered as the application boundary.
- 2.15 The individual positions of trees and groups have been shown on the Tree Survey Plan, Figure 2 (drawing no. 6873-A-02.01, 6873-A-02.02, 6873-A-02.03, 6873-A-02.04). 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 and hedgerows, their relation to any existing surrounding features has 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.
- 2.16 As part of the Arboricultural Impact Assessment, a Tree Retention Plan, Figure 3 (drawing no. 6873-A-03.01, 6873-A-03.02, 6873-A-03.03, 6873-A-03.04) has been prepared to show the proposed layout in relation to the existing tree cover allowing an assessment of any potential conflicts. The plan also identifies which trees would be required to be removed or retained as part of the proposed development.

#### **Tree Constraints and Root Protection Areas**

- 2.17 Below ground constraints to future development are represented by the area surrounding the tree that contains sufficient rooting volume for the specimen to have the best chance of survival in the long term. This is known as the root protection area. The root protection area has been calculated in accordance with section 4.6 of BS5837 and requires suitable protection in order for the tree to be successfully incorporated into any future scheme. Where applicable the shape of the root protection area has been modified to take into account 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.
- 2.18 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.

#### 3.0 RESULTS

3.1 A total of twenty five individual trees, six groups of trees and six hedgerows were surveyed as part of the arboricultural assessment. Trees were surveyed as individual trees and groups / blocks of trees where examples are clearly present as such per the description. Refer to Figure 2 – Tree Survey Plan (drwg.no. 6873-A-02.01, 6873-A-02.02, 6873-A-02.03, 6873-A-02.04) and Appendix A – Tree Schedule for full details of the trees included in this assessment. The table below summarises the trees assessed. Several of the trees have been discussed in more detail following the table, owing to their physical condition or arboricultural significance.

#### **Results Summary**

	Individual Trees	Total	Groups of Trees	Total
Category U - Unsuitable	T5, T7, T18	3	G1	1
Category A (High Quality / Value)	T15, T17, T20	3		0
Category B (Moderate Quality / Value	T1, T4, T6, T8, T9, T11, T13, T14, T16, T19	10	H3, H5	2
Category C (Low Quality / Value)	T2, T3, T10, T12, T21, T22, T23, T24, T25	9	G2, G3, G4, G5, G6, H1, H2, H4, H6	9

#### Table 1: Summary of Trees by Retention Category

3.2 In general the tree cover was of a mature age and individual trees presented a range of defects consistent of the species, their respective ages and the growing environment in which they reside, having received little in the way of targeted past management. Several of the specimens which stood within close proximity to an existing farm track along the headlands of several fields, namely trees T1-T19, had been periodically pruned which had generally involved the removal of lower crown material or lateral branches overhanging the road to heights below those recommended for the acceptable and safe passage of farm machinery.

- 3.3 The condition of trees varied throughout the site although the majority were in fair to good health, albeit several more mature tree specimens showed signs of typical storm damage (branch and limb breakages), impaired structural conditions and/or crown dieback attributed to age (and possible influence from pathogenic diseases), which would be expected for such examples in this type of growing environment.
- 3.4 Several features assessed as part of the tree survey have been discussed in more detail below where deemed appropriate to assist with meeting the overall aims and objectives of this assessment.
- 3.5 English oak and common ash was the dominant species and there were a number of mature hedgerows bisecting the site formed of hawthorn and blackthorn.
- 3.6 The majority of the individual tree cover assessed was considered to be of a moderate to low arboricultural quality, with the exception of three isolated individual specimens (T15, T17, T20) which were considered to present a higher arboricultural quality (category A) and an estimated future life expectancy of at least 40 years. Such trees are deemed to be particularly good examples of their species and have visual importance as arboricultural and/or landscape features.
- 3.7 T5, T7, T18 and G1 were considered to be unsuitable for retention (category U) due to their significantly impaired conditions and the onset of overall terminal decline leading to the eventual death of a tree/s.
- 3.8 T5 presented a mature crack willow which had a large diameter single stem supported by a uniform crown of established epicormic regenerative growth. The main stem had failed at a height of 6-8m above ground level and the resulting fractured stub was extensively decayed leading to the formation of a hollow.
- 3.9 T7 was a standing dead example of a mature English oak comprising a crown framework which was devoid of any live growth. Standing within a dense boundary forming scrub mass, T7 was considered to be unsuitable for retention.
- 3.10 T18, despite housing several established live epicormic branches, exhibited a poor overall structural condition due, in the most part, to the presence of an extensively decayed stem cavity and lower basal hollowing.

#### 4.0 ARBORICULTURAL IMPACT ASSESSMENT

- 4.1 The following paragraphs present a summary of the tree survey and offers 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.
- 4.2 The AIA has been based upon the Access Plan (drwg.no. LAY01\_AccessRoad\_011). The drawing demonstrates the proposals to construct a new single track purpose-built access road suitably engineered for the passage of HGV's. The access road shall link Ledbury Road, along the northern boundary of the assessment area, to the bio-gas facility to the south bisecting several field parcels in the process.
- 4.3 An overlay of the above layout has been incorporated in the Figure 3 Tree Retention Plan (drwg.no. 6873-A-03.01, 6873-A-03.02, 6873-A-03.03, 6873-A-03.04) to assist in identifying potential conflicts with the existing trees. In particular, an evaluation of the rooting influence from any trees in close proximity to the proposed track has been taken into account for any damage that may occur to the physical root systems.
- 4.4 Three individual trees (T5, T7 and T18) and one group of trees, namely G1, were considered to be unsuitable for retention (category U) due to their significantly impaired conditions and the onset of overall terminal decline leading to the eventual death of a tree/s.
- 4.5 Despite their low arboricultural value it is always advised that the ecological benefit of category U tree specimens are fully considered prior to any decision taken for their complete removal/exclusion from any future development proposals. With the application of appropriate tree management, in this instance the creation of monoliths, these specimens could be retained as habitat features to contribute to the sites overall bio-diversity.

#### **Access Points and Access Road Layout**

- 4.6 To facilitate the construction of the proposed access road none of the individual trees surveyed as part of this assessment need to be removed. The only removal of vegetation would be a small section of the boundary forming hedgerow (H5) in order to accommodate the final positioning of the point of access into the site from Ledbury Road. It may however be required that an increased length of H5 needs to be removed to that illustrated within Figure 3 Tree Retention Plan, subject to the requirements of any sight lines or visibility splays that need to be satisfied as specified by the Highways Authority.
- 4.7 Despite the potential for an increased section of H5 that may need to be removed, the removal of a relatively short section of this hedgerow should not constrain the development as the majority of the hedgerow would be retained along with all of the assessed tree cover with the exception of those trees considered as being unsuitable for long term retention (category U). As such it is considered that the removal of a small section of the boundary forming hedgerow would not have a detrimental effect on the wider local landscape nor would it be considered to detract from the landscape characteristic of the site.

- 4.8 The proposed access roads indicative alignment encroaches within the root protection area (RPA) of T10 and along the southern edge of T19's RPA. It is therefore recommended during the final design stages that the road layout is amended where possible to outside the RPA of these specimens. Should the position of the road be otherwise constrained and restricted in any modification to its proposed alignment in this instance it is should be highlighted that presently there is an existing single passage farm track constructed of compacted gravel/hardcore passing within the RPA's of both T10 and T19.
- 4.9 This temporary farm access appears to have been in existence in this position for a number of years, evident through the level of ground compaction observed during the assessment. The build-up of compacted ground conditions within the root protection areas of the trees will have reduced the amount of air spaces for oxygen being available and subsequently impaired normal root function.
- 4.10 In addition prior to the track existing there is also evidence that the field would have been cultivated close to the edge where the trees are located hence it would be therefore reasonable to presume that the root systems of these trees are likely to have already been subjected to damage and disturbance possibly having naturally adapted to growing at lower depths then they would have if undisturbed under normal open grown conditions.
- 4.11 It would also be reasonable to presume that in response to the damage and disturbance to their growing conditions over time, not only from the historic cultivation operations but also the later presence of the track, in order to compensate for loss of rooting material the root systems of these trees are likely to have established a greater root spread and volume of rooting material into the land to the south of the existing access road, an area of ground which has seen fewer disturbances.
- 4.12 It is recommended that the use of "tree-friendly" sympathetic construction techniques are considered, utilising the principles of "no-dig" construction road surfaces within the RPA;s of the trees affected by the access road (T10 and T19). Specific details of these methods should be formalised within an appropriate Arboricultural Method Statement (AMS) which would support the Arboricultural Assessment. This is a viable option to minimise the impact to the rooting environments of these trees as the road shall be privately owned and maintained upon its completion. At current these types of construction techniques are currently unadoptable by Highways Agencies however this is not a material consideration in this instance.
- 4.13 Such methods of construction and the use of industry led specialist engineering solutions i.e. three dimensional "load bearing" cellular confinement systems can be used particularly in the case of carriageways, footways and driveways in order to avoid unnecessary losses of trees. Guidance for the design and specification of the final road specification should be sought by a reasonably qualified structural engineer.

#### **Tree Management**

4.14 A number of the trees positioned alongside the proposed access road may require minor tree works in the form of crown lifting in order to reduce the risk of injurious contact occurring between low, overhanging branches and passing HGV's.

- 4.15 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.
- 4.16 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.
- 4.17 Where this is not possible, vegetation should be checked for the presence of nesting birds prior to removal by an experienced ecologist.
- 4.18 Prior to any tree surgery and / or felling of protected trees being carried out it will be necessary to apply to the relevant local planning authority to gain consent for the works. For more information regarding conservation areas and tree preservation orders it is advised that contact is made with the local planning authority's arboricultural officer, or other such relevant person.

#### 5.0 TREE PROTECTION MEASURES

5.1 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**

- 5.2 All trees retained on site will be protected by suitable barriers or ground protection measures around the calculated root protection area, crown spread of the tree or other defined constraints of this assessment as detailed by section 6 and 7 of BS5837.
- 5.3 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 arboriculturalist.
- 5.4 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.
- 5.5 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.
- 5.6 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**

- 5.7 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.
- 5.8 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. 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.
- 5.9 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.

#### **Ground Protection**

5.10 Where it has been agreed, construction access may take place within the root protection area if suitable ground protection measures are in place. Guidance on examples of appropriate ground protection for several different scenarios is provided in section 6.2.3 of BS5837. The location of and design for temporary ground protection should be detailed as part of an Arboricultural Method Statement required by conditioning should planning permission be granted. In all cases, the objective is to avoid compaction of the soil which can arise from a single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

#### Protection outside the exclusion zone

- 5.11 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.
- 5.12 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.
- 5.13 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.
- 5.14 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.
- 5.15 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.

- 5.16 Notice boards, telephone cables or other services should not be attached to any part of a retained tree.
- 5.17 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 for Aerial Parts of Retained Trees**

5.18 Where it is deemed necessary to operate a wide or tall load, plant bearing booms, jibs and counterweights or other such equipment as part of the construction works it is best advised that appropriate, but limited tree surgery, be carried out beforehand to remove any obstructive branches. 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 arboriculturalist.

- 5.19 A pre-commencement site meeting with contractors who are responsible for operating machinery will be required, as described above, 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.
- 5.20 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.

#### 6.0 CONCLUSION

- 6.1 The site consisted of an expansive area of flat open agricultural land sub-divided into several large to medium field compartments by way of linear tree belts and managed/partially managed deciduous hedgerows. The northern boundary of the site adjoins Ledbury Road.
- 6.2 The type and species of trees varied but the majority were those typically associated with open countryside and dominated by English oak *Quercus robur* and common ash *Fraxinus excelsior*. Also included in the survey were a number of managed and lapsed field bounding and bisecting hedgerows comprising common hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* and small numbers of intermittently distributed English elm *Ulmus procera* and elder *Sambucus nigra*.
- 6.3 The proposals are to construct a single track access lane engineered to a specification suitable for the passage of HGV's. The access road shall link Ledbury Road, along the northern boundary of the assessment area, to the bio-gas facility to the south bisecting several field parcels in the process.
- 6.4 To facilitate the construction of the proposed access road none of the individual trees surveyed as part of this assessment need to be removed. A small section of the boundary forming hedgerow H5 would need to be removed to accommodate the final positioning of the point of access into the site to form the connection with Ledbury Road.

- 6.5 An increased section of H5 may need to be removed to that demonstrated in Figure 3 Tree Retention Plan. This may be required to satisfy any sight lines or visibility splays and as specified by the Highways Authority. The removal of a relatively short section of the boundary forming hedgerow would not however be considered to have a detrimental effect on the wider local landscape nor would it be considered to detract from the landscape characteristic of the site.
- 6.6 The indicative alignment of the access road encroaches within the root protection areas (RPA) of T10 and T19. It is recommended during the final design stages that the road layout is amended where possible to outside the RPA of these specimens.
- 6.7 Should the position of the road be otherwise constrained and restricted in any modification to its proposed alignment in this instance it is should be highlighted that presently there is an existing single passage farm track constructed of compacted gravel/hardcore passing within the RPA's of both T10 and T19.
- 6.8 This temporary farm access appears to have been in existence in this position for a number of years, evident through the level of ground compaction observed during the assessment. The build-up of compacted ground conditions within the root protection areas of the trees will have reduced the amount of air spaces for oxygen being available and subsequently impaired normal root function.
- 6.9 In addition prior to the track existing there is also evidence that the field would have been cultivated close to the edge where the trees are located hence it would be therefore reasonable to presume that the root systems of these trees are likely to have already been subjected to damage and disturbance possibly having naturally adapted to growing at lower depths then they would have if undisturbed under normal open grown conditions.
- 6.10 It is recommended that the use of "tree-friendly" sympathetic construction techniques are considered, utilising the principles of "no-dig" construction road surfaces within the RPA;s of the trees affected by the access road (T10 and T19). Specific details of these methods should be formalised within an appropriate Arboricultural Method Statement (AMS) which would support the Arboricultural Assessment. This is a viable option to minimise the impact to the rooting environments of these trees as the road shall be privately owned and maintained upon its completion. At current these types of construction techniques are currently unadoptable by Highways Agencies however this is not a material consideration in this instance.





Assessment Boundary



e: mail@fpcr.co.uk w: www.fpcr.co.uk

E4 Environment Limited

Ledbury Road Hereford

drawing title SITE LOCATION PLAN **FIGURE 1** 

scale 1:25000 @ A4

date September 2015

drawing number 6873-A-01 rev

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# Appendix A - Tree Schedule

Measurements	Age Class	Overall Condition	Root Protection Area (RPA)			
Height - Measured using a digital laser clinometer (m)	YNG: Young trees up to ten years of age	G - Good: Trees with only a few minor defects and in good overall health needing little, if any attention	<ul> <li>The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m).</li> <li>The RPA is calculated using the formulae described in</li> </ul>			
Stem Dia Diameter measured (mm) in accordance with Annex C of the BS5837	SM: Semi-mature trees less than 1/3 life expectancy	F - Fair: Trees with minor rectifiable defects or in the early stages of stress from which it may recover	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			
Crown Radius - Measured using a digital laser clinometer radially from the main stem (m)	EM: Early mature trees 1/3 – 2/3 life expectancy	P - Poor: Trees with major structural and/or physiological defects such that it is unlikely the tree will recover in the long term	calculated RPA in many cases and where possible a greater distance should be protected. • Where veteran trees have been identified the RPA has			
Abbreviations est - Estimated stem diameter avg - Average stem diameter for	M: Mature trees over 2/3 life expectancy	D - Dead: This could also apply to trees in an advanced state of decline and unlikely to recover	been calculated in accordance with Natural England guidance i.e. 15x the stem diameter, uncapped.			
multiple stems upto - Maximum stem diameter of a group	OM: Over mature declining or moribund trees of low vigour	The BS category particular consideration has been given to the following The health, vigour and condition of each tree 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				
	V: Veteran tree possessing certain attributes relating to veteran trees					

#### **Structural Condition**

The following is an example of considerations when inspecting structural condition:

- The presence of fungal fruiting bodies around the base of the tree or on the stem, as they could possibly indicate the presence of possible internal decay
- Soil cracks and any heaving of the soil around the base
- Any abrupt bends in branches and limbs resulting from past pruning
- Tight or weak 'V' shaped forks and co-dominant stems
- Hazard beam formations and other such biomechanical related defects (as described by
- Claus Mattheck, Body Language of Trees HMSO Research for Amenity Trees No. 4 1994)
- Cavities as a result of limb losses or past pruning
- Broken branches or storm damage
- Damage to roots
- Basal, stem or branch / limb cavities
- Crown die-back or abnormal foliage size and colour

#### Quality Assessment of BS Category

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.

Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.

Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.

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.

Sub-categories: (i) - Mainly arboricultural value

(ii) - Mainly landscape value

(iii) - Mainly cultural or conservation value

#### **Appendix Summary**

	Individual Trees		Totals	Tree Groups and Hedgerows		Totals
Category U	T5, T7, T18		3	G1		1
Category A	Т15, Т17, Т20		3			0
Category B	T1, T4, T6, T8, T9, T11, T13, T14, T16, T19		10	H3, H5		2
Category C	T2, T3, T10, T12, T21, T22, T23, T24, T25		9	G2, G3, G4, G5, G6, H1, H2, H4, H6		9
		Total	25		Total	12

**BS Category Site Wide Distribution** shows the proportion of trees assessed in each category across the whole site which allows an interpretation of the site's overall quality.



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



Estimated Biomass and Carbon Values presents the values calculated from the trees, groups and any woodlands where present. A comparison can be drawn from the values and any proposed removals compared with mitigation planting and the potential carbon sequestration.

**Biomass** is the total mass of all living material within the trees present on site. The biomass of the tree stock has been calculated using allometric equations derived from peer reviewed papers. For the purposes of the calculations hedgerows have not been included due to a lack of research currently in this field.

The **Carbon Equivalent** is half the biomass dry weight and represents the weight of the carbon equivalents present in the tree stock.

**Carbon Dioxide Equivalent** is a conversion of the carbon equivalent to a theoretical weight of carbon dioxide which could be released from the tree stock.



**Representative Species Distribution** displays the proportion of the tree stock for each species with greater than 5% of the total.



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
INDIVI	DUAL TREES									
T1	English Oak Quercus robur	16	est 680	5	М	F	Branch stubs evident Dense undergrowth at the base Epicormic growth evident within the crown Minor dead wood evident in the crown (<75mm) Unable to gain access	209	8.2	B (ii)
T2	Crack Willow Salix fragilis	12	avg 180 200 180 200 200	3	ЕМ	Ρ	Branch stubs evident Coppiced form Flail damage evident Limited future potential Multi stemmed from base Failed limbs	84	5.2	C (ii)
ТЗ	Ash Fraxinus excelsior	23	est 820	7	М	F	Basal suckers present Branch socket cavities observed Branch stubs evident Epicormic growth evident within the crown Minor dead wood evident in the crown (<75mm) Some failed limbs Bank on South side Ditch on North side - recently dug to within 1m of stem	304	9.8	C (ii)
T4	English Oak Quercus robur	18	770	8	Μ	F	Branch stubs evident Characteristic for species Epicormic growth evident within the crown Minor dead wood evident in the crown (<75mm) Bank to south Ditch on North side - recently dug to within 1m of stem	268	9.2	B (ii)
Τ5	Crack Willow Salix fragilis	10	810	2	EM	F	Bark wounds noted Branch stubs evident Heartwood exposed Limited future potential Hollow stem	N/A	N/A	U

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
Т6	English Oak Quercus robur	16	760	8	М	F	Branch stubs evident Epicormic growth evident within the crown No major defects were noted Pruning wounds noted Ditch on North side - recently dug to within 1m of stem	261	9.1	B (ii)
Τ7	English Oak Quercus robur	14	avg 950	6	М	D	Dead trees noted Bat/bird potential	N/A	N/A	U
Т8	English Oak Quercus robur	15	est 920	7	М	F	Branch stubs evident Dense ivy cover on main stem Pruning wounds noted Post and rail fence attached north side Ditch on North side - recently dug to within 1m of stem	383	11.0	B (ii)
Т9	English Oak Quercus robur	18	Over ivy 1000	9	М	F	Branch stubs evident Dense ivy cover on main stem Pruning wounds noted Ditch on North side - recently dug to within 1m of stem Difficult to measure stem accurately	452	12.0	B (ii)
T10	Crack Willow Salix fragilis	13	est 1050	4	Μ	P/F	Branch socket cavities observed Branch stubs evident Epicormic growth evident within the crown Heartwood exposed Major dead wood evident in the crown (>75mm) Lost central leader	499	12.6	C (ii)
T11	English Oak Quercus robur	18	680	7	М	G	Branch stubs evident Minor dead wood evident in the crown (<75mm) No major defects were noted	209	8.2	B (ii)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T12	English Oak Quercus robur	10	est 520	N - 3 S - 4 E - 2 W - 5	М	F	Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm)	122	6.2	C (ii)
T13	English Oak Quercus robur	19	860	7	М	F	Bark wounds noted Branch stubs evident Broken branches evident Compacted ground at the base Epicormic growth evident within the crown Low crown form	335	10.3	B (ii)
T14	English Oak Quercus robur	18	est 700	6	Μ	F	Branch stubs evident Broken branches evident Compacted ground at the base Epicormic growth evident within the crown Minor dead wood evident in the crown (<75mm)	222	8.4	B (ii)
T15	English Oak Quercus robur	21	830	7	М	G	Minor dead wood evident in the crown (<75mm) No major defects were noted	312	10.0	A (ii)
T16	English Oak Quercus robur	14	est 520	4	М	F	Chlorotic leaves evident Minor dead wood evident in the crown (<75mm) Woodpecker holes observed	122	6.2	B (ii)
T17	English Oak Quercus robur	17	est 1020	8	М	G	Branch stubs evident Epicormic growth evident within the crown No major defects were noted	471	12.2	A (ii)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T18	Ash Fraxinus excelsior	12.5	710	4	М	Ρ	Basal cavity observed Branch socket cavities observed Branch stubs evident Heartwood exposed Limited future potential Minor dead wood evident in the crown (<75mm) Cavities and stem hollowing	N/A	N/A	U
T19	English Oak Quercus robur	20	1240	10	ОМ	G	Bark wounds noted No major defects were noted Pruning wounds noted Very poor quality pruning possible future veteran	696	14.9	В (іі)
T20	English Oak Quercus robur	23	est 1350	9	ОМ	F	Bark wounds noted Branch stubs evident Broken branches evident Delaminating bark on main stem Epicormic growth evident within the crown Heartwood exposed Low crown form Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Flared buttress roots Possible future veteran	707	Capped at 15m	A (iii)
T21	English Oak Quercus robur	16	est 820	7	М	F	Branch socket cavities observed Branch stubs evident Epicormic growth evident within the crown Major dead wood evident in the crown Lower limbs removed to 6 metres above ground level Stubs resulting from poor past pruning Situated in hedgerow along watercourse	304	9.8	C (i)
T22	Ash Fraxinus excelsior	15	620	7	М	F	Branch socket cavities observed Characteristic for species Major dead wood evident in the crown Poached ground at the base Sparse crown Poor specimen next to a minor farm track Animal browsing damage	174	7.4	C (i)

Tree	Species	Height	Stem	Crown	Age	Overall	Structural Condition	RPA	RPA	BS5837
No	-	-	Dia.	Radius	Class	Condition			Radius	Cat
T23	Ash Fraxinus excelsior	16.5	910	8	Μ	F	Branch stubs evident Crossing and rubbing branches Epicormic growth evident within the crown Limited future potential Major dead wood evident in the crown Pruning wounds noted Sparse crown Majority of lower limbs stubbed - 5 metres above ground level Trifurcate stem union at crown break - 4.5 metres above ground level Inonotus hispidus bracket - north side above crown break	375	10.9	C (i)
T24	Ash Fraxinus excelsior	11	860	N - 6 S - 7 E - 7 W - 5.5	М	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Browsing damage noted on main stem Epicormic growth evident within the crown Minor dead wood evident in the crown Poached ground at the base Pruning wounds noted Strange formation - possible old coppice stool Sparse and the thinning crown Prominent stubs west side at 2.5 metres - epicormic regeneration	335	10.3	C (i)
T25	Field Maple Acer campestre	7.5	390 370 330	2	M / OM	F	Bark wounds noted Branch stubs evident Browsing damage noted on main stem Compacted ground at the base Epicormic growth evident within the crown Heartwood exposed Limited future potential Sparse crown Old coppice stool - 3 x main stems Dense lower crown of epicormic growth	180	7.6	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
GROUP	S OF TREES									
G1	Crack Willow Salix fragilis	8	avg 220	3	М	Ρ	Failed trees Limited future potential	N/A	N/A	U
G2	Blackthorn Prunus spinosa Crack Willow Salix fragilis Field Maple Acer campestre Hawthorn Crataegus monogyna	6	avg 7x 30	1	М	Ρ	Interlocking crowns Un-maintained hedgerow	3	1.0	C (ii)
G3	Blackthorn Prunus spinosa Crack Willow Salix fragilis Field Maple Acer campestre Hawthorn Crataegus monogyna	4	est 40 50 60	1	Μ	F	Partially maintained hedgerow gaps present Low overall quality	3	1.1	C (ii)
G4	Blackthorn Prunus spinosa Elder Sambucus nigra Hawthorn Crataegus monogyna	8	avg 6x 220	2	Μ	F	Interlocking crowns Multi stemmed from base Un-maintained hedgerow Outgrown hedgerow	131	6.5	C (ii)
G5	Blackthorn Prunus spinosa Elder Sambucus nigra Hawthorn Crataegus monogyna	8	avg 60 150 230 90	3.5	М	F	Light ivy cover on main stem Limited future potential Low crown form Minor dead wood evident in the crown Un-maintained hedgerow	39	3.5	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G6	Crack Willow Salix fragilis	8	est 930 870 1800	4	V	Ρ	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crown had been heavily reduced Epicormic growth evident within the crown Heartwood exposed Limited future potential Minor dead wood evident in the crown Large willow comprising crown of epicormic regenerative from 3.5 metres above ground level Extensive decay to lower stems Larger stem collapsed	707	Capped at 15m	C (iii)

Hedge	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA	BS5837
No									Radius	Cat
HEDGEROWS										
H1	Crack Willow Salix fragilis Elder Sambucus nigra Hawthorn Crataegus monogyna	3	avg 20 30 35	1	М	F	Characteristic for species Flail damage evident Maintained hedgerow Outgrown willow in hedge	1	0.6	C (ii)
H2	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 7x 50	1	М	Ρ	Maintained hedgerow	8	1.6	C (ii)
НЗ	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna	3	180 140 110	0.5	М	F	Flail damage evident Maintained hedgerow	29	3.0	B (ii)
H4	Hawthorn Crataegus monogyna	1.5	50	0.5	М	F	Flail damage evident Maintained hedgerow	1	0.6	C (ii)
H5	Hawthorn Crataegus monogyna	2	avg 260	1	М	G	Characteristic for species Low crown form No major defects were noted Managed hedgerow Large stems suggest good past management	31	3.1	B (ii)
H6	Hawthorn Crataegus monogyna	2	avg 250	1	М	F	Characteristic for species No major defects were noted	28	3.0	C (ii)



# 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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# APPENDIX B PROTECTIVE FENCING SPECIFICATIONS

Protective Fencing to be positioned to the specified dimensions in accordance with Figure 3 Tree Retention Plan

#### NOTES

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