

**University of Hull Photovoltaic
Project, Snuff Mill Lane – BS
5837:2012 Arboricultural
Report, Impact Assessment
and Method Statement
Gardiner and Theobald LLP**

September 2022

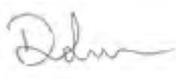
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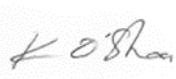
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 and Arboricultural Method Statement

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Executive Summary

On behalf of Gardiner and Theobald LLP (the Client), Ecus Limited (Ecus) has carried out a tree survey to BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations* in April 2022 at the University of Hull Snuff Mill Lane site. This survey has formed the basis of an assessment of the impacts that development proposals may have on existing trees and of any methodologies to be adopted to protect retained trees during development.

The survey recorded all significant trees within the site and those which may be affected by any development proposed within the site boundary, recording a number of parameters including species, crown spread and Root Protection Area (RPA).

The RPA of any given tree is calculated in accordance with BS 5837:2012 and is generally a circular plot centred on its stem. This area around each tree should not be disturbed by excavation, compaction, contamination or other related demolition and construction activities. Minor encroachment into the RPA may be possible if specific methodologies are put in place that reduce the likelihood of the tree being negatively impacted.

The survey recorded 18 individual trees, 18 tree groups and 3 hedgerows. The vast majority of the trees and groups were located close to the site boundaries, generally consisting of larger individual trees surrounded by groups of smaller trees and shrubs.

No trees within the site boundary are protected by a Tree Preservation Order (TPO) and the site is not located within a Conservation Area.

An online search using the Multi Agency Geographical Information for the Countryside (MAGIC) website for statutory conservation sites was undertaken (where appropriate) to determine the presence of Ancient Woodland within 15.0 m of the site boundary.

The Client proposes the construction of a solar farm with associated access and facilities. No trees will require removal from the current proposals although the layout may have an impact on the roots, stems and canopies of retained trees unless suitable protection measures are put in place.

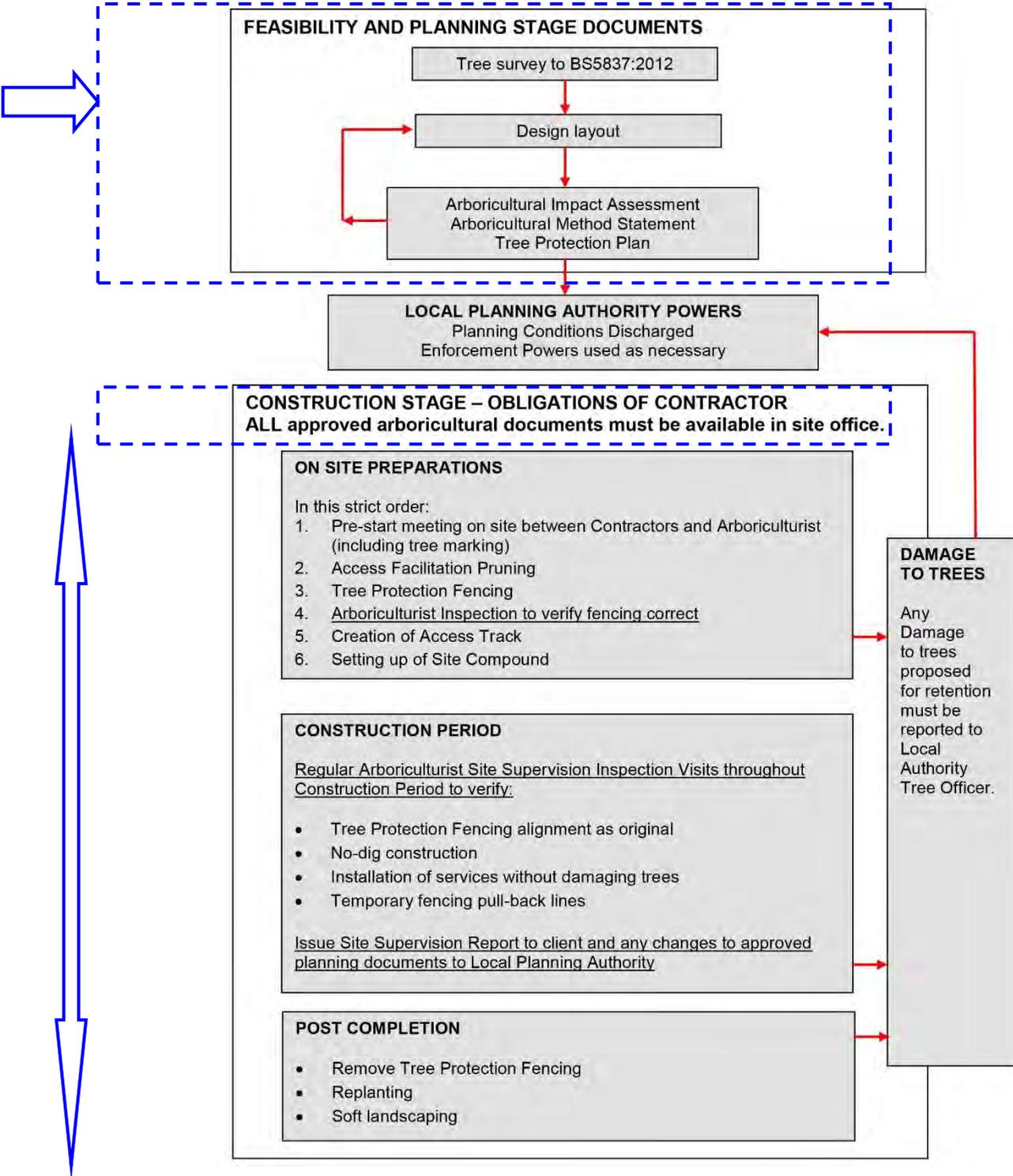
This report details the potential arboricultural impacts of development at the site and offers a range of protection measures and construction methodologies which should be adopted. These measures aim to prevent accidental damage and other adverse effects on the health of retained trees.

The report also makes recommendations for any measures to mitigate or compensate for the loss of trees within the site and the likely impact on the site and the wider local landscape.

1. Introduction

1.1 Context of this Report in the Planning System

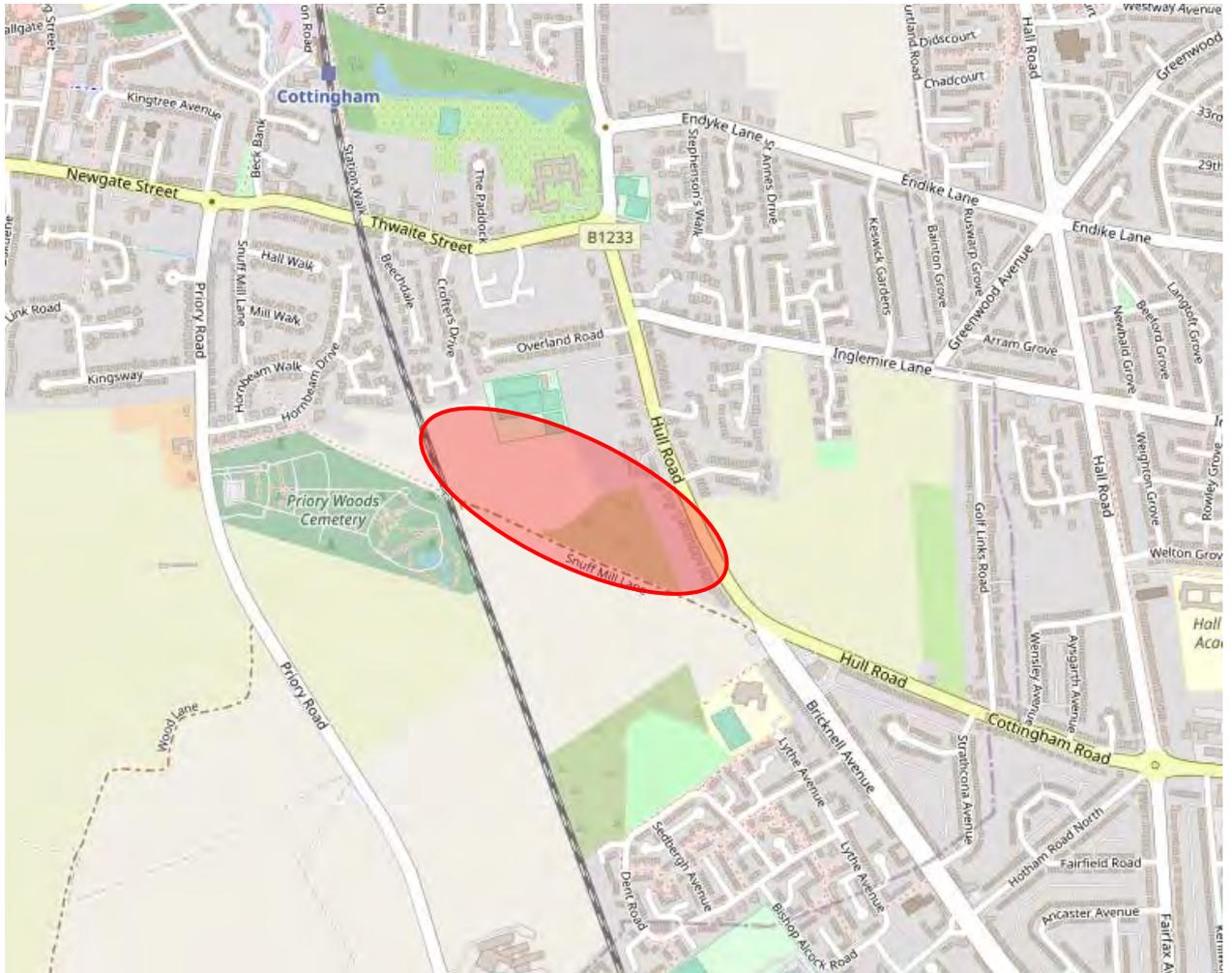
Figure 1: The Design and Construction Process and Tree Care



1.2 Location

1.2.1 Ecus Limited has been commissioned by the Client to undertake a tree survey of the site at Snuff Mill Lane, Cottingham, HU16 4SE, Ordnance Survey UK Grid Reference TA054321, and prepare the findings in a report. The site location is shown in Figure 2.

Figure 2: Location Map



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1.3 Tree Designations

- 1.3.1 The information available on the Hull City Council website (<https://www.hull.gov.uk/environment/environment/works-trees-and-tree-preservation-orders>) has confirmed that the site is not located within a conservation area and no trees included in the survey are protected by a TPO.
- 1.3.2 The permission of the local planning authority must be sought before any works are carried out to protected trees. Potentially unlimited fines can be imposed for illegally carrying out any works to protected trees.
- 1.3.3 Reference to the Multi Agency Geographical Information for the Countryside (MAGIC) website indicates that no ancient woodland is present within a 15.0 m buffer of the site.

1.4 Protected Species

Bats

- 1.4.1 Mature trees can often contain cavities or hollows which provide potential roosting locations for bats. Bats and the places they use for shelter or protection (i.e. roosts) are protected under The Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017). They also receive legal protection under the Wildlife and Countryside Act (WCA) 1981. Consequently, causing damage to a bat roost constitutes an offence.
- 1.4.2 Generally, should the presence of a bat roost be suspected whilst completing works on any trees on site then an appropriately licensed bat worker should be consulted for advice.

Birds

- 1.4.3 Trees and hedgerows can provide habitat for nesting birds which are protected under the Wildlife and Countryside Act (WCA) 1981. Some species are further protected by special penalties. This legislation makes it an offence to intentionally or recklessly damage or destroy an active bird nest or part thereof.
- 1.4.4 As the trees at the site provide potential habitat for nesting birds all tree work should ideally be completed outside the nesting bird season (Generally March to September).
- 1.4.5 If this is not possible then the vegetation should be subject to a nesting bird inspection by a suitably experienced ecologist prior to commencement of works. If active nests are identified then the vegetation, and a defined buffer zone, will need to remain in place until the young have fully fledged.

2. Tree Survey Methodology

2.1 Site survey

- 2.1.1 Ecus have undertaken the tree survey in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations*, to provide detailed and independent arboricultural advice in the context of potential development. The survey was a ground based visual inspection carried out by a suitably qualified arboriculturist. No trees were tagged as part of the survey.
- 2.1.2 The tree inspection was carried out in March 2022 by Dave Farmer FdSc MArborA, Senior Arboricultural Consultant, when the deciduous trees were generally not in leaf.
- 2.1.3 The weather on the day of the survey was warm and dry. This allowed for a thorough inspection of all trees included in the survey.
- 2.1.4 The survey recorded all trees with a stem diameter of 75 mm or more at a height of 1.5 m above ground level within the site boundary. Any significant trees outside the boundary which could be significantly affected by the future development of the site were also recorded.
- 2.1.2 The following characteristics were recorded:
- Species
 - Stem diameter at 1.5 m above ground level (mm)
 - Estimated height (m)
 - Approximate crown spread (m) in North, East, South and West directions
 - Estimate of the number of years that the tree is likely to remain suitable for retention
 - Age class
 - Condition category in accordance with BS 5837:2012. The categories are defined as:
 - Category U = Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years
 - 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 150 mm
 - Value subcategories where appropriate in accordance with BS 5837:2012. These are defined as:
 - 1 = Mainly arboricultural qualities
 - 2 = Mainly landscape qualities
 - 3 = Mainly cultural values, including conservation
 - General notes about physiological and structural condition and any management recommendations
- 2.1.5 All survey data has been based on a topographical survey where possible, supplied by the client. Where topographical information has not identified tree positions or Ordnance Survey mapping has been utilised, trees and hedgerows have been positioned using GPS and aerial photography to provide approximate locations in relation to existing surrounding features. Further confirmation of

tree locations through a topographical survey of the site is recommended to ensure future design accuracy.

- 2.1.6 Some measurements for trees with limited accessibility may have been estimated. This is highlighted with a hash (#) symbol in the Tree Survey Schedule at Appendix 1.
- 2.1.7 Where trees formed a contiguous canopy they may have been grouped, in line with the guidance of BS 5837:2012. If densely wooded areas are not expected to be directly affected by development proposals only the significant trees at the woodland perimeter will have been surveyed.
- 2.1.8 Trees are living organisms that change over time. A re-survey of all trees should be carried out if there have been any significant storm events or more than 12 months have passed since the survey was carried out.

2.2 Calculation of Root Protection Area (RPA)

- 2.2.1 The Root Protection Area (RPA) is calculated according to the formulae set out in BS 5837:2012. This is a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure should be treated as a priority.
- 2.2.2 Due to the specific topography of the site and the presence of surrounding structures the RPA is likely to be a simplified representation of the actual morphology and disposition of tree roots. Any deviation in the shape of the RPA from the calculated circular shape will largely be based on conjecture and so should generally be avoided. However, where significant site features are present that could clearly influence the disposition of tree root growth (e.g. water courses, building foundations and retaining walls), the RPA may be amended to take these features into account.

3. Tree Survey Results

3.1 General Site Description

- 3.1.1 The site was part of a wider area of agricultural fields that appears to have fallen out of use, located in the village of Cottingham, approximately 5.0 km to the northwest of Hull city centre.
- 3.1.2 The trees at the site were predominantly located close to the boundaries, both within the site and in neighbouring properties. The central areas were grassland or scrub.

3.2 Results of Tree Survey

- 3.2.1 The Tree Survey Schedule at Appendix 1 details the results of the tree survey and includes any management recommendations. The schedule should be read in conjunction with the tree plans at Appendix 3 which show the location of each tree and group surveyed and the extent of their canopies and RPA.
- 3.2.2 18 individual trees, 18 tree groups and 3 hedgerows have been recorded during the survey. A summary of the tree survey findings is shown in Table 1.

Table 1: Summary of Tree Survey Findings

Category A	Category B	Category C	Category U
1 Tree	5 Trees	12 Trees	0 Trees
0 Groups	7 Groups	10 Groups	1 Group
0 Hedgerows	0 Hedgerows	3 Hedgerows	0 Hedgerows

- 3.2.3 The most significant tree was the large and particularly impressive beech, T014, growing in a neighbouring property. This tree provided a high level of individual amenity value to the site and surrounding areas.
- 3.2.4 The largest trees growing within the site boundaries were the groups G022, G023 and G029. These trees were visually prominent and in keeping with the surrounding landscape character, however some of the trees may have limited longer term value due to their condition or species characteristics.
- 3.2.5 The majority of the trees and hedgerows were of low value, retention category C, and should not pose a significant constraint on the development potential of the site. However, these trees provide some moderate collective amenity value and comprehensively screen the site from its surroundings. Large scale tree or hedgerow removals should be avoided where trees are not in conflict with design proposals.
- 3.2.6 To the south east of the site was the group of elm trees, G035. The trees within this group were in a particularly poor condition and large limbs failures are likely in the short term. Due to their proximity to a well-used footpath and driveway it is recommended that these trees are removed to ground level as soon as is reasonably practicable.

4. Arboricultural Impact Assessment (AIA)

4.1 Introduction

4.1.1 A BS 5837:2012 Arboricultural Impact Assessment (AIA) has been carried out for trees included in the survey. The AIA methodology evaluates the potential direct and indirect impacts the proposed development could have on the trees at the site. Where necessary mitigation measures are recommended.

4.1.2 BS 5837:2012 paragraph 5.4.2 states:

“The assessment should take account of the effects of any tree loss required to implement the design, and any potentially damaging activities proposed in the vicinity of retained trees. Such activities might include the removal of existing structures and hard surfacing, the installation of new hard surfacing, the installation of services, and the location and dimensions of all proposed excavations or changes in ground level, including any that might arise from the implementation of the recommended mitigation measures. In addition to the impact of the permanent works, account should be taken of the buildability of the scheme in terms of access, adequate working space and provision for the storage of materials, including topsoil.”

4.2 Development Proposals

4.2.1 The client proposes the construction of a solar farm with associated access and facilities.

4.2.2 This AIA is based on the development layout provided by the Client.

4.3 Tree Retention and Removal

4.3.1 The development proposals indicate that 3 trees within the site boundary will need to be removed to facilitate the new development, as they are situated in the footprint of new structures or their retention and protection throughout the development is not suitable.

4.3.2 The trees that need to be removed are detailed in the Tree Data Schedule at Appendix 1 and located on the Arboricultural Impact Assessment Plan at Appendix 3. A summary of the required tree removals is shown in Table 2.

Table 2: Summary of Required Tree Removals

Trees to be Removed			Trees to be Retained		
Category A	Category B	Category C	Category A	Category B	Category C
Trees: 0	Trees: 0	Trees: 0	Trees: 1	Trees: 5	Trees: 12
Groups: 0	Groups: 0	Groups: 0	Groups: 0	Groups: 7	Groups: 10
Hedgerows: 0	Hedgerows: 0	Hedgerows: 0	Hedgerows: 0	Hedgerows: 0	Hedgerows: 3
Total: 0	Total: 0	Total: 0	Total: 1	Total: 12	Total: 25

4.3.3 All trees can be retained and therefore there will be no loss of amenity value.

4.4 Tree Pruning

- 4.4.1 The pruning of trees should only be undertaken where essential, to prevent open wounds that can lead to bacterial or fungal infection. Pruning works should generally be undertaken during the winter months when the tree is dormant or during the summer months when the tree is fully active.
- 4.4.2 Any pruning works that are required to facilitate the development are detailed in the Tree Survey Schedule at Appendix 1.
- 4.4.3 Tree pruning should be carried out by a suitably qualified and insured arboricultural contractor and in accordance with the recommendations of BS 3998:2010 *Tree work – Recommendations*.

4.5 Impacts from Demolition/Construction Operations

- 4.5.1 Where proposed operations encroach beneath the canopy or into the RPA of retained trees there is the potential for damage to occur.
- 4.5.2 Installation of boundary fencing is proposed within the RPA of the retained trees T014 and G023.
- 4.5.3 Potential impacts to tree roots can often be overcome through the use of fencing that requires minimal excavations.
- 4.5.4 Installation of the solar panels will encroach into the rooting area of T020. This is deemed acceptable as will be a minimal encroachment and the panels will be installed in a similar method that of fencing post.
- 4.5.5 All works within the RPA or beneath the canopy of retained trees should be detailed as part of an Arboricultural Method Statement to ensure that these works are carried out in a manner that eliminates the likelihood of any damage occurring.

4.6 Ash Die Back (*Hymenoscyphus fraxineus*)

- 4.6.1 Ash Die Back (ADB) also known as Chalara or Chalara Dieback of Ash, is a disease of ash trees caused by a fungus called *Hymenoscyphus fraxineus*. ADB causes leaf loss, crown dieback and bark lesions in affected trees. Once a tree is infected the disease is usually fatal, either directly or indirectly by weakening the tree to the point where it succumbs more readily to attacks by other pests or pathogens.
- 4.6.2 It is difficult to assign ash trees a retention category using the BS5837:2012 standards because of ADB. The general advice from public bodies is to retain ash trees and see how the disease develops within the local population. However, if clear signs of ADB are found on sites, it is highly likely that all the ash trees on that site will succumb in time. It could therefore be unreasonable to consider an ash tree a significant constraint to development.
- 4.6.3 The Tree Council has produced a document giving guidance to tree owners and managers on how to deal with ADB. *Ash dieback: an Action Plan Toolkit* (Summer 2019)¹. This gives guidance on assessing the danger posed by trees infected with ADB. Ecus have adopted the Suffolk County Council Ash Health Assessment System (Appendix 4). The system categorises ash trees with ADB symptoms into 4 classes:
- Ash Health Class (AHC) 1 – 100 – 75% Live Canopy (Vitality Class 0)
 - Ash Health Class (AHC) 2 – 75% -50% Live Canopy (Vitality Class 1)

¹ <https://treecouncil.org.uk/wp-content/uploads/2019/11/Tree-Council-Ash-Dieback-Toolkit-2.0.pdf>

- Ash Health Class (AHC) 3 – 50% - 25% Live Canopy (Vitality Class 2)
- Ash Health Class (AHC) 4 – 25% - 0% Live Canopy (Vitality Class 3)

4.6.4 Many local authorities have concluded that any trees which fall within AHC 3 and 4 require management and it seems reasonable to follow a similar system. The priority of that management depends on the severity of the tree's condition, with trees declining from AHC 2 into AHC 3 requiring work as part of a program of regular works. As the trees decline towards class 4, action becomes more urgent to abate any hazard, assuming the tree is in a high risk area.

4.7 Mitigation and Protection

- 4.7.1 The retained trees will need protecting from development operations to ensure that they are not negatively impacted by development operations. This should be detailed as part of an Arboricultural Method Statement. The primary method to achieve this is through the use of temporary protective fencing which encloses the RPA of retained trees, creating a sacrosanct Construction Exclusion Zone (CEZ) where no works can take place.
- 4.7.2 In areas where protective fencing is not practicable or would cause an excessive constraint to development operations, further protective methods can be employed such as ground protection measures to avoid soil compaction or stem boxes to protect tree stems from physical damage.
- 4.7.3 Where existing hard surfaces are present within the RPA of retained trees they should be kept in place where possible, even if they are not part of the design proposals. These hard surfaces will provide ground protection for any roots present beneath the hard surface during development works.
- 4.7.4 To compensate for potential root damage and stress caused by construction activities, retained trees onsite should be mulched. The materials that may be used include wood chip, pulverized bark, or leaf mould. The mulched area should extend throughout the open ground within the RPA. The depth of an organic mulch should not be so much as to inhibit aeration of the root system or to cause overheating (Approximately 50 mm to 100 mm).
- 4.7.5 Where the removal of trees is required to facilitate the development, the planting of suitable replacement trees will be required as part of a wider landscaping scheme. It is recommended that tree planting follows a 5 – 10 – 20 - 30 formula (i.e. No more than 5% of any one cultivar, no more than 10% of any one species, no more than 20% of any one genus, and no more than 30% of any one family.) This gives any new tree population maximum resilience against pests and diseases.
- 4.7.6 Tree planting and establishment should be carried out in accordance with BS 8545:2014 *Trees: from nursery to independence in the landscape – Recommendations*.

5. Arboricultural Method Statement (AMS)

5.1 General

- 5.1.1 This Arboricultural Method Statement (AMS) details the specific measures to be adopted to ensure that the retained trees are suitably protected for the duration of the proposed development and should be read in conjunction with the tree plans at Appendix 3.
- 5.1.2 No equipment, machinery or materials shall be brought onto the site in connection with the development until this AMS has been submitted to and approved by the Local Planning Authority.

5.2 Sequence of Events

- 5.2.1 For the purpose of protecting the retained trees, the development works on site should be completed in line with the following sequence of events:
- Pre-commencement site meeting
 - Tree works
 - Installation of tree protection measures
 - Construction operations
 - Temporary access into the CEZ for installation of boundary fencing
 - Removal of tree protection measures

5.3 Pre-Commencement Site Meeting

- 5.3.1 A pre-commencement site meeting should take place prior to any works being started to finalise plans for the layout of the tree protection measures and to ensure that all potential issues are adequately considered.
- 5.3.2 The site developer and the project arboriculturist should be in attendance for the meeting. It may also be a requirement for the LPA tree officer to attend and so prior notification of the meeting should be provided to the LPA.

5.4 Tree Works

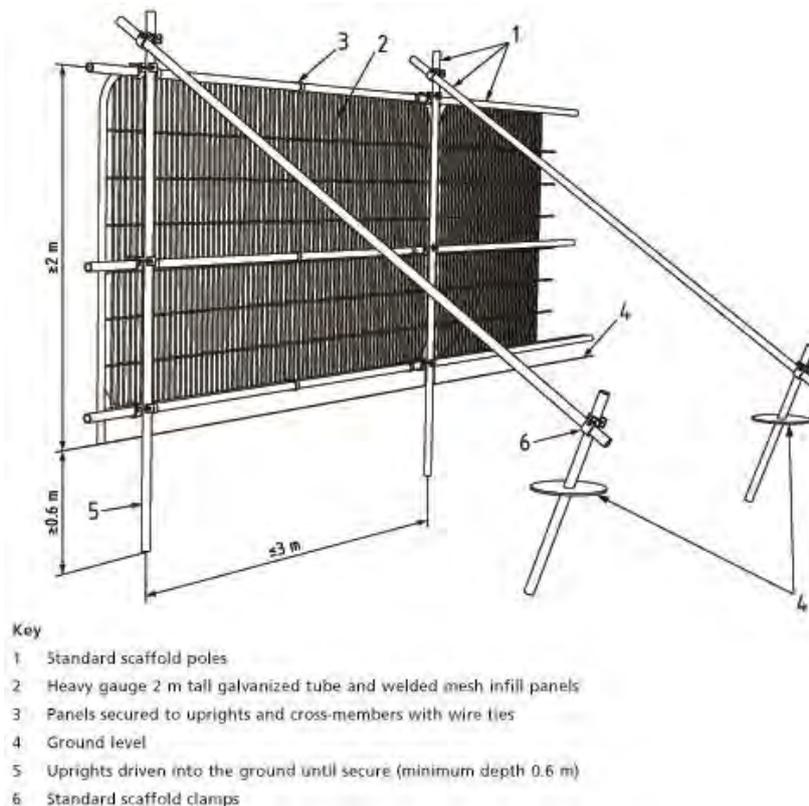
- 5.4.1 Prior to the commencement of any development operations and the storage of plant, machinery and materials on site, any required tree works should be carried out. The trees to be removed and any pruning works that are required to facilitate the development are detailed in the Tree Survey Schedule at Appendix 1.
- 5.4.2 All tree works should be carried out by a suitably qualified and insured arboricultural contractor and in accordance with the recommendations of BS 3998:2010 *Tree work – Recommendations*.
- 5.4.3 It is recommended that trees should be checked in advance of any works by a suitably qualified ecologist to ensure there is no disturbance to nesting birds or roosting bats.

5.5 Tree Protection Fencing

- 5.5.1 Prior to the commencement of any development operations and the storage of plant, machinery and materials on site either the proposed permanent boundary fencing or the tree protective fencing should be located as shown on the Tree Protection Plan at Appendix 3. Where possible this fencing should exclude all site activities from the RPA of retained trees, creating a sacrosanct Construction Exclusion Zone (CEZ).

- 5.5.2 It should be confirmed by the project arboriculturist that the fencing has been correctly set out on site, prior to the commencement of any other operations.
- 5.5.3 The default specification for tree protection fencing is shown in Figure 3. However, where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, an alternative specification should be prepared by the project arboriculturist and, where relevant, agreed with the local planning authority.

Figure 3: BS 5837:2012 Default Protection Fencing Specification



- 5.5.4 An example of an alternative specification is 2 m tall welded mesh panels on rubber or concrete feet. In such cases, the fence panels should be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The distance between the fence couplers should be at least 1 m and should be uniform throughout the fence. The panels should be supported on the inner side by stabilizer struts, which should be attached to a base plate secured with ground pins or mounted on a block tray.
- 5.5.5 All-weather notices should be attached to the fencing to indicate that operations are not permitted within the CEZ, with words such as “CONSTRUCTION EXCLUSION ZONE – NO ACCESS”.
- 5.5.6 Once the tree protection fencing has been installed it should not be altered or removed without prior consultation with the project arboriculturist. If the tree protection fencing needs to be re-positioned to allow for development operations to continue, this must be carried out under the supervision of the project arboriculturist and with prior consent from the LPA.
- 5.5.7 The tree protective fencing must remain in place until the all construction operations on site have been completed and all plant and machinery has been removed.

5.6 Temporary Access into the CEZ for Installation of Boundary Fencing

- 5.6.1 Where fencing is to be installed within the RPA of retained trees this must consist of posts and panels or rails only, trenched footings are not acceptable within the RPA. The holes for posts should be kept to the minimum depth required and excavated using hand tools only.
- 5.6.2 Fence posts should be erected a minimum of 1.0 m from tree stems. The post locations may need adjusting if significant roots are uncovered, so that the roots remain intact. If wet concrete is to be used, post holes should be lined with an impermeable membrane to prevent soil contamination close to tree roots.
- 5.6.3 The fencing alignment should allow for a minimum distance of 0.5 m between any tree stem and the fence, providing sufficient room for future growth and minimising the risk of potential conflicts between the fence structure and tree stems.
- 5.6.4 This will require the tree protection fencing to be temporarily breached and should therefore be carried out in consultation with the project arboriculturist.

5.7 Installation of Utilities and Services

- 5.7.1 Where possible all above and below ground utilities and services are to be directed away from the retained trees. Above ground services should be routed away from tree canopies, allowing sufficient space to allow for likely future crown growth. Below ground services should be grouped together and routed away from the RPA of retained trees.
- 5.7.2 Any below ground utilities or services that must be routed through the RPA should be installed in accordance with BS 5837:2012 clause 7.7.2 and NJUG 10: *Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*.

5.8 Management of Exposed / Damaged Roots

- 5.8.1 Provided that works in close proximity to retained trees are carried out in line with the specifications detailed within this report the potential for damage to significant roots is low. However, on occasion approved works that are close to or within the RPA of retained trees can result in accidental root damage or roots becoming exposed.
- 5.8.2 If any exposed roots are smaller than 25 mm diameter they can be pruned back if required, however roots occurring in clumps or of 25 mm diameter and over should be retained where possible and worked around.
- 5.8.3 Where the severance of larger roots is unavoidable, the advice of the project arboriculturist must be sought, as such roots might be essential to the tree's health and stability. It may be determined that the design layout must be slightly altered to allow for the retention and adequate protection of significant roots.
- 5.8.4 Roots that are heavily damaged or severed during approved works may need to be pruned back using a suitable sharp tool, such as secateurs or a handsaw. The cut must be made cleanly, leaving the smallest surface area possible, and beyond any obvious damage, towards the tree that the root is likely to have come from. If it is not clear which direction the root has grown from, the root should be pruned back to both sides of the damage/severance.
- 5.8.5 A health and safety assessment should be carried out or a regular monitoring regime put in place for trees that have incurred damage to roots in close proximity to their stems or where the damaged roots are 100 mm in diameter or larger. Such damage could lead to instability or a decline in health and condition.

- 5.8.6 Exposed roots or roots that have been pruned should be immediately recovered with earth to prevent desiccation. If this is not possible they should be wrapped in hessian sheets which are dry in winter, wet in summer. These should be removed prior to backfilling.

5.9 Landscaping Works

- 5.9.1 Where soft landscaping is proposed within the RPA of retained trees, excavations should be kept to the minimum required to provide adequate conditions for the establishment of new shrubs and trees. Excavations should be carried out carefully and by hand, avoiding the severance of any roots larger than 25mm diameter.
- 5.9.2 Ground levels within the RPA should generally not be altered to avoid the potential for damage to tree roots. Roots are considered to be primarily within the top 0.6 m of the soil. Any excavations have the potential to damage or remove part of the root system and could affect the vigour or stability of the tree. Conversely, increasing the ground level can compact the soil, potentially suffocating the roots and causing them to die off. If minor level changes are unavoidable as part of an approved landscaping scheme, the advice of the project arboriculturist should be sought.
- 5.9.3 Any landscaping works that are within the RPA of retained trees or will require the tree protection fencing to be temporarily breached should be carried out in consultation with the project arboriculturist.

5.10 Additional Precautions

- 5.10.1 Consideration should be given to site operations outside of the CEZ that could indirectly impact the retained trees, including the provision of adequate space for site cabins, welfare facilities and other temporary structures.
- 5.10.2 Site operations should take sufficient account of wide or tall loads in order that they can operate without coming into contact with retained trees. The movement of plant in proximity to trees should be supervised by a banksman, to ensure adequate clearance from trees is maintained at all times.
- 5.10.3 Fires on sites should generally be avoided. Where fires are unavoidable, they should not be lit in a position where heat could affect the foliage or branches of retained trees. 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.
- 5.10.4 Any materials that could contaminate the ground around tree roots, such as fuels, oils or cement, should be stored and handled well away from the outer edge of the RPA.

6. Arboricultural Site Supervision

- 6.1.1 Site monitoring and supervision by the project arboriculturist is likely to be required on a regular basis throughout the development. The specific site operations in close proximity of retained trees that will require supervision include:
- Tree removal and tree pruning works
 - Installation of tree protection measures
 - Installation of any service runs in proximity to retained trees
- 6.1.2 A minimum of one week's notice should be given to the supervising arboriculturist where possible before the start of any works within the RPA of retained trees, to allow the site visit to be scheduled.
- 6.1.3 All site visits will be recorded with the date and time along with any findings or comments relating to the tree protection measures and the specific operations supervised. These can be made available to the LPA tree officer on request.

7. References

BS 3998:2010 *Tree work – Recommendations*. ISBN 978 0 580 53777 6

BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations*. ISBN 978 0 580 69917 7

BS 8545:2014 *Trees: from nursery to independence in the landscape – Recommendations*. ISBN 978 0 580 71317 0

Littlefair P. (2011). *Site layout planning for daylight and sunlight: a guide to good practice (BR 209)*. ISBN 978 1 84806 178 1.

Volume 4 National Joint Utilities Group (NJUG) *Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*, Volume 4: Issue 2: 16/11/2007, www.njug.org.uk

Appendix 1: Tree Survey Schedule

Table 3: Tree Survey Schedule

Key:	Symbols used	Age Class	Est Yrs	Comments	Tree Management	BS 5837:2012 Retention Categories
	< = less than ~ = approximately > = greater than # = estimated	Young, Semi mature, Early mature, Mature or Over mature	Estimate of safe life expectancy (<10, 10+, 20+ or 40+ years)	MS – Multi-stemmed TD - Trunk division (height in metres) DED – Dutch Elm Disease ADB – Ash Die Back AHC (1, 2, 3 or 4) – Ash Health Class	<i>Tree works that are recommended regardless of future development are in italics</i> Tree works that are required to facilitate the proposed development are in bold	U – Unsuitable for retention A – High B – Moderate C – Low Sub-categories: 1 = mainly arboricultural qualities 2 = mainly landscape qualities 3 = mainly cultural values

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
G001	Elder 10+ (<i>Sambucus nigra</i>) Lawson Cypress x5 (<i>Chamaecyparis lawsoniana</i>) Cherry Laurel 10+ (<i>Prunus laurocerasus</i>)	8	100 avg	See Plan				0.5	Semi Mature	40+ Years	Good	Dense mass of multi-stemmed trees & shrubs forming a single canopy, no obvious defects	-	C2	-	-
T002	Ash (<i>Fraxinus excelsior</i>)	10	570	6	4.5	7	7	1	Mature	10+ Years	Poor	Large exposed roots at base, significant lean to south, various bark wounds with signs of decay, minor deadwood in crown	-	C1	6.84	145

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
G003	Lawson Cypress (<i>Chamaecyparis lawsoniana</i>) Hawthorn (<i>Crataegus monogyna</i>) Lombardy Poplar x9 (<i>Populus nigra italica</i>)	26	550 avg #	See Plan				2.5	Mature	10+ Years	Poor	Linear group of poplars with smaller hawthorn & cypress at northern end, several large decaying stubs from previous stem failures, minor deadwood throughout crowns	-	C2	-	-
T004	Sycamore (<i>Acer pseudoplatanus</i>)	12	290	3	3	3	3	3	Semi Mature	20+ Years	Fair	Growing at edge of drainage channel, various stubs & minor deadwood throughout crown	-	C1	3.48	38
T005	Sycamore (<i>Acer pseudoplatanus</i>)	4	220	0.5	1	2	1	1	Semi Mature	<10 years	Poor	Regrowth from a heavily pruned stem, significant lean to west	-	C2	2.64	21

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
G006	Goat Willow x5 (<i>Salix caprea</i>) Common Hawthorn x2 (<i>Crataegus monogyna</i>) Privet 10+ (<i>Ligustrum vulgare</i>) Lawson Cypress x5 (<i>Chamaecyparis lawsoniana</i>)	7	120 avg	See Plan				0.5	Semi Mature	20+ Years	Fair	Linear group growing on opposite side of drainage channel & in neighbouring properties, several ivy covered stems	-	C2	-	-
G007	Apple x2 (<i>Malus domestica</i>)	6	270 avg #	See Plan				2	Semi Mature	20+ Years	Fair	2 trees forming a single canopy, old pruning wounds, epicormic growth	-	C1	-	-
T008	Cherry Plum (<i>Prunus cerasifera</i>)	6.5	80, 80, 60	2	2	2	2	2	Semi Mature	40+ Years	Fair	No obvious defects	-	C1	1.536	7
G009	Cherry 10+ (<i>Prunus sp.</i>)	6	80 avg	See Plan				1	Semi Mature	40+ Years	Good	Dense young to semi mature group, surrounded by dense undergrowth	-	C2	-	-
T010	Lawson Cypress (<i>Chamaecyparis lawsoniana</i>)	15	600 #	4	4	4	4	2	Early Mature	40+ Years	Good	Growing in neighbouring property, largely shielded from view by surrounding undergrowth, no obvious defects	-	B1	7.2	163

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
G011	Blue Spruce (<i>Picea pungens</i> 'Glauca') Silver Birch x2 (<i>Betula pendula</i>) Cherry (<i>Prunus</i> sp.)	15	420 avg	See Plan				1.5	Early Mature	40+ Years	Good	Larger birch & cherry trees with smaller spruce at southern end, understory of various shrubs, old pruning wounds, minor deadwood throughout crown	-	B1	-	-
H012	Beech 10+ (<i>Fagus sylvatica</i>)	2	50 avg	See Plan				0	Semi Mature	40+ Years	Good	Well managed hedgerow	-	C2	-	-
T013	Sycamore (<i>Acer pseudoplatanus</i>)	12	440 #	4	4	4	4	4	Early Mature	40+ Years	Good	Largely shielded from view by boundary hedgerow, old pruning wounds, epicormic growth	-	B1	5.28	88
T014	Beech (<i>Fagus sylvatica</i>)	15	720 #	6.5	6.5	6.5	6.5	1	Mature	40+ Years	Good	Large & impressive tree, no obvious defects	Prune western crown back by up to 1.0m to facilitate new boundary fencing	A1	8.64	232
G015	Hawthorn 10+ (<i>Crataegus monogyna</i>)	6	140 avg	See Plan				0.5	Semi Mature	40+ Years	Fair	Dense ivy covered linear group, occasional elder & sycamore sapling, surrounded by dense brambles & undergrowth	-	C2	-	-

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
G016	Ash x2 (<i>Fraxinus excelsior</i>) Silver Birch x5 (<i>Betula pendula</i>) Sycamore 10+ (<i>Acer pseudoplatanus</i>)	16	400 avg	See Plan				4	Early Mature	40+ Years	Good	Woodland type group of predominantly sycamore, approx 5m spacings, some ivy covered stems, minor deadwood in crowns	-	B1,2	-	-
G017	Sycamore 10+ (<i>Acer pseudoplatanus</i>)	6.5	80 avg	See Plan				1	Young	40+ Years	Good	Saplings & young trees, understory of privet, no obvious defects	-	C2	-	-
T018	Sycamore (<i>Acer pseudoplatanus</i>)	15	510	6	6	6	6	3	Early Mature	40+ Years	Fair	Dense ivy on stem & in crown, largely shielded from view by ivy & boundary fence, no obvious defects	-	B1	6.12	117
G019	Oak x8 (<i>Quercus robur</i>) Cherry (<i>Prunus sp.</i>) Goat Willow x4 (<i>Salix caprea</i>) Silver Birch (<i>Betula pendula</i>)	11	230 avg	See Plan				1.5	Semi Mature	40+ Years	Fair	Majority of stems covered in ivy, various branch stubs, old pruning wounds & minor deadwood, trees individually of lower value	-	B2	-	-
T020	Lombardy Poplar (<i>Populus nigra italica</i>)	28	1010	2.5	2.5	2.5	2.5	2	Mature	20+ Years	Good	Dense ivy on stem, no obvious defects	-	B1	12.12	460

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
T021	Hawthorn (<i>Crataegus monogyna</i>)	7	400 #	4.5	3	3	4.5	1	Early Mature	10+ Years	Poor	Dense ivy on stem & into crown, elder shrubs growing against stem, sparse crown, high proportion of minor deadwood	-	C2	4.8	72
G022	Black Hybrid Poplar x8 (<i>Populus x canadensis</i>)	28	1100 avg	See Plan				1.5	Mature	20+ Years	Good	Linear group of particularly large trees, dense ivy on all stems, occasional minor deadwood throughout, limited prospects but only due to general species characteristics	-	B1	-	-
G023	Beech (<i>Fagus sylvatica</i>) Oak x3 (<i>Quercus robur</i>) Elm (<i>Ulmus sp.</i>)	16	650 avg	See Plan				2	Mature	40+ Years	Good	Larger oak & beech, smaller elm to south, understory of various smaller trees & shrubs, dense ivy on stems & into crowns, occasional minor deadwood	Minor pruning required to facilitate installation of boundary fence within the group	B1	-	-
T024	Ash (<i>Fraxinus excelsior</i>)	7.5	270 avg #	5.5	4	4	4	1	Semi Mature	10+ Years	Fair	Dense ivy on stem & in crown, minor deadwood throughout crown	-	C1	4.584	66

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
G025	Hawthorn 10+ (<i>Crataegus monogyna</i>) Elder 10+ (<i>Sambucus nigra</i>) Ash x4 (<i>Fraxinus excelsior</i>)	5.5	80 avg	See Plan				0.5	Semi Mature	20+ Years	Fair	Linear group of predominantly hawthorn with several elder & the occasional ash, dense ivy on stems & some crowns, occasional dead stem, minor deadwood throughout	-	C2	-	-
G026	Ash 10+ (<i>Fraxinus excelsior</i>) Deodar Cedar x3 (<i>Cedrus deodara</i>) Oak 10+ (<i>Quercus robur</i>)	17	560 avg	See Plan				3.5	Early Mature	40+ Years	Good	Woodland type group, some stems covered in ivy, various old pruning wounds some with potential for decay, minor deadwood throughout	-	B1,2	-	-
T027	Ash (<i>Fraxinus excelsior</i>)	9.5	100 avg	4.5	4.5	4.5	4.5	1.5	Young	10+ Years	Fair	Multi-stemmed at base with several included bark unions	-	C1	3.792	45

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
H028	Ash 10+ (<i>Fraxinus excelsior</i>) Goat Willow 10+ (<i>Salix caprea</i>) Elder 10+ (<i>Sambucus nigra</i>) Hawthorn 10+ (<i>Crataegus monogyna</i>)	6	50 avg	See Plan				0.5	Semi Mature	40+ Years	Fair	Dense hedgerow with the occasional larger individual tree	-	C2	-	-
G029	Elm (<i>Ulmus sp.</i>) Beech x3 (<i>Fagus sylvatica</i>)	18	580 avg	See Plan				1.5	Mature	40+ Years	Fair	Linear group forming a single canopy, dense ivy on stems & into some crowns, various minor cavities & branch stubs, minor deadwood throughout	-	B1	-	-
T030	Hawthorn (<i>Crataegus monogyna</i>)	6.5	200 #	2.5	2.5	2.5	2.5	1	Semi Mature		Poor	Surrounded by smaller ivy covered trees & shrubs, dense ivy on stem & into crown	-	C2	2.4	18

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
H031	Ash 10+ (<i>Fraxinus excelsior</i>) Goat Willow 10+ (<i>Salix caprea</i>) Elder 10+ (<i>Sambucus nigra</i>) Hawthorn 10+ (<i>Crataegus monogyna</i>)	6	50 avg	See Plan				0.5	Semi Mature	40+ Years	Fair	Dense hedgerow with the occasional larger individual tree	-	C2	-	-
T032	Beech (<i>Fagus sylvatica</i>)	16	730	9.5	9.5	6.5	8.5	2	Mature	40+ Years	Good	Dense ivy on stem & into crown, surrounded by dense undergrowth, exposed roots at base	-	B1	8.76	243
T033	Hawthorn (<i>Crataegus monogyna</i>)	6.5	240 #	3	3	3	3	0.5	Semi Mature	20+ Years	Poor	Surrounded by smaller ivy covered trees & shrubs, dense ivy on stem & into crown	-	C2	2.88	26
T034	Ash (<i>Fraxinus excelsior</i>)	13	590	5	5	5	5	3	Early Mature	10+ Years	Fair	1m long thin wound at base no obvious sign of associated decay, occasional snapped & hanging branch in crown, minor deadwood throughout	-	C1	7.08	158

Tree No.	Species	Height (m)	Stem Diam. @ 1.5 m (mm)	Canopy Spreads (m)				Height of Crown Clearance (m)	Age Class	Est Yrs	Overall Condition	Comments	Tree Management	BS 5837:2012 Retention Category	RPA Radius (m)	RPA (m ²)
				N	E	S	W									
G035	Elm x8 (<i>Ulmus sp.</i>)	16	1060 avg	See Plan				3	Over Mature	<10 years	Poor	Sparse linear group with a dense understory of various smaller trees & shrubs, approx 10m spacings, all trees have major central cavities with extensive decay and signs of recent large branch failures, high proportion of major deadwood & crown dieback, complete collapse is likely in the short term & all trees should be removed as soon as is reasonably practicable	<i>Removal of all elm trees advised regardless of future development</i>	U	-	-
G036	Elder 10+ (<i>Sambucus nigra</i>)	6	90 avg	See Plan				1	Semi Mature	10+ Years	Fair	Dense ivy on stems & into crowns, various branch stubs & deadwood throughout	-	C2	-	-
T037	Elder (<i>Sambucus nigra</i>)	5	60, 60	3	3	3	3	1	Semi Mature	20+ Years	Fair	Dense brambles growing through crown, no obvious defects	-	C2	1.02	3
G038	Elder 10+ (<i>Sambucus nigra</i>)	6	90 avg	See Plan				1	Semi Mature	10+ Years	Fair	Dense ivy on stems & into crowns, various branch stubs & deadwood throughout	-	C2	-	-
T039	Ash (<i>Fraxinus excelsior</i>)	14	470	5.5	5.5	5.5	5.5	3	Early Mature	10+ Years	Good	Various branch stubs & minor deadwood throughout crown	-	C1	5.64	99

Appendix 2: Site Photographs



Plate 1: Overview of site from south east



Plate 2: T014 from the west



Plate 3: G025 and G026 from the south west



Plate 4: T020, T021, G022 and G023 from the west

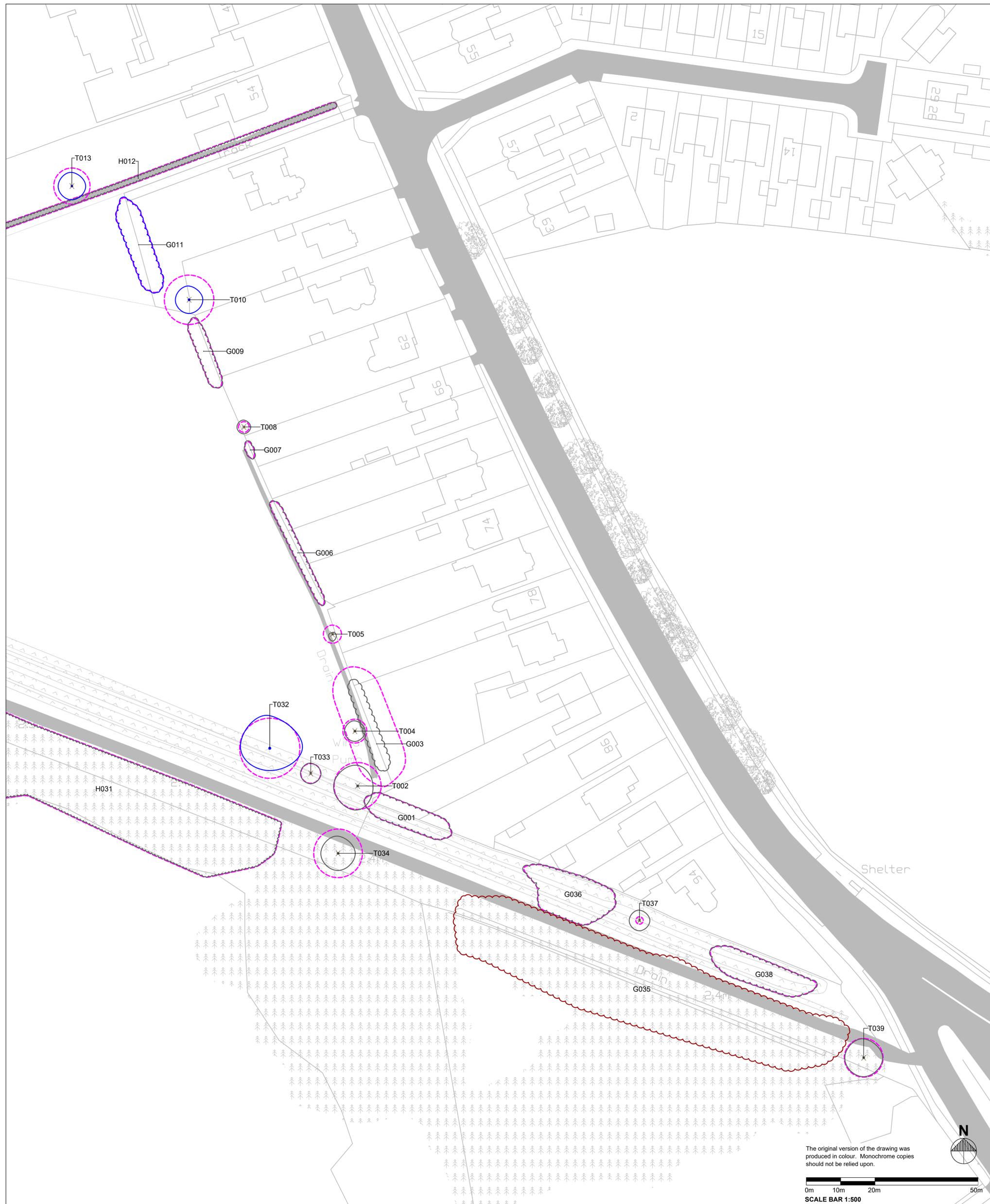


Plate 5: H028 and G029 from the east



Plate 6: G035 from the north west

Appendix 3: Figures



The original version of the drawing was produced in colour. Monochrome copies should not be relied upon.



GENERAL NOTES

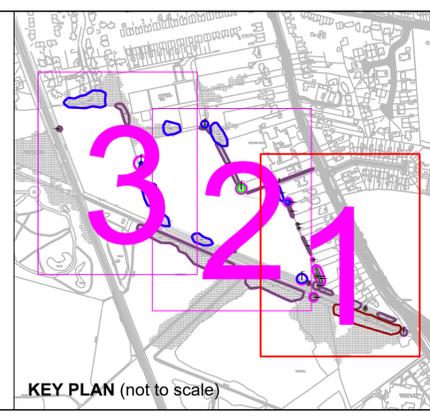
- Drawing for Planning purposes only
- Refer to arboricultural report produced by Ecus Ltd titled 'University of Hull Photovoltaic Project, Snuff Mill Lane - BS 5837:2012 Arboricultural Report, Impact Assessment and Method Statement'.
- Based on topographic survey provided by the client.
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KEY

Tree Categories (BS 5837:2012)			
Category A Trees	Category B Trees	Category C Trees	Category U Trees
Root Protection Area (RPA)			



REV	DATE	DRAWN BY	CHECKED BY	REVISION COMMENT
Job 18618D - University of Hull Photovoltaic Project, Snuff Mill Lane				
Title Figure 4 - Tree Constraints Plan (Sheet 1 of 3)				
By	Date	Scale @ A1	Drg. no.	
DF	Apr 2022	1:500	18618D-ARB-01	



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GENERAL NOTES

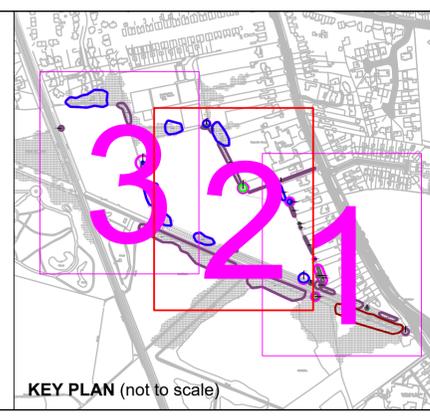
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KEY

Stem Location from Topographic Survey	Stem Location Estimated		
Tree Categories (BS 5837:2012)			
Category A Trees	Category B Trees	Category C Trees	Category U Trees
Root Protection Area (RPA)			



REV	DATE	DRAWN BY	CHECKED BY	REVISION COMMENT

	Brook Holt Blackburn Road Sheffield S61 2DW Tel. (0114) 2669292 www.ecusltd.co.uk		
	Job 18618D - University of Hull Photovoltaic Project, Snuff Mill Lane		
Title Figure 5 - Tree Constraints Plan (Sheet 2 of 3)			
By DF	Date Apr 2022	Scale @ A1 1:500	Drg. no. 18618D-ARB-02



GENERAL NOTES

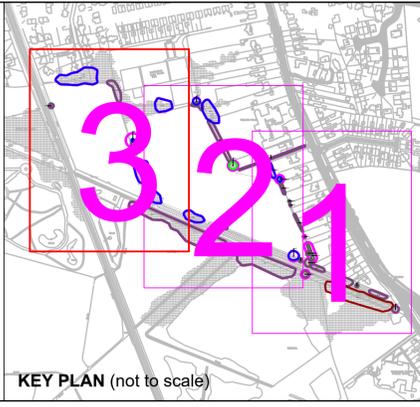
- Drawing for Planning purposes only
- Refer to arboricultural report produced by Ecus Ltd titled 'University of Hull Photovoltaic Project, Snuff Mill Lane – BS 5837:2012 Arboricultural Report, Impact Assessment and Method Statement'.
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KEY

Stem Location from Topographic Survey
 Stem Location Estimated
Tree Categories (BS 5837:2012)
 Category A
 Category B
 Category C Trees
 Category U Trees
 Trees
 Root Protection Area (RPA)

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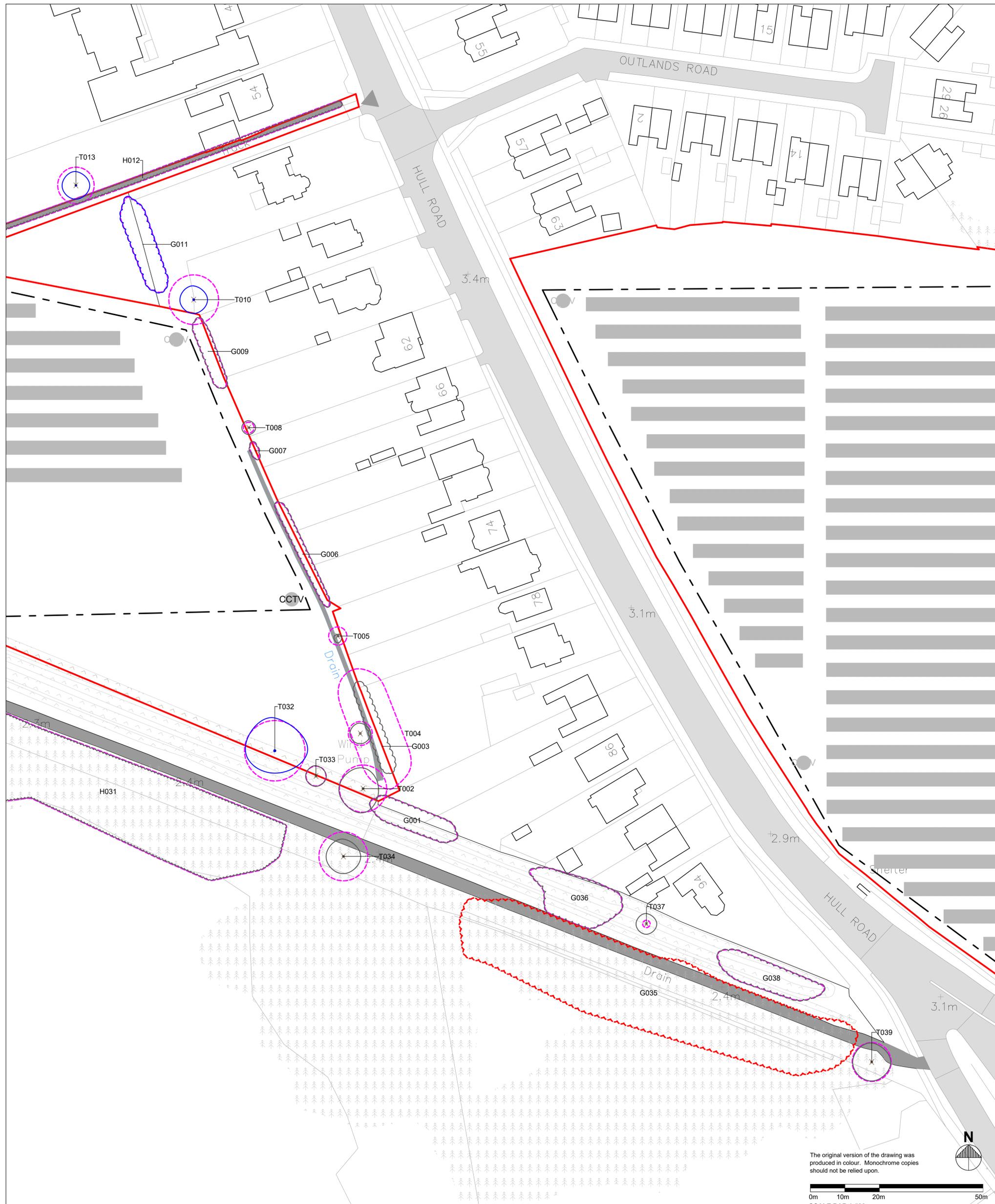
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Job
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Title
 Figure 6 - Tree Constraints Plan (Sheet 3 of 3)

By DF	Date Apr 2022	Scale @ A1 1:500	Drg. no. 18618D-ARB-03
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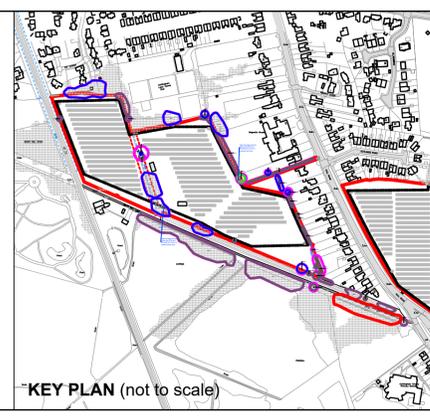
GENERAL NOTES

- Refer to arboricultural report produced by Ecus Ltd titled 'University of Hull Photovoltaic Project, Snuff Mill Lane – BS 5837:2012 Arboricultural Report, Impact Assessment and Method Statement'.
- Based on topographic survey provided by the client.
- Building layout and masterplan provided by the client.
- Refer to Engineer's details for level and drainage information.
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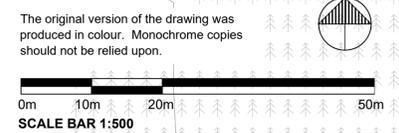
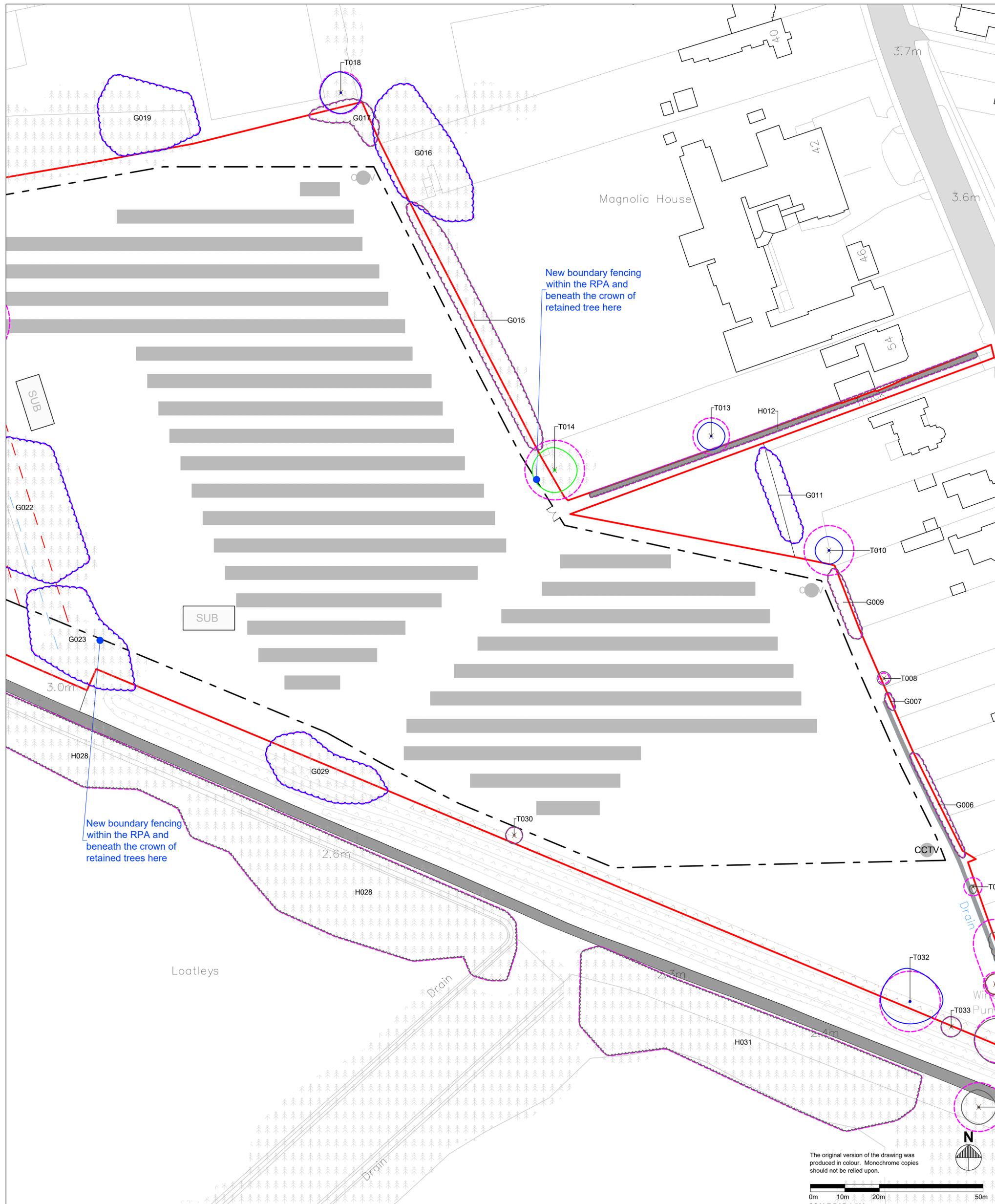
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Tree Categories (BS 5837:2012)			
	Category A Trees		Category B Trees
	Category C Trees		Existing Tree to be Removed
	Root Protection Area (RPA)		
	RPA of Tree to be Removed		



A	16.09.22	KO	DF	UPDATED LAYOUT
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Job		18618D - University of Hull Photovoltaic Project, Snuff Mill Lane		
Title		Figure 7 - Tree Impacts Plan (Sheet 1 of 3)		
By	Date	Scale @ A1	Drg. no.	
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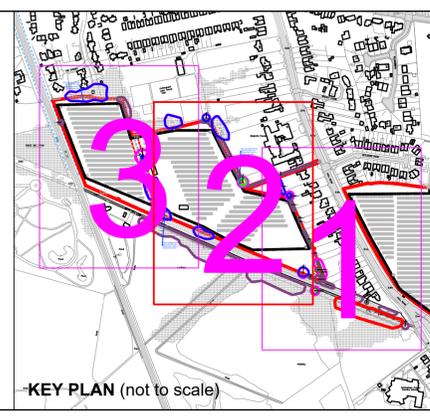
GENERAL NOTES

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KEY

	Stem Location from Topographic Survey		Stem Location Estimated
Tree Categories (BS 5837:2012)			
	Category A Trees		Category B Trees
	Category C Trees		Existing Tree to be Removed
	Root Protection Area (RPA)		
	RPA of Tree to be Removed		



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A	16.09.22	KO	DF	UPDATED LAYOUT

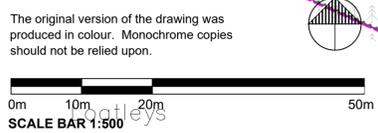
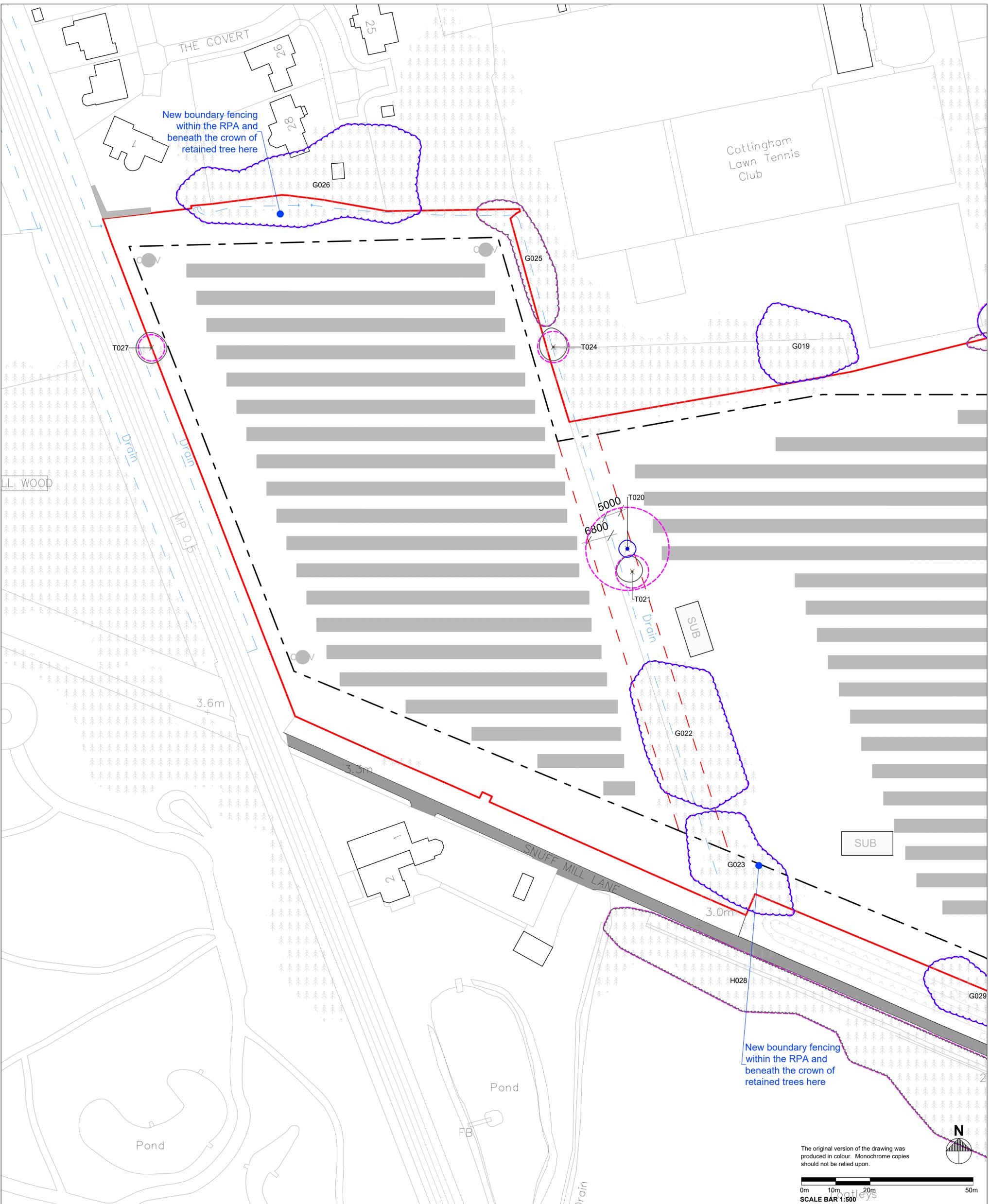
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18618D - University of Hull Photovoltaic Project, Snuff Mill Lane

Title
Figure 8 - Tree Impacts Plan (Sheet 2 of 3)

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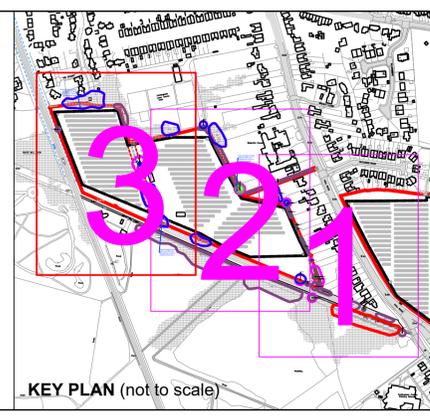
GENERAL NOTES

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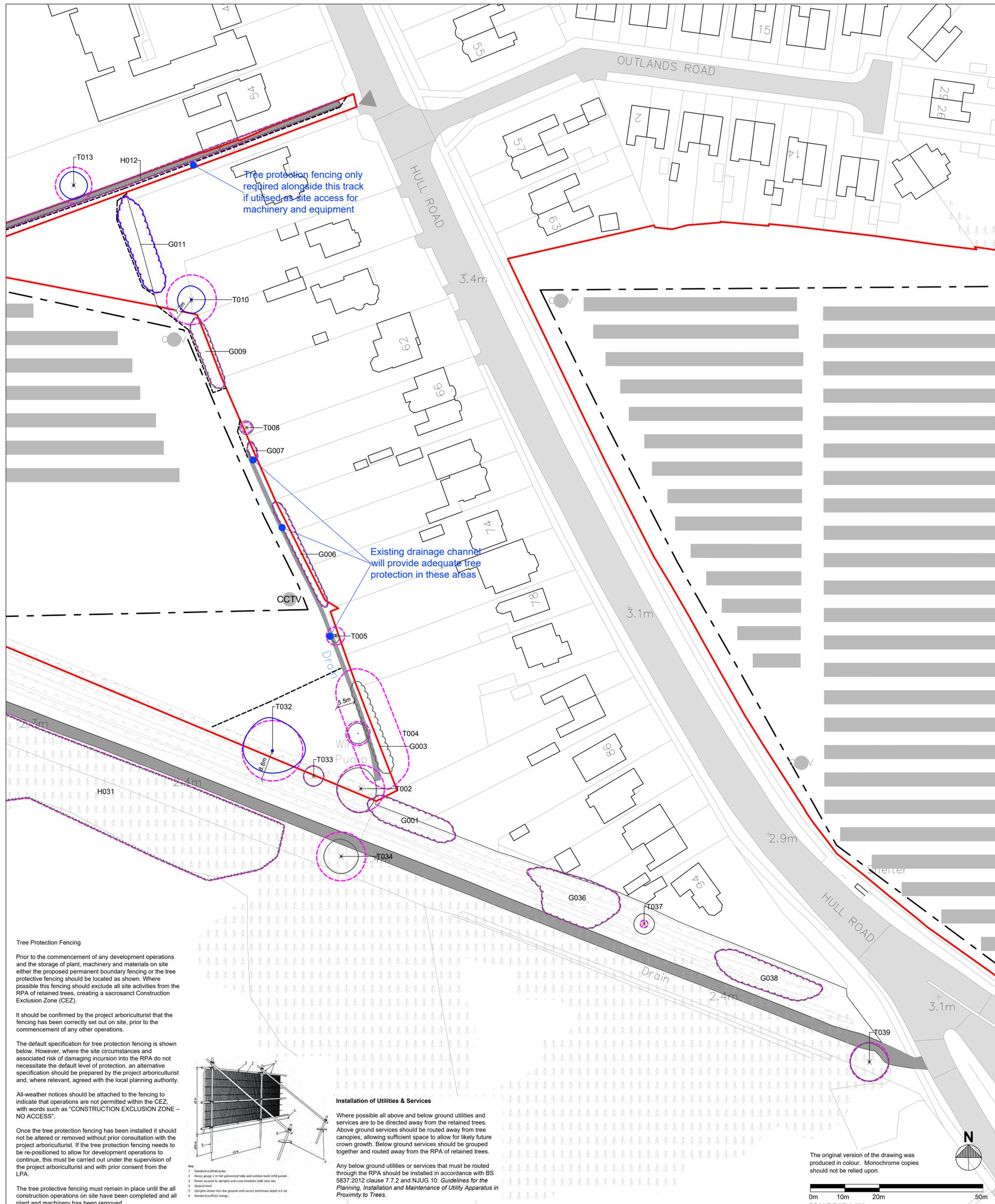
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KEY

	Stem Location from Topographic Survey		Stem Location Estimated
Tree Categories (BS 5837:2012)			
	Category A Trees		Category B Trees
	Category C Trees		Existing Tree to be Removed
	Root Protection Area (RPA)		
	RPA of Tree to be Removed		



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Job 18618D - University of Hull Photovoltaic Project, Snuff Mill Lane				
Title Figure 9 - Tree Impacts Plan (Sheet 3 of 3)				
By	Date	Scale @ A1	Drg. no.	
DF	Apr 2022	1:500	18618D-ARB-06	



Tree Protection Fencing

Prior to the commencement of any development operations and the storage of plant, machinery and materials on site either the proposed permanent boundary fencing or the tree protective fencing should be located as shown. Where possible this fencing should exclude all site activities from the RPA of retained trees, creating a sacrosanct Construction Exclusion Zone (CEZ).

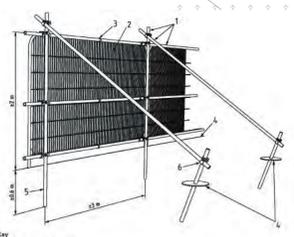
It should be confirmed by the project arboriculturist that the fencing has been correctly set out on site, prior to the commencement of any other operations.

The default specification for tree protection fencing is shown below. However, where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, an alternative specification should be prepared by the project arboriculturist and, where relevant, agreed with the local planning authority.

All-weather notices should be attached to the fencing to indicate that operations are not permitted within the CEZ, with words such as "CONSTRUCTION EXCLUSION ZONE - NO ACCESS".

Once the tree protection fencing has been installed it should not be altered or removed without prior consultation with the project arboriculturist. If the tree protection fencing needs to be re-positioned to allow for development operations to continue, this must be carried out under the supervision of the project arboriculturist and with prior consent from the LPA.

The tree protective fencing must remain in place until the all construction operations on site have been completed and all plant and machinery has been removed.

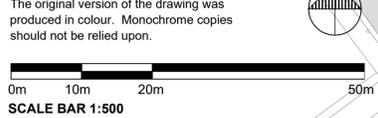


- 1. Standard scaffold pipe
- 2. Heavy gauge 2 m fall galvanized tube and welded mesh infill panels
- 3. Panels secured to uprights and cross-members with wire ties
- 4. General level
- 5. Uprights driven into the ground until secure (minimum depth 6.6 m)
- 6. Standard scaffold clamps

Installation of Utilities & Services

Where possible all above and below ground utilities and services are to be directed away from the retained trees. Above ground services should be routed away from tree canopies, allowing sufficient space to allow for likely future crown growth. Below ground services should be grouped together and routed away from the RPA of retained trees.

Any below ground utilities or services that must be routed through the RPA should be installed in accordance with BS 5837:2012 clause 7.7.2 and NJUG 10: *Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*.



GENERAL NOTES

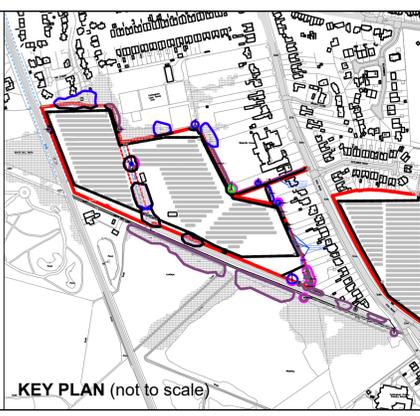
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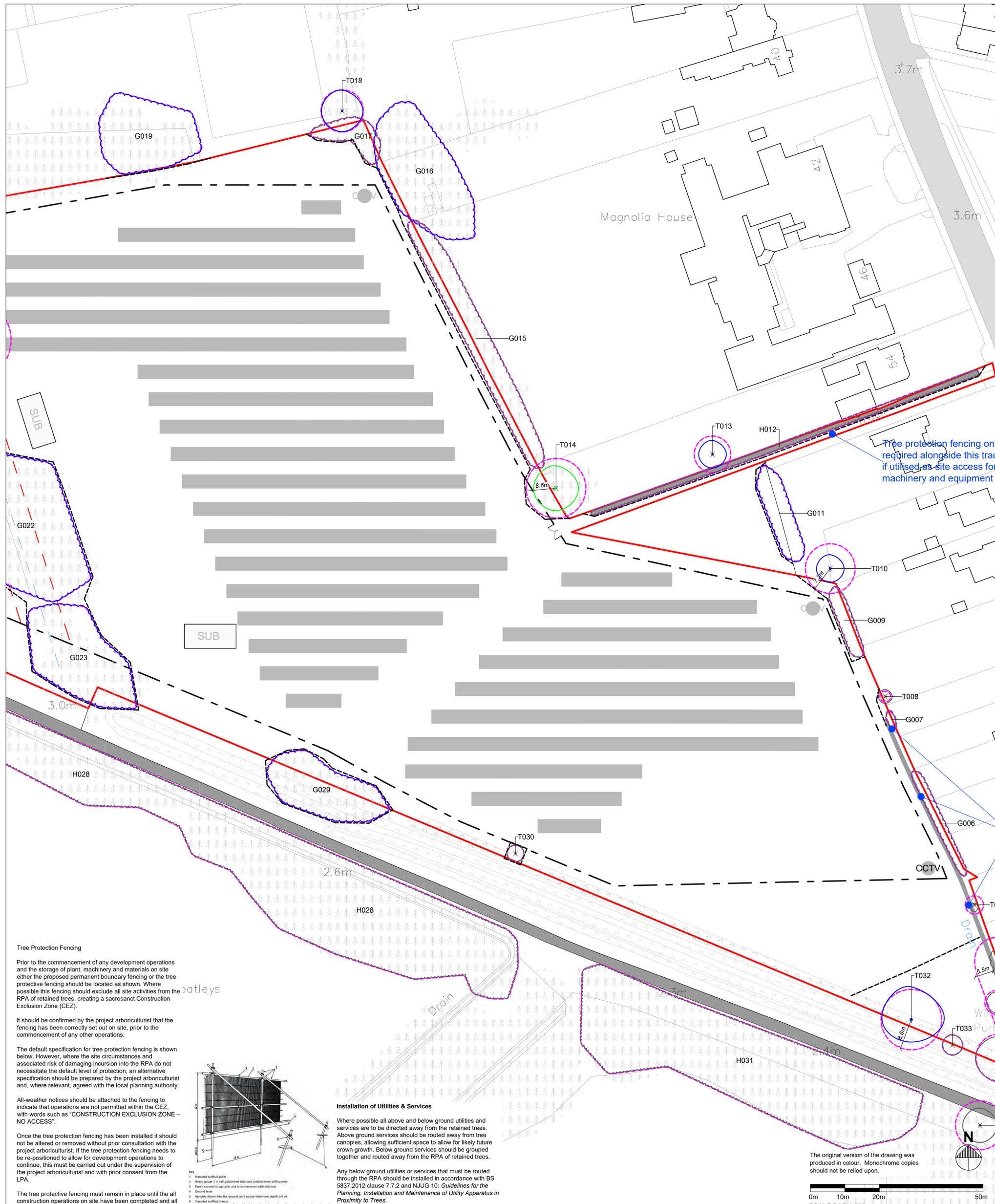
KEY

- Stem Location from Topographic Survey
- Stem Location Estimated
- Tree Categories (BS 5837:2012)
- Category A Trees
- Category B Trees
- Category C Trees
- Existing Tree to be Removed
- Root Protection Area (RPA)
- Tree Protection Fencing*

*See note on drawing



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Title Figure 10 - Tree Protection Plan (Sheet 1 of 3)				
By	Date	Scale @ A1	Drg. no.	
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Tree Protection Fencing

Prior to the commencement of any development operations and the storage of plant, machinery and materials on site either the proposed permanent boundary fencing or the tree protective fencing should be located as shown. Where possible this fencing should exclude all site activities from the RPA of retained trees, creating a sacrosanct Construction Exclusion Zone (CEZ).

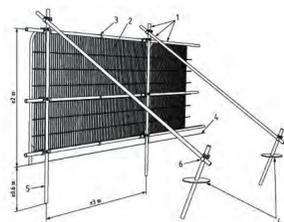
It should be confirmed by the project arboriculturist that the fencing has been correctly set out on site, prior to the commencement of any other operations.

The default specification for tree protection fencing is shown below. However, where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, an alternative specification should be prepared by the project arboriculturist and, where relevant, agreed with the local planning authority.

All-weather notices should be attached to the fencing to indicate that operations are not permitted within the CEZ, with words such as "CONSTRUCTION EXCLUSION ZONE - NO ACCESS".

Once the tree protection fencing has been installed it should not be altered or removed without prior consultation with the project arboriculturist. If the tree protection fencing needs to be re-positioned to allow for development operations to continue, this must be carried out under the supervision of the project arboriculturist and with prior consent from the LPA.

The tree protective fencing must remain in place until the all construction operations on site have been completed and all plant and machinery has been removed.

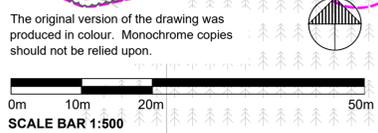


- 1 Standard scaffold poles
- 2 Heavy gauge 2 m tall galvanized tube and welded mesh (800 panels)
- 3 Panels secured to uprights and cross-members with wire ties
- 4 Ground level
- 5 Uprights driven into the ground until secure (minimum depth 0.5 m)
- 6 Standard scaffold bracing

Installation of Utilities & Services

Where possible all above and below ground utilities and services are to be directed away from the retained trees. Above ground services should be routed away from tree canopies, allowing sufficient space to allow for likely future crown growth. Below ground services should be grouped together and routed away from the RPA of retained trees.

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GENERAL NOTES

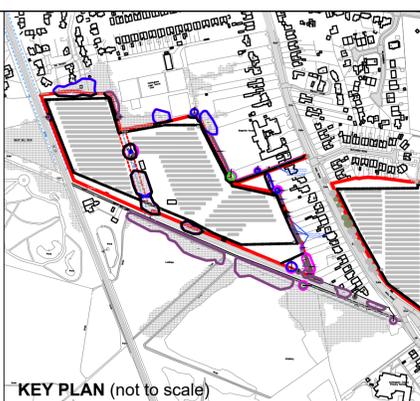
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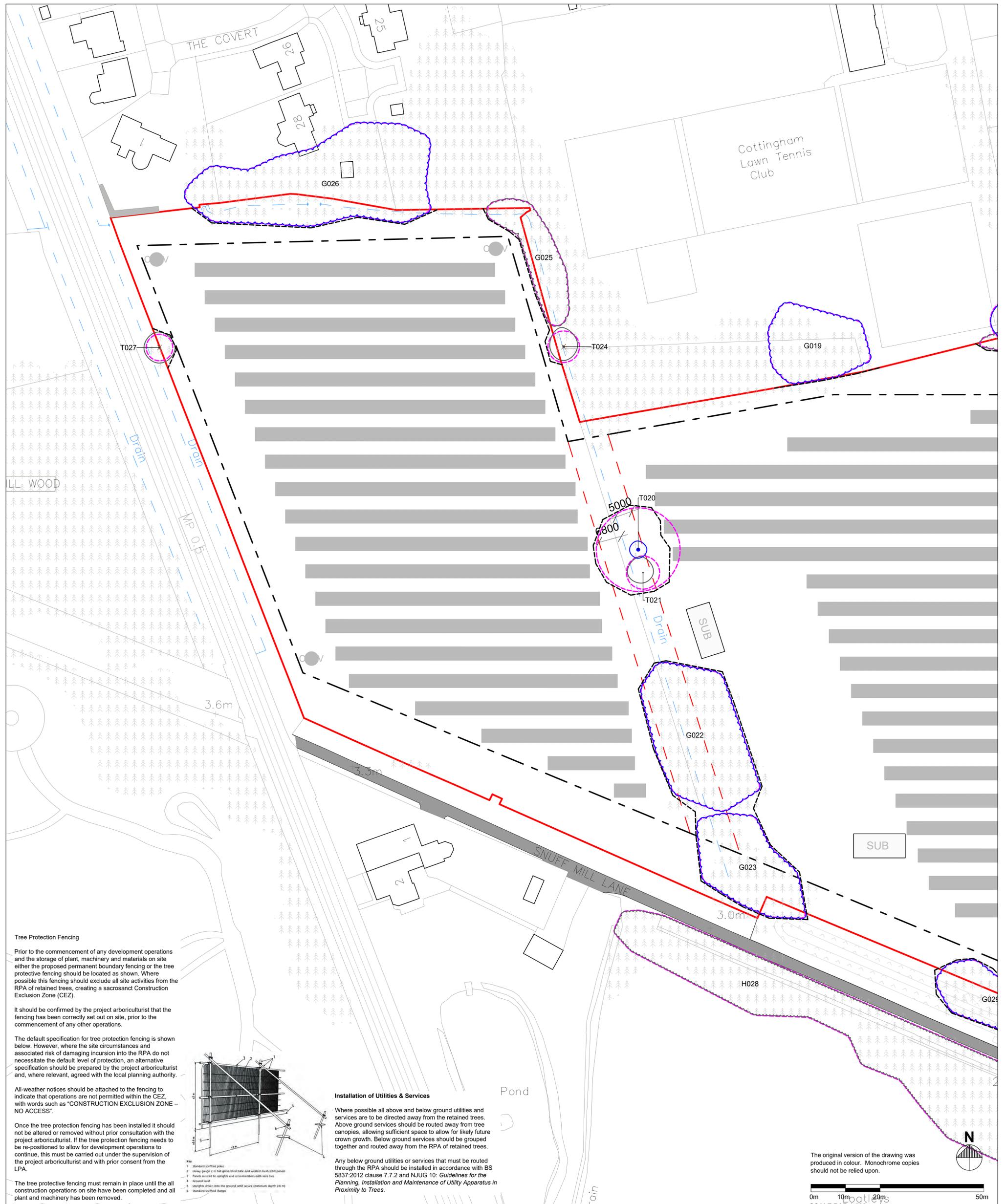
KEY

- Stem Location from Topographic Survey
- Stem Location Estimated
- Tree Categories (BS 5837:2012)
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- Category B Trees
- Category C Trees
- Existing Tree to be Removed
- Root Protection Area (RPA)
- Tree Protection Fencing*

*See note on drawing



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Title		18618D - University of Hull Photovoltaic Project, Snuff Mill Lane		
Figure		Figure 11 - Tree Protection Plan (Sheet 2 of 3)		
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Tree Protection Fencing
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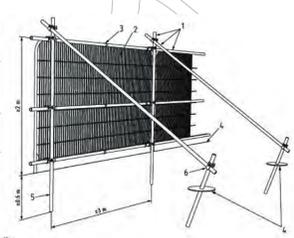
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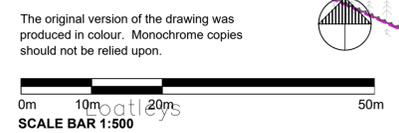
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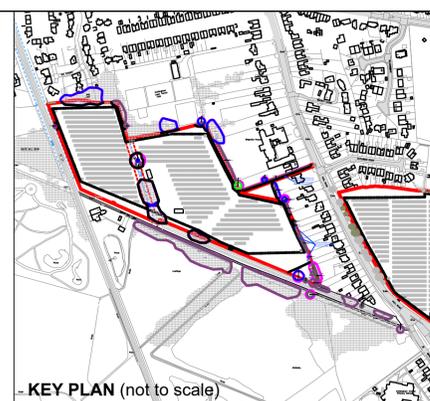
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KEY

	Stem Location from Topographic Survey		Stem Location Estimated
Tree Categories (BS 5837:2012)			
	Category A Trees		Category B Trees
	Category C Trees		Existing Tree to be Removed
	Root Protection Area (RPA)		
	Tree Protection Fencing*		

*See note on drawing



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Job
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Title
Figure 12 - Tree Protection Plan (Sheet 3 of 3)

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Appendix 4: Suffolk County Council Ash Die Back Canopy Description



The Issue

Identifying the symptoms of Ash Dieback in large trees can be difficult, so a system was needed to enable easy description of the current state of an Ash Tree. Tree Canopy assessment has been widely used since the late 1980's across Europe based on work produced in Switzerland in 1986. In 1990 the Forestry Commission produced a book – '[Assessment of Tree Condition](#)' to enable a standard system for describing the condition of a tree based on the percentage of existing canopy remaining.

Using this methodology Suffolk County Council undertook to describe the health of an Ash in Suffolk.

The steps undertaken

During the summer of 2013/14 Suffolk County Council assessed and photographed Ash across the county. They determined that there were 4 useful categories to describe Ash canopies. The categories chosen were

- 100% full canopy,
- 75% canopy,
- 50% canopy
- and 25% canopy.

These are represented photographically in the pictures at the end of this Case Study.

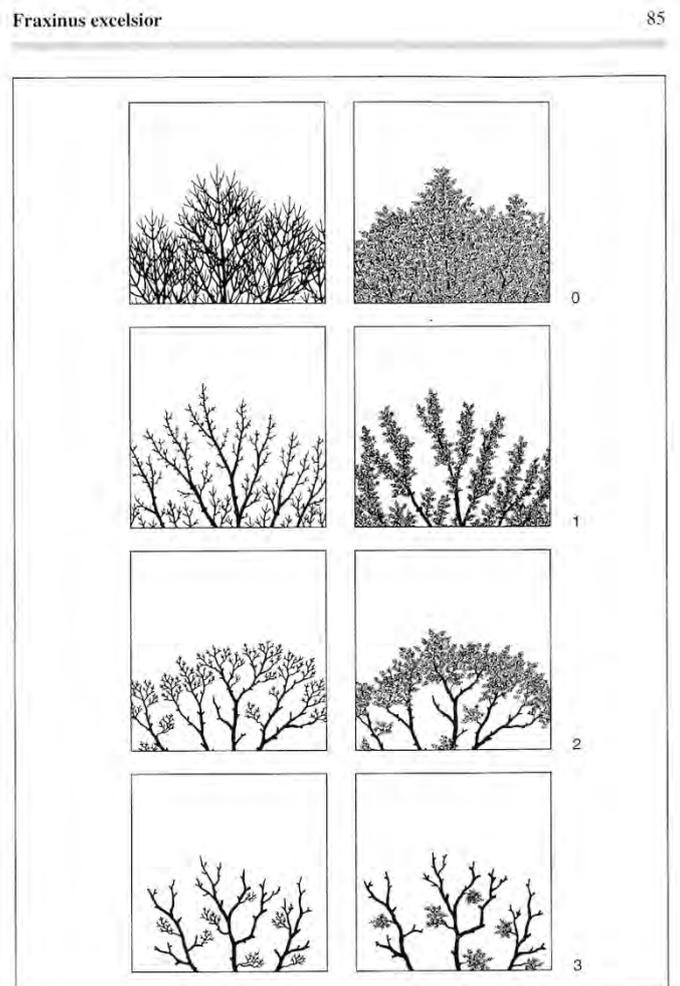
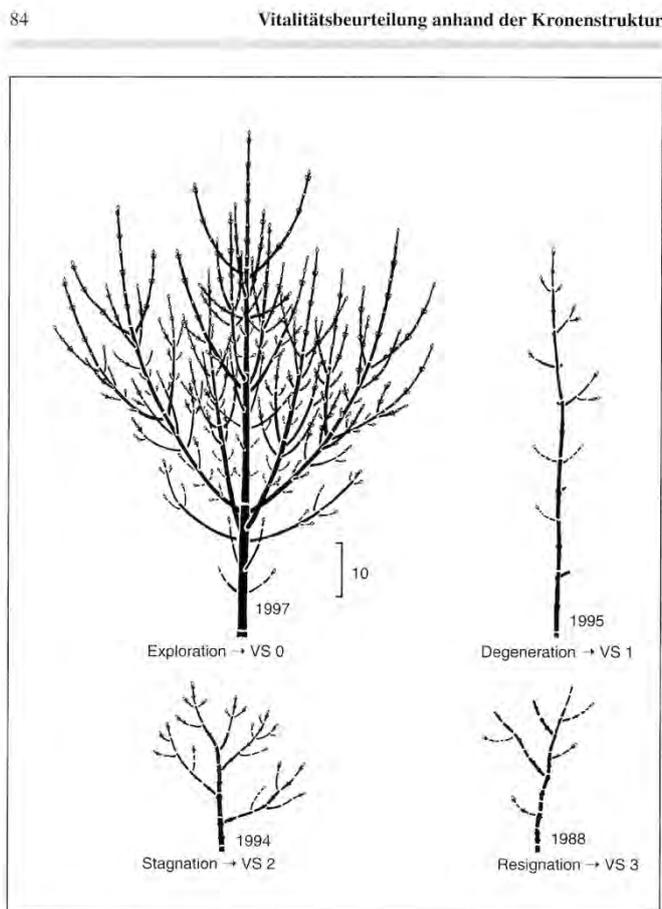
These 4 classes fit with work undertaken in Germany by Professor Andreas Roloff who has been describing the state of vitality of European Trees. He also uses 4 categories – described as

- Vitality Class 0: Healthy vigorous trees showing treetop shoots in the exploration phase: both the main axes and part of the lateral twigs consist of long-shoots. For this reason, a regular net-like branching pattern is developed, which reaches deep into the interior of the crown. The crowns are equally closed and domed, and do not show any greater gap unless a stronger intervention has occurred, such as pruning measures, because such a gap is closed quickly by the intensive ramification. In summer, a dense foliage arises without any greater gap.
- Vitality Class 1: Weakened trees show treetop shoots in the degeneration phase. Thus, spears/"fox tails" are formed, rising above the canopy. The leaves on these spears are dense and grow all around them (at the top of the lateral short-shoots or shortshoot chains). The crowns make a frazzled impression on the outside, and have a fastigated appearance, because the airspace between the spears is not completely filled by leaves and twigs, and the crown has a spiky outline. Inside the crown, the branching pattern, and hence the foliage, is quite dense. In this vitality class, straight percurrent main axes of the treetop branches are still dominant, but the crowns no longer look as intact as in class 0 because of the spears shooting out of the canopy.
- Vitality Class 2: In obviously less vigorous trees, the treetop shoots begin to build short-shoots in the stagnation phase. The leafless state could be designated as the claw stage, because the short-shoot chains in the outside of the crowns grow longer, are predominant, and stretch claw-like to the light. These short-shoot chains, growing too long, break off in summer in thunderstorms and heavy rains, and strew the forest floor in

declining stands. Under normal circumstances, trees get rid of parts of their unimportant twigs in the inner and lower crown parts in this way. However, if the treetop shoots themselves are declining, the self-pruning of twigs progresses into the outskirts of the crown, and the crowns become thin from the inside outwards. The cause for this occurrence is not premature leaf fall, but broken short-shoot chains, a lack of shoots, and dead buds and twigs. The branching pattern shows a bushy and lumpy accumulation in the periphery of the crown. This accumulation causes summer and winter bushy crown structures and greater gaps. The crown periphery still has hardly any straight percurrent branches.

- Vitality class 3: In considerably damaged or declining trees of the crowns finally fall apart by the breaking off of larger branches and the dieback of whole crown parts. The tree seems to consist only of more or less surplus sub-crowns, dispersed randomly in the airspace and forming whip-like structures. The treetop is often dying back or is already dead, because the treetop shoots grew in the retraction phase.

These 4 vitality classes are shown below for Ash.



The work in Germany and Suffolk complements each other and establishes the ability to be able to assign an ash tree to 1 of 4 categories, which describe the trees current health or vitality. This is a simple and useful method for describing the current state of an Ash's health.

The Outcome

Using this 4 category framework, allows a tree to be assigned to a category, showing its current state of health, enabling data on the tree to be collected. The suggestion going forward is that these 4 classes are used as described as:

Ash Health Class 1 – 100 – 75% Canopy (Vitality Class 0)

Ash Health Class 2 – 75% -50% Canopy (Vitality Class 1)

Ash Health Class 3 – 50% - 25% Canopy (Vitality Class 2)

Ash Health Class 4 – 25% - 0% Canopy (Vitality Class 3)

Figure 1: Photos of Dieback of ash trees



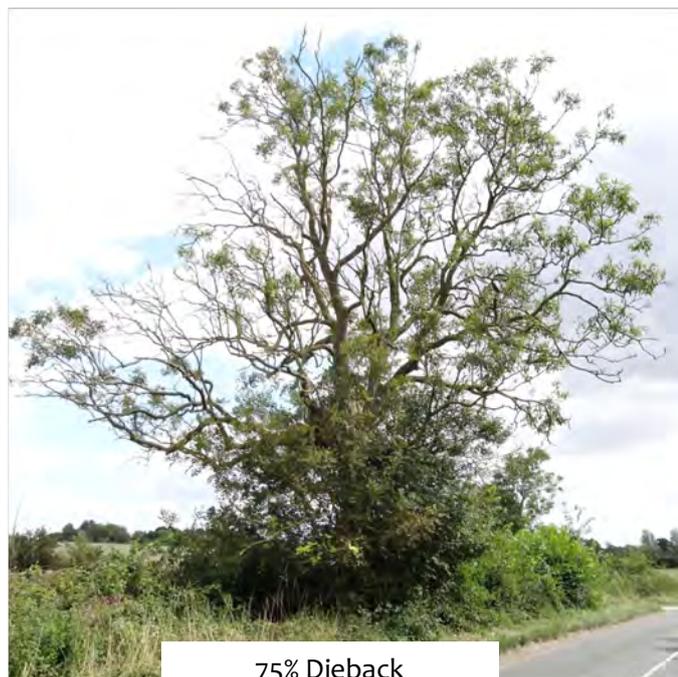
0% Dieback - Healthy Crown



25% Dieback



50% Dieback



75% Dieback

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