ARBORICULTURAL IMPACT ASSESSMENT

BS 5837:2012 Trees in Relation to Design, Demolition and Construction-Recommendations

Arboricultural Survey and

Impact Assessment Report

Lord Hill, Abbey Foregate, Shrewsbury SY2 6AX

Prepared for:

SY Homes (Old Coleham) ltd

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TREE CONDITION AND ARBORICULTURAL IMPACT ASSESSMENT

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CONTENTS:

1.0 INTRODUCTION and SURVEY METHODOLOGY

1.01 Lingard Farrow Styles were commissioned by SY Homes (Old Coleham) ltd to carry out a tree survey and assessment of the existing trees and prepare an AIA report to support a full planning application for a proposed residential development. The inspection was carried out on the 27 May 2021 and proceeded in line with the recommendations outlined in the British Standard **'Guide for Trees in Relation to Design, Demolition and Construction' (BS 5837:2012) section 'Tree Surgery, Tree Categorisation and Tree Constraints Plan'** and is required as an essential part of the development planning process.

1.02 The issues to be addressed in this report include:

- The condition and amenity value of the trees within the site.
- The relevant Planning Policy.
- The impact of the proposed development on the tree resource.
- Information on the protection of retained trees.

1.03 Tree Survey.

- This report is to be read in conjunction with LFS Tree Survey and Tree Protection Plan dwg. no 3083-TPP.
- The survey involved a visual inspection of 9 no specimen trees, tree groups and mature shrubs in accordance with BS 5837:2012.
- The visual inspection was carried out from ground level and aided by the use of binoculars to assist in the high-level condition assessment of the trees.
- Trees were not climbed.
- Tree dimensions were measured using a combination of a Richter Diameter Tape, Leica Disto Laser Rangefinder and a Nikon 550 Forestry Pro Laser Rangefinder.
- Trees were recorded with a stem diameter of 75mm plus (measured at a height of 1.5m above ground level unless otherwise stated in the tree schedules). Trees less than this stem diameter were recorded as shrubs or hedges.
- Any multistem tree diameters were measured and recorded as an aggregate diameter in accordance with BS 5837:2012.
- The trees were not tagged at the inspection.

- Internal main stem investigations were not carried out.

1.04 Weather conditions at the time of the tree assessment were cool and overcast

1.05 Quest Design and Planning architects proposed layout and drawing informs this TPP together with Lingard Farrow Styles dwgs nos 3083-001Rev A and 3083-002.

1.06 No soils samples were taken.

2.0 SITE DESCRIPTION

2.01 The site is adjacent to the A5112 Bage Way and is located off Abbey Foregate in Shrewsbury. The development proposals include the change of use of the main hotel building to residential and includes the development of the existing lodge building area and car park. The site contains a number of mature trees and shrubs.

2.02 All trees, and mature shrubs were assessed within the site. A number of trees are on the joint boundary to the east with the adjoining residential property. Their close proximity to the proposed development required that their Root Protection Areas (RPA) were assessed to consider any impacts from the proposed development.

2.03 As part of the development proposals all specimen trees will be retained. The tree group and specimen trees (T05,T06,T07and TG08) to the east of the proposals are a cohesive landscape feature and are prominent to public views. As such they warrant a higher grading. Tree/shrub groups SG09 and TG03 are recommended for removal to facilitate development. Specimen tree T02 is a prominent landscape feature and will be retained.

2.04 The site is within Shrewsbury Conservation Area.

3.0 EXISTING TREES

3.01 The quality and value of each tree or group of trees is recorded in the attached tree schedule. Each tree is allocated to one of four categories each of which is explained under the headings 'Tree Categorisation' in Section 4.0 and the BS Cascade Chart for Tree Quality Assessment shown in table 1 (appendix 10.3).

A	Good	Retain at all cost
B	Medium	Retain
C	Fair	Retain
U	Dead	Remove from site

The position of the trees is indicated on the attached LFS identification plan dwg.no 3083-TPP.

3.02 Although this is not a condition survey, the general condition of the trees is recorded and management recommendation may be made particularly where safety issues may be of concern from this brief ground level inspection. Trees should be subject to

regular tree condition inspections and appropriate management and a full tree condition inspection is recommended and particularly on completion of any development.

3.03 The survey involved recording each specimen tree or group within the site boundary with a stem diameter of above 75mm. In addition the trees over this size growing on land adjacent to the site and which are at or within a distance equal to 12 times their stem diameter from the boundary were included in the assessment.. This is to ensure that adequate consideration is given during site development planning to root zones and canopies from adjacent trees which may impact on the site.

3.04 Additional information recorded in the tree schedules is shown in appendix 10.1 Table 1 and is in accordance with BS 5837:2012.

4.0 TREE CATEGORISATION

4.01 The primary purpose of this report is to provide an assessment of the trees and to determine their suitability for retention on the proposed development. To assist in this assessment the trees are categorised and given an appropriate grading. This grading is recorded in the attached tree schedules (appendix 10. 2, by colour code the tree survey LFS dwg no 3083-TPP and the BS Cascade Chart for Tree Quality Assessment shown in table 2 (appendix 10.3).

4.02 Where young trees occur as individual specimens i.e. trees with stems less than 150mm diameter at 1.5m above ground level they are graded as C trees. Although these trees may have the potential to develop into mature specimens, as is the case with Ash or Oak, they should not be allowed to dominate site layout considerations. In such cases there would be an opportunity to lift and transplant smaller trees to other locations.

4.03 The number of trees and shrub groups in each category area (total 9 no):

Grade A High quality: 1 no: TG08
Grade B Moderate quality: 4no: T02, TG04, T05,T07.
Grade C Low quality: 4no T01, TG03, T06, SG09
Grade U Unsuitable remove: None

5.0 ARBORICULTURAL IMPACT ASSESSMENT

5.01 Arboricultural impacts are a predicated change in condition as a result of a proposed development activity. This assessment provides an evaluation of the probable direct and indirect effects on the existing trees and the effect of the trees on the development. The assessment considers the condition and

character of the trees and includes, where required, impact mitigation recommendations.

5.02 Impact of the Proposed Development on Trees

In all the total number of trees and shrub groups removed to facilitate the proposed development will be 2no (2no Grade C).

Fig 1. Tree losses & management required to implement the proposals

T Spec. TG/SG Group H Hedge				
BS 5837 Grade	**A High**	**B Moderate**	**C Low quality**	**U Unsuit**
Trees Removed	**nil**	**nil**	**nil**	**nil**
Trees Managed	**nil**	**T02**	**nil**	**nil**

5.03 The medium /long term impact of the proposed development on local amenity, landscape character and screening is therefore considered to be **LOW**.

5.04 As part of the site development proposals there will be landscape mitigation in the form of new tree and shrub planting .(See Lingard Farrow Styles landscape plans dwgs nos 3083-001Rev A and 3083-002). Suitable trees would include *Betula pendula, Malus sylvestris, Pinus nigra, Alnus incana* and *Quercus robur.*

5.05 The medium /long term impact of the proposed development on amenity, landscape character and screening is therefore considered to be **LOW.**

5.06 Potentially damaging construction activities adjacent to trees.

Fig 2.Tree that require to be protected by special precautions

T Spec. TG/SG Group H Hedge				
BS 5837 Grade	**A High**	**B Moderate**	**C Low**	**U Unsuitable**
Trees protected by special precautions other than fencing and ground protection (no dig methods)	**nil**	**T02**	**nil**	**nil**

The proposed development impact on retained trees is considered to be **LOW**. All potentially damaging construction activities can be controlled by arboricultural supervision and appropriate construction method statements.

6.0 IMPACT OF PROPOSALS ON EXISTING TREES

6.01 The potentially damaging effects of construction activities have been considered as follows:

Fig 3. Potential effects of construction activity

Activity	Scope of Activity	Impact
1.Site access	The proposal utilizes existing hard surfaced road for main site access and most intensive construction activities	Nil
2.Contractor parking	Provided by an existing car park adjacent to the development site	Nil
3.Workspace	Provided within the existing adjoining cleared areas without affecting the Root Protection Areas of any retained trees	Nil
4.Storage	Storage areas can be provided on site and outside the Root Protection Areas of all retained trees	Nil

6.02 Future pressure for tree removal

Trees retained in close proximity to structures and hard surfacing have the potential to cause damage. Where these impacts are perceived as high there is likely to be pressure to remove retained trees. The assessment of how proposed development will be affected by retained trees is as follows:

Fig 4. Potential effects of future growth

Activity	Outcome	Impact
1.Shading	The proposed development will be subject to tree shading from the east during the day. This impact has been predicted and accepted by the client, therefore no future pressure on retained trees.	Nil
2.Structural damage	There is sufficient space in the	Nil.

	proposals for the future root spread of trees nos T02. This will also be controlled by the management of the canopies.	

6.03 Protection and Construction

All excavation, soil-stripping or site grading within the protected area will be monitored by an ACW (Arboricultural Clerk of Works). Passage of vehicles across the unprotected soil surface must also be avoided, especially when the soil is wet, as this will cause breakage of the surface roots, soil compaction and consequently reduced soil aeration. Surviving roots may not be able to grow through the compacted soil.

6.07 Conclusions on Impacts

Given that the specified protection is implemented to protect the retained trees (as specified in the Arboricultural Method Statement section 7.0), and the specific construction considerations given to the long term retention of tree nos. T02 and off site trees T05, T06, T07, TG08 and TG04, the development proposal will have a **LOW** impact on the value of the existing trees to the local public amenity or landscape character.

Sufficient space has also been included in the development proposals for the planting of new trees to provide mitigation against the proposed tree loss.

7.0 ARBORICULTURAL METHOD STATEMENT

701 Once layout proposals have been finalized the British Standard recommends a Tree Protection Plan (TPP) is prepared. (LFS dwg.no 3083-TPP).

All retained trees will be protected with fencing in accordance with BS 5837:2012 prior to commencement of site construction works (see appendices 10.8) and in agreement with the Local Planning Authority Arboricultural Officer.

7.02 The Root Protection Area (RPA)

This is established using Table D1 Annex D from BS 5837:2012. For single stem trees the RPA is calculated as an area equivalent to a circle with a radius 12 times the stem diameter, measured in accordance with Annex C of BS 5837:2012. In the case of multi stemmed trees with five or less stems the RPA is calculated by the combined stem diameter multiplied by the number of stems. With more than five stems the mean stem diameter is multiplied by the number of stems. The RPA's are indicated as a radius in the tree schedule Appendix 10.2 and shown on LFS dwg.no 3059-TPP. These distances provide an Exclusion Zone for site construction works. The erection of a substantial protective barrier is required at these distances and the type of suitable fencing is indicated in Appendix 10.8.

BS5837:2012 recommends that where incursions into RPA's are necessary construction methods must be adopted that cause as little damage to the rooting environment as possible and no more than 20% of the RPA is covered with hard construction.

Fig 5. Tree protection modication schedule

Tree no & species	Root protection area (m2)	BS min radial protection	Modified	Justification for modification	Position of fence from base of tree (m)
T02. Willow	**191**	**7.80**	**Yes**	**Effect of retaining wall on root morphology**	**2.0 from base of tree to northeast and southwest and 1.0 from base of tree southeast**
T08. Mixed tree group	**Max 707**	**Max 15.0**	**Yes**	**Reduced on northwest due to effect of existing road and fence line on root morphology**	**1.0 from line of existing boundary fence**

7.03 Rationale for Tree Protection

The part of the tree most susceptible to damage is the root system, which because it is not immediately visible, is most frequently ignored, although the stem and branches are also vulnerable. Damage or death of the root system will affect the health, growth, vigour, life expectancy and safety of the rest of the tree. This is because the majority of the tree's root system is found within the top 600mm of the soil profile, extending radially for a distance frequently in excess of the tree's height. The parts of the root system which are active in water and nutrient uptake are very fine, typically less than 0.5mm diameter. It is essential that the conditions in the soil remain conducive to healthy growth of these fine roots so that water and nutrients necessary for healthy tree growth can be absorbed, in addition to water and nutrients, roots, in order to function, require oxygen from the soil for the purpose of respiration. Diffusion between the soil and the atmosphere is essential. Anything which disturbs this balance will affect the condition of the root system and in turn the health of the tree. Compaction of the soil within the rooting zone of a tree will create long term damage through preventing respiration and the percolation of water. Vehicles tracking over the soil are responsible for such damage and such action must be reduced or avoided during construction works.

7.04 Construction Exclusion Notices

On completion of the exclusion zone protection by barriers and/or ground protection construction works can commence. All weather notices should be erected on the barrier with words such as 'Construction Exclusion Zone – Keep Out' (see appendix 10.8). A qualified and experienced person will visit the site to check the tree protection and signs until the protection is removed.

7.05 Additional Considerations

In addition the following shall be addressed or avoided:

a) Care shall be taken when planning site operation to ensure that wide or tail loads, or plant with booms such as jibs and counterweights can operate without coming into contact with retained trees. Such contact can result in serious damage to them and might make their safe retention impossible. Consequently any transit or traverse of plant in close proximity to trees shall be conducted under the supervision of a banksman to ensure that adequate clearance of trees is maintained at all times. In some circumstances it may be impossible to maintain adequate clearance thus necessitating access facilitation pruning.

b) Material which will contaminate the soil e.g. concrete mixings, diesel oil and vehicle washings shall not be discharged within 10m of the tree stem.

c) Fires shall not be lit in a position where their flames can extend to within 5m of foliage, branches or stem. This will depend on the size on the size of the fire and the wind direction.

d) Notice boards, telephone cables or other services shall not be attached to any part of the tree.

e) Trees to be felled that are adjacent to, or, that lie within a continuous canopy of trees to be retained will be removed with particular care. In some cases a tree may have to be removed in sections.

7.06 Maintaining the Protective Barrier

Special attention should be given to maintain the 'Protective Barrier' during the construction phase ensuring that it remains rigid and complete. In order to avoid disturbances to the Protective Barrier once it is installed it should be inspected on a daily basis. Repairs shall be made immediately should it be damages or not fit for the purpose intended.

7.07 Site Construction Area

Position to be outside the Root Protection Areas (RPA's) with access to be agreed with the contractor prior to commencement.

7.08 Contractors Car Parking

Position to be outside the Root Protection Areas (RPA's) with access from the existing car park.

7.09 Intensity and nature of Construction Activity

It is anticipated that construction activity will be high. All Construction Exclusion Zones must be fenced off prior to commencement.

7.10 Phasing of Construction Works

The phasing plan must include reference to the maintenance of tree protection zones particularly with material storage and service runs.

7.11 Space required for Excavated Materials.

All proposed excavated materials are to be stored well outside the RPA's of the retained trees. Position to be agreed prior to site works commencement.

7.12 Underground Service Routes

The location and routes for the existing services are outside the protection area for the trees. Any new services lines within the RPA's will be routed beneath tree roots without damaging them utilizing hand dug trenches or a 'mole'.

To avoid damage to shallow feeder roots all changes of level will be minimized and monitored during site operations.

Vegetation to be removed on the existing soil surface will be eliminated utilizing hand cultivation.

All excavations close to retained trees will be undertaken by hand to avoid damage to bark and roots. All exposed roots with a diameter of greater than 25mm are significant and need to be retained. Once revealed they are to be surrounded with sharp sand and backfilled and temporarily protected with damp hessian.

7.13 Changes in Ground Level

There are some level changes proposed within the established RPA's of retained trees the impacts of which are covered in this report.

7.14 Space for Cranes, Plant and Scaffolding

The limited factors in terms of these considerations are the trees and the size and weight of the equipment. Often tall vehicles collide and cause collision injury to trees environment and the tree's physiology. For this reason, care must be taken when operating cranes to avoid collision injury occurring. All plant must be tracked on, off and around the site avoiding the established RPA's. Where there is no alternative and with acceptance of a Method Statement by the LAP tracking over root plates may be possible, if load bearing ground plates are used and are sufficient to support the spread and load of the plant equipment. This may not be possible on sloping ground.

7.15 Space for site Huts, Temporary Latrines and other Structures.

Site huts and latrines are to be located within an area of the site that is outside the RPA's.

7.16 The Type and Extent of Landscaping Works required within Tree Protection Areas.

Any landscape design shall take account of the existing trees and any proposed planting within their RPA's shall be avoided where possible (see proposed LFS landscape plan 3059-01.

7.17 Space for Storing Materials, Spoil and Fuel and for the Mixing of Cement and Concrete.

Such activities can have implications on tree health if they occur within the established RPA or if they have the ability to run into an RPA. All such activities will be kept clear of such special areas. A 'Cement Washing Zone' shall be created at least 15m away from any retained tree.

7.18 The Effects of Slope on the Movement of Potentially Harmful Liquid Spillage on or into Protected Areas.

It is essential that allowances will be made for the slope of the ground so that damaging material such as concrete washings, mortar or diesel oil cannot run towards tree root zones. In such areas a ground level barrier of timbers covered with heavy duty PVC dug into the ground outside of the tree root zones will be required. This barrier will require daily inspection to monitor its integrity.

7.19 Arboricultural Supervision

Site supervision during any proposed tree work operations are to be undertaken by a suitably qualified person in conjunction with the Local Authority Arboriculture Officer. All tree work is to be carried out in accordance with BS 3998:2010 Tree Work Recommendations.

7.20 Tree Removal

Of the 9no existing specimen trees and shrub groups assessed, 7no will be retained and incorporated into the new development scheme. 2no will be removed to facilitate development. There are no trees recorded as unsafe at the time of the assessment.

7.21 Tree Replanting /Mitigation

The proposed removal of the no trees and shrub groups will be compensated by the planting of new trees throughout the development together with the planting of ornamental shrubs and hedges (See Lingard Farrow Styles landscape plans dwgs nos 3083-001 Rev A and 3083-002).

7.22 Summary of Arboricultural Considerations - Construction Stage

Site supervision during the construction phase operations and will be undertaken by a suitably qualified person Arboricultural Clerk of Works (ACW) in conjunction with the Local Authority Arboriculture Officer.

Fig 6. Programme of Phasing and Arboricultural Input

Phase	Arboricultural Input
Pre-Demolition	• Supply all main demolition contractors with a copy of the AIA, Method • Statements and Tree Protection Plan. • Inform all site staff and contractors of the tree protection implications and restrictions as part of the site induction requirements. • Erect site boundary security fence. • Initial meeting between contractors, developers and arboriculturist to clarify tree issues. • Erect tree protective fencing to the identified CEZ's in accordance with the Tree Protection Plan • Site inspection before demolition/construction by Arboriculturists and LA Tree Officer.
Demolition	• Inspection of tree protection barriers prior to commencement of demolition/construction. • Carry out an auditable system of arboricultural site monitoring on a regular basis during periods of intense demolition adjacent to existing retained trees. • Carry out any agreed tree work including removal of agreed trees. • Site inspection by Arboriculturist following the completion of demolition to confirm condition of tree protective fencing to the identified CEZ's.
Pre-Construction	• Supply all main construction contractors with a copy of the AIA, Method Statements and Tree Protection Plan. • Inform all site staff and contractors of the tree protection implications and restrictions as part of the site induction requirements. • Initial meeting between main contractors, developers and arboriculturist to clarify tree issues.

	• Site inspection before construction by Arboriculturists and LA Tree Officer to confirm that tree protection is in place prior to commencement of construction.
Construction	• Carry out an auditable system of arboricultural site monitoring on a regular basis during periods of intense construction adjacent to existing retained trees. • Site inspection by Arboriculturist following the completion of construction and prior to the removal of tree protective barriers.
Post Construction	• On completion of the main construction works remove tree protective fencing to the CEZ's. • Commence soft landscape and tree planting works

8.0 LEGAL AND PLANNING CONSTRAINTS REGARDING TREES ON SITE

8.01 The legal considerations referred to are general constraints that relate to arboriculture and do not cover any other legal matters that may be relevant on this site.

8.02 **The Wildlife and Countryside Act 1981** protects nesting birds and to disturb nesting birds can be a criminal off offence. Therefore, if tree works are programmed during the nesting season, between March and August, and should nesting birds be present, then all but essential works will need to be postponed. If during the undertaking essential works a nest or nests are found to be present, then further advice will be sought from the relevant authority.

8.03 **Tree Preservation Orders and Conservation Area Status.**

The law on TPOs is in **Part Viii of the Town and Country Planning Act Town and Country Planning (Trees) Regulations 1999.** When any tree is protected by a TPO or are situated within a Conservation Area it is an offence (1) cut down (2) uproot (3) top (4) lop (5) wilfully damage or (6) wilfully destruct a tree without the express written permission from local Planning Authority (LPA), there are exceptions:

- Cutting down trees in accordance with a grant scheme, or where a felling licence has ben granted.
- Cutting down or cutting back a tree which is dying, dead, or dangerous.

- In line with an obligation under an Act of Parliament.
- At the request of certain organisations specified in the order.
- A tree which is directly in the way of development that is about to start for which detailed planning permission has been granted.
- In a commercial orchard or pruning fruit trees in accordance with good horticultural practice.
- To prevent or control a legal nuisance.

8.04 Wildlife and Countryside Act (as amended) Conservation (Natural Habitat) Regulations (1994) 5.1 In Britain, all bats and their roost sites are currently protected by law. The part that protects them is found within the Wildlife and Countryside Act 1981 and as amended by schedule 12 of the Countryside and Rights of Way Act 2000 and the conservation Regulations 1994 under Section 39 (1). The legislation makes it an offence to intentionally or recklessly damage, destroy or obstruct access to a site used by bats whether bats are present at the time or not. This can include work on trees whether it is surgery, felling, the covering or filling of cavities or the installation of rod braces and flexible cable braces where a bat roost is present.

There are some 16 species of bat native to the British Isles, all are insectivorous and depend to some extent on habitat in which trees are a significant element. Bats are a protected species and are in decline both globally and nationally. Therefore, they are to be fully considered before any tree work commences and particularly if the trees are mature. If a bat roost is known to be in any tree that is to be removed or worked on, a licence must be obtained from Natural Resources England.

Where there is a risk that bat roosts may be present, it is incumbent upon the owner to commission a specialist bat survey to identify bat roosts before instruction for tree surgery to commence. Failure to do so and in the event of disturbing a roost site and upon conviction is an offence. Maximum penalties for committing offences relating to bats or their roosts can amount to imprisonment for a term not exceeding six months or to fines of up to Level 5 on the standard scale under the Criminal Justice Act 1982/1991 per roost or bat disturbed or killed or both.

8.05 Statute and Common Law

A landowner should be aware that both statute and common law dictates regular inspections of trees on land in their control are necessary where such trees could cause injury or damage in the event they should fall or shed any parts. A person suitably qualified in arboriculture should undertake such routine inspections and any remedial tree works recommended within the time constraint specified, to prevent injury or damage occurring. A landowner should retain records of all inspections and any remedial tree works that have resulted from such inspections.

8.06 Forestry Act 1987

A felling licence is required wherever an excess of 5 cubic meters of timber is felled per calendar quarter. Exceptions to the Act include felling trees which when measured at 1.3m above ground level have a stem diameter of 8cm or below.

Other exceptional felling includes:

- Thinning of trees with a stem diameter of 10cm or below
- Coppicing of trees with a diameter of 15cm or below

Exceptions are also afforded to work carried out by statuary undertakers i.e. removal of dangerous/dead trees, prevention of abatement of a nuisance and to prevent the spread of quarantined pests or diseases in accordance with a notice served by a Forestry Commission Plant Health Officer.

When full planning permission is authorised, both statutory obligations described above are no longer applicable and are transcended by the Town and Countryside Planning Act of 1990, which permits tree removal for the purpose of development.

The site will not be subject to the provisions of the Forestry Act.

8.07 Hedgerow Regulations 1997

Hedgerows are protected by the Hedgerows Regulations 1997. A summary of the regulations is contained in the Defra leaflet 'The Hedgerows Regulations: Your Questions Answered'. More detailed guidance is contained in 'The Hedgerows Regulations 1997: A Guide to the Law and Good Practice'.

Permission is required from the local planning authority before removing hedges that are:

- At least 20 metres in length
- Over 30 years old
- Contains at least 7 woody species per 30m2
- Contains fewer woody species per 30m but includes one of the following:

  Populus nigra ssp betulifolia, Tilia platyphyllos, Tilia cordata, *Sorbus torminalis* or certain plant species.

Hedgerows with particular historical associations or in areas covered by a Historic Landscape Characterisation are often protected on the basis of historic importance and their wildlife value.

9.0 REPORT LIMITATIONS

9.01 This report is a pre-development survey and is not a risk assessment or a detailed report on the health and condition of the trees.

9.02 Every attempt has been made to provide a realistic and accurate assessment of trees and their condition at the time of this inspection. No responsibility can be accepted for a damage or injury as a result of the failure of any tree or its parts due to faults not apparent upon a visual inspection carried out at this session, or for faults developing subsequent to the survey. Similarly, no liability can be accepted for the condition of the trees that are obscured in part or whole e.g. neither by dense ivy or other foliage nor for any that proved inaccessible. Certain features which might provide evidence of ongoing decay or decline e.g. seasonal fruiting bodies, damage to foliage, insect emergence holes may not be in evidence. Only those features present at the time of the inspection could be assessed.

9.03 Reference is made in this report for the possibility of additional assessment of specimen trees particularly with reference to long term safety and stability. This assessment could be assisted by the use of a Tomograph such as the PICUS sonic Tomography which assesses the internal condition of the tree by using sonic waves. The standard technology involves the attachment of sensors to measuring nails.

9.04 This report is based on the tree circumstances and condition at the time of the survey. It must be recognized that the circumstances may be altered radically over the course of any developmental process and that such changes cannot be accurately predicted, i.e. such a change could be the effect of localised wind turbulence created by the new development. As trees grow they respond and mechanically adapt to their surroundings and exposure limits.

Unless stated in writing the inspection shall not include any underground parts of the tree. It does not consider damage resulting from the extraction of moisture from shrinkable clay soils by tree root causing subsidence or by heave occurring through soil rewetting following removal trees on the site.

Recommendations relating to foundation design or material specification are beyond the scope of this report.

APPENDICES

10.1 TABLE 1 Tree Schedule Explanatory Notes

Number: Sequential Tree, Group or Woodland rreferencenumber.
Name: Scientific name (Common name in brackets).
Height: Recorded in metres by inclinometer in each discrete area and estimated from the measured tree.
Lwr crn ht: Lower crown height, the height of the canopy above the ground.
Trunk diam: Tree stem diameter in millimetres at 1.5 m above adjacent ground level rounded up to nearest 50 mm. For multi-stemmed trees, a cumulative diameter is calculated (in accordance with BS 5837:2012 Annex C).
Crown Spread: Measured in metres & taken at four cardinal points (N E S W).
1st Sig branch: Existing height in metres above ground level of the first significant branch with direction of growth (if available).

Life stage	**Y**	**Young**	Recently planted or establishing tree.
	SM	Semi-mature	Age less than one-third life completed. Established tree but one that has not reached its potential ultimate height and has significant growth potential.
	EM	Early-mature	One-third to two-thirds life completed. A tree reaching its ultimate potential height, whose growth rate is slowing down but will still increase in stem diameter and crown spread.
	M	Mature	Two thirds plus life complet ed. Specimen with limited potential for any significant increase in size but with a reasonable life expectancy.
	LM	Late-mature (Over-mature in the BS)	Two-thirds plus life completed and declining. A tree that ha passed its optimum gr owth rate and may require specialist managem ent. These trees may offer significant benefits in terms of nature conservation
	V	Veteran	A tree that shows features of biological, cultural, or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species .

Category: A grade given in accordance with BS 5837:2012 - Tree Categories (see copy of Table 1 from BS 5837:2012 below).
Comments: General observations e.g. collapsing, the presence of any decay and physical defect and including further investigation of suspected defects t hat require more detailed assessment a nd potential for wildlife habitat.
Life Expectancy: Estimated remaining contribution in years in terms of amenity (<10, 10+, 20+, 40+).

Physiological condition	**G**	**Good**	Tree that appears to be in good condition and healthy without significant defects.
	F	**Fair**	Tree that appears to be structurally sound but due to minor defects is downgraded from good.
	P	**Poor**	Tree which shows signs of poor health, in decline and/or with significant defects.

10.2 TREE SCHEDULE

CLIENT: **S Y Homes (Old Coleham) ltd** **PROJECT:** **Proposed Residential Development** **Ref 3083**	**SURVEY DATE:** **27 May 2021** **DWG NOS:** **3083- TPP Tree Survey and Tree Protection Plan**	**COLUMN KEY:** **#** Estimated dimension **H** Height **D T** Stem diameter & type **CS** Crown Spread **LB** First significant branch height **Age** Life stage **YR** Years remaining **GR** Grade **RPA Rad** Root Protection Area radius **RPA m^2** Root Protection area	**AGE:** **Y** Young **SM** Semi mature **EM** Early mature **M** Mature **OM** Over mature **V** Veteran	**GR – GRADE:** **A – Good quality.** **B – Moderate quality.** **C – Low quality** **U – Unsuitable. Remove.**

NO	SPECIES	H m	D mm T	CS (m)				LB (m)	AGE	YR	GR	CONDITION	RECOMMEND	RPA Rad.	RPA M^2
				N	S	E	W								
T01	*Acer sp.* (Maple)	7.0	180	2.5	2.5	2.5	2.5	n/a	SM	20-40	C2	Small specimen street tree in pavement outside development site.	No work	2.10	14
T02	*Salix sp.* (Willow)	18.0	650#	8.0	7.5	6.5	6.5	6.0	M	20+	B2	Dense ivy growth precludes full inspection. Occluded wounds. Prominent landscape feature. Canopy overhangs highway land by 3m to the west. Dieback.	Remove dieback and ivy and reinspect. Reduce canopy to the southeast to facilitate development	7.80	191
T03	Mixed tree group	Up to 8.0	n/a	n/a	n/a	n/a	n/a	1.8	SM	10+	C2	Scrub area of Goat Willow, Ash saplings, Dogwood and Ivy.	Remove to facilitate development	n/a	n/a
T04	Mixed tree group	Up to 13.0	n/a	n/a	n/a	n/a	n/a	n/a	SM	20+	B2	Native tree group on adjoining Nature Reserve Site to south and forming	No work	n/a	n/a

												good screen. Multistem Sycamore, Alder, Elder, Hawthorn, Ash saplings, Rose, Buddleia and Ivy. Tree group at lower level to site.			
T05	*Acer pseudoplatanus* (Sycamore)	21.0	2x 500 1x 280#	7.0	7.0	7.0	7.0	6.0	EM	15-	B2	Three specimens forming part of cohesive tree group on adjoining third party land to east. Occluded wounds. Ivy growth.	Reduce overhanging canopies to the west to facilitate development.	15.0	707
T06	*Fraxinus excelsior* (Ash)	18.0	500	6.0	6.0	8.5	8.5	n/a	SM	10 +	C2	Specimen forming part of cohesive tree group on adjoining third party land to east. Dieback. Main stem bifurcates into two @ 2.2m. Cavity at junction. Recently pruned. Displaying signs of stress.	Monitor condition of tree.	6.0	113
T07	*Acer pseudoplatanus* (Sycamore)	14.0	2x 500#	7.0	7.0	7.0	7.0	6.0	EM	20-	B2	Two specimens forming part of cohesive tree group on adjoining third party land to east. Occluded wounds	Reduce overhanging canopies to the west to facilitate development	12.0	452
TG08	Mixed tree group	Up to 20.0	n/a	n/a	n/a	n/a	n/a	n/a	EM	20 +	A2	Tree group on adjoining third party land to east. Significant landscape feature consisting of Ash, Sycamore, Holly, Pine, Hawthorn, Elder and Privet	Reduce overhanging canopies to the west to facilitate development.	n/a	n/a
SG09	Mixed shrub group	Up to 3.0	n/a	n/a	n/a	n/a	n/a	n/a	SM	10-	C2	Mixed shrub group of Choisya, Fatsia. Azalea, Prostrate Juniper and Spiraea.	Remove to facilitate development	n/a	n/a

10.3 TABLE 2 from BS 5837:2012
Trees in relation to design, demolition & construction – Recommendations. Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note) **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	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning). • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low-quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve.*			RED
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention **Category A** **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups, or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups, or woodlands of significant conservation, historical, commemorative, or other value (e.g. veteran trees or wood-pasture)	GREEN
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	BLUE
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	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	GREY

10.4 TREE PHOTOGRAPHS

1. View to northwest to T01

2. View to southwest to tree groupTG08

3. View to south to T02 and TG03

5. View to southeast to TG04

4. View to southwest to TG08

6. View to northwest to TG04

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10.5 GLOSSARY OF TERMS

Arboriculture:	The culture and management of trees as groups or individuals, primarily for amenity and urban forestry excluding commercial purposes.
Aerial inspection:	The crown is assessed by a climber who inspects defects at close range.
Architecture:	In a tree, a term describing the pattern of branching of the crown or root system.
Arboricultural Implication Assessment (AIA):	Study undertaken by an arboriculturist to identify, evaluate and possibly manage the extent of direct and indirect impact on existing trees that may arise as a result of the implementation of the site layout.
Arboricultural Method Statement:	Methodology for the implementation of any aspects of development that has the potential to result in the loss or damage to a tree.
Assessment:	In relation to tree hazards, the process of estimating the risk which a tree or group of trees poses to persons or property
Branch:	A limb extending from the main stem or parent branch of the tree
Construction Exclusion Zone:	Area based on the RPA (metres as a radial measurement and sometimes a m^2). Identified by the use of barriers and/or ground protection for the purpose to ensure the successful; long term retention of a tree.
Crown:	Total volume occupied by the foliage
Crown thinning:	Removal, pruning of selected branches throughout the crown of the tree.
Crown reduction:	Pruning the height and overall crown spread to achieve a smaller crown size.
Crown cleaning:	Removal of all dead twigs and small dead branches, diseased wood, cracked and damaged wood and rubbing branches.
Defect:	In relation to tree hazards, any feature of a tree that detracts from the uniform distribution of mechanical stress or which makes the tree mechanically unsuited to its environment.
Dysfunction:	In woody tissues, the loss of physiological function, especially water conduction.
Epicormic sprouts:	New branches that grow from dormant buds just beneath the bark. They are usually associated with lopping or topping cuts.
Failure:	In connection with tree hazards, a partial or total fracture within woody tissues or loss of cohesion between roots and soil.

Flush Cuts:	Where a branch has been cut very close to the stem, removing the branch collar. This can also be very injurious, allowing decay to enter.
Fluted stem:	A stem that has distinct raised ribs at the buttress.
Group:	The term 'group' is intended to identify trees that form cohesive arboricultural features either **aerodynamically** (e g trees that provide companion shelter), **visually** (e.g. avenues or screens or **culturally** including for biodiversity (e.g. parkland and wood pasture).
Hanger:	A branch that has completely broken and is hanging in the crown.
Heave:	In relation to a shrinkable clay soil, expansion due to re-wetting, sometimes after felling or root severance of a tree which was previously extracting moisture from the deeper layers; also in relation to root growth, the lifting of pavements and other structures by radial expansion; also, in relation to trees stability, the lifting of one side of wind-rocked root plate.
Included bark:	Where a branch and stem or two stems have a very tight union, bark presses on bark and becomes ingrown. The result is structurally a weak junction.
Internal inspection:	Can be undertaken by invasive drilling techniques or by the use of ultrasound technology
Leader:	Leading shoot or stem – usually applied to a single stemmed tree.
Occluded:	A cavity or wound where new bark has completely sealed the wound.
Preventative action:	In a tree hazard management, action that helps to prevent injury to persons or damage to property,
Pruning:	The removal or cutting back of twigs, branches or roots; in some contexts applying only to twigs or small branches only, but more often used to describe all kinds of work involving cutting.
Retained Tree:	A tree that has been considered suitable by an Arborist for retention and which during the design stage is selected for retention and incorporated within the development.
Risk:	The likelihood of the potential harm from a particular hazard becoming actual harm.
Ribs:	A protrusion of reactive wood growth that has formed over a crack or other anomaly.
Root Protection Area:	Layout design tool indicating the area surrounding a tree that contains sufficient rooting volume to ensure the survival of the tree shown in plan form in m^2.
Sprouts:	These are re-growth branches that grow rapidly from large

	wounds, more so on some species such as poplar and lime. They do not have a strong union with the stem and tend to break out when they grow large.
Stem	The single main stem of a tree.
Subsidence:	In relation to soil or structures resting in or on soil, a sinking due to shrinkage when clay soils dry out sometimes due to extraction of moisture by tree roots.
Suppression:	A tree which is beneath the crown(s) of another canopy and is being restricted by it.
Sucker:	Shoots that grow from roots, often at the base of the tree
Targets:	In a tree hazard assessment (and with somewhat incorrect technology), persons or property or other things of value, which might be harmed by mechanical failure of the tree or by objects falling from it.
Tipping:	Cutting the ends of branches between nodes.
Topping:	Indiscriminate reduction of height leaving a large wound. Can be very injurious to tree health.
Tree constraint Plan (TCP):	Plan prepared by an arboriculturist or similar qualified person for the layout design showing the RPA and representing the effect that the mature height and spread of retained trees will have layouts through shade dominance etc.
Tree Preservation Order:	In Great Britain, an order made by a local authority, whereby the authority's consent is generally required for the cutting down, topping or lopping of specified trees.
Tree Protection Plan:	Scale drawing prepared by an arboriculturist showing the final layout proposals, tree retention and tree and landscape protection measures detailed within the arboricultural method statement (AMS) which can be shown graphically.
Vigour:	In tree assessment, an overall measure of the rate of shoot production, shoot extension or diameter of growth.
Visual tree Assessment (VTA):	In addition to the literal meaning, a system expounded by Mattheck & Breloer (1995) to aid the diagnosis of potential defects through visual signs and the application of mechanical criteria.
Wind exposure:	The degree to which a tree of other object is exposed to wind, with regard both to duration and velocity.
Wind pressure:	The force exerted by wind on a tree or other object.
Wind snap:	The breaking of a tree by a stem by wind.
Wind throw:	The blowing over of a tree at its roots.

10.6 BIBLIOGRAPHY

References for the recommendations contained in this report are from the following publications:-

- Modern Arboriculture.
  Shigo A.L.

- Hazards from Trees – A General Guide: Forestry Commission Practice Guide.
  Lonsdale D.

- Principles of Tree Hazard Assessment and Management.
  Lonsdale D.

- BS 5837:2012: Trees in Relation to Construction.
  British Standards Institute.

- BS:3998:2010 Recommendations for Tree Work.
  British Standards Institute.

- Veteran Trees – A Guide to Risk and Responsibility.
  English Nature.

- Alan Mitchell's Trees of Britain.
  Mitchell A.

- Practice Note April 12 (Through the Trees to Development).
  Derek Patch and Ben Holding.

- Standard Advice for Ancient Woodland and Veteran Trees
  April 2014
  Forestry Commission/Natural England

10.7 TREE SURVEY PLAN & TREE PROTECTION PLAN

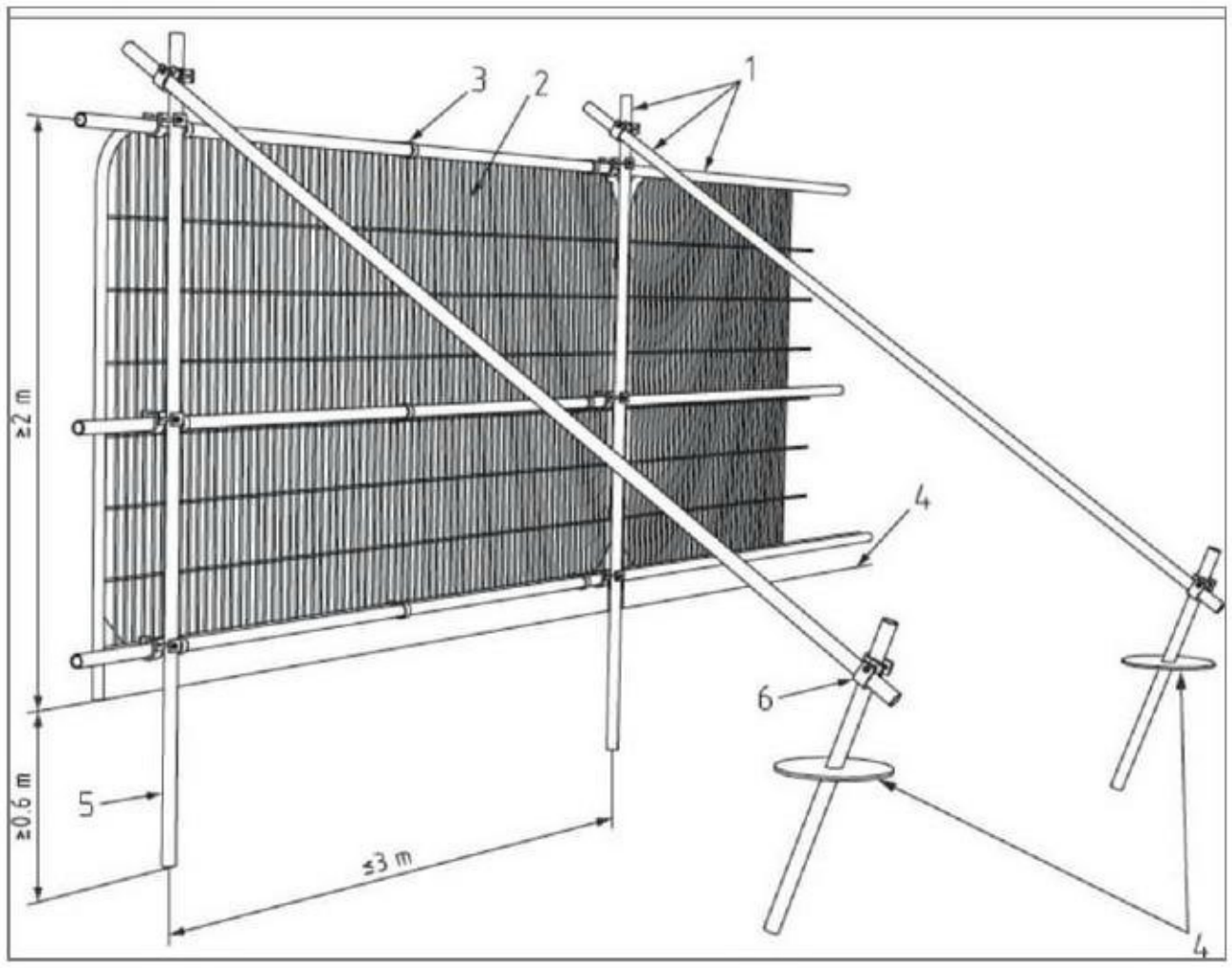
Dwg no 3083-TPP

10.8 SPECIFICATION FOR TREE AND ROOT PROTECTION BARRIERS

Specification for Tree Protection Barriers

Fencing specification reproduced from BS 5837:2012 Trees in relation to design, demolition, and construction – Recommendations.

1.High Construction Pressure

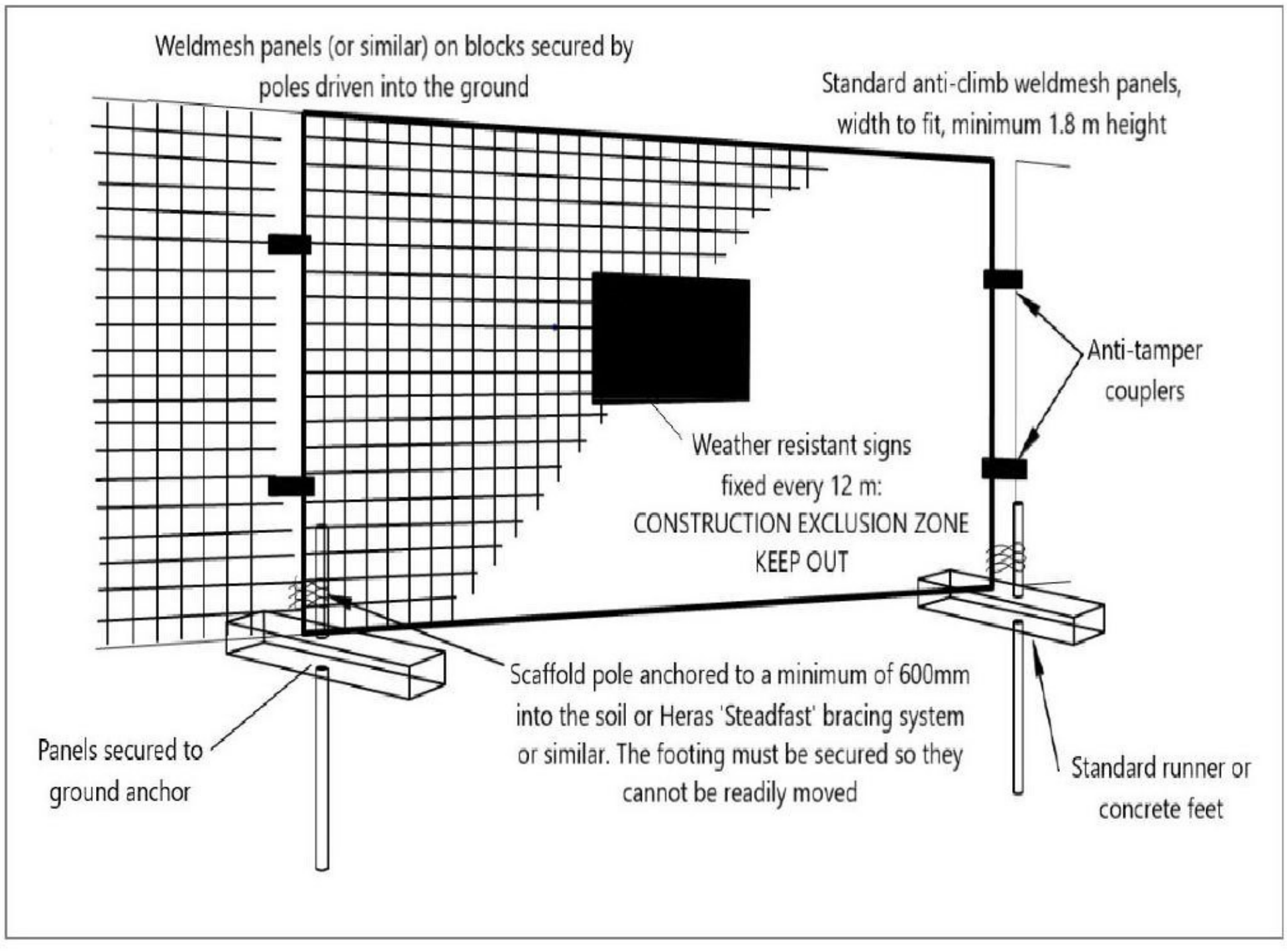


Key.

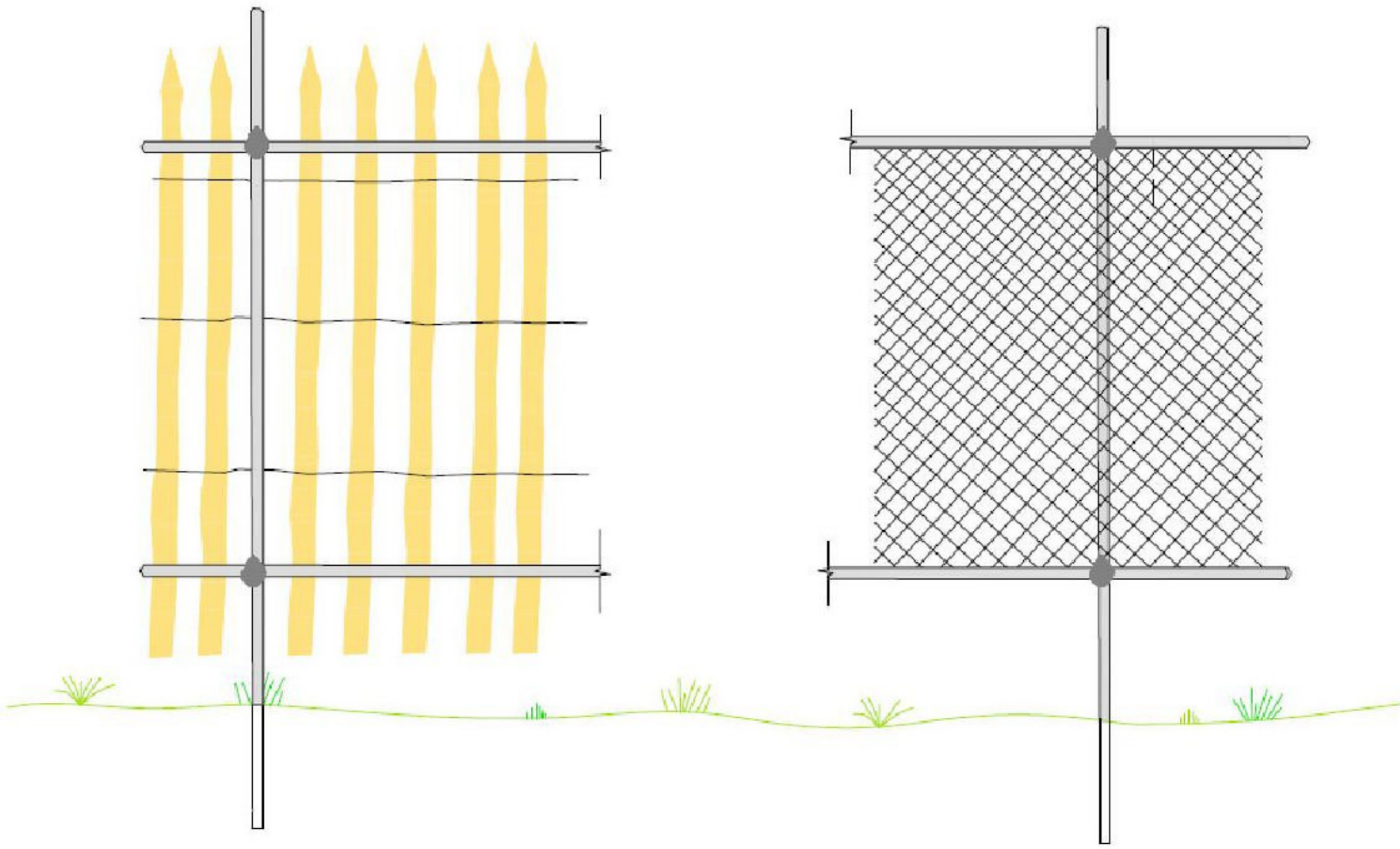
1. Standard scaffold poles
2. Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3. Panels secured to uprights and cross-members with wire ties
4. Ground level
5. Uprights driven into the ground until secure (minimum depth 0.6 m)
6. Standard scaffold clamps

3. Medium Construction Pressure

Fencing specification reproduced from BS 5837:2012 Trees in relation to design, demolition, and construction – Recommendations.



3. Low Construction Pressure Secondary Tree Protection Barrier



Cleft chestnut pale or chain link fencing attached to scaffold framework. Uprights driven well (min 0.6 m) into the ground with bracing as required by ground conditions.

4. Ground Protection

- Ground protection to protect underlying soil and roots in the RPA to consist of sheets of heavy gauge exterior plywood laid over 50mm bed of compressible wood chip. Plywood to be secured to ground with steel pins.
- Ground protection to be installed at locations shown on the Tree Protection Plan (TPP).
- Ground protection locations will not be altered without the approval of the Arboricultural Clerk of Works (ACW).
- Ground protection will not be removed at the end of the construction phase without the approval of the Arboricultural Clerk of Works (ACW).

5. Tree Protection Signs

- No equipment, machinery or materials shall be brought onto the site for the purposes of the development until fencing has been erected in accordance with the plans and particulars which shall have been previously approved by the local planning authority in writing.
- The areas forming the Construction Exclusion Zone are to be protected by Tree Protection Barriers as per the recommendations in BS 5837:2012 (Figure 2) or as specified below.
- ***This fencing is to be erected before any work commences on site and is to remain in place undamaged for the duration of all work or each phase. It will only to be removed once all work is completed and if required by planning condition, with the formal consent of the local planning authority.***
- If the fencing be broken or removed during the course of carrying out the development, it shall be promptly repaired or replaced to the satisfaction of the local planning authority.
- Within any area fenced in accordance with this condition, nothing shall be stored, placed or disposed of on the above or below ground, the ground level shall not be altered, no excavations shall be made, nor shall any fires be lit, without the prior written consent of the local planning authority.
- Other than works detailed within this method statement or approved in writing by the local planning authority, no works at all (including storage or dumping of materials) shall take place within the exclusion zones defined by the protective fencing.
- The fencing is to carry waterproof warning notices denying access within the RPA. The following signs or similar will be attached to the fence panels.

6. Arboricultural Site Considerations – To be displayed in a prominent place.

1. Tree Protective Barriers must be regarded as sacrosanct and must not be removed or altered without prior consultation with either the Local Planning Authority (LPA) or the arboricultural consultant responsible for the site supervision.
2. Ground protection must not be lifted or removed without prior consultation with either the LPA or the arboricultural consultant responsible for the site supervision.
3. Damage caused to protective fencing or ground protection must be reported to the site supervisor immediately to ensure efficient repair.
4. No materials, chemicals, machinery, or vehicles must be stored within the Construction Exclusion Zone as defined on the Tree Protection Plan (TPP) and identified on site by fencing and above ground root protection.
5. No materials must be rested against a tree's trunk or machinery chained to it.
6. No pruning of trees may be undertaken by anyone other than an arborist, and all work must be approved by the supervising arboricultural consultant.
7. Any physical damage caused to a tree retained on site must be reported to the site manager so remedial work can be undertaken without delay.
8. Builder's sand, which contains salt, must not be used to back fill excavation within or in close proximity to tree roots, as this can have a toxic affect. Sharp sand can be used instead.
9. Material that will contaminate the soil, e.g. concrete mixings, diesel oil and vehicle washings, must not be discharged within 10 metres of a tree stem.
10. Fires must not be lit in a position where their flames can extend to within 5 m of foliage, branches, or trunk. This will depend on the size of the fire and wind direction.
11. Notice boards, telephone cables or other services must not be attached to any part of a tree.