

**Tree Condition Report
Arboricultural Impact Assessment
Arboricultural Method Statement
Tree Protection Plan**

Land at Knolton, Overton, Wrexham LL13 0LE

For

Berrys LLP



2.12.2016 & 17.3.2018

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1.0 Remit:

Check the condition of the significant trees identified on the Block Plan provided by Berrys LLP within and adjacent to the proposed development area. Provide an Arboricultural Impact Assessment, Method Statement and Tree Protection Plan to BS5837 (2012) Trees in relation to design, demolition and construction – Recommendations.

2.0 Report limitations:

The conclusion and recommendations in this report are valid for a period of one year, or a lesser period where indicated in the report. All trees are susceptible to exceptional weather events or deterioration resulting from other environmental changes in close proximity to the tree. The evaluation is based upon Visual Tree Assessment (Mattheck & Breloer 2001). Observations have been made from ground level with the aid of binoculars.

2.1 Statutory Obligations

Bats and the Law (Woodland Management for Bats 2005)

‘The Wildlife and Countryside Act 1981 makes it an offence to disturb, damage or destroy bats or their roosts. The Act applies in both England & Wales and requires consultation with the appropriate SNCO before carrying out activities which might harm or disturb bats or their roosts.

The Act is amended by the CROW Act 2000. This adds *recklessness* to the offence of damaging or destroying a place a bat uses for shelter or disturbing a bat while using a roost.

The Conservation (Natural Habitats Regulations 1994) implements the European Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992, amended August 2007 & Oct 2010. Under the regulations, damaging or destroying a breeding site or resting place is an absolute offence, regardless of whether the act of doing so may be regarded as reckless, deliberate or incidental.

Wild Birds (Mynors 2002) The Primary legislation affecting wild birds in England, Scotland and Wales is the Wildlife and Countryside Act 1981 (as amended). In January 2001 the Countryside and Rights of Way Act 2000 (CROW) included amendments, which strengthened the law in England and Wales. The basic principle of the Wildlife and Countryside Act 1981 (as amended) is that all wild birds, their nests and eggs, are protected by law and some rare species are afforded special protection. There are certain exemptions to this notably in respect of wildfowl, game birds and various species that may cause damage. (Cowan 2002)

Felling licence: Subject to tree size, location, condition and other Statutory protection, or prior planning approval, not more than 5m³ of timber can be felled in any Calendar quarter without first obtaining a Forestry Commission (FC) felling licence. Failure to obtain a licence where required is a prosecutable offence. Detailed information including exemptions can be found on the FC web site

Conservation Area and Tree Protection Orders: The Local Authority protects trees within the district by the use of and administration of Tree Preservation Orders (TPOs). Trees can also be protected if they are within a Conservation Area. TPOs are used to protect trees (including areas of woodland) where their removal would have a significant impact on the local environment and its enjoyment by the public. TPOs prohibit the cutting down, uprooting, wilful damage or destruction of trees. Any works to a tree(s) protected by a TPO or falling within a Conservation Area first requires the consent of the Local Authority.

It is a prosecutable offence to carry out work to a tree protected by a TPO, or remove it, without the prior consent of the Local Authority. Detailed information including exemptions can be found on the Local Authority web site

2.2 Tree Condition Survey and Arboricultural Impact Assessment (AIA)

Inspection method: Visual Tree Assessment (VTA) from ground level.

Location: Land at Knolton, Overton, Wrexham LL13 0LE **Date:** 22.12.2015

Protection Status: Not known

Limitations: Trees and shrubs have been identified, current height measured to the nearest metre and ultimate height assessed with reference to The Hillier Manual of Trees and Shrubs. A Visual Tree Assessment (VTA) has been carried out on trees in, or adjacent to, the development site. Refer to proposed site layout drawing for tree locations. The risk assessment and recommendations are valid for a period of one year. No detection equipment has been used other than a sounding hammer and metal probe.

NB. All trees are at risk of failure through exceptional weather conditions.

Identification No.	T1
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	14m
Ultimate Height (M)	14m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	82cm
Crown clearance	5m
Crown Spread (M)	Radius; N: 8m; E: 7m; S: 8m; W: 3m
Growth stage	Late-Mature
Tree Condition: Root: No evidence of soil movement Stem: Column of dead cambium on west side. Crown: Crown death on west side. No evidence of recent breakouts. Major deadwood Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Life expectancy less than 40 years. Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 82cm diameter at 1.5m $(0.82 \times 12) = 9.8\text{m}$ radius. Total RPA required at current stage of growth = 302m^2 Arboricultural Impact Assessment AIA: - The proposed new access drive falls within the RPA. No strip excavation is permitted within the RPA. 'BS 7.7.2.1: The design should not require excavation into the soil, including the lowering of levels and/or scraping, other than the removal, using hand tools, of any turf layer or other surface vegetation'. - A 3-dimensional No-Dig cellular confinement system (CCS) with a permeable surface is proposed for the new drive section within the RPA e.g. www.geosyn.co.uk/product/cellweb-tree-root-protection Method Statement: construction of new access drive - Ramping on and off the above-ground CCS section must be constructed outside the RPA or using cellular grid of different thickness to form a series of 'steps' which are infilled with stone, levelled to form the sloping ramp and surfaced with porous tarmac within the RPA - The CCS should be designed by an engineer to carry the maximum anticipated loading for site construction traffic and future use - The CCS must be constructed before vehicles cross the RPA using the 'rolling out' system of installation. - The permeable surface within the RPA and compensatory area should be protected with a temporary sacrificial surface laid over a geotextile separator to ensure permeability is retained (i.e. interstices should not become blocked by the passage of construction vehicles). No excavation for haunching is permitted on side of the CCS closest to the tree/s within the RPA. The CCS edge must be supported e.g. by above-ground retaining boards/blocks secured with road pins to minimise damage to the lateral roots. Install section of Heras fence and temporary ground protection indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Forester & Arborist Services Ltd

Identification No.	T2
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	15m
Ultimate Height (M)	15m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	54cm
Crown clearance	3m
Crown Spread (M)	Radius; N: 6m; E:7m; S: 6m; W: 7m
Growth stage	Mature
Tree Condition: Root: No evidence of soil movement Stem: wounds occluded Crown: No evidence of recent breakouts or significant dieback. Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 54cm diameter at 1.5m $(0.54 \times 12) = 6.5\text{m radius}$. Total RPA required at current stage of growth = 133m ² Arboricultural Impact Assessment AIA: - The proposed new access drive falls outside the RPA. - An existing open-sided barn falls within the RPA - No strip excavation is permitted within the RPA. 'BS 7.7.2.1: The design should not require excavation into the soil, including the lowering of levels and/or scraping, other than the removal, using hand tools, of any turf layer or other surface vegetation'. Method Statement: construction of new access drive - Install the section of Heras fence as indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Identification No.	T3
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	14m
Ultimate Height (M)	14m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	45cm
Crown clearance	5m
Crown Spread (M)	Radius; N: 4m; E:2m; S: 3m; W: 3m
Growth stage	Mature
Tree Condition: Root: No evidence of soil movement Stem: obscured by ivy growth Crown: Restricted development. Overwhelmed by ivy growth. No evidence of recent breakouts Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 45cm diameter at 1.5m $(0.45 \times 12) = 5.4\text{m radius}$. Total RPA required at current stage of growth = 92m ² Arboricultural Impact Assessment AIA: - No strip excavation is permitted within the RPA. 'BS 7.7.2.1: The design should not require excavation into the soil, including the lowering of levels and/or scraping, other than the removal, using hand tools, of any turf layer or other surface vegetation'. - The proposed new access drive falls outside the RPA. - An existing open-sided barn falls within the RPA Method Statement: construction of new access drive - Install the section of Heras fence as indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Identification No.	T4
Species	Common oak <i>Quercus robur L.</i>
Current Height (M)	14m
Ultimate Height (M)	15m (at ultimate height for site)
Current Stem Dia (cm) at narrowest point below fork	73cm
Crown clearance	5m
Crown Spread (M)	Radius; N: 4m; E:2m; S: 3m; W: 3m
Growth stage	Mature
Tree Condition: Root: No evidence of soil movement Stem: co-dominant stems, obscured by ivy growth Crown: No evidence of recent breakouts or significant dieback Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 73cm diameter at 1.5m $(0.73 \times 12) = 8.8\text{m}$ radius. Total RPA required at current stage of growth = 92m² Arboricultural Impact Assessment AIA: • The proposed new access drive falls just inside the RPA perimeter. There is sufficient compensatory rooting area. • No strip excavation is permitted within the RPA. '<i>BS 7.7.2.1: The design should not require excavation into the soil, including the lowering of levels and/or scraping, other than the removal, using hand tools, of any turf layer or other surface vegetation</i>'. • An existing open-sided barn falls within the RPA • Construction access will be required within the RPA Method Statement: construction of new access drive • Install the section of Heras fence set back within the RPA and temporary ground protection installed as indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Identification No.	T5
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	15m
Ultimate Height (M)	15m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	70cm
Crown clearance	5m
Crown Spread (M)	Radius; N: 7m; E:5m; S: 8m; W: 6m
Growth stage	Late-Mature
Tree Condition: Root: No evidence of soil movement Stem: wounds occluded. Crown: No evidence of recent breakouts or significant dieback. Major deadwood Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 70cm diameter at 1.5m $(0.70 \times 12) = 8.4\text{m}$ radius. Total RPA required at current stage of growth = 222m^2 Arboricultural Impact Assessment AIA: - The proposed new access drive falls within the RPA. - No strip excavation is permitted within the RPA. 'BS 7.7.2.1: The design should not require excavation into the soil, including the lowering of levels and/or scraping, other than the removal, using hand tools, of any turf layer or other surface vegetation'. - A 3-dimensional No-Dig cellular confinement system (CCS) with a permeable surface is proposed for the new drive section within the RPA e.g. www.geosyn.co.uk/product/cellweb-tree-root-protection Method Statement: construction of new access drive - Ramping on and off the above-ground CCS section must be constructed outside the RPA or using cellular grid of different thickness to form a series of 'steps' which are infilled with stone, levelled to form the sloping ramp and surfaced with porous tarmac within the RPA - The CCS should be designed by an engineer to carry the maximum anticipated loading for site construction traffic and future use - The CCS must be constructed before vehicles cross the RPA using the 'rolling out' system of installation. - The permeable surface within the RPA and compensatory area should be protected with a temporary sacrificial surface laid over a geotextile separator to ensure permeability is retained (i.e. interstices should not become blocked by the passage of construction vehicles). No excavation for haunching is permitted on side of the CCS closest to the tree/s within the RPA. The CCS edge must be supported e.g. by above-ground retaining boards/blocks secured with road pins to minimise damage to the lateral roots. Install section of Heras fence and temporary ground protection indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Identification No.	T6
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	14m
Ultimate Height (M)	14m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	58cm
Crown clearance	4m
Crown Spread (M)	Radius; N: m; E:5m; S: 6m; W: 3m
Growth stage	Mature
Tree Condition: Root: No evidence of soil movement Stem: Column of decay on northeast side. Woundwood response. Crown: Old tear out wound site on first order limb at junction with stem. No evidence of recent breakouts or significant dieback. Risk Assessment: Likelihood of structural failure on south facing limb over proposed drive. Recommendation: Reduce loading with 20% end reduction. Pruning to BS3998(2010) Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 58cm diameter at 1.5m $(0.58 \times 12) = 7\text{m radius}$. Total RPA required at current stage of growth = 154m^2 Arboricultural Impact Assessment AIA: - The proposed new access drive falls within the RPA. - No strip excavation is permitted within the RPA. <i>'BS 7.7.2.1: The design should not require excavation into the soil, including the lowering of levels and/or scraping, other than the removal, using hand tools, of any turf layer or other surface vegetation'</i>. - A 3-dimensional No-Dig cellular confinement system (CCS) with a permeable surface is proposed for the new drive section within the RPA e.g. www.geosyn.co.uk/product/cellweb-tree-root-protection Method Statement: construction of new access drive - Ramping on and off the above-ground CCS section must be constructed outside the RPA or using cellular grid of different thickness to form a series of 'steps' which are infilled with stone, levelled to form the sloping ramp and surfaced with porous tarmac within the RPA - The CCS should be designed by an engineer to carry the maximum anticipated loading for site construction traffic and future use - The CCS must be constructed before vehicles cross the RPA using the 'rolling out' system of installation. - The permeable surface within the RPA and compensatory area should be protected with a temporary sacrificial surface laid over a geotextile separator to ensure permeability is retained (i.e. interstices should not become blocked by the passage of construction vehicles). No excavation for haunching is permitted on side of the CCS closest to the tree/s within the RPA. The CCS edge must be supported e.g. by above-ground retaining boards/blocks secured with road pins to minimise damage to the lateral roots. Install section of Heras fence and temporary ground protection indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Identification No.	T7
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	16m
Ultimate Height (M)	16m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	89cm
Crown clearance	4m
Crown Spread (M)	Radius; N: 7m; E:7m; S: 4m; W: 8m
Growth stage	Mature
Tree Condition: Root: No evidence of soil movement Stem: crown lifted; woundwood response. Crown: No evidence of recent breakouts or significant dieback. Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 89cm diameter at 1.5m $(0.89 \times 12) = 10.7\text{m radius}$. Total RPA required at current stage of growth = 360m^2 Arboricultural Impact Assessment AIA: - The proposed new dwelling falls at the perimeter of the RPA - Construction access will be required within the RPA - No strip excavation is permitted within the RPA. 'BS 7.7.2.1: The design should not require excavation into the soil, including the lowering of levels and/or scraping, other than the removal, using hand tools, of any turf layer or other surface vegetation'. Method Statement: construction of new house - Construction access to the east elevation of the new house will be required within the RPA - Install section of Heras fence set back within the RPA and temporary ground protection installed as indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Identification No.	T8
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	16m
Ultimate Height (M)	16m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	74cm
Crown clearance	5m
Crown Spread (M)	Radius; N: 5m; E:5m; S: 2m; W: 8m
Growth stage	Mature
Tree Condition: Root: No evidence of soil movement Stem: localised wound sites at stem base. Crown: Asymmetric development. No evidence of recent breakouts or significant dieback. Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 74cm diameter at 1.5m $(0.74 \times 12) = 8.9\text{m radius}$. Total RPA required at current stage of growth = 249m^2 Arboricultural Impact Assessment AIA: - The proposed new house footprint falls outside the RPA. Method Statement: construction of new house - Install section of Heras fence as indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Identification No.	T9
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	15m
Ultimate Height (M)	15m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	95cm
Crown clearance	5m
Crown Spread (M)	Radius; N: 2m; E:5m; S: 6m; W: 7m
Growth stage	Mature
Tree Condition: Root: No evidence of soil movement Stem: localised wound sites; woundwood response. Crown: Asymmetric development. Old storm damage breakout on east side. No evidence of recent breakouts or significant dieback. Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 95cm diameter at 1.5m $(0.95 \times 12) = 11.4\text{m radius}$. Total RPA required at current stage of growth = 408m ² Arboricultural Impact Assessment AIA: - The proposed new garage and house footprint fall outside the RPA. Method Statement: construction of new garage and house - Install section of Heras fence protection indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

Identification No.	T10
Species	Common oak <i>Quercus robur</i> L.
Current Height (M)	15m
Ultimate Height (M)	15m (at ultimate height for site)
Current Stem Dia (cm) at 1.5m	90cm
Crown clearance	2m
Crown Spread (M)	Radius; N: 6m; E:7m; S: 4m; W: 6m
Growth stage	Mature
Tree Condition: Root: No evidence of soil movement Stem: wounds occluded Crown: Recent storm damage breakout on south side. Limb still attached No evidence of significant dieback. Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 Category B2 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating' Water Demand NHBC 4.2-B: HIGH Root Protection Area RPA: for tree of 90cm diameter at 1.5m $(0.90 \times 12) = 10.8\text{m radius}$. Total RPA required at current stage of growth = 366m ² Arboricultural Impact Assessment AIA: - The west facing corner elevation of the proposed new house falls 1m inside RPA. - Compensatory rooting area is available Method Statement: construction of new house - Construction access to the east elevation of the new house will be required within the RPA - Install section of Heras fence set back within the RPA and temporary ground protection installed as indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended	

H1:

Condition: 15m section of Hawthorn hedge managed at 4m height. No evidence of recent breakouts or dieback.

Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 **Category B2** 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating'

Water Demand NHBC 4.2-B: High

Root Protection Area RPA: for average tree of 20cm diameter at narrowest point below fork $(0.20 \times 12) = 2.4\text{m}$ radius.

Total RPA required at current growth stage = 18m^2

Arboricultural Impact Assessment AIA:

- The proposed new access drive falls within the RPA.
- No strip excavation is permitted within the RPA. *'BS 7.7.2.1: The design should not require excavation into the soil, including the lowering of levels and/or scraping, other than the removal, using hand tools, of any turf layer or other surface vegetation'.*
- A 3-dimensional No-Dig cellular confinement system (CCS) with a permeable surface is proposed for the new drive section within the RPA e.g.
www.geosyn.co.uk/product/cellweb-tree-root-protection

Method Statement: construction of new access drive

- Ramping on and off the above-ground CCS section must be constructed outside the RPA **or** using cellular grid of different thickness to form a series of 'steps' which are infilled with stone, levelled to form the sloping ramp and surfaced with porous tarmac within the RPA
- The CCS should be designed by an engineer to carry the maximum anticipated loading for site construction traffic and future use
- The CCS must be constructed before vehicles cross the RPA using the 'rolling out' system of installation.
- The permeable surface within the RPA and compensatory area should be protected with a temporary sacrificial surface laid over a geotextile separator to ensure permeability is retained (i.e. interstices should not become blocked by the passage of construction vehicles). No excavation for haunching is permitted on side of the CCS closest to the tree/s within the RPA. The CCS edge must be supported e.g. by above-ground retaining boards/blocks secured with road pins to minimise damage to the lateral roots.
- Install section of Heras fence and temporary ground protection indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended

H2:

Condition: 20m section of Hawthorn hedge managed at 1.8m height. No evidence of recent breakouts or dieback.

Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 **Category B2** 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating'

Water Demand NHBC 4.2-B: High

Root Protection Area RPA: for average tree of 20cm diameter at narrowest point below fork (0.20 x 12) = **2.4m** radius.

Total RPA required at current growth stage = 18m²

Arboricultural Impact Assessment AIA:

- The proposed new drive footprint falls at the RPA perimeter

Method Statement: construction of new house

- Install section of Heras fence as indicated on Tree Protection plan. Specification as recommended in BS5837 (2012) Fig 3 appended

G1+H3:

Condition: 12 x Mature to late-mature oaks and hawthorn hedge adjacent to the sections of crushed rubble track and concrete hardstanding forming access to the proposed new dwelling.

Tree Quality Assessment: Ref.BS5837 (2012) 4.5.1 **Category B2** 'trees present in numbers, usually growing as groups, such that they attract a higher collective rating'

Water Demand NHBC 4.2-B: High

Root Protection Area RPA: N/A

Arboricultural Impact Assessment AIA:

- The existing agricultural track falls with the hedge and tree RPAs
- No strip excavation is permitted within the RPA
- No HGV construction vehicles are permitted to use the existing rubble track

Method Statement: (proposed access drive to House)

- Upgrade work to the surface of the crushed rubble track must utilise porous material.
- Re-grading of the existing rubble track (to improve drainage) must not penetrate the mineral soil.

General Arboricultural Method Statement ref. BS 5837 (2012)

3.0 The root protection area (RPA) recommendation in BS 5837 2012 (Trees in relation to design, demolition and construction – Recommendations), is based upon a minimum area (in m²) calculated from the measurement of the stem diameter and a factor of the radial distance between the tree stem and the outer extent of the main lateral roots. The resulting area is usually recorded as a generalised circle on the tree survey. However, the significant figure is the equivalent available rooting area in m² rather than the circular shape; tree roots exploit the optimum ground conditions for their physical development dependant upon soil aeration, plant-available water, mineral elements and physical barriers to growth. Providing the total minimum area in m² recommended in the RPA is available to the tree, the actual shape of the area is less significant, *providing* it can be demonstrated that the construction process will not result in significant damage to existing roots greater than 25mm in diameter. 'The viable retention of trees on construction sites is dictated by the successful protection of their root systems throughout the development process from initial site clearance to installation of the new landscape. Healthy soils contain five basic components: oxygen, organic matter, mineral matter, living organisms and moisture. A soil's porosity allows water to drain through, carbon dioxide to escape and oxygen to enter. Construction vehicles operating on exposed soils, particularly in wet conditions, compact the soil pores and prevent these processes from occurring' (Cowan 2005)

3.1 The Tree Protection Plan (TPP) and method statement details how the construction work will be carried out in proximity to the retained trees, protective barrier specification, timing of work, other mitigation measures where required and supervision of the protection measures during construction.

3.2 Summary of works

Drainage and Utilities: Follow recommendation in the NJUG Volume 4 Code of practice relating to work in proximity to tree roots within the RPA; specifically, the avoidance of trench excavations within the RPA. Any drainage or service related works to be carried out within the Root Protection Area must be subject to the prior written approval of the LPA of a method statement detailing how such works are to be carried out and monitored, so as to avoid undue damage to the tree.

Site Compound, construction materials, soil/demolition debris storage mixing of concrete and washings: Must be located outside of the Root Protection Areas. Vehicle movements, storage of vehicles or heavy machinery, lighting of fires and no excavations or alterations of ground level is permitted within the protective barrier or areas of temporary ground protection

Method of work for individual trees retained in proximity to construction works or access to the works: refer to the work method described for each retained tree ref. section 2.2 of the report.

3.3 Protective Fencing

- Protective barriers should be erected with verticals positioned to avoid the lateral roots of the larger trees. Refer to BS 5837 (2012) figure 3 Protective barrier for details of the recommended specification.
- Protective barrier should be erected and then approved by the Local Planning Authority before the start of demolition and construction works on site, including the installation of temporary site office, storage and welfare facilities if required
- The barrier and ground protection shall be maintained in a satisfactory condition throughout the duration of development. There is to be no access or operations of any kind within the barrier, nor repositioning of the barrier even temporarily, without the prior written approval of the LPA.

Appendix 1

Photo Detail: Tree condition illustration ref. Sect 2.2

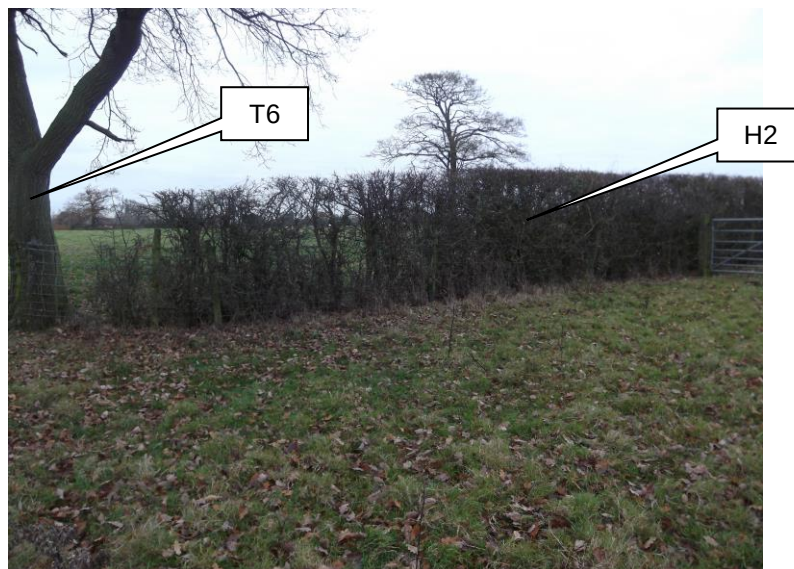


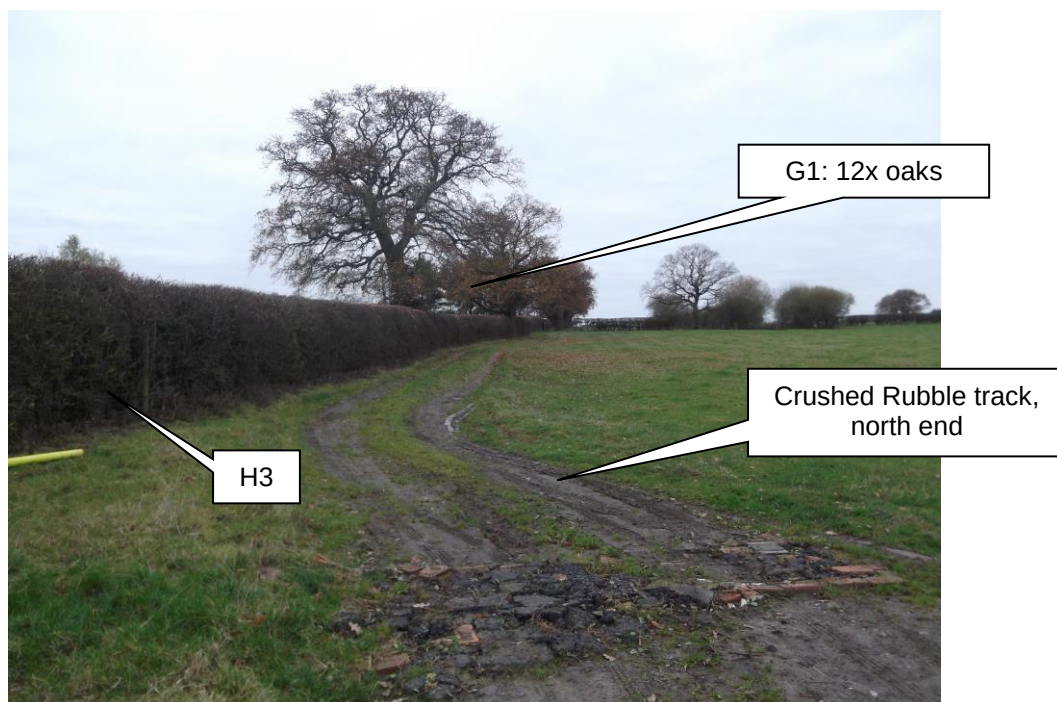
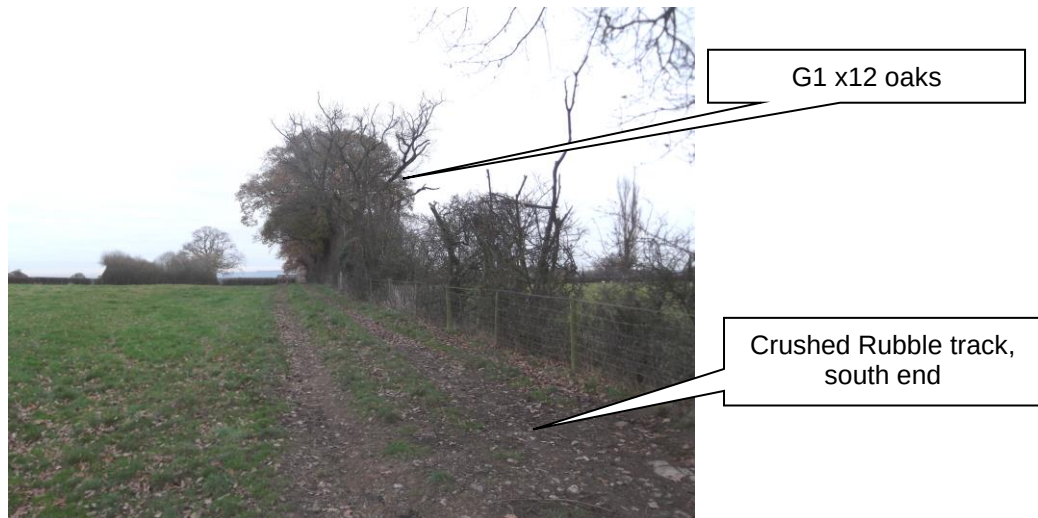


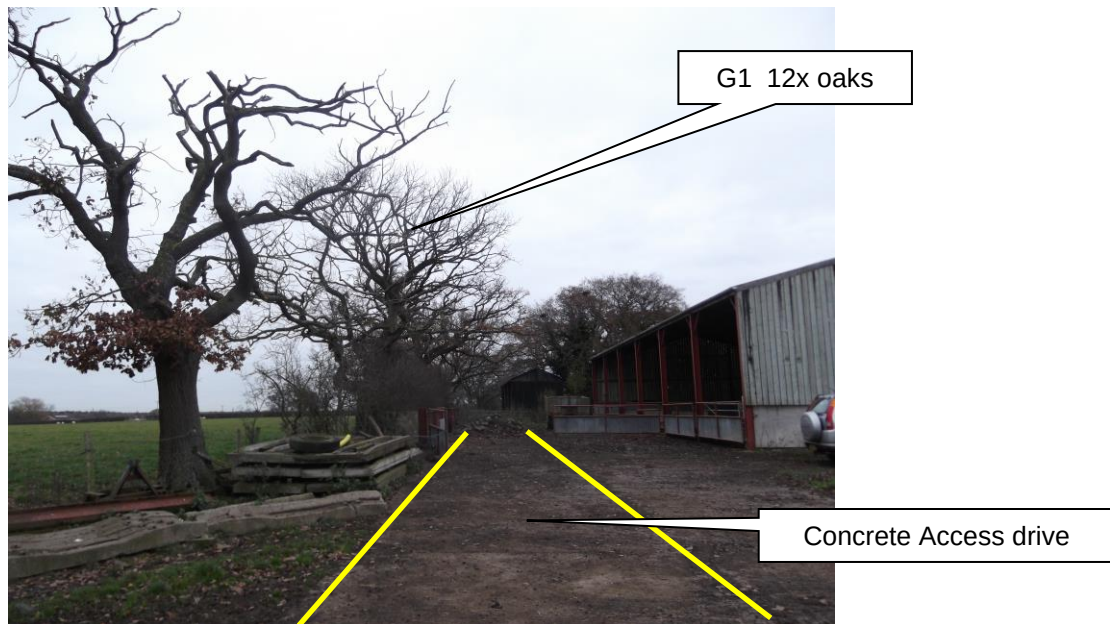






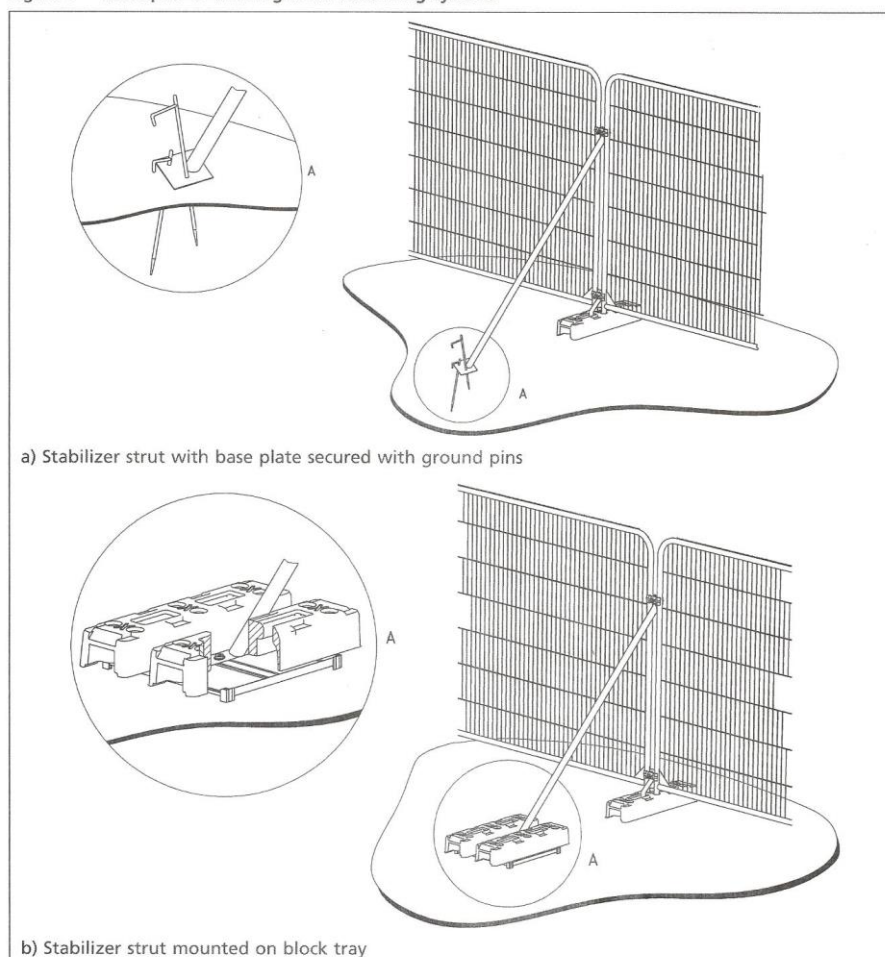






Appendix 2

Tree Location and Protection Plan supplied as 2 separate drawings

Appendix 3**BS 5837 2012 Protection illustrations****BRITISH STANDARD****BS 5837:2012****Figure 3 Examples of above-ground stabilizing systems****6.2.3 Ground protection during demolition and construction**

6.2.3.1 Where construction working space or temporary construction access is justified within the RPA, this should be facilitated by a set-back in the alignment of the tree protection barrier. In such areas, suitable existing hard surfacing that is not proposed for re-use as part of the finished design should be retained to act as temporary ground protection during construction, rather than being removed during demolition. The suitability of such surfacing for this purpose should be evaluated by the project arboriculturist and an engineer as appropriate.

6.2.3.2 Where the set-back of the tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site.

6.2.3.3 New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

NOTE The ground protection might comprise one of the following:

- a) for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;
- b) for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;
- c) for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

6.2.3.4 The locations of and design for temporary ground protection should be shown on the tree protection plan and detailed within the arboricultural method statement (see 6.1).

6.2.3.5 In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

6.2.4 Additional precautions outside the exclusion zone

6.2.4.1 Planning of site operations should take sufficient account of wide loads, tall loads and plant with booms, jibs and counterweights (including drilling rigs), in order that they can operate without coming into contact with retained trees. Such contact can result in serious damage to the trees and might make their safe retention impossible. Consequently, any transit or traverse of plant in proximity to trees should be conducted under the supervision of a banksman, to ensure that adequate clearance from trees is maintained at all times. Access facilitation pruning should be undertaken where necessary to maintain this clearance.

NOTE In some instances, local planning authority consent for pruning might be required.

6.2.4.2 Fires on sites should be avoided if possible. Where they are unavoidable, they should not be lit in a position where heat could affect foliage or branches. The potential size of a fire and the wind direction should be taken into account when determining its location, and it should be attended at all times until safe enough to leave.

NOTE Local environmental health authorities might have specific restrictions.

6.2.4.3 Any materials whose accidental spillage would cause damage to a tree should be stored and handled well away from the outer edge of its RPA.

Appendix 4

Appendix 4 Glossary of Arboricultural Terms

Adaptive Growth: Woundwood.	New strengthening woody growth in response to loss of tissue through decay or physical damage
Age Class: Young	Up to 1/3 rd life expectancy
Early-mature	Between 1/3 rd and 2/3rds life expectancy
Mature	Over 2/3rds life expectancy
Late-mature	Onset of natural limb loss; increase in dysfunctional tissue
Over-mature	Declining or moribund trees of low vigour. NB Late-mature and over-mature trees are more prone to structural failure than young or early-mature trees.
Breakout:	Loss of a limb usually close to the junction the main stem or scaffold limb
Branch bark ridge:	Natural feature in the axil of the branch providing a simple guide for locating the best position for the top edge of a pruning cut.
Buttressing:	Root flare at the base of the stem
Crown dieback:	Significant loss of foliage throughout the crown; often the result of root damage. Usually indicating a tree in decline.
Deadwood:	Dead secondary branching persisting on the scaffold limbs. Minor deadwood <50mm diameter is less likely to cause damage in the event of failure. Major deadwood >50mm present a greater hazard and is a greater risk of failure in trees without durable heartwood e.g. Lime and ash. Deadwood which is not presenting a hazard to the highway is excluded from the inspection report. Deadwood stubs: Prevent the sealing of the wound site, providing sites of decay and increasing risk of limb failure.
Epicormic Response:	Growth of dormant buds on areas of the stem or scaffold limbs effected by loss of woody tissue or foliage. New woody tissue is laid down in areas of vigorous epicormic growth.
Included bark:	Weak regions of bark-to-bark contact at the stem or branch junctions.
Retrenchment:	Describes the response in new growth in the lower crown, following dieback in the upper crown. A feature of some over-mature trees, enabling survival into great age (veteran trees)
Scaffold limbs:	1 st order limbs; the major limbs supporting the secondary branching or 2 nd & 3 rd order branches
Soil Heave:	Raised lateral roots or loosened soil surrounding the base of the tree.

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Biddle P G (1998) *Tree root damage to buildings Vol 1*. Willowmead Publishing Ltd
Opik H & Rolfe S (2005) *The Physiology of Flowering Plants* Cambridge
Lonsdale D, (1999) *Principles of Tree Hazard Assessment and Management* HMSO
Mattheck & Breloer (1994) *The body language of trees DTR* TSO
Mattheck C, (2007) *Updated Field Guide for Visual Tree Assessment* Forschungszentrum Karlsruhe GmbH
Roberts J, Jackson N, Smith M (2006) *Tree Roots in the Built Environment* TSO
Strouts & Winter, (1994) *Diagnosis of ill-health in trees D.o.E* HMSO
Weber & Mattheck (2001) *Manual of Wood Decays in Trees* Arboricultural Association
White, White & Walters (2005) *Trees; A field Guide to the trees of Britain and Northern Europe*. Oxford

Arb Implication Assessment: T F Merchant Chartered Forester M. Arbor.A

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