Ecological Design Strategy

No2 Cross Green Road, Dalton
Report Reference: BG17.211.2
October 2017
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Document Control

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<thead>
<tr>
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<th>Signature</th>
<th>Date</th>
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<tbody>
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1 Introduction

1.1 Brindle & Green Ecological Consultants Ltd were commissioned by Acumen Designers & Architects to prepare an Ecological Design Strategy to discharge condition 8 relating to the planning permission No. 2017/62/92149 which stated the following:

8. Before works to construct the first dwelling’s superstructure are commenced an Ecological Design Strategy addressing ecological enhancement for the application site shall be submitted to and approved in writing by the Local Planning Authority. The Ecological Design Strategy shall include the following.

   a) Purpose and conservation objectives for the proposed works.
   b) Review of site potential and constraints.
   c) Detailed design(s) and/or working method(s) to achieve stated objectives.
   d) Extent and location/area of proposed works on appropriate scale maps and plans.
   e) Type and source of materials to be used where appropriate, e.g. native species of local provenance and make and model of bat/bird boxes.
   f) Timetable for implementation demonstrating that works are aligned with the proposed phasing of development.
   g) Persons responsible for implementing the works.
   h) Details of initial aftercare and long-term maintenance.
   i) Details for monitoring and remedial measures.
   j) Details for disposal of any wastes arising from works. The Ecological Design Strategy shall be implemented in accordance with the approved details and all features shall be retained in that manner thereafter. Reason: In the interest of ecological preservation and enhancement, in accordance with Chapter 11 of the National Planning Policy Framework.

1.3 This Ecological Design Strategy (EDS) incorporates ecological enhancements to address Condition 8. The document pays particular attention to the management of existing hedgerows. Enhancement measures along with a cautious approach to work are included to provide opportunities and safeguard protected species that may use the site. This document makes reference to and reaffirms the developer's obligation to ensure that the protection afforded to the known bat roost within the property is considered
and sets out methods that will be the subject of a low impact licence submission to Natural England.

1.4 It is recommended that the monitoring period of the works proposed in this document extends to a minimum of 5 years.

1.5 Amendments from the design plans detailed within Appendix 1 may result in slight changes to the enhancement plans at a later stage. If construction has not commenced within one year of the date of this report, the document may require reviewing and/or updating.

1.6 Timescales relating to implementation are included where appropriate but are more general owing to there being no known commencement date at this stage.

1.7 The developer should ensure all waste is managed by a certified waste disposal company. The site did not support any invasive plant species. Any measures pertaining to the treatment of contaminated waste is outside the scope of this document and further advice should be sought by a competent professional in this field.
2  Purpose & Conservation Objectives for the Proposed Works

2.1  The planning permission granted at No2 Cross Green Road in Dalton is for the demolition of an existing residential dwelling with associated outbuildings to facilitate the development of 10 new houses.

2.2  The five key conservation objectives are as follows;

a) Mitigation and enhancement relating to the loss of a known day roost of a single common pipistrelle (*Pipistrellus pipistrellus*) under a Low impact licence.

b) Retention/creation of linear foraging and commuting habitats to aid the success of compensatory bat mitigation and to provide ‘green linkages’ across the site in line with LBAP targets.

c) Working methods to avoid impacts on breeding birds

d) Cautious working to avoid impacts on badgers.

e) Enhancement measures and cautious working for reptiles.
3 Review of Site Potential & Constraints

3.1 Habitats
3.1.1 The habitats on site have been evaluated as being of low ecological value; supporting local value in relation to the immediate surroundings and a regional context. The site was dominated by amenity grassland. The sward supported very few herb species and did not support any species of high conservation value. As such, the grassland is not considered to be a NBAP or LBAP habitat and should not provide a constraint to the development. Although the hedgerows are classed as NBAP habitats, they were species-poor, containing less than five woody species, and as such are considered to be of lower ecological value as a habitat, but have value as commuting pathways.

3.2 Protected Species
3.2.1 No evidence of reptiles was recorded during the survey; however, the site supported a suitable habitat matrix comprising a variable grass sward structure, log piles, wood chipping and compost heaps. Due to the small size of the site and its isolated location within an expanse of residential development, the site is unlikely to support a reptile population, but may intermittently support a small number of individuals. It is therefore possible that a small number of individuals could be harmed during the preconstruction clearance of the site.

3.2.2 The dusk emergence and dawn re-entry surveys confirmed a day bat roost within the three-storey residential dwelling at 8 Cross Green Road, Huddersfield. A single common pipistrelle emerged from the same location during both dusk emergence surveys (29/06/2017) and (18/07/2017). Two common pipistrelles were observed returning to the same roost location during the dawn survey on 03/08/2017, and as such a Natural England EPS development licence is required in order to proceed with the development work.

3.2.3 There was no evidence such as setts, mammal runs, snuffle holes or latrines to suggest that badgers are active onsite. However, the site provided suitable foraging habitat for badgers and as such it is feasible to suggest that potential impacts to badgers as a consequence of the development proposals would
be in the form of direct or indirect harm, injury or death to individuals during the construction phase.

4 Detailed Design(s) and/or working method(s) to achieve stated objectives

4.1 Roosting Bats

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Natural England Development Licence &amp; Method Statement</strong></td>
<td>Prior to works commencing.</td>
</tr>
<tr>
<td>A European Protected Species Development Licence from Natural England is to be applied for. This will include a method statement produced by a suitably qualified ecologist.</td>
<td></td>
</tr>
<tr>
<td>The recommendations below outline suggested mitigation work to be included within the method statement. These works can take place at any time, however should ideally take place over the winter period when bat species such as common pipistrelle are likely to be absent from buildings.</td>
<td>Pre-development works.</td>
</tr>
<tr>
<td><strong>1. Installation of temporary bat boxes</strong></td>
<td></td>
</tr>
<tr>
<td>Install 1 x temporary bat box (2FN Schwegler Bat Box) on a pressure treated timber pole (telegraph pole) within the site boundary, ideally in close proximity to any retained linear features (e.g. hedgerow). Any bats found during the following exclusion and/or soft stripping works to be transferred to this box by hand.</td>
<td>Pre-development works.</td>
</tr>
<tr>
<td><strong>2. Install exclusion devices</strong></td>
<td></td>
</tr>
<tr>
<td>Where possible, the installation of one-way excluders will be undertaken prior to the permanent blocking of access points to known roost sites on Building 1. Excluders also to be installed on potential access points for crevice-dwelling bats on Building 1.</td>
<td>Pre -development works</td>
</tr>
<tr>
<td>Devices to remain in-situ for a period of five nights where weather conditions are favourable for bat activity. Period to be extended should unfavourable weather conditions occur.</td>
<td></td>
</tr>
<tr>
<td><strong>3. Capture exercise during soft stripping of roofing</strong></td>
<td></td>
</tr>
</tbody>
</table>
features
Bat roosting features should be soft stripped under the supervision of the Named Ecologist. Should bats be encountered during soft stripping then they will be captured by hand and relocated to a pre-installed temporary bat box. Once all bat roosting features have been stripped, checked and structures made unsuitable for roosting bats the buildings can be declared free of bats. Demolition works can then proceed without ecological supervision. Temporary bat box to remain in place during this period.

4. Creation of compensatory habitat
Permanent compensatory bat roosting habitat to comprise of a Bat Brick (such as a Habibat 001, or similar) incorporated within the north-eastern elevation of a single property.

Enhancements
Hedgerows lining the southern and eastern boundaries should be retained where possible and enhanced through additional planting of native woody species.

4.2 Habitats

<table>
<thead>
<tr>
<th>Management Prescriptions</th>
<th>Target Species</th>
<th>Proposed Enhancements</th>
</tr>
</thead>
</table>
| Hedgerows                | Birds, invertebrates and mammals including: Dunnock House sparrow Hedgehog Bat species Badgers Reptiles | i) Hedgerow planting and gap filling (where required) with native species within the existing (and any proposed) hedgerows. Any new hedgerows should support a minimum of five native species to allow establishment of a species rich hedgerow. Hedgerows should be planted following guidance in Appendix 2.  
ii) Implementation of a Hedgerow management strategy for existing and proposed hedgerows as outlined in Appendix 2. |
Habitat Creation Areas.

Placement of artificial refuges to enhance habitat on site for protected species.

Target Species

Targeted towards: Birds

The following species are proposed for inclusion within the retained hedgerows, specifically because of their native attributes and the suitable of attraction wildlife / visual variation in stem / leaf colour and shape.

Habitats and gap filling: 2 rows of plants @ 3 plants/m per row, 60-80cm. Notch planted with rabbit protection (minimum 600mm height and staked).

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Plant Code</th>
<th>Qty</th>
<th>Size</th>
<th>Max Height</th>
<th>Max Spread</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crataegus monogyna</td>
<td>CM</td>
<td>50%</td>
<td>Whip (60-80 cm)</td>
<td>20 yrs (5m)</td>
<td>20 yrs (4m)</td>
<td>Bare Root</td>
</tr>
<tr>
<td>Rosa canina</td>
<td>RC</td>
<td>5%</td>
<td>Whip (60-80 cm)</td>
<td>4m</td>
<td>2.5m</td>
<td>Bare Root</td>
</tr>
<tr>
<td>Sambucus nigra</td>
<td>SN</td>
<td>5%</td>
<td>Whip (60-80 cm)</td>
<td>4m</td>
<td>4m</td>
<td>Bare Root</td>
</tr>
<tr>
<td>Acer campestre</td>
<td>AC</td>
<td>15%</td>
<td>Whip (60-80 cm)</td>
<td>20 yrs (6m)</td>
<td>20 yrs (4m)</td>
<td>Bare Root</td>
</tr>
<tr>
<td>Cornus sanguinea</td>
<td>CS</td>
<td>5%</td>
<td>Whip (60-80 cm)</td>
<td>3m</td>
<td>2.5m</td>
<td>Bare Root</td>
</tr>
<tr>
<td>Carpinus betulus</td>
<td>CB</td>
<td>5%</td>
<td>Whip (60-80 cm)</td>
<td>20 yrs (6m)</td>
<td>20 yrs (4m)</td>
<td>Bare Root</td>
</tr>
<tr>
<td>Prunus spinosa</td>
<td>PS</td>
<td>15%</td>
<td>Whip (60-80 cm)</td>
<td>20 yrs (5m)</td>
<td>20 yrs (4m)</td>
<td>Bare Root</td>
</tr>
</tbody>
</table>

All artificial refugia should be installed under the supervision of a suitably experienced ecologist

*Birds:* The following nest boxes [*NHBS.com*]:

- 10 x 1B Schwegler bird boxes in the following sizes:
  - 4 x 26mm Hole, 3 x 32mm Hole, 1 x Oval Hole
  - 2x 1SP sparrow terrace

These should be positioned on new houses, with entrance holes directed towards the north and east to avoid strong sunlight and driving rain. The Bird boxes should be positioned at a height of between 2 and 4 metres during the Autumn.

4.3 Breeding Birds

Breeding Birds

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of breeding birds was found within Building 1 and the nearby hedgerows and shrubs provide suitable nesting bird habitat. Given their protection, development must be sympathetic to the value of these habitats and potential impacts on breeding birds, their eggs, nests and young. The breeding bird season is generally accepted as being between March and September. Developers should consider and implement the options most appropriate to their scheme;</td>
<td>Work should be conducted outside of the breeding bird season between March and September inclusive.</td>
</tr>
<tr>
<td>a) Tree pruning, vegetation clearanceme and demolition works should be undertaken outside of the breeding bird season, between the months of October and February where possible.</td>
<td></td>
</tr>
<tr>
<td>b) Any tree pruning, vegetation clearance or</td>
<td></td>
</tr>
</tbody>
</table>
demolition works proposed for removal between the months of March and September should be subjected to a search for active birds’ nests 24 hours prior to commencement of works. This should confirm whether all or some clearance is achievable.

4.4 Badgers

<table>
<thead>
<tr>
<th>Badgers</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendations</td>
<td>During and post development</td>
</tr>
</tbody>
</table>

The site could provide foraging habitat for outlying badger populations. Appropriate precautions should be employed during construction works to prevent harm to this protected species. Construction workers should be given a “toolbox talk” by a suitably qualified ecologist, including detail on badger ecology, the law and procedures to safeguard badgers such as the following:

- Any exposed excavations to be left overnight are to be covered at the end of each working day, or include a means of escape for any fallen animals (e.g. a scaffolding plank).
- Any temporarily exposed open pipes are to be capped to prevent badgers gaining access.
- Should badgers or any evidence of badgers be encountered during the construction phase, all works should cease and the advice of an ecologist sought.

4.5 Reptiles

<table>
<thead>
<tr>
<th>Reptiles</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendations</td>
<td>The works should be undertaken immediately prior to any ground clearance works</td>
</tr>
</tbody>
</table>

It is recommended that the following reasonable avoidance measures are followed to ensure no protected species are adversely affected by the proposed development:

a) **Toolbox talk prior to start on site**

A suitably qualified ecologist will deliver a toolbox talk to the contractors responsible for the works. The talk will cover reptile ecology, reptiles and the law, and what to do if reptiles are found during the works. If during the works period any reptiles are found on site, works should cease in that area and
a suitably qualified ecologist should be contacted for advice.

b) **Strimming**
Grassland and ruderal vegetation will be directionally strimmed in two stages to allow any reptiles present to move out of the area naturally. The strimming should be undertaken under the supervision of a suitably qualified ecologist, and all vegetation removed from the working area to prevent potential areas of refuge being created.

c) **Destructive search**
Suitable refugia, such as rubble, logs or refuse should be searched by hand under the supervision of a suitably experienced ecologist. Suitable refugia could be moved to an alternative location on site to create artificial hibernacula (see enhancement prescriptions below).

d) Should reptiles be found, they should be moved to suitable habitat to the west and north of the application boundary.

<table>
<thead>
<tr>
<th>Enhancement Prescriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The creation of hibernacula on site is recommended to create safe areas for reptiles. This needs to be located in an area that has suitable habitat for reptiles, such as:</td>
</tr>
<tr>
<td>a) Free from flooding</td>
</tr>
<tr>
<td>b) Mixture of tall and short grasses</td>
</tr>
<tr>
<td>c) Areas that have both sun and shade</td>
</tr>
</tbody>
</table>

Hibernacula consist simply of an excavated hollow infilled with materials such as building rubble and/or tree roots. Small drainage pipes are placed around the edges of the hollow that lead from the surface into voids and spaces within the building rubble and/or tree roots. This allows access for reptiles into the voids within the material used. The hollow is then covered over with loose turfs of soil and allowed to revegetate naturally. Discarded materials from building works could be utilised in hibernacula creation. |

| During/post construction. |
Existing hedgerow to be maintained and enhanced

Proposed location of hibernacula
<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Blue Triangle]</td>
<td>1B Schwegler bird boxes in the following sizes: 4 x 26mm Hole</td>
</tr>
<tr>
<td>![Yellow Triangle]</td>
<td>1B Schwegler bird boxes in the following sizes 1 x Oval Hole</td>
</tr>
<tr>
<td>![Blue Triangle]</td>
<td>2x 1SP sparrow terrace</td>
</tr>
<tr>
<td>![Green Triangle]</td>
<td>1B Schwegler bird boxes in the following sizes 3 x 32mm Hole</td>
</tr>
<tr>
<td>![Orange Circle]</td>
<td>Install 1 x temporary bat box (2FN Schwegler Bat Box) on a pressure treated timber pole (telegraph pole) within the site boundary, ideally in close proximity to any retained linear features (e.g. hedgerow). Any bats found during the following exclusion and/or soft stripping works to be transferred to this box by hand.</td>
</tr>
<tr>
<td>![Pink Star]</td>
<td>Permanent compensatory bat roosting habitat to comprise of a Bat Brick (such as a Habibat 001, or similar) incorporated within the north-eastern elevation of a single property.</td>
</tr>
</tbody>
</table>
5 Landscape Management Plan

The Landscape Management Plan should be reviewed every 5-years by those responsible for the landscape management and maintenance of the site. The review allows the success of management schemes to be reviewed and amended where necessary to ensure the design vision is achieved and maintained.

6.1 General Management

The following are general management operations that apply to the entire landscape proposals for the site (For full planting and management specifications please consult Appendix 1 & 2):

1) Operations should be undertaken as necessary to ensure that the aims and objectives for the site are achieved and maintained.

2) All materials to be of the highest standard and the contractor is to make good any planting defects. Plants to be selected from nurseries listed by the Horticultural Trade Association Nursery Certification Scheme. All planting areas to be watered following scheme design, particularly during the summer months of years 1-5, and during periods of drought.

3) Application of approved and appropriate fertiliser to planted areas in Years 1, 2 and 3 should be undertaken in early spring.

4) Trimming of hedges or tree removal should be undertaken outside of bird nesting season, which is March to August inclusive, unless supervised by suitably experienced ecologist. All trimmings, clippings and grass cuttings are to be removed to a composting area off site or within a designated location on site.

5) All plants and turf shall conform to BS3936 & BS4428 and be planted in accordance with the specification. Planting timings: Deciduous trees and shrubs: Late October to late March. Container grown plants: At any time if ground and weather conditions are favourable.
6) Watering: Ensure the full depth of the topsoil is evenly and thoroughly wetted, following an adhoc system to ensure establishment and continued thriving. A fine rose should be used to avoid damage or displacing plants or soil.

7) Regular weeding: Weed hard and soft areas by hand or by chemical means, as appropriate to the ground and plant establishment conditions. All rubbish, roots, weed and stones exceeding 25mm shall be collected and removed on a regular basis during the pre-practical completion maintenance visits.
6.2 **Habitat specific management**

<table>
<thead>
<tr>
<th>Landscape Feature</th>
<th>Management timing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landscape Feature</strong></td>
<td><strong>Management timing</strong></td>
</tr>
<tr>
<td><strong>Year 1 - 5</strong></td>
<td><strong>Year 6 onwards</strong></td>
</tr>
<tr>
<td>New and existing Hedgerows</td>
<td>See ecological enhancement management strategy Appendix 2</td>
</tr>
<tr>
<td>Removal of encroaching tall ruderal herbs and scrub</td>
<td>See ecological enhancement management strategy Appendix 2</td>
</tr>
<tr>
<td>Pathways/hardstanding</td>
<td>Keep path areas clear of debris ensure surface is suitable for all weather conditions. Make good damaged surfaces to maintain safe and accessible routes as necessary.</td>
</tr>
</tbody>
</table>
7 Implementation

7.1 The responsibility of the implementation of this plan lies with Worth Homes of 3. Emley Moor Business Park, Huddersfield HD9 9TY.

7.2 The successful contractors will be responsible for providing a detailed programme of works prior to starting on site. The contract should stipulate that all landscape works will be completed within the first planting season (October to April) after the completion of any excavation works.

7.2 The landscape contractor’s contract should include a 12-months maintenance and replacement guarantee period, and the works outlined above [Years 2 onwards] will likely be subject to a separate contract.

8 On-going monitoring and remedial measures

The success of the proposed management and habitat creation should be monitored for a five-year period after completion. Following the five-year period, a review of data will allow a judgement on the success of the management plan. Where targets have not been met, or aims are failing, a management review will be undertaken.
### Appendix 1: Ecological Enhancement Management Strategy

<table>
<thead>
<tr>
<th>Management Prescriptions</th>
<th>Description of proposed works</th>
<th>Timing</th>
<th>Frequency</th>
</tr>
</thead>
</table>
| **Hedgerows**<br> *Planting and Management strategy* | Hedge planting and gap filing<br>Plant 1+1 Bare root stock whips, 60-80cm high. Hedgerows should be planted in a double staggered row 30cm apart, see below:<br>![Diagram of hedgerow planting](image)
Plants should be staked and tree guards utilised.<br>Checks on plant health and regular watering. If any of the plants fail, they are to be replaced with similar species<br>Control weeds to prevent disturbance to young | October to February (Avoid frost) | Year 1 post construction |
<p>| | | | |
|                           |                               |        |           |</p>
<table>
<thead>
<tr>
<th>Management Prescriptions</th>
<th>Description of proposed works</th>
<th>Timing</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removal of stakes (new plants)</td>
<td>After 2(^{nd}) years growth</td>
<td>Year 2</td>
<td></td>
</tr>
<tr>
<td>Hedge laying and coppicing undertaken on new hedgerows to encourage a thick hedgerow, and prevent basal gaps.</td>
<td>October to March</td>
<td>Year 2 onwards – undertaken management on small areas over a long period of time.</td>
<td></td>
</tr>
<tr>
<td>Existing hedgerows managed by flailing to promote a thick fruiting hedgerow of between 2 and 4 metres** (Avoid cutting any mature tree species present, and encourage standard trees within hedgerows).</td>
<td>November – February **Flailing can be introduced once a new hedgerow has become established at approximately 10 years</td>
<td>Every three years, on a rotational system – avoid cutting all hedgerows in the same year.</td>
<td></td>
</tr>
<tr>
<td>Sward Management</td>
<td>One cut, post flowering (late Aug / Sept) cuttings left to allow seeding</td>
<td>Annual cut, ongoing management</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Habitat Creation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bird and bat boxes</strong></td>
<td>Installation of all boxes as specified in Figure 1</td>
</tr>
<tr>
<td></td>
<td>Inspection / monitoring of enhancement uptake</td>
</tr>
</tbody>
</table>
Appendix 2: Landscape Specifications – General Advice and Requirements

Soil and Climatic Conditions
Cultivate and plant into moist friable soil that is not waterlogged, frozen or snow covered. Work should be undertaken while weather conditions are suitable for operations. Planting should not be undertaken during periods of frost or strong winds. Preparation, planting and mulching materials must be free from toxins, pathogens or other extraneous substances harmful to plant, animal or human life.

Prior to planting, under suitable conditions, cultivate in accordance with BS3882. The top 300mm of all planting beds, should be cultivated using suitable plant to loosen, aerate and break up the soil into particles of 2-8mm. Remove weeds, perennial weed roots and undesirable material brought to the surface including stones and clods larger than 25mm in any dimension, roots, tufts of grass and foreign matter. Topsoil should be a minimum of 450mm for shrubs and trees, and 150mm for turfed and seeded areas. Do not dig or cultivate within root spread of trees and shrubs to be retained.

Machines and Tools
Use only machinery and tools suitable for the site conditions and the work to be carried out. Hand tools should be used around trees, scrub, plants and in confined spaces where it is impractical to use machinery.

Specification of Plant Material
All species shall be true to name and character and shall be supplied as specified with all the trees origin and provenance meanings given in the National Plant Specification. They shall have been grown and handled according to good horticultural practice and according to all current UK Government and EC regulations. The supplying nursery shall be expected to carry out thorough and rigorous production methods to ensure that the stock is of highest standards and selected from nurseries listed by the Horticultural Trade Association Nursery Certification Scheme. Obtain from approved sources with soil and climatic conditions similar to those prevailing on site. Adequately and carefully pack and protect against mechanical damage, extremes of temperature and drying out. The code for Plant Handling published by C.P.S.E. shall be strictly adhered to.
i) Supplied plants should be materially undamaged, sturdy, healthy and vigorous, be of good shape, and without elongated shoots. Plants should be free from pests, diseases, discoloration, weeds and physiological disorders.

ii) Plants should be grown in a suitable environment and sufficiently hardened off prior to delivery to site.

iii) All trees shall conform generally to BS 3936 Part 1 (Nursery Stock Trees) and BS 4043 (Advanced Nursery Stock Trees) and as further described in the plant schedules.

iv) All trees shall be strong growing, shall have reasonably straight, upright stem and accord with the dimensions given in the Schedule with evenly balanced and well developed crowns, with no main branch crossing the crown, and well developed fibrous root structure. All batches of single species shall be uniform in character.

v) All stems shall be free from abrasions and stem girdling. Stems shall be straight and uniform.

vi) The root system and condition must be uniform and well developed with fibrous root hairs typical of a healthy tree of the species, age and number of transplantations.

Clear Stem Trees
All clear stem trees shall have a full and well-developed crown with uniform leaf coverage appropriate to their age and species. All shall bear a single upright straight central leader. Unless otherwise stated, they shall have a 1.8m clear stem height.

Feathered Trees
Feathered trees shall be furnished with a single leader and well-developed laterals (except for ashes) to ground level with uniform and full leaf coverage appropriate to their age and species/type. Stems shall be straight and uniform and free from abrasions and stem girdling. All plants shall have a strong fibrous well developed but compact root system with root spread proportional to the size of the tree with a reasonable proportion of fine fibrous rootlets. The roots shall not be torn or lacerated. Birches must be supplied as container grown.

Bare Root Trees
All bare rooted subjects shall have a strong fibrous root structure. The root systems shall be well developed but compact with root spread proportional to the size of the tree with a reasonable proportion of fine fibrous rootlets. The roots shall not be torn or lacerated.
Rootballed Trees
The trees shall have a good well-formed root ball with dimensions according to the species and size of the tree. The diameter of the root ball is usually at least three times the size of the girth, measured at 1 metre above ground level. Rootballed trees shall be adequately supported by wire mesh and hessian, or other suitable material to prevent collapse of the rootball. The rootball shall be of sufficient size to contain the fibrous roots. Trees, which have a collapsed rootball or expose major parts of the root system will be rejected.

Container Shrubs
All plants shall be well developed and bushy and shall have been grown in the same container for at least one full growing season prior to delivery. All specimen shrubs shall have a balanced, well developed crown with a strong main stem and lateral branches or a minimum of 4 stems arising from the ground level, dependent on species. All specimen shrubs shall be well furnished to ground level. The root systems will adequately fill the capacity of the container to show clear evidence of the proper establishment of a healthy fibrous root system. Plants showing signs of being pot-bound or waterlogged will not be accepted. The plants shall be appropriately spaced to allow a full and uniform branch and leaf coverage to develop, evenly radiating around the pot. The compost will hold sufficient reserves of nutrients to maintain the plant in a satisfactory condition for a reasonable period of time after leaving the Growers Nursery. The compost shall be free from any perennial weeds, not contain peat from UK sites of Special Interest or the equivalent from other countries and have a reasonable moisture content. All plants shall be free from diseases and pests and undamaged properly hardened off before delivery.

Plant Material: Sourcing
Plants are to be obtained from an approved source confirmed in writing at the time of tender. The plant source/s are to have soil and climatic conditions similar to those prevailing at the site. Where plant material is unobtainable or known to be likely to be unobtainable at the time of ordering, alternatives maybe submitted with the tender, stating the price and how they differ from the specifications (N.B Such substitutions may not be acceptable and submission of further alternatives may be required). Obtain approval before making any substitution. Where alternative species and/or sizes are offered, the contractor must clearly state in their tender, which specified plants/sizes they propose to change. Any materials, which do not meet the requirements of the Specification, or are unsuitable or defective in any other way, will be rejected. The minimum sizes in the plant schedules will be strictly enforced.
Single species from more than one source must be of the same clonal type and cultivator, and be similar in form, root structure and size.

Provide each plant/tree or group of plants/trees of a single species or cultivar with supplier's labelling for delivery to site, showing:

• Full botanical name;
• Total number;
• Supplier's name and address;
• Employer's name and project reference or order number; and
• Plant specification in accordance with scheduled National Plant Specification categories.

All plant stock is to be inspected at the nursery before supplying samples to site for approval. Failure to inspect the nursery stock will not relieve the contractor of his obligations under the specification. The contractor shall satisfy himself on the quality, health, vigour and numbers of all the stock and its ability to meet the specification. At the time of the plant inspection visit, at the nursery of origin, the contractor shall make allowances for providing numbered security tags, for use of identifying the stock for the project and individual specimens. Following approval, plants are to be clearly identified with non-perishable labels as being reserved for use on this project.

**Unloading on Delivery**

The contractor shall supervise the unloading of the plants and shall inspect the plants at delivery.

**Plant/Tree Handling, Storage and Transport**

The contractor shall comply with CPSE ‘Handling and establishing landscape plants’ (obtainable from the Horticultural Trades Association) Part I, Part II and Part III, paragraphs 1.3.3 to 1.3.6, 3.0, and 4.0.

Plants/trees shall be handled with care and protected from frost, mechanical damage and shock, e.g. by dropping from a vehicle.

Plants, which are not to be planted on the day of delivery to the site, are to be stored by approved methods.

Watering should continue to keep all plant roots moist until planting can commence.

The contractor shall allow for all costs associated with undertaking correct storage of plant material.
Protection of Existing Grass
All existing grass areas are to be protected from planting operations by using boards/tarpaulins. Do not place excavated or imported materials directly on grassed areas.

Preparation of Planting Areas/Planting Materials
The contractor shall prevent weeds from seeding and perennial weeds from becoming established, by applying a suitable herbicide (non-residual). Allow period of time to elapse as recommended by manufacturer before cultivation. Hand Weeding should also be employed to prevent weeds becoming established.

Apply a general fertiliser evenly over the soil at 70g/m², and soil improver (soil association approved), do not use peat or products containing peat.

Planting Shrubs, Perennials, and trees
Pits shall be of a sufficient size to take rootballs, without breaking them, or roots without bending or cramping. Plants are to be positioned in the locations and numbers shown on the drawings and placed to achieve even spacing and proper matching of shapes. Plants shall be placed in positions showing their best side to the front. Where two or more plant species are shown in one space, they should be evenly mixed together to achieve the required effect unless otherwise noted on the drawings. Do not plant in straight lines unless indicated on the respective scheme drawings.

Plants shall be planted at the same depth as their nursery mark allowing for settling of soil after planting. They shall be completely vertical and well firmed in after planting. All plants shall be planted so as to adopt a truly vertical position. Care shall be taken to avoid breaking up the rootball of pot grown shrubs. Plants that have full fibrous rootballs shall have their roots gently eased out. The topsoil shall be lightly consolidated and firmed around the root collar to eliminate all air pockets.

Turfed and grassland areas should be cultivated and levelled as appropriate. A pre-seeding fertiliser should be applied prior to laying, following the manufacturer’s instructions. Turf should be cultivated, weed free amenity turf, laid with broken joints which is well butted up. The turf should be laid using planks to prevent damage and should be watered immediately after planting to prevent shrinkage.
Water plants thoroughly immediately after planting, using a fine rose where necessary to avoid damaging plants. Lightly firm soil around plants and fork and/or rake soil, without damaging roots, to a fine tilth with approved gentle cambers and no hollows.

**Creating Tree Pits**

Mark the centre of each pit with a suitable peg, e.g. Dahlia stake, indicating the species and size on the peg. No tree pits shall be dug until final tree positions have been pegged out and approved by the CA.

Excavate the base of the pit with a slightly raised centre. Retain topsoil for re-use. In sloping ground, maintain horizontal base and vertical sides with no less than minimum specified depth throughout.

Pits shall be prepared just before the trees are planted. On no account shall tree pits be left unfilled. Pits once excavated shall be backfilled with topsoil and only re-excavated immediately prior to planting to accommodate the rootball spread of the tree.

For Rootballled, bare rooted, containerised and container grown, unless otherwise instructed:

- **60-80cm Semi-mature**: 2000mm square x 900mm deep
- **30-60cm Semi-mature**: 1500mm square x 900mm deep
- **25-30cm Semi-mature**: 1500mm square x 900mm deep
- **20-25cm Semi-mature**: 1200mm square x 900mm deep
- **Large feathered & multi stemmed**: 1200mm square x 900mm deep
- **18-20cm & 16-18cm**: 200mm square x 900mm deep
- **14-16cm & 12-14cm**: 900mm square x 600mm deep
- **Standard (include multi stemmed)**: 900mm square x 600mm deep
- **Feathered, light & half standards & specimen shrubs**: 600mm square x 450mm deep
- **Whips**: 450mm square x 300mm deep

Where necessary increase the above dimensions to ensure that pits are wide enough to accommodate roots when fully spread and an additional 200mm deep to accommodate a 200mm layer of drainage substrate.

Tree roots must not be trimmed or altered in order to be accommodated in any excavation. Any excavated material, which is not topsoil shall be removed from site.

Trees adjacent to hard surfacing and/or services to have growing area defined by Greenleaf Reroot 600 high density root barrier, in accordance with manufacturer's and Engineer's guidance.
All trees within grassed areas to have a strimmer guard e.g. Tubex 'Grass Trimmer Tree Guard' Material with the following specification or similar approved: LDPE, colour: Black, Height: 200mm, Diameter: 95mm, Flange Base: 58mm

**Staking trees and shrubs**

Stakes: Softwood milled round, straight and free from projections and large or edge knots with pointed lower end.

Nails: To BS 1202: part 1. galvanised, minimum 25mm long and with 10mm diameter heads.

Minimum stake sizes:

<table>
<thead>
<tr>
<th>Tree size</th>
<th>Overall length of stake / Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feathered Stock (up to 2000mm tall)</td>
<td>1200mm / 75mm</td>
</tr>
<tr>
<td>Nursery Stock</td>
<td>500mm / 75mm</td>
</tr>
<tr>
<td>Advanced Nursery Stock</td>
<td>1500mm / 100mm</td>
</tr>
</tbody>
</table>

If conditioned are unfavourable i.e windy / exposed, feathered stock should be planted with the length of the stake should be increased to 1500mm.

**Short Single Staking** - Feathered and Nursery Stock (up to 12-14cm girth bareroot stock).

Position stake close to tree on windward side and drive vertically at least 300mm into bottom of pit before planting. Consolidate material around stake during backfilling. Cut stake to approximately 600mm above ground level. Secure tree firmly but not rigidly to the stake with Belts, Pads and Spacers

**Short Double Staking** - For all Advanced Nursery stock (14-16 & 16-18 cm girth). Drive stakes vertically at least 300mm into the bottom of the pit on either side of the tree position before planting. Consolidate material round stakes during backfilling. Cut stakes to approximately 600mm above ground level. Secure tree firmly but not rigidly with, Belts and spacers (e.g Special Nylon Reinforced 37.5mm Rubber belt and Rubber Sleeves cut to length, rubber belt looped around tree stem, through rubber spacer sleeves cut to correct length to each stake use one nail fixing per stake.

**Backfilling Material** - The following backfilling is for all pits from whips to semi-mature. The client reserves the right to inspect all tree pits prior to the contractor backfilling with the specified material/ameliorants.

Top 400mm of backfill to tree pits only:

- 70% topsoil; 30% tree and shrub planting compost; and 100g/m³ fertiliser.
- Tree and Shrub planting compost: Peat free
Backfill pits with approved subsoil up to 400mm from surface and backfill remaining depth with above topsoil backfill mix. The pits shall be filled in 150mm layers of subsoil finishing with topsoil and ameliorants. Each layer shall be consolidated in the gap between the rootball and the pit. Any subsequent settlement in tree pits shall be allowed for or made good by the contractor at his own expense as a defect during the Maintenance and Defects Liability Period.
Any excavated material, which does not form part of the backfill shall be removed from site.

Tree Protection
Ensure that protection methods do not impede natural movement of trees or restrict growth.

Inspections
Notwithstanding the conditions of this section the contractor must give 48-hours’ notice to the client of his intention to begin the following operations:
Setting out; Application of herbicide; Application of fertiliser, Delivery of plants, Planting shrubs, Planting of trees; and Watering.

Pre Practical Completion Maintenance
The Contractor shall make allowances for maintaining the works installed for the period prior to Practical Completion.

Contractor is responsible for protecting seeded and planted areas. Maintain fencing until grass/planting is well established then remove and reinstate ground. Make good any damage to grass until area is accepted. The works shall include, but not be limited to, the following operations:
Watering during establishment, and pest / disease management (Contractor shall apply approved chemicals in accordance with manufacturer’s recommendations).

Cleanliness
The contractor shall remove soil from all hard surfaces and leave the works in a clean, tidy condition at Practical Completion. All hard surfaces are to remain free from any litter and grass clippings etc.

Vandalism and Theft
Prior to the issue of the Certificate of Practical Completion the contractor shall be responsible for all losses to the works resulting from vandalism and theft or a lack of protection.
**Replacements**

Reinstate to original condition and within a reasonable period of time (according to season), any damage or disturbance occurring during the period up to practical completion, to soil structure, planting, grass, fencing, hard landscaping, structures or buildings. This includes replacing topsoil to the correct levels if subsidence or settlement occurs.

The contractor shall replace with approved equivalent trees/shrubs/plants, all dead, dying, defective plants, vandalised and stolen material in accordance with the Specification before Practical Completion can be certified.

If, for unavoidable seasonal or climatic reasons, it is not possible/practicable to replace plants before Practical Completion, the contractor must agree to undertake replacements as soon as possible during the next suitable planting season unless instructed otherwise.