



Ecological Mitigation and Enhancement Scheme

**Phase 2A – Woodcroft,
Farm Development Site,
Waterlooville
Planning Application Ref:
APP/13/00804**

On behalf of:



March 2018

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1. Introduction

The development proposal for Development of 288 residential units comprising 9 x one bedroom, 110 x two bedroom, 124 x three bedroom and 45 x four bedroom, retention of existing farmhouse, new access road from Eagle Avenue, internal access roads, associated car parking, open space and landscaping.

This Ecological Mitigation and Enhancement Scheme (EMES) considers only Phase 2A of the development.

This report is the “Ecological Mitigation and Enhancement Scheme” (EMES), its focus is the impact the development, and the consequent vegetation removal, protected species mitigation measures, habitat creation and ongoing management of habitat created.

The report also outlines the procedure for reinstatement of habitat in order to increase biodiversity and minimise impacts on existing wildlife in the affected area.

2. Roles and responsibilities

The roles and responsibilities of the parties involved in the successful implementation of the management plan are outlined below:

Client: Linden Homes

- Adhere to UK and European Legislation and Guidelines.
- Ensure annual monitoring for 5 years after project completion with regards to landscape restoration and enhancement works is undertaken and that the EMES is reviewed and updated as appropriate;
and
- Regular liaison with the Relevant Authorities regarding the results of the annual monitoring and the success of the landscape Implementation.

Landscape and Ecological Consultants: Kingfisher Ecology Ltd

- To provide an Ecological Clerk of Works (ECoW) for the project
- The provision of overall direction for the implementation and performance of the plan to include regular monitoring and an annual review.
- Provide assistance to the landscape contractor, ensuring adherence to legislation and guidance.
- Coordination and supervision of the installation and ongoing maintenance of the landscape and ecological restoration.
- Liaise between the client and contractor on an agreed regular basis with respect to progress and the status of the landscape and ecological restoration.
- Undertake annual monitoring of the landscape and ecological enhancement works to ensure successful establishment.
- Ensure that annual monitoring is fully documented and reported.
- Review and make recommendations regarding appropriate changes to the maintenance and management programme.
- Review and update the Ecological Mitigation and Enhancement Scheme as appropriate.

Contractor: Linden Homes

- Adhere to the requirements of this plan.
- Adhere to UK and European Legislation and Guidelines
- Liaise with the Landscape and Ecological Consultants and other client's representatives as appropriate.
- Provide all relevant information to the client and their representatives.
- Provide a detailed programme of scheduled works.
- Diligently execute the works in accordance with the approved drawings and specifications.

Designated Role/ Technical Area	Responsibilities	Company and Contact
Developer	Responsible for ensuring any planning conditions are adhered to by liaising with Site Manager and Environmental Manager regularly.	Linden Homes
Site Manager	Responsible for ensuring any planning conditions are adhered to by liaising with Site Manager and Environmental Manager regularly. Overall responsibility on site for the specific construction activities. Also, responsible for producing detailed CEMP and any subsequent updates. Monitoring sub-contractors' compliance with the CEMP. In the event of an environmental incident or emergency, the Site Manager will liaise with the Environmental Manager on construction activities and enforce any modifications to methods statements or stops to works required.	TBC
Environmental Manager (Ecology)	Responsible for ensuring any planning conditions are adhered to by liaising with Site Manager and Environmental Manager regularly. Responsible for ensuring appropriate environmental monitoring is undertaken. Liaison will be undertaken with the Site Manager in the event of an environmental incident to advise on actions to be taken.	TBC

3. Supporting plans

a. Background Documents

Environmental surveys have been undertaken on the site. The following relevant ecological surveys have been carried out:

EXTENDED PHASE 1 HABITAT SURVEY
BAT SURVEY
DORMOUSE SURVEYS
GREAT CRESTED NEWT SURVEYS
BREEDING BIRD SURVEYS
HEDGEROW SURVEYS

4. Site Specific Method Statement

TO BE FOLLOWED IN RELATION TO APPENDIX C Map showing all Habitats to be Removed where an ecological watching brief is required and a cautionary phased approach to habitat removal

N.B.: Should any protected species be encountered in the absence of an ecologist, work should stop immediately and the ecologist for this project contacted.

i. Vegetation Clearance work

- Where ground maintenance such as grass cutting or cutting back of tall ruderal, woody vegetation or trees will occur, the work may cause harm to protected species including reptiles, amphibians, breeding birds, dormice, protected flora and bats.
- Topsoil stripping may also cause harm to protected species including the aforementioned as well as badgers.
- Prior to any works commencing the area to be cleared will be carefully checked by a suitably qualified Ecologist to check for the presence of protected species.
- Only after the Ecologist is satisfied that the area is clear of protected species (or in the case of protected flora, the area is marked) can vegetation clearance commence.

ii. Preferred Methods of Clearance

- The use of a flail is not acceptable for vegetation clearance where there is potential for protected species to be present. A suitably qualified ecologist will determine if there is such potential.
- Vegetation clearance will be done by mechanical hand tools such as strimmers / brush cutters or by rotary mower where the cutting deck is able to be raised to a minimum of 25-30cm from the ground.
- Woody vegetation and trees will be trimmed or removed with the use of mechanical tools such as chainsaws and hedge trimmers.

- Topsoil will be stripped by machines with a wide bucket with long tines. A grading bucket is unacceptable.
- All areas will be checked by an ecologist prior to and after work commencing in order to check the area for protected species.

b. Invasive species (flora)

The Wildlife and Countryside Act 1981 (WCA) is the principal legislation dealing with non-native species. The WCA has been amended in relation to England and Wales by various pieces of legislation, including the Wildlife and Countryside Act 1981 (Variation of Schedule 9) (England and Wales) Order 2010, the Natural Environment and Rural Communities Act 2006 and the Countryside and Rights of Way Act 2000.

Section 14(1) of the WCA makes it illegal to release or allow to escape into the wild any animal which is not ordinarily resident in Great Britain and is not a regular visitor to Great Britain in a wild state, or is listed in Schedule 9 to the Act. It is also illegal to plant or otherwise cause to grow in the wild any plant listed in Schedule 9 to the Act. The Schedule 9 list of animal and plant species has been amended by the Wildlife and Countryside Act 1981 (Variation of Schedule 9)(England and Wales) Order 2010. Offences under section 14 carry a maximum penalty of a £5,000 fine and/or 6 months imprisonment on summary conviction (i.e. at Magistrates' Court) and an unlimited fine (i.e. whatever the court feels to be commensurate with the offence) and/or 2 years imprisonment on indictment (i.e. at Crown Court). Guidance on Section 14 of the WCA gives further information. Here you can also find a list of species in Schedule 9 of the WCA for England and Wales.

Section 14(4A) of the WCA, as inserted by section 23 of the Infrastructure Act 2015, enables species control agreements and orders to be made by environmental authorities to ensure that landowners take action on invasive non-native species, or permit others to enter the land and carry out those operations, to prevent their establishment and spread.

The Species Control Provisions: Code of Practice for England sets out how the provisions should be applied by environmental authorities in England.

It should be noted that no invasive flora has been identified in any of the surveys for the project.

Prior to any works commencing, areas where vegetation clearance is to be undertaken, a thorough inspection for invasive flora by a suitably experienced Ecologist will be done.

In the event that an invasive species is encountered, then a 1m demarcation "no entry" buffer will be created around the area (see images below for an example). A species specific treatment will be undertaken in line with guidelines set by DEFRA in order to prevent the spread of invasive flora.

Unauthorised personnel are strictly forbidden from entering the invasive flora exclusion area.

No unauthorised personnel or plant machinery can enter the exclusion area.

In the event that persons or plant machinery are unexpectedly within an area where invasive flora is present, then all equipment, clothing, and plant machinery must be thoroughly checked for fragments of vegetation and carefully cleaned to prevent the spread of invasive flora.

Table illustrating the type of exclusion fence that will be used if invasive flora is discovered during works



5. Protected Species Method Statements

i. Reptiles

1. Vegetation Clearance

- When maintaining grassland and tall ruderals in order to make areas unsuitable for reptiles, a 2 phase cutting approach is required as a persuasive technique that will allow any reptiles present to move away from the area.
- The first phase is an initial cut to approximately 25-30cm, the area will then be left for a minimum of several hours (to be instructed by the ecologist) to allow reptiles to move away from the area.
- The second phase cut must be preceded by an ecologist carefully checking the area for any remaining reptiles. Once the area has been checked then the short cutting can commence.

2. Topsoil Clearance

- If topsoil is to be removed, it is common practice to remove any reptiles present to safety, an exercise called a 'translocation'.
- As with reptile surveys, it is necessary to carry out translocations at times of the year when reptiles are active, i.e. between March/April and October. This will be carried out by an ecologist prior to works commencing. Artificial refugia, if present, will remain in position until immediately prior to a destructive search.
- The works will begin with topsoil stripping under strict ecological supervision. The upper layer (15cm) of topsoil will be stripped by machines with a wide bucket with long tines (to minimise injury to reptiles). A grading bucket is unacceptable.
- The pace of clearance will be slow enough to prevent injury to reptiles and allow sufficient time for any buried animals to be uncovered.
- Uncovered reptiles will be captured by hand by an ecologist and moved to a suitable habitat outside the construction zone.

- At the end of each day, topsoil will be checked for reptiles and compacted (or removed from site) to make that area uninhabitable for reptiles.
- The ecologist will guide the work. If vegetation clearance/ topsoil stripping cannot be completed in one operation, refugia trapping will continue in the part yet to be cleared.

Table illustrating a Phased habitat manipulation (vegetation clearance) and topsoil strip



ii. Nesting Birds: Vegetation Clearance

- If any ground nesting birds or birds nesting in stands of nettles, brambles or other woody vegetation are discovered, then a 5m buffer zone around the nest site will be created and no works will be done within the buffer zone until all chicks have fledged and/or breeding bird activity has stopped.

iii. Dormice: Vegetation Clearance

- A full suite of dormouse surveys was undertaken in 2013. No evidence of dormice was observed, however, as a cautionary approach, the following methods for vegetation clearance will be employed during the proposed works.
- The removal of all affected potential dormouse habitat will be carried out by destructive search supervised by an ecologist in order to safely check for dormice.

- All suitable habitat woody vegetation (e.g. hedgerows) will be carefully searched for nests prior to clearance.
- Hedgerows will be cut to approximately 40cm above the ground by hand (bow or chain saw) and removed (by hand). Where appropriate, large trees and bushes will be carefully felled in sections and lowered to the ground by rope. All cut material will be searched and removed carefully to protect any dormice on the ground.
- The grubbing up of stumps/root balls will be completed under strict ecological supervision as the final stage at least 24 hrs after the initial cutting to 40cm.
- In the unlikely event that dormice (or nests) are found during the destructive searches, all works will be suspended until a European Protected Species Mitigation Licence can be obtained. When under an approved EPSML, dormice will be captured by hand and, after being checked for injuries, transported immediately in large cotton drawstring BTO bird holding bags by an ecologist to the nearest suitable habitat (i.e. nest boxes within the nearest retained hedge). Alternatively, if the dormouse is within a nest, then it will be transported within the nest.
- Once the supervising ecologist is satisfied that all vegetation that may provide opportunities for dormice to build nests has been safely removed, or made unsuitable for habitation, the remaining works will proceed.
- Contractors and other unlicensed personnel are strictly forbidden from handling dormice. However, if a dormouse is found injured it can be handled by unlicensed persons and will be taken to a veterinary surgeon immediately.

iv. Tree Works: Bats

Prior to any tree clearance and any works on trees which have been assessed to provide moderate or high Potential Roost Features (PRF's) for bats an arboreal Potential Roost Feature (PRF) inspection survey will be undertaken by a suitably experienced and licenced Ecologist.

- The purpose of a ground level roost assessment of trees is to visually assess a tree for bat roost suitability. Potential Roost Features (PRF) identified will determine if further survey effort is required in order to assess the actual or potential presence or absence of bats.
- Detailed assessment of each tree that will be affected by the proposed works will need to be undertaken in order to carefully inspect for PRFs.
- Each tree will be assessed from the ground up to compile information on the tree's PRFs. Inspections will be carried out during daylight hours with good light conditions. Poor light conditions can mean that PRFs are missed.
- All assessments will be undertaken in the same manner and will include both close inspection and inspection further away from the tree. High level PRFs will be inspected using close focussing binoculars combined with a high powered torch.
- Dimensions and characteristics of each PRF will be recorded and referenced to each tree.
- PRFs that may be used by bats include:
 - Woodpecker holes
 - Rot holes
 - Hazard beams
 - Other vertical or horizontal cracks and splits
 - Partially detached platey bark
 - Knot holes arising from naturally shed branches, or branches previously pruned back to the branch collar
 - Man-made holes or cavities created by branches tearing out from parent stems
 - Cankers (caused by localised bark death) in which cavities have developed

- Other hollows or cavities, including butt rots
 - Double-leaders forming compression forks with included bark and potential cavities
 - Gaps between overlapping stems or branches
 - Partially detached ivy with stem diameters in excess of 50mm
 - Bat, bird, dormouse boxes
- In the summer, it may be possible to hear bats making audible social calls (or non-audible calls using a bat detector) from roosts in trees.
- If the roosting habitat in a tree is deemed to provide **moderate to high Potential Roost Features (PRF)**, then further surveys are required.
- Further survey effort will consist of Arboreal PRF inspection surveys by tree climbing by qualified tree climbers or qualified IPAF MEWP operators who hold a Natural England bat Class Level 2 licence as is required by Law.
- Further emergence and return to roost surveys will be required if bats are found to be present in a tree in order to characterise the roost. If bat guano is discovered, it will be collected and sent away for DNA analysis in order to identify the species.
- If bats are found to be present in any of the trees, a European Protected Species Mitigation Licence will need to be applied for and granted before any work can proceed that will disturb the tree roost.
- If no or low suitability PRFs for bats are found, then no further survey effort will be required.

6. Lighting

Artificial light has been shown to influence bat behaviour. Light falling on bat roosts can cause bats to emerge later which can considerably reduce foraging time especially at peak foraging time which is just after dusk. Illuminating bat roosts can also result in increases in avian predation. Disturbance to roosts can have a detrimental effect to the future of a colony.

Bat species including noctule, serotines, pipistrelle and Leisler's can take advantage of artificial light sources such as street light due to the increased insect concentrations providing increased foraging potential.

However, continuous lighting does in effect repel certain bat species as studies have shown that slower broad-winged species such as long-eared bats, barbastelle, greater and lesser horseshoe bats and myotis tend to avoid artificial light.

It is strongly recommended that all lighting needs to be directional and should have a narrow beam which illuminates only the required areas on the ground.

Light sources such as Light Emitting Diodes (LEDs) could be used for area illumination. The light emitted is more directional. The light is produced in a narrow beam and produces an instant light.

Security lighting should be timed and activated by motion sensors in order to reduce light pollution.

7. Management aims

- To restore and reinstate disturbed sections of the development, temporary construction accesses and construction compounds to enable their previous condition to be re-established.
- To maintain the general character of the existing local landscape.
- To compensate for the loss of established landscape features associated with the construction, achieved through targeted planting of trees and shrubs and wildlife meadow planting.
- To ensure impacts on biodiversity are minimised and, where practical, to provide net gains for biodiversity.

8. Post construction reinstatements and enhancements

a. Proposed Tree Planting

Any trees removed for construction purposes will be replaced on a 2 for 1 ratio (unless, in certain circumstances, this is deemed inappropriate). No deep rooted tree species will be planted within six metres of the centreline of the pipes or any existing overhead lines. Replanted trees will consist of native like for like species with a girth of 80-120mm at 1.2m from the ground.

b. Hedgerow Planting

All hedgerows will be enhanced with a diversity of fruiting native species. All hedge enhancements will be planted with 60-120mm whips with canes and protective tubes. Planting will consist of 2 staggered rows at 300-500mm spacing and 250mm gap between each row where gaps are currently present. Where practicable, hedges whips will be planted to widen the hedges and to increase the species richness.

9. Ecological and landscape enhancements

Ecological and landscape enhancements within the development boundary include the following:

- Planting hedgerows
- Planting trees
- Installing bat boxes
- Installing bird boxes

a. Hedgerows and Trees

Both trees and hedges are to be reinstated with native species. The number of original species will consequently be increased.

Planting of a variety of fruiting trees and shrubs trees will enhance the site for wildlife.

Species-rich hedgerows will be planted by staggered slit planting of individual whips, which will be 0.6 to 1.2 metres high.

b. Wildflower meadow planting and night scented plants

N.B. There will be wild flower seed mix planted parallel to the hedge and adjacent to the sports field

It is recommended that enhancements to the vegetation of the site after development could be made that will benefit local wildlife. Night scented plants will be incorporated into the landscaping to attract moths and other insects that will benefit species such as bats. The night scented plants that will be incorporated into a planting scheme are as follows:

Climbers:

- Dog rose *Rosa canina*
- Common ivy *Hedera helix*
- Jasmine *Jasminum officinale*
- Blackberries and raspberries *Rubus spp.*
- Dwarf honeysuckle *Lonicera xylosteum*
- Common honeysuckle *Lonicera periclymenum*

Bedding plants:

- Nottingham catchfly *Silene nutans*
- Bladder campion *Silene vulgaris*
- Flowering tobacco *Nicotiana sylvestris*
- Common soapwort *Saponaria officinalis*
- Night scented stock *Matthiola longipetala*

c. Bat boxes

Pole mounted bat boxes will be erected (locations to be agreed with Hampshire County Council Ecologist). Bat boxes will also be placed on trees around the perimeter of the site (locations to be agreed with Hampshire County Council Ecologist).

Table illustrating pole mounted bat boxes

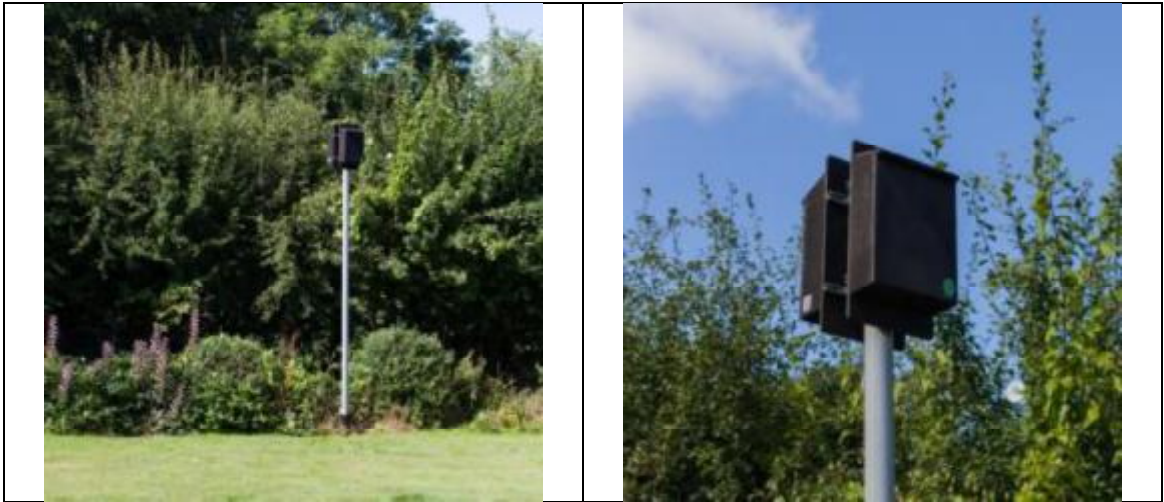


Table illustrating tree mounted bat boxes



Bat roost enhancements for buildings

The following material requirements illustrate what can be incorporated into a building that will provide enhanced features for bats:

Integrated batboxes provide an enclosed space for bats to roost and rest.

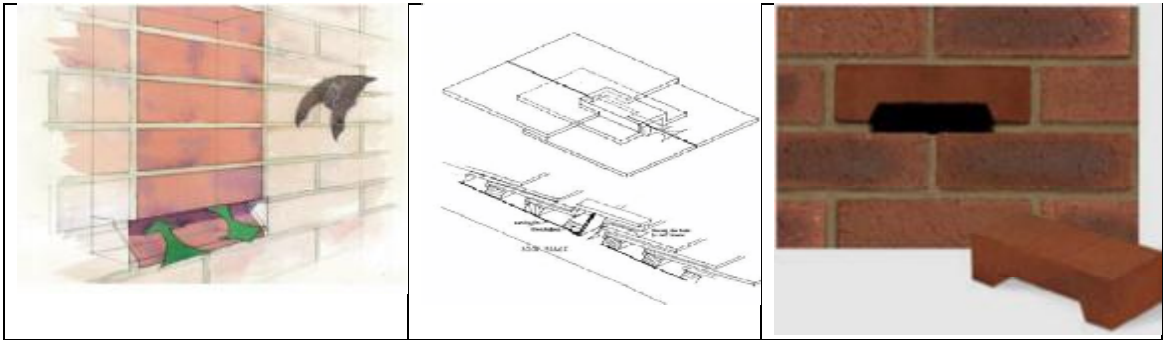
Free access bat brick allow bat to access a roof void that has been allocated as a bat roost.

Use only traditional based bitumen roof liner or modern membranes like Protect A1™ roof liner. Woven or long strand roof liners such as Tyvek™ must be avoided as bats can get tangled up in the fibres causing potential bat mortalities.

Timber treated with products deemed safe to use on bat roosts must be used. Details of products can be found using Natural England Guidance Technical Information note TIN092 – Bat Roosts and Timber Treatment Products.

A bat loft will be created on the Woodcroft Farm development site, however, there is not a suitable location for a bat loft within Phase 2A.

Table illustrating bat access for buildings



d. Bird boxes

Bird boxes will be provided for a variety of species. The image below details the 2HW Schwegler nest box that will be used to enhance the site for wagtails which are a species that has had a moderate decline in recent years and are a Birds of Conservation Concern in the UK - Amber List species.



10. Implementation timetable

A detailed implementation timetable for all enhancement and reinstatement activities will be produced when a construction start date has been confirmed and in conjunction with the appointed contractor and in agreement with Hampshire County Council.

An Ecological Clerk of Works (ECoW) will be engaged at the planning and design stage, during construction and post completion works to monitor, advise and report on progress during the project life cycle. All ecological reporting will be available for review by Hampshire County Council at all stages of the proposed works.

The ECoW will also help interpret and communicate the requirements of the EMES to contractors who in turn will sign up and comply with all the requirements detailed in the plan.

11. Monitoring and management

a. Proposed Planting

The reinstatement of all planted areas, including individual trees or hedgerow sections, shall be monitored for up to a period of five years from the time of planting or for a period when confirmation of successful establishment of habitat has been achieved.

During this time, any plants which have failed to establish will be replaced, weeds removed and herbicide applied if required.

Areas of planting found not to be thriving will be treated to such additional works, e.g. replacement planting, as are required to rectify the situation within the next appropriate season.

A total of 2 inspections by a qualified arboriculturist will be undertaken to inform any necessary work to retained trees following completion of the work during July-August in years 1 and 2 post completion of works.

b. Management Aims and Objectives

To ensure impacts on biodiversity are mitigated and to enhance biodiversity through carefully considered habitat creation.

To ensure the establishment of robust and healthy replacement trees reflecting the species mix of adjacent existing woodland and hedgerows enabling the previous condition of woodland to be ultimately re-established.

To ensure the establishment of robust and healthy replacement hedgerows reflecting the species mix and density of the adjacent existing hedgerow enabling their previous condition to be re-established and enhanced where required.

To ensure suitable replacement of linear habitat is provided for local bat populations and in turn establishing wildlife corridors.

c. Ecological and Landscape Monitoring

Up to a five year monitoring period for all habitat reinstatements is required for all reinstated hedges and trees. They will be monitored every 6 months for up to 5 years after the planting works when planting has been established. All monitoring records will be available for review by Hampshire County Council.

Bat boxes will be monitored in the first, third, and the fifth year following their instalment, in order to establish if bats are using these enhancement features.

12. Appendices

APPENDIX A Tree Protection

Root protection area (RPA) incursions

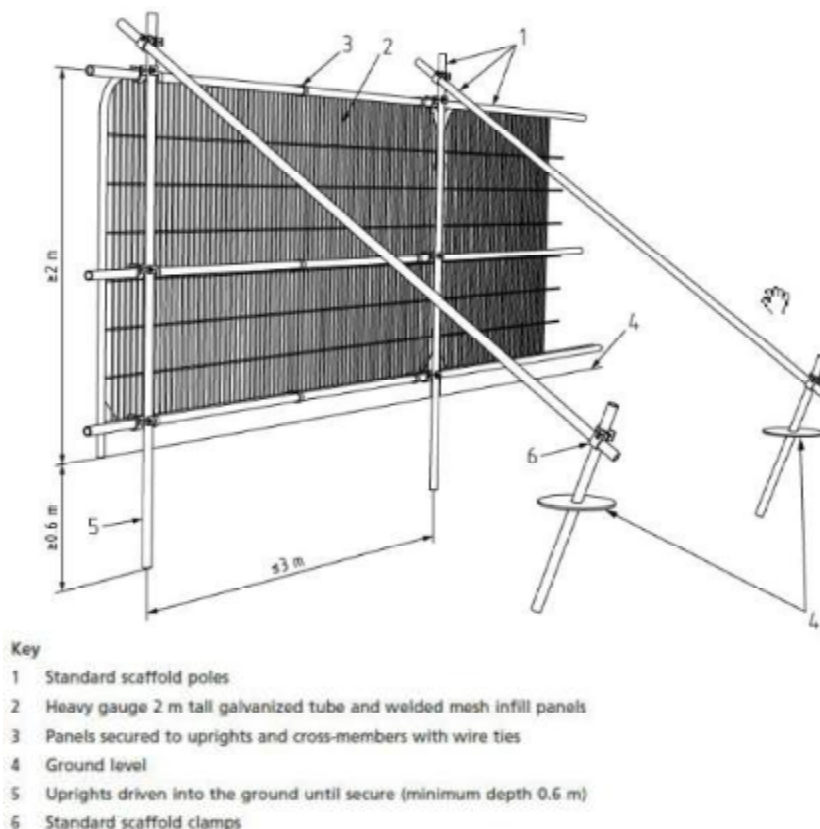
The RPAs of retained trees shall be protected throughout the development process by the erection of tree protection fencing, which will create construction exclusion zones.

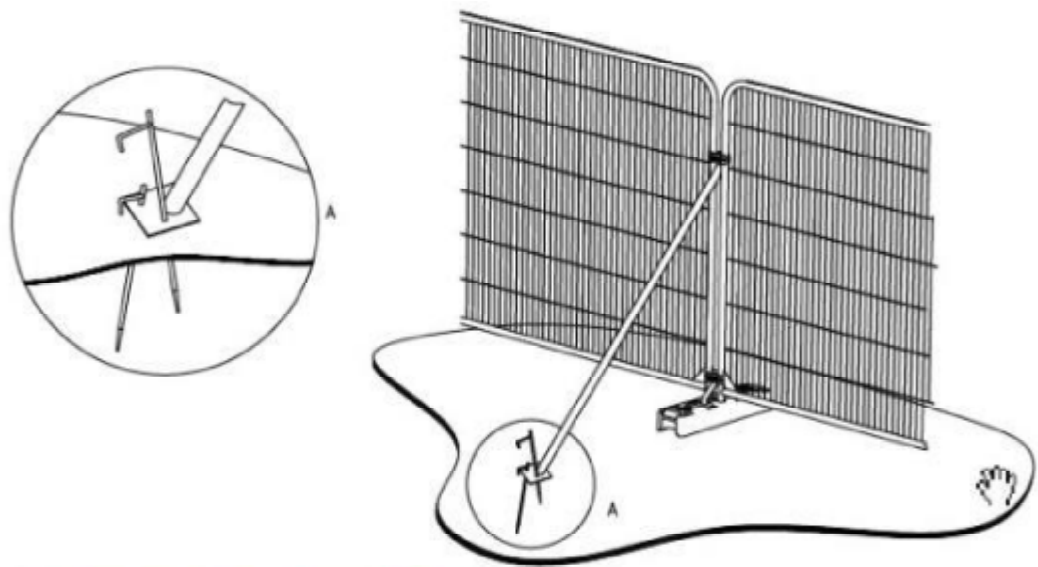
Tree protection fencing

Tree protection fencing shall form a permanent barrier between the area under construction and the exclusion zone for the duration of the development phases. It shall be erected in accordance with BS5837:2012 (see below).

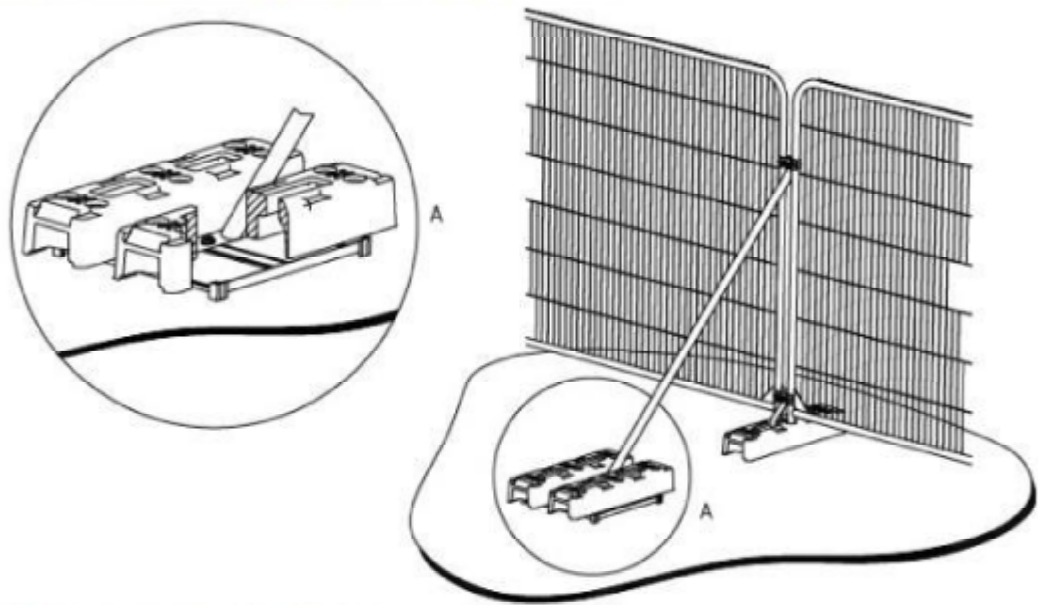
The fencing shall be of (Heras' type, 2m high, comprising mesh panels on rubber or concrete feet and supported on a scaffold frame in accordance with BS5837: 2012. The panels shall be securely fixed with wire or scaffold clamps joined together using a minimum of two anti-tamper couplers, installed so they can only be removed inside the fence. The distance between the fence couplers shall be at least 1m and shall be uniform throughout the fence. The panels shall be supported on the inner side with stabiliser struts, attached to a base plate secured with ground pins.

Diagrams illustrating the Heras fencing to be used.





a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

Construction exclusion zone signs shall be fixed to every other panel.



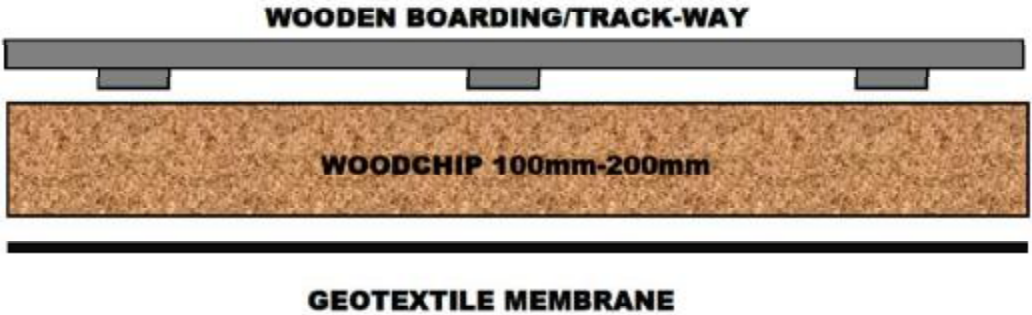
Temporary Ground Protection Specification (locations are illustrated in appendix F)

BS5837 recognizes that incursions into the construction inclusion zones will be required during construction.

Therefore, the following ground and tree protection measures will be ensured throughout all phases of the development works:

For pedestrian movements - a single thickness of scaffold boards places either on top of a driven scaffold frame, to form a suspended walkway, or on top of a compression-resistant layer (e.g.) 100mm depth of woodchip), laid on to a geotextile membrane.

For pedestrian-operated plant up to a gross weight of 2 t - proprietary inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150mm depth of woodchip), laid onto a geotextile membrane.



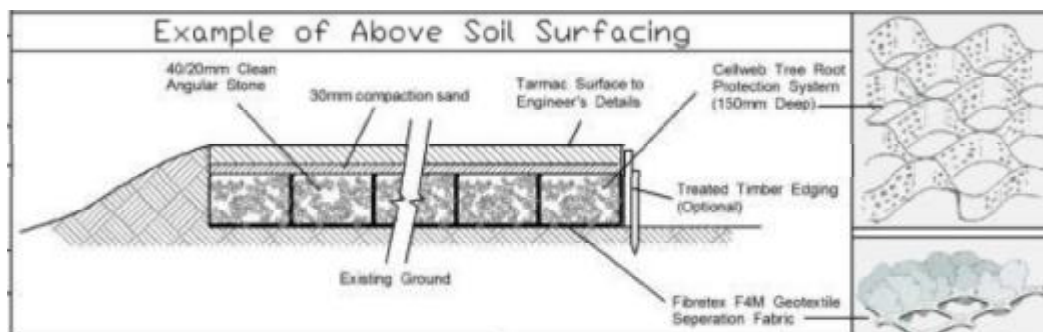
For wheeled or tracked construction traffic exceeding 2 t gross weight - an alternative system (e.g. proprietary systems) to an engineering specification designed conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

Manual excavation within RPAs

Where the footprint extends into the RPA's of any existing trees, excavations shall be dug manually with care, and under arboricultural supervision. Any roots that become exposed, shall immediately be wrapped or covered to prevent desiccation. Any wrapping shall be removed prior to backfilling, which shall take place as soon as is possible. Roots encountered smaller than 25mm diameter may be pruned back, making a clean cut with a suitable sharp tool - such as bypass secateurs – except where they occur in clumps. Roots occurring in clumps or of 25mm diameter and over shall be severed only following consultation with the arboricultural consultant, as such roots might be essential to the trees health and stability. Prior to backfilling, retained roots should be surrounded with topsoil or uncompacted sharp sand, (builder's sand shall not be used because of its high salt content, which is toxic to trees), or other loose inert granular fill, before the soil is replaced. This material shall be free of contaminants and other foreign objects potentially injurious to tree roots.

Low invasive surface installation

It is anticipated that there will be permanent incursion into the RPA's of retained trees at the proposed site access at Clay Lane (see appendix F). Therefore, construction above the existing soil surface 'no-dig', will be carried out with a three- dimensional cellular confinement system as a sub-base. There will be no soil lowering, root severance or soil compaction in order that oxygen and water can reach the roots beneath. This shall be constructed as described in accordance with 'Through the Trees to Development' (Patch, D. and (olding, B. (2007). Arboricultural Practice Note APN 12.)



See illustrative diagram below – Three-dimensional load spreading system example.

The existing ground surface shall have any vegetation removed by hand or a suitable systemic herbicide and any undulations levelled with sharp sand prior to installation.

A geotextile separation sheet shall be laid onto the bare ground and pinned out into position. On top of this a cellular confinement system (or Cellweb) will be installed to form the sub-base to act as a permeable load suspension layer. A minimum 100mm standard cell width shall be used. Cell depth should normally be a minimum of 100mm for drives, but the exact specification shall be appropriate

for the vehicle types intended for use. Cell depths vary from 75 – 200mm dependent on requirements.

The Cellweb shall be pulled out tight and held in place with pegs and filled with a clean, 'no fines' angular free draining aggregate with a particle size of between 20mm and 40mm. The final wearing course shall be permeable and should permit vertical gaseous diffusion and water infiltration. On this project shingle or washed gravel is to be used. The edging material shall be designed so as not to require excavation within the RPAs of retained trees. A pre-formed edging secured in place by metal pins may be used or softwood boards held in place by softwood pegs may be acceptable. Topsoil may then be ramped up to the sides to conceal the edging treatments if desired.

Tree protection measures

Protective fencing and ground protection / manual excavation (including the use of cellular confinement sub-base systems), where the development footprint extents into the RPA of retained trees will provide adequate protection if accompanied by detailed methods and on-site supervision by a consultant arboriculturist.

Additional Precautions:

Oil, bitumen, cement or other material likely to cause damage to the tree will not be stacked or discharged within 10m of the trees stem or within the protective area. Also, materials in general will not be stacked or discharged within the exclusion zone.

Trees that are to be retained will not be used as anchorage for equipment.

Concrete mixing and washing will not be carried out within 10m of any retained trees.

Planning of site operations shall take sufficient account of wide or tall loads in order that they can operate without coming into contact with retained trees

Fires shall be avoided if possible, or if unavoidable, lit in a position where heat cannot affect foliage or branches. The potential size of the fire and wind direction shall be taken into account.

Materials whose accidental spillage would cause damage to a tree shall be stored and handled well away from RPA's

Notice boards, cables or other services shall not be attached to tree
Trees that are to be retained will not be used as anchorage for equipment.

APPENDIX B: Landscape and visual impact

Primary mitigation in the form of new native tree and shrub planting around the proposed development.

Where sections of hedge are removed to facilitate development these will be replaced with like for like hedgerow planting where practical and species diversity will be enhanced. For ecological reasons it is proposed to install brash screens to gaps prior to replanting which will reduce minor temporary visual effects that would result from leaving the gaps open throughout the construction phase.

It is not possible to re-plant native broadleaved trees directly above and within 3m either side of underground pipes and near to above ground operational equipment, including the air vent stacks. Therefore the principal areas for providing landscape and ecological mitigation is at the proposed pumping station sites. It is proposed that approximately 6m of new planting around the sites will be established allowing for appropriate gaps for access and maintenance. Native species mix for woodland/thicket type planting and individual trees is included.

APPENDIX B.2: Schedule and methodology for planting trees

Landscape Specification for Planting and Ground Reinstatement: Woodcroft Farm Development

General Requirements

The handling of plants to be in accordance with National Plant Specification 'Handling and Establishing Landscape Plants'. All plants and planting operations to comply with the requirements and recommendations of all current relevant British Standard specification including but not limited to:

- BS 3936-1:1992 Nursery stock. Specification for trees and shrubs
- BS 3882: 2007 Specification for topsoil and requirements for use (incorporating Corrigendum No.1)
- BS 4428:1989. Code of practice for general landscape operations (excluding hard surfaces) (AMD 6784)
- BS 5837:2012 Trees in Relation to Design, Demolition and Construction
- BS 5545:2014 Trees from nursery to independence

Soil Management

Soil resources will (by volume) constitute the dominant material used in the construction of the scheme and in order to maximise the potential resource available on site and minimise waste needing to be disposed, careful handling of soils is critical.

The purpose of this control plan is to describe the measures to be taken to minimise the risk of negative impacts on soils resulting from work on the scheme. Planned aspects/activities conducted that pose a risk of creating these impacts are:

- Archaeology
- Soil stripping

- Excavation works
- Tunnelling
- General site activities
- Removal of hedges, fences and trees
- Construction of access roads
- Topsoil stripping
- Grading and benching
- Land drainage

Environmental Control Measures

All works will be conducted in line with approved method statements as agreed with the HCC and relevant third parties.

General measures will include:

- The independent land agents will agree a soil type and structure and crop losses prior to Contractor's taking the possession of the site. Following completion, the and the soil will be fully reinstated and handed back to the land owner via the land agents.
- Only stripping, stockpiling or placing soil in the driest condition possible and using tracked equipment where possible to reduce compaction.
- Confining traffic movement to designated routes.
- Keeping soil storage periods as short as possible.
- Clearly defining stockpiles of different soil materials and minimising mixing.
- The use of herbicides on the project to control weeds will be kept to a minimum and spraying of herbicides near to water courses is prohibited. If any herbicides have to be used, this will be approved by the landowner and the Client and use, storage and disposal in accordance with appropriate safety data sheets.
- Soil pollution prevention measures as described in Sections: Land Contamination, Water Management and Discharges, Flood Risk Management and Waste Management will be implemented where appropriate.

Topsoil handling

- Topsoil should be stripped during dry weather periods – as dry soil has greater strength and is less likely to be damaged – and if heavy rain (as a guide >10mm in 24hrs, varies with soil type and previous rainfall amounts) occurs during the stripping process then it should be stopped until the soil has dried out.
- Topsoil stripping to Environmental Advisor recommended depths in suitable ground conditions Topsoil storage in maximum 2m high managed bunds and shall be separate from subsoil storage.
- Topsoil reinstatement and placement in landscape areas will take place when under suitable ground conditions.
- If the topsoil has become compacted and become anaerobic during storage, cultivation will be done before seeding and planting

Subsoil handling

- Subsoil is to be stored on subsoil and reinstatement will be in the order and at the same location as from where it was removed.

- Subsoil will be loosed when ground conditions suitable prior to reinstatement of topsoil.
- Tracked vehicles will be used to minimise compaction. Truck movements will be restricted to routes in order to minimise the creation of compacted areas.

Soil Stockpiling/Storage

- Topsoil and subsoil will be stockpiled separately to allow reinstatement.
- Stockpiles will not be positioned within the root or crown spread of trees, or adjacent to ditches, watercourses or existing or future excavations.
- For stockpiles that are to be grass seeded and maintained, a maximum side slope of 1 in 2 (25°) is appropriate.

Reinstatement

- All areas temporarily affected by the development will be fully reinstated to its original condition following completion.

Ground Preparation, Planting and Mulching Materials

- All materials will be free from toxins, pathogens or other extraneous substances harmful to plant, animal or human life.
- Details will be submitted as necessary certification of source, analysis, suitability for purpose and absence of harmful substances. Certified materials: To be sanitised and stabilised compost, bark mulch.
- All areas to be planted or seeded will be cleared of surface vegetation prior to planting using hand held equipment such as strimmers and/or clearance by hand.
- The use of herbicide will not permitted without prior consent.
- All litter debris and stones above 50mm in any dimension and any other unwanted material, arisings and surface debris will be removed from the planting area.
- For areas to be seeded, the soil surface will be loosened to establish good seed contact with the soil and rooting zone.
- Trees will be planted in pits at approximately 4m spacings throughout the planted areas shown on the landscape plan allowing:
 - at least 3m distance from trees and security fencing;
 - appropriate distances from underground assets e.g. pipeline
 - unobscured, clear visibility within vision splays agreed with the highways authority and or at entry and exit points at the pumping stations.
- Timing of Planting
- Tree planting will be carried out in the first available season between November and March inclusive when suitable weather allows. Planting will not be undertaken during periods of extreme weather including very cold wet or dry conditions.
-

Tree Pits

- Standard trees will be planted in pits with adequate clearance from roots (when spread) or the perimeter of the rootball and the side of the pit, min pit size 1000mm diameter x 600mm deep, break up sides and base to 250mm.

- Place soil around the roots gently shaking tree as the pit is filled to ensure good contact between the soil and roots. Firm backfill material layer by layer as the pit is filled taking care to avoid damaging roots.
- Trees will be planted to the original soil depth as grown in the nursery, allowing for settling of soil after planting. The size of the pit will allow for the provision of good quantity of suitable backfill material, 1:1 mix of excavated topsoil with proprietary tree and shrub compost with 12 month slow release fertiliser tablets in each pit and an application of mycorrhizal fungi at the manufacturer's recommended rates for application e.g. Maxwell Mycological and Mycorrhizal Fungi Fertiliser Tablets see suggested product section below.

Tree Stakes and Fixings

- Each tree will be fitted with double stakes with a cross bar, driven approximately 500mm above finished ground level, attached windward side of tree. Stakes should be driven into pit before trees are planted. One end of the stakes will be pointed and driven approximately 600-900mm into the ground. The stakes once driven into place avoiding the tree roots should be fixed with the cross bar and the flexible tie around a suitably clear part of the tree stem without rubbing against branches.
- The tree will be secured to the stake with a flexible tree tie and pad Toms Trees Standard pad (SKU01) nylon reinforced belt (SKUB2) or similar approved. Each tree should be fitted with an Arbortech strimmer guard, or similar approved to the base.

Mulch

- A circle of bark mulch will be applied around the base of each tree to a radius of 400mm from tree stem and approximately 70mm thick. Trees will be watered in to field capacity after planting and prior to applying mulch.

Shrub Planting

- Shrubs to be planted to fill the areas shown on the landscape plan allowing for planting of standard trees. Shrubs supplied as 40-60cm bare-root transplants to be notch-planted directly into weed free soil at approximately 1000mm centres in staggered rows. All plants should receive proprietary slow release fertiliser and mycorrhizal root dip at the time of planting such as Rootgrow Gel at a rate of 4ml per plant and 30g fertiliser per plant, or to manufacturer's specification, see suggested supplier section below. Evergreen shrubs should be treated with anti-desiccant.
- Ilex to be planted individually in pits approximately 400mm deep x 450mm diameter pits backfilled with 50/50compost/topsoil mix.
- Shrubs to be planted in same species groups of 3 – 9 except for evergreens which should be evenly distributed throughout the area indicated on the plan.
- Each plant to be fitted with a 600mm high Tubex guards or similar approved standard shrub protectors supported by an appropriate wooden stake and fitted in accordance with the manufacturer's recommendations. Suitable shrub shelters should be installed to protect Ilex aquifolium plants which are wider to accommodate branched shrubs and to protect against grazing animals. A layer of bark mulch (approximately 70mm thick approximately 400mm wide) to be applied to the base of shrubs. Plants should be watered in after planting and prior to applying mulch.

Aftercare of Trees and Shrubs

- Areas of new tree and shrub planting will be maintained a minimum of 5 years following planting whichever is longer to ensure that planting becomes well established. Any plant that fails within this time will be replaced with the same species in the next available planting season. As plants establish stakes, ties and shelters may be removed to allow the natural spread and development of the plants.

Maintenance operations during the establishment period are anticipated to include:

- weed control;
- topping up of mulch;
- checking the condition of plants;
- checking and securing stakes ties and shelters; and
- watering as necessary.

Watering of Trees and Shrubs

- Quantity: Wet the full depth of topsoil/water to field capacity.
- Application: Even and without displacing roots or soil.
- Frequency: Undertake watering during the establishment period - for at least the first 12 months following planting as necessary to ensure satisfactory establishment and continued thriving of all planting.
- Timing: If water supply is or is likely to be restricted by emergency legislation do not carry out watering until instructed.

Reinstatement of Amenity Grassed Areas

- General aim is to achieve healthy growth and development of grass coverage, to ensure a vigorous grass sward, free from the visible effects of pests, weeds and disease.
- The appearance will be of a closely knit, continuous ground cover of even density, height and colour.
- Carry out the work while soil and weather conditions are suitable. Early spring or autumn are ideal times when weather is generally mild, not too wet or too dry - April to June or August to October. Avoid extreme conditions including very wet, dry, windy and cold weather.
- Sowing General: Establish good seed contact with the soil/rooting zone.
- Method: To suit soil type, proposed usage, location and weather conditions during and after sowing.
- Distribution: 2 equal sowings at right angles to each other and diagonally to main axis.
- Supplier: Emorsgate
- Mixture reference: Emorsgate EG22 – Wear Tolerant Turfgrass Mixture or similar approved. Origin (as defined in the National Plant Specification) Native UK. Seed should be produced for the current growing season to EC purity and germination regulations.
- Application rate: As supplier's recommendation (2500 kg/ha, 100 kg/acre, 25g/ m²)
- Location: Sown on bare ground in areas disturbed and reinstated to amenity grass following construction works.

Habitat enhancement of field margins and pumping stations

- Disturbed field margins will be reinstated to include wild flower meadow mixes to provide habitat enhancements for invertebrates, reptiles, amphibians, birds and bats.

Watering Grassed Areas (During establishment if required)

- Quantity: Wet the full depth of topsoil.
- Application: Even and without displacing seed, seedlings or soil.
- Frequency: As necessary to ensure the establishment and continued thriving of all seeded areas.
- Timing: If water supply is or is likely to be restricted by emergency legislation do not carry out seeding or watering until instructed.

Cutting and Establishment of Grassed Areas

- When the seeds have germinated and the grasses reach a height of about 10cm, the grass should be cut, to cut back unwanted 'weeds'. Any pernicious perennials such as thistles and docks should be pulled up before they flower and disperse seed.
- Thereafter during the first year, cut as required during the growing season to 50mm minimum. In following years, cut as necessary to the required height to maintain a tidy appearance and/or in accordance with any established management plan for the site.

Suggested Suppliers

Tree shelters and strimmer guards

Fiberweb Geosynthetics Ltd, a Berry Plastics company, Blackwater Trading Estate, The Causeway, MALDON. CM9 4GG. UK

Tel: +44 (0) 1621 874201

Email: plantcare@tubex.com

<http://www.tubex.com/>

Arbortech Ltd,

Unit 3A, Lymore Gardens Business Park, Bath, BA2 1AQ

Tel: 01225 420826.

www.arbortech.co.uk

Tree fixings

Toms Tree Ties,

7 Marley Farm, Headcorn Road, Smarden, Ashford, Kent, TN27 8PJ

Tel: 01233 770066

www.jtoms.co.uk

Grass seed

Emorsgate Seeds, Limes Farm, Tilney All Saints, King's Lynn, Norfolk, PE34 4RT

Tel: (01553) 829028

E-mail: enquiries@emorsgateseeds.com

www.wildseed.co.uk

Fertiliser and Mycorrhizal Fungi

Maxwell Mycological 18-10-12 +5%MgO +4%S +TE + Mycorrhizal Fungi, Fertiliser Tablets 500 x 24 g.

Supplied by Maxwell Amenity, Allscott Park, Allscott, Telford, Shropshire, TF6 5DY.

Telephone: +44 (0)1902 440250

Email: sales@amenity.co.uk

<https://www.amenity.co.uk/>



Rootgrow Gel – Micorrhizal dip for bare root plants

PlantWorks Limited, Unit 930 Cornforth Drive, Kent Science Park, Sittingbourne, Kent, ME9 8PX

Telephone: +44 (0) 1795 411527

Email: info@rootgrow.co.uk

<http://www.rootgrow.co.uk/>

Appendix C Map showing all Habitats to be Removed where an ecological watching brief is required and a cautionary phased approach to habitat removal for Phase 2A:



Appendix D Ecological enhancements for Phase 2A:



Appendix E Soft landscaping scheme for Phase 2A:







END