Westgate, Cleckheaton – BS5837:2012 Arboricultural Impact Assessment and Arboricultural Method Statement

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Contents

Executive Summary

On behalf of Strata Homes Limited (the Client), Ecus Limited (Ecus) has carried out an Arboricultural Impact Assessment and produced an Arboricultural Method Statement, to BS 5837:2012 '*Trees in Relation to Design, Demolition and Construction- Recommendations',* for the site at Westgate, Cleckheaton. This follows a Tree Survey Report carried out by Ecus in October 2020, which formed the basis of an assessment of the impact that development proposals may have on existing trees, and any methodologies to be adopted to protect any retained trees.

The survey recorded all trees within the site and all those which may be affected by any development proposals within 12 m of the site boundary, recording a number of parameters including species, crown spread and Root Protection Area (RPA).

The RPA is the area of ground around a tree which should not be disturbed by excavation, compaction, changes in level or other construction/demolition operations. The extent of the RPA is calculated in accordance with BS 5837:2012, and is an important part of the methodologies described in this report.

The Client proposes the construction of 194 new residential properties with associated access, driveways and hard and soft landscaping. This will require the removal of 68 trees (one category U) and 34 tree groups (8950 m^2) and may also have an impact on above and below ground parts of retained trees, unless adequate protection of these trees is provided.

This report details the arboricultural impact and offers a range of protection measures that should be put in place prior to works starting on site, in addition to construction methodologies which should be adopted. The following measures, described in detail in Chapter 5, will prevent accidental damage and other adverse affects on the health of retained trees:

- Protective fencing;
- Installation of utilities and services within RPA;
- Construction of fencing within RPA; and
- Soft landscaping and planting within RPA.

This report makes further recommendations for any measures to mitigate or compensate the loss of trees within the site, and the likely impact on the site and the local landscape. These include

- Replacement tree planting to compensate the loss of trees;
- Planting of shrubs and hedgerows to mitigate the loss of screening of the site
- Planting of native to compensate the loss of habitat;
- Planting of non-native and ornamental species to improve the amenity of the site;
- The preparation of a Landscape Management Plan to ensure the continued monitoring of retained trees and the establishment of newly planted trees and shrubs.

For ready reference, Figure 1.1 (Chapter 1) is a simplified version of the 'Design and Construction Process and Tree Care' table outlined in BS 5837:2012. The table identifies processes and obligations expected at the various stages of the construction project. BS 5837:2012 is considered an iterative process, and as such the project arboriculturalist's advice should be ongoing.

List of Figures and Tables

1. Introduction

1.1 Context of this document in the Planning System

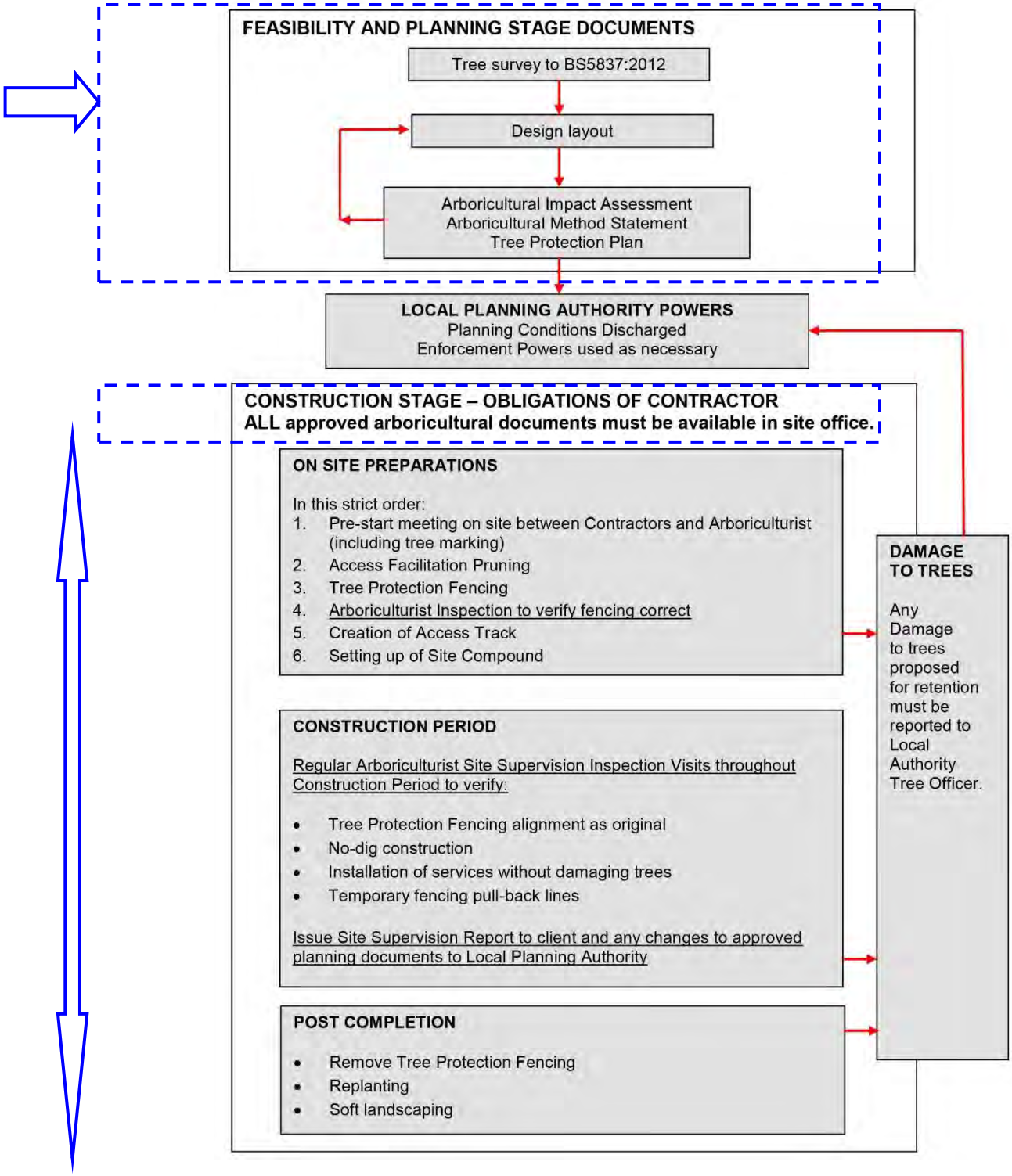

Figure 1.1 - The Design and Construction Process and Tree Care

1.1.1 This document has been prepared at the feasibility and planning stage of a project.

1.1.2 If it becomes an approved Planning Arboricultural Method Statement of tree protection measures and/or Tree Protection Plan, a copy should be to hand in the Site Office at all times during the Construction Stage.

1.2 Location

1.2.2 Ecus Limited (Ecus) was commissioned by Stata Homes Limited (the Client) to undertake a tree survey of the site at Westgate, Cleckheaton, BD19 5HT, UK Grid Reference SE 18447 25094. The site location is shown on Figure 1.2.

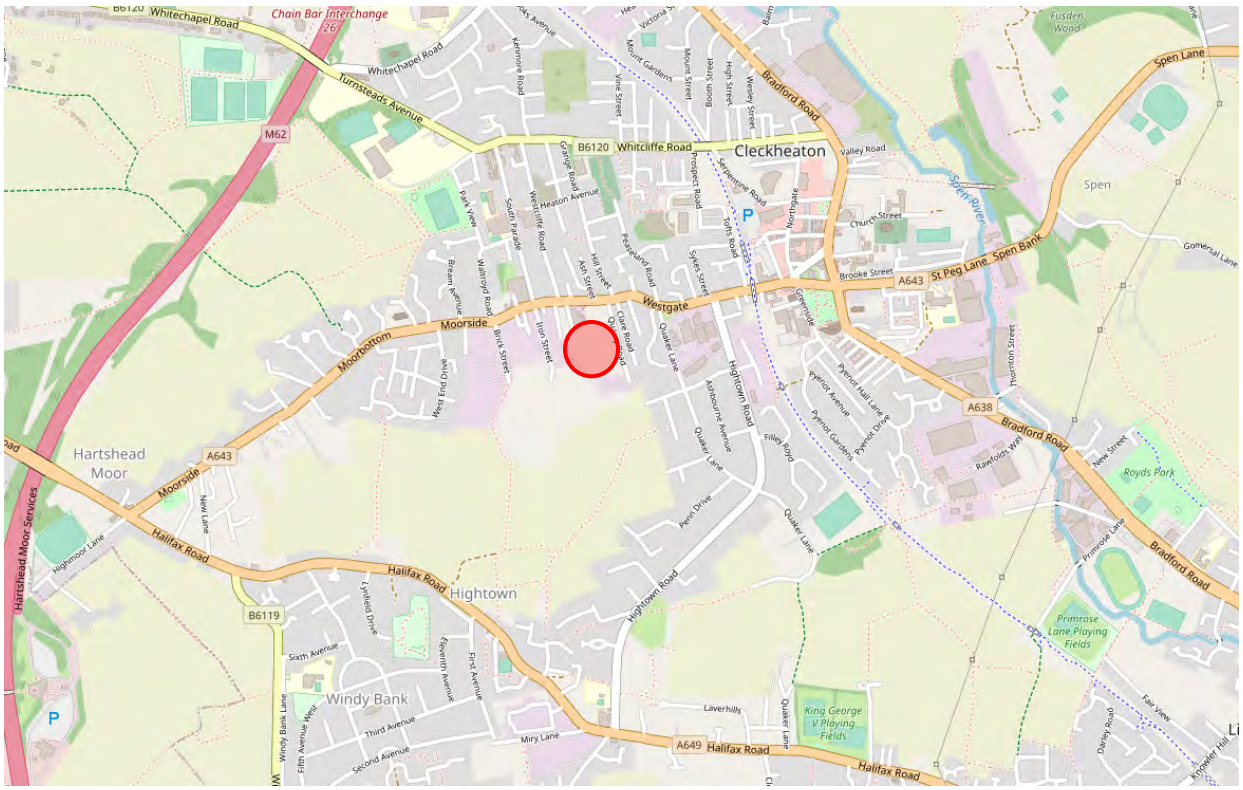

Figure 1.2 – Location Plan
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1.2.3 The survey was carried out in accordance with BS 5837:2012 '*Trees in Relation to Design, Demolition and Construction- Recommendations*'. This report sets out the findings of the survey and recommendations have been made for preliminary tree work that may be required.

1.3 General Site Description

1.3.1 The site is a mostly disused industrial estate. Whilst there is currently one building still in use that is accessed via Stone Street. The large building towards the centre of the site has been damaged by a fire and is no longer in use. The remainder of the site has large amounts of rubble spoil, areas of hard standing and foundations of previously demolished buildings.

1.3.2 Aerial imagery from 2002 (available from Google Earth) shows that much of the site was still in use as an industrial estate with vehicles, hard surfaces and storage throughout the site at the time of the imagery. By 2009, the majority of the site was disused and some trees had started to colonise the site. The site was cleared in 2011 with all trees, except for the TPO trees, felled and removed.

1.3.3 There is a large amount of silver birch *Betula pendula* and goat willow *Salix caprea* that has begun to colonise the unmade areas of the site creating a large number of groups within the site. There are large numbers of more established trees around the edges of the site, notably along the eastern boundary beside Quarry Road. To the south there are two areas of woodland adjacent to the site.

1.3.4 A stream known as Blacup Beck runs from west to east just inside the southern boundary of the site.

1.3.5 The site is publicly accessible via Stone Street, Iron Street and Brick Street, with a car park adjacent to Westgate. Whilst there is no formal public access throughout the site it is clearly used extensively by local dog walkers as well as some anti-social behaviour.

1.3.6 The site is highly visible from the adjacent residential properties on Quarry Road to the east. It is not visible from the highway of Westgate due to commercial buildings adjacent to the northern boundary of the site. The site can be seen from the commercial and industrial units to the west, on the opposite side of Brick Street.

1.4 Limitations

1.4.1 The recommendations presented in this report are based on the available information reviewed when compiling the Arboricultural Impact Assessment and Arboricultural Method Statement.

1.4.2 Ecus cannot be held responsible for any recommendations or conclusions based on the published information if it is later proven to be inaccurate.

1.4.3 There may be other conditions prevailing on the site which are not disclosed by the available information and, therefore, could not be taken into account when writing this report. Ecus cannot be responsible for unrecorded information.

1.4.4 The conclusions and recommendations of this report cannot be guaranteed to gain regulatory approval. This report should be passed to the relevant regulatory authorities for their comment and approval prior to undertaking any works on site, if it is required as part of a planning application.

1.5 Tree Designations

1.5.1 The survey included identification of any existing designations affecting trees on the site such as Tree Preservation Orders (TPO) and Conservation Area status by checking the map information available on Kirklees Metropolitan Council website www.kirklees.gov.uk.

1.5.2 This check confirmed that 16 trees (T004 – T019) are protected by Tree Preservation Order ref. No. 57 dated 14.12.1992 see Figure 1.3 (Appendix 3).

1.5.3 This check confirmed that the site is no located within a Conservation Area.

Trees covered by Tree Preservation Order (TPO)

1.5.4 Tree Preservation Orders currently exist to cover individual trees, tree groups (Group TPO), woodland (Woodland TPO) and areas of trees (Area TPO). Individual and Group TPOs specify the exact position, number and species of the protected trees, whereas Woodland TPOs and Area TPOs protect all trees within an area of land shown on the TPO map as follows: Woodland - All trees young and old, including the woodland floor regeneration; Area - only those trees that were present at the time the TPO was confirmed (trees younger than the date of the TPO are not covered). If in doubt over the protection of specific trees, the local Tree Officer/ Arboricultural Officer should be contacted for clarification prior to site layout proposals being finalised.

1.5.5 The Tree Preservation Order prohibits the topping, lopping, damaging, wilful destruction and uprooting of the tress covered by the TPO without prior consent of the Local Authority. This includes any works included in the preliminary management recommendations in the Tree Survey Schedule (Table 3.1, Appendix 1) and any work proposed in close proximity that may have an impact on both above and/or below parts of these trees.

1.5.6 Consent needs to be sought from the Local Planning Authority if tree removal work or tree management work affect protected trees within the site or those which overhang the site boundary. Tree works must not be carried out without permission.

1.5.7 Work will also be permitted if it is included in an Arboricultural Impact Assessment, Arboricultural Method Statement and/or Tree Protection Plan approved by the Local Planning Authority where development proposals for a site have been granted Planning Permission.

Felling Licence

1.5.8 The felling of trees is regulated in England by the Forestry Act 1967 (the Act). The Forestry Commission is the government regulator that enforces the provisions of the Act.

1.5.9 The felling of growing trees in England is restricted under section 9 of the Act. It requires that felling is either authorised by a felling licence issued by the FC or the felling activity is excepted from the need for a licence.

1.5.10 There are many exceptions to the need for a licence, based on the type of the tree, the location of the tree, the size of the tree, the nature and scope of the felling activity and the person responsible for the felling. These are primarily set out in section 9 of the Act as well as the Forestry (Exceptions from Restriction of Felling) Regulations 1979.

1.5.11 The most relevant exemption is;

'Section 9 - Requirement of licence for felling (1) A felling licence granted by the appropriate forestry authority shall be required for the felling of growing trees, except in a case where by or under the following provisions of this Part of this Act this subsection is expressed not to apply…

(d) is immediately required for the purpose of carrying out development authorised by planning permission granted or deemed to be granted under the Town and Country Planning Act 1990 or the enactments replaced by that Act, or under the Town and Country Planning (Scotland) Act 1997.

1.5.12 Advice from a suitably qualified arboriculturalist should be sought before any felling takes place onsite.

1.5.13 The granting of permission to remove trees covered by a TPO by the Local Planning Authority does not remove the need to obtain a felling licence from FC if more than 5 m^3 of timber are to be felled in a calendar quarter and none of the exemptions apply.

Ancient Woodland/Veteran Trees

1.5.14 A check of the Multi-Agency Geographical Information for the Countryside (MAGIC) website (www.magic.defra.gov.uk) shows that there is no ancient woodland in close proximity to the site.

1.5.15 The site does not contain any recorded veteran trees as shown on the Ancient Tree Inventory maintained by the Woodland Trust (ati.woodlandtrust.org.uk).

2. Arboricultural Impact Assessment (AIA)

2.1 Introduction

2.1.1 A BS5837:2012 Arboricultural Impact Assessment (AIA) has been carried out for trees present across the Site. This methodology evaluates the direct and indirect effects of the Proposed Development and where necessary recommends mitigation. The British standard states, "*The assessment takes 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 has been taken of the buildability of the scheme in terms of access, adequate working space and provision for the storage of materials, including topsoil*."

2.1.2 As well as an evaluation of the extent of the impact on existing trees, the AIA assessment should include where necessary:

a) the tree survey; (Ecus report *Westgate, Cleckheaton - BS 5837:2012 Tree Survey ref 14572*)

b) trees selected for retention, clearly identified and marked on a plan with a continuous outline; (14572-ARB-03 and 14572-ARB-04)

c) trees to be removed, also clearly identified and marked on a plan with a dashed outline or similar; (14572-ARB-03 and 14572-ARB-04)

d) trees to be pruned, including any access facilitation pruning, also clearly identified and labelled or listed as appropriate;

e) areas designated for structural landscaping that need to be protected from construction operations in order to prevent the soil structure being damaged;

f) evaluation of impact of proposed tree losses;

g) evaluation of tree constraints and draft tree protection plan;

h) issues to be addressed by an arboricultural method statement, where necessary in conjunction with input from other specialists.

2.1.3 To ensure clarity and consistency Ecus has adopted a similar approach to evaluating impacts on the tree as would be used in undertaking an Environmental Impact Assessments (EIA). The methodology used assesses the sensitivity of the receptor and the magnitude of change to give a significance of any affect. The detailed methodology is outlined in Appendix 2.

2.2 Development Proposals

2.2.1 An Arboricultural Impact Assessment of the proposed site plan has been undertaken to assess the likely impact of the development on existing trees and tree groups. This assessment is based on the development plan provided by the Client (ref: Strata Homes Limited 18-CL2-SEGB-WE-01 rev P dated November 2020).

2.2.2 The Client proposes the construction of 194 new residential properties with associated access, driveways and hard and soft landscaping.

2.2.3 The construction will be of standard materials and methods.

2.3 Arboricultural Impact Assessment

Direct Impact from Development

2.3.1 The development plan indicates that 68 trees and 34 tree groups within the red line site boundary will need to be removed to accommodate the new development, including new buildings, new roads and drives as well as new hard landscape.

Summary

2.3.2 Table 4.1 below summarises the summary of tree removals:

Table 4.1: Summary of Tree removals

Category A	Category B	Category C	Category U
None	None	T004, T005, T006, T007, T008, T009, T010, T011, T012, T013, T014, T015, T016 ,T017, T018, T019 – Hybrid black poplar	T127 - Rowan
		T116 – Common ash	
		T024 – Common hawthorn	
		T020, T022 – Lawson cypress	
		T126 - Rowan	
		T001, T028, T037, T038, T039 – Silver birch	
		T002, T021, T023, T030, T031, T032, T035, T068, T069, T070, T071, T072, T074, T101, T102, T103, T104, T105, T106, T108, T109, T110, T112, T113, T114 - Sycamore	
		T034, T046 – Wild cherry	
		T027, T029, T033, T040, T041, T042, T043, T044, T053, T107, T117, T122, T123, T124 – Goat willow	
		G061, G067 – Aspen groups	
		G036, G050, G051, G052, G094, G111, G121 – Goat willow groups	
		G125 – Lawson cypress group	
		G047, G048, G054, G056, G057, G058, G059, G062, G064, G065, G066, G075, G076, G077, G078, G095, G096, G120 – Silver birch groups	
		G049, G055, G092 – Sycamore groups	
		G063, G091, G093 – Wild cherry groups	
Total None	**Total** None	**Total** 67 Trees 34 Groups (8950 m^2)	**Total** 1 Tree 0 Groups

2.3.3 The trees are all of low category C quality and have grown in dense shrubby groups within the last 20 years. Therefore the sites tree population sensitivity to change is considered to be medium as although of low individual value, they provide a large amount of cover to the site, which is used by dog walkers and is overlooked by residential properties. The magnitude of change is high as the site is being almost completely cleared of trees with only a few groups being retained to the south and several low quality trees retained where possible to provide some more established landscape features and improve overall age diversity on the site. Overall the significance of this effect would be a moderate negative impact that will last for a medium term so long as there is a robust replanting strategy that seeks to replace the screening afforded to the edges of the site and improve biodiversity where possible within the site.

2.3.4 Due to the level of removal it will not be possible to replant enough trees to ensure a net gain in canopy area and it may be appropriate to offer off site contributions within the local area. Overall, off-site contributions could result in a relatively short term impact to the local area as the trees being removed are predominantly young trees between ten and 15 years in age.

2.3.5 Sixteen trees (T004 to T019) are protected by Kirklees Tree Preservation Order ref. No. 57 dated 14.12.1992. However at the time of survey it was noted that these previously pollarded trees have not been managed for some time and are in very poor condition. The removal of these trees should not be prevented under the TPO due to their condition but the local authority may seek to ensure that similar trees are replanted in the same location to maintain the screening character that they would have afforded the site in the past.

2.4 Recommendations

2.4.1 As the development proposals assume the removal of 67 trees and 34 tree groups growing within the site, no protection measures will be required for those trees.

2.4.2 Chapter 5 Arboricultural Method Statement describes measures to protect the retained trees during the development, and operations within the RPA of retained trees including:

- Protective fencing;
- Installation of utilities and services within RPA;
- Construction of fencing within RPA; and
- Soft landscaping and planting within RPA.

2.4.3 It is recommended that replacement tree planting is carried out where possible within the new design. In particular, trees should be planted along the eastern boundary with Clare Road to compensate for the loss of screening to the adjacent residential properties and the removal of TPO protected trees T004 to T019. Similarly screening trees should be planted on the western boundary to provide a visual screen from the site to the neighbouring industrial units. Another area that could be improved through tree planting is to the south of the site where existing groups could be improved and joined up with the woodland to the south.

2.4.4 Unless otherwise specified, the trees should be planted at minimum 12-14 cm standard size and establishment should be carried out in accordance with BS 8545:2014 '*Trees: From Nursery to Independence in the Landscape – Recommendations'.*

2.4.5 Recommended species to create screening on the boundaries of the site include hornbeam *Carpinus betulus*, field maple *Acer campestre*, Magnolia *Magnolia* grandiflora, scots pine *Pinus sylvestris*, Bhutan pine *Pinus wallichiana* and western red cedar *Thuja plicata*.

2.4.6 To improve the woodlands and groups to the south it is recommended that a mix of native broadleaf

trees are planted as whips to allow for successful planting over a wide area. Species include field maple *Acer campestre*, sessile oak *Quercus petraea*, small-leafed lime *Tilia cordata*, with common hawthorn *Crataegus monogyna* and hazel *Corylus avellana* to form an understorey.

2.4.7 It is recommended that tree planting follows 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.

3. Arboricultural Method Statement (AMS)

3.1 Important Founding Principle of BS 5837:2012

3.1.1 The most important and effective process, in terms of preventing damage to trees on a construction site, is the timely erection of tree protection fencing. **This must be erected as the first operation on site**, for example, before access track construction, before Contractors site cabins, and before trenching for service runs.

3.1.2 The founding principle of BS 5837:2012 '*Trees in Relation to Design, Demolition and Construction-Recommendations*' is that the protective fencing is erected before any other operation. However, it is noted that the fencing provides an unnecessary and potentially dangerous restriction to essential tree works and therefore tree works can be carried out before fencing is erected.

3.2 General

3.2.1 The Arboricultural Method Statement should be read in conjunction with Figures 5.1 and 5.2 Tree Protection Plans in Appendix 3. The Arboricultural Method Statement (AMS) paragraphs below are written in the chronological sequence they are to be carried out:

3.3 Pre-Commencement

3.3.1 It is advised that a Pre-Commencement Site Meeting is held with contractors who are responsible for operating machinery on site. The meeting will firstly highlight the potential for damage occurring to tree crowns, but thereafter ensure that extra care is applied when manoeuvring any machinery within close proximity of retained trees to prevent any contact with the tree and consequent damage to crown, stem or roots.

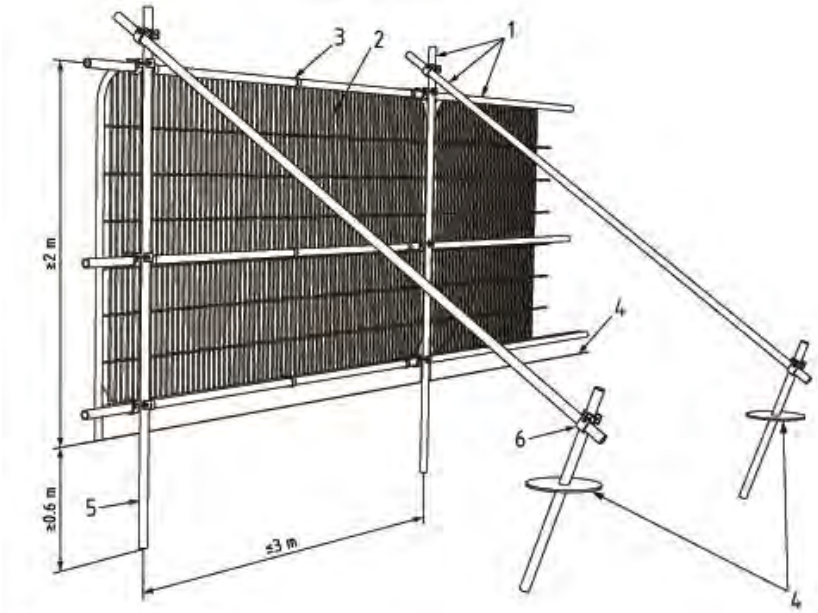
3.3.2 For clarity, prior to any construction or development work proceeding, the alignment of the protective fencing (Section 3.4) and the RPAs of any individual trees to be retained which are not able to be protected by fencing should be marked out using the distances provided in the table within the tree survey report. Marking out should be completed or approved by a person with arboricultural expertise as individual trees will have root zones that may be affected by local conditions and allowances will need to be made to accommodate this. This may be done prior to, or during, the Pre-Commencement Site Meeting.

3.4 Protective Barrier/Tree Protection Fencing

3.4.1 The development design prepared for the site indicates that a large number of trees within the site are being retained. In addition there are several trees off site but within 12m of the site boundary. All these trees need to be protected from all demolition/construction operations by a protective barrier (fencing to BS 5837:2012 which creates a sacrosanct Construction Exclusion Zone (CEZ).

3.4.2 The alignment of the protective barrier is based on the calculated extent of the RPA in accordance with BS 5837:2012. The detailed alignment for the Phases is shown in Figures 5.1 and 5.2 Tree Protection Plan in Appendix 3.

3.4.3 In principle, protective fencing should be erected before any construction/demolition operations start on site and should be removed only on completion of all construction/demolition works on site. In this phased project, the protective fencing for Construction Phase should be erected before any work commences on site. At the end of the Construction Phase, but before the commencement of the Demolition Phase, some of the fencing (as shown on Figure 5.1) can be removed, and protective fencing of the Demolition Phase erected. (delete if no phasing) Thereafter, no protective fencing should be removed until completion of all construction and demolition work.



Key
1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill 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 0.6 m)
6 Standard scaffold clamps

Figure 5.3: Default Specification for Protective Barrier to BS 5837:2012

3.4.4 The default specification for protective barrier is shown in Figure 5.3 above. Site hoarding is an acceptable alternative. It may be appropriate on some sites to use temporary site offices as components of the protection barriers, on the understanding that they will remain in situ for the duration of the construction/demolition works and their removal will be planned to ensure the Contractor's co-ordinated withdrawal from site away from the trees rather than towards them.

3.4.5 BS 5837:2012 clause 6.2.2.3 specifies an alternative protective barrier where site circumstances and associated risk of damage incursion into the RPA do not necessitate the default level of protection. This can include 2m tall welded mesh panels (e.g. Heras fencing) on rubber or concrete feet to protect from cars, vans, pedestrians and manually operated plant. The alternative specification for the protective barrier should only be used if and where agreed with the Local Planning Authority.

3.4.6 All weather notices should be placed on fencing to indicate that operations are not permitted within the fenced area, for example "CONSTRUCTION EXCLUSION ZONE – NO ACCESS" or similar.

3.4.7 Once set up fences should not be removed or altered without prior consultation with the arboricultural advisor.

3.4.8 The presence of long grass and other vegetation in the 'Construction Exclusion Zone' is a welcome indicator that the protected area has been left undisturbed. However, on occasion, and certainly towards the end of the project, it is acceptable to cut the vegetation by hand held strimmer or scythe taking care not to work within 300mm of the tree trunk (to avoid damaging the bark). Vegetation within 300mm of the trunk can be cut with non-mechanised shears.

3.5 Installation of power supply and services

3.5.1 There are currently no proposals to route services or utilities through the RPA of any retained trees. If this changes at a later stage of the project, proposals should be submitted to the local planning authority Tree Officer for approval.

3.5.2 As guidance only, it is noted here that any underground power supply and services routed through the RPA should be installed in accordance with BS 5837:2012 clause 7.7.2 and National Joint Utilities Group (NJUG) Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.

3.6 Construction within RPA

Fence construction within RPAs

3.6.1 Where fence posts need to be installed within RPAs, excavations should be minimal and carried out using hand held tools. Fence posts should be erected at least 1 m from trees, and using metal post support spikes or if using concrete mix, post holes should be lined with an impermeable membrane to prevent contact between tree roots and potentially damaging chemicals in the concrete.

3.6.2 The proposed fence alignment should allow for a minimum distance of 500 mm between the tree stems and the fence, providing sufficient room for the future increase of the stem diameter and minimising the risk of potential conflicts between the fence structure and the tree stem.

Changes of level within RPAs

3.6.3 Generally, the levels within the RPA or protected area should not be changed. Tree roots are considered to be, in the main, within the top 600 mm of the soil. Obviously, any excavation into this will remove part of the root system and potentially affect the vigour or stability of the tree. Conversely, any additional material built up above ground level will compact the soil beneath it, potentially compacting all the air pores in the 600 mm depth of soil that most roots are in, effectively suffocating the roots and thus affecting the vigour or stability of the tree.

3.6.4 On occasion, additional soil may be gently spread by hand within the RPA/protected area, for example, to marry levels in small areas between raised levels of no-dig construction and the existing levels. The maximum depth of this would be to 150 mm, reducing to nil. However, it is not generally acceptable, in large areas of the RPA/protected area to raise the level as a blanket. Any areas which will need to be raised are to be agreed Local Planning Authority prior to construction. Specifically there will be no mechanical equipment within the RPA/protected area to spread, compact, or level out soil levels as this would compact the soil.

3.7 Excavations for soft landscaping

3.7.1 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.

Removal of Existing Hard Standing

3.7.2 Where soft landscaping is proposed within the RPA in existing hard surfaces, the wearing course and its sub-base should be carefully lifted using handheld tools. Should any roots be exposed in the process, they should be immediately wrapped or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.

3.7.3 Prior to backfilling, retained roots should be surrounded with topsoil or uncompacted sharp sand (other than builders' sand), or other loose inert granular fill, before soil or other suitable material is replaced.

Soil Improvements and Mulching

3.7.4 To compensate for root damage and stress caused by construction activities, retained trees onsite should be mulched. The materials that may be used for mulching include coarsely divided plant matter, such as wood chip, pulverized bark, or leaf mould, any of which may be combined with well-rotted animal manure. The mulched area should extend over as much of the root system as can be allowed by other site-usage requirements. The depth of an organic mulch should not be so much as to inhibit aeration of the root system or to cause overheating of uncomposted material (normally no more than 80 mm to 100 mm). The mulch should be periodically replenished as it decomposes, so that it does not become depleted.

4. Tree Management

4.1.1 The following section provides guidance as to how retained trees will best be protected during construction. More detailed guidelines for tree protection during construction are given in BS 5837:2012 'Trees In Relation To Design, Demolition And Construction- Recommendations'.

4.1.2 Any tree roots severed during site clearance works will be wrapped or covered with hessian sheets (wet in summer, dry in winter) as an immediate protection measure against desiccation and rapid temperature changes. This will be removed prior to backfilling which should be carried out as soon as possible. In addition the advice of an arboriculturalist, or the Tree Officer of the local planning authority, will be sought as soon as possible on the potential effect of the root damage on the tree's stability, vitality and legal implications.

4.1.3 All tree works will follow best practice procedures as set out in BS 3998:2010. All trees should be maintained in good condition on site and be inspected annually (where overall condition requires) or every 2 years and after any major storm events, with safety a priority.

4.1.4 The best practice principles have been broadly summarised below:

- Once areas around trees have been protected by fencing, any works on the remaining site area may be commenced providing activities do not impinge on protected areas;
- Wide or tall loads etc. will not come into contact with retained trees. Banks-person will supervise transit of vehicles, jibs, booms etc. where this is in close proximity to retained trees;
- Oil, bitumen, cement or other material that is potentially injurious to trees will not be stacked or discharged within 10 m of a tree bole. No concrete mixing will be done within 10 m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree;
- No fires will be lit where flames are anticipated to extend to within 5 m of tree foliage, branches or trunk, taking into consideration wind direction and size of fire;
- Notice boards, telephone cables or other services should not be attached to any part of a retained tree; and
- In the event of having caused any branch or limb damage to retained trees, the advice of an arboriculturalist will be sought on what tree surgery can be carried out, in accordance with BS 3998:2010, to correct the damage, and the best timescale for that tree surgery which will be determined by season, species, gravity of damage and legal status of the tree (Tree Preservation Order/ Conservation Area/nesting birds/roosting bats).

4.1.5 All of the above precautionary measures will be applied to minimise the effect of any damage to long-term tree health and safety.

4.1.6 It is recommended that any trees that require removal or significant canopy works should be checked in advance of works by an ecologist to ensure there is no possibility of any disturbance to nesting birds or roosting bats.

5. References

Books and Papers

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.*

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: Tables

Table 3.1 – BS 5837:2012 Tree Survey Schedule

Key:	Measurements	Age – Class	Overall Condition	BS 5837 2012 : Cascade Chart for Quality Assessment/Retention Category	Symbols:
	MS – Multi-stemmed	YNG – Young Mature	G – Good	A – High	< = less than
	Ht - Height in metres	SM – Semi-mature	F – Fair	B – Moderate	~ = approximately
	Stem – Stem Diameter at 1.5m in mm	EM – Early mature	P – Poor	C – Low	> = greater than
	Crown – Crown spread in metres	M – Mature	D - Dead	U – Unsuitable for retention	
	TD - Trunk division (height in metres)	OM – Over mature **Est Yrs –** estimate of years remaining (40+ years; 20+ years; 10+ years, <10 years)	ADB – Ash Die Back DED – Dutch Elm Disease	**Sub-categories:** **1** = mainly arboricultural values **2** = mainly landscape values **3** = mainly cultural values.	Kirklees Metropolitan Council TPO ref No. 57 (1992)
RPA = Root protection area (equivalent to a circle with a radius 12 x the stem diameter of single stem trees or 12 x the notional stem diameter of multi stemmed trees as per BS 5837:2012 clause 4.6). This will be capped to 707m² for trees with a stem diameter larger than 1.25m.					

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m²)
T001	Silver Birch *(Betula pendula)*	10	250	3	3	3	3	2	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	3	28
T002	Sycamore *(Acer pseudoplatanus)*	8	130	3	3	2	3	2	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	1.56	8
T003	Sycamore *(Acer pseudoplatanus)*	8	130	2	2	1	2	2	Early Mature	20+ Years	Fair	-	-	C2	1.56	8
T004	Black Hybrid Poplar *(Populus x canadensis)*	10	550	6	4	5	5	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6.6	137
T005	Black Hybrid Poplar *(Populus x canadensis)*	12	500	2	2	2	2	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T006	Black Hybrid Poplar *(Populus x canadensis)*	8	500	2	5	2	2	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T007	Black Hybrid Poplar *(Populus x canadensis)*	8	500	3	3	3	3	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T008	Black Hybrid Poplar *(Populus x canadensis)*	10	350	1	1	1	1	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	4.2	55

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T009	Black Hybrid Poplar *(Populus x canadensis)*	8	500	3	3	3	3	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T010	Black Hybrid Poplar *(Populus x canadensis)*	15	500	2	2	2	2	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T011	Black Hybrid Poplar *(Populus x canadensis)*	10	500	1	3	4	3	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T012	Black Hybrid Poplar *(Populus x canadensis)*	14	500	2	3	2	2	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T013	Black Hybrid Poplar *(Populus x canadensis)*	13	450	2	3	1	2	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	5.4	92
T014	Black Hybrid Poplar *(Populus x canadensis)*	12	400	1.5	1.5	1.5	1.5	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	4.8	72
T015	Black Hybrid Poplar *(Populus x canadensis)*	11	500	3	3	3	3	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T016	Black Hybrid Poplar *(Populus x canadensis)*	11	300	1.5	1.5	1.5	1.5	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	3.6	41
T017	Black Hybrid Poplar *(Populus x canadensis)*	12	500	3	4	3	3	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T018	Black Hybrid Poplar *(Populus x canadensis)*	12	500	3	3	2	3	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	6	113
T019	Black Hybrid Poplar *(Populus x canadensis)*	15	800	1	3	3	3	2	Mature	<10 Years	Poor	Previously pollarded.	***Remove for development***	C2	9.6	290
T020	Lawson Cypress *(Chamaecyparis lawsoniana)*	12	300	2.5	2.5	2.5	2.5	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	3.6	41
T021	Sycamore *(Acer pseudoplatanus)*	8	250	2	3	3	3	2	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	3	28

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T022	Lawson Cypress *(Chamaecyparis lawsoniana)*	14	350	2.5	3	2.5	3	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	4.2	55
T023	Sycamore *(Acer pseudoplatanus)*	8	250	0.5	3	2	2	2	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	3	28
T024	Common Hawthorn *(Crataegus monogyna)*	8	150	3	2	3	3	0	Early Mature	20+ Years	Fair	Sycamore growing inside.	***Remove for development***	C2	1.8	10
T025	Goat Willow *(Salix caprea)*	5	130	3	3	3	3		Early Mature	20+ Years	Fair	-	-	C2	1.56	8
T026	Silver Birch *(Betula pendula)*	13	330	3	3	3	3	4		20+ Years	Fair	-	-	C2	3.96	50
T027	Goat Willow *(Salix caprea)*	12	350	2	3	3	3	3	Mature	20+ Years	Fair	Two stems.	***Remove for development***	C2	4.2	55
T028	Silver Birch *(Betula pendula)*	10	300	3	3	3	3		Mature	20+ Years	Fair	-	***Remove for development***	C2	3.6	41
T029	Goat Willow *(Salix caprea)*	8	300	3	3	3	3	3	Mature	20+ Years	Fair	Three stems	***Remove for development***	C2	3.6	41
T030	Sycamore *(Acer pseudoplatanus)*	6	120	1.5	1.5	1.5	1.5	3	Mature	20+ Years	Fair	-	***Remove for development***	C2	1.44	6
T031	Sycamore *(Acer pseudoplatanus)*	10	150	2.5	2.5	2.5	2.5	3	Mature	20+ Years	Fair	-	***Remove for development***	C2	1.8	10
T032	Sycamore *(Acer pseudoplatanus)*	9	120	2	2	2	2	3	Mature	20+ Years	Fair	-	***Remove for development***	C2	1.44	6
T033	Goat Willow *(Salix caprea)*	10	250	3	3	3	3	3	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	3	28
T034	Wild Cherry *(Prunus avium)*	8	120	2	2	2	2	2	Semi Mature	20+ Years	Fair	-	***Remove for development***	C2	1.44	6

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m²)
T035	Sycamore *(Acer pseudoplatanus)*	12	300	5	5	5	5	2	Mature	20+ Years	Fair	-	***Remove for development***	C2	3.6	41
G036	GROUP of Goat Willow *(Salix caprea)*, Common Hawthorn *(Crataegus monogyna)* and Sycamore *(Acer pseudoplatanus)*	Ave. 14	Ave. 250	As per drawing.				2	Mature	20+ Years	Fair	Dense group on boundary with approximately 15 to 20 stems. 200 to 300 mm DBH. 10 to 15 m height.	***Remove for development***	C2	0	294
T037	Silver Birch *(Betula pendula)*	8	100	2	2	2	2	0	Semi Mature	20+ Years	Fair	-	-	C2	1.2	5
T038	Silver Birch *(Betula pendula)*	8	100	2	2	2	2	0	Semi Mature	20+ Years	Fair	-	-	C2	1.2	5
T039	Silver Birch *(Betula pendula)*	8	100	2	2	2	2	0	Semi Mature	20+ Years	Fair	-	-	C2	1.2	5
T040	Goat Willow *(Salix caprea)*	6	80	2	3	2	1	0	Early Mature	10+ Years	Poor	-	***Remove for development***	C2	0.96	3
T041	Goat Willow *(Salix caprea)*	8	250	3	3	3	3	2	Early Mature	20+ Years	Poor	-	***Remove for development***	C2	3	28
T042	Goat Willow *(Salix caprea)*	8	250	3	3	3	3	2	Early Mature	20+ Years	Poor	-	***Remove for development***	C2	3	28
T043	Goat Willow *(Salix caprea)*	7	200	3	3	3	3	2	Early Mature	20+ Years	Poor	-	***Remove for development***	C2	2.4	18
T044	Goat Willow *(Salix caprea)*	7	250	3	3	3	3	2	Early Mature	20+ Years	Poor	-	***Remove for development***	C2	3	28
T046	Wild Cherry *(Prunus avium)*	6	200	3	3	3	3	0	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	2.4	18

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
G047	GROUP of Silver Birch *(Betula pendula)* and Sycamore *(Acer pseudoplatanus)*	Ave. 5	Ave. 75	1.5	1.5	1.5	1.5	0	Semi Mature	20+ Years	Fair	Birch and Sycamore, 4 to 6 m tall. Less than 100 mm DBH.	***Remove for development***	C2	0	48
G048	GROUP of Silver Birch *(Betula pendula)*	Ave. 5	Ave. 75	2	2	2	2	0	Semi Mature	20+ Years	Fair	Birch 4 to 6 m tall. Less than 100 mm DBH.	***Remove for development***	C2	0	76
G049	GROUP of Sycamore *(Acer pseudoplatanus)* and Silver Birch *(Betula pendula)*	Ave. 5	Ave. 75	2	2	2	2	0	Semi Mature	20+ Years	Fair	Birch and Sycamore, 4 to 6 m tall. Less than 100 mm DBH.	***Remove for development***	C2	0	132
G050	GROUP of Goat Willow *(Salix caprea)* and Silver Birch *(Betula pendula)*	Ave. 8	Ave. 85	3	3	3	3	0	Semi Mature	20+ Years	Fair	Goat willow and Birch, 6 to 8 m tall. 80 to 100 mm DBH.	***Remove for development***	C2	0	126
G051	GROUP of Goat Willow *(Salix caprea)*	Ave. 5	Ave. 75	4	4	4	4	0	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	0	86
G052	GROUP of Goat Willow *(Salix caprea)*	Ave. 4	Ave. 75	2	2	2	2	0	Young	20+ Years	Fair	Young scrub.	***Remove for development***	C2	0	133
T053	Goat Willow *(Salix caprea)*	Ave. 7	253	4	4	4	4	0	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	3.036	28
G054	GROUP of Silver Birch *(Betula pendula)*	Ave. 5	Ave. 75	1	1	1	1	0	Semi Mature	20+ Years	Fair	Dense group of birch, 4 to 6 m tall, all less than 100 m DBH.	***Remove for development***	C2	0	705

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
G055	GROUP of Sycamore *(Acer pseudoplatanus)*, Silver Birch *(Betula pendula)* and Goat Willow *(Salix caprea)*	Ave. 6	Ave. 75	2	2	2	2	0	Semi Mature	20+ Years	Fair	Dense group, predominantly willow with occasional ash and hawthorn. 5 to 8 m tall, 75 to 120 mm DBH.	***Remove for development***	C2	0	543
G056	GROUP of Silver Birch *(Betula pendula)*	Ave. 6	Ave. 75	1	1	1	1	0	Semi Mature	20+ Years	Fair	Dense group of birch, 4 to 6 m tall, all less than 100 m DBH.	***Remove for development***	C2	0	136
G057	GROUP of Silver Birch *(Betula pendula)*	Ave. 8	Ave. 75	1	1	1	1	0	Semi Mature	20+ Years	Fair	Dense group of birch, 5 to 8 m tall, 75 to 120 mm DBH.	***Remove for development***	C2	0	424
G058	GROUP of Silver Birch *(Betula pendula)*	Ave. 6	Ave. 75	1	1	1	1	0	Young	20+ Years	Fair	Dense group of birch, 4 to 6 m tall, all less than 100 m DBH.	***Remove for development***	C2	0	57
G059	GROUP of Silver Birch *(Betula pendula)*	Ave. 7	Ave. 80	1	1	1	1	0	Semi Mature	20+ Years	Fair	Dense group of birch, 5 to 8 m tall, 75 to 120 mm DBH.	***Remove for development***	C2	0	95
T060	Goat Willow *(Salix caprea)*	6	250	4	4	4	4	0	Early Mature	20+ Years	Fair	Dense group of willow, 4 to 6 m tall, all less than 100 m DBH.	-	C2	3	28

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
G061	GROUP of Aspen *(Populus tremula)* and Sycamore *(Acer pseudoplatanus)*	Ave. 10	Ave. 75	1	1	1	1	0	Semi Mature	20+ Years	Fair	Aspen, sycamore and occasional birch. 6 to 10 m tall, 75 to 100 mm DBH.	***Remove for development***	C2	0	128
G062	GROUP of Silver Birch *(Betula pendula)*	Ave. 5	Ave. 75	1	1	1	1	0	Semi Mature	20+ Years	Fair	Dense group of birch, 4 to 6 m tall, all less than 100 m DBH.	***Remove for development***	C2	0	434
G063	GROUP of Wild Cherry *(Prunus avium)*, Common Ash *(Fraxinus excelsior)* and Sycamore *(Acer pseudoplatanus)*	Ave. 8	Ave. 100	2.5	2.5	2.5	2.5	0	Early Mature	20+ Years	Poor	Cherry with occasional ash and sycamore. 6 to 10 m tall, 75 to 100 mm DBH.	***Remove for development***	C2	0	54
G064	GROUP of Silver Birch *(Betula pendula)*	Ave. 7	Ave. 100	2	2	2	2	0	Early Mature	20+ Years	Fair	Dense group of birch, 5 to 8 m tall, 75 to 120 mm DBH.	***Remove for development***	C2	0	246
G065	GROUP of Silver Birch *(Betula pendula)*	Ave. 7	Ave. 75	2	2	2	2	0	Early Mature	20+ Years	Fair	Dense group of birch, 5 to 8 m tall, 75 to 100 mm DBH.	***Remove for development***	C2	0	1241
G066	GROUP of Silver Birch *(Betula pendula)*	Ave. 7	Ave. 80	2	2	2	2	0	Early Mature	20+ Years	Fair	Dense group of birch, 5 to 8 m tall, 75 to 100 mm DBH.	***Remove for development***	C2	0	52
G067	GROUP of Aspen *(Populus tremula)*	Ave. 6	Ave. 75	2	2	2	2	0	Semi Mature	20+ Years	Fair	-	***Remove for development***	C2	0	92
T068	Sycamore *(Acer pseudoplatanus)*	7	120	2	2	2	2	2	Semi Mature	20+ Years	Fair	-	***Remove for development***	C2	1.44	6

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T069	Sycamore *(Acer pseudoplatanus)*	7	120	2	2	2	2	2	Semi Mature	20+ Years	Fair	-	***Remove for development***	C2	1.44	6
T070	Sycamore *(Acer pseudoplatanus)*	7	120	2	2	2	2	2	Semi Mature	20+ Years	Fair	-	***Remove for development***	C2	1.44	6
T071	Sycamore *(Acer pseudoplatanus)*	5	120	2	2	2	2	2	Semi Mature	20+ Years	Fair	-	***Remove for development***	C2	1.44	6
T072	Sycamore *(Acer pseudoplatanus)*	5	120	2	2	2	2	2	Semi Mature	20+ Years	Fair	-	***Remove for development***	C2	1.44	6
T074	Sycamore *(Acer pseudoplatanus)*	7	141	2	2	2	2	2	Semi Mature	20+ Years	Fair	-	***Remove for development***	C2	1.692	9
G075	GROUP of Silver Birch *(Betula pendula)* and Goat Willow *(Salix caprea)*	Ave. 6	Ave. 75	1	1	1	1	0	Semi Mature	20+ Years	Fair	Dense willow and birch with buddleia. 4 to 7 m tall, 75 to 100 mm DBH.	***Remove for development***	C2	0	363
G076	GROUP of Silver Birch *(Betula pendula)*	Ave. 5	Ave. 75	1	1	1	1	0	Semi Mature	20+ Years	Fair	Dense group of birch, 4 to 6 m tall, all less than 100 mm DBH.	***Remove for development***	C2	0	227
G077	GROUP of Silver Birch *(Betula pendula)*	Ave. 6	Ave. 75	2	2	2	2	0	Semi Mature	20+ Years	Fair	Dense birch with goat willow and buddleia. 4 to 7 m tall, 75 to 100 mm DBH.	***Remove for development***	C2	0	1066
G078	GROUP of Silver Birch *(Betula pendula)*	Ave. 5	Ave. 75	1	1	1	1	0	Young	20+ Years	Fair	Dense group of birch, 4 to 6 m tall, all less than 100 mm DBH.	***Remove for development***	C2	0	444

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T079	Silver Birch *(Betula pendula)*	6	150	2	2	2	2	0	Early Mature	20+ Years	Fair	-	-	C2	1.8	10
G080	GROUP of Wild Cherry *(Prunus avium)* and Silver Birch *(Betula pendula)*	Ave. 8	Ave. 100	2.5	2.5	2.5	2.5	0	Early Mature	20+ Years	Fair	Group alongside building.	-	C2	0	206
G081	GROUP of Sycamore *(Acer pseudoplatanus)*, Silver Birch *(Betula pendula)* and Goat Willow *(Salix caprea)*	Ave. 10	Ave. 150	4	4	4	4	0	Mature	20+ Years	Fair	More mature willow on boundary with occasional sycamore and birch.	-	C2	0	193
G082	GROUP of Sycamore *(Acer pseudoplatanus)*	Ave. 5	Ave. 120	2	2	2	2	0	Young	20+ Years	Fair	-	-	C2	0	96
G083	GROUP of Silver Birch *(Betula pendula)*	Ave. 5	Ave. 75	1.5	1.5	1.5	1.5	0	Young	20+ Years	Fair	Dense group of birch, 4 to 6 m tall, all less than 100 m DBH.	-	C2	0	54
G084	GROUP of Goat Willow *(Salix caprea)*	Ave. 8	Ave. 120	3	3	3	3	0	Early Mature	20+ Years	Fair	Dense group of willow, 6 to 8 m tall, all less than 100 m DBH.	-	C2	0	149
G085	GROUP od Silver Birch *(Betula pendula)* and Common Hawthorn *(Crataegus monogyna)*	Ave. 6	Ave. 90	2	2	2	2	0	Semi Mature	20+ Years	Fair	Dense group of birch and hawthorn, 4 to 6 m tall, all less than 100 mm DBH.	-	C2	0	172

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
G086	GROUP of Silver Birch *(Betula pendula)* and Goat Willow *(Salix caprea)*	Ave. 6	Ave. 100	3	3	3	3	0	Semi Mature	20+ Years	Fair	Dense group of birch and goat willow, 4 to 6 m tall, all less than 100 mm DBH.	-	C2	0	67
G087	GROUP of Silver Birch *(Betula pendula)* and Goat Willow *(Salix caprea)*	Ave. 6	Ave. 100	3	3	3	3	0	Semi Mature	20+ Years	Fair	Dense group of birch and goat willow, 4 to 6 m tall, all less than 100 mm DBH.	-	C2	0	23
G088	GROUP of Silver Birch *(Betula pendula)* and Goat Willow *(Salix caprea)*	Ave. 10	Ave. 120	3	3	3	3	0	Early Mature	20+ Years	Fair	Dense woodland group.	-	B2	0	1487
G089	GROUP of Goat Willow *(Salix caprea)*	Ave. 4	Ave. 75	3	3	3	3	0	Young	20+ Years	Fair	Dense group of goat willow, 2 to 4 m tall, all less than 80 mm DBH.	-	C2	0	152
G090	GROUP of Silver Birch *(Betula pendula)*	Ave. 4	Ave. 75	1	1	1	1	0	Young	20+ Years	Fair	Dense group of birch, 2 to 4 m tall, all less than 80 mm DBH.	-	C2	0	138
G091	GROUP of Wild Cherry *(Prunus avium)* and Goat Willow *(Salix caprea)*	Ave. 6	Ave. 75	1	1	1	1	0	Semi Mature	20+ Years	Poor	Dense group of cherry and goat willow, 4 to 6 m tall, all less than 100 mm DBH.	***Remove for development***	C2	0	116

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m²)
G092	GROUP of Sycamore *(Acer pseudoplatanus)* and Silver Birch *(Betula pendula)*	Ave. 5	Ave. 100	2	2	2	2	0	Semi Mature	20+ Years	Fair	Dense group of birch and sycamore, 4 to 6 m tall, all less than 100 mm DBH.	***Remove for development***	C2	0	120
G093	GROUP of Wild Cherry *(Prunus avium)* and Silver Birch *(Betula pendula)*	Ave. 5	Ave. 75	2	2	2	2	0	Semi Mature	20+ Years	Fair	Dense group of cherry and birch, 4 to 6 m tall, all less than 100 mm DBH.	***Remove for development***	C2	0	229
G094	GROUP of Goat Willow *(Salix caprea)*	Ave. 4	Ave. 75	2	2	2	2	0	Young	20+ Years	Fair	Dense group of goat willow, 2 to 4 m tall, all less than 80 mm DBH.	***Remove for development***	C2	0	86
G095	GROUP of Silver Birch *(Betula pendula)*, Sycamore *(Acer pseudoplatanus)* and Goat Willow *(Salix caprea)*	Ave. 5	Ave. 75	1	1	1	1	0	Young	20+ Years	Poor	Dense group of birch, willow and sycamore, 4 to 6 m tall, all less than 100 mm DBH.	***Remove for development***	C2	0	215
G096	GROUP of Silver Birch *(Betula pendula)* and Sycamore *(Acer pseudoplatanus)*	Ave. 5	Ave. 90	2	2	2	2	0	Semi Mature	20+ Years	Poor	Dense group of birch and sycamore, 4 to 6 m tall, all less than 100 mm DBH.	***Remove for development***	C2	0	164
T097	Silver Birch *(Betula pendula)*	10	139	2	2	2	2	0	Early Mature	20+ Years	Fair	-	-	C2	1.668	9
T098	Sycamore *(Acer pseudoplatanus)*	5	100	3	3	3	3	1	Semi Mature	20+ Years	Fair	-	-	C2	1.2	5
T099	Sycamore *(Acer pseudoplatanus)*	8	120	2	2	2	2	1	Semi Mature	20+ Years	Fair	-	-	C2	1.44	6

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
T100	Sycamore *(Acer pseudoplatanus)*	10	240	3	3	3	3	1	Semi Mature	20+ Years	Fair	-	-	C2	2.88	26
T101	Sycamore *(Acer pseudoplatanus)*	12	600	4	4	4	4	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	7.2	163
T102	Sycamore *(Acer pseudoplatanus)*	7	100	2.5	2.5	2.5	2.5	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	1.2	5
T103	Sycamore *(Acer pseudoplatanus)*	12	500	4	4	4	4	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	6	113
T104	Sycamore *(Acer pseudoplatanus)*	6	200	2	2	2	2	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	2.4	18
T105	Sycamore *(Acer pseudoplatanus)*	12	346	4	4	4	4	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	4.152	55
T106	Sycamore *(Acer pseudoplatanus)*	10	424	4	4	4	4	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	5.088	82
T107	Goat Willow *(Salix caprea)*	6	179	3	3	3	3	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	2.148	14
T108	Sycamore *(Acer pseudoplatanus)*	10	283	3	3	3	3	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	3.396	36
T109	Sycamore *(Acer pseudoplatanus)*	12	350	4	4	4	4	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	4.2	55
T110	Sycamore *(Acer pseudoplatanus)*	11	300	4	4	4	2	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	3.6	41
G111	GROUP of Goat Willow *(Salix caprea)*	Ave. 5	Ave. 75	3	3	3	3	0	Semi Mature	20+ Years	Poor	Willow scrub around sycamore.	***Remove for development***	C2	0	618
T112	Sycamore *(Acer pseudoplatanus)*	8	180	3	3	2	3	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	2.076	14
T113	Sycamore *(Acer pseudoplatanus)*	8	180	2	2	2	2	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	2.076	14

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m²)
T114	Sycamore *(Acer pseudoplatanus)*	9	180	3	3	3	3	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	2.076	14
T115	Silver Birch *(Betula pendula)*	9	180	2	2	2	2	0	Mature	20+ Years	Fair	-	-	C2	2.076	14
T116	Common Ash *(Fraxinus excelsior)*	5	100	1	2	3	1	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	1.2	5
T117	Goat Willow *(Salix caprea)*	7	180	3	3	3	3	0	Mature	20+ Years	Fair	-	***Remove for development***	C2	2.076	14
T118	Sycamore *(Acer pseudoplatanus)*	7	100	3	3	3	3	0	Mature	20+ Years	Fair	-	-	C2	1.2	5
T119	Goat Willow *(Salix caprea)*	6	180	3	3	3	3	0	Mature	20+ Years	Fair	-	-	C2	2.076	14
G120	GROUP of Silver Birch *(Betula pendula)*	Ave. 10	Ave. 100	2	2	2	2	0	Semi Mature	20+ Years	Poor	Group alongside building.	***Remove for development***	C2	0	605
G121	GROUP of Goat Willow *(Salix caprea)*	Ave. 6	Ave. 100	3	3	3	3	0	Early Mature	20+ Years	Fair	Group of more mature goat willow screening building.	***Remove for development***	C2	0	329
T122	Goat Willow *(Salix caprea)*	6	180	4	4	4	4	0	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	2.076	14
T123	Goat Willow *(Salix caprea)*	6	141	4	4	4	4	0	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	1.692	9
T124	Goat Willow *(Salix caprea)*	5	179	3.5	3.5	3.5	3.5	0	Early Mature	20+ Years	Fair	-	***Remove for development***	C2	2.148	14

Tree No	Species	Ht (m)	Stem Diam @ 1.5 m (mm)	Canopy Spread (m) N- E- S- W				Height of Crown Clearance	Age Class	Est yrs	Overall Condition	Comments	Management Recommendations	BS 5837 Category	RPA Radius (m)	RPA (m^2)
G125	GROUP of Lawson Cypress *(Chamaecyparis lawsoniana)* and Common Ash *(Fraxinus excelsior)*	Ave. 4	Ave. 130	1.5	1.5	1.5	1.5	0	Semi Mature	20+ Years	Poor	Small trees adjacent to car park.	***Remove for development***	C2	0	20
T126	Rowan *(Sorbus aucuparia)*	6	350	3	2	3	3	0	Early Mature	20+ Years	Poor	-	***Remove for development***	C2	4.2	55
T127	Rowan *(Sorbus aucuparia)*	6	350	3	3	3	2	0	Dead	Dead	Dead	Dead tree.	***Remove tree***	U	0	0
T128	Silver Birch *(Betula pendula)*	6	80	1	1	1	1	0	Young	20+ Years	Fair	-	-	C2	0.96	3
G129	GROUP of Common Ash *(Fraxinus excelsior)*	Ave. 3	Ave. 106	2	2	2	2	0	Young	10+ Years	Poor	2 small ash adjacent to car park.	-	C2	0	27
T130	Goat Willow *(Salix caprea)*	3	100	3	2	2	1	0	Semi Mature	10+ Years	Poor	-	-	C2	1.2	5

Appendix 2 – Arboricultural Impact Assessment Methodology

6. Arboricultural Impact Assessment

6.1 Introduction

6.1.1 A BS5837 arboricultural impact assessment has been carried out for trees present across the Site. This methodology evaluates the direct and indirect effects of the Proposed Development and where necessary recommends mitigation. The standard states, "*The assessment takes 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 has been taken of the buildability of the scheme in terms of access, adequate working space and provision for the storage of materials, including topsoil*."

6.1.2 There are no published criteria, guidance or methodologies for the assessment of effects of development on forestry, trees or woodland. The Forestry Commission published 'Environmental Impact Assessment for Forestry Projects' in February 2019 however this is concerned with forestry operations and is not relevant to trees on development sites. As a result, the assessment of effects is made based on professional judgement, with reference to:

- the sensitivity of the tree population present in the study area taking account of the degree and rate of change in the tree population, both in the recent past and that anticipated in the near future, and therefore the susceptibility/vulnerability of the tree population to change; the quality of the tree population (based on the categorisation method outline in BS5837:2012 broadly based on amenity value and useful life expectancy) and the extent to which it is rare or distinctive, the value attributed to the tree population through designations;
- magnitude of change and extent of tree removal, impact of proposed development on retained trees and impact of any required tree work;
- duration and reversibility - timescale of effect (days/weeks/months/years) until recovery. Permanent effects are described as such, and likelihood of recovery is detailed where appropriate; and
- adverse/beneficial - if the effect will be beneficial or detrimental to the feature.

6.1.3 The effect of tree removal is normally considered to be of an adverse nature; however indirect beneficial effects in some areas may arise where the introduction of a proposed development allows for the removal of ecologically habitat-poor or discretionary trees. This may be followed up by detailed landscape masterplans, ecological and woodland management plans or schemes of compensatory planting to replace lost trees with more beneficial individuals.

6.1.4 Baseline survey methodologies and data sources used to inform this assessment, including the BS5837:2012 tree surveys.

6.1.5 BS5837:2012 is the accepted standard for the management of trees on development sites. The standard offers advice on the assessment of impacts of a scheme on trees, based on a tree survey carried out to the same BS5837 specifications.

6.1.6 As well as an evaluation of the extent of the impact on existing trees, the arboricultural impact assessment has included:

a) the tree survey;

b) trees selected for retention, clearly identified (e.g. by number) and marked on a plan with a continuous outline;

c) trees to be removed, also clearly identified (e.g. by number) and marked on a plan with a dashed outline or similar;

d) trees to be pruned, including any access facilitation pruning, also clearly identified and labelled or listed as appropriate;

e) areas designated for structural landscaping that need to be protected from construction operations in order to prevent the soil structure being damaged;

f) evaluation of impact of proposed tree losses;

g) evaluation of tree constraints and draft tree protection plan;

h) issues to be addressed by an arboricultural method statement, where necessary in conjunction with input from other specialists.

6.2 Sensitivity of Receptors

6.2.1 Four categories of sensitivity are defined in Table 9.1:

Table 9.1: Definitions of Sensitivity Levels of Trees/Woodland/Forestry

Value	Definition
Very High	Receptor has little or no ability to absorb change without altering its present character, is of very high environmental value, or of international importance.
High	- Highly valued, subject of national designation e.g. Ancient Woodland Category, veteran and heritage trees - Particularly rare or distinctive in a national context; or - Considered susceptible to small changes.
Medium	- Valued more locally, subject to local designation; - Mainly B and C category trees - Rare or distinctive in a regional context; and/or - Are tolerant of moderate levels of change
Low	- Generally, more commonplace, not designated; - Mainly C category trees - Considered potentially tolerant of noticeable change; or - Undergoing substantial development such that their character is one of change.
Negligible	- Low quality, insignificant trees, mainly C and U category - Considered tolerant of noticeable change; or - Having undergone substantial development such that their character is one of change.

6.3 Magnitude of Change

6.3.1 The magnitude of change has been assessed with reference to the four categories defined in Table 9.2:

Table 9.2: Definitions of Magnitude of Change Levels

Magnitude	Definition
High	A noticeable change to the tree population over a wide area or an intensive change over a limited area.
Medium	Small changes to the tree population over a wide area or noticeable change over a limited area.
Low	Very small changes to the tree population over a wide area or small changes over a limited area.
Negligible	No discernible change to the tree population.

6.4 Significance of Effect

6.4.1 The significance of the effect is calculated by combining the sensitivity of the receptor (Table 9.1) with the magnitude of change (Table 9.2) in Table 9.3 below.

Table 9.3: Framework for Assessment of the Significance of Effect

Magnitude of Change	Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Appendix 3 – Figures